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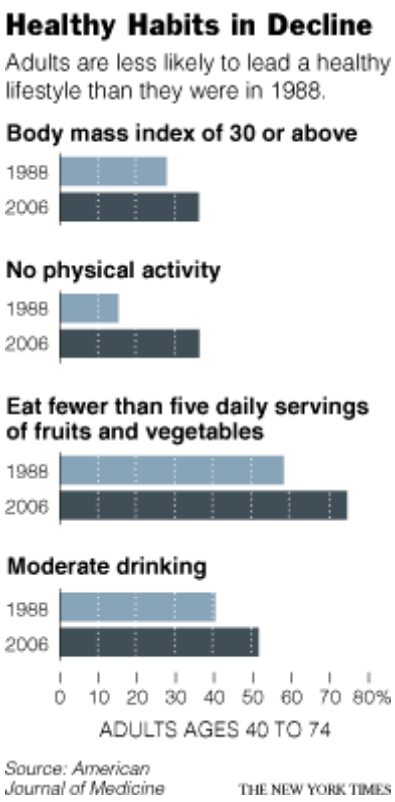
Bad Habits Asserting Themselves

By RONI CARYN RABIN



Five fruits and vegetables a day. Exercise, several times a week at least. No smoking.

Anyone who hasn't heard the healthy lifestyle message has to be living under a rock. But whether it's the vegetable-hating inner child or the primal urge to conserve physical energy asserting itself, millions of middle-age Americans are having none of it.

Over the last 20 years, the share of Americans 40 to 74 who eat five fruits and vegetables a day has dropped to 26 percent from 42 percent, according to the latest analysis of an authoritative national survey on health and nutrition.

Moderate drinking — roughly one drink a day for women, two for men — increased to 51 percent from 40 percent, even as the number of abstainers went down, to 40 percent from 51 percent. (Advice is mixed on whether this is a healthy trend.)

And the number of smokers in the 40-to-74 group declined only slightly, to 26 percent from 27 percent.

The obesity rate increased to 36 percent from 28 percent. And 43 percent of Americans said they worked out at least 30 minutes three times a week, down from just over half.

"The results are disappointing and disturbing," said the study's lead author, Dr. Dana E. King, a professor of family medicine at the Medical University of South Carolina in Charleston.

Dr. King added that because fruits and vegetables are markers of a healthy diet, correlated with consumption of fat and fiber, "not eating them is reflective of a decline in diet over all over 18 years."

The study, in the June issue of The American Journal of Medicine, compared results from two National Health and Nutrition Examination Surveys, in 2001-6 and 1988-94. The surveys, done regularly by the National Center for Health Statistics, include a physical examination; each included more than 7,000 respondents 40 to 74 years old.

Dr. King focused on middle-age adults because they are at greatest risk for heart disease, but was surprised that even those with diabetes, high blood pressure or high cholesterol were no more likely to adhere to healthy habits.

“I worry that some people are taking medication instead of following a healthy lifestyle,” he said. “You take a pill and say, ‘I’ll eat whatever I want, and my doctor says my cholesterol is fine.’ Your pill may be lowering your cholesterol, but it’s not doing the other 100 things that proper eating and exercise do for you.”

In some areas, men’s habits have deteriorated more than women’s. In the earlier period, 57 percent of men and 49 percent of women reported exercising three times a week; now both sexes are at 43 percent. The rate of obesity climbed similarly in both men and women.

Although the study did not address the underlying causes of these changes, some experts say men are less receptive than women to advice on nutrition and exercise. Longer commutes and more time spent on the computer have made for more sedentary lives, said Ross Brownson, professor of epidemiology at Washington University in St. Louis.

And Dr. Lori Mosca, director of preventive cardiology at NewYork-Presbyterian Hospital, said stress and depression might be taking a toll. “Most people know what they need to do, but they need to be confident they can actually make the changes and believe the changes will impact their health,” she said. “I think what we’re seeing is that people are giving up.”

Dr. King warned that the rise in unhealthy habits could lead to a costly surge in heart disease and other chronic ailments of the elderly. But he added, “The other half of this message is that changes in lifestyle can do so much good.”

Other studies have shown that people who adopted healthy behavior reduced their risk of heart disease and death by 35 percent in just four years. “So to those people who say it’s too late and won’t do any good — the exact opposite is true,” Dr. King said. “There’s a tremendous benefit in people of this age.”

http://www.nytimes.com/2009/06/09/health/research/09beha.html?nl=health&emc=a3

How a Mild Virus Might Turn Vicious

By DONALD G. McNEIL Jr.

The swine flu virus is rapidly making its way around the world, but it has been relatively mild so far, causing only 139 confirmed deaths. Could it mutate into something more lethal?

Scientists looking at its genetic structure say there is no obvious pressure for it to do so — no reason for this virus to "want," in the Darwinian sense, to kill more of its hosts.

It is already doing a near-perfect job of keeping itself alive by invading human noses and inducing humans to cough it from one to another, said Dr. W. Ian Lipkin, director of the Center for Infection and Immunology at Columbia University's Mailman School of Public Health.

"A really aggressive flu that quickly kills its host" — like SARS and H5N1 avian flu — "gives itself a problem," Dr. Lipkin said.

But flu viruses are highly mutable, and anything could happen in the next two years, the time a new strain normally takes to circle the globe. After all, Spanish influenza began as a mild strain, then turned horrifically virulent, killing 20 million to 100 million people in 1918-19.

But Dr. Peter Palese, head of microbiology at Mount Sinai Medical School and part of the team that rebuilt that virus in 2005 from fragments found in old lung tissue, said that strain was a "once-a-millennium or once-every-10-millennia event — things like it don't happen very often."

Nor is it clear, he added, that viruses really "want" a particular outcome.

"For me, that's too much anthropomorphic thinking," Dr. Palese said. "Look, I believe in Darwin. Yes, the fittest virus survives. But it's not clear what the ultimate selection parameter is."

A mutation that confers lethality, he explained, may confer another advantage scientists have not pinned down.

The new virus has been described as "a real mutt" by Walter R. Dowdle, the former chief of virology for the Centers for Disease Control and Prevention, because of its unique mix of Eurasian and American swine, human and bird genes.

Flu chromosomes are quite simple — eight short strands of RNA that issue the genetic code for a grand total of 11 proteins. They break apart in a jumble inside cells they infect, and then they reassemble, picking up random bits of other flus, which makes the results unpredictable.

The current swine flu strain lacks several genes believed to increase lethality, including those that code for two proteins known as PB1-F2 and NS-1, and one that codes for a tongue-twister called the polybasic hemagglutinin cleavage site.

PB1-F2 appears to weaken the protective membrane of the energy-producing mitochondria in an infected cell, ultimately killing the cell. Specifically, it attacks dendritic cells, the sentinels of the immune system. Its lethality could be accidental — a protein good at killing sentries might just go on killing other cells once inside the fort.

All pandemic flus, including those of the Spanish, Hong Kong and Asian flus, make PB1-F2. So does the H5N1 bird flu. The current swine strain does not.

The NS-1 protein also maims the immune response by blocking interferon, an antiviral protein made by cells.

Very lethal bird flus also have the unusual cleavage site, which allows the hemagglutinin spike on the virus's shell to split and inject its genetic instructions into different kinds of cells, like those in the lungs and the gut.

Such an addition to the novel H1N1 would be very dangerous. But because it has been found only in avian flus, it is unlikely to become a component of a human flu, Dr. Palese said. Even the 1918 virus, which was avian in origin, lacked it.

A much more likely change, scientists have said, is that the H1N1 swine flu will become resistant to the antiviral drug Tamiflu. A gene for Tamiflu resistance is now almost universal in seasonal H1N1 flus.

If that happens, the world's Tamiflu stockpiles will be all but worthless, and doctors may have to switch to Relenza, which is a powder used with an inhaler, which makes it more expensive and harder to take.

Depending on the mutation, older antiviral drugs like rimantidine may be useful, but so much resistance to them developed in seasonal flu that they were largely abandoned a few years ago.

Dr. Palese was asked about another notion concerning likely mutations. There has been outrage at Egypt's decision to kill all the pigs belonging to its Coptic Christian minority. It has been depicted as misguided and motivated by religious bigotry, because the "swine flu" is really now a human flu.

But Egypt is also in an especially dangerous situation. The new swine flu reached it just last week. The H5N1 avian flu has circulated in its backyard chickens since 2006, defying all eradication efforts. In the last year, dozens of H5N1 cases have been confirmed in toddlers, almost all of whom have survived — which led some experts to speculate that those are cases of a less lethal version of H5N1 that is better adapted to humans.

In that case, might it be wise to get rid of the country's relatively small pig population, since pigs are "mixing vessels" that can catch both human and bird flus?

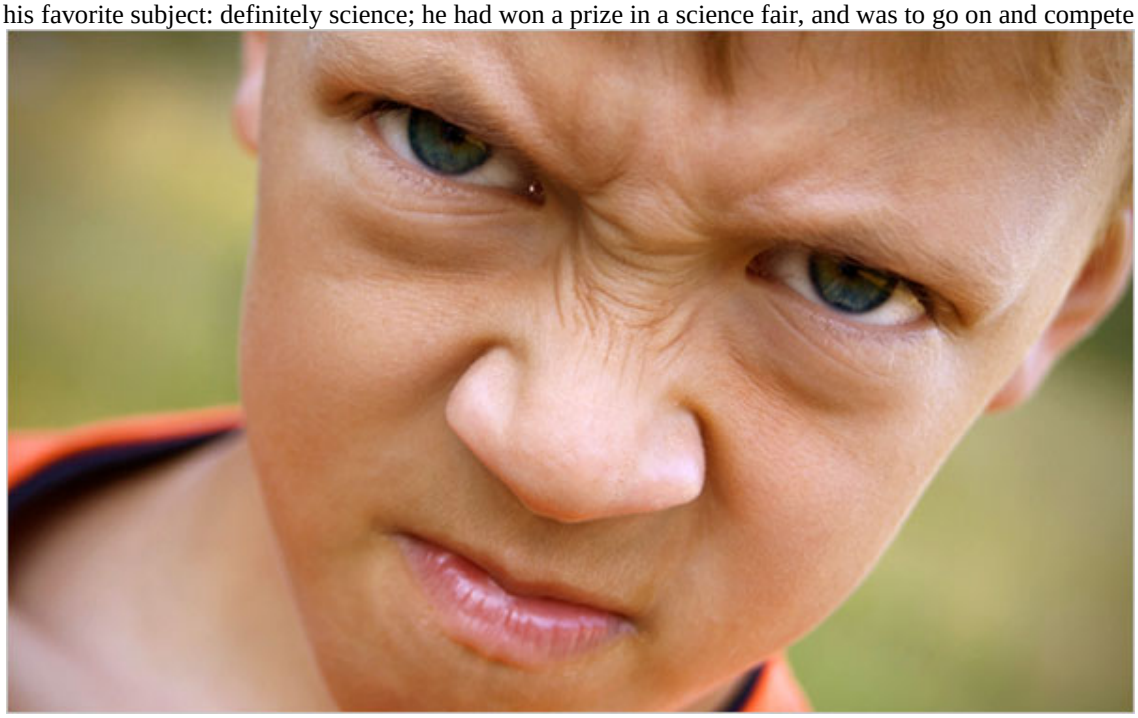
"I agree with the premise, if you really could eliminate an animal reservoir," Dr. Palese said. "But the virus is out of pigs now — and it's more important that those poor people have something to eat."

http://www.nytimes.com/2009/06/09/health/09flu.html?nl=health&emc=a1

At Last, Facing Down Bullies (and Their Enablers)

By PERRI KLASS, M.D.

Back in the 1990s, I did a physical on a boy in fifth or sixth grade at a Boston public school. I asked him his favorite subject: definitely science; he had won a prize in a science fair, and was to go on and compete



in a multischool fair.

The problem was, there were some kids at school who were picking on him every day about winning the science fair; he was getting teased and jostled and even, occasionally, beaten up. His mother shook her head and wondered aloud whether life would be easier if he just let the science fair thing drop.

Bullying elicits strong and highly personal reactions; I remember my own sense of outrage and identification. Here was a highly intelligent child, a lover of science, possibly a future (fill in your favorite genius), tormented by brutes. Here's what I did for my patient: I advised his mother to call the teacher and complain, and I encouraged him to pursue his love of science.

And here are three things I now know I should have done: I didn't tell the mother that bullying can be prevented, and that it's up to the school. I didn't call the principal or suggest that the mother do so. And I didn't give even a moment's thought to the bullies, and what their lifetime prognosis might be.

In recent years, pediatricians and researchers in this country have been giving bullies and their victims the attention they have long deserved — and have long received in Europe. We've gotten past the "kids will be kids" notion that bullying is a normal part of childhood or the prelude to a successful life strategy. Research has described long-term risks — not just to victims, who may be more likely than their peers to experience depression and suicidal thoughts, but to the bullies themselves, who are less likely to finish school or hold down a job.

Next month, the American Academy of Pediatrics will publish the new version of an official policy statement on the pediatrician's role in preventing youth violence. For the first time, it will have a section on bullying — including a recommendation that schools adopt a prevention model developed by Dan Olweus, a research professor of psychology at the University of Bergen, Norway, who first began studying the phenomenon of school bullying in Scandinavia in the 1970s. The programs, he said, "work

at the school level and the classroom level and at the individual level; they combine preventive programs and directly addressing children who are involved or identified as bullies or victims or both."

Dr. Robert Sege, chief of ambulatory pediatrics at Boston Medical Center and a lead author of the new policy statement, says the Olweus approach focuses attention on the largest group of children, the bystanders. "Olweus's genius," he said, "is that he manages to turn the school situation around so the other kids realize that the bully is someone who has a problem managing his or her behavior, and the victim is someone they can protect."

The other lead author, Dr. Joseph Wright, senior vice president at Children's National Medical Center in Washington and the chairman of the pediatrics academy's committee on violence prevention, notes that a quarter of all children report that they have been involved in bullying, either as bullies or as victims. Protecting children from intentional injury is a central task of pediatricians, he said, and "bullying prevention is a subset of that activity."

By definition, bullying involves repetition; a child is repeatedly the target of taunts or physical attacks — or, in the case of so-called indirect bullying (more common among girls), rumors and social exclusion. For a successful anti-bullying program, the school needs to survey the children and find out the details — where it happens, when it happens.

Structural changes can address those vulnerable places — the out-of-sight corner of the playground, the entrance hallway at dismissal time.

Then, Dr. Sege said, "activating the bystanders" means changing the culture of the school; through class discussions, parent meetings and consistent responses to every incident, the school must put out the message that bullying will not be tolerated.

So what should I ask at a checkup? How's school, who are your friends, what do you usually do at recess? It's important to open the door, especially with children in the most likely age groups, so that victims and bystanders won't be afraid to speak up. Parents of these children need to be encouraged to demand that schools take action, and pediatricians probably need to be ready to talk to the principal. And we need to follow up with the children to make sure the situation gets better, and to check in on their emotional health and get them help if they need it.

How about helping the bullies, who are, after all, also pediatric patients? Some experts worry that schools simply suspend or expel the offenders without paying attention to helping them and their families learn to function in a different way.

"Zero-tolerance policies that school districts have are basically pushing the debt forward," Dr. Sege said. "We need to be more sophisticated."

The way we understand bullying has changed, and it's probably going to change even more. (I haven't even talked about cyberbullying, for example.) But anyone working with children needs to start from the idea that bullying has long-term consequences and that it is preventable.

I would still feel that same anger on my science-fair-winning patient's behalf, but I would now see his problem as a pediatric issue — and I hope I would be able to offer a little more help, and a little more follow-up, appropriately based in scientific research.

http://www.nytimes.com/2009/06/09/health/09klas.html?nl=health&emc=a1

Is This a Pandemic? Define 'Pandemic'

By LAWRENCE K. ALTMAN, M.D.

After decades of warnings about the inevitability of another pandemic of influenza, it is astonishing that health officials have failed to make clear to the public, even to many colleagues, what they mean by the word pandemic.

Generations of people have used the term to describe widespread epidemics of influenza, cholera and other diseases. But as the new H1N1 swine influenza virus spreads from continent to continent, it is clear that a useful definition is far more complicated and elusive than officials had thought.

And what is at stake is far more than an exercise in semantics. A clear understanding of the term is central to the World Health Organization's six-level staging system for declaring a pandemic, which in turn informs countries when to set their control efforts in motion.

Dictionaries and medical journals offer little guidance. Their definitions can be too vague or too narrow, contradictory and clouded by jargon.

"There is a lot of misinformation in the medical literature, and it is really quite hard to figure out what is and what is not a pandemic," said Dr. David M. Morens, an epidemiologist at the National Institute of Allergy and Infectious Diseases who has been studying the history of pandemics.

The word implies the rapid spread of an infectious disease to many countries in different regions, hitting each with more or less the same severity. But in fact, severity varies — not all people are infected at the same time, and not every country need be affected.

And there can be many other factors, including the numbers and percentages of people falling ill and dying; a population's vulnerability to the disease, based on previous rates of infection; and the quality of health care facilities and disease monitoring systems.

Not least is that scientists do not know precisely how pandemics arise, what fuels them, why they vary in their lethality, why some occur in waves and why they stop.

Health officials have long preached that with influenza, the only sure bet is to expect the unexpected. The new swine influenza virus, which appeared suddenly after years of warning about a potential pandemic of avian influenza, upset the W.H.O.'s assumptions that most people have the same understanding of the word pandemic.

For years, the organization's Web site defined an influenza pandemic as causing "enormous numbers of deaths and illness." But the agency recently pulled the definition, apologizing for causing confusion and anxiety.

One of the biggest problems in public health is communicating risk assessment.

United States and W.H.O. officials say their preparedness plans are intended for governments, not people in the street. Officials bristle at criticism that their messages and plans have led the public to equate the word pandemic with the Spanish influenza of 1918-19, the worst recorded pandemic in history, killing 20 million to 100 million people.

In preparing for the worst, officials have considered milder pandemics, said Dr. Nancy J. Cox, chief of the influenza division at the Centers for Disease Control and Prevention in Atlanta.

But Dr. William Schaffner, the chairman of preventive medicine at Vanderbilt University, said that "we, the public health community, deserve to be chided" about the confusion.

"We ought to be able to do a better job in communicating in an understandable way," he said in an interview.

Scientists like to assert that theirs is an exact discipline. But like the terms "evidence -based medicine" and "peer review," pandemic turns out to be another example of imprecise vocabulary that doctors use every day, assuming everyone understands their meaning.

Journals, textbooks and reference works use pandemic in discussing certain diseases, but rarely define the word.For example, the definition section of the Control of Communicable Diseases Manual, a standard reference work, includes "endemic" (said of a disease that is usually present in an area or a population group) and "epidemic" (more cases of an illness than would normally be expected) but not "pandemic."

The disease manual's editor, Dr. David L. Heymann, a retired assistant director-general of the W.H.O., said the term had not caused confusion in the past, but assured me in an interview that "pandemic will be defined in the next edition."

Even the indexes of most major medical textbooks do not list pandemic. One is Harrison's Principles of Internal Medicine, of which Dr. Anthony S. Fauci, who directs the National Institute of Allergy and Infectious Diseases, is a main editor.

"It's a mistake, and I'm surprised it's not there because it should have been," Dr. Fauci said in an interview.Government agencies do not have official lists of pandemics. Textbooks cite many recent and old ones, including these:¶AIDS. Many experts have called H.I.V. a pandemic. Others disagree, saying the virus is pandemic only in Africa.

¶Cholera. Since 1817, most experts agree, the world has had seven pandemics of this bacterial illness, which causes severe diarrhea and dehydration. ¶Acute hemorrhagic conjunctivitis. Beginning in 1969, an enterovirus has caused tens of millions of cases of a highly contagious, acute, painful, but rarely blinding, form of hemorrhagic eye inflammation.¶Dengue. Since World War II, this mosquito-borne viral disease has spread widely in Asia and Latin America.

¶Syphilis. A pandemic of the bacterial disease raced through Europe and Asia after Columbus's return from America and during mass movements of armies in Europe.

Although pandemics have been classically limited to infectious diseases, the term has spread to noninfectious, chronic ones. For example, many health officials now speak of pandemics of obesity and heart disease.

Knowledge about past pandemics is necessarily incomplete; historical accounts cannot make up for the absence of modern disease monitoring and laboratory tests.About 14 pandemics of influenza have been described since the 16th century, with the first indisputable one occurring in 1889.

In 1580, an influenza pandemic swept through Asia into Europe within six weeks, and at least 10 percent of Rome's 81,000 residents died in the first week, said Dr. Michael T. Osterholm, director of the Center for Infectious Disease Research and Policy at the University of Minnesota. Some Spanish cities were almost totally depopulated.

Dr. Morens, of the infectious diseases institute, said his studies of influenza pandemics left a confusing track record and "are rewiring our brains about thinking about influenza."

"The medical literature will tell you there were three pandemics in the 1830s," he said — "one from 1830 to 1832, a second in 1833 to 1834 and a third in 1836 to 1837. But I am beginning to think they were all one pandemic."Dr. Morens said he was puzzled as to why no influenza pandemics were recorded for nearly 150 years after the one in 1580, although there were some severe localized epidemics.

"A period of pandemic stability makes us wonder whether a pandemic comes at any time by chance," he said, "or whether something about epidemic situations prevents pandemics," or at least delays them.

The W.H.O.'s staging system has long been part of its plan for an influenza pandemic. Deep concern about a potential pandemic of the H5N1 avian influenza virus led the organization to convene a large meeting of experts in 2005. Among other things, the experts recommended simplifying the staging system.

A number of doctors ask why health agencies do not declare seasonal influenza a pandemic when it spreads around the world.

But Dr. Osterholm, the Minnesota expert, said that "you can't use the terminology for just worldwide transmission, because if you did that, you would say every seasonal flu year is a pandemic."

"To me," he continued, "a pandemic is basically a new or novel agent emerging with worldwide transmission."

Dr. Keiji Fukuda, an influenza expert who is an assistant director-general at the W.H.O., said in an interview that "as difficult as things are right now," the problem of defining a pandemic and communicating risk "would be magnitudes worse and more confusing" if the agency had not dealt with AIDS, SARS and avian influenza.

Those experiences prompted new international health regulations and pandemic plans, and allowed critical scientific information to be disseminated quickly, he said.

The process was "painful, sure," he said. "But you can't really do anything like this without having some amount of pain."

http://www.nytimes.com/2009/06/09/health/09docs.html?_r=1&nl=health&emc=a1

Letting the Patient Call the Shots

By PAULINE W. CHEN, M.D.

I would like to believe that my care is "patient-centered." I try, for instance, to begin my visits with patients by asking how I can help. And I try not to leave an exam room without setting aside time for anything patients might feel I did not address.

But a couple of weeks ago, Dr. Donald M. Berwick, made me wonder if I should do more.

Dr. Berwick, a Harvard pediatrician and president of the Institute for Healthcare Improvement in Cambridge, Mass., is a leading authority on health care quality. Last month in a national health policy journal, Dr. Berwick published an article titled, "What 'Patient-Centered' Should Mean: Confessions of an Extremist." In it, he writes that the United States will require health care systems that are radically different from most of the ones we have today if we are to deliver truly patient-centered care. These systems would transfer control from doctors to the patients themselves.

Some examples of this new model of care? Shared decision-making would be mandatory in all areas of care, with patient preference occasionally putting evidence-based care "in the back seat." Patients and families would participate in the design of health care processes and services and would be a part of daily rounds. Medical records would belong not to clinicians but to patients, who would no longer have to get permission to look at them or call the doctor for lab results.

Even the word "compliance" would become obsolete.

As Dr. Berwick writes in his piece, "[We] would all be far better off if we professsionals recalibrated our work such that we behaved with patients and families not as hosts in the care system, but as guests in their lives."

I called Dr. Berwick recently to discuss his definition of patient-centered health care, the effect of such a system on doctors, and actions patients could take now to improve their care.

Q. Do you think "patient-centeredness" exists in current health care practice?

A. If you are interested in quality, you have to be interested in patient-centeredness. Good doctors and nurses do try mostly to focus on every patient as an individual. But we have built a system around clinicians that makes it impossible to customize care the way it needs to be. We don't have a standard of services or processes that are comfortable for patients. We have built a technocratic castle, and when people come into it, they are intimidated.

Patients keep having to repeat their name because the system has no memory. We dress them in silly-looking gowns. We give them the food we make instead of the food they want. We don't let them look into their medical records unless they have permission. Health care keeps telling patients the rules instead of asking patients about their individual needs. What is said is, "This is how we do things here," not "How would you like things done?"

People get accustomed to this. They are trained to be passive, and passivity is not a good idea. Studies have shown that people who are trained to be proactive do better and feel stronger. They have more pride and trust in their own capabilities.

When you make someone helpless, in a funny way you make them sicker, even if all you cared about was just the body.

Q. What if a patient's preference is in conflict with recommendations grounded in evidence-based medicine?

A. I would treat it as a challenge of information exchange. Human beings have got to have the ability and the responsibility to make their own decisions. As long as they know everything they need to know, they should be able to make the decision. If we doctors feel a person is going to make unwise choices, we have to take on the responsibility of being teachers, educators and informers. We need to give people all the knowledge and information so they can make their decisions well.

And we don't do that well at the moment. It's often done as a relatively pro forma matter.

Q. Tell me about your views on "noncompliance."

A. I think "noncompliance" is a control word, a power word, and we need a slightly different one. "Compliance" means I order and you either do it or not; you obey. Patients live in their bodies and may know more than the person who prescribes or does their procedure. They may know better about what is going on in their body and about the optimization of their own life. I think people who aren't taking their own medicine are telling us valuable information about their medications and their life, and we need to listen to them.

Q. Many clinicians already feel stretched to their limits. Will creating this kind of patient-centered health care system add to the stress on physicians?

A. When you are in a position of having to deny and exclude patients, it is draining on the spirit. I actually think the mode I am counseling would be more satisfying or joyous for caregivers. Not all of the time or always, but it would be a better place to be. You would be putting yourself at more of a level *with* the patient, as more of a peer. And you wouldn't have to carry on as if you were mythical. Medicine is imperfect and doctors know that.

Q. What can patients do to encourage more patient-centered health care?

A. Know more about what's happening to you. It stuns me that people don't know what medicine they are taking. Know the name of your medicine and what it does to you. If you are getting a procedure done, know the procedure. Medicine is not nuclear physics. Most adults and kids can basically understand. There can be uncertainty in medicine, but if there's mystery, something is wrong.

Speak up and be prepared. From research we know that patients who write down questions do better. Bring your digital recorder into the meeting so you can listen to the conversation several times after. Bring a companion along to be your sentinel, your advisor.

In the end, if you are being cared for by a doctor or nurse who doesn't give you what you feel is choice or control, find someone else. But only if you want that. Some patients don't want that and it's a perfectly good choice, too.

Q. And doctors?

A. Remember why you went into this profession in the first place.

But the burden to change the system falls on the leaders, the stewards, the people who create the organizations where the workforce works. Doctors want to do their work in a patient-centered way; they really do. We have to fix the health care system so that it gives doctors the time to do the job they want to do.

Join the discussion on the Well blog, "Giving Patients What They Want."

http://www.nytimes.com/2009/06/04/health/04chen.html?nl=health&emc=a9

Rotavirus: Every Child Should Be Vaccinated Against Diarrheal Disease, W.H.O. Says

By DONALD G. McNEIL Jr.

The World Health Organization recommended last week that the vaccine against rotavirus, a diarrheal disease that kills 500,000 children a year, be given to every child in the world.

More than 85 percent of those deaths are of poor children in Africa, Asia and Latin America, and the W.H.O. endorsement allows donor money to be used for the vaccine.

Rotavirus drops are already routine for babies in the United States. Without them, virtually all children are infected by age 3; most cases are mild, but some unpredictably turn life-threatening.

In countries with ambulances and hospitals, even unimmunized children with severe viral diarrhea can usually be saved with intravenous fluids. In poor countries, they often die.

The recommendation came after trials in South Africa and Malawi showing that a GlaxoSmithKline vaccine worked even in areas with poor sanitation, competing viruses, high infant death rates and mothers with AIDS. The results of trials on a rival Merck vaccine in Bangladesh, Ghana, Kenya, Mali and Vietnam are expected in the fall.

The recommendation "clears the way for vaccines that will protect children in the developing world from one of the most deadly diseases they face," said Dr. Tachi Yamada, president of global health at the Bill & Melinda Gates Foundation, which paid for much of the research.

The next steps will not be cheap, Mr. Gates said recently. Even in poor countries, the vaccine costs about $20 and the vials must be refrigerated — no easy task in places lacking electricity.

http://www.nytimes.com/2009/06/09/health/09glob.html?nl=health&emc=a7

1984 thoughtcrime? Does it matter that George Orwell pinched the plot?

George Orwell's Nineteen Eighty-Four is a classic – but it owes its plot, characters and conclusion to Yevgeny Zamyatin's 1920s novel We

A superior writer … George Orwell in the 1940s. Photograph: CSU Archives/Everett/ Rex Features

It is a book in which one man, living in a totalitarian society a number of years in the future, gradually finds himself rebelling against the dehumanising forces of an omnipotent, omniscient dictator. Encouraged by a woman who seems to represent the political and sexual freedom of the pre-revolutionary era (and with whom he sleeps in an ancient house that is one of the few manifestations of a former world), he writes down his thoughts of rebellion – perhaps rather imprudently – as a 24-hour clock ticks in his grim, lonely flat. In the end, the system discovers both the man and the woman, and after a period of physical and mental trauma the protagonist discovers he loves the state that has oppressed him throughout, and betrays his fellow rebels. The story is intended as a warning against and a prediction of the natural conclusions of totalitarianism.

This is a description of George Orwell's Nineteen Eighty-Four, which was first published 60 years ago on Monday. But it is also the plot of Yevgeny Zamyatin's We, a Russian novel originally published in English in 1924.

Orwell's novel is consistently acclaimed as one of the finest of the last 100 years – two years ago Guardian readers voted it the 20th century's "definitive" book – and it remains a consistent bestseller. Should it alter our respect for it that Orwell borrowed much of his plot, the outlines of three of his central figures, and the progress of the book's dramatic arc from an earlier work?

Orwell reviewed We for Tribune in 1946, three years before he published Nineteen Eighty-Four. In his review, he called Zamyatin's book an influence on Aldous Huxley's Brave New World, though Huxley always denied anything of the sort. "It is in effect a study of the Machine," Orwell wrote of We, "the genie that man has thoughtlessly let out of its bottle and cannot put back again. This is a book to look out for when an English version appears." He seems to have taken his own advice.

We was not published in Russia until the glasnost era of 1988; among its most controversial passages for the Soviets was an apparent call for a new revolution to sweep away theirs: "How can there be a final revolution? There is no final one. The number of revolutions is infinite. The last one – that's for children. Infinity frightens children, and it's essential that children get a good night's sleep." Foreign editions released in Zamyatin's lifetime led to his being banned from publishing, and eventually he wrote to Stalin

to ask permission to live abroad. It was granted, and he left Russia for ever in 1931. He died six years later.

The characters in We are numbered rather than named: its Winston Smith is D-503, and its Julia I-330. Its Big Brother is known as the Benefactor, a more human figure than Orwell's almost mythical dictator, who at one point phones D-503 ("D-503? Ah … You're speaking to the Benefactor. Report to me immediately!"). Where Orwell's apartments come complete with an all-seeing "telescreen", Zamyatin's buildings are simply made of glass, allowing each of the residents – and the "Guardians" who police them – to see in whenever they want. We's Airstrip One, or Oceania, is called OneState. Instead of puzzling over 2+2=5, its lead character is disturbed by the square root of –1.There are many aspects of We that mark it out as an interesting work in its own right. Zamyatin has a distinctive way with description: when a doctor laughs, "the blades of [his] scissor-lips flashed", while a woman walks along moving her buttocks "from side to side as if she had eyes in them". He anthropomorphises the letters that begin his characters' names; it is thought he may have had synaesthesia, and identified letters with certain colours.

On the down side, Zamyatin's structure – a series of diary entries – becomes progressively less believable the more trouble D-503 gets himself into, while his plot is marred by confusing jumps in time and place. A scene in which the characters fly into space unfortunately cannot help but seem laughable now.So does it matter that Orwell borrowed plot and characters from the earlier book? After all, it seems clear that he made a superior work of literature out of them. Nineteen Eighty-Four's importance comes not so much from its plot as from its immense cultural impact, which was recognised almost immediately when it won the £357 Partisan Review prize for that year's most significant contribution to literature, and which has continued to this day. Most of the aspects and ideas of the novel that still resonate so strongly in political life are his own: newspeak, doublethink, thoughtcrime, the Thought Police, Room 101; the extreme use of propaganda, censorship and surveillance; the rewriting of history; labels and slogans that mean the opposite of what they say; the role for Britain implied in the name Airstrip One. References to these things pervade all levels of our culture. Apart from the obvious, I remember an amusing NME review of an album by the laddish band Cast that read: "Imagine a trainer stamping on a human face ... for ever."

In addition, unlike We, Nineteen Eighty-Four is written with expert control in an accessible style about a world recognisably our own, and its twists of plot – including the existence (or not) of the Brotherhood resistance movement – are gripping, sophisticated and convincing. The dark, pessimistic tone of Nineteen Eighty-Four is also all Orwell's.

If any aspect of We takes the shine off Nineteen Eighty-Four, it's that Orwell lifted that powerful ending – Winston's complete, willing capitulation to the forces and ideals of the state – from Zamyatin. It's a wonderful, wrenching twist, in both books, and a perfect conclusion, though We and Nineteen Eighty-Four differ slightly in the fate of the female dissident: I-330 is killed without giving up her beliefs, whereas Julia is broken in the same way as Winston.

Perhaps We deserves more recognition than it has had, but if Nineteen Eighty-Four had never existed, it is extremely doubtful Zamyatin's book would have come to fill the unique place Orwell's work now occupies. Nineteen Eighty-Four is an almanac of all the political ideas no "right-thinking" person would ever want their government to countenance, and the word Orwellian has come to signify a badge of shame intended to shut down any movement in that direction – with an imperfect record of success.

http://www.guardian.co.uk/books/booksblog/2009/jun/08/george-orwell-1984-zamyatin-we

Diabetes warning signs detected

Body chemistry changes that lead to type 2 diabetes begin several years before symptoms become apparent, research has shown.

The researchers pinpointed specific changes in blood glucose levels and sensitivity to the hormone insulin.

They hope this could eventually be used to help identify people at high risk of the disease earlier, meaning action can be taken to delay its progression.

The Lancet study was led by University College London.

It was presented to a meeting of the American Association of Diabetes.

TYPE 2 DIABETES
Long-term condition caused by too much glucose in the blood
Occurs when not enough insulin is produced by the body for it to function properly, or when the body's cells do not react to insulin. This is called insulin resistance
Symptoms can be controlled by healthy eating, and monitoring blood glucose level
However, injections may eventually be required

The researchers followed 6,538 UK civil servants over almost 10 years, during which 505 cases of type 2 diabetes were diagnosed.

They examined how the volunteers' blood glucose levels and the capacity of their tissues to respond to insulin - known as insulin sensitivity - changed over time.

They also looked at how the insulin-producing beta-cells of the pancreas functioned over time.

Rapid acceleration

The researchers showed that in volunteers who did not develop diabetes changes in body chemistry occurred at a steady, even pace over time.

However, patients who developed diabetes showed a rapid acceleration in both fasting and post-meal blood glucose levels starting three years before they were diagnosed with the condition.

Insulin sensitivity decreased steeply during the five years prior to diagnosis among the diabetic group.

And their beta-cell function increased between years four and three prior to diagnosis, as their body tried to compensate for the raised glucose levels, but then decreased in the three years up to diagnosis.

The researchers said their work could help efforts to develop more accurate models to predict an individual's risk of developing type 2 diabetes.

They said most prevention studies focused on people in the earliest stages of disease, but by that stage changes to body chemistry were already well advanced.

Lead researcher Dr Adam Tabak said: "Our model may help detect people at high risk to develop diabetes, so we can better target these people to prevent the development of the disease.

"We believe that an earlier intervention - before the conventional prediabetes stage - could delay diabetes development substantially."

More work needed

However, in an editorial in the same journal, diabetes experts Dr David Matthews and Dr Jonathan Levy, from the University of Oxford, warn that much more work is needed.

They wrote: "Does this mean that we find those who are about to get diabetes - perhaps even three or four years ahead? We fear not.

"The sensitivity and specificity of the forward predictions would be poor.

"Now the hunt has to be intensified for the pathology that causes the decompensation that precipitates diabetes."

Pav Kalsi, of the charity Diabetes UK, said: "Although these markers provide a good indication of future type 2 diabetes the lack of sensitivity and specificity means we cannot know for certain, so we'd welcome further research into this promising area of study."

Judy O'Sullivan, of the British Heart Foundation, said: "This study provides better data than we have had before to show that those who are going to get diabetes have signs they are at risk for several years before the disease becomes clinically obvious.

"This reinforces the view that more careful and frequent earlier routine screening could lead to a significant gain in preventing or delaying the onset of the disease."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8085762.stm

Published: 2009/06/08 23:00:13 GMT

Rogue protein 'spreads in brain'

Scientists have shown a rogue protein thought to cause Alzheimer's can spread through the brain, turning healthy tissue bad.

They believe the tau protein may share characteristics with the prion proteins which cause vCJD.

When injected into the brains of healthy mice it triggered formation of protein tangles linked to Alzheimer's.

However, experts stressed the Nature Cell Biology study did not mean tau could be passed from person to person.

" **This does not mean that these diseases are infectious in the same way as mad cow disease and human CJD** "
Professor David Allsop Lancaster University

Tau is a protein present in all nerve cells, where it plays a key role in keeping them functioning properly.

But a rogue form of the protein can trigger the formation of protein clumps within nerve cells known as neurofibrillary tangles.

It is thought that these tangles are likely to be a major cause of Alzheimer's disease.

In the latest study researchers, led by a team from University Hospital, Basel, extracted sections of brain from mice expressing a mutant form of human tau protein.

These extracts were injected into specific regions in the brains of healthy mice.

New tangles

Analysis showed that this induced normal human tau proteins in the healthy mice to clump together to form neurofibrillary tangles.

These newly-formed tangles were also able to spread to nearby regions in the brain.

Another type of rogue protein - the prions - which cause diseases such as vCJD, are thought to be able to twist themselves into a shape which gives them the ability to "infect" nearby healthy tissue.

But until now it had not been thought that tau proteins had the same contagious property.

Dr Michel Goedert of the MRC Laboratory of Molecular Biology in Cambridge, worked on the study.

He said: "This opens new avenues in dementia research that will aim to understand how abnormal tau can spread.

"We can also investigate how diseases caused by tau aggregates and prions are similar."

Disease progression

Professor David Allsop, an expert in neuroscience at Lancaster University, said the study might help explain how tangles spread from one region of the brain to another during the course of Alzheimer's.

However, he said: "This does not mean that these diseases are infectious in the same way as mad cow disease and human CJD.

"There is no evidence that diseases like Alzheimer's disease and Parkinson's disease can be transmitted from one person to another."

Rebecca Wood, chief executive of the Alzheimer's Research Trust, said: "This greater understanding of how tangles spread in Alzheimer's may lead to new ways of stopping them and defeating the disease."

However, Dr Susanne Sorensen, head of research at the Alzheimer's Society, stressed that work was carried out in genetically modified mice, and there was a lot of work to be done before the implications were fully understood.

"There is still so much we do not understand about the changes in tau that lead to tangle formation in humans and, eventually, widespread brain cell death," she said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8084787.stm

Published: 2009/06/07 21:33:14 GMT

Oily fish 'can halt eye disease'

People with age-related macular degeneration (AMD) should eat oily fish at least twice a week to keep their eye disease at bay, say scientists. +

Omega-3 fatty acids found in abundance in fish like mackerel and salmon appear to slow or even halt the progress of both early and late stage disease.

The researchers base their findings on almost 3,000 people taking part in a trial of vitamins and supplements.

The findings are published in the British Journal of Ophthalmology.

An estimated 500,000 people in the UK suffer from AMD, which destroys central vision.

Protective

Experts have already suggested omega-3 may cut the risk of getting AMD by a third, and now this latest work suggests these fats also benefit patients who already have the disease.

" **These findings appear to be consistent with previous research that has shown that eating omega 3 poly-unsaturated fats as part of a balanced diet may help prevent the development of age-related macular degeneration** "
A spokeswoman from RNIB

Progression to both dry and wet forms of advanced AMD disease was 25% less likely among those eating a diet rich in omega-3 fatty acids.

People with advanced AMD who also consumed a low-GI diet, eating of foods that release their sugar more slowly, and who took supplemental antioxidant vitamins and minerals like vitamin C and zinc appeared to reduce their risk of disease progression by even more - by up to 50%.

Substituting five slices of wholegrain bread for white bread every day out of a total intake of 250g of carbohydrate might cut out almost 8% of advanced age related macular degeneration over five years, say the authors.

Surprisingly, however, the supplements were counterproductive for those with early AMD, negating the benefits of omega-3 fats, and even appeared to increase the risk of disease progression.

Those who took all the antioxidant vitamins plus zinc, and who a high daily intake of beta carotene - found in yellow and green vegetables - were 50% more likely to progress to advanced disease.

The researchers at Tufts University, Boston, believe omega-3 fatty acids offer protection against AMD by altering fat levels in the blood after a meal that can be damaging to the body.

'**Moderation**'

But they say it is not clear whether patients should also consider taking supplements as well as omega-3 because of their mixed findings.

They suggest that eating two to three servings of fatty fish, such as salmon, tuna, mackerel, shellfish, and herring every week, would achieve the recommended daily intake (650mg) of omega-3, substantially cutting the risk of both early and late stage AMD.

The UK's Food Standards Agency says people should eat at least two portions of fish a week including one of oily fish.

But they caution that too much oily fish is bad because it can contain low levels of pollutants that can build up in the body.

Most people can safely eat up to four portions a week, but girls and women who might have a baby and those who are pregnant or breastfeeding should limit their intake to two portions a week.

A spokeswoman from RNIB said good nutrition was very important for both general and eye health.

"These findings appear to be consistent with previous research that has shown that eating omega-3 poly-unsaturated fats as part of a balanced diet may help prevent the development of age-related macular degeneration, the main cause of severe sight loss in the UK.

"RNIB hopes that this will further highlight why looking after your eyes should be a key motivation in maintaining a healthy lifestyle," she said.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8088860.stm

Published: 2009/06/08 22:59:51 GMT

Australia wind farm gets go-ahead

By Phil Mercer
BBC News, Sydney

Approval has been given for Australia's biggest wind farm to be built near Broken Hill in New South Wales.

Almost 600 turbines will generate enough electricity for more than 400,000 homes.

A forest of giant turbines will emerge from the red dust of the Australian outback near the isolated town famous for its lead and zinc mining.

The scheme, one of the world's largest onshore wind farms, will eventually cover more than 32,000 hectares.

Planning permission has been granted for the first phase of development.

" **It is a monster wind farm - it is fabulous in scale** "
Donna Bolton, Silverton Wind Farm

Donna Bolton, the project manager for the Silverton Wind Farm, says it will make a significant contribution to the energy requirements of Australia's most populous state.

"It is a monster wind farm. It is fabulous in scale," she said.

"The entire thing will provide enough electricity for 4.5% of New South Wales' electrical needs and it is about 430,000 homes for the entire project.

"Wind power for Australia is fantastic because it is going to be out of the cities, it is going to be where the jobs are needed, it is good for the environment, it is good for the local economies. It is a really significant part of the answer," she said.

Big plans

Wind farms can be costly to maintain and the noise they generate can upset local residents.

The New South Wales government, though, has big plans for this type of green power.

Officials have said that a series of wind projects across the state would reduce greenhouse gas emissions by six million tonnes every year.

Australia is one of the world's worst per capita polluters thanks to a reliance on cheap supplies of coal.

The federal government intends to ease the country's dependence on fossil fuels.

It wants 20% of Australia's electricity to come from renewable sources by 2020.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/asia-pacific/8090554.stm

Published: 2009/06/09 03:42:34 GMT

Chimps mentally map fruit trees

Matt Walker
Editor, Earth News

Chimpanzees remember the exact location of all their favourite fruit trees.

Their spatial memory is so precise that they can find a single tree among more than 12,000 others within a patch of forest, primatologists have found.

More than that, the chimps also recall how productive each tree is, and decide to travel farther to eat from those they know will yield the most fruit.

Acquiring such an ability might have helped drive the evolution of sophisticated primate brains.

Emmanuelle Normand and Christophe Boesch of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany teamed up with Simone Ban of the University of Cocody in Abidjan, Ivory Coast, to investigate the spatial memory of chimpanzees in the wild.

"We were amazed by the apparent easiness by which chimpanzees discover highly productive fruit trees. Or how after being separated from other group members for hours or days, they could join each other silently at a large fruit tree, like if they would have had an appointment at this place," says Normand.

We think it's fair to assume that chimpanzees can remember the exact location of probably thousands of trees
Primatologist Emmanuelle Normand

To find out how they do it, Normand's team first mapped the location of 12,499 individual trees growing within the home range of a group of chimpanzees living in the Tai National Park in Ivory Coast. They identified each tree and used GPS to map its precise position.

The team also identified 17 species of fruit tree that the chimps regularly fed from, and worked out how often each individual tree belonging to these 17 species would be in fruit each month. From that, the researchers could determine how likely it would be that a chimp randomly walking around the forest might bump into a fruit tree that it could feed from.

The team found that the chimps didn't visit the most abundant fruit species most frequently, as would be expected if they were navigating without using spatial memory. They also excluded the possibility that the chimpanzees navigated toward the trees by smell.

Instead, they targeted certain trees and walked directly to them. For example, the apes visited one fruit tree, *Pouteria aningueri*, more than any other, despite it being one of the rarest trees in their home range, the team report in Animal Cognition.

The chimps also travelled much shorter distances to each fruit tree than would be expected by chance, confirming that they travel directly to the trees.

"We think it is fair to assume that chimpanzees can remember the exact location of probably thousands of trees," says Normand.

Of two females closely tracked, one ate from 391 separate trees, averaging 14 trees per day, while the other ate from 506 trees, averaging 18 trees per day. On average, each chimp revisited each tree once every five-and-a-half days.

Remarkably, as well as remembering the location of their favourite trees, the chimps also recalled when each tree would be in season, producing the most fruit. They would then often walk further to reach these more bountiful trees rather than make a shorter journey to a less productive one.

"Across all seasons, it seems that they have preferred tree species," says Normand.

"Like when it is the coula nuts season, chimpanzees crack nuts using tools for hours during a day. Or when it is the Sacoglottis fruits season, then the chimpanzees stay hours digging their fruit wadge in the water to press a maximum of juice from those fruits."

Intriguingly, female chimpanzees travelled shorter distances to eat than males. The researchers don't know why, but speculate that it is either because females better remember the locations of trees, or because males simply compete with one another by ranging more widely through their territory.

In one respect, it is not surprising that chimpanzees have developed an outstanding ability to navigate their home range, says Normand.

One idea, known as the "ecological hypothesis" proposes that the need to remember and find food resources, such as fruit trees, could have driven the evolution of primate brains. In particular, it says that a preference for fruit eating, or frugivory, would select for intelligence compared to leaf-eating, or foliovory.

"That's because the distribution of fruits is more scattered, less predictable and fruits can be more difficult to manipulate than leaves, the nut cracking by Ta chimpanzees being an extreme example," says Normand.

Compared to monkeys, chimpanzees live in larger territories and are highly frugivorous, suggesting that developing an outstanding ability to navigate to fruit trees could have a key driver in the evolution of ape intelligence.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/earth/hi/earth_news/newsid_8086000/8086246.stm

Published: 2009/06/08 12:05:16 GMT

Mobile scanner could detect guns

By Paul Rincon
Science reporter, BBC News

British scientists have developed a portable microwave scanner to help police identify individuals carrying concealed guns and knives.

It is small enough to be used covertly, at some distance from the subject.

The device is based around microwave radar technology and is designed to pick up the "reflections" of weapons concealed beneath clothing.

Some officials believe technology like this could help increase the effectiveness of stop-and-search.

The existing prototype is suitable for the detection of guns, but researchers say subsequent versions of the technology will be able to identify concealed knives as well.

The new device employs low-power microwaves to identify weapons, using similar wavelengths as the body scanners currently in use at a number of airports.

" **This device could save lives and free up valuable policing time** "
Catherine Coates, EPSRC

However, Professor Nick Bowring from Manchester Metropolitan University, who led the development of the new device, said it worked on a different principle.

Unlike airport scanners, the portable machine does not produce an image of the subject, it only analyses signals.

"It is designed to work out on the streets and is not (restricted) to a closed, controlled environment," Professor Bowring told BBC News.

A human operator will transport the device, using it to direct microwave emission at a person of interest.

Return signals - microwaves reflected back towards the device - are picked up, sensed and analysed.

Weapon signature

"[The scanner] does a lot of computing and processing of the signals it acquires. It puts them all together, analyses them over a short period and makes a decision," said Professor Bowring.

"It works on the principle that the radar returns from people, when they are carrying a gun or a knife, look different. And we pick up on those small differences."

" **We welcome scientific innovation in the fight against crime but this kind of technology needs public scrutiny and foundation in law** "
Anita Coles, Liberty

So-called neural network technology is employed to identify signals from concealed weapons and to ignore those from everyday items. Similar technology is used in the automatic recognition of car number plates.

Professor Bowring said he and his team had found ways to reduce the numbers of "false positive" readings to a "very low level".

Because of sensitivities surrounding its use, he could not say what distance the device worked over, but explained it was a "useful stand-off range". Researchers are reluctant to release pictures of the experimental set-up for similar reasons.

Tests are currently being carried out by the Metropolitan Police's operational technology department to see how the scanner could work in practice. If those trials are successful, a device could become available to police forces within two years.

Catherine Coates, head of innovation at the Engineering and Physical Sciences Research Council (EPSRC), said: "This device could save lives and free up valuable policing time currently taken up with gun and knife detection."

'Public scrutiny'

Anita Coles, policy officer for Liberty, told BBC News: "We welcome scientific innovation in the fight against crime but this kind of technology needs public scrutiny and foundation in law.

"The causes of violence also need attention. You will never eliminate all the guns, knives, bottles and glasses so it's important to consider other conditions that foster conflict."

In a statement, Stuart Ibbotson, head of engineering for the Metropolitan Police, said: "We are still at early stages and a way off deploying operational capability yet, but so far, results are very encouraging.

"This kind of device would be of great service to officers, helping them to catch people carrying guns and knives without putting themselves in increased danger. It could also help to target stop and search to further increase its effectiveness."

The number of firearms operations rose by almost a fifth last year in police forces in England and Wales.

Officers fired weapons seven times - up from three incidents the year before, but still fewer times than in 2001.

The Home Office figures showed a drop in firearms operations in some police areas commonly believed to have significant gun crime problems.

Professor Bowring said the scanner had been developed relatively cheaply, at a cost of only a few hundred thousand pounds.

The project involved researchers from MMU, Manchester University, Newcastle University and Queen Mary University of London.

It was funded by the EPSRC, supported by the Metropolitan Police and the Home Office Scientific Development Branch.

Paul.Rincon-INTERNET@bbc.co.uk

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8089959.stm

Published: 2009/06/08 23:12:12 GMT

Girls 'hampered by failure fears'

Girls have a greater fear of failure than boys despite outperforming them at all stages of school, a report said.

And these worries could seriously affect their chances of succeeding in school and work, the Equality and Human Rights Commission study claimed.

It also suggested girls often aim for careers reinforcing gender stereotypes, such as teaching, childcare and beauty.

A government spokesman said all children should have access to good quality impartial careers advice.

But some 94% of the 1,000 English teenagers surveyed for the report said they needed better careers advice.

The Commission's report suggested a fifth of young people had not received one-to-one careers advice, and did not understand how to achieve their desired goal.

" **Schools are looking to see if pupils fit into the system and can perform well** "
Equality and Human Rights Commission

It said despite girls' success at GCSE, three quarters of women still ended up in the "five Cs" of employment - cleaning, catering, caring, cashiering and clerical.

This was partly due to stereotyping of subject choices at school, and school staff consciously or unconsciously encouraging boys and girls to seek what they perceived to be gender appropriate subjects.

The report for Britain's equalities watchdog looked at what factors affected children's chances of succeeding in education.

It found that although a child's social background was the biggest determinant of whether they would succeed, gender also had an effect.

Some 46% of white working class girls feared educational failure, compared with about a quarter of white middle class boys.

White working class boys and white middle class girls were equally fearful of failure on 38%.

Children from poorer backgrounds tended to be less confident of success generally.

'**Drop-outs**'

The research suggested that some young people developed an ingrained sense of failure, often due to the school's emphasis on measuring success by test results.

Findings suggest this can result in feelings of anxiety and fear which can lead to students dropping out of the education system.

The report said one in 10 was so disillusioned that they were considering leaving education or training.

