Infoteca's E-Journal

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CONTENTS

Cassini Double Play: Enceladus and Titan

On the left, Saturn's moon Enceladus is backlit by the sun, showing the fountain-like sources of the fine spray of material that towers over the south polar region. On the right, is a composite image of Titan. (Credit: NASA/JPL/SSI and NASA/JPL/University of Arizona)

ScienceDaily (May 18, 2010) — About a month and a half after its last double flyby, NASA's Cassini spacecraft will be turning another double play this week, visiting the geyser moon Enceladus and the hazy moon Titan. The alignment of the moons means that Cassini can catch glimpses of these two contrasting worlds within less than 48 hours, with no maneuver in between.

Cassini will make its closest approach to Enceladus late at night on May 17 Pacific time, which is in the early hours of May 18 UTC. The spacecraft will pass within about 435 kilometers (270 miles) of the moon's surface.

The main scientific goal at Enceladus will be to watch the sun play peekaboo behind the water-rich plume emanating from the moon's south polar region. Scientists using the ultraviolet imaging spectrograph will be able to use the flickering light to measure whether there is molecular nitrogen in the plume. Ammonia has already been detected in the plume and scientists know heat can decompose ammonia into nitrogen molecules. Determining the amount of molecular nitrogen in the plume will give scientists clues about thermal processing in the moon's interior.

The second of Cassini's two flybys is an encounter with Titan. The closest approach will take place in the late evening May 19 Pacific time, which is in the early hours of May 20 UTC. The spacecraft will fly to within 1,400 kilometers (750 miles) of the surface.

Cassini will primarily be doing radio science during this pass to detect the subtle variations in the gravitational tug on the spacecraft by Titan, which is 25 percent larger in volume than the planet Mercury. Analyzing the data will help scientists learn whether Titan has a liquid ocean under its surface and get a better picture of its internal structure. The composite infrared spectrometer will also get its southernmost pass for thermal data to fill out its temperature map of the smoggy moon.

Cassini has made four previous double flybys and one more is planned in the years ahead.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate in Washington. The Cassini orbiter was designed, developed and assembled at JPL.

More information on the Enceladus flyby, dubbed "E10," is available at:
http://saturn.jpl.nasa.gov/mission/flybys/enceladus20100518/

More information on the Titan flyby, dubbed "T68," is available at:
http://saturn.jpl.nasa.gov/mission/flybys/titan20100520/

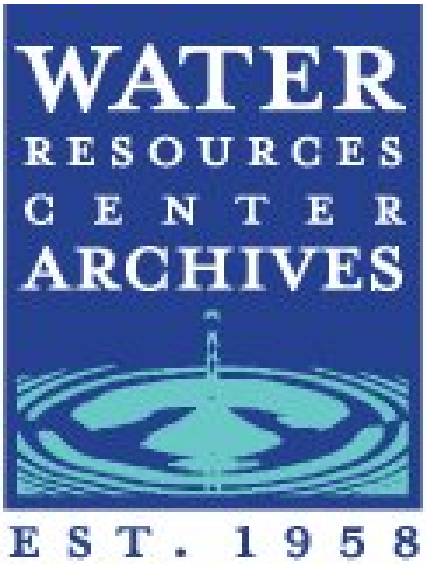
Story Source:

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2010/05/100517234837.htm

California Budget Drought Threatens Water Archive

Posted: 18 May 2010 12:05 AM PDT



The Library budget-slashing epidemic of 2010 shows no signs of letting up. Seems not a day goes by without news of some incredibly difficult challenge facing a library due to a budget shortfall.

The Contra Costa Times is reporting that California's seminal water history archive that is housed at the University of California in Berkeley is in danger of being moved or broken up due to budget issues.

Founded in 1958 by a special act of California Legislature the Water Resources Center Archive consists of a library which houses 120 years of material in a variety of formats including a strong web-based component that is continuously adding digital content to the archive.

"One water expert compared the demise of the archive to the destruction of the Library of Alexandria more than 2,000 years ago."

Peter Gleick, president of the Pacific Institute, and an expert on the world's water resources says:

"It only takes a little while at the water archives to discover not only is not everything online, but some of the most interesting things are not online — old photographs and interviews, the letters and diaries of people involved in California's water history,"

"It's found nowhere else in the state."

And it is in danger. Who would have thought that California would run out money before parts of it ran out of water?

http://feedproxy.google.com/~r/BookPatrol/~3/RFYIxSgNxAE/california-budget-drought-threatens.html?utm_source=feedburner&utm_medium=email

A new source of dioxins: Clean hands

The contaminants that form are novel and their risks unknown
By Janet Raloff
Web edition : Tuesday, May 18th, 2010

The dirty side of cleanVirtually all liquid hand soaps today contain an antimicrobial additive that, once washed into the environment, can spawn dioxins.iStockPhoto

Manufacturers have been adding the germ fighter triclosan to soaps, hand washes, and a range of other products for years. But here's a dirty little secret: Once it washes down the drain, that triclosan can spawn dioxins.

Dioxins come in 75 different flavors, distinguished by how many chlorine atoms dangle from each and where those atoms have attached (their locations indicated by the numbers in the front part of a dioxin's name). The most toxic is 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, or TCDD. Some related kin bearing four to eight chlorines are also toxic, just less so.

Triclosan's dioxin progeny belong to this infamous family, but aren't the ones that have typically tainted the environment. And, before you ask: No one knows how toxic triclosan's dioxins are. Few investigations have been conducted because chemists considered them arcane and too rare to pose a threat.

Patented in 1964, triclosan quickly found use in medical supplies. By 1987, manufacturers were adding it to liquid hand soaps for the consumer market. Within a little more than a dozen years, three-quarters of all such liquid hand soaps would contain the chemical. And as these soaps were used, triclosan washed down residential drains along with chlorinated tap water, forming super-chlorinated triclosan.

In wastewater treatment plants, the bonus chlorine atom or two that tap water had added to the molecule tends to be stripped off, notes William Arnold, an environmental engineer at the University of Minnesota in Minneapolis. But in the finishing stage at those treatment plants, most water gets one last chlorine-disinfection step, which "will re-chlorinate the triclosan," he says, before the water is released out into rivers.

Arnold's group and others have demonstrated in the lab that that in the presence of sunlight, the super-chlorinated triclosan can undergo transformations that beget a series of dioxins. They include 2,8-dichlorodibenzo-*p*-dioxin, 2,3,7- and 1,2,8-trichlorodibenzo-*p*-dioxin, and 1,2,3,8-tetrachlorodibenzo-*p*-dioxin.

The genesis of these compounds isn't just some laboratory curiosity. Triclosan's odd dioxins also develop in the environment — big time, Arnold's group reported May 18 online, ahead of print, in *Environmental Science & Technology*.

Lake fallout

The researchers collected roughly 80-centimeter-deep cores of sediment from a lake downstream of several wastewater treatment plants serving Minneapolis and St. Paul. Like tree rings, sediment layers record the deposition of pollutants as they settle out, with deeper contaminants reflecting fallout from increasingly distant points in time.

Plenty of TCDD and its related kin sat at the bottom of the cores reflecting deposition from the 1940s, but there were none of the unusual dioxins associated with the phototransformation of triclosan. As Arnold's group assayed these cores from the bottom up, concentrations of the conventional dioxins gradually diminished — and quantities of triclosan's dioxins climbed.

"It looks like it's the 1970s when we first really got a hit on the [triclosan] dioxins," Arnold says. Meanwhile, he adds, TCDD and its kin "appear to have peaked in the mid-70s. Then incineration technologies improved and they've been decreasing ever since."

In the sediment's topmost strata, triclosan-related byproducts now account for roughly one-third of all dioxins present. Which indicates, the researchers conclude, that at least in the aquatic world these compounds "represent a previously unrecognized and increasingly important source of di-, tri-, and tetrachlorinated dibenzo-*p*-dioxins."

To investigate how broadly they're littering the environment, "We're going to broaden our survey, looking in about half a dozen lakes in Minnesota," Arnold says — and probe to see whether contaminants that are structurally similar to triclosan might also be generating novel dioxins.

"It's always of concern when we're generating compounds that appear to be stable in the environment and increasing in concentration," Arnold says — especially when any risk they might pose remains unclear. That's why he describes the triclosan-dioxin trend that his team unearthed as "disconcerting."

Oh, and intact triclosan may pose its own environmental risks, another study finds. It exposed male mosquitofish that had come from relatively clean water to triclosan for a month. Concentrations were high, about 100 times what is usually found in water. The treatment induced the guys to produce notable amounts of egg-yolk protein — something only females are supposed to do. Sperm production in these fish also took a big hit, falling by a third when compared to untreated males.

Bottom line: These data indicate the pollutant is "weakly estrogenic" and "imply that triclosan has the potential to act as an endocrine-disrupting agent in aquatic organisms," according to Robert Angus of the University of Alabama at Birmingham and Samiksha Raut of Dalton State College in Georgia. They describe their findings in the June *Environmental Toxicology and Chemistry*.

http://www.sciencenews.org/view/generic/id/59333/title/A_new_source_of_dioxins_Clean_hands

Behavioral therapy can help kids with Tourette disorder

Ten-week course outperforms counseling
By Nathan Seppa
Web edition : Tuesday, May 18th, 2010

An intensive course of behavioral therapy can limit the verbal and physical tics that plague some children with Tourette disorder, a new study finds. This form of therapy, in which a child learns simple ways to derail tics, led to improvement in more than half of children treated, scientists report in the May 19 *Journal of the American Medical Association*.

"I think this is groundbreaking," says clinical psychologist Martin Franklin of the University of Pennsylvania in Philadelphia, who didn't participate in the trial. "Clinically, we now have pretty powerful evidence of the efficacy of a behavioral treatment in this disorder."

Tourette disorder is characterized by short, rapid physical or vocal tics that can take the form of jerking motions, blinking, grimacing, blurting out words or throat clearing. These tics are brought on by urges. And much as a cigarette satisfies a smoker's need for nicotine, the tics seem to resolve these urges, but at a cost. People with Tourette disorder, which starts in childhood and affects about six in 1,000, can face isolation and social stigmatization.

"The urge-tic-relief cycle becomes automatic over time" in Tourette disorder, says study coauthor John Piacentini, a clinical psychologist at the University of California, Los Angeles. "We want to slow it down and make it less automatic."

The behavioral intervention tested in the new study does that by teaching a child to recognize the onset of a tic, identify the body part involved and practice a behavior that competes with the tic, says study coauthor John Walkup, a psychiatrist at the Weill Cornell Medical College in New York City. "By doing this competing response, the connection between the urge and the tic can be disconnected," he says. If the intervention is successful, the urge fades over time.

For example, a child whose tic involved habitually shouting a word or phrase might learn to concentrate on breathing in through the mouth and out through the nose, a pattern that makes it difficult to shout.

The researchers randomly assigned 61 children age 9 to 17 to get the behavioral training. Another 65 children with Tourette disorder were randomly assigned to get counseling and education about the condition. Roughly equal numbers in each group were taking medication for their tics.

After 10 weeks, 53 percent of the children getting behavioral training were judged as much improved or very much improved, according to a standard rating scale of tics. Among those getting counseling and education, 19 percent had improved this much. Questionnaires filled out by the children's parents supported these scores.

Still, nearly half of the treated patients in this study didn't show much improvement. Piacentini says some younger children might find it hard to focus on the intervention. And some Tourette kids have other issues, such as attention deficits, that would hinder concentration on the techniques, he says. Those issues are being studied, and another trial testing the intervention in adults with Tourette disorder is due out this year, Piacentini says.

The behavioral training used in this study is not a try-it-at-home matter in which kids can suppress tics on the first try, says Walkup. Rather, these techniques are taught by therapists and aimed at a specific tic. For

example, Walkup, who worked on this study while at Johns Hopkins University in Baltimore, described a young child he treated whose tic was to stick out his tongue. The child was taught to identify the urge and to put a fist up to his mouth, as if covering a cough. Then he would just poke his tongue up against this hand, concealed. This subverted the tic, which ultimately faded, Walkup says.

Franklin says that patients must first predict a tic. “I get them to be really good at noticing the urge. Then I get them to use a physically incompatible response.” Uncontrolled blinking can be stymied by using slow, controlled blinks, he says.

When Tourette tics fade away with treatment, Franklin says, it’s like the dissipated urge an ex-smoker feels when getting a whiff of a cigarette. Whatever neurological pathway had once been hardwired to cause the tic — or to compel a smoker to reach for a cigarette — has been bypassed, he surmises.

Meanwhile, medication remains the first-line treatment for Tourette, the authors note, even though some drugs for the condition can cause weight gain and have a sedative effect.

http://www.sciencenews.org/view/generic/id/59336/title/Behavioral_therapy_can_help_kids_with_Tourette_disorder

Waterlily saved from extinction

Page last updated at 15:34 GMT, Wednesday, 19 May 2010 16:34 UK

By Pallab Ghosh Science correspondent, BBC News

The waterlilly was native to the hot springs of Rwanda

A scientist based at the UK's Royal Botanic Gardens, Kew, has prevented the world's smallest waterlily from becoming extinct.

Carlos Magdalena now plans to repopulate the plant in its native home in the hot springs of Rwanda.

The world's biggest species of waterlily can have pads that grow to around 3m (10ft).

By contrast the thermal lily is just a centimetre wide - with tiny satin white flowers with a butter yellow centre.

Two years ago, this delicate bloom went extinct in the wild due to over-exploitation of its habitat.

Luckily its seeds were kept in storage - and were used by Carlos Magdalena to regrow the plant at Kew Gardens - just outside London.

It took him months to find the ideal conditions for growth. He hopes now that the Thermal Lily will flourish once again in the hot springs of Rwanda.

"I feel really feel happy and relieved when I managed to successfully grow the plant. I realised then that it wasn't going to disappear forever," he told BBC News.

Pallab Ghosh explains how scientists saved the tiny waterlily from extinction

Although scientists are working hard to bring many endangered plants back from the brink of extinction, they're fighting what is currently a losing battle.

A recent study showed that world governments won't meet the internationally-agreed target of significantly curbing the loss of species by this year.

Governments are to meet to set new targets at the UN's convention on biological diversity in Japan in October. How then can they expect to succeed where the previous convention on biodiversity failed?

Novel strategies

According to James Beattie, another horticulturist at Kew, there's now a more holistic approach to preserving habitats that has been shown to work.

"In the past, efforts were very much focused on species conservation," he said.

Continue reading the main story

We can turn this corner. We have the capability to do it

Prof Steve Hopper Director, Royal Botanic Gardens, Kew

"Now it's being attached to education and working with local partners in these programmes so you can get the message across that these plants are important and the only reason they are disappearing is because of man's activities.

"If you can alter that behaviour then you can bring these plants back quite successfully."

The researchers at Kew say that it's very important to maintain biodiversity.

"Without it, we wouldn't have the products we have today," according to Mr Beattie.

"If you lose that diversity, you risk losing the chances we have of surviving on this planet as things like climate change comes into play".

Professor Steve Hopper, director of Kew Gardens, is optimistic that it is possible to reverse the trend.

"We can turn this corner. We have the capability to do it. There's no reason why another species of plant should go extinct if we apply just a bit of resource and a new attitude towards caring for the natural world."

http://news.bbc.co.uk/2/hi/science_and_environment/10124250.stm

Urinary tract infections 'resistant to antibiotics'

E.coli causes about 80% of UTIs

Urinary tract infections are becoming increasingly hard to treat because of emerging resistance to current antibiotic drugs, experts warn.

They say the problem is spawned by the overuse of antibiotics in the farming industry which enter the food chain.

Scientists from the University of Hong Kong found evidence suggesting resistance genes are being passed from animals to humans in this way.

Their findings are published in the Journal of Medical Microbiology.

The researchers examined Escherichia coli bacteria, which are responsible for the vast bulk of human urinary tract infections. (UTIs).

“ It's a worldwide problem ”

Professor Chris Thomas from the University of Birmingham

Looking at samples from humans and animals they found an

identical gene for antibiotic resistance was present.

The gene, called aacC2, encodes resistance to a commonly-used antibiotic gentamicin and was found in approximately 80% of the 249 human and animal samples the team studied.

Lead researcher Dr Pak-Leung Ho said: "These resistance genes may possibly spread to the human gut via the food chain, through direct contact with animals or by exposure to contaminated water sources.

"When the resistance genes end up in bacteria that cause infections in humans, the diseases will be more difficult to treat."

Global problem

Although the research was carried out in only one region - Hong Kong - experts say the problem is global.

Dr Ho said: "With the international trading of meats and food animals, antibiotic resistance in one geographic area can easily become global.

"Health authorities need to closely monitor the transmission of resistance between food-producing animals and humans and assess how such transfers are affecting the effectiveness of human use of antibiotics."

Professor Chris Thomas, an expert in bacteria at the University of Birmingham, said doctors in the UK were also seeing resistant strains.

"Antibiotic use in animal husbandry is tightly controlled in Europe.

"But even if the problem is being curbed here, people travelling abroad and moving from community to community will bring resistance with them and it will spread.

"It's a worldwide problem."

He said the resistant infections could be treated with other, sometimes more expensive antibiotics. However, with time, resistance may develop to these too, he warned.

In the UK, it is estimated that one woman in three will have a UTI before the age of 24, and that half of all women will have at least one UTI during their lifetime. They are less common among men.

http://news.bbc.co.uk/2/hi/health/8687512.stm

'Sausage not steak' increases heart disease risk

Researchers believe it may be the salt, not the fat, that's the problem

Eating processed meat such as sausages increases the likelihood of heart disease, while red meat does not seem to be as harmful, a study suggests.

A Harvard University team which looked at studies involving over one million people found just 50g of processed meat a day also raised the risk of diabetes.

But there was no such risk from eating even twice as much unprocessed meat, such as beef, lamb or pork.

This was despite the fact the two forms of meat have a similar fat content.

Writing in the journal Circulation, the researchers speculated that given the similar quantities of cholesterol and saturated fats, the difference may be explained by the salt and preservatives added to processed meats.

This is defined as any meat preserved by smoking, curing or salting and includes bacon, sausages, salami and other luncheon meats.

Salt can increase blood pressure in some people, a key risk factor for heart disease.

In animal experiments, nitrate preservatives can promote atherosclerosis and reduce glucose tolerance, which can in turn lead to heart problems and diabetes.

Similar lifestyle

The team from Harvard School of Public Health looked at 20 studies involving more than one million participants from 10 countries.

On average, each 50g serving of processed meat per day - the equivalent of a sausage or a couple of rashers of bacon - was associated with a 42% higher chance of developing coronary heart disease and a 19% higher risk of diabetes.

"Although cause-and-effect cannot be proven by these types of long-term observational studies, all of these studies adjusted for other risk factors," said Renata Micha, lead author.

"Also, the lifestyle factors associated with eating unprocessed meats and processed meats were similar, but only processed meats were linked to higher risk."

Victoria Taylor, senior heart health dietician at the British Heart Foundation, said: "If you like red meat, this can still be included as part of a balanced heart-healthy diet.

"Go for lean cuts and aim to cook from scratch using healthier cooking methods like grilling or baking. If you need to add flavour, then try using fresh and dried herbs, spices and chillies instead of salt."

A spokesman for BPEX, which represents pork producers, insisted processed meats could form part of a balanced diet.

He suggested further research was needed before any dietary recommendations could be made.

"Various studies indicate that high consumption of processed meat can be indicative of an overall poorly balanced diet: therefore it could be other aspects of the diet that are contributing to the increase in risk," he added.

http://news.bbc.co.uk/go/em/-/2/hi/health/8688104.stm

Post-natal depression in fathers 'often undiagnosed'

By Michelle Roberts
Health reporter, BBC News

Caring for a newborn can be stressful

Many new fathers experience post-natal depression, yet most cases go undetected and untreated, experts warn.

One in 10 new fathers may have the baby blues, US researchers believe - based on their trawl of medical literature.

While this rate is lower than in new mothers, it is more than currently recognised, they told the Journal of the American Medical Association.

Lack of sleep and new responsibilities, or supporting a wife with post-natal depression can be triggers, they say.

The Eastern Virginia Medical School team based their findings on 43 studies involving 28,004 parents from 16 different countries including the UK and the US.

“We don't always remember that this is going to be an issue for men as well as for women”

Bridget O'Connell, from the mental health charity Mind

They found new fathers were generally happiest in the early weeks after the birth of their baby, with depression kicking in

after three to six months.

By this time, at least 10% and up to 25% had post-natal depression.

And depression appeared to be shared - men were far more likely to be depressed if their partner also had post-natal depression.

Dr James Paulson and Sharnail Bazemore, who carried out the study, said more efforts should be made to improve screening and referral of at-risk fathers, particularly as mounting evidence suggests that early paternal depression may have substantial emotional, behavioural and developmental effects on children.

"Depression in one parent should prompt clinical attention to the other.

"Likewise, prevention and intervention efforts for depression in parents might be focused on the couple and family rather than the individual," they said.

Paternal pressures

Bridget O'Connell, from the mental health charity Mind, said: "Becoming a parent is one of the biggest changes that both men and women can go through, yet there is still very little understood about how it impacts on mental health, and how many people will experience a perinatal mental health problem.

"New parents can be faced with sleep deprivation, changes in lifestyle, changes in their relationship and new responsibilities all at once, and we don't always remember that this is going to be an issue for men as well as for women."

But Ellie Lee, a lecturer in social policy at Kent University, said it was important not to medicalise normal emotions.

"It is, of course, essential to diagnose and treat serious clinical depression. But there is a tendency to overuse medical labels.

"What is interesting is that saying men have post-natal depression severs the link with biology. Men have not been pregnant, had the hormonal surges or given birth."