It pointed out that the traditional system of education was seen as the most important, with vocational training and apprenticeships not sufficiently promoted as alternatives.

It said: "Schools are looking to see if pupils fit into the system and can perform well.

"If pupils are not able to cope with this, the current set-up rarely provides for them. They are all too often left on the margins and neglected."

However, the poll suggested 95% of youngsters felt they were doing "very well" or "fairly well".

A spokeswoman for the Department for Children, Schools and Families said: "We will be consulting on statutory guidance this year, and challenging stereotypes will be a key principle.

"New quality standards came into force last year which set out the services that local authorities should deliver, including challenging gender-stereotyping and traditional ideas of learning and work."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8090019.stm

Published: 2009/06/08 23:04:48 GMT

Animal Mating Choices More Complex Than Once Thought

Purdue University scientist Andrew DeWoody has found that a group of genes is less important in mate choice than once thought. (Credit: Purdue Agricultural Communications/Tom Campbell)

ScienceDaily (June 9, 2009) — When female tiger salamanders choose a mate, it turns out that size does matter - tail size that is - and that's not the only factor they weigh.

Findings of a Purdue University study show that animals make more complex decisions about choosing mates than once thought. The results of Andrew DeWoody's study, released Monday (June 8) in the journal *Molecular Ecology*, refute a theory that animals use major histocompatibility complex (MHC) genes as the sole basis for mate choice. Immunologists have long known that MHC genes play key roles in the immune response, but more recently behavioral ecologists have postulated that animal mate choice is often based on MHC-type because of the function of those genes.

"Our data indicate that mate-choice decisions aren't solely dependent on MHC, tail length, body size or any other single factor," said DeWoody, a professor of genetics. "Mate choice is a complex process that takes many factors into account."

DeWoody and David Bos, a former postdoctoral assistant who is now a continuing lecturer at Purdue, set out to see how much MHC genes affected mate choice in wild animals. Most prior research showed that an animal would choose a mate with MHC that is the most divergent from its own so that offspring will have more effective immune systems.

Earlier studies in mice suggest that MHC diversity was the sole genetic basis for mate choice. But DeWoody said those studies used mice that were genetically the same in every way except for MHC.

"Sure, mice might base mate-choice decisions wholly on MHC if there is no other consideration, if they don't have any other factors to choose from," DeWoody said. "But wild animals have a lot of different characteristics they can choose from, not just MHC."

Proteins encoded by MHC serve as the immune system's sentry. MHC proteins expressed on the cell surface bind and display small peptides (bits of protein) to T-cells. T-cells interrogate the peptides and determine if they are foreign. If so, the immune response is activated. The more MHC diversity a person

or animal has, the more peptides it is able to bind and display over to T-cells, making it less susceptible to infection.

DeWoody and Bos used tiger salamanders because of their unique mating habits in which females make the sole decision on choosing a mate. Males deposit spermatophores, or sperm packets, for females, who choose the ones that will be used to fertilize their eggs. The females are choosy because they want a mate whose attributes will increase the fitness of their offspring, DeWoody said.

Using wild tiger salamanders, DeWoody and Bos gave each female a choice between two males. They checked the offsprings' genotypes to identify parentage and found that the largest females chose the more MHC-similar mates, not the most divergent ones as expected under prevailing theory. The remaining females seemed to mate at random with regard to MHC.

In addition to MHC, tail length plays a role in reproductive success. Male salamanders with longer tails were twice as likely as those with shorter tails to be chosen as sires.

Bos said it's possible that other factors outweighed MHC for some of the females.

"There may very well be trade-offs," Bos said. "Getting a mate with diverse MHC, large body size and other characteristics might be nice, but getting all of those characteristics might not be practical."

The National Science Foundation funded DeWoody's research. Both DeWoody and Bos would like to conduct similar tests on other MHC genes or on animals in more complex environments. Bos said understanding the factors used to determine mate choice could lead to better understanding of mating habits in all animals, including humans.

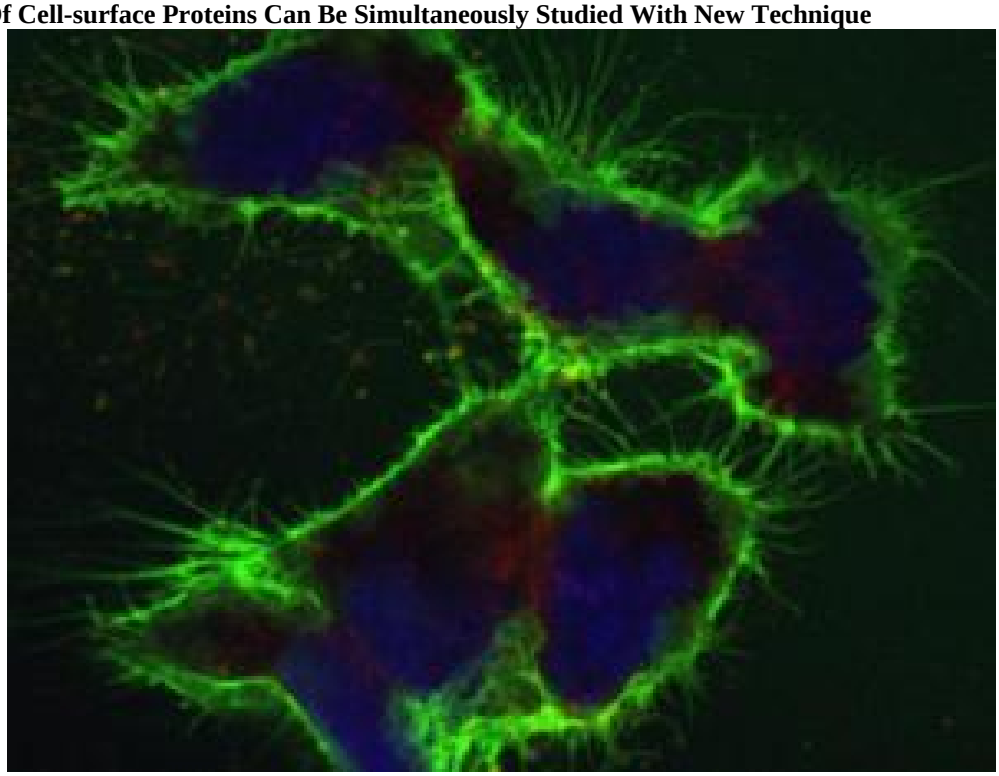
Journal reference:

1. David H. Bos, Rod N. Williams, David Gopurenko, Zafer Bulut, J. Andrew DeWoody. **Condition-dependent mate choice and a reproductive disadvantage for MHC-divergent male tiger salamanders**. *Molecular Ecology*, 2009; DOI: 10.1111/j.1365-294X.2009.04242.x

Adapted from materials provided by Purdue University.

http://www.sciencedaily.com/releases/2009/06/090608162545.htm

Hundreds Of Cell-surface Proteins Can Be Simultaneously Studied With New Technique



The CSC method enables hundreds of cell-surface proteins to be analyzed simultaneously. In order to produce this image, the proteins at the cell surface were labeled with green dye to make them visible; the cell nuclei are stained blue. (Credit: Wollscheid group/ETH Zurich)

ScienceDaily (June 9, 2009) — A new method now enables ETH-Zurich researchers to study hundreds of cell-surface proteins simultaneously. The results obtained could help to develop more accurate diagnostic tests and more specific therapies in the future.

Cancer is a complex disease. Not all stages or subtypes of various cancers spread in the body at the same rate or respond to the same medication. For example, if a woman is diagnosed with breast cancer for instance, determining precisely which tumor grade and stage it is can be crucial in fighting the disease effectively. In many cases, however, modern medicine is not yet advanced enough to be able to do this. Standard treatments, to which not all stages and cancer forms respond, are rather the rule than the exception.

Wanted: new antibodies

In order to establish a diagnosis, usually tissue samples are studied using specific antibodies that can bind to particular proteins on the cell surface of cancer cells. To diagnose cancer, proteins or protein combinations which are typical to a particular form of cancer must be detected. The antibodies are made visible in tissue samples by coupling fluorescent dyes to them. However, as there are very few existing antibodies that work, the diagnosis largely hinges upon very few traceable proteins. The final diagnosis, then, is often simply “cancer”, the particular form is not yet detectable. In order to distinguish between different cancer stages more effectively, more accurate information regarding the assembly of the proteins on the cell surface in various cancer forms would be helpful – as would being able to detect additional, functioning antibodies for testing and diagnosing purposes.

The team of researchers headed by Bernd Wollscheid, group leader at the Institute for Molecular Systems Biology at ETH Zurich and Julian Watts from the Institute of Systems Biology in Seattle (USA), have now developed a new technology that facilitates the development of new and better antibodies. It is called

the “Cell Surface-Capturing” (CSC) and permits the proteins on the cell surface to be measured more specifically. “With the CSC method we can simultaneously identify a vast number of proteins located on the surface of cells at a particular point in time”, specifies Wollscheid. And not only that: The CSC also provides information in which amounts these proteins are found – without needing any antibodies whatsoever.

Sugars on cell surface proteins are the key

The overview of the cell surface and the proteins present there is possible due to a couple of tricks: “In order to examine the cell surface proteins more specifically, we make use of the fact that they are nearly all glycoproteins”, says Wollscheid. These proteins contain at least one sugar molecule somewhere. The researchers attach a kind of adapter to these sugar molecules, which binds firmly to the sugar residue. In the next step, all the glycoproteins throughout the cell are broken into small fragments using an enzyme, which acts as a pair of molecular scissors. The researchers can then use the matching counterpart to the adaptor to easily pull out any fragments of protein that are attached to the sugar residue, i.e. which come from the cell surface. The researchers thus obtain fragments of the tagged cell surface proteins. Before they can be identified, the sugar residue and the adaptor have to be removed using another enzyme.

The researchers subsequently analyze their collection of protein fragments in the mass spectrometer to obtain information on the composition and mass of the fragments. “With the aid of protein databanks, such as SwissProt, we can identify the corresponding proteins and obtain a list of all the proteins that were present on the cell surface at a particular time”, explains Wollscheid. For some of them, the researchers were surprised to detect the presence of certain proteins on the cell surface, since it was not known previously that they were even there at all. It is also fascinating that so many proteins can be detected in one single experiment.

Developing more accurate medical diagnosis workflows

Where previously four to five proteins and their corresponding antibodies were available to characterize a somatic cell or cancer form, but now cells can now be defined via the entire assembly of their cell surface proteins. In order to distinguish between different cell types or cancer forms or stages, one can now look specifically for differences in the quantity and type of the proteins on the cell surface. This allows in the future the selection of cancer specific cell surface proteins for clinical diagnostic and the development of specific sets of antibodies.

The protein fragments obtained using the CSC technology have another crucial advantage: the fact that they origin from the exterior of the protein means that they are easily accessible for antibodies, thus making them ideal target structures for antibodies – an idea that has recently been patented. As a result, they are currently being employed in the production of antibodies.

Testing tissue for clinical purposes directly with the mass-spectrometry-based CSC method is out of question for the time being. Tissue samples taken from patients always contain numerous cells in different amounts. For example, the samples might contain healthy cells and immune defense cells along with cancer cells. The presence of these cells could distort the results. Consequently, research is being carried out with specially enriched tissue samples or cultured cells that mainly consist of celltype. Mass spectrometers are not yet sensitive enough to analyze the tiny amounts of protein that could be obtained from individual cells. For this purpose, antibodies are still required.

Developing specifically acting drugs

Knowing the surface properties of particular cancer cells makes it easier to develop specific new medication that only targets this one cell type. “One could think of drugs that only bind to particular cancer cells due to their cell surface proteins, for instance, and rendering the cancer harmless”, explains Wollscheid. However, the utmost care needs to be taken in this process: if the medication is not specific

enough and destroys all the kidney cells along with the breast cancer cells, the therapy will have done more harm than good.

Monitoring cell development

If the CSC method catches on, not only medicine will benefit from it but basic research will benefit as well. By taking several "snapshots" of the cell surface at particular intervals, researchers can observe how the protein composition on the cell surface changes over time. Wollscheid's team of systems biologists illustrated this using the example of stem cells, which differentiated and developed into brain cells. "The composition of the surface proteins changed drastically", points Wollscheid out, summing up the results. The CSC method enables the comparison of healthy and diseased cells, stem cells and differentiated ones, and to monitor the development form one form to another.

It is quite possible that the newly gained insights coupled with new diagnostic possibilities will help to develop tailored therapies for cancer patients in the foreseeable future. Nonetheless, before this goal can be achieved, much research and development work still needs to be carried out.

Journal reference:

1. Wollscheid B, Bausch-Fluck D, Henderson C, O%u2019Brien R, Bibel M, Schiess R, Aebersold R, Watts J D. **Mass-spectrometric identification and relative quantification of N-linked cell surface glycoproteins**. *Nature Biotechnology*, 2009; 27 (4): 378 DOI: 10.1038/nbt.1532

Adapted from materials provided by ETH Zurich.
http://www.sciencedaily.com/releases/2009/06/090606194216.htm

Self-regulation Game Predicts Kindergarten Achievement

ScienceDaily (June 9, 2009) — Early childhood development researchers have discovered that a simple, five-minute self-regulation game not only can predict end-of-year achievement in math, literacy and vocabulary, but also was associated with the equivalent of several months of additional learning in kindergarten.

Claire Ponitz from the University of Virginia and Megan McClelland of Oregon State University assessed the effectiveness of a game called the Head-Toes-Knees-Shoulders (HTKS) task, which is a new version of the Head-to-Toes task developed by researchers at the University of Michigan. Both tasks have proved effective at predicting academic skills among preschool age children.

The researchers assessed a group of 343 kindergarteners from Oregon and Michigan. Their self-regulation, or ability to control behavior, was measured with the Head-Toes-Knees-Shoulders task, a structured observation requiring children to perform the opposite of a response to four different oral commands. For example, children were instructed to touch their toes if told to touch their head, and vice versa.

They found that students who performed well on his behavior task in the fall achieved strong scores in reading, vocabulary and math in the spring, compared to students who had low performance on the task. In addition, the research showed that the children who performed well on the task scored 3.4 months ahead of peers who performed at average levels on mathematics learning.

"It's amazing that this game works as well as it does," McClelland said. "It is simple to administer, fun for the kids, and predicts children's academic achievement."

One area where the task did not make a difference was assessing children's interpersonal skills. McClelland explained that the game is not "emotion-oriented," meaning it is not set up to trigger an emotional response. Instead, the Head-Toes-Knees-Shoulders task tests children on important classroom-related behavior such as listening, following directions and remembering instructions.

"We know this task predicts end-of-year achievement," she said. "Now we want to take the game to the next level."McClelland is planning to do an extensive evaluation of the task for her next research project, testing the task with an even larger group of children. She also has a number of research projects under way with OSU graduate students, including one that uses a variety of fun games to improve a child's ability to regulate their behavior.

She said she has made a simple DVD that demonstrates the task, and in response has received requests from around the world from researchers who want to use the task with young children."The evidence strongly suggests that improving self-regulation is directly related to academic achievement and behavior," McClelland said. "If we can make a difference early in a child's life, they have that much more of a chance at success."

Their results were published in a recent issue of the journal, *Developmental Psychology*.

J.S. Matthews and Frederick Morrison from the University of Michigan contributed to this research, which was funded by a grant from the Department of Education and National Institutes of Health's National Institute of Child Health and Human Development. For the past two years, Ponitz's work has been funded through an Institute for Education Sciences Postdoctoral training grant to the University of Virginia.

Adapted from materials provided by Oregon State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090608162547.htm

Neolithic Age: Prehistoric Complex Including Two 6,000-year-old Tombs Discovered In Britain

Dr Helen Wickstead examines some of the artefacts found at Damerham. (Credit: Image courtesy of Kingston University)

ScienceDaily (June 9, 2009) — A prehistoric complex including two 6,000-year-old tombs representing some of the earliest monuments built in Britain has been discovered by a team led by a Kingston University archaeologist. Dr Helen Wickstead and her colleagues were stunned and delighted to find the previously undiscovered Neolithic tombs, also known as long barrows, at a site at Damerham, Hampshire.

Some artefacts, including fragments of pottery and flint and stone tools, have already been recovered and later in the summer a team of volunteers will make a systematic survey of the site, recovering and recording any artefacts that have been brought to the surface by ploughing.

Dr Wickstead said that further work would help to reveal more about the Neolithic era. “We hope that scientific methods will allow us to record these sites before they are completely eroded,” she said. “If we can excavate, we’ll be able to say a lot more about Neolithic people in that area and find out things like who was buried there, what kinds of lives they led, and what the environment was like six thousand years ago.”

She said the find was particularly rare because it was close to Cranborne Chase, one of the most thoroughly researched prehistoric areas in Europe. “I was really excited. It’s rare to find sites of this kind and the tombs are likely to be of national importance,” said Dr Wickstead. ”What’s really extraordinary is the location – it’s one of the most famous prehistoric landscapes, a mecca for prehistorians, and you would have thought the archaeological world would have gone over it with a fine tooth comb.”

Dr Wickstead, a visiting researcher in the Faculty of Science, is also project manager of Damerham Archaeology Project, an educational body set up last year to discover more about the archaeology of the area around Damerham village.

The importance of the site at Damerham first emerged in 2003 when English Heritage spotted crop marks – which can indicate buried archaeological sites - on aerial photographs of the area. Dr Wickstead volunteered to begin geophysical tests of the area and it was while her team was planning the work that Martyn Barber, a member of the Damerham Archaeology Project, looked at a Windows Live Map of the

area to find the car park where he was due to meet his colleagues and was astonished to see another tomb a few hundred metres from the first. “To find any new monuments of this date still visible as humps on the ground is unusual,” said Dr Wickstead, “But to find two is fantastic – we were flabbergasted.”

Work on the site is in its early stages but Dr Wickstead said the tombs may contain human bones, while nearby there are cropmark traces of some larger circular enclosures which may have been built at the same time as the prehistoric monument at Stonehenge, which is 15 miles away.

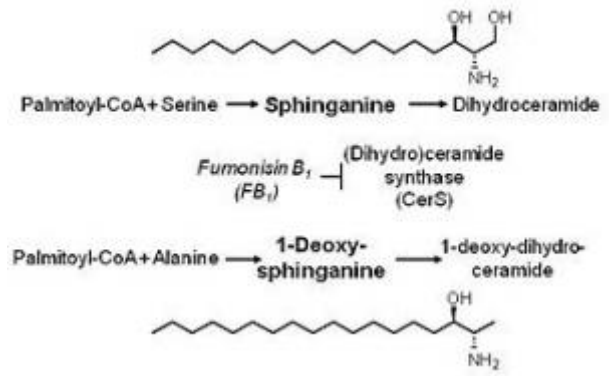
In Neolithic times, a ritual burial involved leaving a body out so the flesh would decay. Some of the bones were later put in a tomb, or relatives may even have kept some bones as a special talisman. ”We don’t know whether these sites contained chambers with bones in them - some long barrows never contained bones at all, rather like cenotaphs today. We may also find that any chambers have been destroyed by ploughing – only by excavating could we find out for sure,” said Dr Wickstead.

She said her team were sensitive to the emotions stirred by discovering human remains. “The recovery of ancient human remains is always handled sensitively,” said Dr Wickstead. “We feel respect for the dead people we study, and we treat their remains,with care.”

Adapted from materials provided by Kingston University, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090608143835.htm

New Category Of Fat In Mammalian Cells May Help Explain How Toxin Harms Farm Animals



ARS scientists and their colleagues have discovered a new category of fats in mammalian cells whose chemical backbone is based on the amino acid alanine rather than serine. (Credit: ARS)

ScienceDaily (June 9, 2009) — A new category of fats in mammalian cells discovered by Agricultural Research Service (ARS) scientists and colleagues may help explain how a harmful toxin called fumonisin causes disease in farm animals.

The discovery could open up a new research area for exploring ways to reduce the toxic effects of fumonisin, which is found in corn that has been infected with a fungus called Fusarium. Fumonisin is known to cause a host of diseases, such as equine leukoencephalomalacia, which is a brain disease in horses, and porcine pulmonary edema, a lung disease in swine.

In previous work, these scientists found that fumonisin inhibits the formation of a group of fats known as sphingolipids and disrupts the metabolism of sphingolipids and other fats. It is now known that this disruption of fat metabolism is the cause of the animal diseases and also kidney and liver toxicity and cancer in rodent animal models. In the earlier studies, this group showed that inhibition increases the levels of several well-known sphingolipid metabolites and an unidentified sphingolipid which was coined "the mystery peak."

ARS toxicologist Ronald Riley at the ARS Richard B. Russell Research Center in Athens, Ga., and colleagues at Health Canada in Ottawa, Emory University in Atlanta, Ga., and the Georgia Institute of Technology in Atlanta identified the "mystery" compound. The research was published recently in the *Journal of Biological Chemistry.*

Riley and his colleagues found that the first enzyme that makes the backbone--sphinganine--common to all sphingolipids normally uses serine as a substrate. However, the mystery compound was being produced because the enzyme was using the amino acid "alanine" instead.

This is important because the oxygen atom which is found on serine is critical in the formation of more complex sphingolipids. Thus, this new sphingoid base was called 1-deoxysphinganine and serves as the backbone for a new category of sphingolipids (1-deoxydihydroceramides) in mammalian cells and tissues.This new sphingoid base accumulates in cells and tissues after fumonisin exposure. Riley and his colleagues showed that the amount of 1-deoxysphinganine rises when levels of serine fall relative to alanine. Thus, these compounds are an underappreciated category of bioactive sphingolipids that might play important roles in cell regulation and disease.

Adapted from materials provided by USDA/Agricultural Research Service.

http://www.sciencedaily.com/releases/2009/06/090606105725.htm

Is Rural Land Use Too Important To Be Left To Farmers?

ScienceDaily (June 9, 2009) — As demands on rural land increase and we are all having to deal with the effects of climate change, we may need to take a fresh look at our priorities, according to leading academics at The Future of Rural Land Use, a conference organised by the UK Research Councils' Rural Economy and Land Use Programme on 4 June 2009.

Director of the Relu Programme, Professor Philip Lowe, said: "Our approach to the countryside in the UK has swung from a post World War 2 outlook of relentless expansion of food production, to surpluses in the 1970s and 80s, which gave us the opportunity for an unprecedented focus on conservation. "But now we are once again experiencing anxieties about food security and a possible global food crisis.And this time we have climate change in the picture bringing additional demands on land. We need space for growing new biofuel crops and for water storage that could save more populated areas from flooding, we may need additional room for mobile or flexible infrastructure during extreme weather events, and yet at the same time more people than ever want to live in rural areas or to use the countryside for leisure pursuits, whether that means angling, shooting, walking, bird watching or horse riding."

Relu researchers are coming up with some of the evidence that the government will need to make decisions about these kinds of priorities:

- Dr Angela Karp, who heads the Centre for Bioenergy and Climate Change at Rothamsted Research, is investigating the environmental impacts of growing the biofuels short rotation coppice willow and Miscanthus grass. Dr Karp said: ""The first generation of biofuels came in for a lot of criticism because they were seen as taking land away from food production. This second generation of crops could have much greater advantages. They are fast-growing, with the potential to produce large biomass yields on more marginal land from low inputs of fertilisers and pesticides. Although there are concerns that they are bad for biodiversity, our results revealed beneficial effects on plants, insects and birds for willow in particular."
- Professor Joe Morris of Cranfield University is investigating more effective management of floodplains. He has found that there is considerable potential for using rural land for flood storage but other interests, including biodiversity may suffer. Professor Morris said: "There are conflicts, and trade-offs will increasingly have to be made. For example, flood management may not always sit comfortably with farmers' commercial objectives. And should the interests of rural populations always be a lower priority than saving urban infrastructure?"
- Professor Bill Sutherland of Cambridge University is investigating how the management decisions that farmers take affects the biodiversity of their land. Professor Sutherland said: "Agricultural policy and economic conditions affect farmers' livelihoods and their management decisions. Areas of land that were designated as set aside in the 1980s and 1990s are now being brought back into cultivation and this has implications for biodiversity. Our project is modelling the effects of this change and which species will be winners and losers."

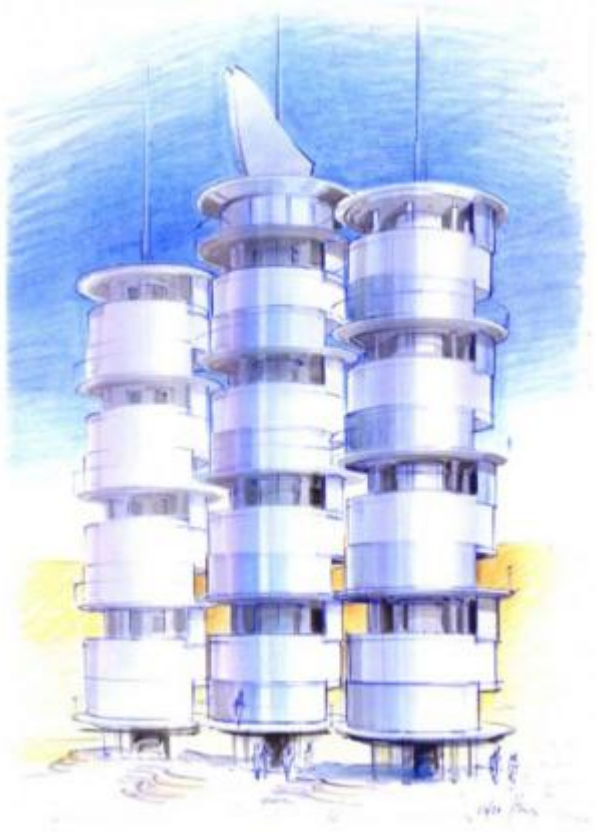
Research from the Relu Programme will be important for the complex policy decisions about land use that need to be taken at national and regional level.

Professor Philip Lowe said: "As we come to expect more and more from land, we have to decide what our priorities for land use are in the UK. We are well used to operating within a land use planning system in urban areas. Any system to be applied to rural land use would have to be much more flexible. There would undoubtedly be opposition from some land owners but we know that land will be a major asset for society in mitigating and adapting to climate change. Is it not time, at least for a wider public debate on this issue?"

Adapted from materials provided by Newcastle University, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090608143837.htm

Drinking Water From Air Humidity



Drinking water from air humidity. (Credit: Image courtesy of Fraunhofer-Gesellschaft)

ScienceDaily (June 8, 2009) — Not a plant to be seen, the desert ground is too dry. But the air contains water, and research scientists have found a way of obtaining drinking water from air humidity. The system is based completely on renewable energy and is therefore autonomous.

Cracks permeate the dried-out desert ground, the landscape bears testimony to the lack of water. But even here, where there are no lakes, rivers or groundwater, considerable quantities of water are stored in the air. In the Negev desert in Israel, for example, annual average relative air humidity is 64 percent – in every cubic meter of air there are 11.5 milliliters of water.

Research scientists at the Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB in Stuttgart working in conjunction with their colleagues from the company Logos Innovationen have found a way of converting this air humidity autonomously and decentrally into drinkable water. “The process we have developed is based exclusively on renewable energy sources such as thermal solar collectors and photovoltaic cells, which makes this method completely energy-autonomous. It will therefore function in regions where there is no electrical infrastructure,” says Siegfried Egner, head of department at the IGB. The principle of the process is as follows: hygroscopic brine – saline solution which absorbs moisture – runs down a tower-shaped unit and absorbs water from the air. It is then sucked into a tank a few meters off the ground in which a vacuum prevails. Energy from solar collectors heats up the brine, which is diluted by the water it has absorbed.

Because of the vacuum, the boiling point of the liquid is lower than it would be under normal atmospheric pressure. This effect is known from the mountains: as the atmospheric pressure there is lower than in the valley, water boils at temperatures distinctly below 100 degrees Celsius. The evaporated, non-saline water is condensed and runs down through a completely filled tube in a controlled manner. The gravity of this water column continuously produces the vacuum and so a vacuum pump is not needed. The reconcentrated brine runs down the tower surface again to absorb moisture from the air.

“The concept is suitable for various sizes of installation. Single-person units and plants supplying water to entire hotels are conceivable,” says Egner. Prototypes have been built for both system components – air moisture absorption and vacuum evaporation – and the research scientists have already tested their interplay on a laboratory scale. In a further step the researchers intend to develop a demonstration facility.

Adapted from materials provided by Fraunhofer-Gesellschaft.

http://www.sciencedaily.com/releases/2009/06/090605091856.htm

Cantabrian Cornice in Spain Has Experienced Seven Cooling And Warming Phases Over Past 41,000 Years

The examination of the fossil remains of rodents and insectivores from deposits in the cave of El Mirón, Cantabria, has made it possible to determine the climatic conditions of this region between the late Pleistocene and the present day. (Credit: Gloria Cuenca-Bescós / SINC)

ScienceDaily (June 8, 2009) — The examination of the fossil remains of rodents and insectivores from deposits in the cave of El Mirón, Cantabria, has made it possible to determine the climatic conditions of this region between the late Pleistocene and the present day. In total, researchers have pinpointed seven periods of climatic change, with glacial cold dominating during some of them, and heat in others.

In 1996, an international team of scientists led by the University of Zaragoza (UNIZAR) started to carry out a paleontological survey in the cave of El Mirón. Since then they have focused on analysing the fossil remains of the bones and teeth of small vertebrates that lived in the Cantabrian region over the past 41,000 years, at the end of the Quaternary. The richness, great diversity and good conservation status of the fossils have enabled the researchers to carry out a paleoclimatic study, which has been published recently in the *Journal of Archaeological Science.*

"We carried out every kind of statistical analysis over a six-month period at the University of New Mexico, analysing around 100,000 remains, of which 4,000 were specifically identified, and catalogued according to species and the number of individuals in each stratum", Gloria Cuenca-Bescós, lead author of the study and a researcher in the Paleontology Department of the UNIZAR's Institute for Scientific Research (IUCA), tells SINC.

The resulting study involves climatic inferences being drawn on the basis of the fossil associations of small mammals whose remains have been deposited in El Mirón over the past 41,000 years. The fossil associations of these mammals reveal the composition of fauna living around the cave at the time, and have made it possible to develop a paleoclimatological and paleoenvironmental reconstruction of the environment.

The research shows that there have been seven periods of cooling and warming in the Cantabrian cornice over the past 41,000 years. An analysis carried out by other authors on data relating to pollen, marine isotope stratigraphy, and materials deposited by glaciers backs this up this result.

The water rat was king of the Late Pleistocene

According to the study, there were four unstable cold periods, two more stable ones, and a temperate climatic period at the El Mirón cave. The scientists are unsure about dating the seventh and last period ended, as this "could correspond with the Bronze Age, the Ice Age, or the start of agricultural expansion by human beings, which certainly would have impacted on the wild animals living close to the caves.

However, the study shows that during earlier periods at the end of the Late Pleistocene, the species that predominated during cold periods were rodents and insectivores that were well-adapted to environments with only sparse vegetation. "When climatic conditions became more mild at the end of the last cold pulse of the Late Pleistocene, known as the Dryas III, forest-dwelling rodents and insectivores flourished and become more frequent in the associations", explains Cuenca-Bescós. We now know that the water vole (Arvicola terrestris) dominated in this period.

According to the researcher, this domination by woodland species started to decline in the area only at the end of the Holocene, when human activities began to change the landscape, and when deforestation resulting from permanent settlements and agriculture can be observed "even though the climate continued to be favourable to these kinds of organisms".

The study has also shown that the majority of the Pleistocene taxa became extinct around 10,000 years ago while "some cold-adapted species, which had managed to survive, moved to the north of Europe, leaving our warmer latitudes behind", the scientist concludes.

Cuenca-Bescós, Gloria; Straus, Lawrence G.; González Morales, Manuel R.; García Pimienta, Juan C. “The reconstruction of past environments through small mammals: from the Mousterian to the Bronze Age in El Miron Cave (Cantabria, Spain)” Journal of Archaeological Science 36(4): 947-955 April 2009

Journal reference:

1. Cuenca-Bescós et al. **The reconstruction of past environments through small mammals: from the Mousterian to the Bronze Age in El Mirón Cave (Cantabria, Spain)**. *Journal of Archaeological Science*, 2009; 36 (4): 947 DOI: 10.1016/j.jas.2008.09.025

Adapted from materials provided by Plataforma SINC.

http://www.sciencedaily.com/releases/2009/06/090603091254.htm

Prehistoric Whale Discovered On The West Coast Of Sweden

The discovery of the whale bone. (Credit: Svevia)

ScienceDaily (June 8, 2009) — The skeleton of a whale that died around 10,000 years ago has been found in connection with the extension of the E6 motorway in Strömstad. The whale bones are now being examined by researchers at the University of Gothenburg who, among other things, want to ascertain whether the find is the mystical "Swedenborg whale".

Similar to the "Swedenborg whale"

There are currently four species of right whale. What is particularly interesting is that the size and shape of the whale bones resemble those of a fifth species: the mystical "Swedenborg whale", first described by the scientist Emmanuel Swedenborg in the 18th century."Bones from what is believed to be Swedenborg's right whale have previously been found in western Sweden. However, determining the species of whale bones found in earth is complicated and there is no definitive conclusion on whether the whale actually existed, it could equally well be a myth," says zoologist Thomas Dahlgren and his colleague Leif Jonsson.

DNA tests conducted

To determine the species of whale that has been found Thomas Dahlgren has conducted DNA tests that are to be analysed in conjunction with researchers at the Natural History Museum in London. The whale bones are interesting in several respects. The fragments of bone were collected in a clay deposit and remains of marine organisms that today are also endangered species were found around them."The hunt for the large whale species, which led to the extinction of the Atlantic grey whale and perhaps the Swedenborg whale, may also have caused the extinction of a large number of species that are dependent on whale carcasses for their survival," says Thomas Dahlgren.

Preserved in clay

The whale bones are thought to be around 10,000 years old and were found 75 metres above sea level, but in a site that at that time was located out on the coast. It is conjectured that the bones have been preserved for such a long time as they were surrounded by fine, oxygen-free clay. The largest whale bone, approximately 2.5 metres long, is part of a jawbone. Among the smaller bones is a vertebra. Discussions are underway on whether the bones can be put in order and potentially put on public display.

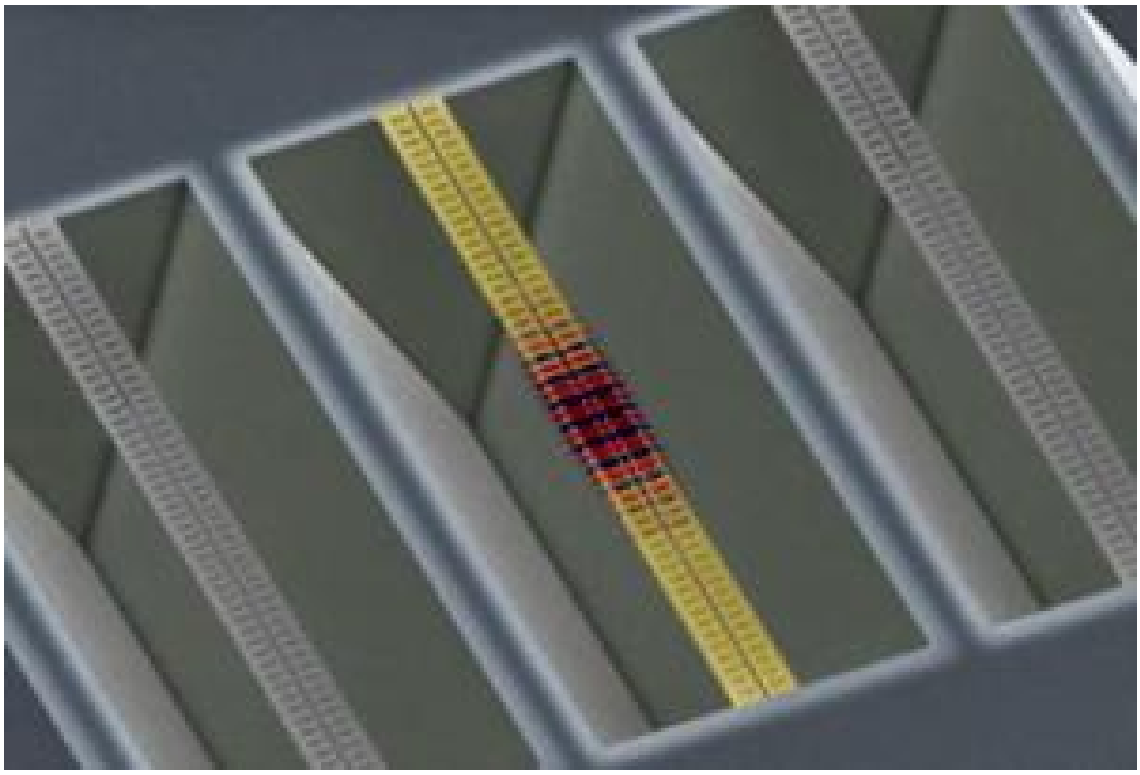
Facts about the Swedenborg whale (Balaena swedenbo´rgii)

The whale species is believed to have existed in the North Sea from the period when the inland ice melted until about 8,000 years ago, and subsequently to have died out. Ten collections of bones from the species have been found in the west of Sweden. However, there is speculation that the bones have been mistaken for other species, and that the Swedenborg whale never existed. Source: Swedish National Encyclopedia

Adapted from materials provided by University of Gothenburg.

http://www.sciencedaily.com/releases/2009/06/090605110420.htm

Nanoscale Zipper Cavity Responds To Single Photons Of Light



Scanning electron microscope image of an array of "zipper" optomechanical cavities. The scale and sensitivity of the device is set by its physical mass (40 picograms/40 trillionths of a gram) and the nanoscale gap between the two nanobeams (100 nanometers/100 billionths of a meter). (Credit: Caltech/Matt Eichenfield and Jasper Chan)

ScienceDaily (June 8, 2009) — Physicists at the California Institute of Technology (Caltech) have developed a nanoscale device that can be used for force detection, optical communication, and more. The device exploits the mechanical properties of light to create an optomechanical cavity in which interactions between light and motion are greatly strengthened and enhanced.

These interactions, notes Oskar Painter, associate professor of applied physics at Caltech, and the principal investigator on the research, are the largest demonstrated to date.

The device and the work that led to it are described in a recent issue of the journal *Nature*.

The fact that photons of light, despite having no mass, nonetheless carry momentum and can interact with mechanical objects is an idea that dates back to Kepler and Newton. The mechanical properties of light are also known to limit the precision with which one can measure an object's position, since simply by using light to do the measurement, you apply a force and disturb the object.

It was important to consider these so-called back-action effects in the design of devices to measure weak, classical forces. Such considerations were part of the development of gravity-wave detectors like the Laser Interferometer Gravitational-Wave Observatory (LIGO). These sorts of interferometer-based detectors have also been used at much smaller scales, in scanning probe instruments used to detect or image atomic surfaces or even single electron spins.

To get an idea of how these systems work, consider a mirror attached to a floppy cantilever, or spring. The cantilever is designed to respond to a particular force—say, a magnetic field. Light shining down on

the mirror will be deflected when the force is detected—i.e., when the cantilever moves—resulting in a variation in the light beam's intensity that can then be detected and recorded.

"LIGO is a huge multikilometer-scale interferometer," notes Painter. "What we did was to take that and scale it all the way down to the size of the wavelength of light itself, creating a nanoscale device."

They did this, he explains, because as these interferometer-based detectors are scaled down, the mechanical properties of light become more pronounced, and interesting interactions between light and mechanics can be explored.

"To this end, we made our cantilevers many, many times smaller, and made the optical interaction many, many times larger," explains Painter.

They call this nanoscale device a zipper cavity because of the way its dual cantilevers—or nanobeams, as Painter calls them—move together and apart when the device is in use. "If you look at it, it actually looks like a zipper," Painter notes.

"Zipper structures break new ground on coupling photonics with micromechanics, and can impact the way we measure motion, even into the quantum realm," adds Kerry Vahala, Caltech's Ted and Ginger Jenkins Professor of Information Science and Technology and professor of applied physics, and one of the paper's authors. "The method embodied in the zipper design also suggests new microfabrication design pathways that can speed advances in the subject of cavity optomechanics as a whole."

To create their zipper cavity device, the researchers made two nanobeams from a silicon chip, poking holes through the beams to form an effective optical mirror. Instead of training a light down onto the nanobeams, the researchers used optical fibers to send the light "in plane down the length of the beams," says Painter. The holes in the nanobeams intercept some of the photons, circulating them through the cavity between the beams rather than allowing them to travel straight through the device.

Or, to be more precise, the circulating photons actually create the cavity between the beams. As Painter puts it: "The mechanical rigidity of the structure and the changes in its optical response are predominantly governed by the internal light field itself."

Such an interaction is possible, he adds, because the structure is precisely designed to maximize the transfer of momentum from the input laser's photons to the mechanical nanobeams. Indeed, a single photon of laser light zipping through this structure produces a force equivalent to 10 times that of Earth's gravity. With the addition of several thousand photons to the cavity, the nanobeams are effectively suspended by the laser light.

Changes in the intensity and other properties of the light as it moves along the beams to the far end of the chip can be detected and recorded, just as with any large-scale interferometer.

The potential uses for this sort of optomechanical zipper cavity are myriad. It could be used as a sensor in biology by coating it with a solution that would bind to, say, a specific protein molecule that might be found in a sample. The binding of the protein molecule to the device would add mass to the nanobeams, and thus change the properties of the light traveling through them, signaling that such a molecule had been detected. Similarly, it could be used to detect other ultrasmall physical forces, Painter adds.

Zipper cavities could also be used in optical communications, where circuits route information via optical beams of different colors, i.e., wavelengths. "You could control and manipulate what the optical beams of light are doing," notes Painter. "As the optical signals moved around in a circuit, their direction or color could be manipulated via other control light fields." This would create tunable photonics, "optical circuits that can be tuned with light."

Additionally, the zipper cavity could lead to applications in RF-over-optical communications and microwave photonics as well, where a laser source is modulated at microwave frequencies, allowing the signals to travel for kilometers along optical fibers. In such systems, the high-frequency mechanical vibrations of the zipper cavity could be used to filter and recover the RF or microwave signal riding on the optical wave.

Other authors on the *Nature* paper, "A picogram- and nanometre-scale photonic-crystal optomechanical cavity," include graduate students Matt Eichenfield (the paper's first author) and Jasper Chan, and postdoctoral scholar Ryan Camacho.

Their research was supported by a Defense Advanced Research Projects Agency seeding effort, and an Emerging Models and Technologies grant from the National Science Foundation.

Journal reference:

1. Matt Eichenfield, Ryan Camacho, Jasper Chan, Kerry J. Vahala, Oskar Painter. **A picogram- and nanometre-scale photonic-crystal optomechanical cavity**. *Nature*, 2009; 459 (7246): 550 DOI: 10.1038/nature08061

Adapted from materials provided by California Institute of Technology.

http://www.sciencedaily.com/releases/2009/06/090604144338.htm

Television Watching Before Bedtime Can Lead To Sleep Debt

ScienceDaily (June 8, 2009) — According to new research presented at Sleep 2009, the 23rd Annual Meeting of the Associated Professional Sleep Societies,* television watching may be an important determinant of bedtime, and may contribute to chronic sleep debt.

The study included data from 21,475 people aged 15 or older who completed the American Time Use Survey between the years 2003 and 2006. The study examined the activities participants undertook two hours before and after bed time. It found that television viewing was by far and away the dominant pre-sleep activity, accounting for almost 50% of pre-bed time.

According to the authors of the study, Mathias Basner, MD, MS, MSc, and David F. Dinges, PhD, of the University of Pennsylvania School of Medicine in Philadelphia, they were surprised to find that watching television seemed to be the most important time cue for the beginning of the sleep period, rather than hours past sunset or other more biological factors. So, in fact, TV may make people stay up late, while alarm clocks make them get up early, potentially reducing sleep time below what is physiologically needed.

Sleeping less than 7-8 hours daily impairs alertness and is associated with increased obesity, morbidity and mortality. Despite this fact, up to 40 percent of Americans sleep for less than the recommended time per night.

"Given the relationship of short sleep duration to health risks, there is concern that many Americans are chronically under-sleeping due to lifestyle choices," said Dinges. Dr. Basner added that "According to our results, watching less television in the evening and postponing work start time in the morning appear to be the candidate behavioral changes for achieving additional sleep and reducing chronic sleep debt. While the timing of work may not be flexible, giving up some TV viewing in the evening should be possible to promote adequate sleep."

*The abstract, "The Time of Our Lives: Work, Sleep and Television" was presented on June 8.

Adapted from materials provided by American Academy of Sleep Medicine, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2009/06/090608071941.htm

'Warrior Gene' Linked To Gang Membership, Weapon Use

Boys who carry a particular variation of the gene Monoamine oxidase A (MAOA), sometimes called the "warrior gene," are more likely not only to join gangs but also to be among the most violent members and to use weapons, according to a new study from The Florida State University that is the first to confirm an MAOA link specifically to gangs and guns. (Credit: iStockphoto/S.P. Rayner)

ScienceDaily (June 8, 2009) — Boys who carry a particular variation of the gene Monoamine oxidase A (MAOA), sometimes called the "warrior gene," are more likely not only to join gangs but also to be among the most violent members and to use weapons, according to a new study from The Florida State University that is the first to confirm an MAOA link specifically to gangs and guns.

Findings apply only to males. Girls with the same variant of the MAOA gene seem resistant to its potentially violent effects on gang membership and weapon use.

Led by noted biosocial criminologist Kevin M. Beaver at FSU's College of Criminology and Criminal Justice, the study sheds new light on the interplay of genetics and environment that produces some of society's most serious violent offenders.

"While gangs typically have been regarded as a sociological phenomenon, our investigation shows that variants of a specific MAOA gene, known as a 'low-activity 3-repeat allele,' play a significant role," said Beaver, an award-winning researcher who has co-authored more than 50 published papers on the biosocial underpinnings of criminal behavior.

"Previous research has linked low-activity MAOA variants to a wide range of antisocial, even violent, behavior, but our study confirms that these variants can predict gang membership," he said. "Moreover,

we found that variants of this gene could distinguish gang members who were markedly more likely to behave violently and use weapons from members who were less likely to do either."

The MAOA gene affects levels of neurotransmitters such as dopamine and serotonin that are related to mood and behavior, and those variants that are related to violence are hereditary. Some previous studies have found the "warrior gene" to be more prevalent in cultures that are typified by warfare and aggression.

"What's interesting about the MAOA gene is its location on the X-chromosome," Beaver said. "As a result, males, who have one X-chromosome and one Y-chromosome, possess only one copy of this gene, while females, who have two X-chromosomes, carry two. Thus, if a male has an allele (variant) for the MAOA gene that is linked to violence, there isn't another copy to counteract it. Females, in contrast, have two copies, so even if they have one risk allele, they have another that could compensate for it. That's why most MAOA research has focused on males, and probably why the MAOA effect has, for the most part, only been detected in males."

The new study examined DNA data and lifestyle information drawn from more than 2,500 respondents to the National Longitudinal Study of Adolescent Health. Beaver and colleagues from Florida State, Iowa State and Saint Louis universities detailed their findings in a paper in the journal *Comprehensive Psychiatry.*

Journal reference:

1. Beaver et al. **Monoamine oxidase A genotype is associated with gang membership and weapon use**. *Comprehensive Psychiatry*, 2009; DOI: 10.1016/j.comppsych.2009.03.010

Adapted from materials provided by Florida State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090605123237.htm

Basket Weaving May Have Taught Humans To Count

Basketry masks in Amazonia. (Credit: Image courtesy of University of East Anglia)

ScienceDaily (June 8, 2009) — Did animals teach us one of the oldest forms of human technology? Did this technology contribute to our ability to count? These are just two of the themes due to be explored at a conference on basketry at the University of East Anglia.

The event, which takes place today and tomorrow (June 5-6), is part of Beyond the Basket, a major new research project led by the university exploring the development and use of basketry in human culture over 10,000 years.

Basketry has been practised for millennia and ranges from mats for sitting on, containers and traps for hunting, to fencing and barriers for animals or land, partitions and walls - all of which have been central to culture.

Beyond the Basket is a two-and-a-half year project funded by the Arts and Humanities Research Council as part of its Beyond Text programme. The research will explore the role of basketry in human culture and focus on various parts of the world, both in the past and present, from Europe to Amazonia, central Africa and Papua New Guinea.

The aim is to identify the mechanical traditions of making and the ways in which basketry is implicated in wider patterns of understanding, for example the order of society or the design of the universe. It will also show the impact of woven forms on other media, such as pottery, painting, and stone sculpture and architecture, and look at the future of basketry and the solutions it could offer to current issues, whether technical or social.

Project leader Sandy Heslop, of the School of World Art and Museology at UEA, said: “Basketry is a worldwide technology and is the interaction between human ingenuity and the environment. It tends to make use of, and therefore has to be adapted to, local conditions in terms of resources and environment.

"Without basketry there would be no civilisations. You can't bring thousands of people together unless you can supply them, you can't bring in supplies to feed populations without containers. In the early days of civilisations these containers were basketry.

"We may think of baskets as humble, but other people and cultures don't. They have been used for storage, for important religious and ceremonial processes, even for bodies in the form of coffins."

It is about 10,000 years ago that evidence for basketry starts to appear in North America, Asia, Europe and the Middle East. Today its uses and influences are still seen, from the bamboo scaffolding often used in Asia, to contemporary architecture, for example the 'Boiler Suit' - the name given to the 'woven' steel tiles encasing the boiler room at Guy's Hospital in London.

Mr Heslop said: "Beyond its practical uses, basketry has arguably been even more influential on our lives, since it relies on the relationship of number, pattern and structure. It therefore provides a model for disciplines such as mathematics and engineering and for the organisation of social and political life.

"Given the range of uses of basketry the associations of the technology are very varied. Some are aggressive, others protective, some help create social hierarchies others are recreational."

The conference, Beyond the Basket: Construction, Order and Understanding, will look at various themes including: design and production, environmental issues, commercial and historical perspectives, weaving in architecture, and the mathematics of basketry, as well as more anthropological and archaeological topics. Among the speakers will be experts from North and South America, as well as the UK.

Beyond the Basket will culminate in an exhibition and accompanying book in 2011. The exhibition will include ancient material recovered by excavation as well as more recent examples of basketry from around the world and will enable people to experience basketry directly.

For further information about Beyond the Basket and to view images visit http://projects.beyondtext.ac.uk/beyondthebasket

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Adapted from materials provided by University of East Anglia, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090604222534.htm

Archaeologists Locate Confederate Cannons, Naval Yard

University of South Carolina underwater archaeologist Christopher Amer and archaeological assistant Joe Beatty carry an artillery shell from a Confederate Brooke rifled cannon recovered from the Pee Dee River in Marion County, S.C. (Credit: Courtesy of South Carolina Institute of Archaeology and Anthropology)

ScienceDaily (June 8, 2009) — Archaeologists from the University of South Carolina and East Carolina University have located two large cannon from a sunken Confederate gunboat in the Pee Dee River and have identified where the Mars Bluff Naval Yard once stood on the east side of the river in Marion County, S.C.

State underwater archaeologist Christopher Amer and state archaeologist and research associate professor Dr. Jon Leader began work April 30. The project called for locating and, eventually, raising three cannon, each weighing upwards of five tons, that were once aboard C.S.S. Pee Dee, as well as determining the location of the naval yard where the gunboat had been built.

Amer said the underwater research has been very successful, despite rising waters that have created a higher or more swift-moving current and lower visibility.

“Our underwater work hasn’t been easy,” Amer said. “In spite of high, near-flood water in the river, we have located two of the three cannon and have raised two 7-inch Brooke artillery shells and four 6.4-inch Brooke shells. Water operations also have located pilings from the dock where vessels were outfitted and evidence of post-war logging operations.”

Leader, with the help of eight university students, conducted terrestrial operations using ground-penetrating radar and other remote-sensing technologies to identify where the buildings of the naval yard once stood. The data was used to create a 3-D map for excavation work.

Archaeologists and graduate students are digging pits, measuring 50 centimeters wide down to the Pleistocene layer, so that artifacts can be dated in the soil layers where they lay before they are excavated.

A variety of objects, including ceramics, glass and nails, provide clues to the location of specific buildings and activity areas at the naval yard, which operated as a Confederate States of America (CSA) stronghold from 1862 –1865.

"A smoking pipe bowl fragment recovered by the excavation team bears the initials 'WG,'" Leader said. "WG pipes are known from American Revolutionary War and others sites to ca. 1830. It gave us quite a start, as one of the original owner's initials was also WG, a remarkable coincidence."

Among the resources Amer has used in the project is a letterbook kept by Confederate Lt. Edward Means from Aug. 3, 1864, to March 15, 1865 (among holdings at Louisiana State University), which provides valuable information about operations at the Mars Bluff Naval Yard.

Amer says the university's research findings and the artifacts recovered will help tell the story of the people who worked at the Mars Bluff Naval Yard and how they constructed the Confederate warships.