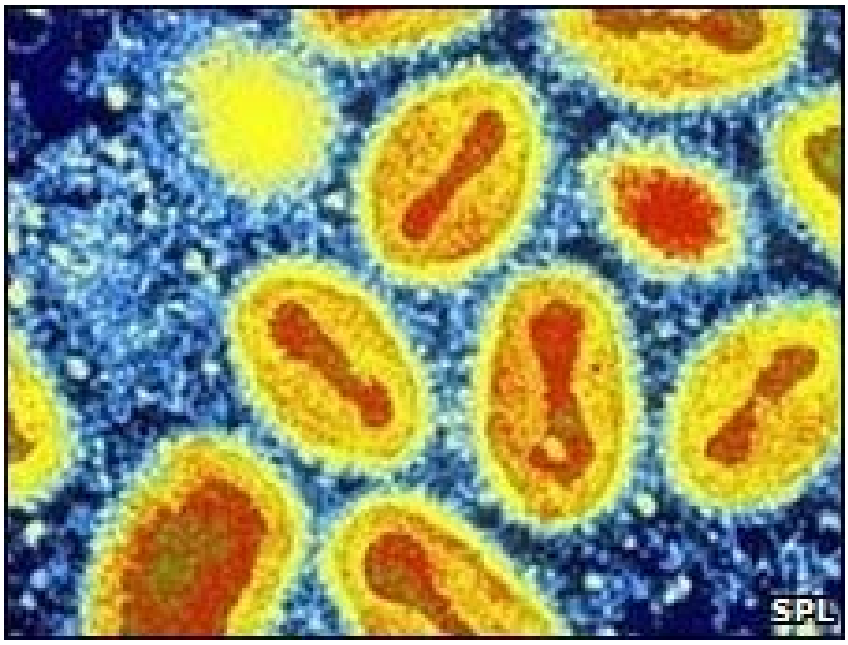
She said modern men were put under other strains.

"It is no longer good enough to just be the bread-winner. They have to be engaged and involved. They are expected to abstain from alcohol, attend every scan and 'feel the pain' of birth.

"This can be a stressful experience."

http://news.bbc.co.uk/2/hi/health/8687189.stm

Smallpox demise linked to spread of HIV infection



By 1980 smallpox had been eradicated

The worldwide eradication of smallpox may, inadvertently, have helped spread HIV infection, scientists believe.

Experts say the vaccine used to wipe out smallpox offered some protection against the Aids virus and, now it is no longer used, HIV has flourished.

The US investigators said trials indicated the smallpox jab interferes with how well HIV multiplies.

But they say in the journal BMC Immunology it is too early to recommend smallpox vaccine for fighting HIV.

Kill no cure

Lead researcher Dr Raymond Weinstein, from Virginia's George Mason University, said: "There have been several proposed explanations for the rapid spread of HIV in Africa, including wars, the reuse of unsterilised

needles and the contamination of early batches of polio vaccine.

"However, all of these have been either disproved or do not sufficiently explain the behaviour of the HIV pandemic."

Dr Weinstein and his colleagues believe immunisation against smallpox may go some way to explain the recent rises in HIV prevalence.

Smallpox immunisation was gradually withdrawn from the 1950s to the 1970s, following the worldwide eradication of the disease, and HIV has been spreading exponentially since then, they say.

Now, only scientists and medical professionals working with smallpox are vaccinated.

To test if the events may be linked, the researchers looked at the white blood cells taken from people recently immunised against smallpox and tested how they responded to HIV.

They found significantly lower replication rates of HIV in blood cells from vaccinated individuals, compared with those from unvaccinated controls.

The smallpox vaccine appeared to cut HIV replication five-fold.

Immune boost

The researchers believe vaccination may offer some protection against HIV by producing long-term alterations in the immune system, possibly including the expression of a receptor called CCR5 on the surface of white blood cells, which is exploited by the smallpox virus and HIV.

Jason Warriner, clinical director for the Terrence Higgins Trust, said: "It's impossible to say whether the withdrawal of the smallpox vaccine contributed to the initial explosion of HIV cases worldwide, but it is a plausible explanation.

"This is an interesting piece of research, and not just as a history lesson. Anything that gives us greater understanding of how the virus replicates is another step on the road towards a vaccine and, one day, a cure.

"Further studies into the role receptor cells play are needed, and even then any discoveries are likely to be just one part of the solution.

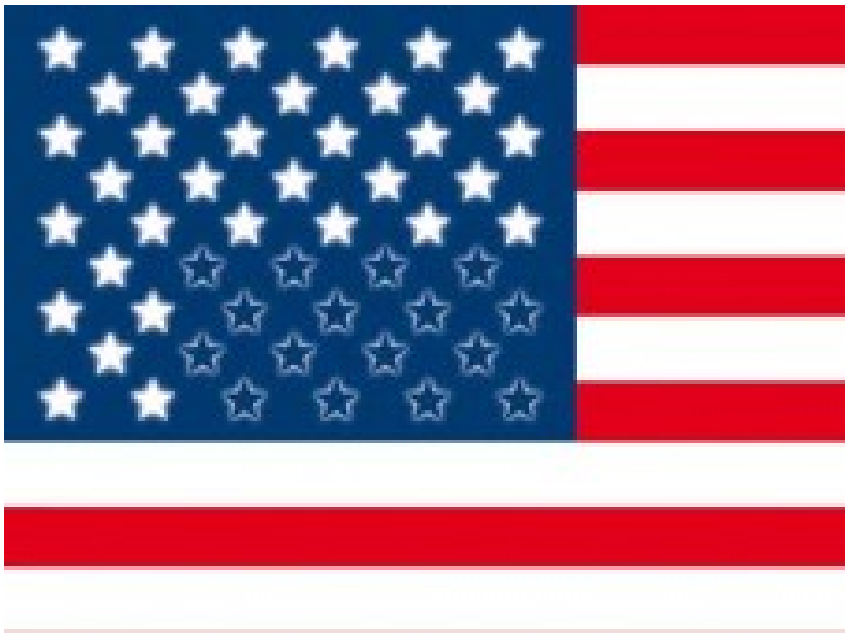
"Until we find a way to eradicate the virus from the body, the focus should remain on stopping it being passed on in the first place."

http://news.bbc.co.uk/2/hi/health/8686750.stm

Saving Energy Means Getting the South on Board

Coal-fueled region uses more energy per capita and pays less for it than the U.S. overall.

By Melinda Burns



Twelve of the 16 Southern states rank in the bottom half of the U.S., and nine of them rank in the bottom third on the 2009 State Energy Efficiency Scorecard, an annual publication of the American Council for an Energy Efficient Economy.

The American South is not known for its energy conservation. Coal is plentiful, and electricity is cheap.

Washington, D.C., and 16 Southern states from Delaware to Texas use 44 percent of the total energy consumed in the United States but account for only 36 percent of the country's population. The South is responsible for 41 percent of U.S. carbon emissions.

Of course, it also has an outsize industrial base, too. The South accounts for slightly more than half the industrial energy use in the nation, most of it from iron and steel, pulp and paper, oil refining and chemicals manufacturing. And while that helps account for greater per capita use, it can also create greater opportunities for savings.

Twelve of the 16 Southern states rank in the bottom half of the U.S., and nine of them rank in the bottom third on the 2009 State Energy Efficiency Scorecard, an annual publication of the American Council for an Energy Efficient Economy.

The scorecard from the Washington, D.C.-based nonprofit group looks at building codes, state legislation, appliance standards and utility and transportation policies aimed at saving energy. While California was ranked first with a score of 50, Mississippi and Alabama ranked second and third from the bottom with scores of 2 and 3, respectively, in energy efficiency.

But laggards can become leaders. In a report last month for the Southeast Energy Efficiency Alliance, a 3-year-old nonprofit group based in Atlanta, researchers at Duke University and the Georgia Institute of Technology outlined some giant steps the South could take to move up in the rankings.

"If the South could achieve the substantial energy-efficiency improvements that have already been proven effective in other regions and other nations," the report said, "carbon emissions across the South would decline, air quality would improve, and plans for building new power plants to meet growing electricity demand could be downsized and postponed while saving ratepayers money."

The South is the largest and fastest-growing region in the United States. Energy consumption in the region is expected to grow by 16 percent over the next 20 years, creating a need for nearly 300 new power plants if no steps are taken to cut back usage.

To flatten out future demand for energy through 2030, the researchers from Duke and Georgia Tech proposed nine aggressive energy-saving policies. If the policies are adopted, they said, 40 existing power plants in the South could be retired by 2030 and only 10 new plants would be needed to replace them. A typical Southern household would save $26 a month on its future energy bills by 2020 and $50 by 2030.

The researchers said it would cost the South $200 billion in public and private funds to implement the policies over the next 20 years, but the region would save $448 billion overall.

"We picked our policies because they were large and we thought they would be cost-effective," said Etan Gumerman, a co-author of the report and a senior policy associate at Duke's Nicholas Institute for Environmental Policy Solutions. "We're hoping to show that there is a large energy efficiency potential in this region and good reasons for policymakers to be thinking about how to realize them and get the utilities' interests more in line with the consumers' interests.

"The sooner this is pursued, the easier it will be."

Co-author Marilyn Brown, a professor in the School of Public Policy at Georgia Tech and a founder of the Southeast Energy Efficiency Alliance, was appointed in December by President Obama to the board of directors of the Tennessee Valley Authority, the federal agency that supplies electricity to seven southeastern states. The authority is the nation's largest public power company.

Tennessee itself, though it ranked 38th on the national scorecard for energy efficiency, also was named one of the "most improved states" by the American Council in 2009. Last year, Tennessee's governor set up a task force on energy policy and ordered state agencies to "lead by example." The state also updated its residential building energy codes.

Delaware and Washington, D.C., which tied for 20th on the scorecard, also made the council's "most improved" list. Delaware established a nonprofit group to deliver comprehensive energy efficiency services to households and businesses. Washington implemented strict building codes and became the first city in the country to require the public disclosure of the energy scores of buildings.

Still, 11 of the 20 metropolitan areas in the country with the largest carbon footprints are in the South — a reflection, in part, of the region's historically low rates for electricity. Southerners pay just over half as much for energy as U.S. residents overall.

Ben Taube, executive director of the Energy Efficiency Alliance, said the report from Duke and Georgia Tech would help in "proving the point" about energy conservation.

"There's a lot of room for improvement," he said. "Efficiency hasn't been in the mix for a long time. But that's changing. Customers are asking for it. An awareness is driving our states, and we're seeing more deployment of efficiency, though not on the scale of California, New Jersey or New York."

If Congress puts a future price on carbon, the South could be more vulnerable but also "could perhaps gain the most by capitalizing on opportunities to transform its energy system, compared with other areas of the country," the report said.

Building codes and appliance standards either do not exist in Southern states or they lag well behind the codes and standards in other regions. Efficiency is pursued less aggressively, too. A 2009 poll shows that Southerners are almost evenly split over whether U.S. energy policy should favor conservation or drilling, whereas in the West, 60 percent of those polled said policy should favor conservation, and only 31 percent said the U.S. should favor drilling.

The report recommended more aggressive building codes for homes and commercial buildings; expanded weatherization assistance programs for low-income families; tighter standards in commercial buildings for furnaces, boilers, water heaters and air conditioners, and generous incentives for energy saving retrofits.

In industry, where the potential for energy savings is greatest, more efficiency assessments could be provided for plants, and new technologies could be installed in place of aging boilers, motors, pumps and fans, the report said.

By pursuing some of these same policies, California has kept per capita energy use flat in recent decades, while U.S. per capita use overall has risen 50 percent.

Aggressive energy efficiency policies "could set the South on a course toward a more sustainable and prosperous energy future," the report said. If adopted, it said, the policies would create about 520,000 new "green" jobs by 2030, and the economy would grow by $1 billion — a small but important boost in a region with the highest proportion of poor households in the U.S.

Finally, 20 billion gallons of water could be saved by 2030, or 45 percent of the projected growth in demand for water in the South, because it would not be needed for cooling systems at future new power plants, the report said. By 2030, the water savings are estimated to reach 90 billion gallons.

http://www.miller-mccune.com/science-environment/saving-energy-means-getting-the-south-on-board-16155/?utm_source=Newsletter110&utm_medium=email&utm_content=0525&utm_campaign=newsletters

Phosphorus and the Oxygen Connection

In deep geologic time, it may have helped turned the sky from orange (!) to blue, a new study shows.

By Melinda Burns

As recently reported by Miller-McCune, scientists believe the world may be approaching "peak phosphorus." Supplies of phosphate rock, a key source of phosphorus for fertilizers, may start to decline in 20 years, they say, triggering famine and food shortages.

Now, beyond food, phosphorus is getting credit for the very air we breathe. New research from the Carnegie Institution for Science suggests that hundreds of millions of years ago, phosphorus may have jump-started the modern-day atmosphere, paving the way for the evolution of complex life forms and even turning the sky blue.

Biochemist Dominic Papineau studied the phosphate deposits that formed during a critical interval in the history of the Earth, from 2.5 billion years ago to about 540 million years ago. During this period, levels of oxygen in the atmosphere increased in two phases, from trace amounts to near-present levels, giving rise to a spectacular explosion in the diversity of life forms, including sponges and hard-shelled marine organisms.

"Phosphate rocks formed only sporadically during geologic history," Papineau was quoted in a release announcing his paper, "and it's striking that their occurrences coincided with major global biogeochemical changes as well as significant leaps in biological evolution."

Over geologic timescales of tens of millions to a few hundreds of millions of years, he said, supercontinents broke up and glaciers melted, increasing the weathering of the Earth's crust and washing large quantities of phosphorus into the oceans.

"When you melt a 'Snowball Earth,' you're going to create a lot of rivers," Papineau told Miller-McCune.com. "That has the potential to erode the crust under the ice sheet and make rivers all over the place. That will really accelerate the erosion and lead to higher rates of delivery of phosphorus to the ocean."

Once there, he said, the phosphorus likely fed the growth of vast blooms of cyanobacteria, or blue-green algae, which in turn pumped oxygen into the atmosphere.

"The previous atmosphere was possibly methane-rich, which would have given the sky an orangish color," Papineau was quoted. "So this is the time that the sky literally began to become blue."

During Great Oxidation Event, when the oxygen in the atmosphere increased to 10 percent of present-day values, single-celled organisms grew large and acquired cell structures called mitochondria, the so-called "powerhouses" of cells. Mitochondria burn oxygen to yield energy. In the second phase studied by Papineau, ending 540 million years ago, oxygen increased to near-present levels, climaxing in the most significant leap in biological diversity and complexity in Earth's history. The "Cambrian Explosion," as it is called, has been documented in the fossil record.

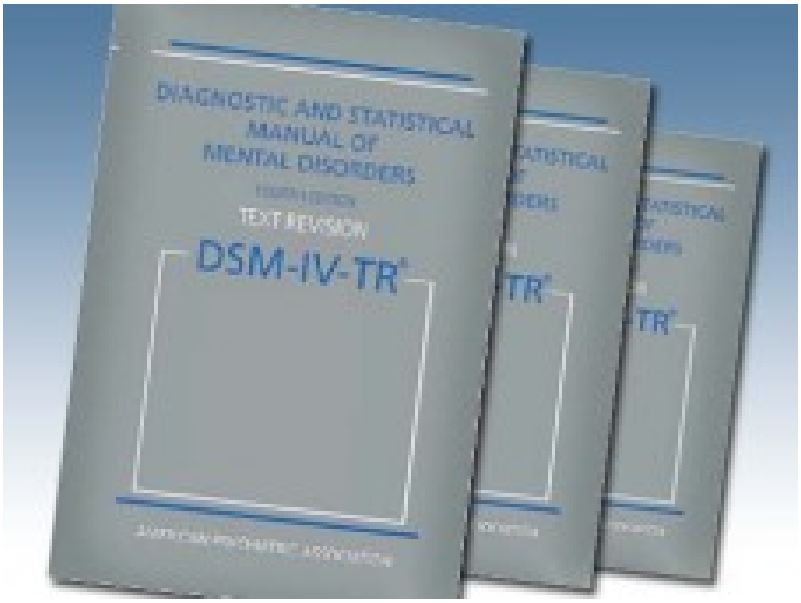
"Phosphorus has been overlooked," Papineau told Miller-McCune.com. "I think it's an essential clue. Phosphate is one of the main connections between the geosphere, the crust and the weathering — and the biosphere, the cyanobacteria and all the changes they cause when they bloom."

http://www.miller-mccune.com/science-environment/phosphorus-and-the-oxygen-connection-16100/

Infallibility and Psychiatry's Bible

The latest "Diagnostic and Statistical Manual of Mental Disorders" is being revised and, by some, reviled.

By Arnie Cooper



The latest Diagnostic and Statistical Manual of Mental Disorders is being revised and, for some, the revision isn't worth the paper it's printed on. Seen here is the fourth edition.

"For every ailment under the sun/There is a remedy, or there is none/If there be one, try to find it/If there be none, never mind it."

Imagine how easy the practice of psychology would be if we lived in the black-and-white world of Mother Goose. Alas, resolving the many pathologies amid the vast spectrum of human behavior remains in many cases elusive, despite myriad treatments and interventions available today.

Still, the path to wellness would be near impossible were it not for the *Diagnostic and Statistical Manual of Mental Disorders*. This encyclopedia of mental illness, published by the American Psychiatric Association, offers the final word on everything from kleptomania to schizophrenia. No wonder it's regularly consulted by clinicians, health insurance companies, the pharmaceutical industry and policymakers throughout the United States and, in varying degrees, the rest of the world.

Commonly referred to as the "psychiatrist's bible," like its namesake, the 886-page *DSM* has inspired more than its share of controversy over the years.

The latest battle became public last summer when the authors of the current *DSM-IV*, Allen Frances and Robert Spitzer, sent a letter to the APA's Board of Trustees warning of serious problems with both the

process and content of the *DSM-V*, currently being revised for publication in 2013. Their missive followed a back-and-forth between Frances and the APA in the pages of the *Psychiatric Times*.

In their July 6, 2009 letter, Frances and Spitzer assailed the *DSM-V* task force for its lack of transparency: "The *DSM-V* leadership has lost contact with the field by restricting the necessary free communication of its workgroups and by sealing itself off from advice and criticism." Unless the internal review process improved, the authors warned that questions would be raised about the "legitimacy" of the APA's role in producing this and future manuals.

Perhaps more disturbing, especially to the general public, was Frances and Spitzer's assertion that thanks to new thresholds for defining mental illness, tens of millions of "false positives" — otherwise known as people — will become newly diagnosed patients "subjected to the needless side effects and expense of treatment."

All of this is complicated by medicines that may not do what they promise to. (A recent article in the *Journal of the American Medical Association*, for example, found that antidepressants were no more effective than sugar pills for individuals suffering mild to moderate depression.)

Frances knows the problem all too well. As the former chair of the *DSM-IV* task force, the 57-year-old Duke University professor of psychiatry contributed unintentionally to some of the most popular over-diagnoses involving children.

"I'd been party to three false epidemics, ADD, autism and childhood bipolar, thinking that I'd been very careful," Frances says. "I had realized that no one else would be in a position to know how damaging it could be as someone who's already contributed to the problems. If *we* could be conservative and careful and do this, a group that wants to be ambitious and that is less careful could do much more damage."

This did not sit well with the APA, which responded with a counterattack. In the *Psychiatric News* response, APA President Alan Schatzberg said that Frances "misrepresented" the information presented through *DSM-V* updates as final products rather than works in progress.

Moreover, Schatzberg hinted that Frances and Spitzer were questioning the *DSM* for their own financial gain. As Schatzberg wrote: "Both [Frances and Spitzer] continue to receive royalties on *DSM-IV*-associated products. The fact that Dr. Frances was informed at the APA Annual Meeting last month that subsequent editions of his *DSM-IV*-associated products would cease when the new edition is finalized, should be considered when evaluating his critique and its timing."

Both doctors reject Schatzberg's charge and continue to speak out against the direction the new *DSM* is headed. Three days after the much anticipated (and delayed) publication of the *DSM-V* draft proposal on Feb. 8, Frances wrote another commentary for *Psychiatric Times*, "Opening Pandora's Box: The 19 Worst Suggestions for DSM-V." Just how much an impact all this internal feuding will have on the final product remains to be seen, but one thing is certain: As technology, politics, society, medicine and the legal system continue evolving, so too will the *DSM*.

History of the *DSM*

The *Diagnostic Statistical Manual* originated in the 1840s when the U.S. Census made its first attempt to determine how many patients were confined to mental hospitals. At first, only a single category — idiocy/insanity — was used, but by 1880 the census listing had expanded to seven disorders including mania, melancholia, monomania, paresis, dementia, dipsomania and epilepsy.

In 1913, Dr. James May pleaded with the precursor to the APA, the American Medico Psychological Association, to create a uniform classification system. And though by 1917, the list had grown to 22, it wasn't until 1933 that the first edition of the *Statistical Manual for Mental Diseases* appeared. After several revisions the manual as it's known today, *DSM-I*, was published in 1952. (Three years earlier the World Health Organization's *International Statistical Classification of Diseases* included a section on mental diseases for the first time.)

That first *DSM*, which adopted much of its categorization system from the U.S. Army, listed 106 disorders.

In 1968, *DSM-II* was approved with 182 disorders and for the first time incorporated sociological and biological knowledge. A major controversy occurred following protests by gay activists from 1970 and 1973 over the inclusion of homosexuality as a disorder. It was dropped from the seventh edition of *DSM-II* in 1974, though ultimately replaced with "sexual orientation disturbance."

Also that year — under the leadership of Spitzer – *DSM-III* was created to make its nomenclature consistent with the ICD. More significantly, the *DSM-III* for the first time incorporated a research-based, empirical approach to diagnosis. When it was published in 1980, the text was now nearly 500 pages with 265 diagnostic categories.

The *DSM-IV* was completed in 1994, with a text revision in 2000. Its 297 categories embrace a "biologic" approach to diagnosis and are designed to improve communication between clinicians and researchers.

http://www.miller-mccune.com/health/infallibility-and-psychiatrys-bible-16255/

School Lunches Even the Lunch Lady Wouldn't Eat

Congress is preparing to take up reauthorization of the Child Nutrition Act, but the recipe for success is far from simple.

By Emily Badger

An anonymous Midwestern elementary school teacher has been filing daily dispatches and cell phone-snapped photos of school lunches like this popcorn chicken and prepackaged meatloaf. Congress is set to take up reauthorization of the Child Nutrition Act. (fedupwithschoollunch.blogspot.com)

An anonymous Midwestern elementary school teacher has been filing daily dispatches from the cafeteria, posting to her blog each day cell phone-snapped photos of popcorn chicken and prepackaged meatloaf. She has been documenting, every day, what the kids in her school are fed for lunch.

As Mrs. Q's several thousand followers have found, however, the grub fed American schoolchildren looks pretty disgusting when you put it up on the Internet. (In fact, the images and accompanying commentary are so unappetizing, Mrs. Q has to explain on her site that she stays anonymous to protect her job.)

The blog — and similar photos other teachers have been prompted to send in — puts a greasy, cellophane-wrapped face on the alarming research about school lunch, a subject of growing interest in Washington as Congress prepares to take up reauthorization of the Child Nutrition Act.

The topic is suddenly in vogue, from Mrs. Q's viral website, to Jamie Oliver's ***Food Revolution*** (an ABC series that revealed, among other things, that first-graders in Huntington, W.Va., couldn't identify a tomato from a potato) to Michelle Obama's anti-obesity campaign.

The White House Task Force on Childhood Obesity, an outgrowth of Obama's Let's Move! initiative, last week presented its findings to the president. The report suggests many of the answers to solving childhood obesity within a generation lie at school, where the First Lady points out many children consume as many as half their daily calories.

The report draws heavily on research from a 2007 U.S. Department of Agriculture study of school nutrition. The federal government establishes nutrition standards that schools must meet to receive federal reimbursement for meals. That USDA report found that nearly 94 percent of meals served in schools failed to meet all of the nutritional standards, even though most were meeting the required meal patterns (eight servings of bread per week, a half-cup of fruit and vegetables a day, etc).

During the 2004-05 school year, 100 percent of schools were serving kids all of their required protein, and most of their calcium. But 49 percent met the appropriate targets for calories and only 30 percent for saturated fat.

Not surprisingly, while many offered healthier alternatives such as low-fat lunches, students seldom picked up that option. And french fries accounted disproportionately for the available vegetables.

The task force report identifies a number of culprits: School kitchens are ill-equipped and underfunded, cafeteria workers need better training, and nutrition education has been ignored. To illustrate how easy it is to nudge a child's nutrition choices, the report cites research from the Sesame Street Workshop.

In that study, 22 percent of preschoolers opted for broccoli over a Hershey's chocolate bar. But 50 percent went for the broccoli when it had an Elmo sticker on it. (Therein lies a double-edged lesson about both the power of corporate marketing, and the potential influence for good grown-ups can wield steering kids to the right choices.)

In one creative solution, the First Lady announced last week a new USDA program to pair chefs with local schools to educate kids and spruce up menus in a version of the Jamie Oliver model.

Two of the biggest obstacles, though, are structural. The current nutritional guidelines that schools must meet were established in 1995. Last October, an Institute of Medicine report proposed rewriting them to focus more on reducing sodium and saturated fat and increasing fruits, vegetables and whole grains.

The other issue — and it's the most thorny — is money. The Healthy, Hunger-Free School Kids Act of 2010, the proposed reauthorization, would require the USDA to rewrite nutrition standards as recommended by the IOM. And it would boost funding by $4.5 billion over the next 10 years. But schools that meet the new requirements would only get a boost of 6 cents per meal.

It's unclear if that will be enough to train the cafeteria workers who will be using newly purchased equipment to prepare more expensive food.

http://www.miller-mccune.com/politics/lunches-even-the-lunch-lady-wouldnt-eat-16184/

Restaurant Menu Labels Can Make a Difference

The new U.S. health reform law requires chain restaurants to post nutrition info. Might knowing the calorie count mean the extinction of deep-fried Oreos?

By Joanne Kenen

A new law requiring chain restaurants to label menus with nutrition info is having an impact on diners. Early data show that being able to see calorie counts is helping them make healthier choices. (Arinn / Flickr.com)

Picture yourself in a restaurant, trying to decide between two chicken entrees. Equally tempting, equally tasty, equally priced. How to decide? And if you knew that Chicken A had three times as many calories as Chicken B, would you decide differently?

Not even professional nutritionists can accurately estimate calorie counts in restaurant food — unless the menu tells them.

Soon, menus will tell them. Under the new health reform law, all chain restaurants with more than 20 outlets will have to post calorie counts on menus. To help diners make sense of those numbers, restaurants (if they aren't doing so already) will have to provide information on recommended daily caloric intake and make easily available more detailed nutritional information about salt, carbs, fat and other components of their food choices. Vending machines will have calorie counts, too. (While the Food and Drug Administration must write regulations by March 2011, the timetable for full implementation is not yet certain).

Public health experts hope that the information, over time, will influence how diners make choices. Their hope isn't blind; it's data-driven.

Early data from New York and King County in Seattle, the first two communities that have put menu labeling laws into effect, show that giving diners more dish on their diet has a modest but detectable impact — more than some earlier voluntary initiatives where customers had to seek out the information on brochures or

computer kiosks. With accurate and readily accessible information right on the menu or the menu board, more restaurant customers do opt for that 400-calorie Chicken A, not the 1,200-calorie Chicken B. And public health experts predict the behavior shift will be more discernable over time.

Dr. Thomas Frieden led the way on menu labeling as New York City's health commissioner before taking up his current post as head of the U.S. Centers for Disease Control. To evaluate the impact of the menu rules, he said, researchers in New York gathered and analyzed a sampling of receipts, seasonally adjusted, from chain restaurants.

"We were able to compare from one year to the next," Frieden explained. "There was a significant reduction in the number of calories per meal purchased."

On the other hand, the CDC chief cautioned, good consumer nutrition empowerment "can be easily overwhelmed by economic incentives." A real bargain — like five bucks for a foot-long monster sandwich — could entice someone to buy higher-calorie food or order a larger portion. Daily specials or temporary menu items won't require labels under the new law.

King County, which includes Seattle, has been surveying its residents since its menu rules went into effect. "People are making better choices," said Dr. James Krieger, chief of chronic disease and injury prevention for the county public health department. Not everyone perusing a menu takes into account the new information, but the preliminary signs of "small changes but in the right direction" suggests a tentative beginning of a consumption shift.

"We're seeing large increases in the number of people who are aware once [calorie counts] are posted on menu boards," Krieger said. "Of those who are aware, 30 percent or so use it to change their choices. So more people, absolutely, are increasing their use of this nutritional information to make choices."

Better choices are both a health and an economic imperative. Americans have been getting heavier for several decades; the United States is now the fattest country on Earth, according to the Organisation for Economic Co-operation and Development. Two-thirds of adults and one third of children are overweight or obese. Obesity-related disease and conditions accounted for about $147 billion of U.S. medical expenses in 2008. The Partnership for Prevention has predicted that those costs will more than double, to around $344 billion within a decade if present trends continue. Obesity-linked conditions contribute to rising Medicare spending, too. Thin 65-year-olds cost Medicare 15 to 40 percent less during the rest of their lives than their plumper peers, according to an Academy Health report.

No one expects menu labels alone to undo decades of changing social norms that have led Americans to serve food — often unhealthy processed food loaded with fat, sugar, salt and chemical additives — everywhere all the time. A generation ago, kids didn't get chips and sodas at all their activities (including sports). Muffins and donuts were not de rigueur at business meetings. No one had ever seen a deep-fried Oreo, never mind learn how to make them at home.

Now nearly half the food money spent in the U.S. goes to restaurants and takeout, and there is ample data that food outlets and chain restaurants are a big factor in the fattening of America, according to public health experts, nutritionists and people who study chronic disease.

"More than 30 studies have shown a link between eating out and obesity," said Margo Wootan, director of nutrition policy at the Center for Science in the Public Interest. We call it "eating on the run," but actually it's eating in the car, at the desk, on the couch, in front of the TV.

"In and of itself, menu labeling is not going to reverse the obesity epidemic," said former FDA Commissioner Dr. David Kessler, whose 2009 book The End of Overeating scrutinized the fast-food industry's impact on our bellies and our brains. "But it's one of the most important steps the government can take."

Restaurant meals are large — and mysterious. Customers don't really know what's in their foods, said nutritionist Mary Story, a professor at the University of Minnesota and director of the Robert Wood Johnson Foundation Healthy Eating Research program. The tarragon chicken salad may sound healthier than ham and cheese on rye, but without nutritional information about mayonnaise and marinades, fat and fiber, customers can't know for sure.

"I personally try not to eat out. It's so easy to gain weight, and we have no idea how many calories are in the food we are eating," she said. "I'm a registered dietician. I've been working in nutrition for 25 years. If anyone should be able to [gauge calorie counts] I should. But I can't. You have no idea what's in the food."

Story says definitive research on the impact of menu labeling — more extensive and authoritative than New York and Seattle's earlier city-based surveys — will take time. The effect won't be immediate. Changing health-related behavior, whether it's seat belts, smoking or deep-frying Oreos, takes years.

But the experts say that the menu labels don't just affect the eating habits of individuals and families. It's changing the restaurant industry itself. The chains initially fought labeling laws, but dropped their opposition to a version negotiated during the health reform debate. They shifted in part because they decided they would rather have one national law to deal with than scores of state and local statutes, said National Restaurant Association spokesman Mike Donohue.

The other reason for the strategic shift?

They realized customers are hungry, so to speak, for better nutritional information. More restaurants have begun to revamp their menus, offering healthier options. Many now voluntarily offer nutrition information, though not always on the menu itself.

For instance, Starbucks (which voluntarily provides nutritional information online and through in-store brochures) may still offer a 500-calorie raspberry scone with 26 grams of fat. But Starbucks also offers 200-300 calorie healthy snacks — some with complete nutritional labeling on the back of the package.

Chefs have gotten with the zeitgeist, too. When the restaurant association surveyed chefs about trends for 2010, it got answers like "bite-sized or mini-desserts," "smaller portions for a smaller price" and "healthy kids meals." People can even get the fast fat low-down on iPhone apps.

Frieden, who like other public health officials is also eyeing Americans' consumption of heart-disease provoking salt, is a strong proponent of giving consumers more information through menu labeling while understanding that it must be part of a much broader healthy eating/healthy exercise strategy and cultural shift.

"There's no magic bullet," he said. But there may be a growing appetite for the 400-calorie chicken.

http://www.miller-mccune.com/health/restaurant-menu-labels-can-make-a-difference-16114/

The Poisonous Proceeds of Penny-Pinching

Researchers report the shame evoked by miserly behavior may have negative long-term health consequences.

By Tom Jacobs

Study suggests stinginess could be harmful to your health, but only if your tightwad tendencies arouse feelings of shame. (Dan Fletcher / istockphoto)

Is stinginess harmful to your health? Newly published research suggests the answer may be yes — if your tightwad tendencies arouse feelings of shame.

Writing in the *Journal of Health Psychology*, a research team led by University of British Columbia psychologist Elizabeth Dunn describes an experiment in which 50 students were given an opportunity to be generous.

Specifically, each received 10 one-dollar coins as compensation for their participation. They were then given the option of donating some or all of this payment to a randomly selected classmate who was not involved in the experiment. Those who chose to do so put a portion of their earnings in an envelope and handed it to the presumably pleased recipient.

Both before and after the experiment, all the participants rated their mood — specifying their levels of such emotions as excitement, anxiety and shame — and provided a saliva sample, so their cortisol could be measured. Cortisol is a hormone that gets activated in times of emotional stress; frequent or prolonged elevation of cortisol levels has been shown to increase one's vulnerability to disease.

"Participants who kept more money for themselves reported … more negative (emotions) and more shame," the researchers report. "Shame predicted higher levels of post-game cortisol, controlling for pre-game cortisol."

This suggests "stingy economic behavior can produce a feeling of shame, which in turn drives secretion of the stress hormone cortisol," Dunn and her colleagues conclude. "Over time, such behavior may have compounding consequences for health."

They added, "To the best of our knowledge, this study is the first to identify the pathways through which a specific economic decision may 'get under the skin' to influence a health-related biological process."

So, in terms of wear and tear on the body, there's a price to be paid for being Scrooge-like. But the researchers add that this effect appears to depend upon "one's proneness to shame" and whether a particular decision to give or withhold money "holds implications for one's moral character."

This leads to an unfortunate irony. Plenty of ungenerous people feel no shame at all in ignoring the less well-off (note the recent resurgence of interest in Ayn Rand), and this research suggests their moral obliviousness may actually ward off this threat to their long-term health.

Unless, of course, they're merely repressing such uncomfortable emotions, which could have its own long-term health consequences. All things considered, it's probably wiser to not be a miser.

http://www.miller-mccune.com/business-economics/the-poisonous-proceeds-of-penny-pinching-16062/

Self-Respect Tops List of American Social Values

A survey of American social values over recent decades finds an increasing emphasis on self-respect, while security and a sense of belonging decline in importance.

By Tom Jacobs

In a survey, self-respect topped the list of American social values, while security and a sense of belonging decline in importance. (Charles L. Barnes / Flickr.com)

The social values of Americans have changed dramatically over the past three decades, with self-respect surging in importance and a sense of security mattering far less. That is the conclusion of a group of scholars writing in the *Journal of Advertising Research*, who paint a portrait of a self-confident and increasingly individualistic society.

In 2007, a research team led by Eda Gurel-Atay, a doctoral candidate at the University of Oregon's Lundquist College of Business, commissioned a survey in which 1,500 Americans were asked to rate the importance of eight social values, and to identify the one they considered most important. The scholars then compared the results with those from similar surveys taken in 1976 and 1986.

The values were self-respect ("to be proud of yourself and confident in who you are"), security ("to be safe and protected from misfortune and attack"), warm relationships with others, a sense of accomplishment, self-fulfillment, being well-respected, a sense of belonging and fun-enjoyment-excitement ("to lead a pleasurable, happy life; to experience stimulation and thrills").

Self-respect led the list in all three surveys, with a greater percentage of Americans ranking it as the most important value with each new survey. By 2007, 28.8 percent ranked it No. 1, compared to 21.1 percent in

1976 and 23.0 in 1986. Psychologist Ellen Langer and writer Joan Didion, both of whom have written eloquently about the importance of self-respect, will no doubt be pleased.

Security, on the other hand, plunged in importance, from 20.6 percent of respondents placing it first in 1976, to 16.5 percent in 1986 and 12.4 percent in 2007. That most recent survey was taken before the onset of the severe economic recession, which raises the question of whether security would move up on the list if the question were asked today.

Gurel-Atay concedes that is possible, but very much doubts it has bounced back to 1970s or 1980s levels. "When we collected data in 2007, there were still problems related to security (terrorism, Hurricane Katrina effects, Iraq War, etc.) and actually some of the presidential campaigns were emphasizing security issues," she noted in an e-mail message. In spite of this post-9/11 atmosphere, the importance of security continued to decline.

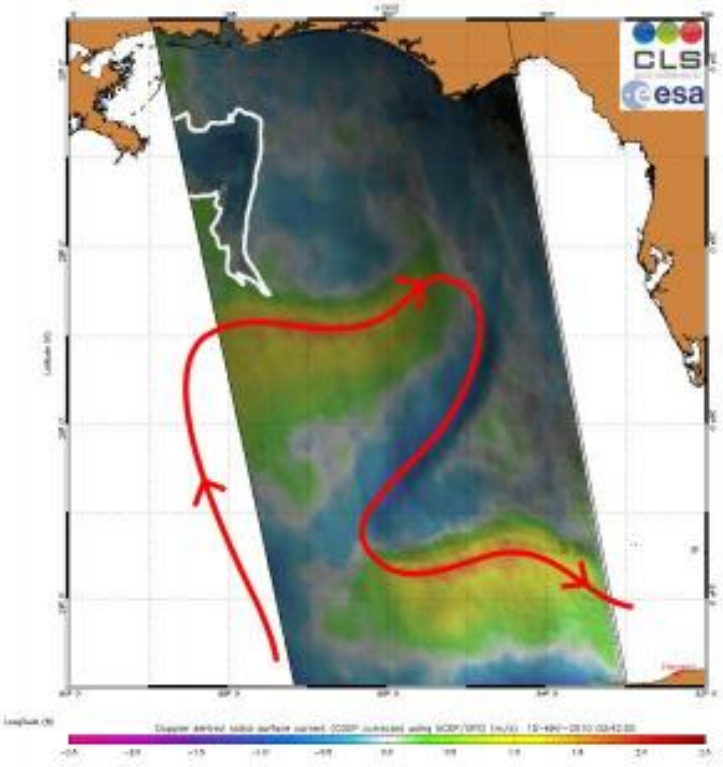
"Warm relationships with others" steadily grew in importance, from 16.2 percent in 1976 to 20.9 percent in 2007. But a "sense of belonging" dropped from 7.9 percent in 1976 to a mere 3.3 percent in 2007. It was overtaken by "fun-enjoyment-excitement," which doubled from 4.5 percent in 1976 to 9.3 percent in 2007.

"A sense of belonging (social connectedness) appears to have steadily eroded for all age groups, both genders, all education groups and most income groups in the United States," Gurel-Atay and her colleagues report. They see this as consistent with their overall findings, noting that "If a person looks to him- or herself as the ultimate arbiter of most things, a need for belonging ought to correspondingly diminish."

So Americans, who have traditionally marched to the sometimes-quirky beat of their own drums, are even more individualistic today than in past decades. This makes the study of how our genetic makeup and early life experiences morph into motivation even more important. If we tend to follow our own inner compass, it would be good to understand how we settle upon a meaningful direction.

http://www.miller-mccune.com/culture-society/self-respect-tops-list-of-american-social-values-16121/

Gulf of Mexico Oil Spill in the Loop Current



In this Envisat Advanced Synthetic Aperture Radar (ASAR) image, acquired on 15 May 2010, advanced processing methods have been performed to display ocean surface roughness variations and Doppler-derived ocean surface radial velocities around the oil spill area in the Gulf of Mexico. The oil spill (outlined in white) is seen stretching toward the Loop Current (red arrow). (Credit: CLS)

ScienceDaily (May 19, 2010) — Scientists monitoring the U.S. oil spill with the European Space Agency's Envisat radar satellite say that it has entered the Loop Current, a powerful conveyor belt that flows clockwise around the Gulf of Mexico towards Florida.

"With these images from space, we have visible proof that at least oil from the surface of the water has reached the current," said Dr Bertrand Chapron of Ifremer, the French Research Institute for Exploitation of the Sea.

Dr Chapron and Dr Fabrice Collard of France's CLS have been combining surface roughness and current flow information with Envisat Advanced Synthetic Aperture Radar (ASAR) data of the area to monitor the proximity of the oil to the current.

In the ASAR image above, acquired on 18 May, a long tendril of the oil spill (outlined in white) extends down into the Loop Current (red arrow).

"We performed advanced processing methods on the images to display surface features like variations in roughness and velocity, which provides insight into the spatial structure of the spill and its transport by surface currents," Dr Collard explained.

From the ASAR images of 12 May and 15 May, the oil spill was observed stretching increasingly closer to the Loop Current, raising concerns that it could reach the current and be carried south towards coral reefs in the Florida Keys.

"Now that oil has entered the Loop Current, it is likely to reach Florida within six days," Dr Chapron said. "Since Envisat ASAR, ERS-2 and other SAR satellites are systematically planned to acquire data over the area, we will monitor the situation continuously."

The scientists warn however that since the Loop Current is a very intense, deep ocean current, its turbulent waters will accelerate the mixing of the oil and water in the coming days.

"This might remove the oil film on the surface and prevent us from tracking it with satellites, but the pollution is likely to affect the coral reef marine ecosystem," Dr Collard said.

Combined efforts using satellite imagery and in-situ measurements of collected water samples will help to assess whether oil is in the deep waters of the ocean.

The Loop Current joins the Gulf Stream -- the northern hemisphere's most important ocean-current system -- sparking fears that oil could enter this system and be carried up to the US East Coast.

Story Source:

Adapted from materials provided by European Space Agency.

http://www.sciencedaily.com/releases/2010/05/100519112721.htm

Labels Urged for Food That Can Choke

By LAURIE TARKAN

On a July afternoon in 2006, Patrick Hale microwaved a bag of popcorn for his two young children and sat down with them to watch television. When he got up to change the channel, he heard a strange noise behind him, and turned to see his 23-month-old daughter, Allison, turning purple and unable to breathe.

As a Marine, he was certified in CPR, but he could not dislodge the popcorn with blows to her back and finger swipes down her throat. He called 911, but it was too late: by the time Allison arrived at the hospital, her heart had stopped beating. An autopsy found that she had inhaled pieces of popcorn into her vocal cords, her bronchial tubes and a lung.

"Neither one of us knew that popcorn was unsafe," said her mother, Christie Hale of Keller, Tex.

Now, the American Academy of Pediatrics, the nation's leading pediatricians' group, wants that to change. Saying that food should be subject to as much scrutiny as toys, it is calling on the Food and Drug Administration to require warning labels on foods that are known choking hazards, and to evaluate and monitor food for safety.

"You have a SuperBall that by government regulation has to carry warnings telling people it's a risk to young children and you can't market it to them, yet you can have the same identical shape and size gumball and there are no restrictions or requirements," said Dr. Gary Smith, director of the Center for Injury Research and Policy at Nationwide Children's Hospital in Columbus, Ohio, the lead author of the pediatricians' policy statement on food hazards.

At the same time, the academy is urging manufacturers to redesign some of the most dangerous foods — especially the hot dog, a leading choking hazard. That call has been widely ridiculed on the Internet; many commenters said parents should modify the hot dog themselves — by cutting it. And Janet Riley, president of the National Hot Dog and Sausage Council, said of a redesign, "It's not going to happen."

But the food designer Eugene D. Gagliardi Jr., who invented Steak-umms and popcorn chicken, has come up with a new hot dog that is soon to be marketed on the East Coast. It looks the same in the package, but has eight deep slits that open when cooked, causing it to break apart into small pieces when eaten.

The pediatricians' group began studying the issue nine years ago, when 17 children around the world, including several in the United States, choked to death on a gelatinous candy that had to be sucked out of a plastic cup the size of a coffee creamer. The F.D.A. eventually banned its sale.

"That product should never have come out on the market," Dr. Smith said. "Children had been dying in Canada, Japan and the U.S. for years, and we hadn't picked up on it" — until reports of a cluster of deaths in Northern California.

There are no recent nationwide figures on food choking. In 2001, about 17,500 children 14 and younger were treated in emergency departments for choking, and 60 percent of the episodes were caused by food. In 2000, 160 children died from an obstruction of the respiratory tract.

Children under 4 are at the highest risk, not only because their airways are small (the back of a toddler's throat narrows to the diameter of a straw) but also because of the way their eating abilities develop. Front teeth usually come in at 6 or 7 months — so babies can bite off a piece of food — but the first molars, which grind food down, do not arrive until about 15 months, and second molars around 26 months.