"The artifacts recovered to date provide us with a tantalizing glimpse into past lifeways at the site," Amer said, "and remind us of a time in this nation's history when, in the face of advancing overwhelming odds, the Confederate officers, sailors and workmen at the only inland Confederate naval shipyard in South Carolina, along with the local community, gave it their best shot."

The Mars Bluff Naval Yard was one of a score of Confederate naval yards that were located inland in Southern states so gunboats and support vessels for the war could be built and protected from Union forces. Mars Bluff was chosen for its inland location, proximity to the railroad, water communication with Charleston via Georgetown and the abundance of ash, oak and pine lumber.

C.S.S. Pee Dee was a 150-foot Macon class gunboat that was built at Mars Bluff and outfitted with two Brooke rifled cannon and a Union Dahlgren cannon and launched in January 1865. The Pee Dee's career was short-lived. Fearing that the gunboat might fall into enemy hands as Gen. William T. Sherman's Union troops moved from Columbia northward to advance on North Carolina, commanders ordered the cannons thrown overboard into the Pee Dee River before the ship was scuttled on March 15, set ablaze and blown up.

The project of the S.C. Institute for Archaeology and Anthropology at the University of South Carolina is funded in part by a $200,000 grant from the Drs. Bruce and Lee Foundation in Florence. Plans call for the cannon and artifacts recovered from the Mars Bluff Naval Yard and associated with the C.S.S. Pee Dee to be preserved at conservation laboratories at Francis Marion University under the supervision of Leader. They will then be exhibited at the Florence County Museum.

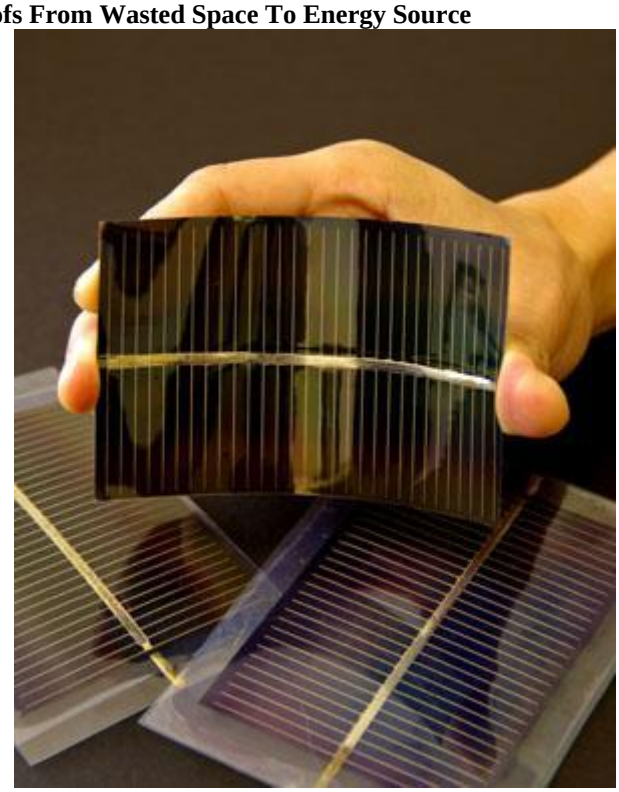
The project includes collaboration with East Carolina University and Francis Marion University. ECU's Program in Maritime Studies is conducting a field school on the site through June 19, providing support to the SCIAA team's research and excavation work.

Amer said researchers have been aided greatly by the Pee Dee Research and Recovery Team, which conducted an underwater survey of the site in the 1990s under an intensive survey license from SCIAA, and by the owners of the property on which the site is located. The owners have allowed the university and ECU archaeologists to stage the underwater operations on their property and conduct terrestrial archaeology.

Adapted from materials provided by University of South Carolina.

http://www.sciencedaily.com/releases/2009/06/090605175102.htm

Flexible Solar Power Shingles Transform Roofs From Wasted Space To Energy Source



PNNL, Vitex Systems and Battelle are working to adapt a film encapsulation process that would enable flexible solar panels like this. The flexible solar panels could be placed on rooftops like shingles and could replace today's boxy solar panels that are made with rigid glass or silicon and mounted on thick metal frames. (Credit: Photo courtesy of Vitex Systems, Inc.)

ScienceDaily (June 8, 2009) — A transparent thin film barrier used to protect flat panel TVs from moisture could become the basis for flexible solar panels that would be installed on roofs like shingles.

The flexible rooftop solar panels - called building-integrated photovoltaics, or BIPVs - could replace today's boxy solar panels that are made with rigid glass or silicon and mounted on thick metal frames. The flexible solar shingles would be less expensive to install than current panels and made to last 25 years.

"There's a lot of wasted space on rooftops that could actually be used to generate power," said Mark Gross, a senior scientist at the Department of Energy's Pacific Northwest National Laboratory. "Flexible solar panels could easily become integrated into the architecture of commercial buildings and homes. Solar panels have had limited success because they've been difficult and expensive to install."

Researchers at PNNL will create these flexible panels by adapting a film encapsulation process currently used to coat flat panel displays that use organic light-emitting diodes, or OLEDs. The work is made possible by a Cooperative Research and Development Agreement recently penned between Vitex Systems and Battelle, which operates PNNL for the federal government.

PNNL researchers developed the thin film technology in the 1990s. At the time, the lab's team investigated 15 possible applications, including solar power. Vitex licensed the technology from Battelle in 2000 and focused its initial efforts on developing the ultra-barrier films for flat-panel displays. Now PNNL and Vitex are taking a hard second look at solar power.

The encapsulation process and the ultra-barrier film - called Barix™ Encapsulation and Barix™ Barrier Film, respectively - are already proven and effective moisture barriers. But researchers need to find a way to apply the technology to solar panels that are made with copper indium gallium selenide, called CIGS, or cadmium telluride, called CdTe.

Under the agreement, researchers will create low-cost flexible barrier films and evaluate substrate materials for solar panels, which are also called photovoltaics, or PVs. Both the film and substrate must be able to survive harsh ultraviolet rays and natural elements like rain and hail for 25 years.

The agreement also calls for researchers to develop a manufacturing process for the flexible panels that can be readily adapted to large-scale production. If successful, this process will reduce solar panel manufacturing costs to less than $1 per watt of power, which would be competitive with the 10 cents per kilowatt-hour that a utility would charge.

"Vitex is proud to continue its long, successful relationship with PNNL," said Martin Rosenblum, Vitex's vice president of operations and engineering. "Vitex is excited to further its Barix™ technology's proven barrier performance for photovoltaics toward mass manufacturing. Together, we look forward to creating a product that will help alleviate America's dependence on foreign oil and increase America's access to an abundant renewable energy source - the sun."

Battelle, which is the majority shareholder of Vitex, is optimistic that this research agreement will contribute to a new way of generating solar power. Battelle recently increased its investment in Vitex for new state-of-the-art thin film encapsulation equipment and expanded its intellectual property portfolio.

"We're confident that Vitex will be uniquely positioned to help meet the demand for flexible solar panels, OLED displays and lighting that should rise along with the economy," said Martin Inglis, Battelle's chief financial officer.

PNNL's research efforts will be paid for with up to $350,000 from the DOE's Energy Efficiency and Renewable Energy Technology Commercialization Fund. Last year, DOE announced that up to $1.5 million from the fund would be available to PNNL for projects that help commercialize technologies that reduce energy use or tap renewable energy sources. Because the fund requires commercial partners to match funding, Vitex will provide up to $350,900 of in-kind labor, equipment and materials for this project.

Adapted from materials provided by DOE/Pacific Northwest National Laboratory.

http://www.sciencedaily.com/releases/2009/06/090605171242.htm

Fatty Foods -- Not Empty Stomach -- Fire Up Hunger Hormone

New research suggests that the hunger hormone ghrelin is activated by fats from the foods we eat--not those made in the body--in order to optimize nutrient metabolism and promote the storage of body fat. (Credit: iStockphoto/Marketa Ebert)

ScienceDaily (June 8, 2009) — New research led by the University of Cincinnati (UC) suggests that the hunger hormone ghrelin is activated by fats from the foods we eat—not those made in the body—in order to optimize nutrient metabolism and promote the storage of body fat.

The findings, the study's author says, turn the current model about ghrelin on its head and point to a novel stomach enzyme (GOAT) responsible for the ghrelin activation process that could be targeted in future treatments for metabolic diseases.

The laboratory study, led by Matthias Tschöp, MD, UC associate professor of psychiatry and internal medicine, is published online ahead of print on June 5, 2009, in the journal *Nature Medicine.*

Ghrelin is a hormone that was believed to accumulate during periods of fasting and is found in the body in high concentrations just before meals. It is dubbed the "hunger hormone" because it has been shown that administration of pharmacological doses acts in the brain to stimulate hunger and increase food intake in animal models and humans.

The ghrelin hormone is unique in that it requires acylation (the addition of a fatty acid) by a specific enzyme (ghrelin O-acyl transferase, or GOAT) for activation. Originally it was assumed that the fatty acids attached to ghrelin by GOAT were produced by the body during fasting.

The new data by Tschöp and his team suggests that the fatty acids needed for ghrelin activation actually come directly from ingested dietary fats. In a departure from an earlier model that was upheld for nearly a decade, Tschöp says, it appears that the ghrelin system is a lipid sensor in the stomach that informs the brain when calories are available—giving the green light to other calorie-consuming processes such as growing.

Tschöp and his team used mouse models to test the effects of over expressing the GOAT enzyme, or "knocking it out." They found that, when exposed to a lipid-rich diet, mice without GOAT accumulated

less fat than normal mice, while those with over-expressed GOAT accumulated more fat mass than normal mice.

"When exposed to certain fatty foods, mice with more GOAT gain more fat," says Tschöp. "Mice without GOAT gain less fat since their brain does not receive the 'fats are here, store them' signal."

Tschöp says that although his study can't be immediately extrapolated to humans, recent human studies at the University of Virginia measured (separately) active and inactive ghrelin concentrations. Those studies showed that during fasting, active ghrelin levels were flat, but during the presence of fat from foods, ghrelin levels peaked with meals as previously described. Tschöp says these human studies support the new model for ghrelin.

"Our GOAT studies in mice offer an explanation of what could have been happening during the longer fasting periods in these human studies," Tschöp adds. "Without dietary fats, ghrelin peaks remain inactive and don't affect storage of fat.

"We are particularly interested in how ghrelin may be involved in the rapid benefits of gastric bypass surgery," says Tschöp. "This powerful obesity therapy frequently reduces appetite and improves metabolism before substantial weight loss occurs. Intriguingly, this procedure causes food to bypass the stomach and gut sections that contain GOAT/ghrelin cells, which, based on this newly described model, would prevent ghrelin activation."

The study was supported by the Leibniz Graduate College and by the National Institutes of Health's National Institute of Diabetes and Digestive and Kidney Diseases.

Co-authors include Paul Pfluger, PhD, and Ronald Jandacek, PhD, both from the University of Cincinnati; Henriette Kirchner, graduate student from the University of Cincinnati and the German Institute of Human Nutrition; Annette Schürmann, PhD, and Hans-Georg Joost, MD, PhD, both of the German Institute of Human Nutrition; and Traci Czyzyk, PhD, John Hale, PhD, Mark Heiman, PhD, Jesus Gutierrez, PhD, Patricia Solenberg, PhD, and Jill Willency, PhD, all from Lilly Research Laboratories.

Adapted from materials provided by University of Cincinnati Academic Health Center.

http://www.sciencedaily.com/releases/2009/06/090605151351.htm

Skin Lesion Leads To More Cancer Types Than Once Believed

Actinic keratoses. (Credit: Image courtesy of Brown University)

ScienceDaily (June 8, 2009) — Actinic keratoses are sun-damaged rough patches or lesions on the skin — often pink and scaly — that doctors have long believed can turn into a form of skin cancer known as squamous cell carcinoma.

Now researchers at Brown University, the Veterans Administration Medical Centers in Providence and Oklahoma City, and others have determined that actinic keratoses appear responsible for a larger spectrum of skin cancers than previously thought. Their research is highlighted in the current edition of *Cancer*.

"We found some interesting things," said Dr. Martin Weinstock, the paper's lead author. Weinstock, chief of dermatology at the VA Medical Center in Providence, is professor of dermatology and community health at The Warren Alpert Medical School of Brown University. The U.S. Department of Veterans Affairs Office of Research and Development funded the study.

Vincent Criscione, a fourth-year Alpert Medical School student, served as the paper's first author. Beyond Brown and the VA, researchers from Rhode Island Hospital and Henry Ford Hospital in Detroit also contributed.

The study provided up to six years of follow-up to quantify the risk of progression of actinic keratoses to cancer.

To conduct the study, Weinstock and the other researchers looked at 169 patients from the VA Medical Center in Oklahoma City who had a high risk for skin cancers. They, in turn, were among 1,131 patients from multiple cites who took part in a chemotherapy prevention trial conducted previously. Most had at least one actinic keratosis on their body. Combined, they had about 7,784 of the lesions on their faces and ears. There were up to six years of follow-up to quantify the risk of progression of actinic keratoses to cancer.

Two-thirds of the patients who had developed squamous-cell carcinomas, a form of treatable skin cancer, could trace their cancer to actinic keratoses. One-third of patients who ended up with basal cell carcinoma, the most common form of skin cancer in the United States, could trace their cancers to actinic keratoses.

Scientists had previously been able to connect squamous-cell carcinomas to the lesions, but not basal cell. They also found that the actinic keratoses come and go, becoming invisible and resurfacing over time. That was a challenge for doctors because the lesions often were not visible during follow-up.

Thus, the research reinforces the need for skin cancer prevention. Scientists estimate that 40 million people in the United States alone have some form of actinic keratoses, and preventative removal of the lesions costs more than $1 billion annually, Weinstock said.

Before this study, Weinstock said, scientists could rely on one other body of research conducted 20 years ago that found less than 1 in 1,000 instances of actinic keratoses annually turned into squamous cell carcinoma, even though actinic keratoses are commonly removed as a preventative treatment for skin cancer.

Research is underway, Weinstock said, to determine if one of the treatments for actinic keratoses will be effective in preventing skin cancers.

Adapted from materials provided by Brown University.

http://www.sciencedaily.com/releases/2009/06/090602162000.htm

Scientists Uncover Mode Of Action Of Enzyme Linked With Several Types Of Cancer

ScienceDaily (June 8, 2009) — Scientists at the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal have discovered a key mechanism used by cells to efficiently distribute chromosomes to new cells during cell multiplication.

Published in the journal Molecular Cell, the study is the first to demonstrate that this mechanism relies on the polo kinase, an enzyme implicated in several cancers. Inhibiting this mechanism could be key to developing effective therapies to treat cancer.

Each human cell contains, in its nucleus, all the coding instructions necessary to direct the cell's activities. A complete set of those instructions is referred to as a genome. Cancer cells are capable of altering their genome in order to promote uncontrolled growth. "Cancer cells achieve this by gaining or losing specific chromosomes, or by inducing structural defects in their genome," explains Damien D'Amours, Principal Investigator at IRIC and director of the study, "We discovered that the polo kinase, overexpressed in a broad range of human tumours, tells the chromosomes exactly when to condense during cell division."

Misregulation of the polo kinase is associated with cancers, thereby suggesting a link between defects in chromosome condensation and the formation of tumours. "Pharmaceutical companies and independent researchers are already working on the development of new cancer drugs to inhibit the activity of the polo kinase," points out Damien D'Amours, "Understanding this enzyme's mode of action should enable us to control it. Such knowledge may reveal itself to be key in developing effective therapies to treat cancer."

In a preview article commissioned by *Molecular Cell*, world leader in chromosome dynamics Tatsuya Hirano, of the Riken Advanced Science Institute in Japan, qualifies the research as a tour de force study that will help address outstanding questions in the field.

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Adapted from materials provided by University of Montreal, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090603131435.htm

Confusion Reigns Over Whole-grain Claims In School Lunches

While most nutrition experts agree that school lunches should include more whole-grain products, a new study from the University of Minnesota finds that food-service workers lack understanding and the resources to meet that goal. (Credit: iStockphoto/Mark Stout)

ScienceDaily (June 8, 2009) — While most nutrition experts agree that school lunches should include more whole-grain products, a new study from the University of Minnesota finds that food-service workers lack understanding and the resources to meet that goal.The study, which involved school food-service directors from across Minnesota, appears in the current issue of the *Journal of Child Nutrition and Management.* Because they serve so many meals to children each day, school food-service directors have a major influence on students' food choices and in turn their overall health, the authors note.

Most experts recommend at least three servings of whole-grain foods a day, but American children fall far short of that goal, averaging about one serving per day.

The U of M researchers found that while food-service workers are aware of the health benefits of whole-grain foods, they aren't always sure whether a food product meets whole-grain criteria. The directors also cited higher costs and difficulty finding vendors who sold whole-grain products.

The latest study is part of an ongoing series in which researchers from the university are measuring awareness of whole grains and testing ways to incorporate them into children's diets, particularly in school nutrition programs.

"The goal is to remove confusion surrounding the definition of a whole-grain food and to provide simple standards to follow when ordering whole grain products for school meals," said Len Marquart, the project's lead researcher and an assistant professor in the university's food science and nutrition department. "This will require working together--enhanced communication among vendors, distributors and manufacturers along with key players in government, industry and school foodservice."

Adapted from materials provided by University of Minnesota.

http://www.sciencedaily.com/releases/2009/06/090602161930.htm

Family Obligation In Chinese Homes Lowers Teenage Depression Symptoms

ScienceDaily (June 8, 2009) — A new study of Chinese-American youth has found that family obligation, for example caring for siblings or helping elders, plays a positive role in the mental health of Chinese-American adolescents and may prevent symptoms of depression in later teenage years.

Published in the *Journal of Family Psychology*, the study found that 14-year-olds who reported a greater sense of family obligation reported fewer depressive symptoms by the time they reached 16. The findings suggest that family obligation may be protective against depressive symptoms. The authors suggest that a greater sense of family obligation in the early teenage years could provide teenagers with a strong family bond that makes them feel secure even when they move through adolescence and become more autonomous.

The longitudinal study surveyed 218 Chinese-American teenagers over a two-year period. As participants grew older, their actions to help and support their families decreased. However, their attitude and respect toward their families remained stable, indicating that immigrant adolescents continue to endorse their traditional cultural values even when their behaviors suggest they are becoming less traditional.

The study was authored by Linda Juang and Jeffrey Cookston, both associate professors of psychology at San Francisco State University. It will be published in the June issue of the Journal of Family Psychology, a special issue focusing on families and immigration.

Journal reference:

1. Linda P. Juang and Jeffrey T. Cookston. **A Longitudinal Study of Family Obligation and Depressive Symptoms Among Chinese American Adolescents**. *Journal of Family Psychology*, 2009; 23 (3) DOI: 10.1037/a0015814

Adapted from materials provided by San Francisco State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090604124804.htm

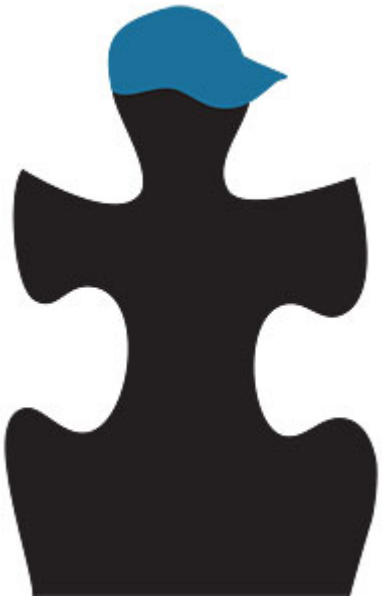
Guy Talk
By LORI GOTTLIEB

THE SECRET LIVES OF BOYS

Inside the Raw Emotional World of Male Teens

By Malina Saval

257 pp. Basic Books $25.95



When my obstetrician told me I was having a boy, I thought, "Hmm." I didn't know a lot about boys. In school, they were mystifying creatures who huddled in packs by their lockers, greeted one another with elaborate handshakes and wrestled for fun. If Google could be trusted, boys were different from girls in all sorts of troubling ways: they were uncommunicative, emotionally stunted, unaffectionate, illiterate, hyperactive, and prone to violence and drug abuse.

The books about today's boys seemed just as discouraging. From "Guyland: The Perilous World Where Boys Become Men" to "Raising Cain: Protecting the Emotional Lives of Boys," young men were portrayed as depressed, angry and suffering. One book was based on a Newsweek cover article whose title, "The Boy Crisis," said it all.

Malina Saval, a journalist who has written about teenage boys and an educator who has taught them, believed these depictions didn't tell the whole story. Presumably, the boys' own voices would.

The 10 young men she profiles in "The Secret Lives of Boys" don't fit the stereotypes. Instead of the predictable "Breakfast Club"-like middle-class suburban jocks, brainiacs and geeks, we meet a rich kid with severe O.C.D.; a gay, vegan, hearing-impaired would-be Republican; a rural home-schooled Shakespeare fan; a bizarrely sheltered African-American boy who wears suits to school but is inexplicably popular; an optimist with an abusive father; a former methamphetamine addict who does his rehabilitation work as a teaching assistant at a Los Angeles Hebrew school; an ambitious mini-adult intensely focused on his future; a self-described troublemaker with bipolar disorder; a Muslim who considers himself an average American kid; and a teenage dad with gang ties who bonds with Saval over discussions about sippy cups and diapers.

But as different as these boys seem, what unites them, Saval says, is the very quality boys reputedly lack — a desire for connection: "The boys told me straight out that they were not just looking for someone to talk to, but someone to talk with."

They talked with Saval, and what they told her, as the subtitle promises, is indeed raw and emotional. It's also real, funny and astute. On the myth that boys don't value friendships the way girls do, one boy observes that girls are hypocritical, claiming to be "good friends" one day but behaving like enemies the next. Another boy comments on his peers' addiction to video games: "I'm like, 'How is that going to help you in life?' " All the boys are struggling with something — what teenager isn't? — but hanging out with them is certainly interesting.

The book's strength — its collection of voices — is also its weakness. Saval lets her subjects speak for themselves but offers little commentary, and what there is of it is often awkward and sometimes confusing. "Alain's popularity says something on a broader level about boys and race relations," she writes, but she never tells us what it says or why the situation might be different if he were, say, a girl. Without some perspective tying the themes together, the discrete stories are like a list of ingredients that give a sense of a completed dish but don't quite convey what it tastes like.

Still, in a voyeuristic way, parents, teachers and especially teenage girls will be fascinated to know that boys care about fashion, cry about girlfriends and have deep feelings. More important, they might see aspects of themselves reflected in these stories and realize, as I did, that boys aren't so mystifying after all.

Lori Gottlieb, a commentator on National Public Radio, is the author of "Stick Figure: A Diary of My Former Self."

http://www.nytimes.com/2009/06/07/books/review/Gottlieb-t.html?em

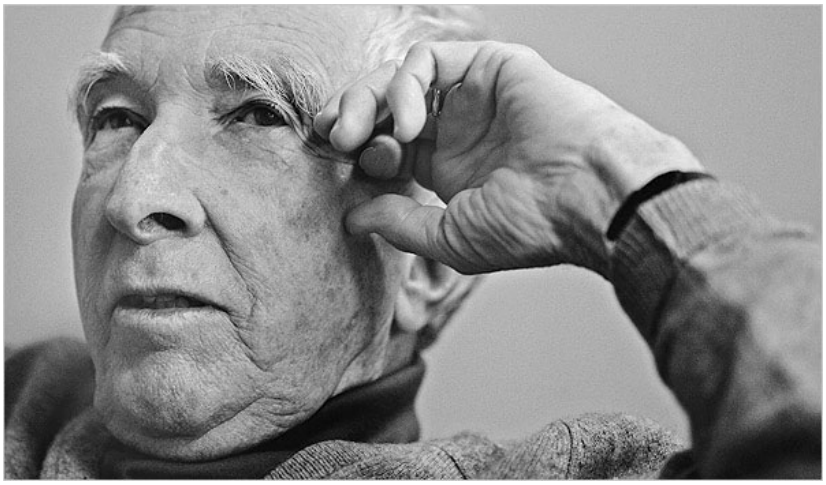
The Road Home

By T. CORAGHESSAN BOYLE

MY FATHER'S TEARS

And Other Stories By John Updike

292 pp. Alfred A. Knopf. $25.95



Twenty years ago, John Updike published a memoir, "Self-Consciousness," which opens with an extended reminiscence of his hometown. The author has been stranded for the evening while his mother and daughter are at the movies, and he walks the streets of Shillington, Pa., in a light rain, reliving the past in the incantatory detail with which he informed and illuminated his fiction, summoning up the names of departed local merchants, of his teachers and elementary school classmates, recalling the material texture of his childhood right on down to the candies, magazines and coloring books offered for sale at the variety store, recording the essence of his time amongst us. "The street," he writes, "the house where I had lived, seemed blunt, modest in scale, simple; this deceptive simplicity composed their precious, mystical secret, the conviction of whose existence I had parlayed into a career, a message to sustain a writer book after book." That message, that testimony of an individual and recollective consciousness as it relives and reviews the matter of a lifetime and grapples with the effects of aging, disease, decline and death, is the focus of Updike's final collection of new fiction.

Of these 18 stories, all but one (an odd travelogue called "Morocco," dating from 1979) were published in the last decade, and their themes and situations hark back to the author's earliest autobiographical fiction, especially the stories set in Olinger, Updike's fictionalized version of Shillington. The difference here is that the protagonists in this collection are, for the most part, at the end of their lives, and so the news of familial drama and divorce and the cocktail parties, barbecues and casual wooings of quotidian life in suburbia is given retrospectively, wistfully, presented in the larger context as memories of lost moments and lost opportunities. Updike once described himself as "a literary spy within average, public-school, supermarket America." So he was. And these are his last smuggled dispatches, made all the more poignant for their finality.

Two of the stories here feature a familiar Updike alter ego, David Kern, the boy who teetered on the brink of losing his faith all those years ago in "Pigeon Feathers," now grown old and hesitant. Both are set in motion by Kern's return to Olinger, first for a high school class reunion and then for a nearby conference. In the more successful of the two, "The Walk With Elizanne," Kern and his second wife go first to the local hospital to visit a classmate who is unable to attend the reunion because of her infirmity. Mamie is bedridden, emaciated, old, dwelling, as she says, in the "last chapter" of her life, and yet Kern remembers her as she was in kindergarten, remembers her mother, remembers the class plays where she was always "the impish little sister." What sustains her — and him — is her religious faith, a theme that runs through

many of the stories in this collection. Kern contrasts that faith with the "unresisted atheism" that "left people to suffer with the mute, recessive stoicism of animals."
At the reunion itself, he encounters Elizanne, whom he also knew as a child but who even then represented something of the exotic, her name pronounced "Ay-lizanne," and now, though "plump women of 67 or -8 have a family resemblance," she electrifies him by telling him how much he'd meant to her all these years because he was the first boy to walk her home and kiss her. This occasions a flood of recollected sensory detail, Updike at his best, an eternalizing of the moment of that kiss which stands in defiance of age and decrepitude and the bone cancer winnowing Mamie in the prison of her reduced self. In the final scene, the story takes a bold leap into the past, illuminating the walk and the kiss, Elizanne pattering on in her soft breathless adolescent voice and already arrived on her parents' doorstep with so much more to tell. And David, the stutterer of the Olinger stories, enchanted, intoxicated, assuring her, "We have t-tons of time."
In the second Kern story — "The Road Home" — David is uncertain and confused, out of touch with his roots and unable to find the country club where he has arranged to meet with several of his classmates who, unlike him, have remained in their hometown. The drive allows the memories to wash over him, the sensory details of his youth blossoming and brightening along the way. At dinner, when finally he arrives, after a number of the miscues common to the elderly, he bombards his classmates with reminiscence, challenging them to match his mnemonic abilities, on a roll until he misremembers the name of his classmate Ned's boyhood dog ("Ned made the correction with an uncharacteristic, irritated quickness"). For his classmates, Olinger's past has been tempered by its present and so holds little of the magic with which Kern invests it. Ultimately, they treat him as an outsider. (Interestingly, as the story progresses, he is referred to increasingly as "Kern" rather than the more intimate "David," as if even the author were distancing himself from this voluble old duffer.)
nd here lies both the triumph and the limitation of these stories: the obsessive recollection of detail for its own sake. In the foreword to "The Early Stories, 1953-1975," published six years ago, Updike describes his younger self sitting in his office above a restaurant in Ipswich, where "my only duty was to describe reality as it had come to me — and to give the mundane its beautiful due." That is his triumph. Among all the writers of our time, he was the most gifted in illuminating the phenomenological world. But in these stories, like David Kern at his reunion, he presents details in a testimonial way, as a feat of recollection, and sometimes — as in "Kinderszenen" and "The Guardians," which both present a young child's perspective on Updike's familiar world — the details tend to overwhelm the artistry of the stories themselves.
The news from our spy in the house of the old is delivered with equanimity, if not acceptance, and with a certain distancing from the young (even, in "Blue Light," from the elderly protagonist's own children and grandchildren). Some of the stories — notably "Varieties of Religious Experience," a response to 9/11 written from the points of view of several characters, including one of the terrorists, and "The Accelerating Expansion of the Universe," which brilliantly enfolds the unexpected response of an elderly man to an act of violence within the existential questions that plague him — put the accumulation of experience to test in order to question the ways of God to man or even the possibility of God in the face of scientific inquiry and the randomness of life. Others are wistful and wickedly funny, like the playful "Outage," in which another senior is brought to the very brink of fulfilling a sexual fantasy with a younger woman only to have its consummation denied him by a higher power (the electric company). Best of all, though, is the knowing resignation of the final story, "The Full Glass," in which the first-person narrator, approaching 80, takes us through the reduced rituals of the old as they both savor and prepare to give up forever even the simplest animal pleasures. He reflects on an affair he once had with a vibrant, brassy woman, whose death many years later "removed a confusing presence from the world, an index to its unfulfilled potential," and considers how all that living has worn him down. And then in the story's — and the collection's — slyly affecting final line, the narrator steps outside of himself to offer up a fatalistic toast, not with intoxicating wine but with water, life's pure essence: "If I can read this strange old guy's mind aright, he's drinking a toast to the visible world, his impending disappearance from it be damned."
T. Coraghessan Boyle's most recent novel is "The Women."

http://www.nytimes.com/2009/06/07/books/review/Boyle-t.html?8bu&emc=bua2

Telling the Tale

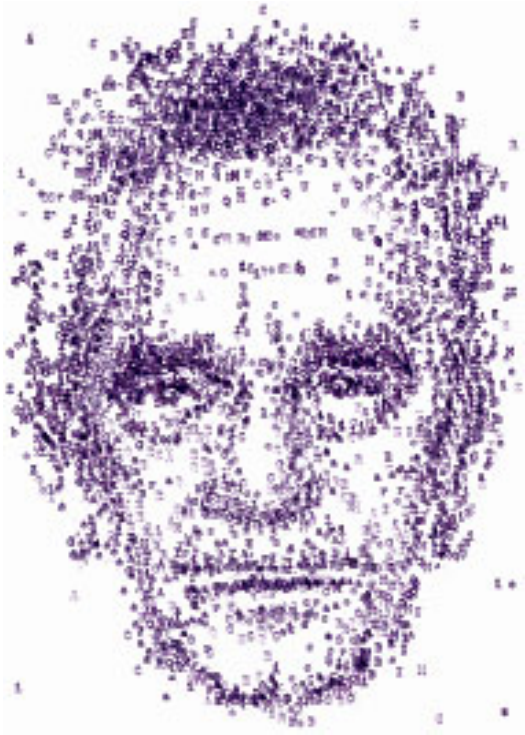
By PAUL BERMAN

GABRIEL GARCÍA MÁRQUEZ

A Life

By Gerald Martin

Illustrated. 642 pp. Alfred A. Knopf. $37.50



The single most thrilling event in Gabriel García Márquez's life, judging from the biography by Gerald Martin, took place in February 1950, when the novelist, who was 22 and not yet a novelist, though he was already trying to be, accompanied his mother to the backwoods town where he had spent his early childhood. This was a place called Aracataca, in the "banana zone" of northern Colombia. His grandfather's house was there, and his mother had decided to sell it.

García Márquez himself has described this trip in his autobiography, "Living to Tell the Tale." But Martin supplies, as it were, the fact-checked version — a product of the 17 years of research that went into "Gabriel García Márquez: A Life," together with the benedictions of the novelist himself, who has loftily observed, "Oh well, I suppose every self-respecting writer should have an English biographer." In "Living to Tell the Tale," García Márquez says that, upon arriving at Aracataca, he entered the house and inspected the rooms. The English biographer, by contrast, observes that García Márquez has also said he never entered. Either way, he saw the house. Childhood vistas presented themselves, and vistas prompted thoughts.

García Márquez was engrossed just then in a study of Joyce, Woolf, Faulkner and Proust, in Spanish translation. He was learning to appreciate what Martin calls "the multiple dimensions of time itself." And with a pensive gaze at the old house, he realized — here was the epiphany — he could invent himself anew. There was a way to become a member of the sleek novel-writing avant-garde, and this was to be the boy from Aracataca. And so he had his grand theme; and he had his writer's persona, who was

himself, as adult and child both; and he had his method of inquiry, which was to gaze back on his own most powerful childhood experiences.

The opening sections of Martin's biography are clogged with genealogical chronicles of the Garcías (the father's family) and the Márquezes (the mother's), snaking into the 19th century — a preposterously tangled story of cousins and noncousins united in wedlock, nonwedlock, near-incest, vendetta-mania and frontier trailblazing in the Colombian wilds, such that, after a few pages, you can hardly remember who is who, and where the murder took place, and what the civil war was about, or the next civil war, or the next. You could even suspect that Martin, having set out to describe García Márquez, has ended up competing with him: where the novelist ornamented some versions of "One Hundred Years of Solitude" with a one-page genealogical table, the biographer has ornamented "Gabriel García Márquez" with seven pages of them.

But what else was a biographer to do? A kind of sea breeze of atmospheric moods blows across García Márquez's work — a saline mood of unexplained and understated pathos, moods of delicate solidarity and even complicity with everything frail and cracked, a slightly morbid mood. And all of those moody currents seem to converge, in the end, on a single lush and regal emotion, which is nostalgia — García Márquez's never-exhausted and always tender search for what he is not going to find: his own past, and his family's, and the universe at his grandfather's knee.

His childhood touched on one other experience, though, and this had nothing to do with family lore. Martin tells us that, as a child, García Márquez read Alexandre Dumas and "A Thousand and One Nights." He was a normal boy. Mostly he was a normal Latin American. He read the poets of Spanish literature's "Golden Age," the 16th and 17th centuries. And, in this fashion, he appears to have spent whole portions of his childhood dwelling not just in northern Colombia but also in the hyper-elegant universe of Luis de Góngora and the syllable-counting poets of imperial Spain, long ago — whose own memories reached spectrally back into the shadows of Roman myth and esoteric philosophy.

The lucky break in García Márquez's life was to win a scholarship to an excellent college outside Bogotá, where his studies concentrated on still another of the early modernist writers, the Nicaraguan poet Rubén Darío. The English-speaking world has never paid much attention to Darío, but that is because his deepest theme was strictly a Spanish-speaking one — namely, the same vexed problem that García Márquez would have to solve: how to reconcile a childhood immersion in the poetry of the Golden Age with an adult immersion in the realities of the modern age. Darío entertained a precise idea of how to do this. It was through a kind of madness. He embraced every last extravagant curlicue of the Golden Age — the Roman myths and esoteric doctrines, the fanatical dedication to the verse structures of Spanish tradition — only he embraced them in a pop-eyed spirit of paradox. He wanted to show how large and heartbreaking is the gap between life as it ought to be and as it actually is. And this idea, too, Darío's mad embrace of the Golden Age, entered into García Márquez's imagination — or so it seems to me, though Martin says not too much about this.

García Márquez's readers sometimes imagine that supernatural events and folk beliefs in his novels express an all-purpose spirit of primitivist rebellion, suitable for adaptation by progressive-minded writers in every region of the formerly colonized world. Martin endorses that interpretation in the opening sentence of his biography, where he flatly defines García Márquez, encyclopedia style, as "the best-known writer to have emerged from the 'third world' and the best known exponent of a literary style, 'magical realism,' which has proved astonishingly productive in other developing countries." But I think that, on the contrary, magical events and folk beliefs in the writings of García Márquez show how powerfully the Golden Age has lingered in memory. Instead of a postcolonial literary rebellion against Western imperialism, here is a late-blooming flower of the Spanish high baroque. Gongorism disguised as primitivism. And, being a proper son of Darío, García Márquez has gone on to embrace in his mad spirit the glories of Spanish rhetoric at its most extreme.

Martin tells us that in García Márquez's own estimation, his greatest book is "The Autumn of the Patriarch," from 1975 — a book that is an extended homage to Darío, who is invoked at the beginning and again at the very end, and who, somewhere in the middle, shows up as a character, sailing into port on a banana boat to deliver a poetry recitation. Every last sentence in "The Autumn of the Patriarch" offers a heroic demonstration of man's triumph over language — unless it is language's triumph over man. The sentences begin in one person's voice and conclude in someone else's, or change their subject halfway through, or wander across the centuries, and, even so, conform sufficiently to the rules of rhetoric to carry you along. To read is to gasp. You want to break into applause at the shape and grandeur of those sentences, not to mention their length. And yet to do so you would need to set down the book, which

cannot be done, owing to the fact that, just when the impulse to clap your hands has become irresistible, the sentence you are reading has begun to round a corner, and you have no alternative but to clutch onto the book as if steering a car that has veered out of control.

Those are gorgeous sentences, but they are also tyrannical — and tyranny, in the conventional political sense, is entirely the novel's theme. "The Autumn of the Patriarch" tells the story of a despot ruling over an unnamed and benighted Caribbean land. It is a dictator novel. The marriage of plot and prosody makes it a masterpiece — a greater triumph even than Mario Vargas Llosa's marvelously brilliant "Feast of the Goat," which is likewise a Caribbean dictator novel, and likewise invokes Rubén Darío. "The Autumn of the Patriarch" does have a puzzling quality, though. The dictator whose portrait emerges from those - tropical-flower sentences is monstrous and despicable — yet even his creepiest tyrannical traits are presented as signs of the human condition, deserving of pity and compassion, maybe even a kind of sorrowful love. I have always wondered what sort of political attitude García Márquez meant to convey with those peculiar ambiguities.

But now that I have read Martin's biography, I know. The book is 642 pages long, and the first half of it, after completing the genealogical survey of northern Colombia, records the dreadful poverty that García Márquez and his wife and two sons endured before 1967, when "One Hundred Years of Solitude" finally lifted him into the comforts of multiple-home ownership and, in 1982, the Nobel Prize. But the second half mostly recounts the novelist's subsequent career as hobnobber among the powerful — a man who, according to his biographer, has labored hard and long to get himself invited to the dinner tables of presidents, dictators and tycoons around the world. And among those many table companions, no one has mattered more to him than the maximum leader of the Cuban revolution, Fidel Castro, with whom García Márquez has conceived a genuine friendship, based on shared vacations, a part-time career promoting Havana as a movie-industry capital and a history of defending the Castro dictatorship against its detractors in the Hispanic literary world. Here is the real-life Caribbean tyrant. García Márquez does lead you to think about Castro in some of those spectacular sentences in "The Autumn of the Patriarch." And the novelist plainly loves his dictator.

Martin gushes over nearly everything that García Márquez has ever done, yet, even so, he concedes that friendship with Castro has sometimes aroused criticism. The biographer mentions twice that Vargas Llosa (who at one point punched García Márquez in the face, for reasons possibly bearing on marital honor) has described García Márquez as Castro's "lackey." Martin emphasizes the insult mostly to show the indignities that García Márquez has undergone out of fidelity to Fidel. And yet, the biography's account of the friendship will make readers pause thoughtfully over that word, "lackey." Martin tells us that, on an occasion when Castro visited Colombia, García Márquez volunteered to be one of his bodyguards. The world's most popular serious novelist does seem to be a flunky of the world's longest-lasting monomaniacal dictator. Why García Márquez has chosen to strike up such a friendship is something I cannot explain — except to point out that, as Martin shows, the great novelist has never veered from the epiphany that came to him at his grandfather's house in 1950, and he has always been fascinated by the grotesque, the pathetic and the improbable.

Paul Berman is a writer in residence at New York University and the author of the forthcoming "Flight of the Intellectuals."

http://www.nytimes.com/2009/06/07/books/review/Berman-t.html?8bu&emc=bua1

Pop and Rococo Meet and Greet

By RANDY KENNEDY

VENICE — For more than 40 years the art world has never known quite what to do with John Wesley and the paintings that seem to tumble out of his dreams.

Early on it classified him as a Pop artist, a label that sat uncomfortably. “But I accepted it because it got me into a lot of shows,” said Mr. Wesley, now 80. He has also been called an insurgent Minimalist, largely because of Donald Judd’s admiration for his work and Mr. Judd’s enshrinement of it alongside some of the most important examples of Minimalism at the Chinati Foundation in Marfa, Tex.

The critic Dave Hickey, in an ecstatic essay in 2000, even launched a rear-guard action for Mr. Wesley as a 20th-century extension of Rococo, putting him in the company of Boucher and saying of his relative lack of prominence among the great postwar painters: “Those who know know; those who care care; those who don’t know or care don’t have a clue, but that’s O.K., too.”

Many more people will undoubtedly know and care about Mr. Wesley now, as a result of a blockbuster retrospective, organized by the renowned Italian curator Germano Celant under the auspices of the Prada Foundation, that opened here on Friday in conjunction with the Venice Biennale.

The show, which runs through Oct. 4, is only the second major survey of Mr. Wesley’s bright, funny, relentlessly flat and often unsettlingly erotic work, after a well-received retrospective nine years ago at the P.S. 1 Contemporary Art Center in Queens. The new exhibition, spread out through the cavernous rooms of two former boarding-school buildings on the island of San Giorgio Maggiore, has brought together three times as many works, more than 150 dating to the early 1960s, when Mr. Wesley, who had moved to New York from Los Angeles, was still working at the post office. (He once described that job equably as “a very polite prison, full of very decent prisoners.”)

When he arrived in Venice last week and had a chance to look at some of his older paintings for the first time in decades — many are in collections in Europe, where his early following was much stronger than in the United States — he grew a little teary.

“I’m really looking forward to seeing those,” he had said shortly before leaving for Italy, sitting in his sunny, rambling apartment and studio near Washington Square in Greenwich Village. “I want to make sure they’re mine,” he added with his characteristic dry wit.

Mr. Wesley, who grew up in Los Angeles, had a difficult childhood and no formal art training before deciding to become a painter. When he was 5, his father died of a heart attack on the family’s bathroom floor, and Mr. Wesley ended up briefly in an orphanage, returning home to a demanding stepfather.

Before the post office, he worked as a dishwasher and later as a draftsman for the Northrop aircraft company, interpreting blueprints, an experience that contributed to the dark, matte industrial blues of his early paintings.

Though he has described himself as a loner, he has nearly always been alone in a crowd of fellow artists. He was close to Ed Kienholz in Los Angeles, and his second wife was the painter Jo Baer. Besides Mr. Judd, he has counted Dan Flavin and Robert Ryman as friends, and in a published conversation with Alanna Heiss, the curator of his P.S.1 show, he recounted once making an impromptu beer delivery to Willem de Kooning's studio, where the two men talked about their shared susceptibility to anxiety attacks.

But Mr. Wesley has always been very uncomfortable talking about himself or his painting, a reticence that may also have contributed somewhat to his below-the-radar reputation. The writer Hannah Green, his third wife, wrote that he made it a "rule never to talk about his work and above all not to catch himself sounding eloquent."

A tall, slightly stooped man dressed like a Sunday gardener in a chambray shirt and New Balance running shoes, he was courtly and funny during the interview of almost two hours while managing to answer almost no questions about the visual obsessions that return again and again in his paintings: dogs, birds, airplanes, floating babies, lithe pink women and cartoon characters like Popeye, Olive Oyl, Dagwood and Blondie.

With titles like "Hungarian Dog Wrestler," "Debbie Millstein Swallowed a Thumbtack" and "Bumstead in Bedlam," they can suggest old blues songs sprung surreally into the visual world, a kind of postmodern channeling of the "old, weird America" written about by Greil Marcus and mined by Bob Dylan.

The critic Ken Johnson, a frequent contributor to The New York Times, wrote in Art in America that it is "as though the clichés of popular culture had been dipped in the pool of the artist's unconscious and come out soaked with private meanings, associations and feelings."

Asked about such interpretations and about often being described as a surrealist — the curator Mr. Celant said he has always seen the strong influence of de Chirico and Magritte — Mr. Wesley shrugged. "I didn't go out and try to be a surrealist," he said. "It was just fun doing what I was doing."

Hanging on the wall of the apartment near his desk that afternoon was a meaty-looking canvas slathered with paint that looked nothing like a Wesley. He explained that he had made it when he was very young, under the influence of Soutine, before he discovered the work of Jasper Johns and other post-Abstract-Expressionist artists and radically changed course. He was relieved, he said, that the old painting had his son's name written all over the back of it: "That way if I croak, it won't go into my body of work — it will go back him."

Mr. Wesley begins his paintings by tracing images, often fashion or news photos, from magazine and books. As the tracings are transformed into gouaches and then into acrylic paintings, the elements morph, often becoming reversed or repeated, and the forms are stripped down, rendered more rubbery and stylized.

Eyelashes can come to look like black webbing. Baseball gloves can be mistaken for ears or maybe vaginas. Dagwood might disappear altogether, with just an empty speech bubble left floating in the room to indicate its sad-sack source. ("It's magic," Mr. Wesley deadpanned during the interview, as Jessica Fredericks, his dealer, held up a recent tracing he had made from a clipped newspaper photograph of Condoleezza Rice. Mr. Wesley said he had simply been struck by the form of Ms. Rice's face, but added: "I like Condi. I hope they don't put her in jail. She just got in with the wrong crowd.")

Asked how he would describe himself as a painter, he burst out laughing and said, "I have absolutely no idea."

"But I seem to have found my own place," he said, "which I'm thankful for."

Outside the gallery on San Giorgio Maggiore on Friday night, as he made his way through the admiring, well-heeled crowd pressing around him, he looked as if he were longing for a nice, quiet corner to hold down. But he was smiling more often than not, and at one point gazed over the water toward the heart of Venice, then up at the huge exhibition sign that faced it, emblazoned with his name.

"Well," he said, "this is really something, isn't it?"

http://www.nytimes.com/2009/06/09/arts/design/09wesley.html?_r=1&ref=design

'AFRICAN AND OCEANIC ART FROM THE BARBIER-MUELLER MUSEUM, GENEVA'
Putting 'Primitive' to Rest

By HOLLAND COTTER

In the Michael C. Rockefeller Wing at the Metropolitan Museum you'll find a tiny African copper relief that probably predates, and would surely have awed, the great Lorenzo Ghiberti. You'll encounter a bust of a Nigerian beauty to rival Nefertiti; an Oceanic Apollo with the physique of an Olympian; and a Micronesian statuette that is, with its stacks of faceted planes, Brancusi before Brancusi.

These objects, along with 32 others, make up the exhibition called "African and Oceanic Art From the Barbier-Mueller Museum, Geneva: A Legacy of Collecting." The show, an unabashed masterpiece display, is not only a gold mine of historical data and a connoisseur's delight, but also a reminder of how perceptions evolve — a mere few decades ago everything here was referred to as "primitive art."
This was a capacious category. It covered African, Oceanic and North American Indian material, as well as Pre-Columbian art from Central and South America and all things "tribal" from everywhere else. Only fairly recently have the political dimensions of "primitive" begun to be fully sorted out and reckoned with.
Meanwhile, long-established museum collections built on that catch-all concept are still with us, changed now in their thinking if not necessarily in their form.
The Barbier-Mueller Museum represents one such collection; the Rockefeller Wing, with origins in Nelson A. Rockefeller's 1957 Museum of Primitive Art, another. At the Met the two converge, complementing and extending each other. In one sense the result is an old-fashioned sampler display of one-tribe-one-style sculptural types: a classic reliquary figure from Gabon; a textbook New Ireland mask; and so on.
At the same time, by bringing certain comparable pieces from two different collections together, the show is an invitation to alter our habits of looking. We are encouraged to retain a sense of the context and history of objects, but to pay more than usual attention to interpretive inventiveness and formal finesse: in short, to get a sense of the many things that "great" in art based on non-Western models can mean.
In the Barbier-Mueller exhibition that spectrum is wide and deep. The collection was started in the early 20th century by Josef Mueller (1887-1977), the son of a Swiss industrialist. A young man with a hankering for the vie de bohème, he moved to Paris in 1907. Not being an artist himself, he became a collector, buying Picassos hot from the studio, and in due course buying what Picasso was buying: African and Oceanic art.
He eventually moved back to the Swiss family home, filling its 18 rooms with Cézanne landscapes, Baule masks, Olmec sculptures and local folk carvings of a kind we would now call outsider art. In 1955 his daughter Monique married another collector, Jean Paul Barbier, and the two assumed responsibility for

the collection, adding to it, documenting it and finally in 1977 establishing the museum that bears their name.

The Met show — organized by Alisa LaGamma, the museum's curator of African art, and Eric Kjellgren, associate curator of Oceanic art, with Yaëlle Biro, a research assistant for African art — opens with one of the Barbier-Mueller's treasures, a serpent dance headdress carved by a Baga artist in Guinea, West Africa, in the 19th or early 20th century. Seven feet tall, patterned with chevrons and diamonds, and shaped with gentle undulations, the piece was brought out for initiation rites and worn upright on a dancer's head so that it towered over everything in a great rainbow curve.

This piece was one of a half-dozen collected by Europeans in Guinea in 1957, when the spread of Islam had put such sculptures out of favor. Another example from the group, and a remarkable variation on a fantastic theme, is in the Met collection and on permanent view in the Rockefeller Wing. In this case the serpent bends dramatically just below midpoint, as if its upper portion were swaying outward in space. The vertiginous impression it must have made while in motion is easy to imagine.

Two Senufo figures from Ivory Coast, one in the Swiss collection, the other in the Met's, make another eye-training comparison, though here the immediately noticeable difference is in condition rather than concept. The female figure from the Barbier-Mueller, her braceleted arms poised so that her hands rest on her thighs, is in fabulous shape.

Her male counterpart at the Met, though marvelously carved, is time-worn, with one entire arm and the hand of the other missing. You have the sense, though, that even intact, he would be the less dominant figure. He is sleepy-serene. She is a self-possessed spark.

Such comparisons tell us things useful to know. They tell us that African art is not a fixed set of forms repeated verbatim, with particular forms assigned to particular locales. It is an art of specificity, individuality, fresh responses and nuanced invention, with images and ideas in constant transformation: try this, add that, take that away.

So intense and extensive is this dynamic that the very term "African art" is at some important level useless, if not misleading. While obviously less pejorative than "primitive art," it similarly ignores the reality of thousands of separate traditions, belief systems and talents, not to mention the factors of time and change.

The same is at least as true of Oceanic Art, an omnibus term embracing unnumbered cultures spread across thousands of miles of the Pacific, from Asia to Australia to Antarctica. The installation for the Met show, skillfully designed by Michael Batista, places African objects against yellow backgrounds and Oceanic objects against slate-gray. But even without those visual guidelines, it is easy to distinguish between the two "primitivisms," and to get a sense of the diversity within each.

The big Oceanic entries from the Barbier-Mueller really pack a wallop. They're like a series of startling confrontations, from a scrunched-up gargoyle made for a Papua New Guinea roof; to a bark-cloth mask of ferocious fragility — it looks to be made of tissue and syringes — from the Bismarck Archipelago; to a larger-than-life wood mask from the Torres Strait Islands, with a Frankenstein forehead, human-hair dreadlocks and a smile that might be a snarl.

All of these images are unalike, and none share visual common denominators with others around them. A Sumatran stone figure of a magician-king seems to exist in a world of its own. So does a small wood female figure from the Carolina Islands composed entirely of proto-Modernist planes with a couple of nicks for navel and nose.

True, all of these objects, like their African counterparts, served a general function: in one way or another they were conceived as links between human and spiritual realms. But the exact mechanics of communication, the precise purpose to which it is put, and the identities of the powers to which it is directed — these are as various, mutable and mysterious as the art itself.

In short, the Met exhibition is both a lesson and a feast. The lesson is that the variety of beauty hidden in words like "primitive," "non-Western," African" and "Oceanic" is greater than we ever suspected and that we are beginning to realize this. As to the feast, the table is set in the Barbier-Mueller show and in the Rockefeller Wing galleries beyond. Like any fine meal, this one fills you up and leaves you wanting more.

"African and Oceanic Art From the Barbier-Mueller Museum, Geneva: A Legacy of Collecting" is at the Metropolitan Museum of Art through Sept. 27.

http://www.nytimes.com/2009/06/05/arts/design/05gene.html

Sexual Partner Status Affects A Woman's, But Not A Man's, Interest In The Opposite Sex

Couple. Researchers found that a woman's partner status influenced her interest in the opposite sex. No such difference was found between men who had sexual partners and those who did not. (Credit: iStockphoto/Jacob Wackerhausen)

ScienceDaily (June 3, 2009) — A study by Indiana University neuroscientist Heather Rupp found that a woman's partner status influenced her interest in the opposite sex. In the study, women both with and without sexual partners showed little difference in their subjective ratings of photos of men when considering such measures as masculinity and attractiveness. However, the women who did not have sexual partners spent more time evaluating photos of men, demonstrating a greater interest in the photos.

No such difference was found between men who had sexual partners and those who did not. "These findings may reflect sex differences in reproductive strategies that may act early in the cognitive processing of potential partners and contribute to sex differences in sexual attraction and behavior," said Rupp, assistant scientist at The Kinsey Institute for Research in Sex, Gender and Reproduction.

For the study, 59 men and 56 women rated 510 photos of opposite-sex faces for realism, masculinity/femininity, attractiveness, or affect. Participants were instructed to give their "gut" reaction and to rate the pictures as quickly as possible. The men and women ranged in age from 17 to 26, were heterosexual, from a variety of ethnic backgrounds and were not using hormonal contraception. Of the women, 21 reported they had a current sexual partner; 25 of the men reported having a sexual partner. This is the first study to report whether having a current sexual partner influences interest in the opposite sex. Other studies have demonstrated that hormones, relationship goals and social context influence such interest. "That there were no detectable effects of sexual partner status on women's subjective ratings of male faces, but there were on response times, which emphasizes the subtlety of this effect and introduces the possibility that sexual partner status impacts women's cognitive processing of novel male faces but not necessarily their conscious subjective appraisal," the authors wrote in the journal article. The researchers also note that influence of partner status in women could reflect that women, on average, are relatively committed in their romantic relationships, "which possibly suppresses their attention to and appraisal of alternative partners."

Journal reference:

1. Rupp et al. **Partner Status Influences Women's Interest in the Opposite Sex**. *Human Nature*, 2009; 20 (1): 93 DOI: 10.1007/s12110-009-9056-6

Adapted from materials provided by Indiana University.

http://www.sciencedaily.com/releases/2009/05/090528120657.htm

Commonly Used Medications May Produce Cognitive Impairment In Older Adults

ScienceDaily (June 3, 2009) — Many drugs commonly prescribed to older adults for a variety of common medical conditions including allergies, hypertension, asthma, and cardiovascular disease appear to negatively affect the aging brain causing immediate but possibly reversible cognitive impairment, including delirium, in older adults according to a clinical review now available online in the *Journal of Clinical Interventions in Aging.*

Drugs, such as diphenhydramine, which have an anticholinergic effect, are important medical therapies available by prescription and also are sold over the counter under various brand names such as Benadryl®, Dramamine®, Excederin PM®, Nytol®, Sominex®, Tylenol PM®, and Unisom®. Older adults most commonly use drugs with anticholinergic effects as sleep aids.

While it is known that these medications do have an effect on the brain and in the case of sleeping pills, are prescribed to act on the brain, the study authors suggest the amount of cognitive impairment caused by the drugs in older adults is not well recognized.

"The public, physicians, and even the Food and Drug Administration, need to be made aware of the role of these common medications, and others with anticholinergic effects, in causing cognitive impairment. Patients should write down and tell their doctor which over-the-counter drugs they are taking. Doctors, who often think of these medications simply as antihistamines, antidepressants, antihypertensives, sleep aids or even itching remedies, need to recognize their systemic anticholinergic properties and the fact that they appear to impact brain health negatively. Doing so, and prescribing alternative medications, should improve both the health and quality of life of older adults," said senior study author Malaz Boustani, M.D., Indiana University School of Medicine associate professor of medicine, Regenstrief Institute investigator, and research scientist with the IU Center for Aging Research.

Dr. Boustani and colleagues conducted a systematic evidence-based analysis of 27 peer reviewed studies of the relationship of anticholinergic effect and brain function as well as investigating anecdotal

information. They found a strong link between anticholinergic effect and cognitive impairment in older adults.

"One of the goals of our work is to encourage the Food and Drug Administration to expand its safety evaluation process from looking only at the heart, kidney and liver effects of these drugs to include effects of a drug on the most precious organ in human beings, our brain," Dr. Boustani said.

"Many medications used for several common disease states have anticholinergic effects that are often unrecognized by prescribers" said Wishard Health Services pharmacist, Noll Campbell, Pharm.D., first author of the study, noting that these drugs are among the most frequently purchased over the counter products. "In fact, 50 percent of the older adult population use a medication with some degree of anticholinergic effect each day."

"Our main message is that older adults and their physicians should have conversations about the benefits and harms of these drugs in relation to brain health. As the number of older adults suffering from both cognitive impairment and multiple chronic conditions increases, it is very important to recognize the negative impact of certain medications on the aging brain," said Dr. Boustani.

The brain pharmacoepidemiology group of the IU Center for Aging Research currently is conducting a study of 4,000 older adults to determine if the long term use of medications with anticholinergic effects is linked to the irreversible development of cognitive impairment such as Alzheimer disease.

Authors of the JCIA study are Noll Campbell, Pharm.D., Wishard Health Services; Malaz Boustani, M.D., MPH; Tony Limbil, M.D., MPH, of University of Illinois; Carol Ott, Pharm.D. of Wishard and Purdue University; Chris Fox, MRCPsych and Ian Maidment, B.Pharm., of Kent Institute of Medicine and Health Sciences University of Kent and Medway NHS Trust, United Kingdom; Cathy C. Schubert, M.D. of the IU School of Medicine; Stephanie Munger, B.S., of Regenstrief and IUCAR; Donna Fick, R.N., Ph.D., of Pennsylvania State University; David Miller, M.D., of the IU School of Medicine and Rajesh Gulati, M.D., of IU Medical Group – Primary Care.

The study was funded by the John A. Hartford Foundation, the Atlantic Philanthropies, the Starr Foundation, and the National Institute on Aging.

Adapted from materials provided by Indiana University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090601111934.htm

Easier Access To Media By Children Increases Risk For Influence On Numerous Health Issues

ScienceDaily (June 3, 2009) — With children having easier access to media and a wider variety of content, the possible negative influence on health issues such as sex, drugs, obesity and eating disorders is increased, and warrants monitoring usage and limiting access if necessary, according to a commentary in the June 3 issue of *JAMA*, a theme issue on child and adolescent health.

Victor C. Strasburger, M.D., of the University of New Mexico School of Medicine, Albuquerque, presented the commentary at a *JAMA* media briefing in New York.

On average, children and adolescents spend more than 6 hours a day with media—more time than in formal classroom instruction, writes Dr. Strasburger. In addition, U.S. youth have unprecedented access to media (two-thirds have a television set in their bedrooms, half have a VCR or DVD player, half have a video game console, and almost one-third have Internet access or a computer), making parental monitoring of media use difficult.

All of this media access does have an influence on a variety of health issues, according to Dr. Strasburger. "The media are not the leading cause of any pediatric health problem in the United States, but they do make a substantial contribution to many health problems, including the following."

- **Violence** - Research on media violence and its relationship to real-life aggression is substantial and convincing. Young persons learn their attitudes about violence at a very young age and, once learned, those attitudes are difficult to modify. Conservative estimates are that media violence may be associated with 10 percent of real-life violence.
- **Sex** - Several longitudinal studies have linked exposure to sex in the media to earlier onset of sexual intercourse. The media represent an important access point for birth control information for youth; however, the major networks continue to balk at airing contraception advertisements at the same time they are airing unprecedented amounts of sexual situations and innuendoes in their primetime programs.
- **Drugs** - Witnessing smoking scenes in movies may be the leading factor associated with smoking initiation among youth. In addition, young persons can be heavily influenced by alcohol and cigarette advertising. More than $20 billion a year is spent in the United States on advertising cigarettes ($13 billion), alcohol ($5 billion), and prescription drugs ($4 billion).
- **Obesity** - Media use is implicated in the current epidemic of obesity worldwide, but it is unclear how. Children and adolescents view an estimated 7,500 food advertisements per year, most of

which are for junk food or fast food. Contributing factors to obesity may include that watching television changes eating habits and media use displaces more active physical pursuits.

- **Eating Disorders** - The media are a major contributor to the formation of an adolescent's body self-image. In Fiji, a naturalistic study of teenage girls found that the prevalence of eating disorders increased dramatically after the introduction of American TV programs.

Dr. Strasburger adds that network contraceptive advertising should be encouraged and legislation should be passed banning all cigarette advertising in all media and limiting alcohol advertising to advertisements that only show the product.

Education of parents, teachers, and clinicians about these issues is necessary, and education of students about the media should be mandatory in schools. "Parents have to change the way their children access the media—not permitting TV sets or Internet connections in the child's bedroom, limiting entertainment screen time to less than 2 hours per day, and co-viewing with their children and adolescents. Research has shown that media effects are magnified significantly when there is a TV set in the child's or adolescent's bedroom."

At the same time, media can be an extraordinary positive power, writes Dr. Strasburger. "Antiviolence attitudes, empathy, cooperation, tolerance toward individuals of other races and ethnicities, respect for older people—the media can be powerfully prosocial." Media can also be used constructively in the classroom in ways that are better than traditional textbooks, such as for viewing plays on DVDs or documentaries of historical events.

"The media are a powerful teacher of children and adolescents—the only question is what are they learning and how can it be modified? When children and adolescents spend more time with media than they do in school or in any leisure-time activity except for sleeping, much closer attention should be paid to the influence media has on them," Dr. Strasburger concludes.

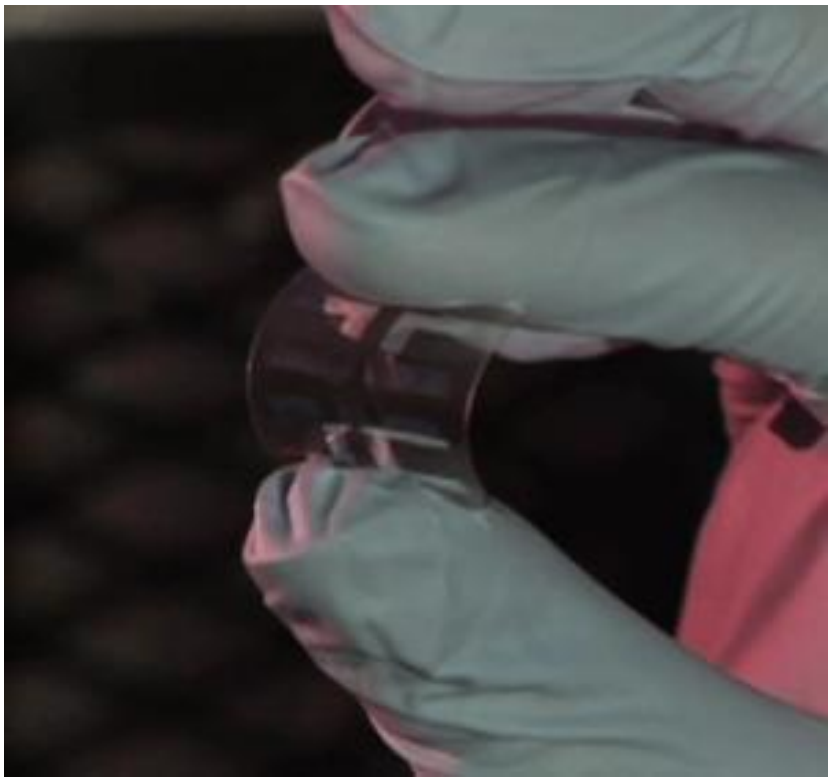
Journal reference:

1. Strasburger et al. **Media and Children: What Needs to Happen Now?** *JAMA The Journal of the American Medical Association*, 2009; 301 (21): 2265 DOI: 10.1001/jama.2009.572

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2009/06/090602111814.htm

Electronic Memory Chips That Can Bend And Twist



Electronic memory chips may soon gain the ability to bend and twist like this one. (Credit: NIST)

ScienceDaily (June 3, 2009) — Electronic memory chips may soon gain the ability to bend and twist as a result of work by engineers at the National Institute of Standards and Technology (NIST). As reported in the July 2009 issue of *IEEE Electron Device Letters*, the engineers have found a way to build a flexible memory component out of inexpensive, readily available materials.

Though not yet ready for the marketplace, the new device is promising not only because of its potential applications in medicine and other fields, but because it also appears to possess the characteristics of a memristor, a fundamentally new component for electronic circuits that industry scientists developed in 2008. NIST has filed for a patent on the flexible memory device (application #12/341.059).

Electronic components that can flex without breaking are coveted by portable device manufacturers for many reasons—and not just because people have a tendency to drop their mp3 players. Small medical sensors that can be worn on the skin to monitor vital signs such as heart rate or blood sugar could benefit patients with conditions that require constant maintenance, for example. Though some flexible components exist, creating flexible memory has been a technical barrier, according to NIST researchers.

Hunting for a solution, the researchers took polymer sheets—the sort that transparencies for overhead projectors are made from—and experimented with depositing a thin film of titanium dioxide, an ingredient in sunscreen, on their surfaces. Instead of using expensive equipment to deposit the titanium dioxide as is traditionally done, the material was deposited by a sol gel process, which consists of spinning the material in liquid form and letting it set, like making gelatin. By adding electrical contacts, the team created a flexible memory switch that operates on less than 10 volts, maintains its memory when power is lost, and still functions after being flexed more than 4,000 times.

What's more, the switch's performance bears a strong resemblance to that of a memristor, a component theorized in 1971 as a fourth fundamental circuit element (along with the capacitor, resistor and inductor).

A memristor is, in essence, a resistor that changes its resistance depending on the amount of current that is sent through it—and retains this resistance even after the power is turned off. Industrial scientists announced they had created a memristor last year, and the NIST component demonstrates similar electrical behavior, but is also flexible. Now that the team has successfully fabricated a memristor, NIST can begin to explore the metrology that may be necessary to study the device's unique electrical behavior.

"We wanted to make a flexible memory component that would advance the development and metrology of flexible electronics, while being economical enough for widespread use," says NIST researcher Nadine Gergel-Hackett. "Because the active component of our device can be fabricated from a liquid, there is the potential that in the future we can print the entire memory device as simply and inexpensively as we now print a slide on an overhead transparency."

Journal references:

1. N. Gergel-Hackett, B. Hamadani, B. Dunlap, J. Suehle, C. Richter, C. Hacker, D. Gundlach. **A flexible solution-processed memristor**. *IEEE Electron Device Letters*, 2009; 30 (7) DOI: 10.1109/LED.2009.2021418
2. D. B. Strukov, G. S. Snider, D. R. Stewart, and S. R. Williams. **The missing memristor found**. *Nature*, 2008; 453 (7191): 80 DOI: 10.1038/nature06932

Adapted from materials provided by National Institute of Standards and Technology.

http://www.sciencedaily.com/releases/2009/06/090602181953.htm

Feeling Close To A Friend Increases Progesterone, Boosts Well-being And Reduces Anxiety And Stress

Why does dishing with a girlfriend do wonders for a woman's mood? A University of Michigan study has identified a likely reason: feeling emotionally close to a friend increases levels of the hormone progesterone, helping to boost well-being and reduce anxiety and stress. (Credit: iStockphoto)

ScienceDaily (June 3, 2009) — Why does dishing with a girlfriend do wonders for a woman's mood?

A University of Michigan study has identified a likely reason: feeling emotionally close to a friend increases levels of the hormone progesterone, helping to boost well-being and reduce anxiety and stress.

"This study establishes progesterone as a likely part of the neuroendocrine basis of social bonding in humans," said U-M researcher Stephanie Brown, lead author of an article reporting the study findings, published in the current (June 2009) issue of the peer-reviewed journal *Hormones and Behavior.*

A sex hormone that fluctuates with the menstrual cycle, progesterone is also present in low levels in post-menopausal women and in men. Earlier research has shown that higher levels of progesterone increase the desire to bond with others, but the current study is the first to show that bonding with others increases levels of progesterone. The study also links these increases to a greater willingness to help other people, even at our own expense.

"It's important to find the links between biological mechanisms and human social behavior," said Brown, is a faculty associate at the U-M Institute for Social Research (ISR) and an assistant professor of internal medicine at the U-M Medical School. She is also affiliated with the Ann Arbor Veterans Affairs Hospital. "These links may help us understand why people in close relationships are happier, healthier, and live longer than those who are socially isolated."

Progesterone is much easier to measure than oxytocin, a hormone linked to trust, pair-bonding and maternal responsiveness in humans and other mammals. Oxytocin can only be measured through an invasive spinal tap or through expensive and complex brain imaging methods, such as positron emission tomography scans. Progesterone can be measured through simple saliva samples and may be related to oxytocin.

In the current study, Brown and colleagues examined the link between interpersonal closeness and salivary progesterone in 160 female college students.

At the start of the study, the researchers measured the levels of progesterone and of the stress hormone cortisol in the women's saliva, and obtained information about their menstrual cycles and whether they were using hormonal contraceptives or other hormonally active medications.

To control for daily variations in hormone levels, all the sessions were held between noon and 7 p.m.

The women were randomly assigned to partners and asked to perform either a task designed to elicit feelings of emotional closeness or a task that was emotionally neutral.

In the emotionally neutral task, the women proofread a botany manuscript together.

After completing the 20-minute tasks, the women played a computerized cooperative card game with their partners, and then had their progesterone and cortisol sampled again.

The progesterone levels of women who had engaged in the emotionally neutral tasks tended to decline, while the progesterone levels of women who engaged in the task designed to elicit closeness either remained the same or increased. The participants' cortisol levels did not change in a similar way.

Participants returned a week later, and played the computerized card game with their original partners again. Then researchers measured their progesterone and cortisol. Researchers also examined links between progesterone levels and how likely participants said they would be to risk their life for their partner.

"During the first phase of the study, we found no evidence of a relationship between progesterone and willingness to sacrifice," Brown said. "But a week later, increased progesterone predicted an increased willingness to say you would risk your life to help your partner."

According to Brown, the findings are consistent with a new evolutionary theory of altruism which argues that the hormonal basis of social bonds enables people to suppress self-interest when necessary in order to promote the well-being of another person, as when taking care of children or helping ailing family members or friends.

The results also help explain why social contact has well-documented health benefits---a relationship first identified nearly 20 years ago by U-M sociologist James House.

"Many of the hormones involved in bonding and helping behavior lead to reductions in stress and anxiety in both humans and other animals. Now we see that higher levels of progesterone may be part of the underlying physiological basis for these effects," Brown said.

Adapted from materials provided by University of Michigan.

http://www.sciencedaily.com/releases/2009/06/090602171941.htm

Leptin's Role In Brain Neurocircuitry Clarified

ScienceDaily (June 3, 2009) — In investigating the complex neurocircuitry behind weight gain and glucose control, scientists have known that the hormone leptin plays a key role in the process. But within the myriad twists and turns of the brain's intricate landscape, the exact pathways that the hormone travels to exert its influence have remained a mystery.Now, a study led by investigators at Beth Israel Deaconess Medical Center (BIDMC) sheds further light on the subject. Reported in tomorrow's issue of the journal Cell Metabolism, the findings demonstrate that when leptin sensitivity is restored to a tiny area of POMC neurons in the brain's hypothalamus, a group of mice deficient in the leptin-receptor are cured of severe diabetes – and also spontaneously double their activity levels – independent of any change in weight or eating habits.

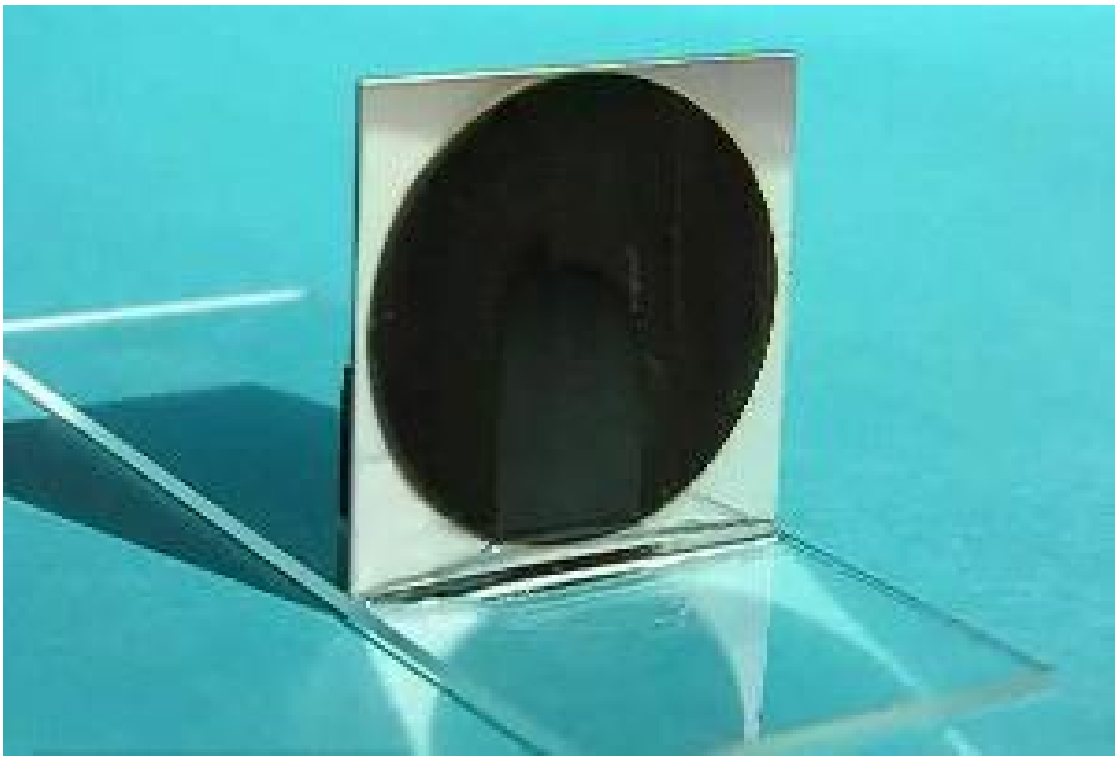
"This discovery suggests a new therapeutic pathway for drugs to treat insulin-resistant diabetes in humans with severe obesity, and possibly even to stimulate their urge to exercise," explains Christian Bjorbaek, PhD, an investigator in the Division of Endocrinology, Diabetes and Metabolism at BIDMC and Associate Professor of Medicine at Harvard Medical School. "We know that the majority of humans with Type 2 diabetes are obese and that weight loss can often ameliorate the disease. However, in many cases, it's difficult for these individuals to lose weight and can keep weight off. If, as these findings suggest, there is a system in the brain that can control blood-glucose directly, it offers hope for the identification of novel anti-diabetic drug targets."First identified in 1994 as an appetite and weight-regulation hormone, leptin plays a key role in energy homeostasis through its effects on the central nervous system. Over the years, investigators have pinpointed a region of the brain's hypothalamus known as the arcuate nucleus (ARC) as one key area where leptin exerts its influence, and within the ARC, they have identified two types of leptin-responsive neurons, the Agouti-related peptide (AgRP) neurons, which stimulate appetite and the pro-opiomelanocortin (POMC) neurons, which curb appetite.

"Still other studies had indicated that, by way of the ARC, leptin also had a function in both blood-sugar control and in activity levels," notes Bjorbaek. "We hypothesized that, in both cases, the POMC neurons were involved."To test their hypothesis, the scientists studied a group of leptin-receptor-deficient laboratory mice. "The animals were severely obese and profoundly diabetic," he explains. "Using Cre-Lox technology we were able to genetically and selectively re-express leptin receptors only in the POMC neurons. When leptin receptor activity was restored to just this very small group of neurons, the mice began eating about 30 percent fewer calories and lost a modest amount of weight." And, he adds, even more dramatically, the animals' blood sugar levels returned to normal independent of any change in weight or eating habits, and their activity levels spontaneously doubled.While more research is needed to explain the mechanisms at play, it may be that the POMC neurons reduce blood glucose by regulating key organs such as the liver or muscle tissue. "Normally, the liver is critical for increasing glucose production between meals in order to provide fuel for the brain, while skeletal muscle is important for the removal of glucose from the blood immediately after a meal," he notes. In this case, however, the POMC neurons may be decreasing glucose release into the blood by the liver and/or increasing glucose uptake from the blood into muscle."The fact that normal glucose levels were restored independent of food or weight changes is important because it suggests that it is possible to normalize blood glucose even without weight loss," explains Bjorbaek. "Furthermore, our finding that the mice had greatly increased activity levels despite still being highly overweight provides hope that POMC neurons and downstream neuronal systems might eventually be tapped to develop drugs that increase the will to voluntarily exercise in individuals who are overweight or obese."Study coauthors include BIDMC researchers Lihong Huo (first author), Kevin Gamber, Sarah Greeley, Jose Silva and Nicholas Huntoon and Xing-Hong Leng of Baylor College of Medicine, Houston, Texas.This study was funded by grants from the American Diabetes Association, the Richard and Susan Smith Family Foundation Pinnacle Program Project, the National Institutes of Health, the Endocrine Society, and the Boston Obesity Nutrition Research Center.

Adapted from materials provided by Beth Israel Deaconess Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090602133553.htm

Scientists Create Metal That Pumps Liquid Uphill



A piece of metal altered by Chunlei Guo's ultra-powerful laser pulls liquid uphill. (Credit: Image courtesy of University of Rochester)

ScienceDaily (June 3, 2009) — In nature, trees pull vast amounts of water from their roots up to their leaves hundreds of feet above the ground through capillary action, but now scientists at the University of Rochester have created a simple slab of metal that lifts liquid using the same principle—but does so at a speed that would make nature envious.

The metal, revealed in an upcoming issue of *Applied Physics Letters*, may prove invaluable in pumping microscopic amounts of liquid around a medical diagnostic chip, cooling a computer's processor, or turning almost any simple metal into an anti-bacterial surface.

"We're able to change the surface structure of almost any piece of metal so that we can control how liquid responds to it," says Chunlei Guo, associate professor of optics at the University of Rochester. "We can even control the direction in which the liquid flows, or whether liquid flows at all."

Guo and his assistant, Anatoliy Vorobyev, use an ultra-fast burst of laser light to change the surface of a metal, forming nanoscale and microscale pits, globules, and strands across the metal's surface. The laser, called a femtosecond laser, produces pulses lasting only a few quadrillionths of a second—a femtosecond is to a second what a second is to about 32 million years. During its brief burst, Guo's laser unleashes as much power as the entire electric grid of North America does, all focused onto a spot the size of a needlepoint, he says.

The wicking process, which on Guo's metal moves at a quick one centimeter per second speed against gravity, is very similar to the phenomenon that pulls spilled milk into a paper towel or creates "tears of wine" in a wineglass—molecular attractions and evaporation combine to move a liquid against gravity, says Guo. Likewise, Guo's nanostructures change the way molecules of a liquid interact with the molecules of the metal, allowing them to become more or less attracted to each other, depending on Guo's settings. At a certain size, the metal nanostructures adhere more readily to the liquid's molecules than the

liquid's molecules adhere to each other, causing the liquid to quickly spread out across the metal. Combined with the effects of evaporation as the liquid spreads, this molecular interaction creates the fast wicking effect in Guo's metals.

Adding laser-etched channels into the metal further enhances Guo's control of the liquid.

"Imagine a huge waterway system shrunk down onto a tiny chip, like the electronic circuit printed on a microprocessor, so we can perform chemical or biological work with a tiny bit of liquid," says Guo. "Blood could precisely travel along a certain path to a sensor for disease diagnostics. With such a tiny system, a nurse wouldn't need to draw a whole tube of blood for a test. A scratch on the skin might contain more than enough cells for a micro-analysis."

Guo's team has also created metal that reduces the attraction between water molecules and metal molecules, a phenomenon called hydrophobia. Since germs mostly consist of water, it's all but impossible for them to grow on a hydrophobic surface, says Guo.

Currently, to alter an area of metal the size of a quarter takes 30 minutes or more, but Guo and Vorobyev are working on refining the technique to make it faster. Fortunately, despite the incredible intensity involved, the femtosecond laser can be powered by a simple wall outlet, meaning that when the process is refined, implementing it should be relatively simple.

Guo is also announcing this month in *Physical Review Letters* a femtosecond laser processing technique that can create incandescent light bulbs that use half as much energy, yet produce the same amount of light. In 2006, Guo's team used the femtosecond laser to create metal with nanostructures that reflected almost no light at all, and in 2008 the team was able to tune the creation of nanostructures to reflect certain wavelengths of light—in effect turning almost any metal into almost any color.

This research funded by the U.S. Air Force Office of Scientific Research and the National Science Foundation.

Adapted from materials provided by University of Rochester.

http://www.sciencedaily.com/releases/2009/06/090602112259.htm

Lightweight Wings For A High-flying Kite

In breezy air: the Tensairity kite during towing tests at Duebendorf airfield. (Credit: Image courtesy of Empa)

ScienceDaily (June 3, 2009) — Tensairity elements made of air filled membrane assemblies, rods and cables have already made a name for themselves in the construction world as extremely light yet strong load-bearing structures. But is this new technology also suitable for use in the aerospace industry, for example to create novel wings for kites? Empa researchers are currently pushing back the envelope in this field, and are also demonstrating their first flying models.

Ultra light wing structures for kites are not just attractive for sport and hobby users but are also of interest to engineers, for example in applications such as towing kites which take advantage of wind energy to provide additional propulsion for diesel powered freighters, pulling them across the oceans. In this case the kites are intended to help shipping concerns to reduce their high fuels costs. They can also be used for other applications involving the exploitation of wind energy, one idea being to allow a kite to climb to a height of several kilometers, while up pulling a line wound around a drum. As the drum rotates to pay out the line, it can be made to generate electricity. When it reaches its target altitude the kite's wing-area is somewhat reduced causing it to descend, following which it begins a new climb phase and once again generates electric power. This is a fascinating field of application for ultra light structures, because in order for the kite to utilize the wind's energy efficiently it must have a large wing area.

Exploring the limits

Rolf Luchsinger, head of Empa's "Center for Synergetic Structures," and his team wanted to make use of a demonstrator device to find out where, from an aeronautical point of view, the limits of the technology lie, and whether a Tensairity kite would offer any particular advantages. Brainstorming together, Luchsinger and a member of his group who had previously studied aerospace engineering came up with several ideas for suitable shapes and sizes. Based on these ideas a series of models were developed with steadily improved aerodynamic and static characteristics, shown by laboratory tests and computer

simulations. The slimmer and more stable the air-filled wing spars, the more efficiently the kite climbs and therefore the better its pulling power can be harnessed to generate electricity.

The biggest Tensairity kite which Luchsinger's team has developed so far has a span of 8 meters and a surface area of 11 square meters, and has undergone numerous load tests in the laboratory. With a weight of 2.5 kilograms it is designed to generate a tensile force of 1000 Newtons, and could in theory climb to an altitude of 4000 meters.

Flight testing under the open sky

After the extended design phase and subsequent construction of the demonstrator kite, the researchers were keen to try out their baby. How high would it climb to? Would it generate the calculated amount of power? And – not to be forgotten – would it return to earth in one piece after its maiden flight? The first tests under the open sky made by the Empa scientists were at a disused military airfield in the Bernese Oberland, where the kite was towed behind a car at a height of 50 meters along a one kilometer long course. Luchsinger was happy with the outcome of this initial trial. "Our system works, the Tensairity kite is capable of generating the power we expected." Now the researchers are already thinking about their next vision – a kite with a span of up to 30 meters whose internal structures are filled with helium, so that even if the wind dies it would still stay aloft.

The novel wing concept is not just suitable for making kites, however. It shows potential for applications in sports and in the unmanned aerospace field. It could also conceivably be used as a communication platform. In this conceptual application a kite platform (HAPS, "High Altitude Platform System") flying at great altitude would act as a relay station for radio and telephony signals instead of a satellite.

Adapted from materials provided by Empa.

http://www.sciencedaily.com/releases/2009/05/090528092526.htm

Ancient Mammals Shifted Diets As Climate Changed

This fossilized horse (Equus) tooth shows where a series of enamel samples have been drilled to help identify seasonal fluctuations in the animal's diet. This horse lived about 1.9 million years ago during a glacial period in Florida. (Credit: Mary Warrick/University of Florida)

ScienceDaily (June 3, 2009) — A new University of Florida study shows mammals change their dietary niches based on climate-driven environmental changes, contradicting a common assumption that species maintain their niches despite global warming.

Led by Florida Museum of Natural History vertebrate paleontologist Larisa DeSantis, researchers examined fossil teeth from mammals at two sites representing different climates in Florida: a glacial period about 1.9 million years ago and a warmer, interglacial period about 1.3 million years ago. The researchers found that interglacial warming resulted in dramatic changes to the diets of animal groups at both sites.

"When people are modeling future mammal distributions, they're assuming that the niches of mammals today are going to be the same in the future," DeSantis said. "That's a huge assumption."

Co-author Robert Feranec, curator of vertebrate paleontology at the New York State Museum, said scientists cannot predict what species will do based on their current ecology.

"The study definitively shows that climate change has an effect on ecosystems and mammals, and that the responses are much more complex than we might think," Feranec said.

The two sites in the study, both on Florida's Gulf Coast, have been excavated quite extensively, DeSantis said. During glacial periods, lower sea levels nearly doubled Florida's width, compared with interglacial periods. But because of Florida's low latitude, no ice sheets were present during the glacial period. Despite the lack of glaciers in Florida, the two sites show dramatic ecological changes occurred between the two periods.

Both sites include some of the same animal groups, allowing DeSantis, Feranec and Bruce MacFadden, Florida Museum curator of vertebrate paleontology, to clarify how mammals and their environments responded to interglacial warming.

The research examined carbon and oxygen isotopes within tooth enamel to understand the diets of medium to large mammals, including pronghorn, deer, llamas, peccaries, tapirs, horses, mastodons, mammoths and gomphotheres, a group of extinct elephant-like animals.

Differences in how plants photosynthesize give them distinct carbon isotope ratios. For example, trees and shrubs process carbon dioxide differently than warm-season grasses, resulting in different carbon isotope ratios. These differences are incorporated in mammalian tooth enamel, allowing scientists to determine the diets of fossil mammals. Lower ratio values suggest a browsing diet (trees and shrubs) while a higher ratio suggests a grazing diet (grasses).

Animals at the glacial site were predominantly browsing on trees and shrubs, while some of those same animals at the warmer interglacial site became mixed feeders that also grazed on grasses. Increased consumption of grasses by mixed feeders and elephant-like mammals indicates Florida's grasslands likely expanded during interglacial periods.

Tooth enamel locks in the chemical signatures of the plants and water an animal consumes, allowing paleontologists to understand the diets and associated climate of fossil specimens that are millions of years old. To find these signatures, researchers run samples of tooth enamel through a mass spectrometer.

DeSantis and her collaborators analyzed enamel samples from 115 fossil teeth. For two of the specimens she took serial samples, small samples that run perpendicular to the growth axis and give insight into how the diet and climate changed over a specific period of time.

"That's one of the cool things about using mammal teeth," she said. "We can actually look at how variable the climate was within a year, millions of years ago."

The study highlights the importance of the fossil record in understanding long-term ecological responses to changes over time, DeSantis said. While ecological studies of modern impacts can cover only limited spans of time, "this study emphasizes the importance of using the fossil record to look at how mammals and other animals responded to climate change in the past, also helping us gain a better understanding of how they might respond in the future."

Journal reference:

1. DeSantis LRG, Feranec RS, MacFadden BJ. **Effects of Global Warming on Ancient Mammalian Communities and Their Environments**. *PLoS ONE*, 4(6): e5750 DOI: 10.1371/journal.pone.0005750

Adapted from materials provided by University of Florida.

http://www.sciencedaily.com/releases/2009/06/090602204255.htm

How Do Thunderstorms Create Lightning? High-energy Particles From Space Used To Probe Thunderstorms

ScienceDaily (June 3, 2009) — Florida Institute of Technology researchers are trying to solve one of the great mysteries in nature: how thunderstorms make lightning. Because, in principle, lightning is a big spark it should behave like other sparks—like the ones created when we touch a door knob on a dry day. Scientists have accumulated evidence, however, that lightning sometimes behaves in very un-spark-like ways.

Lightning can start in regions of thunderstorms that have relatively low electric fields and, so, should create no sparks. Because lightning obviously is made by thunderstorms, scientists are left wondering what they are missing.

Three such scientists, Joseph Dwyer and Hamid Rassoul from Florida Tech and Martin Uman from the University of Florida developed a new technique to remotely measure thunderstorm electric fields on the ground.

By measuring small radio pulses made by cosmic-rays passing through these storms, they calculate that they can reconstruct the electric fields along the high-energy particle's paths. This could allow them to measure any lightning initiation pockets that might exist.

One idea is that thunderstorms generate big electric fields capable of making sparks, but those strong fields are localized in very small pockets—too small to be easily detected by the balloons and aircraft sent into thunderclouds to measure the fields. Although this seems reasonable, the problem has been how to test it. Indeed, for decades scientists have struggled in vain to find such pockets where lightning might be initiated.

"Cosmic-rays are high-energy particles from outer space that constantly rain down on our planet. They form a natural probe for measuring thunderstorms," explained Dwyer, professor of physics and space sciences, who is leading the research effort. "Thunderstorms are big, violent, and dangerous places. Cosmic-ray air showers allow us to study them from a relatively safe location on the ground."

"It's a daunting task to find these high field regions," explained Rassoul, professor of physics and space sciences. "Thunderstorms are large and the chance that a balloon would find its way into exactly the right place at the right time to catch lightning initiation is small."

This summer at the UF/Florida Tech International Center for Lightning Research and Testing at Camp Blanding, Fla., scientists are conducting experiments to search for these lightning initiation pockets. If successful, researchers will be closer to understanding lightning, a phenomenon that has mystified people for thousands of years.

Journal reference:

1. . **Remote measurement of thunderstorm electrostatic fields**. *Journal of Geophysical Research*, (in press)

Adapted from materials provided by Florida Institute of Technology.

http://www.sciencedaily.com/releases/2009/06/090601140934.htm

Suffer Stroke Symptoms? Second Strokes Often Follow Within Hours

ScienceDaily (June 3, 2009) — About half of all people who have a major stroke following a warning stroke (a transient ischemic attack or mild stroke) have it within 24 hours of the first event, according to research published in the June 2, 2009, print issue of Neurology®, the medical journal of the American Academy of Neurology.

"Our study highlights the need for someone who is experiencing the symptoms of a mini-stroke or transient ischemic attack to get to an emergency room fast," said Peter Rothwell, MD, PhD, FRCP, FMedSci, with the University of Oxford in the United Kingdom. "That's because even after a very minor initial stroke, the immediate risk of a major stroke is very high."

For the study, researchers analyzed the medical records of 1,247 people who experienced a TIA, or minor stroke. Of those, 35 had recurrent strokes within 24 hours during the first month after experiencing the TIA.

Scientists looked at whether patients had another stroke within six, 12 and 24 hours after the first stroke. The timeline started when the person either experienced symptoms of a stroke or first called for medical help. The study found that after six hours, the risk of a second stroke went up by 1.2 percent. After 12 hours, the risk climbed another percent and by 24 hours the risk increased to 5 percent.

"This is the first rigorous population based study of the risk of a second stroke within 24 hours of a minor stroke," said Rothwell. "We found a second stroke rate of about 5 percent, with half of all second strokes within seven days occurring in the first 24 hours, and half of these early recurrent strokes being disabling or fatal."

The study was supported by the UK Medical Research Council, the National Institute of Health Research, the Stroke Association, the Dunhill Medical Trust and the Oxford Partnership Comprehensive Biomedical Research Center.

Adapted from materials provided by American Academy of Neurology.

http://www.sciencedaily.com/releases/2009/06/090601182700.htm

When Evolution Is Not So Slow And Gradual

Guppies. What's the secret to surviving during times of environmental change? Evolve...quickly. Guppy populations introduced into new habitats developed new and advantageous traits in just a few years. (Credit: iStockphoto)

ScienceDaily (June 3, 2009) — What's the secret to surviving during times of environmental change? Evolve…quickly.

A new article in *The American Naturalist* finds that guppy populations introduced into new habitats developed new and advantageous traits in just a few years. This is one of only a few studies to look at adaptation and survival in a wild population.

A research team led by Swanne Pamela Gordon from the University of California, Riverside studied 200 guppies that had been taken from the Yarra River in Trinidad and introduced into two different environments in the nearby Damier River, which previously had no guppies. One Damier environment was predator-free. The other contained fish that occasionally snack on guppies.

Eight years after their introduction, the team revisited the Damier guppies to see what adaptive changes they might have picked up in their new environments. The researchers found that the females had altered their reproductive effort to match their surroundings. In the environment where predators were present, females produced more embryos each reproductive cycle. This makes sense because where predators abound, one might not get a second chance to reproduce. In less dangerous waters, females produced fewer embryos each time, thus expending fewer resources on reproduction.

Finally, the researchers wanted to see if these adaptive changes actually helped the new population to survive. So they took more guppies from the Yarra, marked them, and put them in the Damier alongside the ones that had been there for eight years. They found that the adapted guppies had a significant survival advantage over the more recently introduced group.

In particular, juveniles from the adapted population had a 54 to 59 percent increase in survival rate over those from the newly introduced group. In the long run, survival of juveniles is crucial to the survival of the population, the researchers say.

The fact that fitness differences were found after only eight years shows just how fast evolution can work—for short-lived species anyway.

"The changes in survival in our study may initially seem encouraging from a conservation perspective," the authors write. "[B]ut it is important to remember that the elapsed time frame was 13-26 guppy generations. The current results may therefore provide little solace for biologists and managers concerned with longer-lived species."

Journal reference:

1. Gordon et al. **Adaptive Changes in Life History and Survival following a New Guppy Introduction**. *The American Naturalist*, 2009; 090513093746042 DOI: 10.1086/599300

Adapted from materials provided by University of Chicago Press Journals.

http://www.sciencedaily.com/releases/2009/06/090602133551.htm

Ruptured Brain Aneurysms: Minimally Invasive Stroke Treatment Produces Better Patient Outcomes Than Surgical Operation, Study Finds

ScienceDaily (June 3, 2009) — While minimally invasive coil treatments for those with a ruptured brain aneurysm have proved to be a more effective technique than traditional surgical operation in selected patients, the superior procedure is drastically more expensive, according to new research from the Zeenat Qureshi Stroke Research Center at University of Minnesota Medical School.

Using outcomes from more than 2,000 patients – half of whom underwent minimally invasive endovascular coiling for brain aneurysms – and economic data gathered from a variety of hospitals throughout the United States, it is clear the minimally invasive procedure has better patient outcomes – including qualify of life – than the neurosurgical counterpart.

Minimally invasive treatments on average cost about $72,000 more than surgical treatments for each quality-adjusted life years gained (including costs stemming from disability, hospitalization, retreatment, and rebleeding) – partly because multiple follow-up treatments are necessary within the first year of endovascular treatments, as opposed to one major surgical operation.

Coiling is a technique that involves placing a small catheter into the aneurysm and filling it with platinum coils. The catheter is introduced through a blood vessel in the groin and advanced under X-ray all the way into the brain blood vessels. With accrual of additional years with better outcome status, the cost-effectiveness of endovascular coiling would most likely progressively improve and eventually reverse direction, said Alberto Maud, M.D., principal investigator of the study.

"The minimally invasive treatment is better tolerated in selected critically ill patients with ruptured brain aneurysms. The procedure is effective in preventing a second rupture but currently limited in terms of cost due to the need for additional follow-up procedures to treat new aneurysm growth," Maud said. "However, a new generation of devices promises to provide more permanent obliterations for aneurysms. It should be noted that despite additional treatments, patients treated with endovascular treatment continued have lower rates of death and disability than those treated with open surgery."

The research is published in the May issue of the *Journal of Neurosurgery*. Other benefits of minimally invasive surgery include less time in hospital and lower chance of disability, said Adnan I. Qureshi, M.D., senior investigator of the study, who is also the director of the Minnesota Stroke Initiative. Currently about 30 to 40 percent of all patients with aneurysms are treated with minimally invasive procedures, he said.

Intracranial aneurysms impact about 2 percent of the general population worldwide and are present in 10 million people in the United States. Until recently, the predominant treatment was open operation. However, endovascular treatments have increased as the technique has improved.

Other investigators included Drs. Lakshminarayan, Suri, Vazquez, and Lanzino. The study was funded by Zeenat Qureshi Stroke Research Center.

Journal reference:

1. Maud et al. **Cost-effectiveness analysis of endovascular versus neurosurgical treatment for ruptured intracranial aneurysms in the United States**. *Journal of Neurosurgery*, 2009; 110 (5): 880 DOI: 10.3171/2008.8.JNS0858

http://www.sciencedaily.com/releases/2009/05/090529132123.htm

PERM JOURNAL
Modern Dance and Art Bring a Burst of Color to a Gray City

By SOPHIA KISHKOVSKY

PERM, Russia — By night, the disarmed intercontinental ballistic missiles arrayed outside the old Motovilikha factory museum evoke a cold war graveyard.

But the art curators from Moscow who have embraced this military-industrial city see the setting differently: as a quirky backdrop for modern dance.
In a region once known best for producing rockets, petrochemicals and salt — and for incarcerating dissidents in Gulag prison camps — Perm is banking on contemporary art, architecture and theater to overcome its weighty past.
"Doing modern dance performances against the background of these rockets is very appropriate," said Nikolai Palazhchenko, one of the founders of Winzavod, a trendy Soho-style Moscow arts center, and now one of the cultural trendsetters working on projects in Perm.
The city is still a disjointed mélange of Soviet industry, the remains of stately pre-revolutionary mansions and tilted wooden houses scattered along the Kama River. But Mr. Palazhchenko, known as "Spider," and his associates think Perm could become Russia's Berlin. The Russian media are already calling it "Bilbao on the Kama," a reference to the down-at-the heels Basque city transformed by a Guggenheim Museum there designed by Frank Gehry.
Perm's old Motovilikha factory seems a particular fascination. After some of Russia's best young playwrights gathered in Perm for the Novaya Drama contemporary drama festival in March, their workshops resulted in "Motovilikha Worker," a documentary play based on interviews with factory workers.
Another landmark — the city's former Stalin-era riverboat station — was reborn in March as the Perm Museum of Contemporary Art. Until recently, the region's most internationally famous museum was Perm-36, a former Soviet prison camp exhibited as a warning to society.
Closed to foreigners until the late Soviet era, Perm has struggled since Communism's fall, with factories like Motovilikha hit hard.
But Sergei Gordeev, a wealthy senator and patron of Soviet Modernist architecture, has been a driving force behind Perm's current cultural ambitions. He and other philanthropists have committed to giving a total of about $3 million a year toward the new contemporary art museum's collection. Donors include Lukoil and Viktor Vekselberg, the oil and aluminum magnate, while the regional government is financing the museum's operating costs.
"I love it!" wrote Oleg Chirkunov, the region's governor and an avid blogger, after visiting Russkoye Bednoye, an exhibition curated by Marat Guelman, Moscow's most prominent and controversial art gallery owner, at the riverboat station late last year. "I think that Perm has the chance to have a world-class museum."

Although isolated during Soviet times, Perm, a city of one million people about 700 miles east of Moscow, has a rich cultural tradition. The Stroganoff family was given control of the region by Ivan the Terrible and promoted the arts. The Kirov Ballet and Opera were evacuated here from Leningrad during World War II. Perm's State Art Gallery has a hauntingly beautiful collection of wooden sculptures of Jesus carved by indigenous craftsmen in the 17th to early 20th centuries.
Sergei Diaghilev, creator of the legendary Ballets Russes, grew up in Perm, and a festival named after him began here in 2003. An operatic version of Aleksandr Solzhenitsyn's "One Day in the Life of Ivan Denisovich," about the gulag, had its world premiere at the festival this month.
Now Mr. Chirkunov says Perm needs a new, post-Soviet identity.
"We have a clear goal, to try to turn Perm gradually from an industrial city into something different, into a place where it is comfortable for people to live, where there is some concentration of intellectual people," he said.
"Russkoye Bednoye," or "Russian Poor," an exhibition at the contemporary art museum of found-object installations by some of Russia's most acclaimed contemporary artists, has become a catchphrase for the financial crisis. Bolshoi Gorod, a magazine that chronicles the cultural zeitgeist, called it one of 2008's definitive new phrases. Another Moscow magazine, Afisha, named Perm "City of the Year."
Boris Milgram, Perm regional culture minister, said the financial crisis had not seriously curtailed the ambitious cultural plans because "in a time of crisis, culture remains affordable."
The city's newfound cachet was underscored recently when Mr. Guelman announced that he had sold his stake in his Moscow gallery to focus on Perm, where he has been appointed the contemporary art museum's director. Mr. Guelman, previously a Kremlin political strategist, said he and Mr. Gordeev had spent many late nights brainstorming about Perm's future.
"In a year, Perm will be the cultural capital of Russia," Mr. Guelman said at the Novaya Drama festival, which also migrated from Moscow. "A phenomenon is being created in Perm that will pull all of Russian art up to an international level."
Some Perm residents are less than thrilled. Aleksei Bessonov, a local Communist activist, mirrors the criticisms of some Russian nationalists and religious leaders who say contemporary art is often pornographic and reflects a pseudo-liberal philosophy that is ruining the country.
"They want to appear as liberals in the West, as intellectuals," he said of those promoting it. "In fact," he added, "they are fascists, simply fascists. What they are doing is cultural fascism."
While the city celebrates art, Mr. Bessonov says, the region is mired in poverty.
But Mr. Chirkunov, the governor, argues that culture can lift it from economic doldrums. Perm's historic tolerance for gays and ethnic diversity has been credited for its creative energy. "People in Perm are quite tolerant of many things, including ethnic differences," Mr. Chirkunov said. "I wouldn't want to jinx this."
Others speak of Perm's mystical qualities.
"This city has a very beautiful aura, and the sky is incredible here, the river must create this amazing sense of air here," said Novaya Drama's founder, Eduard Boyakov, who plans to devote half his time to Perm over the next several years. "On the other hand there is the urbanistic, incredibly powerful energy of these factories here, the military complex, all these tanks and howitzers and cannons."
Perm, he said, has neither St. Petersburg's "imperial haughtiness" nor the "provincial lack of confidence" of smaller cities.
Mr. Gordeev has drawn some international attention to Perm, bringing Thomas Krens, then the Guggenheim Foundation director, here in 2007. He has also commissioned KCAP, a Dutch architectural firm working on London for the 2012 Olympics, to create a new master plan for Perm, which suffers, among other things, from severe traffic congestion, that post-Soviet urban bane.
Chekhov is said to have based the provincial ennui and cries of "To Moscow! To Moscow!" in "The Three Sisters" on Perm. But now weary Moscow cultural figures seem to be headed to Perm.
"Moscow is losing the attributes of a city and is a megapolis where people earn money during the day and spend it feverishly at night," said Vladimir Sorokin, Russia's most famous contemporary writer, in Perm for a reading. He refuses to give them in Moscow. "People there are arrogant and irritable. Here in Perm audiences are absolutely healthy. They are like the Moscow public of the 1970s."

http://www.nytimes.com/2009/05/28/world/europe/28perm.html?pagewanted=all

Is Slam in Danger of Going Soft?

By LARRY ROHTER

CHICAGO — Slam poetry was invited into the White House last month and it is also the focus of the recent HBO documentary series "Brave New Voices." So you might think that the originator of the poetry slam, a raucous live competition that is more likely to take place in a bar than in a bookstore, would be feeling rather pleased these days.

But from his base here at the Green Mill Cocktail Lounge, Marc Kelly Smith expresses mixed feelings about the growing popularity and respectability of the art form that he created almost 25 years ago. From the start, he envisioned slam poetry as a subversive, thumb-your-nose-at-authority movement, and he wants to ensure it stays true to those origins.

"At the beginning, this was really a grass-roots thing about people who were writing poetry for years and years and years and had no audience," Mr. Smith said recently, just before his weekly Sunday night slam at the Green Mill. "Now there's an audience, and people just want to write what the last guy wrote so they can get their face on TV. Well, O.K., but that's not what people in this country, from Marc's point of view, need. We've got too much of that. This show wasn't started to crank out that kind of thing."

Like it or not, Mr. Smith's concept has become a global phenomenon, especially among young people, who, helped by exposure to hip-hop, seem more comfortable with the idea that poetry belongs both "on the stage and on the page." Slam poetry has been incorporated into school curriculums across the country; more than 80 cities now compete in the annual national championship; and similar contests are springing up in the most unlikely places, most recently on Réunion Island in the Indian Ocean.

"I think that perhaps Marc sees this as snowballing out of control," said Susan B. A. Somers-Willett, author of "The Cultural Politics of Slam Poetry" and a slam poet herself. "This is something that started in Chicago as a group of oddballs who wanted to do some pretty avant-garde things, but over the years, as it entered the commercial sphere, it has gotten more and more homogenous and started catering to a demographic mainstream."

The poetry event that President Obama and his wife, Michelle, hosted at the White House on May 12 was a "jam" rather than a slam, perhaps to distance it from the sometimes boisterous atmosphere that Mr. Smith promotes. The evening included performances by two college-age slammers who have appeared on "Brave New Voices" and by Mayda del Valle, a slam poet from Chicago who won the national slam competition in 2001.