"Between the ages of 3 and 4, they're developing their ability to chew adequately and prepare for swallowing," said Dr. Nisha Kapadia, a pediatric resident at Johns Hopkins Children's Center.

When young children chew foods like peanuts, raw carrots and popcorn, some is ground down and some is not, and they tend to swallow unchewed bits of food that can block the airway or be inhaled into the bronchial tubes and lungs.

The pediatrics group says that while vigilance is important, parents cannot always prevent choking. "I see the parents when they bring their children into the E.R.," Dr. Smith said. "Virtually every time they say, 'I can't believe this happened to my child — I was standing right there.' "

Some advocates say the government should put hazardous foods off limits to young children.

"The F.D.A. needs to set a uniform standard for cautionary information on food that should not be consumed by children under 5," said Bruce Silverglade, legal director of the Center for Science in the Public Interest, an advocacy group that lobbied unsuccessfully in 2003 for a bill to require the Food and Drug Administration to develop food labeling regulations.

In a statement, the agency said it was reviewing the pediatrics academy's new policy and was considering steps to prevent further deaths, but it declined to elaborate.

Some food manufacturers have voluntarily put warning labels on packages. "Two-thirds of hot dogs already have labels," said Ms. Riley, of the National Hot Dog and Sausage Council. But Mr. Silverglade said that was not enough.

"Even if up to two-thirds are labeled, it's shameful that one-third are not," he said.

Cautionary labeling, when it exists, is not always obvious to consumers. After her daughter died, Ms. Hale went to the supermarket and found that some brands of microwave popcorn had a small warning on the bottom of the box.

“What person reads the bottom of a box?” she asked.

The Hales, who both retired from the Marines after their daughter’s death, sued the popcorn manufacturer for wrongful death and settled out of court. (A confidentiality agreement prevents her from naming the manufacturer.)

In 2003, three years before Allison’s death, Mr. Silverglade’s group sent letters to nearly 100 manufacturers, including popcorn makers, urging them to use standardized clear labeling to caution against choking.

“We received about two responses, and even those companies hadn’t made any promises,” Mr. Silverglade said.

A conversation on the Web site CafeMom.com revealed a wide range of opinions about when a child can safely eat popcorn, with many mothers saying they allowed it for their 15- to 24-month-olds.

“He only eats it when I eat so I can make sure he doesn’t choke,” one mother wrote.

But being present will not necessarily prevent choking. “Although the A.A.P. does not give a specific age cutoff,” Dr. Smith said, “I believe it is prudent to wait until at least 4 to 5 years of age before introducing high-risk foods, including popcorn.”

Toys and other objects are also serious choking hazards, especially coins, balloons and balls. The pediatrics academy is also calling for tighter regulation of products sold on eBay and other online sites and in retail toy bins or vending machines, which are often poorly marked.

The group has also urged its members to do a better job of counseling parents on avoiding high-risk foods.

“Parents often think, ‘My child is mature enough to handle a grape or a hot dog,’ ” said Chrissy Cianflone, director of programs for the advocacy group Safe Kids USA. “Parents need to understand that there are physical and cognitive developmental limitations.”

She and others say keeping small objects and unsafe food out of a child’s mouth is the only way to prevent choking accidents, as Allison Hale’s parents can testify.

“Not a day goes by,” Ms. Hale said, “where my husband doesn’t feel like it’s his fault and he did something wrong.”

http://www.nytimes.com/2010/05/25/health/25choke.html?nl=health&emc=healthupdateema1

The Joys of Jumpology

By ROBERTA SMITH

When the photographer Philippe Halsman said, “Jump,” no one asked how high. People simply pushed off or leapt up to the extent that physical ability and personal decorum allowed. In that airborne instant Mr. Halsman clicked the shutter. He called his method jumpology.

The idea of having people jump for the camera can seem like a gimmick, but it is telling that jumpology shares a few syllables with psychology. As Halsman, who died in 1979, said, “When you ask a person to jump, his attention is mostly directed toward the act of jumping, and the mask falls, so that the real person appears.”

A wonderful exhibition of nearly 50 jumps that Halsman captured on film from the late 1940s through the ’50s — sometimes on commission from Life magazine — can be seen at the Laurence Miller Gallery at 20 West 57th Street in Manhattan, through Friday. The photographs feature stars of stage, screen and television; national leaders; a prima ballerina; writers; and other creative types. Except for a few earthbound choreographers, nearly everyone cooperates.

Some images involved a bit more stage direction than others, as with Halsman’s collaboration with the Surrealist Salvador Dalí from the late 1940s. The most famous of these images, “Dalí Atomicus,” shows the madcap Dalí aloft, brush and palette in hand. He is flanked by a chair and two easels (holding Dalí canvases) — all elevated, and seemingly floating, above the floor, which heightens the sense of suspension. But the main event is the great curve of water arcing across the image, along with three flying (or flung) cats in damp, disconcerted disarray. For once Dalí’s characteristic look of exaggerated surprise makes sense.

The show also includes six failed attempts at this shot, their flaws carefully noted by Halsman. I was startled to see that in these attempts the center easel holds only an empty frame. It prompted me to look more closely

at the published photograph: the image on the center easel is a quite accurate depiction of the flying cats, spiky wet fur and all. It was drawn (or painted) and seamlessly inserted after the fact; the empty frame shadow is still visible on the floor. Dalí didn't miss much when it came to Dalíesque moments.

There is a sublime silliness to Halsman's images that can make you laugh or at least smile regardless of how often you see them. They may offer incontrovertible proof of Schiller's claim that "all art is dedicated to joy." Evidently the simple act of getting off the ground requires giving in to something like joy. You have to let go.

One of the purest examples of this joy is an image of Halsman himself, holding hands with a smiling Marilyn Monroe several feet off the ground. Facing his partner, he seems ecstatic, as if he cannot believe his luck. He will hang with one of the world's most photogenic beauties for eternity. The two are caught in nearly matching, tucked-knees positions. Only a few other subjects, including Murray Kempton and Bridget Bardot, achieved a similar sense of height and compactness. (Ms. Bardot is in a one-piece bathing suit on a rocky bluff, making you wonder how she landed.)

Some images juxtapose motion and stasis to great effect. In one, Martha Graham remains seated as Merce Cunningham flies toward her in a superb vaulting leap, almost as if aiming for her head. In another, Gisele MacKenzie does a perfect "Sound of Music" leap — arms outstretched, mouth open — next to an upright piano. Her exuberance registers not at all with the drowsy dachshund ensconced on top of the instrument.

Audrey Hepburn, shot in a hedged garden, goes aloft with legs apart in an enthusiastic cheerleader manner that seems to fit her tightly wound, perfect-girl persona. But it is surprising to find a similar pose and abandon achieved by a debonair-looking man. He turns out to be Aldous Huxley, though at first he looks like Fred Astaire.

Vice President Richard M. Nixon and Ed Sullivan, both in suits, jump with button-down aplomb and surprising verve. Sullivan's arm is raised as if he were introducing the next act; when J. Robert Oppenheimer makes a similar gesture, it seems more symbolic, as if he were reaching for the heavens. Old habits, it seems, die hard. The retired boxer Jack Dempsey, also in a suit, goes straight up, legs together, hands positioned as if jumping rope. Harold Lloyd seems to dive downward, as if he had finally fallen from his clock.

It is important that the subjects of Halsman's images are famous, so we can contrast the general vibe of the images — body language, energy and facial expression — with previous impressions of the subjects, as when Grace Kelly hikes her skirt in a strikingly coquettish way. Halsman's simple device ensures that we see something we haven't quite seen before. It is perhaps not coincidental that he devised jumpology in the era of Action Painting, as Abstract Expressionism was sometimes called, which sowed the seeds that would soon grow into performance art. He pushed his own form, the studio portrait, to extremes, exaggerating its basic components in ways that make us more aware of them: the trust that must exist between photographer and subject; the split-second "performance" that any still camera captures; the uncontrollable revelations of character; the way we all try to rise, as it were, to the occasion of a photograph.

All these elements are distorted, possibly parodied, but also intensified. As is our understanding of how we look at a photograph, read its parts, decipher its message and draw its energy into ourselves.

"Philippe Halsman: Jump" continues through Friday at the Laurence Miller Gallery, 20 West 57th Street, Manhattan; (212) 397-3930, laurencemillergallery.com.

http://www.nytimes.com/2010/05/24/arts/design/24halsman.html?ref=design

The Ocean Blue as Art Abstract

By CAROL VOGEL

This spring the Gagosian Gallery celebrated the opening of its expanded Los Angeles space with a new series of work by the German artist Andreas Gursky. Filling the walls of the white-walled room were five photographs of the ocean, measuring about 8 feet by 11 feet apiece. Each is an image of endless rich, blue water edged by coastlines and punctuated with islands.

The works are a departure for Mr. Gursky, who used available satellite photographs and then manipulated those to create his own, more dramatic work.

“They were as sublime as the Rothko Chapel,” Michael Govan, director of the Los Angeles County Museum of Art, said, referring to the Houston landmark. “They are also satellite photography, which is a breakthrough for the artist.”

Mr. Govan was so taken with the suite of works that he persuaded two trustees — Steven F. Roth, executive vice president of the World Oil Corporation, a family-owned company in Los Angeles, and another trustee who wants to remain anonymous — to buy four of them for the museum. Mr. Govan declined to say what they paid. The gallery was asking $680,000 each.

Although this series was created before the Gulf of Mexico oil spill this spring, Mr. Govan said he considered the subject of oceans “a total obsession of our age,” adding, “It’s so urgent, yet there is a timelessness to these photographs.”

He also said that he was reminded of a historical precedent. Just as 19th-century museums often had a globe of the world and a map of the stars as the linchpin of their displays, these photographs, he said, are the 21st-century equivalent. “This is our globe,” Mr. Govan said.

The museum does not have a specific space to show the Gursky images at the moment. However, Mr. Govan said he planned to have a space designed for them in the middle of its historical collection.

“They will be the centerpiece of our global museum,” Mr. Govan explained. And though the works show only tiny bits of continents and coastline, he added, to him, anyway, “the museum itself becomes the rest of the picture.”

A PETRIFIED FOREST

MoMA P.S. 1 — which until this month was known as the P.S. 1 Contemporary Art Center — was a madhouse on Tuesday afternoon as artists at that museum in Long Island City, Queens, feverishly installed projects in rooms, hallways and stairwells, as well as in the cafe, boiler room and even a broom closet. They faced an imminent deadline: previews would be held on Friday and Saturday before the formal Sunday opening of “Greater New York 2010,” the center’s every-five-year survey of contemporary art in the New York area.

One of the more unusual sights was a cement mixer outside. It was not there to smooth out the sidewalk or resurface P.S. 1’s courtyard, but to put the finishing touches on “Forest Preserved,” by the 34-year-old artist David Brooks. On Tuesday afternoon Mr. Brooks stood in P.S. 1’s 26-foot-high duplex gallery, where concrete had just been dumped, pumped and sprayed over a forest of trees trucked in from nurseries in Florida. As the mixture was drying — and delicately encrusting the trees — the leaves began wilting, cast in a gray haze of heavy concrete.

“It’s important for people to understand that we haven’t plucked these trees from the forest,” said Mr. Brooks, who added that the trees had been arranged to approximate an Amazonian rain forest.

Klaus Biesenbach, the director of MoMA P.S. 1, said he had asked Mr. Brooks to create the forest because “there’s a lot of green concern among younger artists.” By leaving his forest simultaneously in a fossilized state and destroyed, Mr. Brooks said, he hopes to raise awareness about the horrors and escalation of worldwide deforestation.

Mr. Brooks added that the work “will change every day as it decomposes.”

ARCHAIC BRONZES

Archaic bronzes may be considered a classic collecting category in rarefied auction circles, but as the number of Chinese collectors grows, these artworks are becoming more mainstream.

So a sale of Sze Yuan Tang archaic bronzes at Christie’s in New York on Sept. 16 is expected to attract a good deal of attention. The works belong to Anthony J. Hardy, a British-born collector living in Hong Kong. Mr. Hardy, who was a former chairman of Wallem Group, an international shipping concern, is now chairman of the Hong Kong Maritime Museum. The collection is expected to sell for $15 million to $20 million.

Included in the auction will be ancient vessels, ladles and cups. “Most of them were used for ritual offerings of food and wine,” said Theow Tow, Christie’s deputy chairman of Americas and honorary chairman of Asia. They were also created to evoke ancestral spirits.

They date from the 13th to the 11th centuries B.C., the golden age of the Shang dynasty, when some of the finest bronzes were created in Anyang, in northern Henan province.

One of the highlights of the group is a li, or ritual tripod vessel, used for cooking grains or meat. The tripod, cast with three masks featuring horns and angled eyes, dates from the late Shang dynasty, 12th century B.C. It had been owned by the British Rail Pension Fund, which put $100 million, or 2.5 percent of its portfolio, into art in the mid-1970s. After amassing a broad collection, ranging from Chinese porcelains to African tribal art and old master paintings, it sold the works off from 1987 to 1999.

Tastes vary when it comes to what collectors want in bronzes, Mr. Tow said. For some it’s all about shape and patina. Others, however, are fascinated with inscriptions. The bronzes, he said, were “meant to give the impression of power.”

GUGGENHEIM CURATOR

Jeffrey Weiss has been appointed to a new position at the Solomon R. Guggenheim Museum: curator of the Panza Collection. The creation of the job dovetails with a conservation initiative that, with help from a $1.23 million Andrew W. Mellon Foundation grant, involves an in-depth study of the Minimalist, Post Minimalist and conceptual artworks from the 1960s and ’70s that form the core of the museum’s Panza Collection. In the early 1990s, 357 works were donated or sold to the museum by Count Giuseppe Panza di Biumo, the Italian industrialist, who died in April.

Mr. Weiss, who will start at the Guggenheim in August, is well known in the museum world. He ran the Dia Art Foundation for nine months in 2007-8 and before that was in charge of the modern and contemporary art department of the National Gallery of Art in Washington from 2000 to 2007.

http://www.nytimes.com/2010/05/21/arts/design/21vogel.html?ref=design

An Early Triumph in Information Design

By ALICE RAWSTHORN

LONDON — If you were unlucky enough to belong to the "lowest class, vicious and semi-criminal," your street appeared on the map in black. Dark blue meant that you were "very poor," and pale blue "poor." Purple suggested that you lived on a more respectable "mixed" street, while pink was "comfortable" and red "well-to-do." Best of all was for your street to be colored yellow for "wealthy."

This simple color-coding system translated a labyrinth of sociological and economic research into something that everyone could understand. It was devised for Booth's Poverty Map, a series of maps made from 1886 to 1903 by a British philanthropist, Charles Booth, which showed the relative wealth — or otherwise — of the occupants of every street in London.

Mr. Booth had set out to discover how many people were living in poverty, to determine why and what could be done to help them. As well as proving that there was much more poverty in London than the official statistics suggested, his research revealed the nuances of an increasingly complex city with different degrees of hardship, where the rich often lived alongside the poor. Still seen as landmarks of sociological research, his maps are to be exhibited in the new Galleries of Modern London opening Friday at the Museum of London.

"Booth's Maps are important documents of mass poverty, but by drilling down and giving huge amounts of detail, they do more than analyze it statistically," said Beverly Cook, curator of social and working history at the Museum of London. "Many writers and artists of the time saw London as a divided city, split between rich and poor, but these maps show its complexities. In many respects, they give a more realistic portrayal of working class life in London than Charles Dickens's novels."

By making something so complicated seem straightforward, Booth's Poverty Map was also a triumph of information design. It fulfilled one of design's most useful functions — helping us to make sense of the world — by distilling an avalanche of information into a clear, coherent form.

During the late 1800s, when Britain was struggling to understand the impact of the frenzied growth of industrialized cities like London, where thousands of people were plunging into poverty, often unnoticed, Mr. Booth's imaginative use of information design provided a solution to a pressing problem. By illustrating their suffering so clearly, his maps made it impossible to ignore.

The Museum of London is celebrating his work at a time when information design is equally important. Our lives are changing so rapidly, and the future seems so uncertain, that we need it to help us to grapple with the contemporary versions of the same social issues that concerned Mr. Booth and a maelstrom of environmental, political, economic and technological problems, too. Just as daunting is the struggle to make sense of the torrent of information that surges out of computers at accelerating speed. (Do the math — we've produced more data than we can store for each of the past three years, and the volume of new digital information is expected to increase tenfold — or more — every five years.)

As the data crisis worsens, finding new ways to make sense of this tsunami of information and to illustrate it clearly becomes ever more urgent. One solution is data visualization, a new visual language now being developed by information designers. Using sophisticated programming languages, like Processing, they are distilling colossal quantities of baffling data into seductive digital animations — or visualizations — many of which then change in real time to reflect what is actually happening.

Data visualization is an important theme of the "National Design Triennial — Why Design Now?" at the Cooper-Hewitt Museum in New York. It will also be explored in "Talk to Me," an exhibition on innovations in communication design, which is to open next summer at the Museum of Modern Art, New York.

But before the digital age, information design coups were the heroic products of old-fashioned physical slog and intellectual ingenuity, not technology. Take the diagrammatic Underground map that has helped Londoners to make sense of their serpentine subway system since the 1930s. It was the result of years of painstaking sketches and revisions by its designer, Harry Beck. Or the young artist Phyllis Pearsall, who walked for more than 3,000 miles, or 4,800 kilometers, around 1930s London to produce accurate and legible street maps for her A-Z atlas, and then spent up to 18 hours a day drawing them.

The story of Mr. Booth's maps is part-slog, part-ingenuity, too. The heir to a Liverpool shipping fortune, he was a successful industrialist with a passion for social reform. By the mid-1880s, the alarming rise in urban poverty was a national scandal, and Mr. Booth decided to fund a research project to investigate its effect on London.

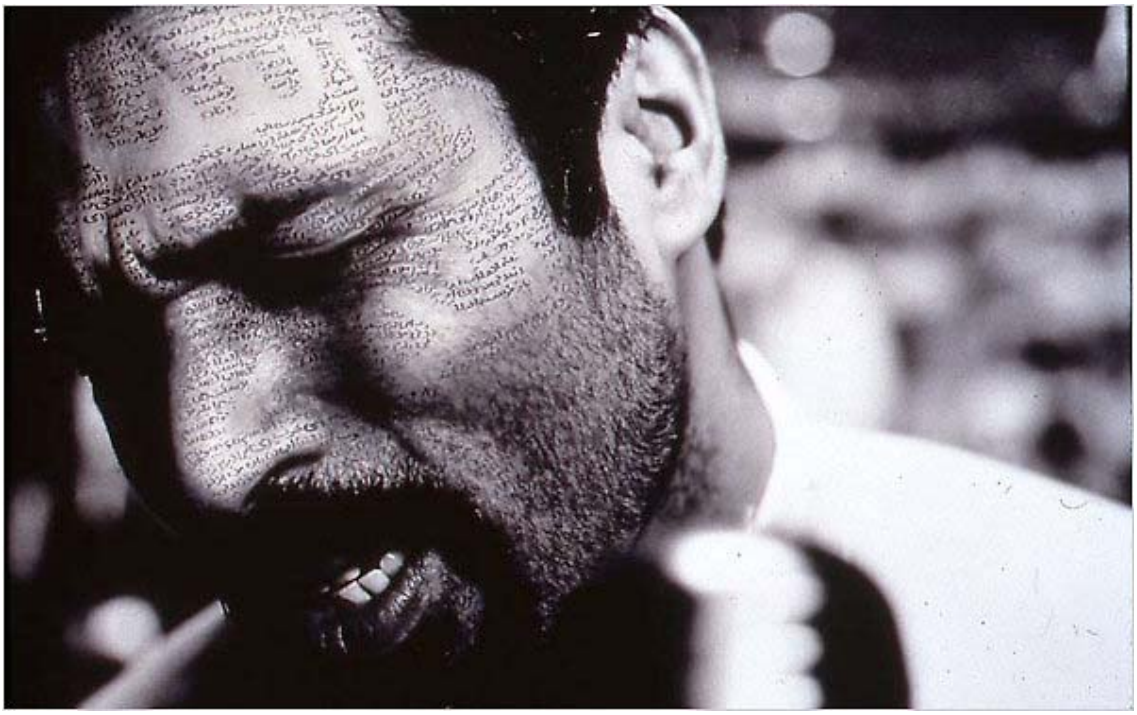
Starting in the poorest part of East London, he and a team of volunteers — including the economist Clara Collett and his wife's cousin, the sociologist Beatrice Webb — scoured the streets, noting the condition of the buildings and talking to the residents. Mr. Booth took lodgings in the area, as did Ms. Collett, who lived there for three months in the hope of befriending the local factory girls. Many of them, she discovered, had been driven to prostitution to make ends meet.

Having made copious notes of their own findings and analyzed heaps of published data, Mr. Booth's team summarized the results by color-coding the streets in the first Poverty Map, which was published in 1889. A second map, covering the whole city, appeared in 1891. The research project continued, and updated editions of the maps came out in the mid-1890s and early 1900s. Each new edition showed through its changing colors how some places had become richer, and others poorer, although Mr. Booth's street, Grenville Place in posh Kensington, remained a plush yellow. His home there was described by Ms. Webb as: "dark, dull and stuffy and somewhat smelly, but the inmates exceedingly charming and lovable."

http://www.nytimes.com/2010/05/24/arts/24iht-design24.html?ref=design

Putting New Faces on Islamic History

By CAROL KINO



ONE balmy evening this month, a glamorous crowd was packed into the tiny Leila Taghinia-Milani Heller Gallery on the Upper East Side for the opening of "Icons," a show of video installations by the Iranian-born filmmaker Shoja Azari that runs through Friday.

It was his first solo show in New York, though Mr. Azari, 52, is no stranger to the high-end art world. The professional and romantic partner of the art star Shirin Neshat, he has been her primary collaborator on films and videos, including the feature "Women Without Men," which opened in Manhattan on May 14. And Mr. Azari's own multimedia installations have been increasingly showcased in galleries and museums around the world.