The Chicago connection is not coincidental. As Ms. Somers-Willett put it, "Chicago is America's poetry city, with a rich, rich tradition of orality and performance-oriented poetry that goes way back," at the very least to Carl Sandburg and Kenneth Rexroth in the first decades of the 20th century.

The Poetry Foundation, which publishes Poetry magazine, also has its headquarters here, and in April set up a Chicago Poetry Tour that includes 22 sites around the city. (An online version of the tour can be downloaded at poetryfoundation.org.) One of the stops is the Green Mill, Mr. Smith's artistic home since 1986.

"What Marc Smith has achieved here and around the world is remarkable," said Stephen Young, program director of the Poetry Foundation. "The slam movement summons a lot of energy and has taught some traditional poets a thing or two about how to read their poems in public."

Yet Mr. Smith and his disciples still raise the hackles of what he refers to as "the academic poets," on both sides of the cultural wars. Amiri Baraka, a Marxist who is known for his politically provocative poetry, has said, "I don't have much use for them because they make the poetry a carnival" and "elevate it to commercial showiness, emphasizing the most backward elements."

On the other side of the divide, Jonathan Galassi, now the honorary chairman of the Academy of American Poets, once described slam poetry as a "kind of karaoke of the written word," while the critic Harold Bloom has called it "the death of art" and complained of "various young men and women in various late-night spots" who "are declaiming rant and nonsense at each other." George Bowering, a former poet laureate of Canada, condemns slams as "abominations" that are "crude and extremely revolting."

Mr. Smith seems to relish such attacks. The initial impulse for slam poetry, he acknowledged, came from his disdain for the conventional poetry readings he attended when he first began to study the craft.

"I went to them, and they were stupid and horrible, with nobody in the audience, and somebody up there onstage throwing all these allusions around, acting as if it's a crowded room and he's communicating," he said. "So I started looking at these poetry readings like, 'These people don't know what they are doing.' And they didn't, which gave me the confidence to say, 'Well, I can do that.' "

A college dropout, Mr. Smith, born in 1949, worked for more than a decade as a surveyor and construction worker. At the same time he was also writing and reading poetry, verse from Walt Whitman, Wallace Stevens and Robert Frost, all of whom he admires, to Ezra Pound, "who I hated, because, what is he saying, you know?" But when asked about influences on the slam style, he mentions the singer-songwriter Tom Waits first. On hearing songs by Mr. Waits, like "Putnam County," he said, "it was like: 'What was that? Wow.' "

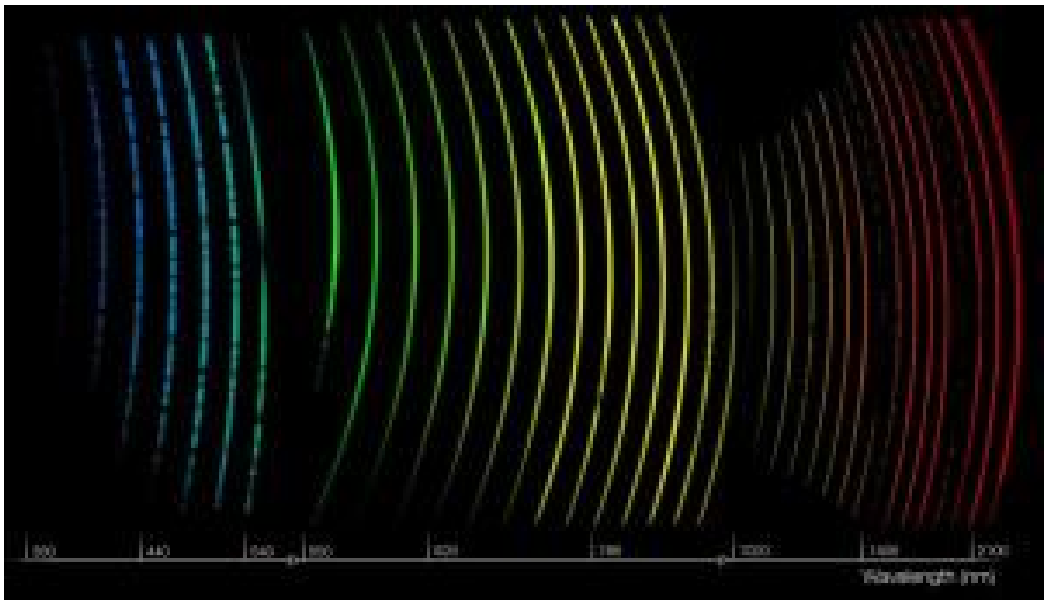
To spread his version of the slam poetry gospel, Mr. Smith has recently released two books, "Take the Mic" and "Stage a Poetry Slam," which he wrote with Joe Kraynak. In addition, the Sunday sessions he leads at the Green Mill are broadcast nationally on Sirius XM satellite radio.

He also continues to refine the show here, which consists of an initial open-microphone set, followed by a performance by an invited artist and finally the competition. But since "the competition from my point of view is meant not to be serious, but a mockery," the first prize is $10, which is an improvement over the Twinkie he used to offer.

"The gimmick here has always been to entertain you and then pow, put it right in you," he said. "Slam is a serious art form that seems like it's just a big, goofy thing. But it's deadly serious. Why do it? Why do any art if you're not going to bring out of yourself the thing that is most vulnerable and most precious, that has to be said? Why do something unless you're really trying to get at what it's really about? And that's what this show is."

http://www.nytimes.com/2009/06/03/books/03slam.html?th&emc=th

Most Efficient Spectrograph To Shoot The Southern Skies



This illustration shows the three spectra produced simultaneously by the new efficient X-shooter instrument on ESO's Very Large Telescope. X-shooter can record the entire spectrum of a celestial object (in this example a distant lensed quasar) in one shot -- from the ultraviolet to the near-infrared-- with great sensitivity and spectral resolution. This unique new instrument will be particularly useful for the study of distant exploding objects called gamma-ray bursts, among the most energetic events in the Universe, which fade rapidly in brightness in matter of hours after the their appearance. The rainbow colours applied to the spectra indicate X-shooter's wide spectral coverage and are meant for illustrative purposes only. The majority of the wavelengths covered are in fact invisible to the human eye. (Credit: ESO)

ScienceDaily (June 3, 2009) — ESO's Very Large Telescope — Europe's flagship facility for ground-based astronomy — has been equipped with the first of its second generation instruments: X-shooter. It can record the entire spectrum of a celestial object in one shot — from the ultraviolet to the near-infrared — with high sensitivity. This unique new instrument will be particularly useful for the study of distant exploding objects called gamma-ray bursts.

"X-shooter offers a capability that is unique among astronomical instruments installed at large telescopes," says Sandro D'Odorico, who coordinated the Europe-wide consortium of scientists and engineers that built this remarkable instrument. "Until now, different instruments at different telescopes and multiple observations were needed to cover this kind of wavelength range, making it very difficult to compare data, which, even though from the same object, could have been taken at different times and under different sky conditions."

X-shooter collects the full spectrum from the ultraviolet (300 nm) to the near-infrared (2400 nm) in parallel, capturing up to half of all the light from an object that passes through the atmosphere and the various elements of the telescope. "All in all, X-shooter can save us a factor of three or more in terms of precious telescope time and opens a new window of opportunity for the study of many, still poorly understood, celestial sources," says D'Odorico.

The name of the 2.5-ton instrument was chosen to stress its capacity to capture data highly efficiently from a source whose nature and energy distribution are not known in advance of the observation. This property is particularly crucial in the study of gamma-ray bursts, the most energetic explosions known to occur in the Universe. Until now, a rough estimate of the distance of the target was needed, so as to know which instrument to use for a detailed study. Thanks to X-shooter, astronomers won't have to go through

this first observing step. This is particularly relevant for gamma-ray bursts, which fade away very quickly and where being fast is the key to understanding the nature of these elusive cosmic sources.

“I am very confident that X-shooter will discover the most distant gamma-ray bursts in the Universe, or in other words, the first objects that formed in the young Universe,” says François Hammer, who leads the French efforts in X-shooter.

X-shooter was built by a consortium of 11 institutes in Denmark, France, Italy and the Netherlands, together with ESO. In total 68 person-years of work by engineers, technicians and astronomers and a global budget of six million Euros were required. The development time was remarkably fast for a project of this complexity, which was completed in just over five years, starting from the kick-off meeting held in December 2003.

“The success of X-shooter and its relatively short completion time are a tribute to the quality and dedication of the many people involved in the project,” says Alan Moorwood, ESO Director of Programmes.

The instrument was installed at the telescope at the end of 2008 and the first observations in its full configuration were made on 14 March 2009, demonstrating that the instrument works efficiently over the full spectral range with unprecedented resolution and quality. X-shooter has already proved its full capability by obtaining the complete spectra of low metallicity stars, of X-ray binaries, of distant quasars and galaxies, of the nebulae associated with Eta Carinae and the supernova 1987A, as well as with the observation of a distant gamma-ray burst that coincidently exploded at the time of the commissioning run.

X-shooter will be offered to the astronomical community from 1 October 2009. The instrument is clearly answering a need in the scientific community as about 150 proposals were received for the first runs of X-shooter, for a total of 350 observing nights, making it the second most requested instrument at the Very Large Telescope in this period.

Adapted from materials provided by European Southern Observatory - ESO.

http://www.sciencedaily.com/releases/2009/05/090525105253.htm

Exercise More, Not Less, To Ease Aching Back, Study Suggests

ScienceDaily (June 3, 2009) — People with lower back pain are better off exercising more, not less.

A University of Alberta study of 240 men and women with chronic lower-back pain showed that those who exercised four days a week had a better quality of life, 28 per cent less pain and 36 per cent less disability, while those who hit the gym only two or three days a week did not show the same level of change.

"While it could be assumed that someone with back pain should not be exercising frequently, our findings show that working with weights four days a week provides the greatest amount of pain relief and quality of life," said Robert Kell, lead author of the study and an assistant professor of exercise physiology at the University of Alberta, Augustana Campus.

About 80 per cent of North Americans suffer from lower back pain.

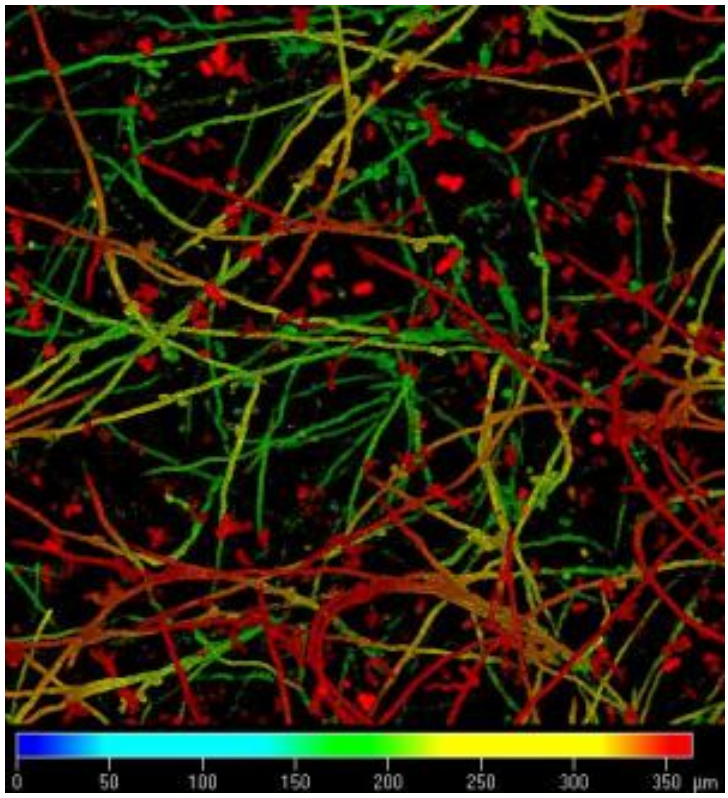
Kell presented some of the findings May 30 at the American College of Sports Medicine conference in Seattle, Wash.

In the study, groups of 60 men and women with chronically sore lower backs each exercised with weights in two, three or four-day weekly programs, or not at all. Their progress was measured over 16 weeks. The level of pain decreased by 28 per cent in programs that included exercise four days a week, by 18 per cent three days a week and by 14 per cent two days a week. The quality of life, defined as general physical and mental well-being, rose by 28 per cent, 22 per cent and 16 per cent respectively.

Adapted from materials provided by University of Alberta, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090602133559.htm

Six New Genome Sequences And Fundamental Insights To The Candida Fungus Family Revealed



Candida species growing as biofilms on catheter material. (Credit: Image courtesy of UCD Conway Institute of Biomolecular & Biomedical Research)

ScienceDaily (June 3, 2009) — An international research collaboration coordinated by UCD researchers and involving scientists at 21 institutes including the genome sequencing centres in the Wellcome Trust Sanger Institute, UK and the Broad Institute at MIT and Harvard, USA have defined six new genome sequences in the Candida fungus family and identified genetic differences in species that cause disease.

The research, published in the journal *Nature*, describes how Candida strains have evolved and ensured their survival by adapting their genetic makeup to respond to changes in their environment. Candida species are the most common cause of opportunistic fungal infection worldwide.

The incidence of *Candida parapsilosis* in particular poses the greatest threat to transplant patients and premature babies as it forms a film that coats the inside of medical devices such as implants, catheters or feeding tubes. The fungus is drug resistant and the only effective treatment involves the removal of the medical device. Prior to this work, very little was known about this species.

The UCD research team led by Professor Geraldine Butler from UCD Conway Institute & School of Biomolecular & Biomedical Science looked at key components of mating and cell division in Candida species, shedding new light on how the fungi reproduce and survive.

Professor Butler, scientific coordinator on this project, began working to identify the sequence of genes of *C. parapsilosis* in 2003 through funding from Science Foundation Ireland. She said, “We started by sequencing small parts of the *C. parapsilosis* genome, which led to our collaboration with the Sanger Institute to sequence the entire genome, and finally to combining this genome with others sequenced by the Broad Institute”

Commenting on their findings, Professor Butler says, “Candida species were originally believed to be incapable of mating, and so may have difficulties in adapting to new environments or new hosts. As a result of our analysis, we now know a great deal more about the evolution of mating, and how some species recombine their genes. Interestingly, *C. parapsilosis* is probably the only species that cannot mate”

By comparing the genetic sequences in disease and non-disease causing fungi, the team found that in general, the disease causing Candida species have many more copies of genes involved in adhesion, and in the cell wall. The stickiness of the proteins in the cell wall makes it easier for the fungi to adhere to the human host.. Further research on the regulation of these proteins may lead to developing treatment methods for infections caused by fungi in the future.

Journal reference:

1. Butler et al. **Evolution of pathogenicity and sexual reproduction in eight Candida genomes**. *Nature*, May 24, 2009; DOI: 10.1038/nature08064

Adapted from materials provided by UCD Conway Institute of Biomolecular & Biomedical Research, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/05/090525105224.htm

Magnetic Tornadoes Could Liberate Mercury's Tenuous Atmosphere

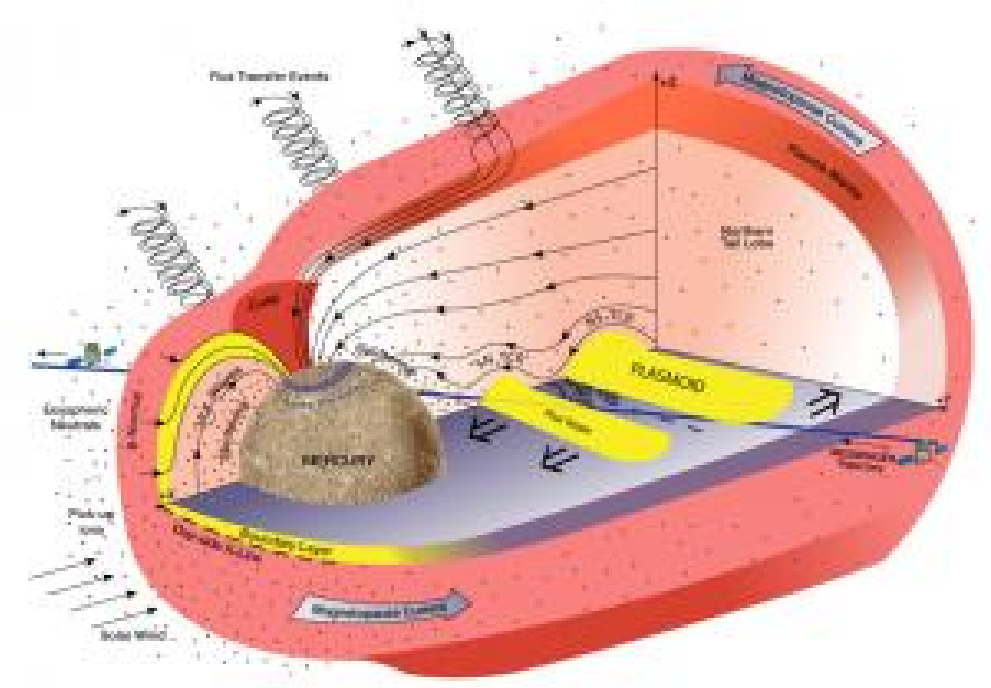


Diagram of magnetic tornadoes at Mercury. This is a diagram of the October 6, 2008, MESSENGER flyby that revealed magnetic tornadoes forming in Mercury's magnetic field. The tornadoes are corkscrew-shaped bundles of twisted magnetic fields and plasma. The pink area represents the boundary of Mercury's magnetic field, called the magnetopause. The tornadoes are technically known as "flux transfer events" (twisted lines) when they form at the magnetopause and "plasmoids" (yellow areas) when they form in the long magnetic "tail" extending from the night-side of Mercury. The large magnetic field leakage through the magnetopause and the flux transfer events acts as open channels through which the solar wind can flow down to the surface of the planet and sputter neutral atoms into Mercury's atmosphere. (Credit: Image produced by NASA/Goddard Space Flight Center/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington. Image reproduced courtesy of Science/AAAS)

ScienceDaily (June 2, 2009) — As the closest planet to the sun, Mercury is scorching hot, with daytime temperatures of more than 800 degrees Fahrenheit (approximately 450 degrees Celsius). It is also the smallest rocky planet, so its gravity is weak, only about 38 percent of Earth's. These conditions make it hard for the planet to hold on to its atmosphere, which is extremely thin, and invisible to the human eye.

However, it can be seen by special instruments attached to telescopes and spacecraft like MESSENGER (MErcury Surface, Space ENvironment, GEochemistry, and Ranging).

"Mercury's atmosphere is so thin, it would have vanished long ago unless something was replenishing it," says Dr. James A. Slavin of NASA's Goddard Space Flight Center, Greenbelt, Md., a co-investigator on NASA's MESSENGER mission to Mercury. That something could be the solar wind, a thin gas of electrically charged particles, called a plasma, which blows constantly from the surface of the sun. The solar wind moves quickly, usually around 250 to 370 miles per second (about 400 to 600 kilometers/second); fast enough to blast atoms off the surface of Mercury. Through a process called "sputtering," solar wind particles that crash into Mercury's surface transfer sufficient energy to launch some atoms into ballistic trajectories high above the surface and replenish Mercury's atmosphere, according to Slavin.

However, there's a problem – Mercury's magnetic field gets in the way. MESSENGER's first flyby on January 14, 2008, confirmed that the planet has a global magnetic field, as first discovered by the Mariner 10 spacecraft during its flybys of the planet in 1974 and 1975.

The ions and electrons that make up the solar wind are electrically charged and "feel" magnetic forces, so a global magnetic field usually deflects the solar wind. However, global magnetic fields are leaky shields and, under the right conditions, they are known to develop holes through which the solar wind can flow.

During its second flyby of the planet on October 6, 2008, MESSENGER discovered that Mercury's magnetic field can be extremely leaky indeed. The spacecraft encountered magnetic "tornadoes" – twisted bundles of magnetic fields connecting the planetary magnetic field to interplanetary space – that were up to 500 miles wide or a third of the radius of the planet.

"These 'tornadoes' form when magnetic fields carried by the solar wind connect to Mercury's magnetic field," said Slavin. "As the solar wind blows past Mercury's field, these joined magnetic fields are carried with it and twist up into vortex-like structures. These twisted magnetic flux tubes, technically known as flux transfer events, form open windows in the planet's magnetic shield through which the solar wind may enter and directly impact Mercury's surface."

Venus, Earth, and even Mars have thick atmospheres compared to Mercury, so the solar wind never makes it to the surface of these planets, even if there is no global magnetic field in the way, as is the case for Venus and Mars. Instead, it hits the upper atmosphere of these worlds, where it has the opposite effect to that on Mercury, gradually stripping away atmospheric gas as it blows by.

Venus has a thick atmosphere that may be replenished by volcanoes, so losses to the solar wind are insignificant. Mars is a different story. Mars lost its global magnetic field billions of years ago. With little apparent volcanic activity since then, the solar wind could have eroded a significant portion of the Red Planet's atmosphere.

Features on Mars resembling dry riverbeds, and the discovery of minerals that form in the presence of water, indicate that Mars once had a thicker atmosphere that kept it warm enough for liquid water to flow on the surface. However, somehow that much thicker ancient atmosphere got lost, because it appears Mars has been cold and dry for billions of years.

In 2013, NASA plans to launch a mission to Mars called MAVEN (Mars Atmosphere and Volatile Evolution Mission). It will explore the various ways Mars loses its atmosphere to space, including how much may have been stripped away by the solar wind.

The process of linking interplanetary and planetary magnetic fields, called magnetic reconnection, is common throughout the cosmos. It occurs in Earth's magnetic field, where it generates magnetic tornadoes as well. However, the MESSENGER observations show the reconnection rate is ten times higher at Mercury.

"Mercury's proximity to the sun only accounts for about a third of the reconnection rate we see," said Slavin. "It will be exciting to see what's special about Mercury to explain the rest. We'll get more clues from MESSENGER's third flyby on September 29, 2009, and when we get into orbit in March 2011."

Slavin's MESSENGER research was funded by NASA and is the subject of a paper that appeared in the journal Science on May 1, 2009.

Adapted from materials provided by NASA/Goddard Space Flight Center.

http://www.sciencedaily.com/releases/2009/06/090602112255.htm

Tai Chi Improves Pain In Arthritis Sufferers

ScienceDaily (June 2, 2009) — The results of a new analysis have provided good evidence to suggest that Tai Chi is beneficial for arthritis. Specifically, it was shown to decrease pain with trends towards improving overall physical health, level of tension and satisfaction with health status. Musculoskeletal pain, such as that experienced by people with arthritis, places a severe burden on the patient and community and is recognized as an international health priority. Exercise therapy including such as strengthening, stretching and aerobic programs, have been shown to be effective for arthritic pain. Tai Chi, is a form of exercise that is regularly practiced in China to improve overall health and well-being. It is usually preformed in a group but is also practiced individually at one's leisure, which differs from traditional exercise therapy approaches used in the clinic.Recently, a new study examined the effectiveness of Tai Chi in decreasing pain and disability and improving physical function and quality of life in people with chronic musculoskeletal pain. The study is published in the June issue of Arthritis Care & Research. Led by Amanda Hall of The George Institute in Sydney, Australia, researchers conducted a systematic review and meta-analysis. They analyzed seven eligible randomized controlled trials that used Tai Chi as the main intervention for patients with musculoskeletal pain. The results demonstrate that Tai Chi improves pain and disability in patients suffering arthritis.The authors state, "The fact that Tai Chi is inexpensive, convenient, and enjoyable and conveys other psychological and social benefits supports the use this type of intervention for pain conditions such as arthritis." "It is of importance to note that the results reported in this systematic review are indicative of the effect of Tai Chi versus minimal intervention (usual health care or health education) or wait list control," the authors note. Establishing the specific effects of Tai Chi would require a placebo-controlled trial, which has not yet been undertaken.

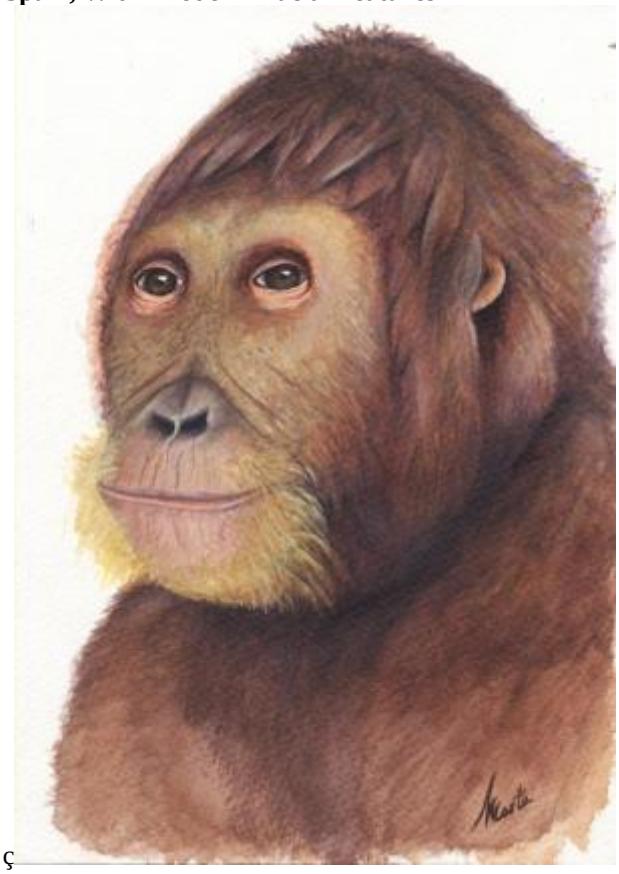
Journal reference:

1. Hall et al. **The effectiveness of Tai Chi for chronic musculoskeletal pain conditions: A systematic review and meta-analysis**. *Arthritis & Rheumatism*, 2009; 61 (6): 717 DOI: 10.1002/art.24515

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090601182922.htm

New Hominid 12 Million Years Old Found In Spain, With 'Modern' Facial Features



Lluc reconstruction. (Credit: Image courtesy of Universitat Autònoma de Barcelona)

ScienceDaily (June 2, 2009) — Researchers have discovered a fossilized face and jaw from a previously unknown hominoid primate genus in Spain dating to the Middle Miocene era, roughly 12 million years ago. Nicknamed "Lluc," the male bears a strikingly "modern" facial appearance with a flat face, rather than a protruding one. The finding sheds important new light on the evolutionary development of hominids, including orangutans, chimpanzees, bonobos, gorillas and humans.

In a study appearing in the *Proceedings of the National Academy of Sciences*, Salvador Moyà-Solà, director of the Institut Català de Paleontologia (ICP) at the Universitat Autònoma de Barcelona, and colleagues present evidence for the new genus and species, dubbed *Anoiapithecus brevirostris*. The scientific name is derived from the region where the fossil was found (l'Anoia) and also from its "modern" facial morphology, characterized by a very short face.

The research team at the ICP also includes collaborator David M. Alba, predoctoral researcher Sergio Almécija, postdoctoral researcher Isaac Casanovas, researcher Meike Köhler, postdoctoral researcher Soledad De Esteban, collaborator Josep M. Robles, curator Jordi Galindo, and predoctoral researcher Josep Fortuny.

Their findings are based on a partial cranium that preserves most of the face and the associated mandible. The cranium was unearthed in 2004 in the fossil-rich area of Abocador de Can Mata (els Hostalets de Pierola, l'Anoia, Barcelona), where remains of other fossilized hominid species have been found. Preparing the fossil for study was a complicated process, due to the fragility of the remains. But once the material was available for analysis, the results were surprising: The specimen (IPS43000) combined a set of features that, until now, had never been found in the fossil record.

Anoiapithecus displays a very modern facial morphology, with a muzzle prognathism (i.e., protrusion of the jaw) so reduced that, within the family *Hominidae*, scientists can only find comparable values within the genus *Homo*, whereas the remaining great apes are notoriously more prognathic (i.e., having jaws that project forward markedly). The extraordinary resemblance does not indicate that *Anoiapithecus* has any relationship with *Homo*, the researchers note. However, the similarity might be a case of evolutionary convergence, where two species evolving separately share common features.

Lluc's discovery may also hold an important clue to the geographical origin of the hominid family. Some scientists have suspected that a group of primitive hominoids known as kenyapithecines (recorded from the Middle Miocene of Africa and Eurasia) might have been the ancestral group that all hominids came from. The detailed morphological study of the cranial remains of Lluc showed that, together with the modern anatomical features of hominids (e.g., nasal aperture wide at the base, high zygomatic rood, deep palate), it displays a set of primitive features, such as thick dental enamel, teeth with globulous cusps, very robust mandible and very procumbent premaxilla. These features characterize a group of primitive hominoids from the African Middle Miocene, known as afropithecids.

Interestingly, in addition to having a mixture of hominid and primitive afropithecid features, Lluc displays other characteristics, such as a very anterior position of the zygomatic, a very strong mandibular torus and, especially, a very reduced maxillary sinus. These are features shared with kenyapithecines believed to have dispersed outside the African continent and colonized the Mediterranean region, by about 15 million years ago.

In other words, the researchers speculate, hominids might have originally radiated in Eurasia from kenyapithecine ancestors of African origin. Later on, the ancestors of African great apes and humans would have dispersed again into Africa -- the so-called "into Africa" theory, which remains controversial. However, the authors do not completely rule out the possibility that pongines (orangutans and related forms) and hominines (African apes and humans) separately evolved in Eurasia and Africa, respectively, from different kenyapithecine ancestors.

The project at els Hostalets de Pierola is continuing and, the researchers anticipate, more fossil remains will be found in the future that will provide key information to test their hypotheses.

Journal reference:

1. Salvador Moyà-Solà, David M. Alba, Sergio Almécija, Isaac Casanovas-Vilar, Meike Köhler, Soledad De Esteban-Trivigno, Josep M. Robles, Jordi Galindo, and Josep Fortuny. **A unique Middle Miocene European hominoid and the origins of the great ape and human clade**. *Proceedings of the National Academy of Sciences*, 2009; DOI: 10.1073/pnas.0811730106

Adapted from materials provided by Barcelona, Universitat Autònoma de.

http://www.sciencedaily.com/releases/2009/06/090602083729.htm

Endless Original Music: Computer Program Creates Music Based On Emotions

Inmamusys could herald a new revolution, of sorts, in music. (Credit: Image courtesy of Plataforma SINC)

ScienceDaily (June 2, 2009) — A group of researchers from the University of Granada (UGR) has developed Inmamusys, a software program that can create music in response to emotions that arise in the listener. By using artificial intelligence (AI) techniques, the program enables original, copyright-free and emotion-inspiring music to be played continuously.

UGR researchers Miguel Delgado, Waldo Fajardo and Miguel Molina decided to design a software program that would enable a person who knew nothing about composition to create music. The system they devised, using AI, is called Inmamusys, an acronym for Intelligent Multiagent Music System, and is able to compose and play music in real time.

If successful, this prototype, which has been described recently in the journal *Expert Systems with Applications*, looks likely to bring about great changes in terms of the intrusive and repetitive canned music played in public places.

Miguel Molina, lead author of the study, says that while the repertoire of such canned music is very limited, the new invention can be used to create a pleasant, non-repetitive musical environment for anyone who has to be within earshot throughout the day.

Everyone's ears have suffered the effects of repetitively-played canned music, be it in workplaces, hospital environments or during phone calls made to directory inquiries numbers. On this basis, the research team decided that it would be "very interesting to design and build an intelligent system able to generate music automatically, ensuring the correct degree of emotiveness (in order to manage the environment created) and originality (guaranteeing that the tunes composed are not repeated, and are original and endless)."

Inmamusys has the necessary knowledge to compose emotive music through the use of AI techniques. In designing and developing the system, the researchers worked on the abstract representation of the concepts necessary to deal with emotions and feelings. To achieve this, Molina says, "we designed a modular system that includes, among other things, a two-level multiagent architecture."

A survey was used to evaluate the system, with the results showing that users are able to identify the type of music composed by the computer. A person with no musical knowledge whatsoever can use this artificial musical composer, because the user need do nothing more than decide on the type of music."

Beneath the system's ease of use, Miguel Molina reveals that a complex framework is at work to allow the computer to imitate a feature as human as creativity. Aside from creativity, music also requires specific knowledge.

According to Molina, this "is usually something done by human beings, although they do not understand how they do it. In reality, there are numerous processes involved in the creation of music and, unfortunately, we still do not understand many of them. Others are so complex that we cannot analyse them, despite the enormous power of current computing tools. Nowadays, thanks to the advances made in computer sciences, there are areas of research -- such as artificial intelligence -- that seek to reproduce human behaviour. One of the most difficult facets of all to reproduce is creativity."

Farewell to copyright payments

Commercial development of this prototype will not only change the way in which research is carried out into the relationship between computers and emotions, the means of interacting with music and structures by which music is composed in the future. It will also serve, say the study's authors, to reduce costs.

According to the researchers, "music is highly present in our leisure and working environments, and a large number of the places we visit have canned music systems. Playing these pieces of music involves copyright payments. Our system will make these music copyright payments a thing of the past."

Journal reference:

1. Miguel Delgado; Waldo Fajardo; Miguel Molina-Solana. **Inmamusys: Intelligent multiagent music system**. *Expert Systems with Applications*, 2009; 36 (3): 4574 DOI: 10.1016/j.eswa.2008.05.028

Adapted from materials provided by Plataforma SINC, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/06/090601085928.htm

NASA Scientists Find Evidence For Liquid Water On A Frozen Early Mars

Evidence suggests flowing water formed the rivers and gullies on the Mars surface, even though surface temperatures were below freezing. Dissolved minerals in liquid water may be the reason. (Credit: NASA and The Hubble Heritage Team (STScI/AURA))

ScienceDaily (June 2, 2009) — NASA scientists modeled freezing conditions on Mars to test whether liquid water could have been present to form the surface features of the Martian landscape.

Researchers report that fluids loaded with dissolved minerals containing elements such as silicon, iron, magnesium, potassium and aluminum, can remain in a liquid state at temperatures well below freezing. The results of this research appear in the May 21 issue of *Nature* magazine entitled "Stability Against Freezing of Aqueous Solutions on Early Mars."

"We found that the salts in water solutions can reduce the melting point of water, which may help explain how liquid water existed in a frozen Martian environment," said Alberto Fairén, a space scientist at NASA Ames Research Center, Moffett Field, Calif. and the lead author of the study.

To understand what formed the surface features on Mars, scientists have focused on the early Martian conditions. Was early Mars warm and wet, or cold and dry? Surface features throughout most of the Martian landscape suggest the presence of water ponds ranging from seas to lakes, and rivers and gullies formed by flowing water, which imply that early Mars was wet.

But there also is some evidence that suggests that Mars may have been permanently cold, with global temperatures well below the freezing point of pure water. To study the 'liquidity' of water on Mars,

climate modelers first simulated various concentrations of greenhouse gases in its atmosphere. They found that these gases cannot efficiently raise the surface temperature above freezing.

A greenhouse atmosphere produced by carbon dioxide and water would have been saturated well below freezing. In addition, the amount of methane needed to raise the surface temperature above freezing, implies the planet had a terrestrial-like biological source for its methane supply, according to previous investigations.

Scientists then took another approach and looked at water solutions containing weathering basalts, similar to those seen at the Mars landing sites. They calculated these fluids' freezing points and evaporative processes. Results showed that a significant amount of weathering fluids containing silicon, iron, magnesium, calcium, chloride, sodium, potassium and aluminum remain in the liquid at temperatures well below freezing.

In addition, they studied the minerals that precipitated in the liquid solutions over time. These minerals are similar to those actually found on the Martian surface. Scientists concluded that salty liquid water on Mars may explain the stability of fluids against freezing on the Martian surface at temperatures below 0°C.

"Our goal was to learn how a combination of different processes of evaporation and freezing affect the freezing point of a hypothetical Martian solution. We also wanted to see how the liquid phases formed and destabilized over the evolution of different solutions," added Alfonso Davila, a co-author of the paper at NASA Ames Research Center, Moffett Field, Calif.

Journal reference:

1. Alberto G. Fairén, Alfonso F. Davila, Luis Gago-Duport, Ricardo Amils & Christopher P. McKay. **Stability against freezing of aqueous solutions on early Mars**. *Nature*, 2009; 459 (7245): 401 DOI: 10.1038/nature07978

Adapted from materials provided by NASA.

http://www.sciencedaily.com/releases/2009/06/090602082638.htm

Benefit Of Aspirin For Healthy People Is Uncertain

A new study has shown that, while taking aspirin is beneficial in preventing heart attacks and strokes among people with established cardiovascular disease (secondary prevention), its benefits don't clearly outweigh the risks in healthy people (primary prevention). (Credit: iStockphoto/Leigh Schindler)

ScienceDaily (June 2, 2009) — A new study has shown that, while taking aspirin is beneficial in preventing heart attacks and strokes among people with established cardiovascular disease (secondary prevention), its benefits don't clearly outweigh the risks in healthy people (primary prevention).

Researchers at the Clinical Trial Service Unit at the University of Oxford analysed data from a number of primary and secondary prevention trials that had compared long-term aspirin use against controls. The findings are published in *The Lancet.*

In the primary prevention trials, aspirin reduced the risk of a non-fatal heart attack by about one fifth. This corresponds to five fewer such episodes each year for every 10,000 people treated. This is offset by a comparable increase in bleeds with long-term aspirin use. One extra stroke is caused by bleeding and three extra gastrointestinal bleeds occur each year per 10,000 treated.

In the secondary prevention studies, aspirin reduced the risk of a serious vascular event (a heart attack, stroke or cardiovascular death) by about a fifth. But the risk of an event is much higher among people with established cardiovascular disease, so that there were 150 fewer such events each year for every 10,000 patients treated. This large benefit greatly exceeds the risk of bleeding.

In both sets of trials, the risk of a serious vascular event was reduced to a similar degree in both men and women.

Previous reviews of primary prevention trials have led to guidelines recommending that aspirin be used widely among healthy people who are more at risk of coronary heart disease, having raised blood cholesterol or blood pressure for example.

But the new analyses show that many people with above average risk of coronary heart disease are also at above average risk of suffering a bleed, so this method of selecting whom to treat may not be appropriate.

Professor Colin Baigent, an MRC scientist who led the work at the Clinical Trial Service Unit, says: 'The primary prevention trials were completed some years ago, when modern drugs such as statins were not widely available. Nowadays, primary prevention with statins and other drugs can safely half the risk of heart attacks and strokes.'

'When aspirin is added to such drugs, the further reduction in serious vascular events is only about half as large as when it is used alone, but the bleeding risks will remain about the same. This has important implications when judging the likely effects of aspirin in practice.'

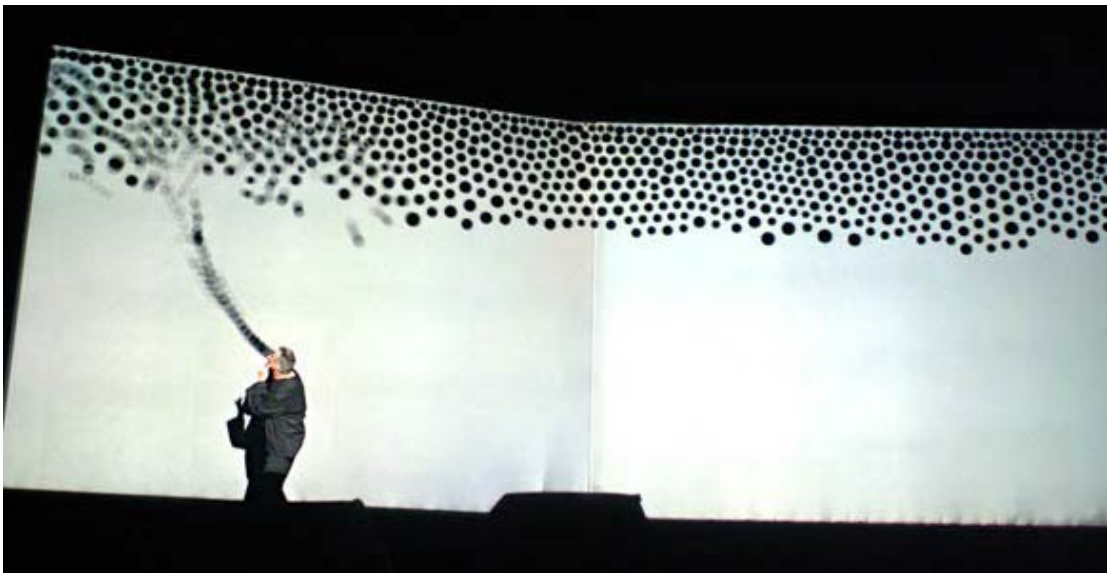
The authors conclude: 'Aspirin is of clear benefit for people who already have cardiovascular disease, but the latest research does not seem to justify general guidelines advocating the routine use of aspirin in all healthy individuals above a moderate level of risk for coronary heart disease.'

When prescribing aspirin to healthy individuals, it is important to consider the potential of such a policy to cause harm. Professor Baigent adds: 'Drug safety really matters when making recommendations for tens of millions of healthy people. We don't have good evidence that, for healthy people, the benefits of long-term aspirin exceed the risks by an appropriate margin.'

Adapted from materials provided by University of Oxford.

http://www.sciencedaily.com/releases/2009/05/090531115613.htm

Teaching Computers To Recognize Objects



ScienceDaily (June 2, 2009) — Recognising objects and groups of objects is something we humans take for granted. For computers, this is far from straightforward. A European project has come up with novel solutions to this conundrum.

Imagine your friends have blindfolded you and taken you to a "secret location". When they take off your blindfold, you immediately see a group of people around you and realise that they have thrown you a surprise birthday party. How did you know? Because everyone shouted "surprise", and there were balloons, a birthday cake and booze.

The question may seem like a silly one, but the processes involved are far from straightforward. In fact, you had to collate an awful lot of visual, as well as other sensory data, cross-reference it with your memories, and make mental deductions.

"Vision is our most important sense and about half of the human brain is involved with vision in one way or another," explains Luc Van Gool of Belgium's Leuven University (KUL) who also leads the Computer Vision Laboratory at the Swiss Federal Institute of Technology (ETH). "Enabling us to recognise the objects and places around us is a task it performs brilliantly."

In fact, what we regard as the simple process of "recognition" would leave many computers stumped. Even something as apparently simple as recognising a birthday cake would normally require computers to be fed with information on what a cake generally looks like, the various shapes and sizes it comes in, the different forms and numbers of candles and other decorations you are likely to find adorning it, etc.

"The same object will look different depending on the viewpoint, the illumination, or the occlusions caused by other objects in front," notes Van Gool.

Points of view

In brief, computers might be able to calculate pi to hundreds of decimal points and model complex weather patterns, but they may find it impossible, without complex and painstaking programming, to recognise a human whose grown their hair or realise that Chihuahuas and Dobermans belong to the same species.

Van Gool is involved in a project, Cognitive-Level Annotation Using Latent Statistical Structure (CLASS -- http://class.inrialpes.fr/), which is developing technologies to recognise visually specific objects, such as your car, or classes of object, such as a random car on the street.

"The recognition of an object as belonging to a particular group is a harder problem for a computer than the recognition of a specific object. The reason is that object classes show large variability among their members," Van Gool points out.

The 3.5-year, EU-funded project managed to achieve technological improvements compared with previous efforts. It developed a system in which the description of the objects is based on the appearance of many separate, small patches. Such localised features give the necessary robustness to deal with the massive variations mentioned earlier. In addition, CLASS created special mechanisms – known as efficient approximate neighbourhood searches – for the comparison of an image or an object with huge numbers of reference images.

A picture speaks a thousand words

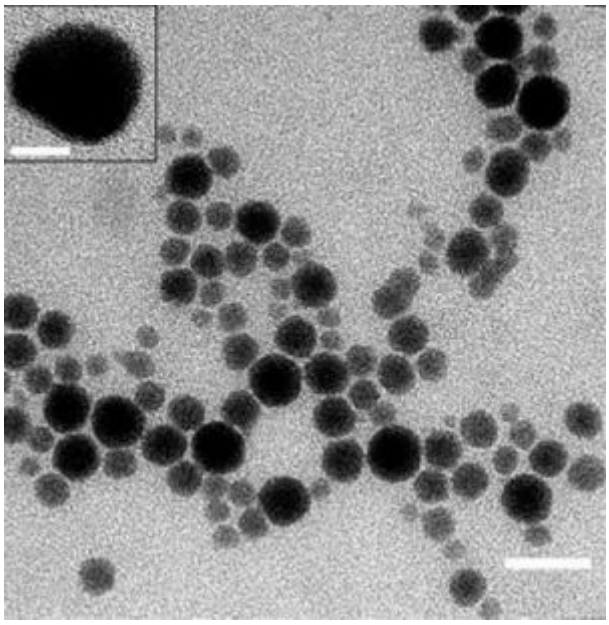
The specific object recognition technology developed by CLASS has already found a commercial application. Through a company known as kooaba, CLASS technology enables mobile phone subscribers who install the relevant software to take a photo with their handset of, say, a monument, a film poster, or an album cover and get relevant online information about it.

"It's like the object itself becomes the link to further information," observes Van Gool. He expects the application of this technology to expand rapidly. For instance, cities and museums may offer interactive guided tours or guide books through kooaba.

Adapted from materials provided by ICT Results.

http://www.sciencedaily.com/releases/2009/06/090601090029.htm

Silver Nanoparticles Show 'Immense Potential' In Prevention Of Blood Clots



Silver nanoparticles (shown) could help prevent blood clots. (Credit: The American Chemical Society)

ScienceDaily (June 2, 2009) — Scientists are reporting discovery of a potential new alternative to aspirin, ReoPro, and other anti-platelet agents used widely to prevent blood clots in coronary artery disease, heart attack and stroke. Their study involves particles of silver — 1/50,000th the diameter of a human hair — that are injected into the bloodstream.

Debabrata Dash and colleagues point out that patients urgently need new anti-thrombotic agents because traditionally prescribed medications too-often cause dangerous bleeding. At the same time, aging of the population, sedentary lifestyle and spiraling rates of certain diseases have increased the use of these drugs. Researchers are seeking treatments that more gently orchestrate activity of platelets, disk-shaped particles in the blood that form clots.

The scientists describe development and lab testing of silver nanoparticles that seem to keep platelets in an inactive state. Low levels of the nanosilver, injected into mice, reduced the ability of platelets to clump together by as much as 40 percent with no apparent harmful side effects.

The nanoparticles "hold immense potential to be promoted as an antiplatelet agent," the researchers note. "Nanosilver appears to possess dual significant properties critically helpful to the health of mankind — antibacterial and antiplatelet — which together can have unique utilities, for example in coronary stents."

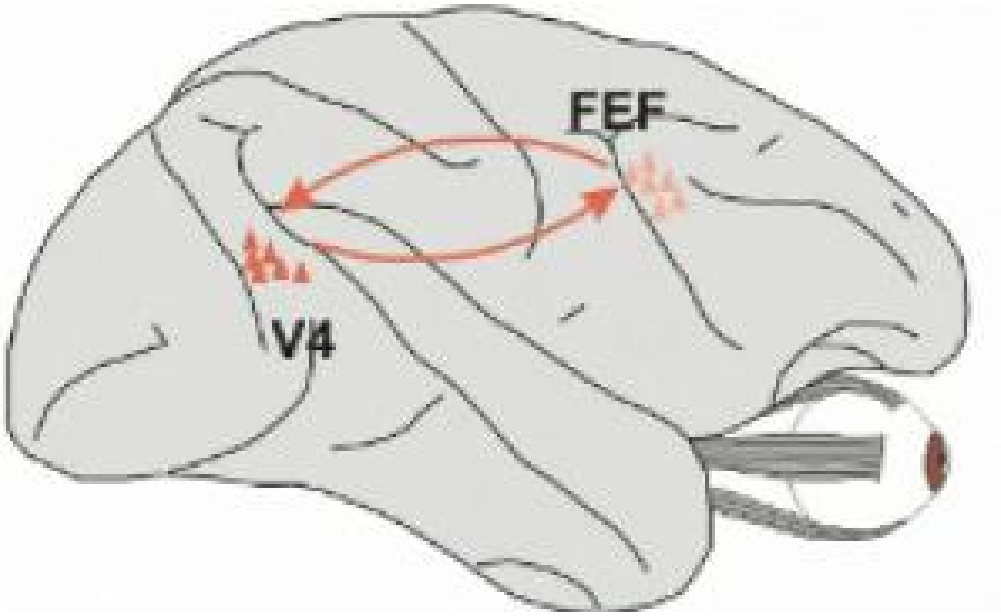
Journal reference:

1. Shrivastava et al. **Characterization of Antiplatelet Properties of Silver Nanoparticles**. *ACS Nano*, 2009; 090504103339013 DOI: 10.1021/nn900277t

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com/releases/2009/06/090601110403.htm

Long-distance Brain Waves Focus Attention



Neurons in the visual cortex (area V4) encode the visual scene, and neurons in the FEF portion of prefrontal cortex control the focus of attention. When attention (cone and circle) is directed to the red book, neurons in FEF and V4 (represented by red triangles) start firing rhythmically, and the neural activity becomes synchronized across the two areas. (Credit: Image courtesy of MIT)

ScienceDaily (June 2, 2009) — Just as our world buzzes with distractions — from phone calls to e-mails to tweets — the neurons in our brain are bombarded with messages. Research has shown that when we pay attention, some of these neurons begin firing in unison, like a chorus rising above the noise. Now, a study in the May 29 issue of *Science* reveals the likely brain center that serves as the conductor of this neural chorus.

MIT neuroscientists found that neurons in the prefrontal cortex — the brain's planning center — fire in unison and send signals to the visual cortex to do the same, generating high-frequency waves that oscillate between these distant brain regions like a vibrating spring. These waves, also known as gamma oscillations, have long been associated with cognitive states like attention, learning, and consciousness.

"We are especially interested in gamma oscillations in the prefrontal cortex because it provides top-down influences over other parts of the brain," explains senior author Robert Desimone, director of the McGovern Institute for Brain Research and the Doris and Don Berkey Professor of Neuroscience at MIT. "We know that the prefrontal cortex is affected in people with schizophrenia, ADHD and many other brain disorders, and that gamma oscillations are also altered in these conditions. Our results suggest that altered neural synchrony in the prefrontal cortex could disrupt communication between this region and other areas of the brain, leading to altered perceptions, thoughts, and emotions."

To explain neural synchrony, Desimone uses the analogy of a crowded party with people talking in different rooms. If individuals raise their voices at random, the noise just becomes louder. But if a group of individuals in one room chant together in unison, the next room is more likely to hear the message. And if people in the next room chant in response, the two rooms can communicate.

In the Science study, Desimone looked for patterns of neural synchrony in two "rooms" of the brain associated with attention — the frontal eye field (FEF) within the prefrontal cortex and the V4 region of the visual cortex. Lead authors Georgia Gregoriou, a postdoctoral associate in the Desimone lab, and Stephen Gotts of the National Institute of Mental Health, trained two macaque monkeys to watch a

monitor displaying multiple objects, and to concentrate on one of the objects when cued. They monitored neural activity from the FEF and the V4 regions of the brain when the monkeys were either paying attention to the object or ignoring it.

When the monkeys first paid attention to the appropriate object, neurons in both areas showed strong increases in activity. Then, as if connected by a spring, the oscillations in each area began to synchronize with one another. Desimone's team analyzed the timing of the neural activity and found that the prefrontal cortex became engaged by attention first, followed by the visual cortex — as if the prefrontal cortex commanded the visual region to snap to attention. The delay between neural activity in these areas during each wave cycle reflected the speed at which signals travel from one region to the other — indicating that the two brain regions were talking to one another.

Desimone suspects this pattern of oscillation is not just specific to attention, but could also represent a more general mechanism for communication between different parts of the brain. These findings support speculation that gamma synchrony enables far-flung regions of the brain to rapidly communicate with each other — which has important implications for understanding and treating disorders ranging from schizophrenia to impaired vision and attention. "This helps us think about how to approach studying and treating these disorders by finding ways to restore gamma rhythms in the affected brain regions."

Huihui Zhou, a research scientist in the Desimone lab, contributed to this study. The NIH/National Eye Institute and National Institute of Mental Health supported this research.

Adapted from materials provided by McGovern Institute for Brain Research.

http://www.sciencedaily.com/releases/2009/05/090528142829.htm

Can You Run a Government With Prediction Markets?

Prediction markets aren't just for forecasting election outcomes, argues a law professor. They actually might be quite useful for all kinds of political and business decisions.

By: Lee Drutman | June 08, 2009

Prediction markets could be used as a tool to aggregate and evaluate information, a kind of "weak crystal ball" that could help lawmakers make more informed decisions.

There are surely many possible ways to design a system of government. But what about a government in which many important decisions — from legislation to administrative rule making to court decisions — are made through prediction markets?

Such is the long-shot thought experiment behind *Predictocracy*, Michael Abramowicz's intriguing field guide to the wide and sometimes wild world of prediction-market applications for government and business.

At a basic level, prediction markets operate somewhat like stock markets. In the stock market, the weight of investors' bets drive a company's share prices up or down. In a prediction market, the weight of investors' bets indicate the likelihood of a given event outcome. For example, at prediction markets Web site Intrade, you can bet on the likelihood of the U.S. taking military action against North Korea (currently low) or unemployment hitting 10 percent by December (currently high).

The idea is rather than taking a survey to get the average opinion and relying on the wisdom *of* crowds, the prediction market identifies the wisdom *in* crowds because the market only attracts participants who feel confident enough in their predictions that they are willing to put money on the line. Prediction markets give participants a financial incentive to get things right.

"We all know intuitively that often the average person doesn't know much about something," explained Abramowicz, a professor of law at George Washington University. "And there are cases where you want to know what experts think, and who is most genuinely confident."

Prediction markets gained some popularity as a tool for forecasting the presidential election in 2008. But when government officials proposed using such a market — a DARPA program to forecast terrorist activities in the Middle East — negative publicity forced them to abandon the project.

Still, one day a few years back, Abramowicz, skeptical about the efficiency of the current legal system, began wondering whether it would be possible to imagine a market mechanism for conducting adjudication. "I thought about it and said, 'No, you couldn't do it,'" he said. "And then the next morning, I woke up and said, 'Yeah, you could.'"

When he woke up, Abramowicz had an idea: If you set up a market so that individuals had to announce a price and then make a commitment to either buy or sell a contract at that price, all participants would have an incentive to pick a price that they thought others would also announce. In such a way, you could establish a focal point coordination process, a very efficient way to aggregate collective judgment. (This is one of the many permutations of the basic prediction market idea throughout the book.)

Regarding courts, *Predictocracy* argues that one of the main reasons why litigation is so costly is that it's often expensive and time consuming to properly value and negotiate lawsuits. "Clients," he wrote, "spend too much on lawyers who gather information and advocate for them."

So Abramowicz argues for a subsidized market where people could place bets on what a randomly selected judge or jury would decide. Market participants (probably a small group with enough legal experience to make informed decisions that would allow them to make money in such a market) could see all the evidence, even perhaps watch videotaped witnesses and cross-examinations over the Internet to make their assessments. Ultimately, the market would come to a prediction on the likelihood of a case succeeding. This prediction could help litigants to decide if they really wanted to go forward, or could even be linked to a formula for assessing civil damages.

Another potential advantage of such a system is that it could likely reduce idiosyncratic judgments, which in turn might reduce the likelihood of frivolous lawsuits. As the current legal system stands, judge and jury assignments can sometimes be a roll of the dice for litigants, which can make it worth gambling if the payoff is big enough. But if results were more predictable, litigants might be more likely to settle in advance.

In the realm of lawmaking, Abramowicz makes a case for something he calls predictive cost-benefit analysis. Say, for example, that you are trying to assess a budget bill. You could, for example, take a random selection of lines from that budget bill and have people place bets on whether a randomly selected member of Congress, 10 years hence, would say that the money was well-spent.

One of the main advantages of this approach is that it takes the politics and ideology out of the process because the predictions would be based on what a randomly selected lawmaker (who could be either a Democrat or a Republican) would think. Such an approach could make lawmaking less partisan and more consistent over time.

"For $10 (million) or $20 million, one could have a powerful tool for rating budget items," he said. "Right now, all we have are sound bites about bridges to nowhere."

In the area of regulation, Abramowicz argues that prediction markets can offer a third way between the rule-based command-and-control approach often favored by Democrats and the leave-it-up-to-the-market approach favored by Republicans. For example, third parties could place bets on whether or not individual workplaces would meet mandated workplace safety targets, sending signals as to whether

workplace safety standards are up to the mark. Government then could assess fines or set up a workplace safety credit-trading scheme based on the prediction market assessments.

"It's interesting that the arguments conservatives have generally put forth to something like OSHA is self-regulation," Abramowicz said. "Simply letting market actors choose on their own could be right, but it would also be that workers have poor information, and that could lead to poor results. What conservatives haven't put forward are mechanisms for achieving a given level of safety."

Abramowicz is also intrigued by the idea of linked prediction markets. For example, you could have an election prediction market that was linked to an economy prediction market that was in turn linked to an energy price prediction market, and so on, since the price of energy affects the economy, and the economy affects elections. "You could break problems down so more people could work on discrete problems," Abramowicz said. "What would propagate up would be very powerful."

Though there are many more proposals and applications in the book, the whole idea of prediction markets begs several questions.

First and foremost: Will prediction markets actually be accurate? After all, the recent stock market gyrations might give some pause to putting too much faith in any kind of market.

Abramowicz remains optimistic. "There's much less likely to be a systematic problem in prediction markets because arbitrage is much easier," he said. "In the history of prediction markets, it's hard to find times when the value of the market was driven by psychological factors different from reality."

Moreover, prediction markets don't necessarily need to be binding. They could just be used as a tool to aggregate and evaluate information, a kind of "weak crystal ball" that could help lawmakers make more informed decisions.

OK. But government by prediction markets? How democratic is that?

"If one defines democracy as what the masses on average prefer, then for the government to make decision by prediction market would be a mistake," Abramowicz said. "But if we think of democracy as a set of institutions that aggregate our collective preferences given widespread individual ignorance about many issues, then prediction markets perform a lot better."

And wouldn't people with vested interests have an incentive to skew the market? *Predictocracy* argues that while this is certainly a risk, this is probably overweighed by the desire of participants to get the prediction right and make the most money.

Though prediction markets are still a fringe idea for policymaking, they are gaining traction in the private sector as more and more big companies experiment with them. For example, a number of companies have set up internal prediction markets for specific sales or stock price targets to help them to plan better.

Abramowicz believes prediction markets will continue to prove their worth and maybe some of the experiments will bubble over into the public sector on a small-scale test basis. But he's not betting on a real predictocracy anytime soon.

"The point of radical ideas is not to advocate those ideas," Abramowicz said. "It's to illustrate how a mechanism could do things you wouldn't think it could do, and once you recognize, wow, it can do all these things, you might think about smaller things it could actually do."

http://www.miller-mccune.com/politics/government-prediction-markets-1278

The Marriage of Mozart and Mindfulness

A pinch of passion goes a long way: Researchers are showing that paint-by-numbers performances, from symphony halls to training grounds, are less well received than mindful renditions.

By: Tom Jacobs | June 05, 2009 |

Researchers show that audiences (and dolphins) prefer it when the people performing for them bring some awareness of the moment with them instead of being captives of rote.stockxchange.com

Orchestral musicians are, in a sense, the assembly-line workers of the arts world. Like their counterparts on the factory floor, they're asked to execute the exact same task again and again — a method that may be efficient for producing consumer goods, but hardly one that promotes inspired performances.

So how can these often unhappy instrumentalists avoid getting into a soul-deadening rut? The answer, according to an intriguing new study, may be as simple as asking them to stay focused, alert and open to new discoveries. The results of such requests are immediate and quite noticeable — not only to the musicians themselves, but also to knowledgeable listeners.
"Practice, if simply viewed as repetition, does not make perfect but merely permanent," notes the report, published in the journal Psychology of Music. In contrast, the authors assert, "Individual attention to novel distinctions and subtle nuances appears to alter the process of creative ensemble performance and lead to music that is more enjoyable to perform and hear."

The study is the product of a cross-disciplinary collaboration between noted Harvard University psychologist Ellen Langer and Arizona State University music professor Timothy Russell. Langer has been studying and writing about the concept of mindfulness — the practice of staying acutely aware of what is happening in the present moment — for more than two decades. Russell, who conducts the three ASU orchestras as well as a professional ensemble in Ohio, has long been interested in putting Langer's concepts to work in the practice room and concert hall.

Along with the University of Pennsylvania's Noah Eisenkraft, they conceived a way to test the practical effect of mindful music-making. Working with the ASU student orchestras — made up of musicians considered too young to be jaded, but apparently already on their way — Russell lead two performances of the same piece: the fiery finale from Brahms' *First Symphony*.

Before the first performance, the conductor told his musicians to "Think about the finest performance of this piece that you can remember. Play it that way." Before the second performance, he gave a quite different instruction: "Play this piece in the finest manner you can, offering subtle new nuances to your performance."

Members of a local community chorus — musically sophisticated men and women who are not professional performers — were asked if they heard a difference after listening to recordings of both.

"Overwhelmingly, they said yes," Russell reported. "The next question was: Which do you prefer? Overwhelmingly, they preferred the mindful one."

The musicians reported they, too, found the second performance a more enjoyable experience. When asked for specifics, players and listeners offered similar descriptions: "There was more energy." "The dynamic range was wider." "The louds and softs were more pronounced."

In other words, attempting to recreate an "ideal" performance proved somewhat stultifying, while staying on the lookout for new nuances was clearly liberating. And, importantly, it did not lead to a breakdown in discipline.

"By definition, an orchestral conductor tries to get everybody to do things in one coordinated way," Russell said. "By giving the instruction to everybody to find some nuance of their own and play it that way, you might expect chaos. But we found that wasn't the case at all.

"What all the musicians pretty much did was (put more effort into) what they were supposed to be doing anyway. If they were supposed to play forte (loud), they played more forte."

To Langer, the implications of these findings go far beyond the concert hall.

"(When Russell told) a whole group of people to essentially do things their own way — subtly different, but still their own way - you ended up with a superior group performance," she noted. "Many businesses are afraid to give employees this kind of control. But if they did, more often than not, you'd end up with a coordinated effort."

Russell repeated the study using two additional pieces of music ("Polonaise" from Rimsky-Korsakov's *Christmas Eve* and Victor Herbert's "March of the Toys") and received the same results. He concedes the fact he conducted both the "mindless" and "mindful" performances could be considered problematic, in that his enthusiasm for the "mindful" condition might have led him to lead a more exciting performance. (Then again, that might be overstating the amount of influence a conductor has on an orchestra.)

He hopes someone will repeat the experiment with a conductor who is as blind to the experiment's goals as are the players and audience members. He'd also like to test whether it would produce the same results with an established, professional orchestra. Russell and Langer have yet to conduct such an experiment, in part because the strict work rules set down by musicians unions make such an undertaking difficult.

Then there's the question of keeping the effect alive. Russell conducts the Arizona Symphony's 20 or more performances of Tchaikovsky's Nutcracker ballet each December, when it serves as the pit band for the area's preeminent ballet company. He admits that the admonition "Find new nuances today" could turn into easily ignored background noise if it were to be repeated before every performance.

"It's up to the teacher or coach or conductor to be clever about it," he said.

Finally, there's the matter of overcoming resistance from musicians who might consider the notion silly, or fear it will mean more work. "People think it's more effortful to do things mindfully," Langer said. "In fact, it's not, and it's more fun. Mindfulness is a way to create passion."

Ironically, Langer — who will be played by Jennifer Aniston in a movie based on her most recent book, *Counterclockwise* — says she is not musically sophisticated enough to hear the difference between the two performances. But she has no doubt the mindful musicians were more alive to the music.

"We have data with dolphins," she said. "We had trainers who were mindful or mindless. In the water, they were instructed either to think familiar thoughts, such as 'Think about all that you know to be true about dolphins,' or to think novel thoughts, such as 'How is the dolphin you're interacting with different from the other dolphins there? How is it different today than it was the last time you interacted with it?'

"When the trainer is mindful, the dolphin swims to him or her faster and stays longer," she said. Whether you're a marine mammal or a Beethoven buff, "You can tell when the light's on but nobody's home. And you can feel it in art."

http://www.miller-mccune.com/culture_society/the-marriage-of-mozart-and-mindfulness-1274

Space May Be the Final Frontier for Some Renewables

The transformation of landscapes to accommodate 'friendly' energy technologies like solar and wind are not inconsequential concerns, says a former Interior official.

By: Frank Nelson | June 01, 2009 |

The transformation of landscapes to accommodate "friendly" energy technologies like solar and wind are not inconsequential concerns, says former Interior official Lynn Scarlett, although solar power may produce more electricity per acre than most other soLuke Partridge

A former Bush administration official now working with an environmental nongovernmental organization sounded a note of caution about a potential downside — and a major one — to renewable energy darlings like wind and solar.

Lynn Scarlett, the former deputy secretary of the Interior, now a consultant with the Environmental Defense Fund, was referring to the extent of land transformation caused by even benign energy sources.

In energy-hungry California, for example, Gov. Arnold Schwarzenegger signed an executive order calling for a third of electricity production to come from renewable sources by 2020. But such efforts promise to be land-intensive. The solar array President Obama recently visited at Nevada's Nellis Air Force Base, for example, covers 140 acres. A project proposed for Carrizo Plains area of California's Central Coast would perch on 12.5 square miles.

In a keynote address to a conference on energy efficiency, organized by the Institute for Energy Efficiency at University of California, Santa Barbara, Scarlett said the development of solar, wind and other renewable projects needs to be closely monitored and not automatically given uncritical approval.

She singled out the impact of huge photovoltaic installations in the desert, suggesting they can adversely impact the delicate landscape and unique wildlife and plant habitat. Students at the Donald Bren School of Environmental Science & Management, also at UCSB, have noted that approving renewable energy

projects as individual items instead of looking at their total impact may miss cumulative harm done to species like desert tortoises and bighorn sheep.

Other voices have also been raised against similar developments, some of which can swallow up several square miles of often remote country with mirrors or windmills, which in turn require new transmission lines and other infrastructure, deepening the dent on the landscape.

And yet ...

Two academics studying the most energy production compared to the amount of land transformed caution that land transformation alone cannot gauge total land-use impacts since it does not "convey the duration of land use and recovery, and any functional degradation."

The full recovery of some coal-mined lands is expected to take several hundred years, says the report by professor Vasilis Fthenakis, founder and director of the Center for Life Cycle Analysis at Columbia University, and associate research scientist Hyung Chul Kim, while safely containing spent nuclear fuel would need around 10,000 years of land occupation.

In addition, says the report, "accounting for secondary effects, including water contamination, change of the forest ecosystem and accidental land contamination," will make the advantages of photovoltaics even greater.

Their research, to be published later this year, compares energy sources by the hours of electricity produced per square meter of land transformed. It shows that photovoltaic comes out ahead of wind, hydro, biomass, coal, natural gas and nuclear.

Fthenakis and Kim looked at all stages of production for each type of energy, from extracting resources, through electricity generation, to the disposal of waste.

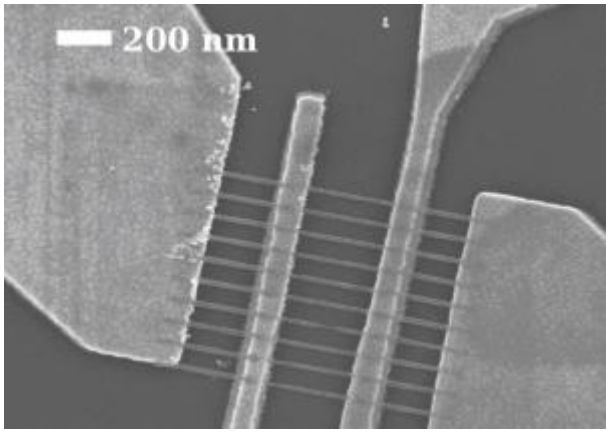
Fthenakis, who is also principal investigator for the National Photovoltaic Environmental Research Center at the Brookhaven National Laboratory, factored in the productive lifetime of different energy installations and the time needed for the landscape to regain its natural state.

"The photovoltaic-fuel cycle transforms the least amount of land per (gigawatt hour) of electricity generated among the renewable technologies we assessed," says the research report.

The researchers noted that renewable technologies generally transform more land than conventional electricity sources. Biomass, with its need for vast growing areas for various plants and trees, has the greatest effect on land transformation

http://www.miller-mccune.com/science_environment/space-may-be-the-final-frontier-for-some-renewables-1272

Graphene May Have Advantages Over Copper For IC Interconnects At The Nanoscale



This scanning electron microscope image shows graphene nanoribbons that are 22 nanometers wide between the middle electrode pair. (Credit: Raghunath Murali)

ScienceDaily (June 8, 2009) — The unique properties of thin layers of graphite—known as graphene—make the material attractive for a wide range of potential electronic devices. Researchers have now experimentally demonstrated the potential for another graphene application: replacing copper for interconnects in future generations of integrated circuits.

In a paper published in the June 2009 issue of the IEEE journal *Electron Device Letters*, researchers at the Georgia Institute of Technology report detailed analysis of resistivity in graphene nanoribbon interconnects as narrow as 18 nanometers.

The results suggest that graphene could out-perform copper for use as on-chip interconnects—tiny wires that are used to connect transistors and other devices on integrated circuits. Use of graphene for these interconnects could help extend the long run of performance improvements for silicon-based integrated circuit technology.

“As you make copper interconnects narrower and narrower, the resistivity increases as the true nanoscale properties of the material become apparent,” said Raghunath Murali, a research engineer in Georgia Tech’s Microelectronics Research Center and the School of Electrical and Computer Engineering. “Our experimental demonstration of graphene nanowire interconnects on the scale of 20 nanometers shows that their performance is comparable to even the most optimistic projections for copper interconnects at that scale. Under real-world conditions, our graphene interconnects probably already out-perform copper at this size scale.”

Beyond resistivity improvement, graphene interconnects would offer higher electron mobility, better thermal conductivity, higher mechanical strength and reduced capacitance coupling between adjacent wires.

“Resistivity is normally independent of the dimension—a property inherent to the material,” Murali noted. “But as you get into the nanometer-scale domain, the grain sizes of the copper become important and conductance is affected by scattering at the grain boundaries and at the side walls. These add up to increased resistivity, which nearly doubles as the interconnect sizes shrink to 30 nanometers.”

The research was supported by the Interconnect Focus Center, which is one of the Semiconductor Research Corporation/DARPA Focus Centers, and the Nanoelectronics Research Initiative through the INDEX Center.

Murali and collaborators Kevin Brenner, Yinxiao Yang, Thomas Beck and James Meindl studied the electrical properties of graphene layers that had been taken from a block of pure graphite. They believe

the attractive properties will ultimately also be measured in graphene fabricated using other techniques, such as growth on silicon carbide, which now produces graphene of lower quality but has the potential for achieving higher quality.

Because graphene can be patterned using conventional microelectronics processes, the transition from copper could be made without integrating a new manufacturing technique into circuit fabrication.

"We are optimistic about being able to use graphene in manufactured systems because researchers can already grow layers of it in the lab," Murali noted. "There will be challenges in integrating graphene with silicon, but those will be overcome. Except for using a different material, everything we would need to produce graphene interconnects is already well known and established."

Experimentally, the researchers began with flakes of multi-layered graphene removed from a graphite block and placed onto an oxidized silicon substrate. They used electron beam lithography to construct four electrode contacts on the graphene, then used lithography to fabricate devices consisting of parallel nanoribbons of widths ranging between 18 and 52 nanometers. The three-dimensional resistivity of the nanoribbons on 18 different devices was then measured using standard analytical techniques at room temperature.

The best of the graphene nanoribbons showed conductivity equal to that predicted for copper interconnects of the same size. Because the comparisons were between non-optimized graphene and optimistic estimates for copper, they suggest that performance of the new material will ultimately surpass that of the traditional interconnect material, Murali said.

"Even graphene samples of moderate quality show excellent properties," he explained. "We are not using very high levels of optimization or especially clean processes. With our straightforward processing, we are getting graphene interconnects that are essentially comparable to copper. If we do this more optimally, the performance should surpass copper."

Though one of graphene's key properties is reported to be ballistic transport—meaning electrons can flow through it without resistance—the material's actual conductance is limited by factors that include scattering from impurities, line-edge roughness and from substrate phonons—vibrations in the substrate lattice.

Use of graphene interconnects could help facilitate continuing increases in integrated circuit performance once features sizes drop to approximately 20 nanometers, which could happen in the next five years, Murali said. At that scale, the increased resistance of copper interconnects could offset performance increases, meaning that without other improvements, higher density wouldn't produce faster integrated circuits.

"This is not a roadblock to achieving scaling from one generation to the next, but it is a roadblock to achieving increased performance," he said. "Dimensional scaling could continue, but because we would be giving up so much in terms of resistivity, we wouldn't get a performance advantage from that. That's the problem we hope to solve by switching to a different materials system for interconnects."

Journal reference:

1. Murali, R. Brenner, K. Yang, Y. Beck, T. Meindl, J. D. **Resistivity of Graphene Nanoribbon Interconnects**. *Electron Device Letters, IEEE*, June 2009 Volume: 30, Issue: 6: 611-613 DOI: 10.1109/LED.2009.2020182

Adapted from materials provided by Georgia Institute of Technology.

http://www.sciencedaily.com/releases/2009/06/090604124808.htm

New Class Of Dim Supernovae

Colour image of supernova SN 2008ha taken on 2008 December 30 at Calar Alto Observatory, with the Zeiss 2.2m Telescope and camera CAFOS. It is a composite of the B, V and R bands. The SN is the faint reddish dot marked with an arrow. The quite irregular shape of the galaxy UGC 12682, that hosts the supernova, is seen at the centre of the image. (Credit: Stefan Taubenberger, Max Planck Institut for Astrophysics.)

ScienceDaily (June 7, 2009) — Core-collapse (or gravitational) supernovae are among the most energetic and violent events in the universe. They constitute the final tremendous explosions that end the life cycles of stars more massive than approximately 8 times the Sun. After running out of fuel, the core of such a star collapses and forms a neutron star or a black hole. At the same time, the outer layers are ejected at high velocity (up to 10% of the speed of light) and shine as brightly as billions of stars together.

The total energy suddenly released by such a typical supernova exceeds the total energy release of the Sun during its whole past and future life time of 10 billion years.

However, some core-collapse supernovae are up to 100 times less energetic and luminous than usual. These low-power explosions normally show the presence of hydrogen gas, but a new event, supernova SN 2008ha, is the first dim supernova in which no hydrogen could be detected. This research has been performed by an international team lead by the Italian astronomer Stefano Valenti (Queen's University in Belfast, United Kingdom), including scientists from Max Planck Institute for Astrophysics (Germany), the National Institute for Astrophysics (Italy), and various other institutions.

The results, recently published in the scientific journal *Nature*, are based on data gathered at Calar Alto Observatory (Andalusia, Spain), the Telescopio Nazionale Galileo (TNG), Nordic Optical Telescope (NOT) and Liverpool Telescope (all in Canary Islands, Spain), the Copernico Telescope (Asiago Observatory, Italy), and other smaller observational facilities.

Taken together, the dimness and lack of hydrogen leave room for two scenarios for the origin of SN 2008ha. One possibility is that the progenitor star may have been a moderately massive star in a binary system, which lost its outer layers through the interaction with the companion. Alternatively, the explosion may be due to a very massive star which shed its envelope through stellar winds and formed a black hole upon core collapse. If the latter scenario should prove to be correct, SN 2008ha may be of particular importance in our understanding of the connection between supernovae and a group of gamma-ray bursts.

The tale of SN 2008ha is one more step in an ongoing research program whose goal is to unveil the secrets of these cosmic explosions. This project involves an international team of scientists from many institutions and relies on observational data from different observatories and instruments. No doubt this exploration will produce more exciting news in the near future.

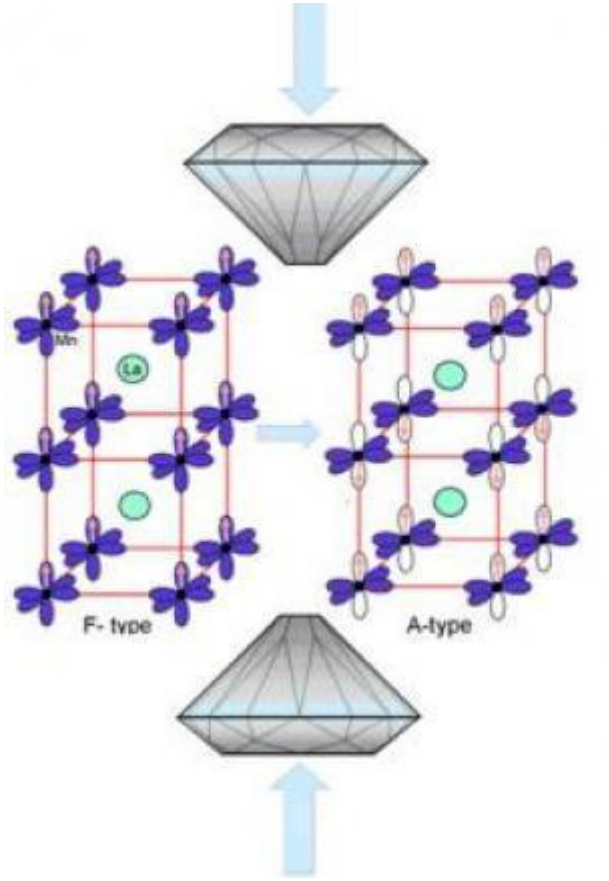
Journal reference:

1. Valenti et al. **A low-energy core-collapse supernova without a hydrogen envelope**. *Nature*, 2009; 459 (7247): 674 DOI: 10.1038/nature08023

Adapted from materials provided by Calar Alto Observatory-CAHA.

http://www.sciencedaily.com/releases/2009/06/090605075215.htm

'Colossal' Magnetic Effect Under Pressure: Another Revolution In Computing Technology?



The structure models for F-type and A-type magnetic ordering in manganite in response to pressure. The arrows inside orbitals indicate the spin direction of d electrons. (Credit: Image courtesy of Carnegie Institute Of Science)

ScienceDaily (June 7, 2009) — Millions of people today carry around pocket-sized music players capable of holding thousands of songs, thanks to the discovery 20 years ago of a phenomenon known as the "giant magnetoresistance effect," which made it possible to pack more data onto smaller and smaller hard drives. Now scientists are on the trail of another phenomenon, called the "colossal magnetoresistance effect" (CMR) which is up to a thousand times more powerful and could trigger another revolution in computing technology.

Understanding, and ultimately controlling, this effect and the intricate coupling between electrical conductivity and magnetism in these materials remains a challenge, however, because of competing interactions in manganites, the materials in which CMR was discovered. In the June 12, 2009, issue of the journal *Physical Review Letters*, a team of researchers report new progress in using high pressure techniques to unravel the subtleties of this coupling.

To study the magnetic properties of manganites, a form of manganese oxide, the research team, led by Yang Ding of the Carnegie Institution's High Pressure Synergetic Center (HPSync), applied techniques called x-ray magnetic circular dichroism (XMCD) and angular-dispersive diffraction at the Advanced Photon Source (APS) of Argonne National Laboratory in Illinois. High pressure XMCD is a newly developed technique that uses high-brilliance circularly polarized x-rays to probe the magnetic state of a material under pressures of many hundreds of thousands of atmospheres inside a diamond anvil cell.

The discovery of CMR in manganite compounds has already made manganites invaluable components in technological applications. An example is magnetic tunneling junctions in soon-to-be marketed magnetic random access memory (MRAM), where the tunneling of electrical current between two thin layers of manganite material separated by an electrical insulator depends on the relative orientation of magnetization in the manganite layers. Unlike conventional RAM, MRAM could yield instant-on computers. However, no current theories can fully explain the rich physics, including CMR effects, seen in manganites.

"The challenge is that there are competing interactions in manganites among the electrons that determine magnetic properties," said Ding. "And the properties are also affected by external stimuli, such as, temperature, pressure, magnetic field, and chemical doping."

"Pressure has a unique ability to tune the electron interactions in a clean and theoretically transparent manner," he added. "It is a direct and effective means for manipulating the behavior of electrons and could provide valuable information on the magnetic and electronic properties of manganite systems. But of all the effects, pressure effects have been the least explored."

The researchers found that when a manganite was subjected to conditions above 230,000 times atmospheric pressure it underwent a transition in which its magnetic ordering changed from a ferromagnetic type (electron spins aligned) to an antiferromagnetic type (electron spins opposed). This transition was accompanied by a non-uniform structural distortion called the Jahn-Teller effect.

"It is quite interesting to observe that uniform compression leads to a non-uniform structural change in a manganite, which was not predicted by theory," said Ding, "Working with Michel van Veenendaal's theoretical group at APS, we found that the predominant effect of pressure on this material is to increase the strength of an interaction known as superexchange relative to another known as the double exchange interaction. A consequence of this is that the overall ferromagnetic interactions in the system occur in a plane (two dimensions) rather than in three dimensions, which produces a non-uniform redistribution of electrons. This leads to the structural distortion."

Another intriguing response of manganite to high pressure revealed by the experiments is that the magnetic transition did not occur throughout the sample at the same time. Instead, it spread incrementally.

"The results imply that even at ambient conditions, the manganite might already have two separate magnetic phases at the nanometer scale, with pressure favoring the growth of the antiferro-magnetic phase at the expense of the ferromagnetic phase," said coauthor Daniel Haskel, a physicist at Argonne's APS. "Manipulating phase separation at the nanoscale level is at the very core of nanotechnology and manganites provide an excellent playground to pursue this objective".

"This work not only displays another interesting emergent phenomenon arising from the interplay between charge, spin, orbital and lattice in a strongly correlated electron system," commented coauthor Dr. Ho-kwang Mao of Carnegie's Geophysical Laboratory, Director of HPSync," but it also manifests the role of pressure in magnetism studies of dense matter."

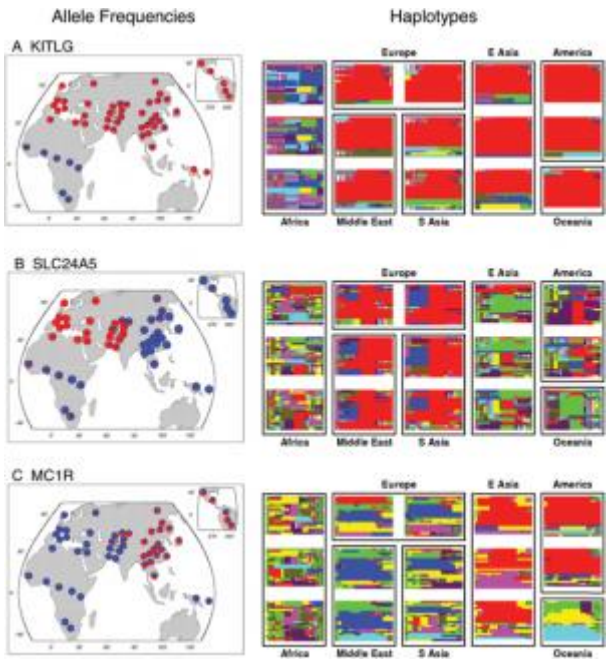
Journal reference:

1. Yang Ding, Daniel Haskel, Yuan-Chieh Tseng, Eiji Kaneshita, Michel van Veenendaal, John Mitchell, Stanislav V. Sinogeikin, Vitali Prakapenka, and Ho-kwang Mao. **Pressure-induced magnetic transition in manganite ($La_{0.75}Ca_{0.25}MnO_3$)**. *Physical Review Letters*, June 2009

Adapted from materials provided by Carnegie Institute Of Science.

http://www.sciencedaily.com/releases/2009/06/090605125340.htm

Geography And History Shape Genetic Differences In Humans



Global allele frequencies and haplotype patterns at three genes with signals of positive selection. (Credit: Coop G, Pickrell JK, Novembre J, Kudaravalli S, Li J, et al.. The Role of Geography in Human Adaptation. PLoS Genetics, 2009; 5 (6): e1000500 DOI: 10.1371/journal.pgen.1000500)

ScienceDaily (June 7, 2009) — New research indicates that natural selection may shape the human genome much more slowly than previously thought. Other factors -- the movements of humans within and among continents, the expansions and contractions of populations, and the vagaries of genetic chance – have heavily influenced the distribution of genetic variations in populations around the world.

The study, conducted by a team from the Howard Hughes Medical Institute, the University of Chicago, the University of California and Stanford University, is published June 5 in the open-access journal PLoS Genetics.

In recent years, geneticists have identified a handful of genes that have helped human populations adapt to new environments within just a few thousand years—a strikingly short timescale in evolutionary terms. However, the team found that for most genes, it can take at least 50,000-100,000 years for natural selection to spread favorable traits through a human population. According to their analysis, gene variants tend to be distributed throughout the world in patterns that reflect ancient population movements and other aspects of population history.

"We don't think that selection has been strong enough to completely fine-tune the adaptation of individual human populations to their local environments," says co-author Jonathan Pritchard. "In addition to selection, demographic history -- how populations have moved around -- has exerted a strong effect on the distribution of variants."

To determine whether the frequency of a particular variant resulted from natural selection, Pritchard and his colleagues compared the distribution of variants in parts of the genome that affect the structure and regulation of proteins to the distribution of variants in parts of the genome that do not affect proteins. Since these neutral parts of the genome are less likely to be affected by natural selection, they reasoned that studying variants in these regions should reflect the demographic history of populations.

The researchers found that many previously identified genetic signals of selection may have been created by historical and demographic factors rather than by selection. When the team compared closely related populations they found few large genetic differences. If the individual populations' environments were exerting strong selective pressure, such differences should have been apparent.

Selection may still be occurring in many regions of the genome, says Pritchard. But if so, it is exerting a moderate effect on many genes that together influence a biological characteristic. "We don't know enough yet about the genetics of most human traits to be able to pick out all of the relevant variation," says Pritchard. "As functional studies go forward, people will start figuring out the phenotypes that are associated with selective signals," says lead author Graham Coop. "That will be very important, because then we can figure out what selection pressures underlie these episodes of natural selection."

But even with further research, much will remain unknown about the processes that have resulted in human traits. In particular, Pritchard and Coop urge great caution in trying to link selection with complex characteristics like intelligence. "We're in the infancy of trying to understand what signals of selection are telling us," says Coop, "so it's a very long jump to attribute cultural features and group characteristics to selection."

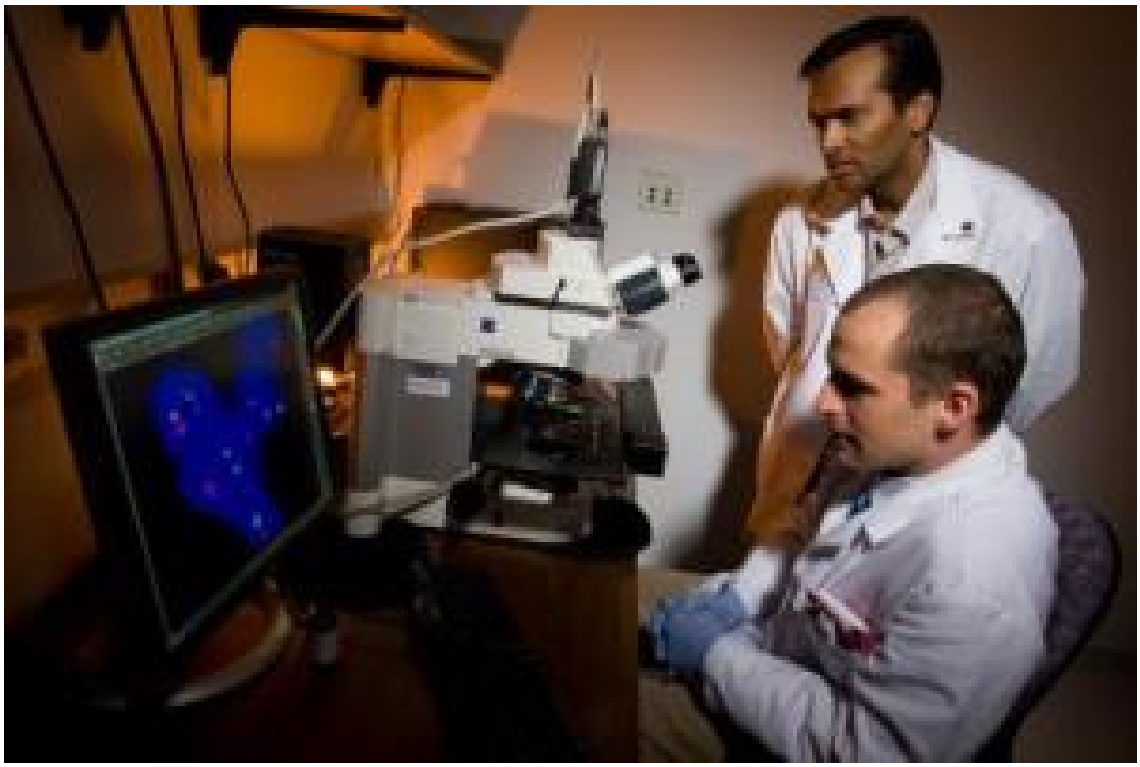
Journal reference:

1. Coop G, Pickrell JK, Novembre J, Kudaravalli S, Li J, et al. **The Role of Geography in Human Adaptation**. *PLoS Genetics*, 2009; 5 (6): e1000500 DOI: 10.1371/journal.pgen.1000500

Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090605091157.htm

Breast Cancer Gene Can Be Blocked By Blood Pressure Drug



Researchers Arul Chinnaiyan and Scott Tomlins. Researchers have identified a gene that is overexpressed in up to 20 percent of breast cancers and that could be blocked in the lab by a currently available blood pressure drug. (Credit: University of Michigan Health System)

ScienceDaily (June 7, 2009) — Researchers have identified a gene that is overexpressed in up to 20 percent of breast cancers and that could be blocked in the lab by a currently available blood pressure drug, according to a new study from the University of Michigan Comprehensive Cancer Center.

The gene, called AGTR1, caused normal breast cells to behave like cancer cells. This behavior was reversed by treatment with the blood pressure drug losartan. Tumors in mice that expressed AGTR1 shrunk by 30 percent eight weeks after treatment with losartan, a drug approved by the U.S. Food and Drug Administration to treat high blood pressure.

"We suspect our analysis has uncovered a new crop of potentially important breast cancer genes. What's also exciting is this gene is blocked by a drug that's already available on the market," says study author Arul Chinnaiyan, M.D., Ph.D., director of the Michigan Center for Translational Pathology and S.P. Hicks Endowed Professor of Pathology at the U-M Medical School.

Results of the study appear online the week of June 1 in the *Proceedings of the National Academy of Sciences.*

The researchers looked at gene expression profiling data from nearly 3,200 microarrays available in the Oncomine database, a tool that allows rapid comparison of thousands of genes in human cancers. The researchers found genes that were dramatically overexpressed within subsets of tumors.

The gene that came up most often was ERBB2, which is better known as HER2, a gene that is overexpressed in 25 percent to 30 percent of all human breast cancers. HER2 is blocked by the targeted therapy Herceptin.

The next most commonly seen gene behind ERBB2 was AGTR1, which was seen in 10 percent to 20 percent of breast tumors. Specifically, AGTR1 was overexpressed only in tumors that were ERBB2-negative and that expressed the estrogen receptor, known as ER-positive. AGTR1 was found to be as much as 100-fold overexpressed in some tumors.

"AGTR1 is very analogous to HER2 or ERBB2. HER2 is a bona fide treatment target for patients with that type of breast cancer. This research defines a novel subtype of ER-positive breast cancer that we hope can be similarly targeted for treatment," says Chinnaiyan, a Howard Hughes Medical Institute investigator.

The researchers tested in cell cultures and in mice the effect of losartan on AGTR1-positive tumors. When losartan was introduced, the AGTR1-positive tumors were reduced, while AGTR1-negative tumors were not affected. In the mice studies, losartan shrank AGTR1-positive tumors by 20 percent after two weeks and by 30 percent after eight weeks.

"Losartan may be a viable therapy for women with AGTR1 over-expressing breast tumors. This study lays the groundwork for a clinical trial to test losartan to treat breast cancers positive for AGTR1," Chinnaiyan says.

Researchers are discussing a possible clinical trial, but one is not currently designed or recruiting for participants.

Additional authors include Daniel R. Rhodes, Bushra Ateeq, Qi Cao, Scott A. Tomlins, Rohit Mehra, Bharathi Laxman, Shanker Kalyana-Sundaram, Robert J. Lonigro, Beth E. Helgeson, Mahaveer S. Bhojani, Alnawaz Rehemtulla, Celina G. Kleer, Daniel F. Hayes, Peter C. Lucas and Sooryanarayana Varambally.

Funding was provided by the Department of Defense Era of Hope Scholar Award, Early Detection Research Network Biomarker Devleopmental Lab, Department of Defense, U-M Cancer Center Bioinformatics Core, Rackham Predoctoral Fellowship, Clinical Translational Research Award from the Burroughs Welcome Foundation and Doris Duke Charitable Foundation Distinguished Clinical Scientist Award. Losartan was provided by Merck U.S.A.

The University of Michigan has filed a patent on AGTR1 and is currently seeking a commercial partner to help bring this technology to market.

Breast cancer statistics: 194,280 Americans will be diagnosed with breast cancer this year and 40,610 will die from the disease, according to the American Cancer Society.

Adapted from materials provided by University of Michigan Health System.

http://www.sciencedaily.com/releases/2009/06/090601182651.htm

Students Who Get Stuck Look For Computer Malfunctions

ScienceDaily (June 6, 2009) — Annika Lantz-Andersson, in her study, examined learning activities involving educational software. The study focuses on situations in which students who work with software during their regular school day instead of mathematics textbooks get stuck when using that software.

Looking for errors in functions

When students attempting to solve a mathematical problem, were informed by the computer that their answer was incorrect, they often focused on trying to find the reasons for this in the functions of the educational software itself.

"They would maintain that their answers merely needed to be rephrased, that the computer's answers were wrong in the same way as answers on an answer key of a mathematics textbook could be wrong, or provided other similar explanations," says Annika Lantz-Andersson.

Her study shows that the often-repeated proposition that educational software is self-instructing is just not true.

No feedback

Her results show that the need for a person providing support is not any less in the case of educational software than in conventional teaching situations."There is a kind of silence in the relationship between students and the educational software they use. The computer never gets tired, is not bothered by endless examples of random answers, does not distinguish between students, but on the other hand cannot provide individually-fitted feedback, which is one of the most important tasks of a teacher", she continues.

Annika Lantz-Andersson's study also does not provide any indication that students view digital technology as being a more authentic or realistic to work with, as compared to conventional educational material.

Expected increase never occurred

The extremely rapid increase in educational software predicted around the year 2000 has not been realised, although most textbooks today have a digital application linked to their conventional text.

"Educational software has many advantages, not least its interactivity and its opportunity to promote cooperation amongst the students. There is still a strong belief that digital technology improves learning, despite the fact that this has not been proven", declares Annika Lantz-Andersson.

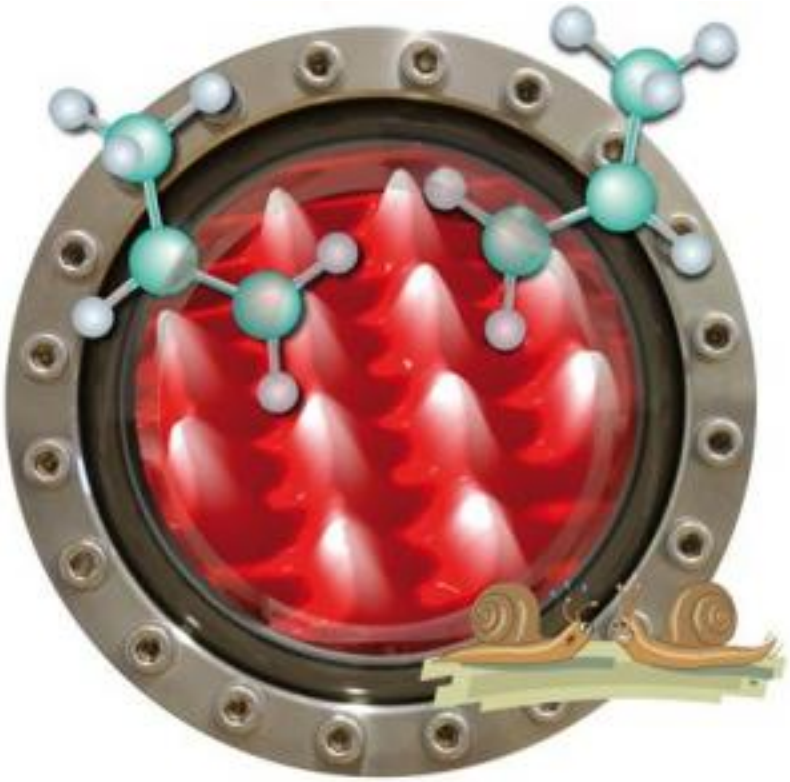
"Instead of getting mired in a debate about how digital tools can solve various types of classical pedagogical problems, it would be more relevant to focus on the new types of interaction and knowledge that can arise from the use of digital tools.

Annika Lantz-Andersson presented her thesis "Framing in Educational Practices. Learning Activity, Digital Technology and the Logic of Situated Action" at the Department of Education on May 29. 2009.

Adapted from materials provided by University of Gothenburg.

http://www.sciencedaily.com/releases/2009/06/090605112333.htm

Molecules Which Flip Into Their Own Mirror Image



Two molecules which possess mirror image symmetry, like snail shells. (Credit: Image courtesy of Empa)

ScienceDaily (June 6, 2009) — Catalysts do function, despite the fact that not all the chemical reactions (and partial reactions) which occur are fully understood, including those which take place during the treatment of automobile exhaust. If scientists understood these processes better not only would they be able to optimize exhaust gas catalysts but also other phenomena which are observed on surfaces, for instance when molecules orient themselves in either right or left handed fashion (i.e. as an image or mirror image). Knowing this would, not least, open new avenues of development in pharmacology for the manufacturers of medicines.

"We tickle molecules," is how Karl-Heinz Ernst of Empa's Nanoscale Materials Science Laboratory describes the experiments that he and his colleagues perform to investigate the chemical reactions which take place on surfaces. Using the electron beam of a scanning tunnel microscope (STM), they induce individual molecules to resonate at very precise frequencies. This is possible because the STM is not just a microscope, capable of imaging the tiniest particles, but also an extremely sensitive tool which can be used to manipulate single atoms and molecules.

During their experiments the Empa scientists observed that the excited molecules began to hop about and move around, rotating about their own axes. They also underwent very rapid "inversion", that is, flipping over into their mirror image shape. By changing the electrical voltage and the tunnel current in the STM the researchers were able to identify which parts of the molecule became excited and how they reacted.

Pairs which are nearly – but not quite – identical

Ernst and his colleagues are particularly interested in this mirror-image or chiral behavior. Such mirror-image pairs, which appear alike but are still different, occur quite frequently in nature, and one may rotate and turn them any way possible in a vain attempt to prove them identical. Prime examples of chirality are snail shells, certain minerals and – yes – molecules. Many molecules which are essential to life have

mirror-image forms, for example DNA, proteins (and their building block components, the amino acids), and sugars.

These molecules occur almost exclusively in one of the mirror image forms. Why this is so remains a puzzle with far reaching consequences, because the two forms of a chiral molecule can have completely different biological effects, despite possessing identical physical and chemical properties. The perfume Carvon, for instance, smells of mint or cumin depending on whether it is the left or right handed version. Less trivial were the effects of the soporific drug Contergan used in the 60's. The right handed form of its active ingredient, thalidomide, caused the desired effect of sleepiness, but when taken by expectant mothers the left handed version of the drug caused severe congenital malformations in their babies.

If these experiments can now be better modeled and as a result the researchers discover why molecules jump over into their mirror image form, the result would be new synthesis processes of benefit not just to the pharmacological world.

Journal reference:

1. Manfred Parschau, Daniele Passerone, Karl-Heinz Rieder, Hans J. Hug, Karl-Heinz Ernst. **Switching the Chirality of Single Adsorbate Complexes**. *Angewandte Chemie International Edition*, 2009; 48: 4065-4068 DOI: 10.1002/anie.200990112

Adapted from materials provided by Empa, via AlphaGalileo.

http://www.sciencedaily.com/releases/2009/05/090529074952.htm

Waist Size And Body Mass Index Are Risk Factors For Sleep Disordered Breathing In Children

ScienceDaily (June 6, 2009) — A study in the June 1 issue of the journal *SLEEP* found that waist circumference and body mass index (BMI) are consistent, independent risk factors for all severity levels of sleep disordered breathing (SDB) in children, suggesting that as with adult SDB, metabolic factors are important risk factors for childhood SDB.

Results indicate that BMI and waist circumference, but not neck circumference, were significant and strong predictors of SDB at all severity levels – primary snoring, mild SDB and moderate SDB. Nasal anatomic factors such as chronic sinusitis, rhinitis and nasal drain were significant predictors of mild SDB; minority status was associated with primary snoring and mild SDB. Tonsil size, assessed by visual inspection, was not a significant risk factor for any level of SDB. Overall, 1.2 percent of children had moderate SDB (an apnea/hypopnea index of five or more breathing pauses per hour of sleep), 25 percent had mild SDB (AHI of at least one but less than five) and 15.5 percent had primary snoring.

According to principal investigator Edward O. Bixler, PhD, of Penn State University College of Medicine in Hershey, Penn., it is often assumed that the primary mechanism of SDB in children is the presence of large tonsils or adenoids. The study suggests, however, that the causes of SDB in children are more complex, that there may be a systemic influence of obesity, and that adenotonsillectomy may not always be the most effective, first-line treatment.

"Risk factors for SDB in children are complex and include metabolic, inflammatory and anatomic factors," said Bixler. "Because SDB in children is not just the outcome of anatomical abnormalities, treatment strategies should consider alternative options, such as weight loss and correction of nasal problems."

The American Academy of Sleep Medicine reports that snoring is one warning sign for obstructive sleep apnea, a common form of SDB that occurs when soft tissue in the back of the throat collapses and blocks the airway during sleep. Snoring that is related to sleep apnea tends to be loud and may include obvious pauses in breathing and gasps for breath. Parents often notice that the child seems to be working hard to breathe during sleep.

The study gathered data from 700 children between the ages of 5 and 12 years who were randomly selected from 18 public elementary schools in Dauphin County, Penn. Fifty-two percent were female, and 23.8 percent of the children were either Black or Hispanic.

Each child was evaluated by a physical exam and monitored for nine hours during one night of polysomnography in a sleep laboratory.

The overall average AHI was 0.8 breathing pauses per hour of sleep, with a maximum value of 24.6. The prevalence of moderate SDB was higher in older children; two percent of children between the ages of 9 and 12 years had moderate SDB, compared with only 0.2 percent of children between 5 and 8 years of age.

Journal reference:

1. Bixler et al. **Sleep Disordered Breathing in Children in a General Population Sample: prevalence and Risk Factors**. *SLEEP*, 2009; 32 (06): 731-736 [link]

Adapted from materials provided by American Academy of Sleep Medicine, via EurekAlert!, a service of AAAS.
http://www.sciencedaily.com/releases/2009/06/090601091918.htm

'Improved' test for Alzheimer's

A new mental agility quiz could help detect Alzheimer's disease more accurately than the traditional test, Cambridge researchers say.

The test can be carried out by patients themselves, potentially while sitting in a GP or hospital waiting room.

Writing in the BMJ Online, researchers say it provides more accurate results than the standard mini mental-state examination, or MMSE.

This test has been used for decades to assist doctors in making a diagnosis.

One criticism has been than it is too easy, and may miss some patients in the early stage of the disease when treatment with anti-cholinesterase drugs - which reduce the breakdown of an important chemical in the brain - can be most effective.

It must also be carried out by a nurse or doctor and can take time to administer.

SAMPLE TYM QUESTIONS

Why is a carrot like a potato?
Remember this phrase: Good citizens always wear stout shoes
Draw the hands so the time reads 9:20 on this clock
In what year did the First World War start?
List four creatures beginning with the letter S
Sums: 20-4=,16+17=, 8x6=, 4+15-17=

Jeremy Brown, a consultant neurologist at Addenbrooke's Hospital said the new Test Your Memory (TYM) evaluation detected 93% of patients with Alzheimer's in a trial involving 540 healthy people and 139 patients. This compared with 52% of patients when using the MMSE.

In particular, the language and memory tests are more difficult, requiring the patient to recall a longer sentence and use language in different ways. It also includes two visuospatial tasks, which are believed to be important for differentiating Alzheimer's from other memory problems.

The perennial "who is the prime minister?" question remains however.

Researchers hope to be able to make the test available for GPs who want it to download shortly.

SAMPLE MMSE QUESTIONS
Three objects named: apple, table, penny. Patient must repeat and remember later
What are these? (a pencil and a watch)
Spell "WORLD" backwards
Patient to copy a picture of pair of intersecting pentagons
Follow a three stage command: Place index finger of right hand on your nose and then on your left ear

"Although this is a very simple test that can be done alone, it's not really to be done at home as there are all sorts of reasons why people may not perform well that are not related to Alzheimer's," said Dr Brown.

"But we are really pleased to have developed something which may improve early diagnosis as there are in many cases effective action that can be taken. In particular we think it will be much easier to use with people who do not have english as a first language."

In an accompanying editorial, Addenbrooke's consultant physician Claire Nicholl wrote: "If the Test Your Memory test is to be adopted more widely it must be validated in a range of settings and different populations.

"Until then, the most important message is that clinicians should identify a test that suits their clinical setting, use it to screen or case find as appropriate, and develop experience in its use to improve the identification of patients with early dementia."