So that night, in a space whose rooms had been darkened to suggest a shrine, the scene felt comfortably familiar as Mr. Azari and Ms. Neshat chatted with a mix of American and Iranian luminaries including Glenn Lowry, the director of the Museum of Modern Art; Lisa Dennison, a chairwoman of Sotheby's North and South America; and Ehsan Yarshater, the director of the Center for Iranian Studies at Columbia University and editor of the Encyclopedia Iranica.

But there was also an undercurrent of nervousness in the gallery, which specializes in Iranian art. For weeks, its owner, Ms. Heller, had received worried letters from friends, many of whom suggested that she think twice before showing Mr. Azari's new work. Five glowing five-foot-high video portraits that he made this year, they are based on the brightly colored posters of Shiite imams, martyrs and saints, all of them male, that hang in shops, restaurants and homes throughout Iran. In each, the traditional subject's face has been replaced with a video portrait of a contemporary Iranian woman who blends seamlessly into the painted background (but can also be seen to move and breathe) — a transformation that some pious Shiites might view as sacrilegious.

Although Ms. Heller doesn't see it that way (the videos "trigger a spiritual feeling in you," she said), some of her staff members were concerned. As a result, "I became nervous that some crazy person would misinterpret it," Ms. Heller said, "and use it in a way that the work did not merit."

And though Mr. Azari now dismisses such fears, he initially expressed concern, too. "I hope I don't lose my head over these pieces," he said some weeks ago while still working on the series. "They could raise a lot of anger."

To some Shiites, the portraits may seem "quite provocative," said Hamid Dabashi, the Hagop Kevorkian professor of Iranian studies and comparative literature at Columbia, who wrote an essay in the show's catalog. "Shoja is taking these religious icons and turning them upside-down."

But, as Mr. Dabashi also noted, many artists are making equally iconoclastic renditions of such posters inside Iran, where Shiite imagery has often been adapted to political ends, a subject he and a co-author explored in "Staging a Revolution," a 2001 book about Iranian revolutionary posters.

To a less educated eye, Mr. Azari's portraits resonate as kitsch — as if a cheesy poster of the Virgin Mary had suddenly come to life — but with a political subtext. "Icon #3," based on a poster of Imam Reza, whose shrine at Mashhad is one of Iran's most visited pilgrimage sites, presents a woman garbed in green (the symbol of Iran's opposition movement), her eyes welling with tears. "Icon #5" recreates a portrait of Imam Hussein, a grandson of the Prophet Muhammad who died — together with the infant son he is shown carrying — at the Battle of Karbala, one of the most significant events in Shiite history; we now see a mother cradling her dead child's body.

While making the work, Mr. Azari, said, he had in mind women like Neda Agha Soltan, the protester killed last June in Tehran during the demonstrations that followed Iran's disputed election, and the many Iranian mothers now mourning others like her. For Mr. Azari, art and politics have long gone hand in hand. Raised in Shiraz, he began making short films as a teenager, and after the 1979 Islamic Revolution he became involved in underground theater, literature and politics. In 1983, as the new government turned increasingly fundamentalist, Mr. Azari, who by then had a wife and son, made his way to New York.

Some years on, divorced and raising his son, Johnny B. Azari (now a rising rock musician), alone in Manhattan, Mr. Azari was working odd jobs and "trying to get it together as an immigrant," he said. He eventually sank his savings into making a feature film, which he never completed. But in 1997, a friend introduced him to Ms. Neshat, then a sought-after young photographer who was trying to assemble a crew for her first video, "Turbulent."

Mr. Azari became deeply involved with the piece, a two-screen installation in which a male and female singer face off. Not only did he play the male lead, he also helped Ms. Neshat gather a creative team whose members, including the production designer Shahram Karimi, have often worked together since. Mr. Azari is now co-writer and co-director on all her film and video projects.

"It was turbulent, literally," he said of that first project. "Shirin was married, and I had a girlfriend. And then everything fell apart. We started to be together."

The piece won the Golden Lion at the 1999 Venice Biennale and set them both on new careers. She became a film and video artist celebrated for exploring Islamic gender roles; he began making experimental and arthouse films, including "K" (2002), an adaptation of three stories by Kafka, and "Windows" (2005), a series of short films that offer a voyeuristic glimpse into ordinary American lives.

"Windows" had its premiere at the Tribeca Film Festival in 2006, the same year an excerpt was seen in a major museum show in Spain; suddenly, Mr. Azari found himself with an art career. Soon he was showing in European galleries; one of them, Figge von Rosen in Cologne, Germany, opened a show of "Icons" on May 14.

Some of his work so far has consisted of what he calls video paintings. One such series combines painted canvases and video projections to curiously three-dimensional effect; made with Mr. Kahrimi, it is based on video clips of oil fields burning in Kuwait during the Persian Gulf war.

Most recently, his works have gone entirely digital. His "Coffee House Painting" (2009), also included in the exhibition, is a 5 1/2-minute video that opens with an image of "The Day of the Last Judgment" by Mohammad Modabber, a late-19th-century Qajar "coffee house" painting, another Shiite folk art genre that presents the lives of martyrs in detail.

Such works once served as backdrops for Pardeh-Khani, performances in which narrators told stories depicted in the canvases. Mr. Azari created a contemporary version by digitally manipulating the picture to include images from contemporary news footage and video clips. The painting first erupts in flames, then the modern-day tribulations come to life: the aftermath of a suicide bombing in a Pakistani market; Hassan Nasrallah, the leader of Hezbollah, giving a speech; an American soldier talking about the music he listens to "when we're killing the enemy" in Iraq.

Yet until the disputed election, Mr. Azari's work never focused on Iran. One day, while examining a Shiite poster on the Internet, he decided the face wasn't what it seemed. "I covered the beard, and I looked at the eyes and the eyebrows, and I realized they are actually females in disguise."

Renaissance painters, he noted, made spirituality accessible by depicting the saints as real people. "I think my impulse is really that," Mr. Azari said. "To take this image of male-dominated religion and to bring it down to earth."

http://www.nytimes.com/2010/05/23/arts/design/23azari.html?ref=design

Climate Fears Turn to Doubts Among Britons

By ELISABETH ROSENTHAL

LONDON — Last month hundreds of environmental activists crammed into an auditorium here to ponder an anguished question: If the scientific consensus on climate change has not changed, why have so many people turned away from the idea that human activity is warming the planet?

Nowhere has this shift in public opinion been more striking than in Britain, where climate change was until this year such a popular priority that in 2008 Parliament enshrined targets for emissions cuts as national law. But since then, the country has evolved into a home base for a thriving group of climate skeptics who have dominated news reports in recent months, apparently convincing many that the threat of warming is vastly exaggerated.

A survey in February by the BBC found that only 26 percent of Britons believed that "climate change is happening and is now established as largely manmade," down from 41 percent in November 2009. A poll conducted for the German magazine Der Spiegel found that 42 percent of Germans feared global warming, down from 62 percent four years earlier.

And London's Science Museum recently announced that a permanent exhibit scheduled to open later this year would be called the Climate Science Gallery — not the Climate Change Gallery as had previously been planned.

"Before, I thought, 'Oh my God, this climate change problem is just dreadful,' " said Jillian Leddra, 50, a musician who was shopping in London on a recent lunch hour. "But now I have my doubts, and I'm wondering if it's been overhyped."

Perhaps sensing that climate is now a political nonstarter, David Cameron, Britain's new Conservative prime minister, was "strangely muted" on the issue in a recent pre-election debate, as The Daily Telegraph put it, though it had previously been one of his passions.

And a poll in January of the personal priorities of 141 Conservative Party candidates deemed capable of victory in the recent election found that "reducing Britain's carbon footprint" was the least important of the 19 issues presented to them.

Politicians and activists say such attitudes will make it harder to pass legislation like a fuel tax increase and to persuade people to make sacrifices to reduce greenhouse gas emissions.

"Legitimacy has shifted to the side of the climate skeptics, and that is a big, big problem," Ben Stewart, a spokesman for Greenpeace, said at the meeting of environmentalists here. "This is happening in the context of overwhelming scientific agreement that climate change is real and a threat. But the poll figures are going through the floor."

The lack of fervor about climate change is also true of the United States, where action on climate and emissions reduction is still very much a work in progress, and concern about global warming was never as strong as in Europe. A March Gallup poll found that 48 percent of Americans believed that the seriousness of global warming was "generally exaggerated," up from 41 percent a year ago.

Here in Britain, the change has been driven by the news media's intensive coverage of a series of climate science controversies unearthed and highlighted by skeptics since November. These include the unauthorized release of e-mail messages from prominent British climate scientists at the University of East Anglia that skeptics cited as evidence that researchers were overstating the evidence for global warming and the discovery of errors in a United Nations climate report.

Two independent reviews later found no evidence that the East Anglia researchers had actively distorted climate data, but heavy press coverage had already left an impression that the scientists had schemed to repress data. Then there was the unusually cold winter in Northern Europe and the United States, which may have reinforced a perception that the Earth was not warming. (Data from the National Oceanic and Atmospheric Administration, a United States agency, show that globally, this winter was the fifth warmest in history.)

Asked about his views on global warming on a recent evening, Brian George, a 30-year-old builder from southeast London, mused, "It was extremely cold in January, wasn't it?"

In a telephone interview, Nicholas Stern, a former chief economist at the World Bank and a climate change expert, said that the shift in opinion "hadn't helped" efforts to come up with strong policy in a number of countries. But he predicted that it would be overcome, not least because the science was so clear on the warming trend.

"I don't think it will be problematic in the long run," he said, adding that in Britain, at least, politicians "are ahead of the public anyway." Indeed, once Mr. Cameron became prime minister, he vowed to run "the greenest government in our history" and proposed projects like a more efficient national electricity grid.

Scientists have meanwhile awakened to the public's misgivings and are increasingly fighting back. An editorial in the prestigious journal Nature said climate deniers were using "every means at their disposal to undermine science and scientists" and urged scientists to counterattack. Scientists in France, the Netherlands and the United States have signed open letters affirming their trust in climate change evidence, including one published on May 7 in the journal Science.

In March, Simon L. Lewis, an expert on rain forests at the University of Leeds in Britain, filed a 30-page complaint with the nation's Press Complaints Commission against The Times of London, accusing it of publishing "inaccurate, misleading or distorted information" about climate change, his own research and remarks he had made to a reporter.

"I was most annoyed that there seemed to be a pattern of pushing the idea that there were a number of serious mistakes in the I.P.C.C. report, when most were fairly innocuous, or not mistakes at all," said Dr. Lewis, referring to the report by the United Nations Intergovernmental Panel on Climate Change.

Meanwhile, groups like the wildlife organization WWF have posted articles like "How to Talk to a Climate Skeptic," providing stock answers to doubting friends and relatives, on their Web sites.

It is unclear whether such actions are enough to win back a segment of the public that has eagerly consumed a series of revelations that were published prominently in right-leaning newspapers like The Times of London and The Telegraph and then repeated around the world.

In January, for example, The Times chastised the United Nations climate panel for an errant and unsupported projection that glaciers in the Himalayas could disappear by 2035. The United Nations ultimately apologized for including the estimate, which was mentioned in passing within a 3,000-page report in 2007. Then came

articles contending that the 2007 report was inaccurate on a host of other issues, including African drought, the portion of the Netherlands below sea level, and the economic impact of severe storms. Officials from the climate panel said the articles' claims either were false or reflected minor errors like faulty citations that in no way diluted the evidence that climate change is real and caused by human activity.

Stefan Rahmstorf, a professor at the Potsdam Institute for Climate Impact Research, successfully demanded in February that some German newspapers remove misleading articles from their Web sites. But such reports have become so common that he "wouldn't bother" to pursue most cases now, he added.

The public is left to struggle with the salvos between the two sides. "I'm still concerned about climate change, but it's become very confusing," said Sandra Lawson, 32, as she ran errands near Hyde Park.

http://www.nytimes.com/2010/05/25/science/earth/25climate.html?ref=science

Tracking the Ancestry of Corn Back 9,000 Years

By SEAN B. CARROLL

It is now growing season across the Corn Belt of the United States. Seeds that have just been sown will, with the right mixture of sunshine and rain, be knee-high plants by the Fourth of July and tall stalks with ears ripe for picking by late August.

Corn is much more than great summer picnic food, however. Civilization owes much to this plant, and to the early people who first cultivated it.

For most of human history, our ancestors relied entirely on hunting animals and gathering seeds, fruits, nuts, tubers and other plant parts from the wild for food. It was only about 10,000 years ago that humans in many parts of the world began raising livestock and growing food through deliberate planting. These advances provided more reliable sources of food and allowed for larger, more permanent settlements. Native Americans alone domesticated nine of the most important food crops in the world, including corn, more properly called maize (Zea mays), which now provides about 21 percent of human nutrition across the globe.

But despite its abundance and importance, the biological origin of maize has been a long-running mystery. The bright yellow, mouth-watering treat we know so well does not grow in the wild anywhere on the planet, so its ancestry was not at all obvious. Recently, however, the combined detective work of botanists, geneticists and archeologists has been able to identify the wild ancestor of maize, to pinpoint where the plant originated, and to determine when early people were cultivating it and using it in their diets.

The greatest surprise, and the source of much past controversy in corn archeology, was the identification of the ancestor of maize. Many botanists did not see any connection between maize and other living plants. Some concluded that the crop plant arose through the domestication by early agriculturalists of a wild maize that was now extinct, or at least undiscovered.

However, a few scientists working during the first part of the 20th century uncovered evidence that they believed linked maize to what, at first glance, would seem to be a very unlikely parent, a Mexican grass called teosinte. Looking at the skinny ears of teosinte, with just a dozen kernels wrapped inside a stone-hard casing, it is hard to see how they could be the forerunners of corn cobs with their many rows of juicy, naked kernels. Indeed, teosinte was at first classified as a closer relative of rice than of maize.

But George W. Beadle, while a graduate student at Cornell University in the early 1930s, found that maize and teosinte had very similar chromosomes. Moreover, he made fertile hybrids between maize and teosinte that looked like intermediates between the two plants. He even reported that he could get teosinte kernels to pop. Dr. Beadle concluded that the two plants were members of the same species, with maize being the domesticated form of teosinte. Dr. Beadle went on to make other, more fundamental discoveries in genetics for which he shared the Nobel Prize in 1958. He later became chancellor and president of the University of Chicago.

Despite Dr. Beadle's illustrious reputation, his theory still remained in doubt three decades after he proposed it. The differences between the two plants appeared to many scientists to be too great to have evolved in just a few thousand years of domestication. So, after he formally retired, Dr. Beadle returned to the issue and sought ways to gather more evidence. As a great geneticist, he knew that one way to examine the parentage of two individuals was to cross them and then to cross their offspring and see how often the parental forms appeared. He crossed maize and teosinte, then crossed the hybrids, and grew 50,000 plants. He obtained plants that resembled teosinte and maize at a frequency that indicated that just four or five genes controlled the major differences between the two plants.

Dr. Beadle's results showed that maize and teosinte were without any doubt remarkably and closely related. But to pinpoint the geographic origins of maize, more definitive forensic techniques were needed. This was DNA typing, exactly the same technology used by the courts to determine paternity.

In order to trace maize's paternity, botanists led by my colleague John Doebley of the University of Wisconsin rounded up more than 60 samples of teosinte from across its entire geographic range in the Western Hemisphere and compared their DNA profile with all varieties of maize. They discovered that all maize was genetically most similar to a teosinte type from the tropical Central Balsas River Valley of southern Mexico, suggesting that this region was the "cradle" of maize evolution. Furthermore, by calculating the genetic distance between modern maize and Balsas teosinte, they estimated that domestication occurred about 9,000 years ago.

These genetic discoveries inspired recent archeological excavations of the Balsas region that sought evidence of maize use and to better understand the lifestyles of the people who were planting and harvesting it. Researchers led by Anthony Ranere of Temple University and Dolores Piperno of the Smithsonian National Museum of Natural History excavated caves and rock shelters in the region, searching for tools used by their inhabitants, maize starch grains and other microscopic evidence of maize.

In the Xihuatoxtla shelter, they discovered an array of stone milling tools with maize residue on them. The oldest tools were found in a layer of deposits that were 8,700 years old. This is the earliest physical evidence of maize use obtained to date, and it coincides very nicely with the time frame of maize domestication estimated from DNA analysis.

The most impressive aspect of the maize story is what it tells us about the capabilities of agriculturalists 9,000 years ago. These people were living in small groups and shifting their settlements seasonally. Yet they were able to transform a grass with many inconvenient, unwanted features into a high-yielding, easily harvested

food crop. The domestication process must have occurred in many stages over a considerable length of time as many different, independent characteristics of the plant were modified.

The most crucial step was freeing the teosinte kernels from their stony cases. Another step was developing plants where the kernels remained intact on the cobs, unlike the teosinte ears, which shatter into individual kernels. Early cultivators had to notice among their stands of plants variants in which the nutritious kernels were at least partially exposed, or whose ears held together better, or that had more rows of kernels, and they had to selectively breed them. It is estimated that the initial domestication process that produced the basic maize form required at least several hundred to perhaps a few thousand years.

Every August, I thank these pioneer geneticists for their skill and patience.

http://www.nytimes.com/2010/05/25/science/25creature.html?ref=science

From Trees and Grass, Bacteria That Cause Snow and Rain

By JIM ROBBINS

BOZEMAN, Mont. — Walking across the campus of Montana State University here, David Sands, a plant pathologist, says the blanket of snow draped over the mountains around town contains a surprise.

The cause of most of it, he said, is a living organism, a bacterium, called pseudomonas syringae.

In the last few years, Dr. Sands and other researchers have accumulated evidence that the well-known group of bacteria, long known to live on agricultural crops, are far more widespread and may be part of a little-studied weather ecosystem. The principle is well accepted, but how widespread the phenomenon is remains a matter of debate.

The accepted precipitation model is that soot, dust and other inert things form the nuclei for raindrops and snowflakes. Scientists have found these bacteria in abundance on the leaves of a wide range of wild and domestic plants, including trees and grasses, everywhere they have looked, including Montana, Morocco, France, the Yukon and in the long buried ice of Antarctica. The bacteria have been found in clouds and in streams and irrigation ditches. In one study of several mountaintops here, 70 percent of the snow crystals examined had formed around a bacterial nucleus.

Some of the bacteria promote freezing as a means of attacking plants. They make proteins that will trigger freezing at higher temperatures than usual and the resulting water ice damages the plant, giving the bacteria access to the nutrients they need.

This ability to promote freezing of water at higher-than-normal freezing temperatures has led Dr. Sands and other scientists to believe the bacteria are part of an unstudied system. After the bacteria infect plants and multiply, he says, they may be swept as aerosols into the sky, where it seems they prompt the formation of ice

crystals (which melt as they fall to earth, causing rain) at higher temperatures than do dust or mineral particles that also function as the nuclei of ice crystals.

"The rain is a mechanism that helps these things move," said Cindy Morris, a plant pathologist with the French National Institute for Agricultural Research, who is studying the bacteria.

The ability of the protein in the bacteria to make snow is well known. Ski areas use a cannon to shoot it into the air with water for snow making, and it is used in cloud seeding efforts to create rain. A single bacterium, far too small to be seen with the naked eye, might make enough protein molecules for a thousand snow crystals.

The researchers believe that there are other bacteria and fungi out there that do the same thing.

Roy Rasmussen, a cloud physicist at the National Center for Atmospheric Research, says the research, mostly by plant pathologists, has renewed the study of bacteria as a cause of rainfall by atmospheric physicists. Some big questions remain, though.

"It's a sound theory," Dr. Rasmussen said. "The question is, do these guys get into the atmosphere in large enough concentrations to have an effect? My gut feeling is this may be important for specific places and specific times, but it's not global. It's not something we missed."

Russ Schnell, an atmospheric scientist with the National Oceanic and Atmospheric Administration, first proposed the importance of bacteria in forming ice crystals in clouds, along with a colleague, Gabor Vali, in a paper in Nature in 1970. "But we didn't have the techniques to do more," Dr. Schnell said. "The tools now are unbelievably better than when we were doing this stuff. It's a neat thing to see."

Interest in the bacteria has grown because of recent publications, and two international meetings on the subject. Ms. Morris estimated that some 30 scientists around the world are researching the role of bacteria in precipitation.

If Dr. Sands is correct about the importance of bacteria, there would be implications for destruction of vegetation through overgrazing or logging, which might decrease the presence of bacteria and contribute to droughts. On the other hand, because the bacteria flourish on some plants and are sparse on others, planting the right vegetation could enhance rain. "Wheat or barley might differ a thousandfold" in the number of bacteria, Dr. Sands said, "depending on the variety."

The research continues. In England, scientists are flying into clouds to take samples of cloud water, and analyzing the DNA of microbes in it. Researchers at Virginia Tech have sequenced the DNA of 126 strains of the bacteria to create a database that could allow scientists to trace the bacteria to their geographic origin.

"It's a complicated system," said Brent C. Christner, an assistant professor at Louisiana State University, who studies microbial ecology in glacial ice and has found the bacteria in Antarctica. "You can't bring them into the lab to enumerate them and study them."

The research could have implications for climate change. Dr. Sands said the bacteria do not grow in temperatures over 82 degrees. If temperatures stayed too warm for too long, he said, they could die. "There's more work to do," Dr. Sands said. "It's a great big complicated picture."

http://www.nytimes.com/2010/05/25/science/25snow.html?ref=science

Higher Education and the Pursuit of Living High Off the Hog

By NICHOLAS WADE

"Tech Transfer" is the deceptively mild title of a mordant satire about scientists and universities and how they do business.

The best scene in this hilarious first novel is a meeting of the trustees of Kershaw University, an elite research university only 200 years younger than Harvard. The trustees have to select a new president. They listen with mounting dismay as the professional headhunter in charge of the search reads out the polished résumés of each candidate, but notes in each case the fatal flaws revealed by background checks, ranging from spousal abuse to bestiality and, even more fatal, plagiarism.

As the trustees hasten to leave for the airport, they agree on a nonentity, Mark Winner, an economics professor with a thin résumé and a clean rap sheet.

The author, Daniel S. Greenberg, is a leading science journalist with a deep knowledge of the academic world and science policy. He edited the news section of Science magazine for many years and then a newsletter, Science and Government Report. Seeking to add an extra dimension to the waste, fraud and abuse he was reporting, Mr. Greenberg from time to time would run "interviews" with an increasingly celebrated scientific entrepreneur, "Dr. Grant Swinger" of the Center for the Absorption of Federal Funds.