Step forward

Rebecca Wood, chief executive of the Alzheimer's Research Trust, which funded the research, said the new test was a big step forward in efforts to spot the early signs of dementia, as two-thirds of the 700,000 people in the UK with dementia remain undiagnosed.

She said: "It works well on people of all social classes and educational backgrounds.

'"Test your memory' is easy to self-administer, involving tasks like copying a sentence, calculations, verbal fluency and recall tests.

"The test is not yet widely available, but further examination of its effectiveness in more diverse settings could lead to it being rolled-out nationwide."

Professor Clive Ballard, director of research at the Alzheimer's Society, said: "A test that helps detect dementia sooner could help more people access vital care and support earlier.

"However, much more research is needed to see if this test works in different settings with different groups of people and whether it is sufficiently sensitive to detect Alzheimer's early."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8091224.stm

Published: 2009/06/10 00:22:50 GMT

HIV in South Africa 'levels off'

South Africa's HIV epidemic has levelled off at an infection rate of 10.9% for those aged two or older, according to a new study.

The survey also suggests the rate of infection in children and teenagers could be falling.

This could be partly attributed to increased use of condoms, it says.

But the survey warned that the overall situation remained "dire". South Africa has the world's largest HIV-positive population, at 5.5 million.

Women aged between 20 and 34 continued to be the worst affected, with 33% carrying HIV, the report by the Human Sciences Research Council said.

Olive Shisana, an author of the study of 20,826 people released on Tuesday, said there were "promising findings of a changing pattern of HIV infection among children and youth".

"The good news is that the change in HIV prevalence in children is most likely attributable to the successful implementation of several HIV-prevention interventions," she said.

Challenges

In children aged 2-14, HIV prevalence had dropped from 5.6% in 2002 to 2.5% in 2008, the report said.

There was also a fall in new infections among teenagers aged 15-19.

" **There is clearly light at the end of the tunnel** "
Aaron Motsoaledi, Health Minister

The overall level of HIV infection in those aged two and over, at 10.9%, had moved little.

In 2002 the figure was 10.8% and in 2005 11.4%.

Reports of condom use were sharply up among young people.

In 2002 57% of men aged 15-24 said they used a condom at their last sexual encounter - a figure which rose to 87% in 2008.

The figure for women in the same age group rose from 46% to 73%.

"There is clearly light at the end of the tunnel," said Health Minister Aaron Motsoaledi. "There is real light."

However, the survey also listed a series of challenges, including a rise in the number of those who have many sexual partners and an increase in HIV prevalence among 15-49 year-olds in some provinces.

Fraser McNeill, an anthropologist at the London School of Economics who has studied HIV/Aids among South Africa's Venda ethnic group, told the BBC's Focus on Africa programme that the report was "great news" if the statistics were reliable.

But he cautioned that programmes to tackle HIV could run up against cultural obstacles.

"I found ways in which Aids intervention programmes are implemented are counterproductive," he said.

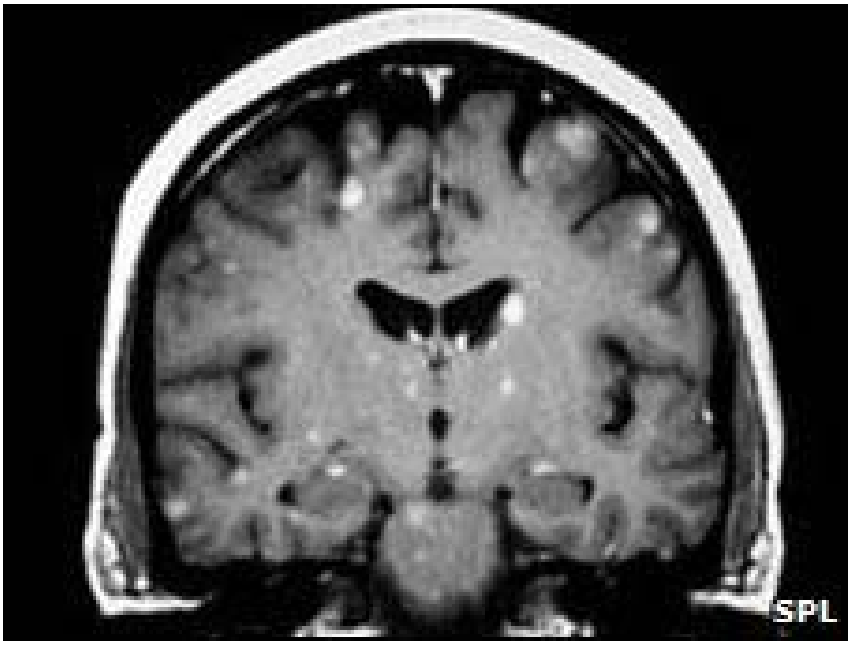
"People on the ground often believe that condoms actually cause Aids, and the women who are involved in the process of Aids education are often framed as vectors of the virus."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/africa/8091489.stm

Published: 2009/06/09 15:35:41 GMT

Way to stop cancers seed in brain

Scientists believe they have found a potential way to stop cancers establishing themselves in the brain, and essentially becoming terminal.



A UK team discovered cancer cells hijack the brain's blood vessels to get all the nourishment they need to seed themselves there.

Key to this is a protein on the surface of cancer cells called integrin which allows them to stick to the vessels.

Drugs that block integrin may stop cancer spread PLoS ONE journal reports.

A fifth of all cancer patients will eventually have disease that has spread to the brain.

" **Now we can try to come up with drugs to target this protein and stop metastatic cancer cells from taking hold in the brain** "
Lead researcher Dr Shawn Carbonell

Indeed, brain metastases are the most common malignant tumours of the central nervous system, outnumbering by 10 times those that originate in the brain.

Once a cancer has spread to the brain the outlook is not good - even with maximal treatment the median survival is nine months.

Scientists at Oxford University, with funding from Cancer Research UK, the Medical Research Council and the US National Institutes of Health, wanted to investigate exactly how cancers spread.

New understanding

Previously it had generally been assumed that tumour cells grew on the cells that make up the grey and white matter of the brain - the neurons and glial cells.

But Dr Shawn Carbonell and his team found that the metastatic cancer cells start to grow on the walls of blood vessels in the brain in over 95% of cases, and not on the nerve cells.

They looked at samples of a range of cancer cell types from humans and mice.

From this they also discovered that the removal of the integrin stopped the cancer cells from attaching to the blood vessels and starting to grow.

Dr Carbonell said although this finding was still a long way from coming up with a new treatment for those with brain metastases, it was exciting.

"We have identified the protein that cancer cells use to anchor themselves to blood vessels in the brain. Now we can try to come up with drugs to target this protein and stop metastatic cancer cells from taking hold in the brain."

Dr Helen George of Cancer Research UK said the discovery was "an important part of the puzzle" and paved the way for new and much-needed treatments to tackle cancers that have spread to the brain.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8089987.stm

Published: 2009/06/10 00:22:06 GMT

Snake slips show slither secret

A simple physics experiment has shed light on slithering - the most common type of motion used by snakes.

Rather than pushing off nearby obstacles, snakes exploit the fact that their scales have different "grip" in different directions.

They also boost speed by lifting curved parts of their bodies off the ground, redistributing their weight.

The research is published in the Proceedings of the National Academy of Sciences.

Since the first theories of snake locomotion arose 70 years ago, the assumption has been that they "push off" objects or irregularities in their paths such as plants or outcrops of rock.

Snakes on a plane

Researchers at New York University and the Georgia Institute of Technology in the US have challenged that theory using an experiment lifted straight out of a physics textbook.

The experiment measures a snake's "coefficient of static friction" - that is, how much its body grips a surface when at rest.

Anaesthetised snakes were pointed in different directions along a flat board held at an angle relative to the ground. By lifting the board until the snakes began to move, the reptiles' friction coefficient could be determined.

A snake facing down the board towards the ground moved easily when held at a shallow angle. A snake lying sideways gripped more, requiring a higher angle before moving, and a snake facing uphill required the highest angle.

The researchers say this clearly points to a mechanism by which the snakes use scales on their bellies as pushing off points.

"What people thought was going on in the macroscopic scale with the sides of their bodies is actually going on in the microscopic scale, with their belly scales," said David Hu, an applied mathematician at the Georgia Institute of Technology.

"If the friction were equal in all directions, a snake would just slither in place, as if it were on a treadmill," he added - a possibility that the team tested by putting snakes on a smooth surface on which they could gain no traction.

As the snakes came out of their anaesthetic daze, the researchers noted that individual scales twitch, confirming the idea that each scale can be independently controlled for maximum traction.

Scale model

The team then developed a simple mathematical model to describe how the snakes would push forward using just the friction provided by their scales.

However, the model came up with maximum speeds lower than those observed in live snakes.

The team then began to look at how the snakes distribute their weight as they slither.

"Most people think that when snakes slither they are completely pressed flat against the ground, but actually they lift their bodies," Dr Hu explained.

"Sometimes it's perceptible and sometimes they just unload parts of their body so their weight distribution is only towards the centre."

The team went on to use a visualisation scheme involving polarised light and gelatine, which changes its optical properties under pressure.

The gelatine showed that the snakes indeed concentrate their weight where their bodies were least curved.

Fitting this behaviour into their model, the team found that not only did it predict the speeds that real snakes achieved, but also that the movement was 50% more efficient.

The weight re-distribution eliminates a lot of wasted slithering effort because they lifted the parts not contributing to forward motion.

"It's analogous to the way we walk or run," Dr Hu said.

"You shift your weight to the left or the right leg, but you don't drag the other leg. The snakes are only touching the ground where the friction force is going to help them move."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8091685.stm

Published: 2009/06/09 17:52:05 GMT

Road particles pose 'higher risk'

By David Shukman
Environment correspondent, BBC News

Children may be at greater risk from the microscopic particles in traffic pollution than was previously thought.

Early findings from a major study in London seen by the BBC show that the lung capacity of 8- and 9-year-olds is 5% lower than the national average.

And 7% of the children - surveyed in the Tower Hamlets area - have lung function reduced to a level internationally regarded as hazardous.

The London study is being led by Professor Jonathan Grigg.

He works out of the Centre for Paediatrics at Barts and the London School of Medicine and Dentistry.

Leaf clues

The particles - so-called "particulates" - are produced in vehicle exhaust and are far smaller than the width of a human hair.

Less than 10 microns across, they are often referred to as PM10.

The results come as researchers at Lancaster University warn that levels of particulates are often higher than shown by official monitoring devices.

Analysing the particulates collected on roadside leaves, the research shows that the pollution can be most intense at the height of many children.

Britain already faces penalties from the European Union for multiple breaches of standards for particulate pollution.

Professor Grigg told BBC News: "Our findings in the East End of London are that children living here have slightly lower lung function than what we'd expect from the national average.

"Now, if that's due to air pollution, as we suspect, they're going to be at increased risk from a range of respiratory disorders such as asthma and infection, and may be at risk in adulthood."

Cough test

A total of 203 children at 10 different schools are taking part in regular tests over several years.

Interim findings from 149 children show that 11 of them have lung capacity that is 80% or lower than the national average - a threshold regarded by researchers as vulnerable to a range of breathing conditions.

One test involves encouraging the children to cough - so the carbon content of their sputum can be analysed.

Microscope analysis shows how particulates are reaching deep into the lungs.

These results will add pressure on the government over Britain's failure to meet European Union air quality standards.

The EU requirement is for average PM10 concentrations to stay below 40 micrograms per cubic metre of air - but most of the country's major conurbations record higher levels.

And the new research by Lancaster University shows that the particulate levels may be even worse than official figures show.

The official data is gathered at automatic monitoring stations which typically sample air at a height of three metres - mainly to avoid the risk of vandalism.

But Professor Barbara Maher and her team have devised a new technique for measuring the magnetic response of particulates on roadside leaves - many of the particles contain fragments of metal.

And the readings show higher concentrations of particulates at lower levels.

'**Progress made**'

Interviewed beside a busy road in Lancaster, Professor Maher said: "We're surrounded by this invisible mist of these millions of toxic particles - you can't see them but we know, we've measured them, they're here.

"When we do our leaf magnetic measurements, our research shows that down at small child height the concentrations - the number - of these very fine particles is sometimes twice the current EU regulation standard."

One set of measurements, outside the Cathedral School in Lancaster, revealed particulate levels that were above the EU standard.

The school's head, Anne Goddard, said the findings were "quite worrying".

"It's the only playground we have at the school and it's right next to the road. The levels are high so obviously the effect on the children, especially those with asthma, is a concern."

The Environment Secretary Hilary Benn admits there is a problem but says 24 out of 27 members of the European Union are in breach of the standards and that most of the landmass of Britain does meet the requirements.

He also said that "huge progress" had been made in the last few decades with the Clean Air Act and changes in vehicles standards.

"But we need to do more and principally that will be about cars and lorries and buses," he said.

"And we've been working with other countries in Europe to improve the standards to get these PM10 particles down because we know it has an effect on our health."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8092182.stm

Published: 2009/06/09 17:31:46 GMT

Online push in California schools

California Governor Arnold Schwarzenegger has unveiled a plan to save money by phasing out school textbooks in favour of internet aids.

Gov Schwarzenegger wants to cut hundreds of millions of dollars in state spending each year.

He says converting to online study will also help keep pupils more up-to-date.

California is facing a state budget gap of $24.3bn and Gov Schwarzenegger on Monday scrapped funding for contracts entered into after 1 March.

'Every penny'

The BBC's Rajesh Mirchandani says Gov Schwarzenegger believes internet activities such as Facebook, Twitter and downloading to iPods show that young people are the first to adopt new online technologies, and so the internet is also the best way to learn in classrooms.

From the beginning of the next school year in August, maths and science students in California's high schools will have access to online texts that have passed an academic standards review.

The governor says digital textbooks can be updated easily - so learning keeps pace with progress.

But our correspondent says the real reason Gov Schwarzenegger wants the change is money.

Last year California spent $350m on textbooks and can no longer afford it.

Authorities are making deep cuts to tackle the budget deficit.

On Monday, Gov Schwarzenegger signed an executive order to scrap funding on contracts from 1 March and bar state agencies from entering into new ones.

He said: "Every state agency and department will scrutinise how every penny is spent on contracts to make sure the state is getting the best deal for every taxpayer dollar."

The Republican governor has ruled out imposing higher taxes to meet the shortfall.

Last month voters rejected a raft of Gov Schwarzenegger's proposals to tackle the deficit.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/americas/8090450.stm

Published: 2009/06/08 21:04:35 GMT

Child carers 'without a voice'

By Katherine Sellgren
BBC News education reporter

Children with caring responsibilities are often "unidentified, unsupported and without a voice", research by the watchdog Ofsted has found.

Inspectors said not enough young carers were known about or receiving support in the eight local councils areas in England they visited last year.

They said children caring for parents with a drug habit or mental health problems were particularly vulnerable.

Another report is highlighting the problems of young carers in Wales.

That report, from the Children's Commission for Wales, says more than half of young carers have felt they could not cope with their responsibilities during the course of a week.

In England, Ofsted inspectors carried out their research last November and December and spoke to 50 young carers - 37 of whom were caring for disabled parents and 13 for siblings.

The children were dealing with a range of disabilities, including physical and sensory impairments, learning difficulties, drug and alcohol-related problems and mental health problems.

'Accepting' of the role

The report found young carers were generally accepting of their role as carer and felt it made them closer to their parents than their peers.

"I don't have anyone back and I don't go out - just say I can't be bothered, it's easier than explaining," one carer told inspectors.

" **Sometimes I am late for school - they don't remember I'm a young carer** "
Young carer

Young carers also said their experience had helped them deal with the practicalities of life at an early age.

"If her speech knocks out I have to lay pillows around her in case she fits," said one carer.

But older children said they were frequently late or absent for school or college and had problems getting coursework finished on time.

Of the 28 young carers at school asked, 19 said their school was aware of their caring responsibilities, but nine had not told staff.

One young carer said: "Sometimes I am late for school - they don't remember I'm a young carer. Just put up with the detention."

Number of carers 'underestimated'

Ofsted said the 2001 census figure that 175,000 children and young people in the UK provided care was an underestimate "because many families do not reveal their situation".

Inspectors found none of the eight areas examined had reliable estimates of the number of potential young carers.

" **My dad don't trust anyone from social services"** "
Young carer

Inspectors said families' reluctance to communicate with the authorities was a key barrier to identifying and supporting young carers.

"My dad don't trust anyone from social services", one carer told inspectors.

The research also found professionals often lacked awareness of the difficulties faced by young carers and did not take children's views into account when assessing disabled parents.

Only three of the 37 young carers with disabled parents said their views had been sought or included in a parents' assessment.

The report said: "Seven areas stated that many professionals... lacked insight into the impact of a parent's disability on the children and young people in the family, some of whom will be young carers."

And in three of the areas assessed, the number of children in caring roles was higher in areas of deprivation.

Schools' role

The inspectors said schools played a key role in helping children with caring duties.

For example, analysing absenteeism data could help reveal pupils not previously identified as having caring responsibilities.

" **I'd take everything out in school - I saw it as a place to escape, but if anyone wound me up, I'd react** "
Jay, 18

Having a young carers policy and a designated teacher with responsibility for these pupils increased the support available.

The report cited one school where young carers presented in assemblies to make other pupils aware of the issues surrounding caring.

Chief inspector Christine Gilbert said: "Councils and their partners need to work together to identify and support young carers and their families.

"It is unacceptable that for most young carers no assessment of their own needs was conducted by children's social care professionals."

Clare Tickell, chief executive for Action for Children, a charity which has run a television campaign to raise awareness of child carers, said: "Young carers are often the invisible faces of caring.

"They can be forced to step in to meet the needs of a relative which are not being fully met by adult care services.

"We know from our work in supporting young carers that they carry a huge weight of responsibility."

The council areas visited by Ofsted were Birmingham City Council, Bournemouth City Council, Cambridgeshire County Council, London Borough of Hounslow, Nottingham City Council, Plymouth City Council, Royal Borough of Kensington and Chelsea and Swindon Borough Council.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8091043.stm

Published: 2009/06/10 10:58:23 GMT

Apes and humans share a common laughing ancestor

- 16:00 04 June 2009 by **Jeff Hecht**
- For similar stories, visit the **Human Evolution** Topic Guide

Even orang-utans enjoy a good laugh (Image: Gerard Fritz / Rex Features)

Laughter is not uniquely human. Researchers who tickled 25 juvenile apes – including three human infants – and recorded the sounds they made say that laughter seems to be shared by all great apes. That would mean laughter dates back some 10 to 16 million years, to our common ancestor.

Some have argued that human laughter must have different origins to that of other apes because it sounds so different. But the new experiments – the first to study all great apes – reveals sound patterns that all share, says Marina Davila Ross, a primatologist at the University of Portsmouth, UK. "It is likely that great apes use laughter sounds to interact in similar ways to humans."

Davila Ross and her colleagues compared 11 features of the sound of laughter from young humans and other great apes with each other and with the laughter of a siamang, the largest living gibbon. They found humans made more "voiced" cries, in which vibration of the larynx's vocal folds at regular frequencies yielded rich harmonics. The vocal folds of all the other apes except for one bonobo vibrated irregularly, making more "noisy" sounds. They also found that humans laughed only while exhaling, but the other apes laughed while inhaling too.

But there was no such clear differentiation in other measures, like peak frequency and sound duration. When the researchers drew up an evolutionary tree based on acoustic traits, they found the siamang came out at the base, followed by the orang-utan, with the bonobo closest to humans – the same lineage shown by genetic analysis.

Evolution of behaviour

"This is a very nice study which shows that when we sometimes compare the primate play face with laughing, we're actually correct," says Frans de Waal, director of the Living Links Center at Emory University in Atlanta, Georgia. The match of acoustic and DNA lineages shows some behaviours "can be traced almost like anatomical features, because they are well defined and probably rest on a strong genetic foundation".

Robert Provine of the University of Maryland Baltimore County suggests laughter goes even further back among. "Laughter is literally the laboured breathing of rough-and-tumble play," he says. "The evolutionary analysis of laughter needs to start with play."

Journal reference: Current Biology (in press)

http://www.newscientist.com/article/dn17248-apes-and-humans-share-a-common-laughing-ancestor.html?full=true&print=true

Muscle Atrophy: When The Body Cannibalizes Itself

ScienceDaily (June 9, 2009) — During desperate times, such as fasting, or muscle wasting that afflicts cancer or AIDS patients, the body cannibalizes itself, atrophying and breaking down skeletal muscle proteins to liberate amino acids. In a new study published online June 8 and in the June 15, 2009 print issue of the *Journal of Cell Biology* Shenhav Cohen, Alfred Goldberg, and colleagues show that muscle atrophy is a more ordered process than was previously thought. These researchers find evidence that enzyme MuRF1 selectively degrades the thick filaments in muscle, while bypassing the thin filaments.

We depend on skeletal muscles because they can produce movement, but they serve another purpose too. "Skeletal muscle is a protein reservoir that can be mobilized in times of need," says Goldberg. The structural core of a muscle cell is the myofibril, composed of myosin-containing thick filaments and actin-containing thin filaments. During atrophy, this structure is disassembled, but exactly how was not known. MuRF1, an atrophy-related gene, is a ubiquitin ligase that "ubiquitylates," or tags a protein, by attaching a ubiquitin molecule, marking it for degradation by the cell. It was unclear when and how ubiquitylation was involved in disassembling skeletal muscles. The researchers triggered atrophy in mice containing defective MuRF1 (lacking its RING-finger domain crucial for ubiquitylation). These mutant mice break down less muscle than wild-type mice, and less ubiquitylation takes place in the mutants.

Cohen and colleagues found that MuRF1 targets the thick filament, demolishing various components in a specific order. The researchers hypothesize that removal of certain thick filament components first permits subsequent MuRF1 access to the myosin heavy chain. However, MuRF1 doesn't exert the same power over the thin filament, which began to come apart even when MuRF1 was absent.

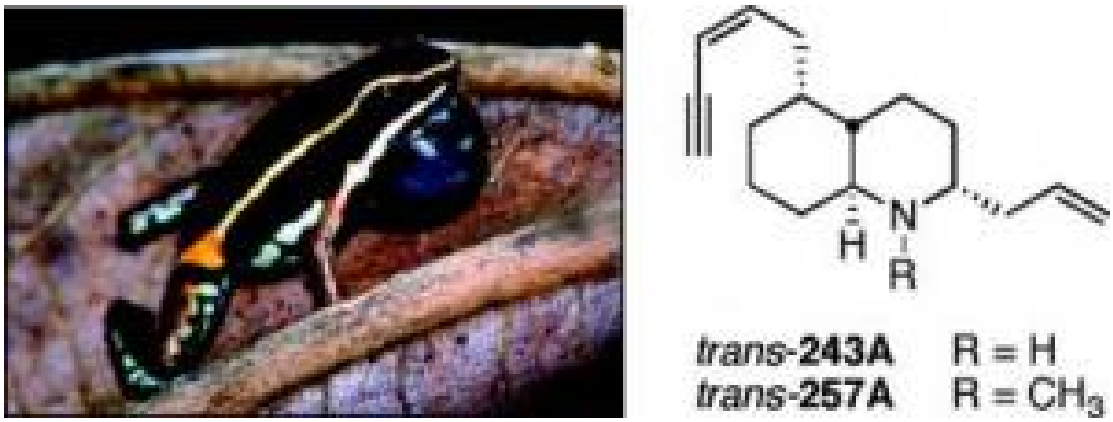
"Up to now, people thought the muscle just gets smaller" during atrophy, Goldberg says. Instead, these findings paint a picture of a well-regulated process of degradation and disassembly. This mechanism "allows the muscle to still be a muscle and function," Goldberg says. "Atrophy doesn't just destroy muscle cells, like apoptosis." The results indicate that MuRF1 doesn't have to wait for caspases or calpains to "pre-digest" the myofibril components. The work also bears on the practical question of whether atrophy can be halted or reversed with drugs. "It argues against MuRF1 inhibitors" for this purpose, Goldberg says, because the enzyme is responsible for degrading only some muscle components, whereas others fall victim to other ubiquitin ligases and autophagy. Inhibitors that work upstream to block signals that activate ubiquitin ligases and initiate autophagy are a better bet.

Cohen, S., et al. 2009. J. Cell Biol. doi:10.1083/jcb.200901052.

Adapted from materials provided by Rockefeller University Press, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090608091337.htm

Newly Discovered Chemical Weapon In Poison Frogs' Arsenal



Scientists have discovered new toxins that some Amazonian poison frogs use as a chemical defense against predators. (Credit: The American Chemical Society)

ScienceDaily (June 9, 2009) — New research documents a surprising chemical weapon used by some Amazonian poison frogs. The study identified for the first time a family of poisons never before known to exist in these brightly colored creatures or elsewhere in nature: the N-methyldecahydroquinolines. The authors then speculated on its origin in the frogs' diet, most likely ants.

H. Martin Garraffo and colleagues note there are more than 500 alkaloids, potentially toxic substances, known to exist in the skin of poison frogs of the family Dendrobatidae. Frogs use them as a chemical defense to discourage predators from biting and eating them. Western Colombian natives have used skin extracts from another group of frogs, unrelated to those in the new study, to coat blow-darts for hunting.

Frogs get nearly all of the alkaloids from their diet, removing alkaloids from ants, mites, small beetles, millipedes and possibly other small arthropods, concentrating them with incredible efficiency, and storing them in their skin. However, Garraffo's group was not certain about the origin of the newly discovered N-methyldecahydroquinolines, which could also be produced in the frogs' own bodies. Feeding experiments with alkaloids fed to captive frogs are planned, which might settle this point.

The scientists analyzed alkaloids from the skin of 13 of the more than 25 species of the genus Ameerega of poison frogs. They identified the new toxins in the frogs as being of the N-methyldecahydroquinoline class, which were present among several other alkaloids.

Journal reference:

1. Daly et al. **N-Methyldecahydroquinolines: An Unexpected Class of Alkaloids from Amazonian Poison Frogs (Dendrobatidae)**. *Journal of Natural Products*, 2009; 090511093706043 DOI: 10.1021/np900094v

Adapted from materials provided by American Chemical Society.

http://www.sciencedaily.com/releases/2009/06/090608101334.htm

Insomnia With Objective Short Sleep Duration In Men Is Associated With Increased Mortality

ScienceDaily (June 9, 2009) — Men with insomnia and sleep duration of six or fewer hours of nightly sleep are at an increased risk for mortality, according to a research abstract that will be presented on June 8, at Sleep 2009, the 23rd Annual Meeting of the Associated Professional Sleep Societies.

Results indicate that compared to people who sleep six hours or more, men with insomnia and less than six hours of nightly sleep were at highest risk of mortality. The mortality rate of the sample was 19.6 percent for men versus 10.3 percent for women.

The study included data from 1,741 men and women who were randomly selected from Central Pennsylvania. Participants were studied in a sleep laboratory; follow-ups were conducted over the course of 14 years for men and 10 years for women. Insomnia was defined by a complaint of insomnia with duration of greater than a year, while "poor sleep" was defined as a complaint of difficulty falling asleep, staying asleep or early final awakening. Polysomnographic sleep duration was classified into two categories; people who slept greater than six hours, and those who slept for less than six hours.

According to the lead author, Alexandros Vgontzas, MD, endowed chair in Sleep Disorders Medicine at Penn State College of Medicine in Hershey, PA., insomnia is associated with medical morbidity and mortality rates similar to those seen in patients with obstructive sleep apnea.

"Based on clinical experience and pervious studies, we can speculate that medication and cognitive behavioral therapy (CBT) or a combination of the two can be used to extend sleep duration and reduce the risk of mortality," said Vgontzas.

Other studies have also found serious medical risks associated with insomnia and objective short sleep duration; another study led by Vgontzas that will presented at SLEEP 2009 found that insomnia with objective short sleep duration is also associated with increased risk of diabetes.

Authors of the study claim that findings indicate that people with insomnia should seek evaluation and treatment from their medical provider. Although the results suggest that people with insomnia have a lower risk for physical problems if their sleep duration is normal, they still are at increased risk for depression and may suffer from the behavioral effects of insomnia.

Abstract Title: Insomnia with objective short sleep duration is associated with increased mortality in men

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Adapted from materials provided by American Academy of Sleep Medicine.

http://www.sciencedaily.com/releases/2009/06/090608071806.htm

Concussion Experts: For Kids -- No Sports, No Schoolwork, No Text Messages

ScienceDaily (June 9, 2009) — When it comes to concussions, children and teens require different treatment, according to international experts who recently published consensus recommendations. The British Journal of Sports Medicine's new guidelines say children and teens must be strictly monitored and activities restricted until fully healed. These restrictions include no return to the field of play, no return to school, and no cognitive activity.

The new consensus is from the International Conference on Concussion in Sports. Children's pediatric concussion expert and neuropsychologist Gerard Gioia, PhD, participated in the panel, and played a key role in delineating the differences between children, adolescents and teens, and adult athletes.

"These consensus recommendations mark the first time that international experts have focused on specialized treatment for kids," said Dr. Gioia, chief of Neuropsychology at Children's National. "This conference of experts has led the way in developing protocols for adult athletes, and now international protocols take into consideration that the developing brain of the child and adolescent requires special consideration. The guidelines also point to the important role parents, coaches, and teachers play in assessing and treating young athletes."

For children and adolescents, the guidance strongly reiterates several key points for coaches, parents, and physicians:

- Injury to the developing brain, especially repeat concussions, may increase the risk of long term effects in children, so no return-to-play until completely symptom free.
- No child or adolescent athlete should ever return to play on the same day of an injury—regardless of level of athletic performance.
- Children and adolescents may need a longer period of full rest and then gradual return to normal activities than adults.

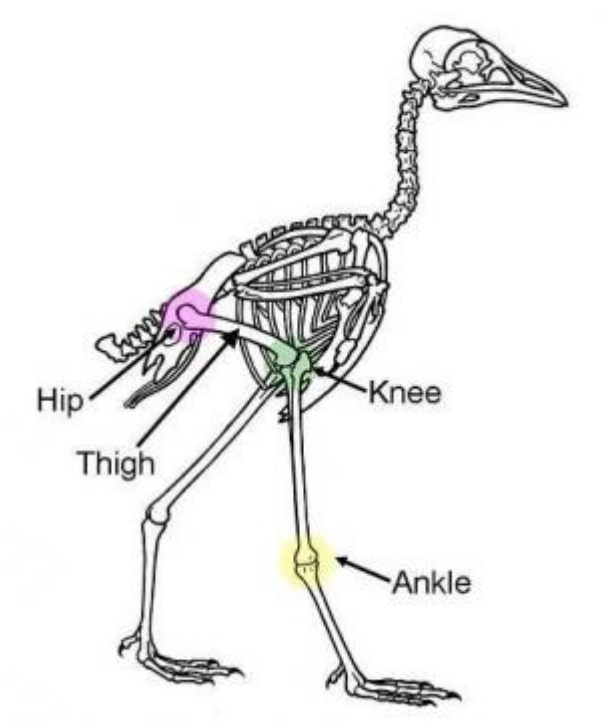
For children, "cognitive rest" is a key to recovery. While restrictions on physical activity restrictions are also important, cognitive rest must be carefully adhered to, including limits on cognitive stressors such as academic activities and at-home/social activities including text messaging, video games, and television watching.

The group's recommendations for children and adolescents were based on the fact that though 80 to 90 percent of adult concussions resolve in seven to 10 days, for children and adolescents, the recovery time is often longer. In all cases, the decision to "return-to-play" should be made based on the individual's progress, not a standard time period. Careful post-injury evaluation of the injured student-athlete is essential.

Adapted from materials provided by Children's National Medical Center, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090608125105.htm

Discovery Raises New Doubts About Dinosaur-bird Links



During walking and running in birds, hindlimb movement is generated primarily at the knee and ankle joints; in humans, movement occurs at the knee, ankle and hip joints. The bird's thigh does not move substantially from its nearly horizontal position where it provides rigid lateral support to the thin walled air-sacs of the respiratory system. (Credit: Image courtesy of Oregon State University)

ScienceDaily (June 9, 2009) — Researchers at Oregon State University have made a fundamental new discovery about how birds breathe and have a lung capacity that allows for flight – and the finding means it's unlikely that birds descended from any known theropod dinosaurs.

The conclusions add to other evolving evidence that may finally force many paleontologists to reconsider their long-held belief that modern birds are the direct descendants of ancient, meat-eating dinosaurs, OSU researchers say.

"It's really kind of amazing that after centuries of studying birds and flight we still didn't understand a basic aspect of bird biology," said John Ruben, an OSU professor of zoology. "This discovery probably means that birds evolved on a parallel path alongside dinosaurs, starting that process before most dinosaur species even existed."

These studies were just published in *The Journal of Morphology*, and were funded by the National Science Foundation.

It's been known for decades that the femur, or thigh bone in birds is largely fixed and makes birds into "knee runners," unlike virtually all other land animals, the OSU experts say. What was just discovered, however, is that it's this fixed position of bird bones and musculature that keeps their air-sac lung from collapsing when the bird inhales.

Warm-blooded birds need about 20 times more oxygen than cold-blooded reptiles, and have evolved a unique lung structure that allows for a high rate of gas exchange and high activity level. Their unusual thigh complex is what helps support the lung and prevent its collapse.

"This is fundamental to bird physiology," said Devon Quick, an OSU instructor of zoology who completed this work as part of her doctoral studies. "It's really strange that no one realized this before. The position of the thigh bone and muscles in birds is critical to their lung function, which in turn is what gives them enough lung capacity for flight."

However, every other animal that has walked on land, the scientists said, has a moveable thigh bone that is involved in their motion – including humans, elephants, dogs, lizards and – in the ancient past – dinosaurs.

The implication, the researchers said, is that birds almost certainly did not descend from theropod dinosaurs, such as tyrannosaurus or allosaurus. The findings add to a growing body of evidence in the past two decades that challenge some of the most widely-held beliefs about animal evolution.

"For one thing, birds are found earlier in the fossil record than the dinosaurs they are supposed to have descended from," Ruben said. "That's a pretty serious problem, and there are other inconsistencies with the bird-from-dinosaur theories.

"But one of the primary reasons many scientists kept pointing to birds as having descended from dinosaurs was similarities in their lungs," Ruben said. "However, theropod dinosaurs had a moving femur and therefore could not have had a lung that worked like that in birds. Their abdominal air sac, if they had one, would have collapsed. That undercuts a critical piece of supporting evidence for the dinosaur-bird link.

"A velociraptor did not just sprout feathers at some point and fly off into the sunset," Ruben said.

The newest findings, the researchers said, are more consistent with birds having evolved separately from dinosaurs and developing their own unique characteristics, including feathers, wings and a unique lung and locomotion system.

There are some similarities between birds and dinosaurs, and it is possible, they said, that birds and dinosaurs may have shared a common ancestor, such as the small, reptilian "thecodonts," which may then have evolved on separate evolutionary paths into birds, crocodiles and dinosaurs. The lung structure and physiology of crocodiles, in fact, is much more similar to dinosaurs than it is to birds.

"We aren't suggesting that dinosaurs and birds may not have had a common ancestor somewhere in the distant past," Quick said. "That's quite possible and is routinely found in evolution. It just seems pretty clear now that birds were evolving all along on their own and did not descend directly from the theropod dinosaurs, which lived many millions of years later."

OSU research on avian biology and physiology was among the first in the nation to begin calling into question the dinosaur-bird link since the 1990s. Other findings have been made since then, at OSU and other institutions, which also raise doubts. But old theories die hard, Ruben said, especially when it comes to some of the most distinctive and romanticized animal species in world history.

"Frankly, there's a lot of museum politics involved in this, a lot of careers committed to a particular point of view even if new scientific evidence raises questions," Ruben said. In some museum displays, he said, the birds-descended-from-dinosaurs evolutionary theory has been portrayed as a largely accepted fact, with an asterisk pointing out in small type that "some scientists disagree."

"Our work at OSU used to be pretty much the only asterisk they were talking about," Ruben said. "But now there are more asterisks all the time. That's part of the process of science."

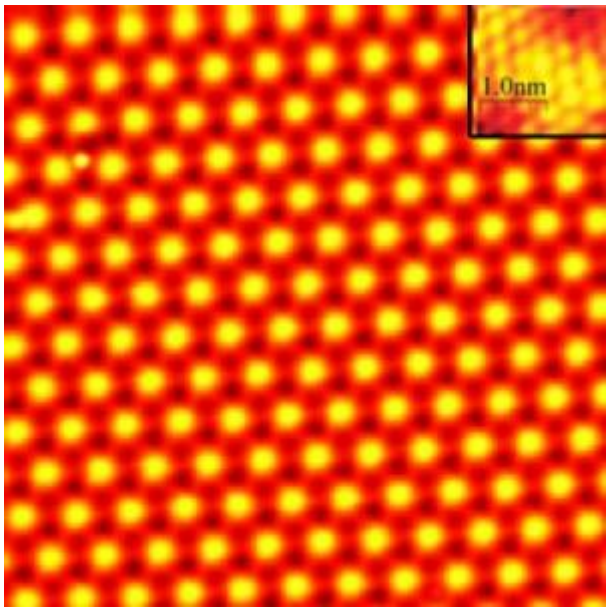
Journal reference:

1. Quick et al. **Cardio-pulmonary anatomy in theropod dinosaurs: Implications from extant archosaurs**. *Journal of Morphology*, 2009; DOI: 10.1002/jmor.10752

Adapted from materials provided by Oregon State University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090609092055.htm

Thinnest Superconducting Metal Ever Created



This is a scanning tunneling microscope image of the 2-atom thick lead film. The inset is a zoomed view showing the atomic structure. (Credit: Dr. Ken Shih, The University of Texas at Austin)

ScienceDaily (June 9, 2009) — A superconducting sheet of lead only two atoms thick, the thinnest superconducting metal layer ever created, has been developed by physicists at The University of Texas at Austin. Dr. Ken Shih and colleagues report the properties of their superconducting film in the June 5 issue of *Science.*

Superconductors are unique because they can maintain an electrical current indefinitely with no power source. They are used in MRI machines, particle accelerators, quantum interference devices and other applications.

The development of the thin superconducting sheets of lead lays the groundwork for future advancements in superconductor technologies. "To be able to control this material—to shape it into new geometries—and explore what happens is very exciting," says Shih, the Jane and Roland Blumberg Professor in Physics. "My hope is that this superconductive surface will enable one to build devices and study new properties of superconductivity."

In superconductors, electrons move through the material together in pairs, called Cooper pairs.

One of the innovative properties of Shih's ultra-thin lead is that it confines the electrons to move in two dimensions, or one "quantum channel," like ballroom dancers gliding across the floor. Uniquely, the lead remains a good superconductor despite the constrained movement of the electrons through the metal.

Shih and his colleagues used advanced materials synthesis techniques to lay the two-atom thick sheet of lead atop a thin silicon surface. The lead sheets are highly uniform with no impurities."We can make this film, and it has perfect crystalline structure—more perfect than most thin films made of other materials," Shih says.

Adapted from materials provided by University of Texas at Austin, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090608095046.htm

Relationship Found Between Napping, Hyperactivity, Depression And Anxiety

ScienceDaily (June 9, 2009) — Napping may have a significant influence on young children's daytime functioning, according to a research abstract that will be presented on June 8 at Sleep 2009, the 23rd Annual Meeting of the Associated Professional Sleep Societies.

Results indicate that children between the ages of 4 and 5 who did not take daytime naps were reported by their parents to exhibit higher levels of hyperactivity, anxiety and depression than children who continued to nap at this age.

According to lead author Brian Crosby, PhD, postdoctoral fellow of psychology at Pennsylvania State University, previous studies have shown that poor or inadequate sleep is linked with symptoms of hyperactivity, anxiety and depression; researchers involved in this study were happy to demonstrate the potential importance of napping for optimal daytime functioning in young children, as napping is often overlooked in favor of nighttime or total sleep.

"There is a lot of individual variability in when children are ready to give up naps. I would encourage parents to include a quiet 'rest' time in their daily schedule that would allow children to nap if necessary."

The study included data from 62 children between the ages of 4 and 5 who were classified as either napping (77 percent) or non-napping (23 percent) based on actigraphy data. Napping children napped an average of 3.4 days per week. Of the sample, 55 percent were white-non Hispanic and 53 percent were male. Caretakers reported their child's typical weekday and weekend bedtime/rise time, napping patterns, family demographics, and completed a behavioral assessment of the child. Actigraphy data for each child was collected continuously for seven to 14 days.

Crosby hopes that findings of this study will encourage caregivers and other researchers to look at the ways napping impacts daytime functioning in children, as an optimal age to stop napping has not yet been determined.

Abstract Title: Napping and Psychosocial Functioning in Preschool Children

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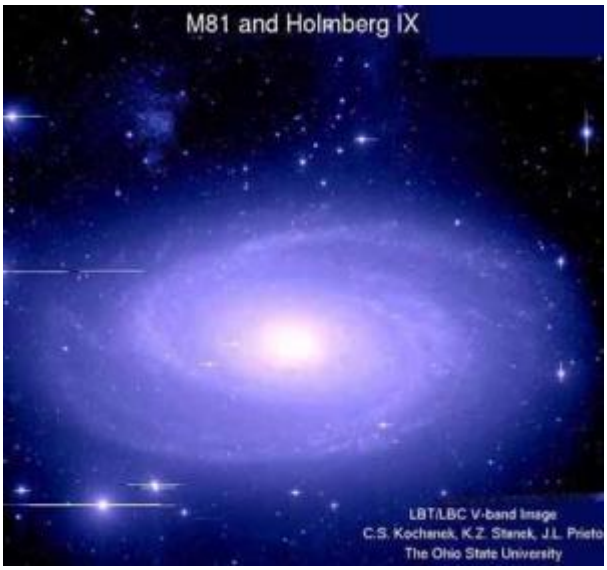
Adapted from materials provided by American Academy of Sleep Medicine.

http://www.sciencedaily.com/releases/2009/06/090608071814.htm

To 300 Million Light Years, And Beyond: A New Way To Measure Cosmic Distances



Ohio State University astronomers are using the Large Binocular Telescope to look for ultra long period cepheid stars in galaxies such as M81, shown here. The stars could offer a new way to measure distances to objects in the universe. (Credit: Image courtesy of Ohio State University.)

ScienceDaily (June 9, 2009) — Ohio State University researchers have found a way to measure distances to objects three times farther away in outer space than previously possible, by extending a common measurement technique.

They discovered that a rare type of giant star, often overlooked by astronomers, could make an excellent signpost for distances up to 300 million light years -- and beyond.

Along the way, they also learned something new about how these stars evolve.

Cepheid variables -- giant stars that pulse in brightness -- have long been used as reference points for measuring distances in the nearby universe, said Jonathan Bird, doctoral student in astronomy at Ohio State. Classical cepheids are bright, but beyond 100 million light years from Earth, their signal gets lost among other bright stars.

In a press briefing at the American Astronomical Society meeting in Pasadena, CA, Bird revealed that a rare and even brighter class of cepheid -- one that pulses very slowly -- can potentially be used as a beacon to measure distances three times farther than their classical counterparts.

This project is the latest in principal investigator Krzysztof Stanek's effort to gauge the size and age of the universe with greater precision.

There are several methods for calculating the distance to stars, and astronomers often have to combine methods to indirectly measure a distance. The usual analogy is a ladder, with each new method a higher rung above another. At each new rung of the cosmic distance ladder, the errors add up, reducing the precision of the overall measurement. So any single method that can skip the rungs of the ladder is a prized tool for probing the universe.

Stanek, professor of astronomy at Ohio State, applied a direct measurement technique in 2006, when he used the light emerging from a binary star system in the galaxy M33 to measure the distance to that galaxy for the first time. M33 is 3 million light years from Earth.

This new technique using so-called "ultra long period cepheids" (ULP cepheids) is different. It's an indirect method, but this initial study suggests that the method would work for galaxies that are much farther away than M33.

"We found ultra long period cepheids to be a potentially powerful distance indicator. We believe they could provide the first direct stellar distance measurements to galaxies in the range of 50-100 megaparsecs (150 million - 326 million light years) and well beyond that," Stanek said.

Because researchers generally don't take note of ultra long period cepheids, there are few of them in the astronomical record. For this study, Stanek, Bird and Ohio State doctoral student Jose Prieto uncovered 18 ULP cepheids from the literature.

Each was located in a nearby galaxy, such as the Small Magellanic Cloud. The distances to these nearby galaxies are well known, so the astronomers used that knowledge to calibrate the distance to the ULP cepheids.They found that they could use ULP cepheids to determine distance with a 10-20 percent error -- a rate typical of other methods that make up the cosmic distance ladder."We hope to reduce that error as more people take note of ULP cepheids in their stellar surveys," Bird said. "What we've shown so far is that the method works in principle, and the results are encouraging."

Bird explained why astronomers have ignored ULP cepheids in the past.Short period cepheids, those that brighten and dim every few days, make good distance markers in space because their period is directly related to their brightness -- and astronomers can use that brightness information to calculate the distance. Polaris, the North Star, is a well known and classical cepheid.

But astronomers have always thought that ULP cepheids, which brighten and dim over the course of a few months or longer, don't obey this relation. They are larger and brighter than the typical cepheid. In fact, they are larger and brighter than most stars; in this study, for example, the 18 ULP cepheids ranged in size from 12-20 times the mass of our sun.

The brightness makes them good distance markers, Stanek said. Typical cepheids are harder to spot in distant galaxies, as their light blends in with other stars. ULP cepheids are bright enough to stand out.

Astronomers have also long suspected that ULP cepheids don't evolve the same way as other cepheids. In this study, however, the Ohio State team found the first evidence of a ULP cepheid evolving as a more classical cepheid does.A classical cepheid will grow hotter and cooler many times over its lifetime. In-between, the outer layers of the star become unstable, which causes the changes in brightness. ULP cepheids are thought to go through this period of instability only once, and going in only one direction -- from hotter to cooler.

But as the astronomers pieced together data from different parts of the literature for this study, they discovered that one of the ULP cepheids -- a star in the Small Magellanic Cloud dubbed HV829 -- is clearly moving in the opposite direction.Forty years ago, HV829 pulsed every 87.6 days. Now it pulses every 84.4 days. Two other measurements found in the literature confirm that the period has been shrinking steadily in the decades in between, which indicates that the star itself is shrinking, and getting hotter.

The astronomers concluded that ULP cepheids may help astronomers not only measure the universe, but also learn more about how very massive stars evolve.

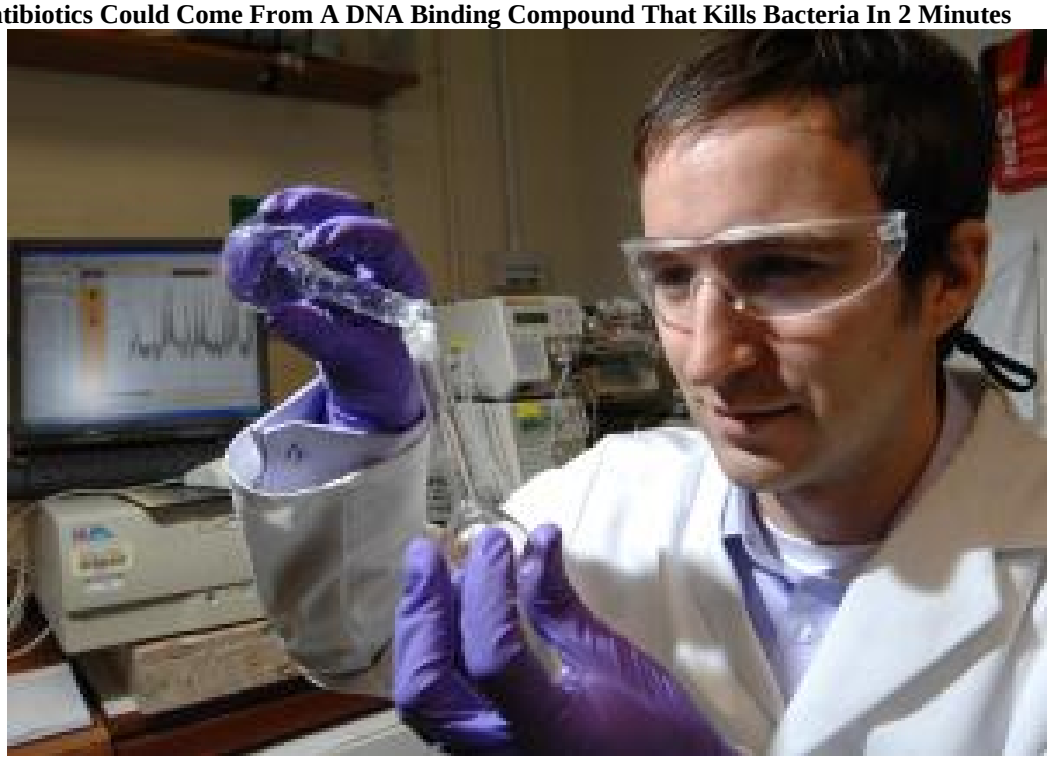
Some of these results were reported in the *Astrophysical Journal* in April 2009. Since that paper was written, the Ohio State astronomers have started using the Large Binocular Telescope in Tucson, Arizona to look for more ULP cepheids. Stanek says that they've found a few good candidates in the galaxy M81, but those results have yet to be confirmed.

This research was funded by the National Science Foundation.

Adapted from materials provided by Ohio State University.

http://www.sciencedaily.com/releases/2009/06/090608131156.htm

New Antibiotics Could Come From A DNA Binding Compound That Kills Bacteria In 2 Minutes



Dr Adair Richards. (Credit: Image courtesy of University of Warwick)

ScienceDaily (June 9, 2009) — A synthetic DNA binding compound has proved surprisingly effective at binding to the DNA of bacteria and killing all the bacteria it touched within two minutes. The DNA binding properties of the compound were first discovered in the Department of Chemistry at the University of Warwick by Professor Mike Hannon and Professor Alison Rodger (Professor Mike Hannon is now at the University of Birmingham). However the strength of its antibiotic powers have now made it a compound of high interest for University of Warwick researchers working on the development of novel antibiotics.

Dr Adair Richards from the University of Warwick said: "This research will assist the design of new compounds that can attack bacteria in a highly effective way which gets around the methods bacteria have developed to resist our current antibacterial drugs. As this antibiotic compound operates by targeting DNA, it should avoid all current resistance mechanisms of multi-resistant bacteria such as MRSA."

The compound [Fe2L3]4+ is an iron triple helicate with three organic strands wrapped around two iron centres to give a helix which looks cylindrical in shape and neatly fits within the major groove of a DNA helix. It is about the same size as the parts of a protein that recognise and bind with particular sequences of DNA. The high positive charge of the compound enhances its ability to bind to DNA which is negatively charged.

When the iron-helicate binds to the major groove of DNA it coils the DNA so that it is no longer available to bind to anything else and is not able to drive biological or chemical processes. Initially the researchers focused on the application of this useful property for targeting the DNA of cancer cells as it could bind to, coil up and shut down the cancer cell's DNA either killing the cell or stopping it replicate. However the team quickly realised that it might also be a very clever way of targeting drug-resistant bacteria.

New research at the University of Warwick, led by Dr Adair Richards and Dr Albert Bolhuis, has now found that the [Fe2L3]4+ does indeed have a powerful effect on bacteria. When introduced to two test

bacteria Bacillus subtilis and E. coli they found that it quickly bound to the bacteria's DNA and killed virtually every cell within two minutes of being introduced - though the concentration required for this is high.

Professor Alison Rodger, Professor of Biophysical Chemistry at the University of Warwick, said: "We were surprised at how quickly this compound killed bacteria and these results make this compound a key lead compound for researchers working on the development of novel antibiotics to target drug resistant bacteria."

The researchers will next try and understand how and why the compound can cross the bacteria cell wall and membranes. They plan to test a wide range of compounds to look for relatives of the iron helicate that have the same mechanism for action in collaboration with researchers around the world.

Journal reference:

1. Richards et al. **Antimicrobial activity of an iron triple helicate**. *International Journal of Antimicrobial Agents*, 2009; 33 (5): 469 DOI: 10.1016/j.ijantimicag.2008.10.031

Adapted from materials provided by University of Warwick.

http://www.sciencedaily.com/releases/2009/06/090608212136.htm

'Eco-Atkins': Plant-based, Low-carb Diet May Promote Weight Loss And Improve Cholesterol Levels

ScienceDaily (June 9, 2009) — Overweight individuals who ate a low-calorie, low-carbohydrate diet high in plant-based proteins for four weeks lost weight and experienced improvements in blood cholesterol levels and other heart disease risk factors, according to a report in the June 8 issue of *Archives of Internal Medicine*, one of the JAMA/Archives journals. A high-carbohydrate, low-fat vegetarian diet also resulted in weight loss but without the additional cardiovascular benefits.

"There is a dilemma relating to the proportion and source of fat, protein and carbohydrate that constitutes the optimal weight loss and cholesterol-lowering diet," the authors write as background information in the article. Newer dietary approaches for the prevention and treatment of chronic disease emphasize increased fruit and vegetable intake and reduced meat consumption.