Dr. Swinger's specialty lay in instantly redirecting his center's activities to whatever scientific fad was highest on legislators' priority list. He would have been first to set up a stem-cell research institute and get the California Institute for Regenerative Medicine to promise him a building.

"Tech Transfer" is the world of Dr. Swinger writ large, populated by scientific entrepreneurs who have learned how to absorb federal funds, suppress charges of malfeasance and live high off the hog. When Dr. Winner assumes the presidency of Kershaw University, he learns the folly of challenging the tenured faculty on any of their sacrosanct, non-negotiable issues:

"These included annual pay increases, lax to near-non-existent conflict-of-interest and conflict-of-commitment regulations, and ample pools of powerless grad students, postdocs and adjuncts to minimize professorial workloads. As a safety net, the faculty favored disciplinary procedures that virtually assured acquittal of members accused of abusing subordinates, seducing students, committing plagiarism, fabricating data, or violating the one-day-a-week limit on money-making outside dealings."

As background to a pleasantly light-hearted plot, "Tech Transfer" includes delicious riffs on the hollowness of the Harvard mystique, on the idleness and self-indulgence of the student body, and on the necessity of marketing a $50,000 a year college education as a luxury good, similar to those newspaper advertisements for $15,000 watches that work no better than a Timex. And there is a fine parody of a New York Times editorial thrown in for good measure.

It probably is not giving away too much of the plot to report that Dr. Winner, after his eventful presidency of Kershaw University, fails upward and is nominated to fill a vacancy in the United States Senate. Readers will hope that the author is laying the ground for a sequel and that Dr. Winner has many more undeserved triumphs ahead of him.

http://www.nytimes.com/2010/05/25/science/25scibooks.html?ref=science

For Children in Sports, a Breaking Point

By JANE E. BRODY

I'd be the last person to discourage children from playing sports. Indeed, I wish many more would move away from their computers, put down their iPods and cellphones and devote more time and energy to physical activities.

But for many children and adolescents, the problem is the opposite of being sedentary. Encouraged by parents and coaches, many with visions of glory and scholarships, too many young athletes are being pushed — or are pushing themselves — to the point of breaking down, physically and sometimes emotionally.

The statistics cited by Mark Hyman in his book "Until It Hurts: America's Obsession with Youth Sports and How It Harms Our Kids" (new in paperback from Beacon Press), are sobering indeed: "Every year more than 3.5 million children under 15 require medical treatment for sports injuries, nearly half of which are the result of simple overuse."

Injuries are only part of the problem, Mr. Hyman wrote. As adults become more and more involved, he noted, "with each passing season youth sports seem to stray further and further from its core mission of providing healthy, safe and character-building recreation for children."

Mr. Hyman, a sports journalist, was prompted to tackle this subject in part by his own misguided behavior as the father of an athletically talented son. At 13, Ben Hyman was a prized pitcher for a local team when his shoulder began to hurt — and hurt enough for him to complain — just before the start of league playoffs.

Despite a professional assessment that Ben's problem was caused by throwing too many baseballs and a recommendation to rest his arm up to a month, his father put him in the game, and again three days later, urging him to "blaze a trail to the championship." When the injured boy began "lamely lobbing balls at home plate," Mr. Hyman realized his foolish shortsightedness in putting winning ahead of his son's well-being.

The Dangers of Overdoing It

The problem was put into focus three years ago by the American Academy of Pediatrics' Council on Sports Medicine and Fitness. In a report in the academy's journal, Pediatrics, Dr. Joel S. Brenner wrote, "Overuse injuries, overtraining and burnout among child and adolescent athletes are a growing problem in the United States."

The goal of youth participation in sports, the council said, "should be to promote lifelong physical activity, recreation and skills of healthy competition."

"Unfortunately," it went on, "too often the goal is skewed toward adult (parent/coach) goals either implicitly or explicitly. As more young athletes are becoming professionals at a younger age, there is more pressure to grab a piece of the 'professional pie,' to obtain a college scholarship or to make the Olympic team."

(If you doubt the role of adults, I suggest you take in a Little League game between teams striving for a championship. But instead of watching the players, watch — and listen to — the parents and coaches screaming at them, and not just words of encouragement.)

But most young athletes and their parents fail to realize that depending on the sport, only a tiny few — 2 to 5 out of 1,000 high school athletes — ever achieve professional status.

Clearly we've gone too far when the emphasis on athletic participation and performance becomes all-consuming and causes injuries that can sometimes compromise a child's future.

The sports surgeon Dr. James R. Andrews said that he now sees four times as many overuse injuries in youth sports as he did just five years ago and that more children today are having to undergo surgery for chronic sports injuries.

Though far more common today, the problem is not new. In 1952, the National Education Association took aim at the "high-pressure elements" and "highly organized competition" in youth sports that gave youngsters "an exaggerated idea of the importance of sports and may even be harmful to them."

In 1988 in The Archives of Disease in Childhood, two London-based physicians, N. Maffulli and P. Helms, concluded, "Young athletes are not just smaller athletes, and they should not become sacrificial lambs to a coach's or parent's ego."

They cited an analysis of training regimens finding that "at least 60 percent of all injuries sustained were in direct relation to training and could be avoided by appropriate changes in training programs." They explained that young athletes are more prone to certain injuries, especially stress fractures; tendinitis; a degenerative condition called osteochondrosis; and damage to the growth plates of bones that can stunt them for life.

Whitney Phelps, the older sister of the Olympics wunderkind Michael Phelps, was the swimmer to watch in the 1990s, until she burned out her body. Motivated by her mother, her coach and her own dreams of the Olympics, she recalls, she swam through pain in her back for years, pain sometimes so severe she could hardly stand up. At 14, Mr. Hyman recounts in his book, her arms would go numb when she turned her head, and she was found to have two bulging spinal discs, a herniated disc and two stress fractures.

Playing It Safe

A major factor in the rising injury rate is the current emphasis on playing one sport all year long, which leaves no time for muscles and joints to recover from the inevitable microtrauma that occurs during practice and play. With increased specialization, there is also no cross-training that would enable other muscles to strengthen and lighten the load.

Even when a sport is done seasonally, daily practice can result in problems. The pediatrics council recommends that young athletes "have at least one to two days off per week from competitive athletics, sport-specific training and competitive practice (scrimmage) to allow them to recover both physically and psychologically." The group also recommends that children and adolescents play on only one team a season and take a vacation of two or three months from a specific sport each year.

Whatever an athlete's age, playing through pain is a bad idea. Pain is the body's signal that something is awry. Ignore it and it is likely to get worse and worse, and the injury could become permanent. Get a professional diagnosis and follow the therapeutic advice. After a prescribed period of rest, return gradually to the sport, increasing training time, repetitions or distance by no more than 10 percent each week.

The Pediatrics authors also suggest that it is a sign of possible burnout when an athlete "complains of nonspecific muscle or joint problems, fatigue or poor academic performance." That's when a child's motivation to continue in the sport should be reassessed.

http://www.nytimes.com/2010/05/25/health/25brod.html?ref=science

New Way Bacterium Spreads in Hospital

By NICHOLAS BAKALAR

Health care workers and patients have yet another source of hospital-acquired infection to worry about, British researchers are reporting.

Clostridium difficile, a germ that causes deadly intestinal infections in hospital patients, has long been thought to be spread only by contact with contaminated surfaces. But a new study finds that it can also travel through the air.

The researchers emphasized that there is no evidence that C. difficile can be contracted by inhaling the germs. Rather, they float on the air, landing in places where more people can touch them.

The bug is commonly spread by contact with infected feces, and the British scientists said the new study made it even more urgent to isolate hospital patients with diarrhea as soon as possible — even before tests confirm a C. difficile infection.

"We don't want people to wait for the confirmation," said the study's senior author, Dr. Mark H. Wilcox, a professor of medical microbiology at the University of Leeds. "By then, the cat's out of the bag."

Outbreaks of C. difficile, a bacterium resistant to many antibiotics, have been increasing in the United States since 2001, along with the evolution of more virulent strains.

People in good health are rarely infected. But broad-spectrum antibiotics can wipe out the bacteria that normally live in the intestines, allowing C. difficile to flourish. Hospitalized people on antibiotics and the elderly, even when not taking medicine, are at high risk.

Health care workers who touch contaminated feces can spread the disease by direct contact with other people or just by touching objects. The spores are resistant to disinfectants and can survive in open areas for months.

The bacterium produces toxins that can cause fever, nausea, abdominal pain, severe diarrhea — and sometimes colitis, a serious inflammation of the large intestine.

Treatment involves replacing the broad-spectrum antibiotics with other antibiotics, usually vancomycin or metronidazole.

The British researchers began with a six-month investigation of 50 patients, symptomatic and not, with confirmed infection. The air near 12 percent of them was found to be contaminated with C. difficile. The more active their diarrheal symptoms, the more likely they were to have spores in the air around them.

Then the scientists repeatedly tested 10 patients with symptomatic illness over a 10-hour period, and the air near 7 was positive for c. difficile, usually during visiting hours or when there was activity in patient rooms like food delivery, ward rounds or bedding changes. Surfaces around 9 of the 10 patients were also contaminated.

The scientists believe that the movement of people and the opening and closing of doors stir up spores on contaminated surfaces, helping them disperse and increasing the possibility of them spreading.

The finding is unlikely to change current preventive practice, said Dr. L. Clifford McDonald, an epidemiologist at the Centers for Disease Control and Prevention. He said that the study supported putting patients in a single room, "which is the norm here in the U.S."

"There is a little bit of dispersion," he added, "but the heavier contamination is still from direct contact."

Dr. Wilcox agreed. "It's important," he said, "not to interpret the results as a justification for methods aimed at removing bacteria from the air, techniques that may be appropriate for highly immunocompromised patients, but not for those at risk for C. diff infection."

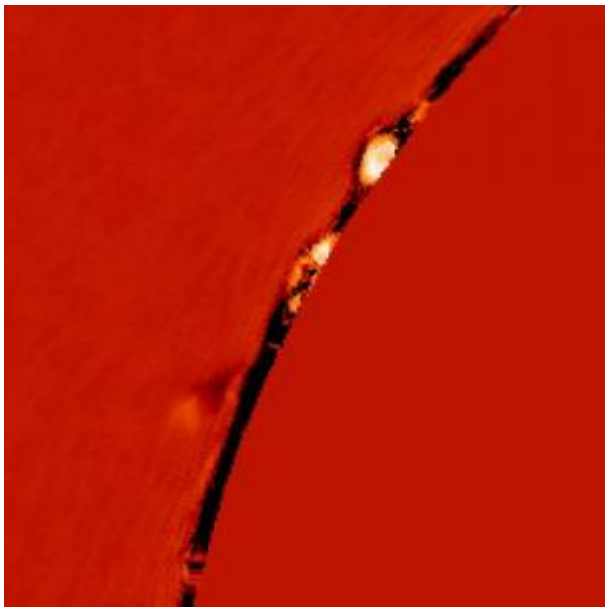
The amounts of C. difficile found in the air were generally modest. There were no clouds of germs circulating in patients' rooms. This may suggest a genuinely low level of airborne contamination, the researchers write, or it may be a result of methodological problems in collecting air samples: the initial location of the sampling devices, their design, or their movement to accommodate patient care or the arrival of visitors.

Dr. Wilcox said patients should protect themselves from C. difficile by the conscientious application of two substances that do not require a prescription: soap and water.

"For everyone in a hospital, staff or patients," he said, "the chief thing is optimal hand hygiene."

http://www.nytimes.com/2010/05/25/health/25infect.html?ref=science

Comet Dives Into Sun: STEREO, SOHO Spacecraft Catch Crash



Hydrogen-alpha observations of the sun's edge from the Coronado instrument of the Mauna Loa Solar Observatory showing what the authors believe to be the comet approaching the solar limb. (Credit: Claire Raftery, Juan Carlos Martinez-Oliveros, Samuel Krucker/UC Berkeley)

ScienceDaily (May 24, 2010) — Solar physicists at the University of California, Berkeley, have captured for the first time the collision of a comet with the sun.

Using instruments aboard NASA's twin STEREO spacecraft, four post-doctoral fellows at UC Berkeley's Space Sciences Laboratory were able to track the comet as it approached the sun and estimate an approximate time and place of impact. STEREO (Solar TErrestrial RElations Observatory), launched in 2006, consists of identical spacecraft orbiting the sun, one ahead of Earth and one behind Earth, providing a stereo view of the sun.

The researchers then looked at data from the ground-based Mauna Loa Solar Observatory in Hawaii, and found images in the predicted spot of what appears to be a comet approaching the edge of the sun from behind the solar disk.

"We believe this is the first time a comet has been tracked in 3-D space this low down in the solar corona," said Claire Raftery, a post-doctoral fellow newly arrived at UC Berkeley from Dublin's Trinity College.

The team presented its data and images during a 5:30-6:30 p.m. poster session on May 24, at the Miami, Fla., meeting of the American Astronomical Society.

Sungrazing comets, comprised of dust, rock and ice, are seldom tracked close to the sun because their brightness is overwhelmed by the solar disk. This comet apparently survived the heat of the corona and disappeared in the chromosphere, evaporating in the 100,000-degree (Kelvin) heat.

Raftery and her colleagues, Juan Carlos Martinez-Oliveros, Samuel Krucker and Pascal Saint-Hilaire, concluded that the comet was probably one of the Kreutz family of comets, a swarm of Trojan or Greek

comets ejected from their orbit in 2004 by Jupiter, and that it made its first and only loop around the sun. The swarm probably resulted from the disintegration of a larger comet.

Martinez-Oliveros' attention was first drawn to the comet after seeing it mentioned in a summary of March 12, 2010, observations by STEREO and by SOHO, the Solar and Heliospheric Observatory. The comet's long, bright tail of dust and ions tagged it as a sungrazing comet seen often by solar astronomers and observatories such as STEREO.

Assuming it was a going to loop around the sun, the researchers decided to see whether the STEREO data were good enough to let them calculate its trajectory.

In fact, the data were good enough to chart the comet's approach for two days before impact.

With an estimate of the impact zone within a circle about 1,000 kilometers in diameter, they searched online data from the Mauna Loa Solar Observatory to determine if they could see the comet next to the sun's edge in the ultraviolet region of the spectrum.

They found a short track, lasting about six minutes, just a few thousand kilometers above the sun's surface in the million-degree corona and 100,000-degree chromosphere.

Based on the comet's relatively short tail, about 3 million kilometers in length, the researchers believe that the comet contained heavier elements that do not evaporate readily. This would also explain how it penetrated so deeply into the chromosphere, surviving the strong solar wind as well as the extreme temperatures, before evaporating.

For their study, the team used the two coronagraphs on STEREO A and B and multiple instruments on SOHO, "demonstrat(ing) the importance of multi-view observations of non solar phenomena," they wrote in their poster.

All members of the team study explosive events on the sun, such as coronal mass ejections, and the hot ionized plasmas that they throw into space. The researchers' detour into cometary physics was purely accidental, they said.

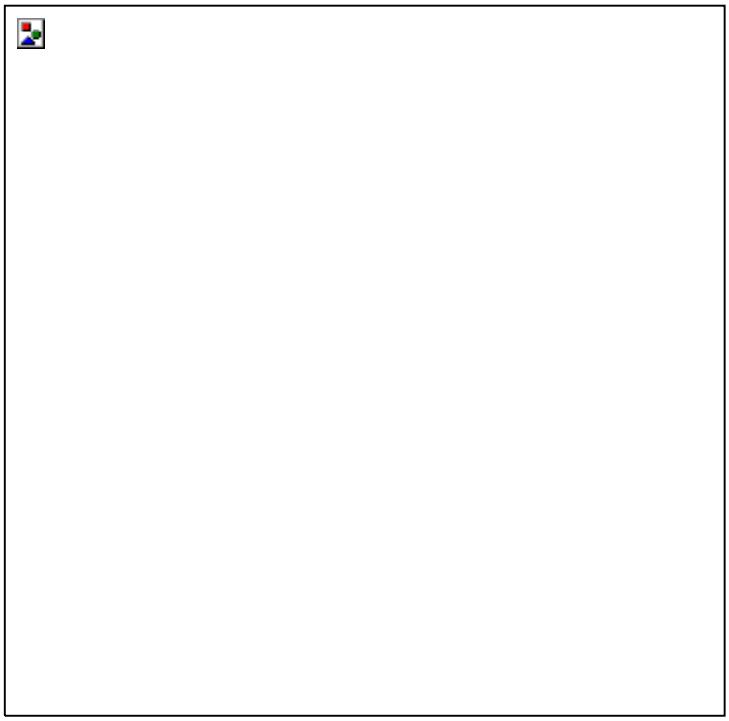
"It was supposed to be an exercise, but it took over our lives," Raftery said.

Story Source:

Adapted from materials provided by University of California - Berkeley. Original article written by Robert Sanders, Media Relations.

http://www.sciencedaily.com/releases/2010/05/100524203306.htm

First Realistic Simulation of DNA Unfolding



From left to right and up to down, DNA structure movements that permit to get an idea about the mechanism by which DNA starts to unfold. (Credit: Copyright A. Pérez, courtesy IRB)

ScienceDaily (May 25, 2010) — The separation of the two DNA strands occurs in millionths of a second. Consequently, it is extremely difficult to study this phenomenon experimentally and researchers must rely on computational simulations. After four years of fine-tuning an effective physical model and massive use of the supercomputer Mare Nostrum, researchers at IRB Barcelona and the Barcelona Supercomputing Center (BSC) have managed to produce the first realistic simulation of DNA opening at high resolution.

The scientists Modesto Orozco, group leader of the Molecular Modelling and Bioinformatics Group at IRB Barcelona, Full Professor of Biochemistry and Molecular Biology at the University of Barcelona and director of the Life Sciences Dept. at the BSC, and Alberto Pérez, "Juan de la Cierva" researcher at BSC, currently at the University of California, San Francisco, (U.S.) publish their findings in a leading international chemistry journal, *Angewandte Chemie*.Alberto Pérez explains that "many of the functions of DNA come about when its two strands separate, when, for example, it has to replicate during cell division or in repair processes. With this study, we propose a mechanism for this process, which in turn, will lead to new experiments for its final corroboration."

The researchers have studied a small DNA fragment, of 12 base pairs (the human genomes has about 3,000 million base pairs), and have obtained 10 million structural snapshots of how DNA unfolds. In this process they have revealed the two main ways by which the natural folded structure move to an unfolded state. "This project," explains Prof. Orozco, "is part of a greater objective of the lab: to attempt to understand the changes that the DNA structure undergoes in biological processes that occur within the cell, such as the expression and repression of genes or DNA replication and transcription.

"DNA holds the genetic information of living organisms and its double helical structure was discovered more than 50 years ago by Watson and Crick. DNA and the proteins that modify it are the most important therapeutic targets in several pathologies, and particularly in cancer. The work performed at IRB Barcelona provides a detailed view of the mechanism through which one of the most crucial processes in DNA occurs, and opens up new prospects regarding the connection between physical properties, functionality and pharmacological effect. The final objective is to achieve that new breakthroughs turn DNA into a universal pharmacological target.

Story Source:

Adapted from materials provided by Institute for Research in Biomedicine-IRB.

Journal Reference:

1. Alberto Perez, Modesto Orozco. **Real-Time Atomistic Description of DNA Unfolding**. *Angewandte Chemie International Edition*, 2010; DOI: 10.1002/anie.201000593

http://www.sciencedaily.com/releases/2010/05/100520093323.htm

Tissue Engineering Technique Yields Potential Biological Substitute for Dental Implants

Human molar scaffolding from the lab of Dr. Jeremy Mao. (Credit: Image courtesy of Columbia University Medical Center)

ScienceDaily (May 24, 2010) — A technique pioneered in the Tissue Engineering and Regenerative Medicine Laboratory of Dr. Jeremy Mao, the Edward V. Zegarelli Professor of Dental Medicine at Columbia University Medical Center, can orchestrate stem cells to migrate to a three-dimensional scaffold infused with growth factor, holding the translational potential to yield an anatomically correct tooth in as soon as nine weeks once implanted.

People who have lost some or all of their adult teeth typically look to dentures, or, more recently, dental implants to improve a toothless appearance that can have a host of unsettling psycho-social ramifications. Despite being the preferred (but generally painful and potentially protracted) treatment for missing teeth nowadays, dental implants can fail and are unable to "remodel" with surrounding jaw bone that undergoes necessary changes throughout a person's life.

An animal-model study has shown that by homing stem cells to a scaffold made of natural materials and integrated in surrounding tissue, there is no need to use harvested stem cell lines, or create an environment outside of the body (e.g., a Petri dish) where the tooth is grown and then implanted once it has matured. The tooth instead can be grown "orthotopically," or in the socket where the tooth will integrate with surrounding tissue in ways that are impossible with hard metals or other materials.

"These findings represent the first report of regeneration of anatomically shaped tooth-like structures in vivo, and by cell homing without cell delivery," Dr. Mao and his colleagues say in the paper. "The potency of cell homing is substantiated not only by cell recruitment into scaffold microchannels, but also by the regeneration of periodontal ligaments and newly formed alveolar bone."

This study is published in the most recent *Journal of Dental Research*, a peer-reviewed scientific journal dedicated to the dissemination of new knowledge and information on all sciences relevant to dentistry, the oral cavity and associated structures in health and disease.

Dental implants usually consist of a cone-shaped titanium screw with a roughened or smooth surface and are placed in the jaw bone. While implant surgery may be performed as an outpatient procedure, healing times vary widely and successful implantation is a result of multiple visits to different clinicians, including general dentists, oral surgeons, prosthodontists and periodontists. Implant patients must allow two to six months for healing and if the implant is installed too soon, it is possible that the implant may fail. The subsequent time to heal, graft and eventually put into place a new implant may take up to 18 months.

The work of Dr. Mao and his laboratory, however, holds manifold promise: a more natural process, faster recovery times and a harnessing of the body's own potential to re-grow tissue that will not give out and could ultimately last the patient's lifetime.

"A key consideration in tooth regeneration is finding a cost-effective approach that can translate into therapies for patients who cannot afford or who aren't good candidates for dental implants," Dr. Mao says. "Cell-homing-based tooth regeneration may provide a tangible pathway toward clinical translation."

Dr. Ira B. Lamster, dean of the College of Dental Medicine, stated: "This research provides an example of what is achievable when today's biology is applied to common clinical problems. Dr. Mao's research is a look into the future of dental medicine."

This research was supported by NIH ARRA Funding via 5RC2 DE020767 from the National Institute of Dental and Craniofacial Research. Columbia has filed patent applications relating to the engineered tooth and, through its technology transfer office, Columbia Technology Ventures, is actively seeking partners to help commercialize the technology.

Story Source:

Adapted from materials provided by Columbia University Medical Center.

Journal Reference:

1. K. Kim, C. H. Lee, B. K. Kim, J. J. Mao. **Anatomically Shaped Tooth and Periodontal Regeneration by Cell Homing**. *Journal of Dental Research*, 2010; DOI: 10.1177/0022034510370803

http://www.sciencedaily.com/releases/2010/05/100524111724.htm

Using Remote Sensing to Track Invasive Trees

Ashe juniper. (Credit: Photo courtesy of Sally and Andy Wasowski, Lady Bird Johnson Wildflower Center)

ScienceDaily (May 25, 2010) — A team of Agricultural Research Service (ARS) scientists has refined remote sensing tools for identifying invasive Ashe juniper shrubs and trees in central Texas and nearby regions. These findings can help rangeland managers determine the extent and severity of Ashe juniper infestations and boost mitigation efforts.

Over the past century, the expansion of Ashe juniper has reduced the production and diversity of other rangeland plant species. Because Ashe juniper has little nutritional value for grazing animals, the vegetative shift has also reduced forage options for livestock and wildlife.

ARS agricultural engineer Chenghai Yang and rangeland scientist James Everitt evaluated remotely sensed data to pinpoint the most accurate "signal" for identifying Ashe juniper stands, which often grow within an assortment of other woodland plants. Yang and Everitt work at the ARS Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas.

Remotely sensed data were collected from two Texas sites that were populated with Ashe juniper and other associated plant communities. The data spanned 98 spectral bands -- which are bands of light that are characterized by different wavelengths -- that ranged from 475 to 845 nanometers.

Then the team used a statistical technique called minimum noise fraction (MNF) transformation to reduce interference. In comparison with the original imagery, MNF imagery takes less time to process and less data space to store, especially when large amounts of remotely sensed data are being analyzed.

MNF transformation consolidated the spectral data into 50 distinct bands. Further analysis indicated that the first 10 bands from this group were the best for identifying Ashe juniper stands. Using these bands, the scientists were able to sufficiently distinguish Ashe juniper from other mixed woody species, other mixed herbaceous species, bare soil and water.

Results from this work were published in the *International Journal of Remote Sensing*.

Story Source:

Adapted from materials provided by USDA/Agricultural Research Service. Original article written by Ann Perry.

Journal Reference:

1. Chenghai Yang, J. H. Everitt, H. B. Johnson. **Applying image transformation and classification techniques to airborne hyperspectral imagery for mapping Ashe juniper infestations**. *International Journal of Remote Sensing*, 2009; 30 (11): 2741 DOI: 10.1080/01431160802555812

http://www.sciencedaily.com/releases/2010/05/100521102631.htm

Obesity Remains an Economic Issue, Research Finds

ScienceDaily (May 25, 2010) — Ensuring access to healthy, affordable foods is a top priority in tackling the obesity epidemic in the United States. Over the course of the last six months, the Institute of Medicine, United States Department of Agriculture, The White House and First Lady Michelle Obama have taken an interest in improving access to affordable and nutritious foods.

Here in Seattle, Adam Drewnowski, UW professor of epidemiology, and his team are tackling the same issue. Remember the "fat zip codes" that predicted obesity rates from a few years ago? Drewnowski and his team were the brains behind that, as well as last summer's study which showed that grocery prices in Seattle varied greatly between one supermarket chain and another.

Now, researchers at the UW Center for Public Health Nutrition, UW Urban Form Lab and the Nutritional Sciences Program in the School of Public Health are asking: "Who buys what foods, why, where, and for how much?"

The answers might surprise you. Most studies have used distance to the nearest supermarket as the best predictor of whether people have good diets and better health. But Drewnowski and team say that's not true. "Six out of seven people shopped for food outside their immediate neighborhood," he said "The closest supermarket for most people was less than a mile away, but people chose the market that was more than three miles away." Driving further to save money on groceries is common. For that reason, physical proximity to a supermarket may not, by itself, assure a healthy diet. "Money does matter," Drewnowski said.

Areas where access to healthy affordable foods is scarce have become known as "food deserts." Seattle, however, is well-supplied with supermarkets, grocery stores, farmers markets and other vendors, said Drewnowski. "We do not see evidence of significant food deserts," he said. In comparison with other areas in the state, public transportation is also prevalent and accessible, so people can take a bus to a supermarket or grocery store with relative ease.

Researchers combined a telephone survey, modeled on the Centers for Disease Control and Prevention (CDC) Behavioral Risk Factors Surveillance System, with new geo-coding techniques and methods of spatial analysis for the new study.

Economic access has also become a primary research focus in public health nutrition, including the work by Drewnowski and team. Supermarket chains have specific demographics--consumers differ by age, education, income, health, and even obesity rates. "The county-wide obesity rate in 2007 was 19.8 percent, but our research found that the obesity rate was only four percent among Whole Foods and PCC shoppers," said Drewnowski. "Consumers who shop at most area supermarket chains have obesity rates at 25 percent and higher. Clearly, not all supermarkets are the same and economic access is determined by price."

UW researchers recently discussed the Seattle Obesity Study results at "Shopping for Health" conference, which brought together public health agencies, academicians, supermarket representatives and policymakers from Seattle, King County and Washington state. Additional findings include:

- New ways to identify underserved areas ("food deserts") in Washington state that are most in need of resources
- New ways to identify healthy, affordable and sustainable foods
- The Seattle Atlas, or SEATTLAS, of all food sources, including supermarkets, grocery stores, and fast food restaurants
- Food purchases and expenditures, diet quality and weight/ obesity

- Insights from similar studies conducted in New York City.

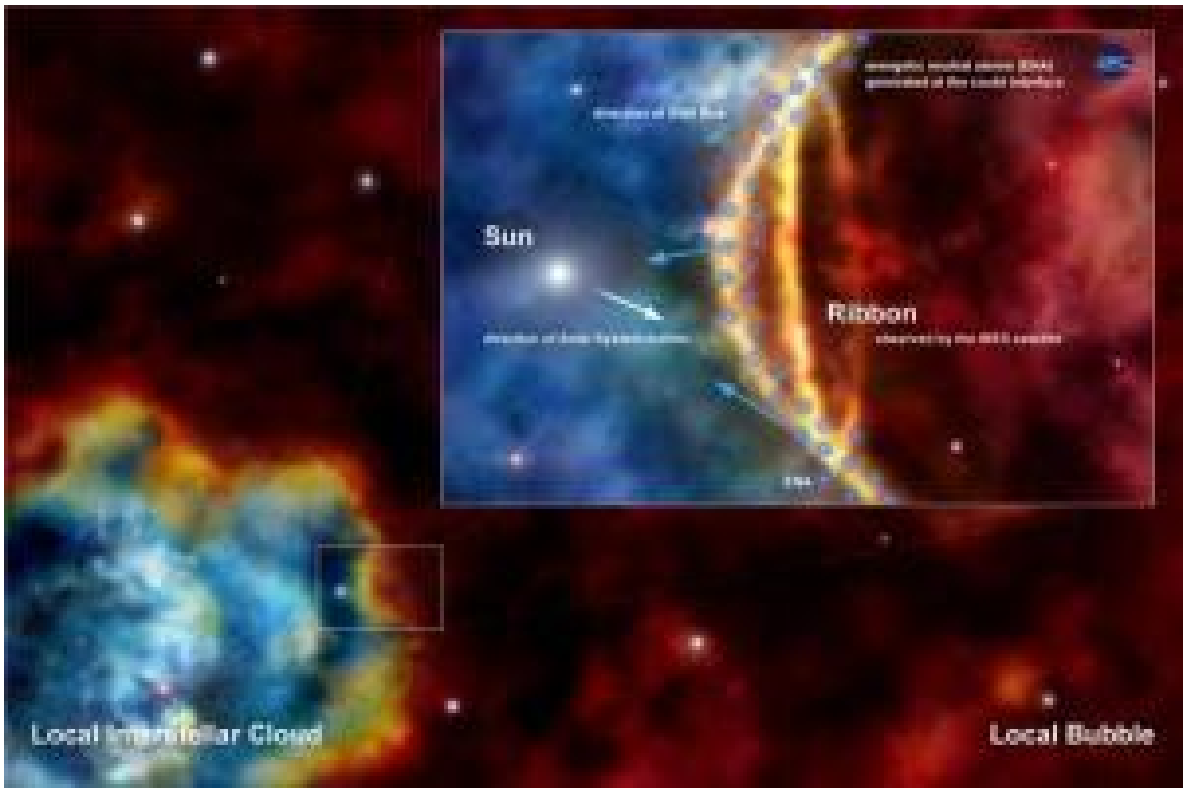
"We plan to explore how local data can best be used in new initiatives to improve access to healthy, affordable foods in Seattle, King County and throughout Washington state," said Drewnowski. "As part of the dialogue, it is extremely important that the food industry be part of the solution and we welcomed their presence at this recent gathering," he said. "We hope to provide the local answer to the question that the federal government is trying to address. And we want to make sure our public health initiatives and programs are backed by research and science."

Story Source:

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2010/05/100524121252.htm

Will the Sun Enter a Million-Degree Cloud of Interstellar Gas?



The Sun traveling through the Galaxy happens to cross at the present time a blob of gas about ten light-years across, with a temperature of 6-7 thousand degrees kelvin. This so-called Local Interstellar Cloud is immersed in a much larger expanse of a million-degree hot gas, named the Local Bubble. The energetic neutral atoms (ENA) are generated by charge exchange at the interface between the two gaseous media. ENA can be observed provided the Sun is close enough to the interface. The apparent Ribbon of ENA discovered by the IBEX satellite can be explained by a geometric effect: one observes many more ENA by looking along a line-of-sight almost tangent to the interface than by looking in the perpendicular direction. (Credit: SRC/Tentaris,ACh/Maciej Frolow)

ScienceDaily (May 24, 2010) — Is the Sun going to enter a million-degree galactic cloud of interstellar gas soon?

Scientists from the Space Research Centre of the Polish Academy of Sciences, Los Alamos National Laboratory, Southwest Research Institute, and Boston University suggest that the ribbon of enhanced emissions of energetic neutral atoms, discovered last year by the NASA Small Explorer satellite IBEX, could be explained by a geometric effect coming up because of the approach of the Sun to the boundary between the Local Cloud of interstellar gas and another cloud of a very hot gas called the Local Bubble. If this hypothesis is correct, IBEX is catching matter from a hot neighboring interstellar cloud, which the Sun might enter in a hundred years.

First full-sky maps of the emissions of energetic neutral atoms (ENA), obtained last year by IBEX, showed a surprising arc-like feature called the Ribbon. This astonishing discovery was later announced by NASA as one of the most important findings in space exploration made in 2009. Shortly after the discovery six hypotheses were proposed to explain the Ribbon, all of them predicting its relation to processes going on

within the heliosphere or in its neighborhood. In a paper recently published in the *Astrophysical Journal Letters*, a Polish-US team of scientists led by Prof. Stan Grzedzielski from the Space Research Centre of the Polish Academy of Sciences in Warsaw, Poland, offers a different explanation.

"We observe the Ribbon," says Grzedzielski "because the Sun is approaching a boundary between our Local Cloud of interstellar gas and another cloud of a very hot and turbulent gas."

Energetic neutral atoms, registered by IBEX detectors, are born out of ions (protons) speeding from the very hot Local Bubble when they exchange charge with the relatively cool atoms "evaporating" from the Local Interstellar Cloud. The newly created ENA have no electrical charge and therefore can dash freely in straight lines from their birth site, oblivious of the impeding magnetic fields. Some of them may reach Earth orbit and be detected by IBEX.

"Had the Ribbon ENA been created at the boundaries of the heliosphere, their birth site would be relatively nearby, within just a couple of hundreds of astronomical units," explains Dr Andrzej Czechowski from SRC PAS, one of the co-authors of the paper. "According to our hypothesis, they are born much, much farther away."

The team of Polish and US scientists suggests that the Ribbon ENA are born by electrical charge exchange between the atoms which "evaporate" from the Local Interstellar Cloud into the nearby Local Bubble of a very hot and fully ionized gas. The Local Bubble is probably a remnant of a series of supernova explosions that occurred a few million years ago and thus is not only very hot (at least million degree Kelvin), but also turbulent. The protons in the Local Bubble nearby to the boundary with the Local Cloud snatch electrons from the neutral atoms and run away in all directions, some of them reaching IBEX.

"If our hypothesis is correct, then we are catching atoms that originate from an interstellar cloud that is different from ours," says Dr. Maciej Bzowski, co-investigator of the mission and head of the Polish IBEX team. But since the creation of such ENA atoms is occurring throughout the entire boundary layer between the clouds, why do we see the Ribbon? "It's a purely geometrical effect, which we observe because the Sun is presently just in the right place, within a thousand of astronomical units from the cloud boundary," explains Grzedzielski.

"If the cloud-cloud boundary is flat, or better slightly extruded towards the Sun, then it appears the thinnest towards the center of the Ribbon and thicker at the sides, right where we see the edge of the Ribbon. If we were farther away from the boundary, we would see no Ribbon, because all the ENAs would be re-ionized and dispersed in the intervening gas of the Local Cloud."

The model developed by the Polish-US team suggests that the boundary between the Local Cloud and the Local Bubble might be not within a few light years from the Sun, as it was believed earlier, but within just a thousand of astronomical units, a thousand-fold closer. This might mean that the Solar System could enter the million-degree Local Bubble cloud as early as the next century. "Nothing unusual, the Sun frequently traverses various clouds of interstellar gas during its galactic journey," comments Grzedzielski.

Such clouds are of very low density, much lower than the best vacuum obtained in Earth labs. Once in, the heliosphere will reform and may shrink a little, the level of cosmic radiation entering the magnetosphere may rise a bit, but nothing more. "Perhaps future generations will have to learn how to better harden their space hardware against stronger radiation," suggests Grzedzielski.

IBEX is the latest in NASA's series of low-cost, rapidly developed Small Explorers space missions. Southwest Research Institute in San Antonio, TX, leads and developed the mission with a team of US and

international partners. NASA's Goddard Space Flight Center in Greenbelt, Md., manages the Explorers Program for NASA's Science Mission Directorate in Washington DC.

Story Source:

Adapted from materials provided by Space Research Centre, Polish Academy of Sciences, via AlphaGalileo.

Journal Reference:

1. S. Grzedzielski, M. Bzowski, A. Czechowski, H. O. Funsten, D. J. McComas, N. A. Schwadron. **A Possible Generation Mechanism For Theibexribbon From Outside The Heliosphere**. *The Astrophysical Journal*, 2010; 715 (2): L84 DOI: 10.1088/2041-8205/715/2/L84

http://www.sciencedaily.com/releases/2010/05/100521191114.htm

DNA Sequence Itself Influences Mutation Rate, New Research Indicates

Intrinsic properties of DNA that influence mutation rate have been identified in new research. (Credit: iStockphoto/Andrew Johnson)

ScienceDaily (May 24, 2010) — Genetic variation due to DNA mutation is a driving force of adaptation and evolution, as well as a contributing factor to disease. However, the mechanisms governing DNA mutation rate are not well understood. In a report published online in *Genome Research*, researchers have identified intrinsic properties of DNA that influence mutation rate, shedding light on mechanisms involved in genome maintenance and potentially disease.

Some DNA mutations are subject to natural selection, either conferring a biological advantage that is selected for, or a negative effect that is selected against. Mutations not under selection are said to be neutral, and the rate at which neutral mutations accumulate is reflective of the true DNA mutation rate. Researchers can estimate this mutation rate by comparing neutrally evolving sequences in species that share a common ancestor.

Interestingly, the neutral mutation rate can vary significantly between different regions of chromosomes. This suggests that the context of the DNA influences how rapidly it accumulates mutations. Sequence high in pairs of the bases C and G (CpGs) where the C's are chemically modified, have been positively correlated with mutation rate. However, the chemical modification of CpGs makes them prone to mutation themselves, and with time they are eliminated from neutrally evolving sequences. NIH researchers Jean-Claude Walser and Anthony Furano have taken advantage of this property to investigate the role of CpGs on the mutation rate of non-CpG DNA, by comparing "old" and "young" sequences.

Walser and Furano compared the CpG content and DNA changes in inactive L1 retrotransposons shared by humans and chimpanzees. These ancient DNA sequences that had previously expanded in our common

ancestor to multiple copies interspersed throughout the genome, but are now extinct "DNA fossils" that are neutrally evolving.

The researchers had previously noted that the older L1s have a lower CpG content than the younger sequences as expected, but here they observed two particularly striking features: "The overall mutation rate in the older fossil sequences dropped dramatically," said Furano, indicating a certain CpG content threshold is required to affect the non-CpG mutation rate. "And most provocatively, the types of mutations changed significantly."

This means that CpGs are not only promoting mutations, but they are also influencing how the non-CpG sequences around them are being mutated, an extension of what the authors call the "CpG effect." These findings strongly support the hypothesis that the co-variation of CpG content and non-CpG mutation rate is a property of the DNA sequence itself, and not a result of the chromosomal location.

"Intriguingly, the CpG effect revealed by our studies mimics the altered mutational state that has been demonstrated for certain cancers," Furano noted. Furthermore, the authors expect that this work will open the door to future studies investigating the mechanisms by which CpGs exert their influence on mutation rate and how this is involved in the critical process of genome maintenance. Scientists from National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) contributed to this study.

Story Source:

Adapted from materials provided by Cold Spring Harbor Laboratory, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Walser J, Furano A. **The mutational spectrum of non-CpG DNA varies with CpG content**. *Genome Research*, 2010; DOI: 10.1101/gr.103283.109

http://www.sciencedaily.com/releases/2010/05/100524092348.htm

Four Biomarkers Important in Colerectal Cancer Treatment Prognosis Discovered

ScienceDaily (May 24, 2010) — Researchers at the University of Alabama at Birmingham (UAB) Department of Pathology have discovered a set of four biomarkers that will help predict which patients are more likely to develop aggressive colorectal cancer and which are not. The findings also shed light on the genetics that result in worse colorectal cancer-treatment outcomes for African-Americans, compared with Caucasians, the researchers said.

In data presented April 19 at the American Association of Cancer Research annual meeting in Washington, D.C., Liselle Bovell, a graduate student working in the laboratory of UAB Associate Professor of Pathology Upender Manne, Ph.D., discovered that patients who tested positive for higher levels of a genetic biomarker called microRNA (miRNA) had increased risk of death after being treated for colorectal cancer.

In genetic tests of tumor samples from the patients, the presence of higher levels of miRNA-21 and miR-106a signaled poorer prognosis after treatment for both Caucasian and African-American patients compared with patients who did not have the higher miRNA levels. The presence of higher levels of miR-181b and miR-203 signaled poorer prognosis after treatment for African-American patients, but not for Caucasians.

"This knowledge gives us solid, prognostic information, so we can better manage patients with these cancers early after diagnosis or surgery," Bovell said.

Nobel Laureate Philip A. Sharp, Ph.D., of the Koch Institute for Integrative Cancer Research at the Massachusetts Institute of Technology, hosted a press conference at the annual meeting that included Bovell and other researchers. In a statement, Sharp said, "The science of miRNAs and related small RNAs will continue to generate new insights into cancer and possible future treatment."

The UAB researchers analyzed data from 218 patients who underwent surgery and other treatments for colorectal cancer at UAB Hospital between 1982 and 2004. They examined the gene-test results of tumor and benign-tissue samples and discovered the four miRNAs important to assessing patient survival.

For many cancers, including colon cancer, African-Americans have lower survival rates than whites. Possible reasons behind this disparity -- including genetic variation, tumor characteristics, access to health care and other factors -- are being examined extensively.

"Our findings underscore the potential clinical usefulness of miRNAs in studying cancer risk and cancer progression, and we've shown that race and ethnicity should be considered in the evaluation," Manne said.

The research is a partnership between UAB and the Morehouse School of Medicine in Atlanta. Funding for the work comes from the National Cancer Institute.

Story Source:

Adapted from materials provided by University of Alabama at Birmingham, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2010/04/100419090947.htm

Intelligent Therapies With Virtual Reality for the Psychological Treatment of Patients Suffering from Fibromyalgia

Researchers in Spain have developed a new therapy based on the use of mobile devices and virtual reality for the psychological treatment of patients suffering from fibromyalgia. (Credit: Image courtesy of Universitat Jaume I)

ScienceDaily (May 24, 2010) — Researchers of the Labpsictec at the Universitat Jaume I of Castellon (UJI) and the LahHuman Group at the Universidad Politecnica of Valencia (UPV) and the University of Valencia (UVEG) have developed a new therapy based on the use of mobile devices and virtual reality for the psychological treatment of patients suffering from fibromyalgia.

This therapy is currently being validated by researchers of the UJI and the University of the Balearic Islands (UIB) with a group of 24 patients and it counts on the essential collaboration of the Rheumatology Department of the Hospital General of Castellón, supervised by the medical doctor Belmonte.

Fibromyalgia is a complex and chronic pain syndrome which causes generalized pain and deep exhaustion, among other symptoms. It is a serious public health problem, more usual among adult women, and which causes significant negative psychological effects. In fact, 35% of affected patients suffer from depressive and anxious syndrome.

"Our aim is to achieve that woman patients learn strategies to face the pain which are an alternative to those they use and which are adaptive in order to improve their physical and mental state and their quality of life," points out Beatriz Rey, researcher of the LabHuman of the UPV.

The method developed by the researchers is made of three applications. The first one is an evaluation system of the chronic pain key factors through mobile devices. It is based on a commercial PDA and a made-to-measure device. The device monitors the degree of physical activity (accelerometer) and communicates with the PDA via Bluethooth.