However, low-carbohydrate diets with increased meat consumption have also been promoted for body weight reduction and the prevention and treatment of diabetes and coronary heart disease. These diets have been shown to be effective in inducing weight loss, reducing insulin resistance, lowering blood fats known as triglycerides and raising high-density lipoprotein cholesterol (HDL-C, or "good" cholesterol) levels, but have tended to increase low-density lipoprotein cholesterol (LDL-C, or "bad" cholesterol) levels. "This lack of a benefit for LDL-C control is a major disadvantage in using this dietary strategy in those already at increased risk of coronary heart disease," the authors write.

David J.A. Jenkins, M.D., of St. Michael's Hospital and the University of Toronto, Ontario, Canada, and colleagues tested the effects of a low-carbohydrate diet high in vegetable proteins from gluten, soy, nuts, fruits, vegetables, cereals and vegetable oils among overweight men and women with high LDL cholesterol levels. A total of 25 participants were randomly assigned to consume this diet—the "Eco-Atkins" diet—for four weeks, while an additional 25 participants ate a control diet that was high-carbohydrate, lacto-ovo vegetarian and based on low-fat dairy and whole grain products. Study food was provided to participants at 60 percent of their estimated calorie requirements.

Of the 47 participants who began the study, 44 (22 in each group) completed the four-week period. Weight loss was similar—about 4 kilograms or 8.8 pounds—in both groups. However, reductions in LDL-C levels and improvements in the ratios between total cholesterol and HDL-C were greater for the low-carbohydrate diet compared with the high-carbohydrate diet. The low-carbohydrate diet also appeared to produce beneficial changes in levels and ratios of apolipoproteins, proteins that bind to fats. In addition, small but significantly greater reductions were seen in both systolic (top number) and diastolic (bottom number) blood pressure for the low-carbohydrate vs. the high-carbohydrate group.

Pending answers to important questions, including whether further reducing carbohydrate intake would produce additional benefits, "a plant-based low-carbohydrate diet high in vegetable proteins and oils may be an effective option in treating those with dyslipidemia for whom both weight loss and lower LDL-C concentrations are treatment goals," the authors conclude.

This study was supported by Solae, LLC, Loblaw Companies Limited and the Canadian Research Chair Program of the Federal Government of Canada. Co-author Ms. Wong is a recipient of a Canadian Institutes of Health Research Doctoral Research Award.

Editorial: Additional Research Needed Before Recommending "Eco-Atkins" Diet

"High-protein, low-carbohydrate diets are advocated by many, predominantly commercial, weight loss programs," write Katherine R. Tuttle, M.D., and Joan E. Milton, M.S., R.D., C.D., of the Providence Medical Research Center at Sacred Heart Medical Center and the University of Washington School of Medicine, Spokane, Wash., in an accompanying editorial.

"Most of these diets have been promoted within popular culture and until recently have been subjected to little scientific scrutiny. Substantial concern has been raised about the potential for adverse effects. Meat is commonly consumed as a major source of dietary protein. However, meat derived from animal muscle also typically contains large amounts of saturated fat and cholesterol."

"The article by Jenkins et al provides insight into debatably more effective and possibly safer tactics for designing higher-protein diets for weight loss and cardiovascular risk reduction. However, it is premature to recommend the 'Eco-Atkins' diet as a weight loss diet of choice without confirmation of its efficacy in larger studies of more diverse and higher-risk individuals. Long-term studies are also essential to ascertain both sustainability and safety."

Journal references:

1. David J. A. Jenkins; Julia M. W. Wong; Cyril W. C. Kendall; Amin Esfahani; Vivian W. Y. Ng; Tracy C. K. Leong; Dorothea A. Faulkner; Ed Vidgen; Kathryn A. Greaves; Gregory Paul; William Singer. **The Effect of a Plant-Based Low-Carbohydrate ('Eco-Atkins') Diet on Body Weight and Blood Lipid Concentrations in Hyperlipidemic Subjects**. *Archives of Internal Medicine*, 2009; 169 (11): 1046 DOI: 10.1001/archinternmed.2009.115
2. Katherine R. Tuttle; Joan E. Milton. **The 'Eco-Atkins' Diet: New Twist on an Old Tale**. *Arch Intern Med.*, 2009; 169 (11): 1027 [link]

Adapted from materials provided by JAMA and Archives Journals.

http://www.sciencedaily.com/releases/2009/06/090608162426.htm

Enzyme Necessary For DNA Synthesis Can Also Erase DNA

ScienceDaily (June 9, 2009) — In this week's edition of *Proceedings of the National Academy of Sciences, PNAS*, Uppsala University scientists describe a new mechanism behind an important process that causes a rapid reduction of DNA in the chromosomes of bacteria. The findings advance our knowledge of how DNA content has been reduced, which is something that has occurred in bacteria that live as parasites inside the cells of other organisms.

The amount of DNA in the chromosomes of bacteria can change rapidly, either by increasing, so-called gene amplification, or by decreasing, so-called gene deletion. These processes are evolutionarily very important, and the discovery of a new mechanism that is involved when DNA disappears is of fundamental importance to our understanding what influences the stability of chromosomes and why the amount of DNA can decrease in certain types of bacteria. "How rapidly and by what mechanisms DNA can disappear from the chromosome is a central genetic and evolutionary question," says Professor Dan I Andersson, the lead author of the study.

Previously these types of large gene deletions, have mostly been studied in artificial model systems with two long identical and neighboring DNA sequences. Normal spontaneous deletions, on the other hand, are often remote from each other and lack sequence identity.

In the current study, the PhD student Sanna Koskiniemi has carried out comprehensive genetic analyses of Salmonella mutants and her results show that a special type of DNA-synthesizing enzymes are necessary if spontaneous deletions are to be formed in the bacteria. This new function has never before been described in these enzymes. By genetically inactivating or overproducing these enzymes, the researchers were able to show that the deletion rates decreased or increased by up to 30 times.

These findings can explain how and why the DNA content of different organisms varies and what genetic mechanisms govern this, says Professor Dan Andersson, who suggests that bacteria that live either as parasites inside cells or in symbiosis with other organisms are of special interest with regard to this new mechanism.

These bacteria often have small chromosomes because DNA has disappeared during evolution. With these new findings we can better understand and predict how DNA is eliminated from chromosomes.

Adapted from materials provided by Uppsala University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2009/06/090608182541.htm

Archeological Evidence Of Human Activity Found Beneath Lake Huron

A potential stone hunting blind beneath Lake Huron that is approximately 3.5 m across. (Credit: Photo courtesy of John O'Shea.)

ScienceDaily (June 9, 2009) — More than 100 feet deep in Lake Huron, on a wide stoney ridge that 9,000 years ago was a land bridge, University of Michigan researchers have found the first archeological evidence of human activity preserved beneath the Great Lakes.

The researchers located what they believe to be caribou-hunting structures and camps used by the early hunters of the period.

"This is the first time we've identified structures like these on the lake bottom," said John O'Shea, curator of Great Lakes Archaeology in the Museum of Anthropology and professor in the Department of Anthropology. "Scientifically, it's important because the entire ancient landscape has been preserved and has not been modified by farming, or modern development. That has implications for ecology, archaeology and environmental modeling."

A paper about the findings is published in the *Proceedings of the National Academy of Sciences*. Co-authors are O'Shea and Guy Meadows, director of the Marine Hydrodynamics Laboratories and a professor in the departments of Naval Architecture and Marine Engineering, and Atmospheric, Oceanic and Space Sciences.

O'Shea and Meadows found features that they believe to be hunting pits, camps, caribou drive lanes and stone piles used to attract the caribou to the drive lanes. Drive lanes are long rows of rocks used to channel caribou into ambushes. The 1,148-foot structure they believe is a drive lane closely resembles one on Victoria Island in the Canadian subarctic.

The hunting formations are on the 10-mile-wide Alpena-Amberley ridge that stretches more than 100 miles from Point Clark, Ontario to Presque Isle, Michigan. The ridge was a bridge between 10,000 and 7,500 years ago when water levels were much lower. Its surface is relatively unspoiled, unlike coastal

areas where scientists believe other archeological sites exist. These coastal sites would now be deeply covered in sediment, so they're often considered lost forever.

Scientists have hypothesized for some time that the ridge might hold signs of ancient occupations. But they didn't know what signs to look for. O'Shea and Meadows zeroed in on caribou-hunting structures after considering the region's climate at the time, which would have been similar to the subarctic. Subarctic hunters are known to utilize caribou drive lanes.

The U-M researchers then narrowed down where to look for these structures by modeling the lake ridge as it would have been when it was dry. They worked with a Robert Reynolds a professor of computer scientist at Wayne State University to reconstruct the ancient environment and then simulate caribou migrations across the corridor. Based on this, they picked three spots to examine.

O'Shea and Meadows used U-M's new, cutting-edge survey vessel Blue Traveler, sonar equipment and underwater remote-operated vehicles with video cameras to survey these areas.

"The combination of these state-of-the art tools have made these underwater archeological investigations possible," Meadows said. "Without any one of these advanced tools, this discovery would not have happened."

Archaeologist will begin examining these areas this summer.

The Paleo-Indian and early Archaic periods are poorly known in the Great Lakes region because most of their sites are thought to have been lost beneath the lakes. Yet they are also times of major shifts in culture and the environment.

The Paleo-Indians were nomadic and pursued big game, O'Shea said. With the Archaic period, communities were more settled, with larger populations, a broad spectrum economy, and new long distance trade and ceremonial connections.

"Without the archeological sites from this intermediate time period, you can't tell how they got from point A to point B, or Paleo-Indian to Archaic," O'Shea said. "This is why the discovery of sites preserved beneath the lakes is so significant."

Perhaps more exciting than the hunting structures themselves is the hope they bring that intact settlements are preserved on the lake bottom. These settlements could contain organic artifacts that deteriorate in drier, acidic soils on land.

The research is funded by the National Science Foundation.

Journal reference:

1. . **Evidence for early hunters beneath the Great Lakes**. *Proceedings of the National Academy of Sciences*, June 8, 2009

Adapted from materials provided by University of Michigan.

http://www.sciencedaily.com/releases/2009/06/090608182543.htm

Evidence Of Macroscopic Quantum Tunneling Detected In Nanowires

ScienceDaily (June 9, 2009) — A team of researchers at the University of Illinois has demonstrated that, counter to classical Newtonian mechanics, an entire collection of superconducting electrons in an ultrathin superconducting wire is able to "tunnel" as a pack from a state with a higher electrical current to one with a notably lower current, providing more evidence of the phenomenon of macroscopic quantum tunneling.

Physics professors Alexey Bezryadin and Paul Goldbart led the team, with graduate student Mitrabhanu Sahu performing the bulk of the measurements. Their research was published on the Web site of the journal *Nature Physics* on May 17.Quantum tunneling is the capability of a particle to inhabit regions of space that would normally be off-limits according to classical mechanics. This research observes a process called a quantum phase slip, whereby packs of roughly 100,000 electrons tunnel together from higher electrical current states to lower ones. The energy locked in the motion of the electrons as they phase slip is dissipated as heat, causing the nanowires to switch from a superconducting state to a more highly resistive one.

It's through this switching of states that allows the tunneling of the phase slip to be observed, the researchers say.Goldbart, who is also a researcher at the university's Frederick Seitz Materials Research Laboratory, describes a quantum phase slip as a phenomenon that allows the spatially extended structure of superconductivity "to undergo a kind of quantum mechanical rip or tear, one where the entire extended behavior of the superconductivity tunnels its way through a classically forbidden set of configurations."

"Semiconductors, insulators and metals all hinge upon the ability of particles to make it through classically forbidden regions, despite apparently having negative kinetic energy there, as quantum physics allows," Goldbart said. In Newton's world, according to Goldbart, particles would be reflected from such regions.Although quantum mechanics governs the realm of atoms and molecules and smaller, quantum phenomena sometimes "leak up" to macroscopic scales, he said.The ultrathin superconducting nanowires fabricated and measured by Sahu and his co-researchers are about 2,000 times finer than a single strand of human hair, which is still "a substantially larger scale than where one typically expects to observe quantum tunneling," Bezryadin said.

According to Bezryadin, who is also a researcher at the Beckman Institute and the Illinois Micro and Nanotechnology Laboratory, it has long been established that single electrons can tunnel, but scant evidence has existed until now for the group tunneling of a large ensemble of superconducting electrons confined in a thin wire.

"Observing switching events in superconducting nanowires at high-bias currents provides strong evidence for quantum phase slips," Bezryadin said. "Our experiments provide further evidence that the laws of quantum mechanics continue to govern large systems, composed of many thousands of electrons, acting as a single entity."Both researchers believe that the practical implication of knowledge gleaned from research into quantum tunneling could have applications in the field of quantum computing."If we learn how to evade the factors that currently suppress quantum superpositions at the macro-scale," Bezryadin said, "we would be better positioned to construct quantum bits for quantum computers, which could perform tasks with an enormous increase in speed and security."

Funding for this research was provided by the U.S. Department of Energy through the Frederick Seitz Materials Research Laboratory and the Institute for Condensed Matter Theory, both at the University of Illinois.

Adapted from materials provided by University of Illinois at Urbana-Champaign.

http://www.sciencedaily.com/releases/2009/05/090527130836.htm

1,000,000 words!

As the one millionth word enters the English lexicon, the joys of our truly global language.

By Simon Winchester
Published: 7:00AM BST 06 Jun 2009

The one millionth word officially enters the English language next week

I will always remember the magical moment when I saw and heard a brand new English word being created. It happened on a commuter train from Oxford to Paddington, during the evening rush, and I witnessed the word being conjured, in an instant, right out of thin air.

Earlier that day I had been in Broadmoor Asylum, researching the strange and tortured Victorian life of an American doctor who had murdered a Londoner in a fit of schizophrenic fury.

The doctor was a clever man, with a vast library in his cell, and in an effort to rehabilitate himself he had volunteered, anonymously, to help make contributions to the Oxford English Dictionary, then under construction in a tin shed in the back garden of James Murray's house on Banbury Road.

But his madness, which ebbed and flowed during his 40-year incarceration, became exceptionally florid one day in 1902, and in a sudden spasm of self-loathing he sliced off his penis with a knife, and flung it into the prison fire.

My discovery of this remarkable event answered a small but singular question: just why the man's work for the OED had suddenly faded away. Delighted with the find, I went promptly up to the OED offices in Oxford to tell everyone and then I walked over to Oxford station.

At the ticket window were two elderly women lexicographers, off to London for the theatre. As we boarded the train, I warned them: have I ever got a story to tell you.

And so, in every gruesome detail, and in an open-plan Thameslink carriage, I related the saga: the sharpening of the blade, the tying of the ligature, the gritted teeth, the fatal slice – and, as I said this, so every whey-faced businessman in the carriage crossed his legs reflexively. There was a sudden corporate gasp.

But not from the two old ladies. They remained quite impassive, thinking. I could see the lexicographical gears grinding in their minds. Then suddenly, and in unison I swear, they spoke: "Autopeotomy!" they cried. Then one to the other: "Yes, Mildred – peotomy is the amputation of the penis. But doing it yourself – that must be autopeotomy. A neologism, I am sure. And Mr Winchester, if you can include this new word in an illustrative sentence in the book you are writing, then we will include it in the next edition of the OED, and you'll be a small part of history."

And so I did, and it duly was and I duly am, and there autopeotomy lies for ever, part of the glittering marvels that make up the English language and which, on Wednesday, is set to celebrate the creation of its one millionth word, according to the Global Language Monitor, a Texas-based association of academics that tracks the use of new words.

It is not known which the millionth word will be, but those on the brink of entering the language as finalists for the one millionth English-language word include "zombie banks", or those banks that would be defunct without government intervention; the pejorative "noob", referring to a newcomer to a given task or community, as in "She's a complete noob to guerrilla gardening"; and "quendy-trendy", meaning hip or up-to-date. I relish them all and, quite frankly, blame my father, plus whoever it was in New York who invented the crossword in the 1920s, for my passion. For my father was a fanatic, and he urged me as a callow teenager to compete with him to see who could do this paper's crossword the faster, a cornflakes box as a barrier between us. We did *The Times* and *The Telegraph*, but for difficult words preferred Ximenes in *The Observe*r, and I came to love Chambers 20th Century dictionary, with all its obscure Scots words that the crossword-setter demanded.

And then, of course, it was but a slow progression from buying Chambers, to owning the OED. I bought my first 17-volume set back in the Eighties, in Hong Kong. I will long remember carrying the books downstairs from a shop in On Lan Street, and stuffing them into the boot of my car during a furious typhoon, sheeting rain and lightning.

I've never been without an OED since. I have three complete sets, including one, bound in dark blue leather and titled in gold, that OUP gave me for writing about the history of what someone called "the greatest piece of sensational serial literature ever written".

I open it up every day. Each morning I take a randomly selected volume to what the Arabs call "the cave of making" and ponder it for more blissful minutes than I imagine most proctologists would think prudent. But the things I discover, the ammunition I have for the hours of writing ahead!

For there seems to be a word for every concept, imaginable and many unimaginable. My favourite for years was "mallemaroking", which an early edition defined as "the carousing of drunken seamen aboard ice-bound Greenland whaling ships", which struck me as a masterly example of hairline linguistic precision. But a later edition of the dictionary slightly amended the definition, dropping the location, trimming it to "the carousing of drunken seamen aboard icebound whaling ships".

This prompted a friend to write a tongue-in-cheek polemic: the foul practice of mallemaroking, he declared, appears to have become unleashed from its native Greenland, and now threatens to extend its tentacles across the entire world. Before it is too late, it must be stopped!

I just cannot imagine any other language offering such opportunities for gaiety and fun. Reading recently that both the Germans and the Chinese have cracked down on the names people are allowed to have, and knowing that the French and the Italians still have gloom-laden academies to protect the so-called purity of their languages, strips out all the amusement and joy that is so very apparent in the tongue we speak so happily. I feel for them, poor deprived purists.

But our language is not perfect. Perhaps not all circumstances are covered, and once I tried to invent a word to fill one tiny niche I felt I discerned in the lexicon. There seemed no word for the grey water-trail left on the kitchen floor by children who come in from the snow without taking off their wellingtons. So I came up with "drimmens", which seemed appropriately glum and grim and vaguely Scots, and I used it in articles for a while. But no one took it up, and, unlike the grislier example of self-mutilation, it never made it to the OED, nor to the Texan million list. I sulk still.

The language bobs and weaves. Words are fugitive things, altering their meaning as custom demands. "Sophisticated" once represented a bad thing, similar to adulteration (similar – but not the same: another delight of English is that there are also no synonyms, most words being highly specific to their task). "Sub-prime", the current bogeyman of the financial crisis, was by contrast once a good thing: once everyone wanted a sub-prime mortgage, which indicated a low interest rate. And these changes give me great pleasure, too, a reminder of how alive and ever-growing our language still manages to be. It changes as the world changes.

I have no doubt which book I would choose, were I ever to be marooned on a desert island: the biggest English dictionary imaginable. They say the next edition of the OED, accommodating all one million of our words, will amount to 40 volumes – enough to be used perhaps to construct the platform of a raft.

Yet I would never dream of doing such a thing, however tempting. I would keep it intact and dry, I would stay put on the island and read the good book every day – while endlessly sailing away with it, entirely in my mind.

Finalists for the one millionth English word

* **Chengguan** Urban management officers, a cross between mayors, sheriffs and city managers.

* **Jai Ho!** From the Hindi, “It is accomplished”; achieved English-language popularity through the Oscar-winning film Slumdog Millionaire.

* **Mobama** Relating to the fashion sense of the US First Lady, as in “that is quite mobama-ish”.

* **Noob** From the gamer community; a neophyte in playing a particular game; used as a disparaging term.

* **Phelpsian** The accomplishments of Michael Phelps at the Beijing Olympics.

* **Quendy-Trendy** British youth-speak for hip or up-to-date.

* **Wonderstar** As in Susan Boyle, an overnight sensation, exceeding all reasonable expectations.

* **Zombie Banks** Banks that would be dead if not for government intervention.

Source: The Global Language Monitor

http://www.telegraph.co.uk/culture/books/5454273/1000000-words.html

WHO backs anti-diarrhoea vaccine

The World Health Organization says a vaccine which can prevent a diarrhoea and vomiting virus should be given to all children as a routine vaccination.

Rotavirus causes more than 500,000 diarrhoeal deaths and two million hospitalisations a year among children.

Over 85% of deaths occur in developing countries in Africa and Asia.

International experts welcomed the WHO's recommendations, based on new research, but UK scientists have said the vaccine is too costly.

'**Milestone**'

The WHO's Strategic Advisory Group of Experts (SAGE) made its recommendations after new data from clinical trials.

The clinical trial, which involved a range or organisations including the Global Alliance for Vaccines and Immunisations (GAVI) and drug company GlaxoSmithKline (GSK), which makes the vaccine plus researchers in South Africa and Malawi, found that rotavirus vaccine significantly reduced severe diarrhoea episodes.

The WHO's Dr Thomas Cherian, said: "This is a tremendous milestone in ensuring that vaccines against the most common cause of lethal diarrhoea reach the children who need them most."

" **This is a tremendous milestone in ensuring that vaccines against the most common cause of lethal diarrhoea reach the children who need them most** "
Dr Thomas Cherian, WHO

But the WHO said, because there were other causes of diarrhoea, it was also important to improve water quality, hygiene, and sanitation and ensure oral rehydration solutions and zinc supplements were available.

Dr Tachi Yamada, president of the Global Health Program at the Bill and Melinda Gates Foundation, said: "This WHO recommendation clears the way for vaccines that will protect children in the developing world from one of the most deadly diseases they face.

"We need to act now to deliver vaccines to children in Africa and Asia, where most rotavirus deaths occur."

Dr Julian Lob-Levyt, chief executive officer of GAVI, said: "This represents another important step in our ability to achieve significant impact on under-five deaths in the world's poorest communities and make progress towards the Millennium Development Goals.

"We are extremely excited about the potential to offer African and Asian countries funding to introduce rotavirus vaccines."

'Price cut'

There are around 130,000 episodes of gastroenteritis caused by rotavirus each year in the UK.

Around 12,700 children are hospitalised, and four die each year.

The Joint Committee on Vaccination and Immunisation, which advises the government, said in February that it would only consider recommending the vaccine if its price were significantly reduced.

In February, the JCVI said: "Rotavirus vaccination would reduce the incidence of rotavirus in the population.

"However, the cost-effectiveness analysis showed that, based on current vaccine prices, universal vaccination of young children significantly exceeded the commonly accepted threshold for cost-effective healthcare interventions.

"Introduction of rotavirus vaccines may only become cost-effective if the vaccine price is reduced significantly."

Professor Andrew Hall, chairman of the JCVI, said the committee always kept vaccines under review and considered new information.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8083684.stm

Published: 2009/06/05 08:59:12 GMT

Natural bleach 'key to healing'

A natural bleach produced by the body appears to play a key role in marshalling the immune system to fight off infection and heal wounds.

US scientists, working on zebrafish, which have similar genes to humans, found a burst of hydrogen peroxide is released following a tissue injury.

This seems to be the signal for white blood cells to converge at the site of damage and begin the healing process.

The Nature study may help explain conditions such as asthma.

Asthma, obstruction in the lungs and some inflammatory gut diseases have all been linked to high levels of white blood cells.

Although zebrafish would at first appear to have nothing in common with humans, they do have similar genes and are widely used to investigate biological processes.

" **This study could provide new insight on immune function and the causes of various inflammatory diseases in humans** "
Dr Leslie Knapp University of Cambridge

The researchers, from Harvard Medical School, inserted into the fish a gene that glows in the presence of hydrogen peroxide.

They discovered that when the tail fins of these fish were injured, a burst of hydrogen peroxide was released from the wound and into the surrounding tissue.

Teams of white blood cells appeared to respond to this chemical signal, arriving at the site of the wound to begin the healing process.

When the researchers blocked the ability to produce hydrogen peroxide, white blood cells failed to respond to the injury.

Mysterious signal

Researcher Professor Timothy Mitchison said: "We've known for quite some time that when the body is wounded, white blood cells show up, and it's really a spectacular piece of biology because these cells detect the wound at some distance.

"But we haven't known what they're responding to. We do know something about what summons white blood cells to areas that are chronically inflamed, but in the case of an isolated physical wound, we haven't really known what the signal is."

In the human body, hydrogen peroxide is produced primarily in three places - the lung, gut and thyroid gland.

Professor Mitchison said: "Perhaps in conditions like asthma, the lung epithelia is producing too much hydrogen peroxide because it's chronically irritated, which, if our findings translate to humans, would explain inappropriate levels of white blood cells.

"This is certainly a question worth pursuing."

Dr Leslie Knapp, of the University of Cambridge, said: "Although hydrogen peroxide is routinely used for wound cleaning and prevention of infection, some laboratory-based studies suggest that hydrogen peroxide can have a negative effect on the healing process by interfering with the activities of cells that form connective tissue.

"This new study, involving a living organism, could provide new insight on immune function and the causes of various inflammatory diseases in humans."

Dr Elaine Vickers, of the charity Asthma UK, said hydrogen peroxide levels did appear to be higher in the lungs of people with asthma, but it was not clear why.

"We welcome any research that increases our understanding of the role that hydrogen peroxide plays in the body.

"This could shed light on the causes of asthma symptoms and potentially lead to new avenues for creating future asthma treatments."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8078525.stm

Published: 2009/06/06 23:44:00 GMT

Floating wind turbine launched

By Jorn Madslien
Business reporter, BBC News

The world's first floating wind turbine is to be towed out to sea this weekend.

Statoil's Alexandra Beck Gjorv told the BBC the technology, the Hywind, to be put off Norway's coast - "should help move offshore wind farms out of sight".

And it could lead to offshore wind farms eventually being located many miles offshore, away from areas where they cause disruption, Ms Gjorv added.

This would benefit military radar operations, the shipping industry, fisheries, bird life and tourism.

"Taking wind turbines to sea presents new opportunities," said Ms Gjorv, of Statoil's new energy division.

"The wind is stronger and more consistent [and] areas are large."

Floating wind farms are set to be connected to mainland grids via cables across the seabed. The longer the cable, the more expensive it is, so the distance from land is not set to become unlimited, explained Ms Gjorv.

The Hywind, a 2.3 megawatt (MW) wind turbine built by Siemens, combines technologies from both the wind farming industry and the oil and gas sectors, and will be tested off the coast of Norway for two years.

In a similar way to how large parts of icebergs are hidden below the sea surface, the turbine has a 100 metre draft that is anchored to the seabed with cables, that can be up to 700 metres long.

Wealthy customers

Floating wind turbine
- The flotation element stretches 100 metres below the sea surface
- It is anchored to the seabed in three places
- It can be moored in waters up to 700 metres deep

Offshore wind farms cost considerably more than wind farms on land, and initially floating ones will be more expensive than static offshore installations.

But over time, insisted Ms Gjorv, the floating turbines should not cost more than fixed ones.

Statoil plans to target markets where there is both an ability to pay as well as large and growing demand for energy, she added.

Floating wind farms could later be established off both coasts of North America and off the Iberian peninsula and the coasts of Norway and the United Kingdom, she said.

Floating wind farms could provide an additional source of energy for countries that have run out of space for their onshore wind farms, or where there is not enough wind on land, Ms Gjorv added.

"The global market for such turbines is potentially enormous, depending on how low we can press costs," she said, though she was not able to quantify it or to outline a timescale for when floating wind farms would become commercially available.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/business/8085551.stm

Published: 2009/06/05 17:38:58 GMT

Key to blood clotting discovered

Scientists have discovered a molecular mechanism that is key to regulating the way blood clots.

The team from Harvard University, writing in the journal Science, said the finding could help treat people who have blood-clotting disorders.

If blood clots too much, people can develop a potentially fatal thrombosis; too little and they can bleed to death.

UK experts said the research was important and could help develop new treatments for blood disorders.

" **This discovery should aid the creation of more effective medicines** "
Professor Jeremy Pearson, British Heart Foundation

A molecular messaging system has to maintain a balance between blood not clotting too much or too little.

The Harvard team identified an area on the von Willebrand factor (VWF) blood-clotting protein which contains a molecular sensor to regulate the size of the protein, important for it to work effectively.

VWF is vital to the body's circulation. It controls the balance between blood clotting and bleeding, and abnormalities affecting VWF can lead to health problems such as bleeding disorders and heart attacks.

Dr Wesley Wong, who worked on the research, said: "The human body has an incredible ability to heal from life's scrapes and bruises.

"A central aspect of this response to damage is the ability to bring bleeding to an end, a process known as haemostasis.

"Yet regulating haemostasis is a complex balancing act."

The team say the work will improve understanding of how the body regulates the formation of blood clots, and could also give some insight into how bleeding disorders, such as von Willebrand disease, disrupt this regulation system, potentially leading to new avenues for treatment and diagnosis.

'**Refine treatment**'

Professor David Lane of the department of haematology at Imperial College London, said: "The size of the VWF protein is important.

"This is controlled by unfolding of VWF by blood flow, which then allows an enzyme - called ADAMTS13 - to get into the protein and chop it up.

"This research has shed light on how this occurs by revealing the detailed structure of the section of VWF that is unfolded and chopped.

"It is important because it tells us where these important sites are in relation to the faults in the protein that cause inherited bleeding disorders, and it tells us more about how blood flow unfolds VWF."

Professor Lane added: "The findings help us to understand the interplay between molecular structure of VWF, blood flow and common diseases, which will help to refine development of treatments."

Professor Jeremy Pearson, Associate Medical Director at the British Heart Foundation, said: "These researchers have deciphered how a crucial part of a crucial protein in our circulation is built.

"This helps us understand how it works in controlling the amount we bleed after injury, while preventing blood clots forming in the wrong place."

He added: "This discovery should aid the creation of more effective medicines for people with diseases, such as von Willebrand's Disease and Thrombotic Thrombocytopenic Purpura (TTP) [blood clotting disorder], for which treatments are currently not good enough."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8082692.stm

Published: 2009/06/06 00:07:09 GMT

Men 'out-performed at university'

By Sean Coughlan
BBC News education reporter

Female students are ahead of men in almost every measure of UK university achievement, according to a report from higher education researchers.

A Higher Education Policy Institute report shows that women are more likely to get places in the top universities and go on to get better grades. Women also outnumber men in high status subjects, such as law and medicine.

The institute's director, Bahram Bekhradnia, says the cause of this gender gap remains uncertain. Women have been entering university in greater numbers than men in recent years - with the participation rate for young women standing at 49%, compared with 38% of young men.

'Good degrees'

The study disproves the notion that men dominate in the most highly-regarded subjects and institutions.

It found that women are taking more places at prestigious Russell Group universities and on the most sought-after courses.

" **It means changing a mindset that continues to see males as advantaged and females as disadvantaged... that is emphatically not the case in higher education** "
Higher Education Policy Institute

The only exception is for Oxford and Cambridge, where men and women are now level.

There are also still some subject areas, such as courses related to maths, physics and technology, where men are in the majority.

But the overall picture shows a consistent trend in women substantially outnumbering men.

There are more women on part-time and full-time courses and women account for a higher proportion of younger and mature students.

In degree grades, women are more likely to gain "good degrees" - taking first class and upper seconds together - while men are more likely to gain lower seconds and thirds. However male students still maintain a narrow lead in firsts - 13.9% to 13% of those who graduate.

According to the report, women's greater success in gaining university places and achieving better degrees extends across different social classes and ethnic groups.

Exam barrier

But finding the cause for this is less straightforward.

"We just don't know," said Mr Bekhradnia.

The introduction of GCSEs in the late 1980s coincided with the time that girls began to overtake boys in academic achievement. However the report also shows that the greater success of women in education is a global pattern - suggesting it is more than the local circumstances of particular types of exam.

Another factor suggested in the gender gap is that boys' academic performance is weakening as much as girls' is improving.

A science test taken by 11 and 12-year-olds in the mid-1970s had been successfully passed by 54% of boys and 27% of girls.

" **Outreach programmes such as Aimhigher seek to engage and inspire young boys to go to university** "
Department for Business, Innovation and Skills spokesman

When the same test was taken in 2003, the scores for both boys and girls had fallen to 17% - a much more rapid decline for boys.

While young women have been entering university in greater numbers and achieving academic success, too many young men have been underperforming, suggests the report.

And while there is still a "mindset that continues to see males as advantaged and females as disadvantaged... that is emphatically not the case in higher education".

In response to the report, a spokesman for the Department for Business, Innovation and Skills, said: "This government is committed to ensuring that everyone with talent and ability to succeed should be given the opportunity to do so whatever their background, gender or race.

"It is essential that we continue to tackle differences in aspirations, which is why outreach programmes such as Aimhigher seek to engage and inspire young boys to go to university through targeted activity around sport, science and music."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/8085011.stm

Published: 2009/06/07 09:10:21 GMT

Software 'gives children a voice'

Scientists claim to have developed the first technology of its kind to allow children with communication problems to converse better.

'How was school today?' is software to help children with disabilities such as cerebral palsy communicate faster.

The system is the result of a project between computing scientists from the Universities of Aberdeen and Dundee, and Capability Scotland.

Pupils from Corseford School in Renfrewshire were first to trial it.

" **I was happy to take part in How was school today? It made me feel good about myself** "
Nicole Vallery Corseford School pupil with cerebral palsy

Dr Ehud Reiter, from the University of Aberdeen's school of natural and computing sciences, said: "How was school today? uses sensors, swipe cards, and a recording device to gather information on what the child using the system has experienced at school that day.

"This can then be turned into a story by the computer - using what is called natural language generation - which the pupils can then share when they get home.

"The system is designed to support a more interactive narration, allowing children to easily talk about their school day and to quickly answer questions."

Rolf Black, from the University of Dundee's school of computing, said: "For a child with severe motor disabilities and limited or no speech, holding a conversation is often very difficult and limited to short one to two word answers.

"To tell a longer story a communication device is often needed to form sentences but this can be very time consuming, putting a lot of strain on holding and controlling the conversation."

'Talk easily'

Sue Williams, head teacher at Capability Scotland's Corseford School in Kilbarchan, said: "In the week we used the system we found it very useful to pupils, teachers, therapists and parents alike. It allows children to take control of the conversation without having to rely on help from us."

Nicole Vallery and Rebecca Clelland were two of the pupils at Corseford to test the new software.

Nicole, 11, who has cerebral palsy, said: "I was happy to take part in How was school today? It made me feel good about myself."

Rebecca said: "It was something different, I enjoyed it."

Nicole's mother, Jan, said: "We really enjoyed using How was school today? and hearing Nicole's story.

"The programme enabled her to talk easily and answer questions quickly, prompting more interaction and giving us a very detailed insight into her day."

Plans are in place to examine how it could be used to support children with different levels and types of impairments.

The project was funded by the Engineering and Physical Sciences Research Council (EPSRC).

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/scotland/north_east/8081410.stm

Published: 2009/06/04 23:25:55 GMT

Small World Crammed on Biennale's Grand Stage

By MICHAEL KIMMELMAN

VENICE — The preview for the Venice Biennale ended this weekend, and after the news media, collectors and dealers left, I wandered to the back of the Arsenale, the ancient former rope factory where part of the main exhibition always unfolds. Calm having descended, the public was now welcome (for $25.50 a ticket), but almost nobody was around. Suddenly I came upon a garden I don't recall having explored before.

It contained a tumbledown brick pavilion with rusting metal doors, open to the breeze and tucked in the shadows. The smell of jasmine and honeysuckle filled the warm air. Inside, 200 gymnastic rings had been hung close together, at various heights, like clustering vines, for a performance some nights earlier by William Forsythe, the dancer. A young woman was clambering from one ring to another, and at being discovered, mid-climb, she smiled shyly, as if acknowledging a shared secret.

Organized by Daniel Birnbaum, this 53rd version of the venerable Biennale is tidy, disciplined, cautious and unremarkable. If any show can be said to reflect a larger state of affairs in art now, this one suggests a somewhat dull, deflated contemporary art world, professionalized to a fault, in search of a fresh consensus. It has prompted the predictable cooing from wishful insiders, burbling vaguely about newfound introspection and gravity.

The Biennale's ostensible theme is "making worlds." Mr. Birnbaum has explained in a news release that this means "an exhibition driven by the aspiration to explore worlds around us as well as worlds ahead," which hardly explains anything at all, of course, while implying that a regrettable inattention to worlds beyond the art world had prevailed. The main show is smaller than the Biennale two years ago, which in virtually every respect seemed more substantial — high-minded and dead serious in light of novelty-addled excess. Part of the Arsenale this time is given over to an advertisement for Abu Dhabi. A prize went to Tobias Rehberger, the stylish German artist, for designing a new cafe. So much for gravity and introspection.

Mr. Birnbaum has also said his show is "about possible new beginnings," to which end he has included works by the Gutai group, Japanese avant-gardists from the 1950s and '60s; Lygia Pape, the Brazilian artist who came to prominence around the same time; and Gordon Matta-Clark, the short-lived American iconoclast of the 1970s. The art crowd gladly talked them all up, as if they were news. Devising quasi-utopian projects of hippie-ish experimentalism by often fugitive means, they aimed to engage more than an art audience and to spread joy. They saw themselves as liberationists, optimists, fabulists and

troublemakers without exactly being ideologues, who shared an almost alchemical knack for transforming scrappy materials and tests of sensual awareness into fine modernist forms.
Here they bring cool pleasures to several parts of the Biennale's main exhibition. Pape's moonbeams of gold thread — a large, ethereal concoction in a vast darkened gallery, titled "Ttéia," from 2002, two years before Pape died — counts among the few coups de théâtre on view.
But the Biennale is meant to be a survey of new art, and while conscientious young artists now dutifully seem to raise all the right questions about urbanism, polyglot society and political activism, their answers look domesticated and already familiar. They look like other art-school-trained art, you might say, which is exactly what Pape and Matta-Clark and the Gutai group didn't want their work to look like, never mind that the art market ultimately found a way to make a buck off what they did, as it does nearly everything, eventually.
Here, notwithstanding how far-flung their origins, almost all the artists in Mr. Birnbaum's show seem to have prominent galleries behind them in New York and Europe, which is not necessarily a problem, but it's hardly proof of larger worlds being explored, either.

As for the national pavilions, video and film works from Canada (Mark Lewis), Serbia (Katarina Zdjelar) and the Netherlands (Fiona Tan) play for the spotlight. But Bruce Nauman commands center stage unlike any American representative since perhaps the young Robert Rauschenberg, 45 years ago.
A miniretrospective of Mr. Nauman's career now occupies the American pavilion. It spills over into university buildings on the other side of the Grand Canal, where a new work, "Days/Giorni," is split between two large rooms. Rows of paper-thin, white loudspeakers, twin gantlets, broadcast voices intoning the days of the week in syncopated varieties (English at one site, Italian at the other).
It claims center stage partly because, among the usual competitors, Britain's entry, Steve McQueen, has phoned in his work, which is a video about the Biennale's leafy Giardini in off-season. Claude Lévêque, representing France, has constructed an inexplicable monstrosity in the form of a cross-shaped prisonlike cell with black flags blown by electric fans, of no apparent meaning. Germany, eschewing nationalism, abdicates its pavilion to a British artist, Liam Gillick, who has installed bare pine kitchen cabinets. It is the lamest German entry in decades, by wide consensus.
Aficionados instead made a kerfuffle over "The Collectors," by the Berlin-based team of Michael Elmgreen and Ingar Dragset, jointly occupying the Danish and Nordic pavilions. An installation about a broken-up family and their dead gay neighbor (his corpse floats in a pool outside the Nordic pavilion), it's an inside joke, an elaborate stage set, clever but shallow.
Mr. Nauman's work manages to be funnier, in dark ways that plumb psychic depths foreign to the likes of Elmgreen & Dragset. Formal panache lends visual rigor to what Mr. Nauman intends, at a glance, to appear jury-rigged and kind of dumb. The needle-stuck-in-the-groove annoyance that he also cultivates demands, like any grueling endeavor, a degree of sacrifice, which may try even the most sympathetic viewer's patience.
But the effort is its own reward, a Beckett-like concept in line with Mr. Nauman's philosophy. From the start John Cage and the Minimalist composers have also been lodestars to Mr. Nauman, whose art often makes odd music out of grating sounds, psychotic rants and everyday speech. "Days/Giorni" takes mindless recitation and turns it into a sort of polyphonic choir.
I mentioned, at the start, discovering Mr. Forsythe's pavilion in the garden because it summoned to mind stumbling for the first time on the Biennale as a student in Italy years ago and finding, late one hot summer day, far from the crush of tourists and churches, in the silent, whitewashed pavilions of the tree-lined Giardini, a work by Mr. Nauman. Its strangeness seemed then, as his art still does, both a rebuke and a universe to be explored.
The memory of it made me wonder about the other big event taking place here, timed to coincide with the Biennale. François Pinault, the billionaire French collector, has installed part of his collection, like choice spoils of war, on long-term view at the Dogana, Venice's former customs house, which the city has turned over to him and the architect Tadao Ando has refurbished.
The building's renovation is a sober and airy arrangement of thick wood beams and concrete, with half-moon windows gazing onto bobbing yachts of Russian oligarchs in the sparkling lagoon. The view is apt. Mr. Pinault's relentless assortment of trendy blue-chip works from the last decade or so, lighted like so many cadavers in a medical school operating theater, reeks of pre-crash money and Bush-era cynicism. Their installation creates the weird, antiseptic aura of Dr. No's lair.

It came as a relief to retreat back to the Giardini and give Mr. Birnbaum's exhibition another shot. In the quiet after the opening, things emerged. Simon Starling's kinetic sculpture, a projector beaming onto a wall a black-and-white film about the construction of the same object at a metal fabricator's in Berlin, made satisfying whirs and clanks. Tony Conrad's large rectangles of yellowing paper, framed by slashes of colored pigment, post-Minimalist haikus from the '70s, slowly faded like aging doges in the late afternoon light.

Yoko Ono had posted on a typed sheet of paper, tacked to a gallery wall, an injunction titled "Cleaning Piece III," from 1996.

It read:

"Try to say nothing negative about anybody.

"a) for three days

"b) for 45 days

"c) for three months

"See what happens to your life."

That seemed like a signal to return to the garden behind the Arsenale, just before it closed, when the sun was still high in the sky.

The last visitors wearily trudged out. The rusty doors to the pavilion were still open. The young woman had left, and a distant belch of a ship's horn broke the silence. No one was watching.

So I tried out Mr. Forsythe's rings.

http://www.nytimes.com/2009/06/11/arts/design/11abroad.html?_r=1&ref=design

A Paris Plan, Less Grand Than Gritty
By STEVEN ERLANGER

PARIS — Every president of France's Fifth Republic has had his Pharaonic project, by which he believes he will leave his mark on the capital and French culture.

François Mitterrand, a fierce Socialist known as the Sphinx, left the new French national library and, to continue the Ozymandias theme, the controversial glass pyramid in the Louvre. Jacques Chirac left the Musée du Quai Branly, an anthropological museum, with an argumentative design by the French architect Jean Nouvel.

President Nicolas Sarkozy, no slouch, wants nothing more than to leave behind "Le Grand Paris." In more than a year of discussions, there have been some spectacular ideas and drawings by 10 teams of famous architects, drawn by the president's invitation to reimagine Paris as a city integrated with its suburbs and responsible in its environmental footprint.

Antoine Grumbach imagines Paris stretching along the Seine to Le Havre and the sea. Roland Castro, whose team included a sociologist and a philosopher, proposed a 250-acre park circled by skyscrapers in La Courneuve, one of the grimmest of the poor Paris suburbs. Richard Rogers plans rooftop gardens and parks built above railway lines. Yves Lion sees Paris sprouting with fields and forests, with citizens able to cultivate their own vegetable patches, an unfortunate similarity to the necessities of Soviet cities.

The architects have provided the ribbons and the balloons, but few if any of the plans are likely to be carried out. Pressed by politics and financing, Mr. Sarkozy has concluded that he will reach for reduced goals that are grittier and essentially practical. The ambition remains the same: to try to bring about a significant improvement in the city's transportation and housing stock, stimulate economic development and break the stranglehold of an artificial "wall" around a relatively small city. The wall is represented by a roughly 22-mile circular highway that separates Paris from a "crown" of suburbs — legally separate cities — where many Parisian workers live.

Mr. Sarkozy has even given up on an effort to reorganize the government and incorporate some of these smaller towns into what really would have been a Grand Paris. A plan for local government reorganization he commissioned from former Prime Minister Édouard Balladur proved so unpopular with the mayors and local councils of the rest of Île-de-France, the administrative region that includes Paris and its suburbs, that the agile and realistic Mr. Sarkozy simply shelved it.

But that left Mr. Sarkozy with a problem. What would be so grand about his Grand Paris?

His answer was, simply, infrastructure. In a speech at the end of April, Mr. Sarkozy said he would leave the dreams of reform to another generation. He said that the state would provide around $50 billion for what he said were complementary proposals for extended subway service that would allow people in the suburbs to travel between them without having to enter Paris, improve existing and saturated subway and

train lines, tie some of Paris's most marginalized and poor neighborhoods into the grid and finally connect all three Paris airports to efficient public transportation.
But construction is not expected to start until at least 2012, and it would take at least 10 years.
The regional council had already drawn up ideas for a circular subway line called the Arc Express, with an estimated cost of $8.4 billion, to connect the inner "crown" of suburbs.
But Mr. Sarkozy's idea is for a more extravagant automated subway line known as the Grand 8, because it both goes around Paris in a wider circle and also cuts through it, looking like a figure 8 on its side.
Some joke that the Grand Infinity might be a better name for it, given the length, some 80 miles, the difficulty of acquiring the land and the cost, around $25 billion, including needed improvements and extensions to three existing lines.
While Mr. Sarkozy has concentrated on transportation, housing is another crucial component of the plan.
Paris is already badly overcrowded, with its poorest minorities largely placed in big public housing projects in the outer rings or suburbs of the city. Still, with only 41 square miles in land (just 1.7 times the size of Manhattan) and a strict height restriction of 121 feet for buildings, there is a severe housing shortage.
To meet demand, the government and private industry are supposed to be building 70,000 housing units a year inside Paris, but in fact have been building only 35,000. Mr. Sarkozy has now backed the 70,000 annual goal as part of his plan, including 19,000 more public housing units. Officials have been talking about a public-private partnership to create new poles, or magnets, for development and housing, made possible by easy transportation and intelligent investment.
Skyscrapers are an inevitable part of the answer, despite extraordinary aesthetic and cultural opposition to them from many French, who like them in New York, Tokyo or Shanghai but detest the few that have been built in Paris. One reason is the architectural nightmare of the Tour Montparnasse, which is generally regarded now as a mistake.
The Socialist mayor of Paris, Bertrand Delanoë, already has courageously begun the debate over building skyscrapers on the edges of Paris and finally won the support of Mr. Sarkozy, who said he was not against building tall "so long as it's beautiful."
The economic crisis has created all sorts of difficulties in every big city in terms of financing, investment and empty office space. But the state is the dominant player in France, and the president is practically royal. The secretary of state for development of the capital region, Christian Blanc, said that the crisis "simply obliges us to think differently," adding that even in the private sector, "money for good projects, that exists."
As for the vision thing, Mr. Blanc said that "grand architectural gestures" would be an important "signature of the Grand Paris project." But he gave no specifics, saying that "they will be studied with local elected officials in the framework of existing projects."
There is another aspect to the plan. Mr. Sarkozy, who made a name for himself with some tough talk during the suburban riots of 2005, when he was the interior minister, is also moving to create a "Grand Paris of police." He is ordering up a super prefecture to coordinate all the police in Paris and the "small crown" of innermost suburbs — Hauts-de-Seine, Seine-St.-Denis and Val-de-Marne — that he failed to incorporate politically into Paris.
"Only 45 percent of delinquents live in the interior of the capital," he said. "Delinquents don't have borders, particularly those belonging to gangs."
It may be a long way from visions of rooftop gardens and urban forests, but it is good politics.
Jeanette Coombs contributed reporting

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On High, a Fresh Outlook

By NICOLAI OUROUSSOFF

I keep picturing Carrie Bradshaw on the High Line, and it terrifies me.

Ever since it was unveiled in 2005, the design for this park, conceived for a strip of elevated rail tracks abandoned nearly 30 years ago, has been the favorite cause of New York's rich and powerful. Celebrities attended fund-raisers on its deck. City officials endorsed it. Developers salivated over it, knowing it would raise land values.

I worried that it would one day be overrun with tourists and film crews. I imagined turning on the television to see Carrie stumbling down its promenade with a broken heel, weeping over Mr. Big. How, I wondered, could it possibly retain the tranquillity that made walking along its rusting, decrepit deck such a haunting experience? So I was overjoyed this weekend when I climbed the stairs at Gansevoort Street, entered the new city park and felt an immediate sense of calm. Designed by James Corner Field Operations with Diller Scofidio & Renfro, the first phase of the High Line, which opened on Tuesday, is a series of low scruffy gardens, punctuated by a fountain and a few quiet lounge areas, that unfold in a lyrical narrative and seem to float above the noise and congestion below. It is one of the most thoughtful, sensitively designed public spaces built in New York in years.

But what's really unexpected about the park is the degree to which it alters your perspective on the city. Guiding you through a secret landscape of derelict buildings, narrow urban canyons and river views, it allows you to make entirely new visual connections between different parts of Manhattan while maintaining a remarkably intimate relationship with the surrounding streets.

The park, which currently extends as far north as West 20th Street, is conceived as a series of interwoven events, like chapters of a book. Approached from the south along Washington Street in the meatpacking district, its 30-foot-high steel deck, supported on big steel columns and sliced off brutally at one end, makes for a striking contrast with the green, leafy landscape atop it. A street-level entry plaza, paved in concrete, is tucked underneath, and a broad metal staircase, with sleek brushed stainless-steel handrails, leads up to the structure's underbelly. Rusted Corten steel plates line the opening in the deck's floor, emphasizing the violence of the cut.

A subtle play between contemporary and historical design, industrial decay and natural beauty sets the tone. The surface of the deck, for example, is made of concrete planks meant to echo the linearity of the old tracks. The path slips left and right as it advances, so that at some points you are right up against the edge of the railing and at others you are enveloped in the gardens.

And those gardens have a wild, ragged look that echoes the character of the old abandoned track bed when it was covered with weeds, just a few years ago. Wildflowers and prairie grasses mix with Amelanchier bushes, their branches speckled with red berries. Mr. Corner designed planters to hold the taller trees, and the Gansevoort entry is marked by a cluster of birches. On Saturday the gardens were swarming with bees, butterflies and birds. I half expected to see Bambi.

Occasionally, you catch a glimpse of a fragment of track lying in the grass, a carefully placed reminder of the High Line's former life.

What saves all this from becoming a saccharine exercise in nostalgia is the sophistication with which these elements are fused together. The benches, for example, have a sleek contemporary feel; they are made of simple wood slats that lock into the deck's concrete planks. The lighting, too, is uncommonly subtle. Most of it is embedded in the bottom of the handrails to keep the focus on the plantings and keep glare to a minimum.

As you continue north, the narrative keeps shifting. The park tunnels through an old brick commercial building just above 13th Street; dimly lit, the cavernous space offers an escape from the heat of a sunny day or from a downpour. Farther up, a spur breaks off and dead-ends into another building, creating a more private pocket overgrown with grasses and shrubs. The most original feature is a small amphitheater that angles down from the center of the deck near 17th Street. Sitting on rows of wood benches, visitors can look through an enormous window up the length of 10th Avenue, the cars and taxis roaring out from directly beneath their feet.

But as mesmerizing as the design is, it is the height of the High Line that makes it so magical, and that has such a profound effect on how you view the city. Lifted just three stories above the ground, you are suddenly able to perceive, with remarkable clarity, aspects of the city's character you would never glean from an office window. At some points, billboards and parking structures dominate the foreground. At others, you are directly below the cornice line, so that you seem to be floating among the rooftops. Longer views open up down narrow side streets to the Hudson, or east across the city.

At the same time, you are still close enough to make eye contact with people on the sidewalks, so that you never lose your connection to the street life. The High Line is the only place in New York where you can have this experience — one that is as singular in its way as standing on the observation deck of the Empire State Building.

None of this would matter if the architects had not struggled so hard to regulate access. It often seemed that almost every developer working in the meatpacking district, at one point or another, was begging to have an apartment building or hotel connect directly to the gardens. Yet remarkably, there are only four access points between Gansevoort and 20th Streets. This adds considerably to the park's low-key mood, and reinforces the notion that it is a place for a quiet stroll, an escape from the trendy neighborhoods below.

We still need to see what will happen when the High Line gets on the major tourist itineraries. The second phase, extending it up to 30th Street, is set to start construction in a few weeks, which will raise new design questions. And developers are still fighting to build bridges to the gardens from their buildings. But the care and patience with which this project was developed, both on the part of the architects and the High Line's founders, Joshua David and Robert Hammond, is a rarity anywhere. They have given New Yorkers an invaluable and transformative gift.

http://www.nytimes.com/2009/06/10/arts/design/10high.html?ref=design