The PDA runs an application that offers some questions the patient has to answer three times a week: intensity of pain (on a scale from 0 to 10), intensity of fatigue (on a scale from 0 to 10) and mood (on a scale from 1 to 7; in this case, the application shows a series of emoticons). The answers to each three questions are stored in the PDA. When the user goes to the medical office, the PDA can be synchonized with the computer of the medical and the data can be stored in a server.

It has been designed a new version of the Virtual Reality system EMMA to induce positive emotions on woman patients that works together with this system. "The psychologist supervises the group sessions using a system of unique screen projection," points out Azucena García-Palacios researcher of the Labpsitec of the UJI.

Those sessions are carefully guided and use contents (texts, sounds, videos, music and images, etc) selected to induce positive emotions. The therapist is present during the session and guides its development. During each session, the system helps the woman patients to consider a feasible objective they must fulfil before taking part on the next one. Woman patients will follow a treatment of three weeks with two sessions a week for making an evaluation of the system.

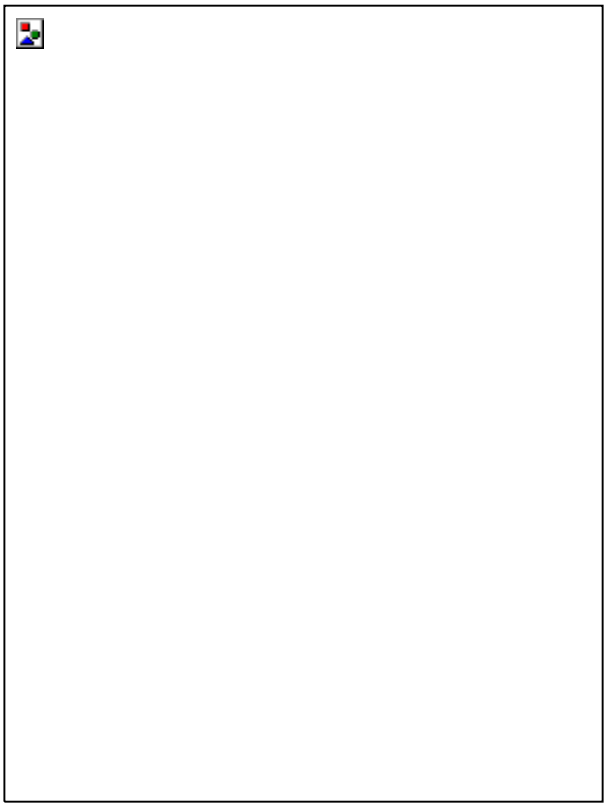
The therapy also has an application of telepsychology (intelligent therapy) through mobile devices in order patients to continue the treatment out of the doctor's office, such as from home. "The application is run in the PDA and also allows watching videos on the screen. The videos are fragments of the treatment sessions with EMMA, which are used to induce positive emotions along sessions," points Rosa Baños of the UVEG.

Story Source:

Adapted from materials provided by Universitat Jaume I, via AlphaGalileo.

http://www.sciencedaily.com/releases/2010/05/100524072959.htm

Ultraviolet Radiation Not Culprit Killing Amphibians, Research Shows



Cascades frogs, 2- to 3-inches long, are the most commonly found frog in sub-alpine waterways and one of the least-sensitive amphibians to UV radiation tested in the Pacific Northwest. (Credit: Wendy Palen Lab)

ScienceDaily (May 24, 2010) — In nature, ultraviolet radiation from sunlight is not the amphibian killer scientists once suspected.

Naturally occurring murky water and females who choose to lay their eggs in the shade keep embryos of one of the nation's most UV-sensitive amphibian species out of harm's way most of the time, new research shows. Less than 2 percent of the embryos of the long-toed salamander received lethal doses of UV across 22 breeding sites across nearly 8 square miles (20 square kilometers) in Washington state's Olympic National Park.

For a second amphibian, the Cascades frog -- known to be among the least UV-sensitive Pacific Northwest species -- the researchers found no instances where eggs received lethal doses.

Declines in amphibian populations around the globe remain a real concern, but the cause is not increasing UV radiation, according to Wendy Palen, lead author and a Simon Fraser University ecologist who conducted the research while earning her doctorate from the UW, and Daniel Schindler, UW professor of aquatic and fishery sciences. The work is being published in the *Proceedings of the National Academy of Sciences* May 25, and is now available online.

"These findings don't contest hundreds of studies demonstrating the harmful effects of UV radiation for many organisms, including humans," Palen says. "Rather, it points out the need to understand where and when it is harmful."

Papers published in the late 1990s and early 2000s raised the alarm that UV exposure was triggering amphibian declines, with many of the findings based on Pacific Northwest amphibians. Previous research wasn't wrong: some species proved extremely sensitive to UV radiation -- with especially high mortality for eggs and larvae -- as shown in physiological studies done mostly in highly controlled laboratory experiments or at just one or two natural ponds or sites, Palen says.

But conditions in labs or a few isolated sites are not what the animals typically encounter in the wild and they do not behave in labs as they do in their natural habitat, the new study of a large number of breeding sites, 22 altogether, revealed.

"When simple tests of species physiology are interpreted outside of the animal's natural environment, we often come to the wrong conclusions," Palen says.

For one thing there are lots of "natural sunscreens" in the water. They are in the form of dissolved organic matter -- remnants of leaves and other matter from wetlands and terrestrial areas that are dissolved in the water, much like tea dissolved in a mug of water. The more dissolved organic matter, the less UV exposure.

And places where the water is more crystal clear, the females from the susceptible salamander behaved differently.

"There hasn't been a lot of work on whether organisms are capable of sensing UV intensity, but these salamanders certainly do," Schindler says. "They change their behavior, with the females laying their eggs in the shade when the clarity of the water puts their eggs at risk."

If for some reason UV radiation were to become much more intense, it could reach a point where amphibians can't behave in ways that protect them, Palen says. But the restrictions on the use of ozone-depleting chemicals, under what's called the Montreal Protocol, appear to be helping restore the ozone layer, which filters the amount of UV radiation reaching Earth.

"By critically evaluating what appear to be threats to ecosystems, we can refine our research and conservation priorities and move onto those that will make a difference in helping amphibians survive," Palen says.

The study area includes one of the richest amphibian habitats in northwest Washington's Olympic National Park. The work was conducted in the Seven Lakes Basin of the Sol Duc drainage in subalpine terrain, that is, on mountain sides just at the point trees struggle to grow.

Palen and Schindler intentionally looked at the most-sensitive species that has been tested from the region, the long-toed salamander or Ambystoma macrodactylum, and the least sensitive, the Cascade frog or *Rana cascadae*.

The 4-inch long salamander is black with a bright yellow stripe down its back and gets its name because each of its back feet has a toe that is long compared to the others. On the West Coast, it's found from Central California to Southeast Alaska. Like most salamanders, it lives its adult life on land but needs water to reproduce. The Cascades frog, 2- to 3-inches long, is brown with black spots and a black mask like a raccoon.

It's the most common frog found in waterways at sub-alpine elevations from Northern California to the Canadian border.

The work was supported by the U.S. Geological Survey, U.S. National Park Service, Canon National Park Science Scholars program and the UW Department of Biology.

Story Source:

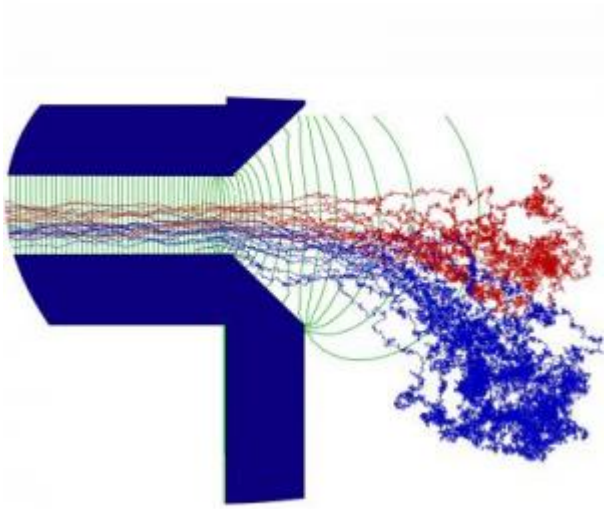
Adapted from materials provided by University of Washington, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Wendy J. Palen, Daniel E. Schindler. **Water clarity, maternal behavior, and physiology combine to eliminate UV radiation risk to amphibians in a montane landscape**. *Proceedings of the National Academy of Sciences*, 2010; DOI: 10.1073/pnas.0912970107

http://www.sciencedaily.com/releases/2010/05/100524101335.htm

Invention Could Aid Mars Probes' Search for Life



The next generation of Mars rovers will use mass spectrometers to search for signs of life, such as amino acids, on the Red Planet. Most current mass spectrometers rely heavily on airflow to guide ionized soil samples through an inlet, down a channel and into a trap for analysis. But this system is less than ideal for Mars missions like ExoMars, due to launch in 2018: airflow requires pumps, and pumps are heavy and energy-hungry. INL's new technology guides ions efficiently using versatile, complex electric fields. The invention could greatly reduce the need for pumps, helping make ExoMars' life-detecting tools smaller, cheaper and more sensitive. (Credit: Idaho National Laboratory)

ScienceDaily (May 24, 2010) — The next generation of Mars rovers could have smaller, cheaper, more robust and more sensitive life-detecting instruments, thanks to a new invention by scientists at the U.S. Department of Energy's Idaho National Laboratory.

The INL team has come up with an efficient new way to generate complex electric fields, which will make it easier to direct ions, or charged particles, along specified paths. The researchers have now filed a patent application for their Total Ion Control method, a key advance in the field of mass spectrometry. Equipment based on TIC could make the Mars Organic Molecule Analyzer (MOMA) -- part of the ExoMars mission scheduled for launch in 2018 -- a better life-detecting tool.

"This is a novel way to shape electric fields for moving ions around," said INL engineer Tim McJunkin, who helped develop the new technology. "It can improve MOMA, and it could improve commercial instruments."

Mass spectrometry allows scientists to determine a sample's chemical composition. The technique has many applications, from flagging explosives at airport screening stations to determining how medicines move through the human body. And it's one of the best ways to find signs of life, such as proteins and amino acids, on other worlds.

In some mass spectrometers, a sample -- for instance, a few grains of Martian soil -- is vaporized, often with a laser. The gas is then ionized, and the charged particles flow through an inlet, down a channel and into an ion trap. The ions are then identified based on details of their movement, which depend on their mass and electrical charge.

To get ions to stream into the trap -- rather than hit the channel walls and "die" -- most current mass spectrometers rely heavily on air flow created by pumps. This system is less than ideal for Mars missions, though; pumps are heavy, and they use a lot of energy.

TIC could assist spectrometers such as MOMA. New TIC-based ion inlets greatly reduce the need for pumps, getting good ion flow solely by generating versatile, intricate electric fields. Since ions are charged particles, properly constructed fields can guide ions safely to the trap all by themselves.

A few other ion inlet technologies attempt to do the same thing, but INL's invention boasts many advantages. For one thing, TIC-based inlets should be cheaper and more robust than their competitors, because they're simpler to construct and have fewer parts. Other devices that generate elaborate, complex electric fields tend to be elaborate and complex themselves. They have multiple, precisely configured electrodes interspersed with other materials that serve as insulators. And they require complicated control electronics, too.

TIC-based solutions, on the other hand, use only a single electrode, and they don't need any insulators. They can be made from many different semi-conducting materials, such as graphite, glass, silicon or polymers. And the fields TIC inlets can generate are not tied to their own shape, meaning they can be incorporated into a wider range of spectrometer designs.

Because of their simple construction, TIC-based inlets are also much smaller and lighter than other types, weighing less than an ounce. This minuscule mass is a big plus for space missions, since it currently costs about $10,000 to put one pound of payload into Earth orbit (and far more to get that payload to Mars).

Energy consumption is another big concern for missions like ExoMars, which is a joint effort between the European Space Agency and NASA. "The ExoMars rover will be powered by nothing but solar," said INL scientist and TIC co-inventor Jill Scott. "So all of its instrument components will have to be very low-power."

INL's new invention hits that mark, too. At a maximum, it requires just 100 milliwatts of power -- one thousand times less than a 100-watt light bulb.

And on top of these advantages, TIC delivers outstanding performance. Tests at INL have shown that TIC inlets shepherd 10 times as many ions down the pike and into the trap as commercially available inlets do. Such efficiency is key to instruments like MOMA, since any signs of life in the Martian soil will likely be few and far between, if they exist at all.

The INL researchers are currently talking to Johns Hopkins University scientist LuAnn Becker, leader of the U.S. MOMA team, about incorporating a TIC-based inlet into MOMA. But the new invention could find many other applications in many different fields, according to Scott.

"This is an enabling technology," she said. "If you want to move ions around cheaply and robustly, and without much weight, this is the way to do it."

Story Source:

Adapted from materials provided by DOE/Idaho National Laboratory, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2010/05/100524072906.htm

More Than 3,500 Pediatric Injuries Related to Crutches, Walkers and Wheelchairs Each Year in the US, Study Finds

ScienceDaily (May 24, 2010) — Children and adolescents with an injury or disability may use mobility aids such as crutches, walkers and wheelchairs to help them move around more easily. However, use of these aids has been associated with risk for injury. A new study conducted by the Center for Injury Research and Policy of The Research Institute at Nationwide Children's Hospital found that more than 63,000 pediatric mobility aid-related injuries were treated in United States emergency departments from 1991-2008, and the annual number of cases increased 23 percent during the 19-year study period.

Results of the study, available as an early release online and appearing in the June print issue of *Pediatrics*, showed that most mobility aid-related injuries occur at home (60 percent). Two injury patterns were also revealed in the data. First, injury patterns varied by the type of mobility aid. Children who used crutches were more likely to sustain injuries to the arms and legs and to be diagnosed with a strain or a sprain. Children who used walkers or wheelchairs, on the other hand, had a higher likelihood of sustaining injuries to the head, were three times more likely to be diagnosed with a traumatic brain injury (TBI) and had a higher likelihood of being hospitalized for their injuries.

"The associations between injury characteristics and type of mobility aid may be a result of the limitations of the children who were using the various aids. Crutch users typically have fewer cognitive, stability and functional limitations than walker and wheelchair users," explained study author Lara McKenzie, PhD, principal investigator in the Center for Injury Research and Policy at Nationwide Children's Hospital. "Likewise, children who fall while using crutches may be able to catch themselves with their feet or hands more easily than those who fall while using walkers or wheelchairs, thereby preventing injuries to the head but leading to more upper extremity injuries."

Also revealed in the data were distinct age associated patterns of mobility aid-related injury. Younger children (10 years of age and younger), who made up 42 percent of all cases, were more likely to injure their heads and sustain TBIs. Children 11 to 19 years of age were more likely to injure their lower extremities and to sustain sprains or strains. The risk for transfer-related injuries, which are injuries that occur when children are moving from one activity to another such as getting in or out of the car or the bath tub, was also greater for older children. This is likely because older children may be more difficult for caregivers to lift or carry.

The study also examined injuries that resulted from the misuse of mobility aids, such as trying a friend's crutches or standing in a wheelchair. Misuse-related injuries occurred in 8 percent of all cases, and crutches were most commonly involved.

"Additional research is essential for identifying injury prevention strategies that are specific to the pediatric population and the particular mobility aids. Research on the underlying conditions and reasons for pediatric mobility aid use may expand the understanding of these injury patterns," said Dr. McKenzie, also a faculty member of The Ohio State University College of Medicine.

This is the first published study to describe the incidence, patterns and trends of pediatric mobility aid-related injuries to children and adolescents treated in U.S. emergency departments over the past two decades. Data for this study were collected from the National Electronic Injury Surveillance System (NEISS), which is operated by the U.S. Consumer Product Safety Commission. The NEISS data set provides information on consumer product-related and sports and recreation-related injuries treated in hospital emergency departments across the country.

Story Source:

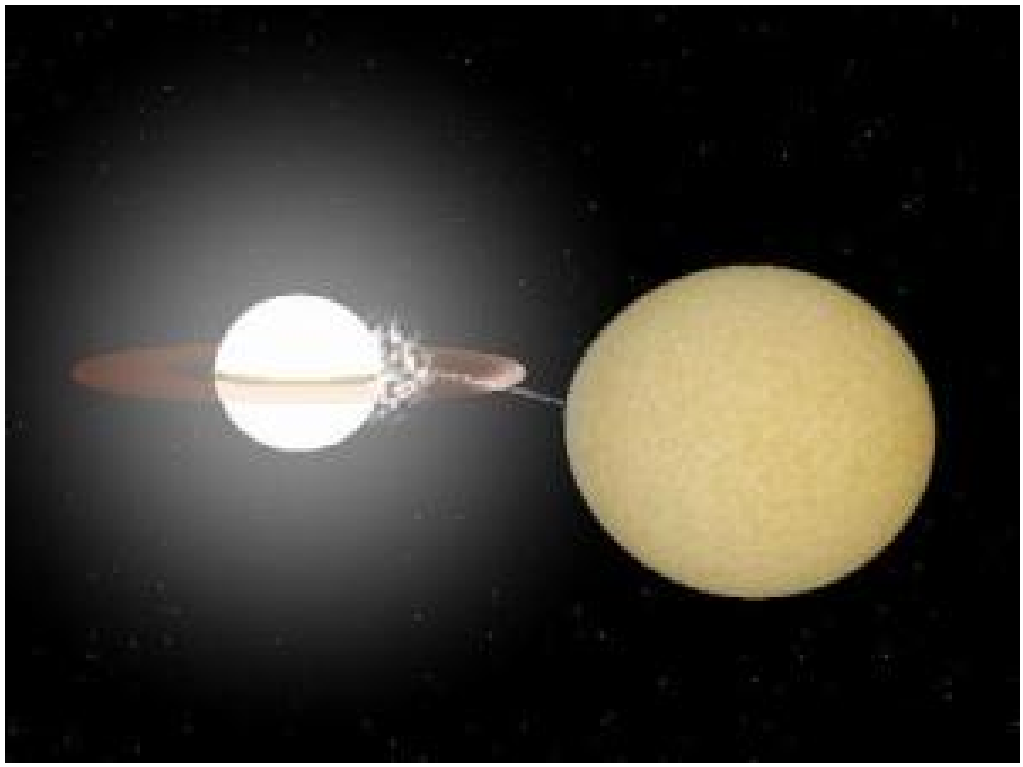
Adapted from materials provided by Nationwide Children's Hospital.

Journal Reference:

1. Alison M. Barnard, Nicolas G. Nelson, Huiyun Xiang, and Lara B. McKenzie. **Pediatric Mobility Aid-Related Injuries Treated in US Emergency Departments From 1991 to 2008**. *Pediatrics*, 2010; DOI: 10.1542/peds.2009-3286

http://www.sciencedaily.com/releases/2010/05/100524101345.htm

Regular Violent Eruptions from Interacting Pair of Stars



An artist's impression of the helium eating binary KL Dra. The stream of helium can be seen flowing from the lighter star on the right to its more massive companion on the left. (Credit: R. Hynes and G. Roelofs)

ScienceDaily (May 24, 2010) — A team of astronomers led by Dr Gavin Ramsay of Armagh Observatory has spotted violent eruptions from an interacting pair of stars that orbit around each other every 25 minutes. Unusually, these outbursts take place at regular and predictable intervals, erupting every two months.

The new observations were made using the fully robotic Liverpool Telescope sited in the Canary Islands and the orbiting Swift observatory. The results will appear in the journal *Monthly Notices of the Royal Astronomical Society*.

The stars are both helium-rich white dwarfs, the compact remnants that are the end state of stars like our Sun. Reflecting their location in the direction of the constellation of Draco, they are named KL Dra. They are separated by a distance equivalent to just half that between the Earth and Moon, close enough for the more massive partner to drag helium off its lighter companion.

The resulting stream of helium travels from one white dwarf and eventually lands on the other at speeds of millions of km per hour. Most of the time the material gets jammed up in a swirling disc around the accreting companion, with only a trickle landing on the star itself, causing it to quietly glow at optical, ultra-violet and X-ray energies. However, the team discovered that every two months the material in the disc gets suddenly released in a giant eruption that causes the stellar system to shine tens of times more brightly than before.

This binary is one of very few systems on a strict helium diet. The hydrogen which was originally in both stars has long been converted into helium and heavier elements. Almost all other interacting binary systems so

far discovered transfer hydrogen material instead. Since helium is heavier and has different properties to hydrogen, the team expect the eruption properties of KL Dra to be different to those of the more familiar hydrogen eating binaries.

As KL Dra is a helium eating binary that erupts regularly and predictably, scientists can plan detailed and sensitive observations using a range of telescopes when it is in outburst. These observations will potentially have wide ranging implications since the same general process of accretion takes place in many astrophysical systems, ranging from young stars in the process of forming, to massive black holes found at the centre of galaxies.

The team of astronomers obtained complementary observations of KL Dra using the Swift observatory. This showed that the eruption was seen very strongly in ultraviolet (UV) light. Surprisingly, unlike the hydrogen eating binaries there was no change in the system's brightness in X-rays during the eruption.

Tom Barclay, a postgraduate student at Armagh Observatory and UCL's Mullard Space Science Laboratory said, "We have a programme to take observations of a dozen helium eating binaries using the Liverpool Telescope to see if they behave in the same way. It was a big surprise to see a second outburst from KL Dra just two months after the first. We then predicted the next outburst would start on December 7th of last year. It was very exciting when our observations showed that it went into outburst on exactly that date!"

Prof. Iain Steele, Director of the Liverpool Telescope commented, "This is another excellent example of the unique power of our robotic telescope that proves particularly effective when it works with space based observatories like Swift. In this case it helped us to discover a completely new type of celestial object. The flexible schedule of the Liverpool Telescope makes it easy for us to coordinate our observations with other facilities and monitor objects that vary on timescales from seconds to years. This approach is virtually impossible with a conventional professional observatory."

Dr Simon Rosen of the University of Leicester and part of the team who made the discovery added, "Thankfully, X-rays and most UV radiation doesn't get through the Earth's atmosphere, so only space-based observatories can observe the high-energy emission from these extreme objects. With its unrivalled capability for making very frequent X-ray and UV observations, we were able to use the Swift to probe the system at high energies and confirm the Liverpool Telescope result."

Dr Ramsay is delighted by the team's work. "Projects like this can take several years to deliver results, so it was great to get such an interesting finding after just a few months."

Story Source:

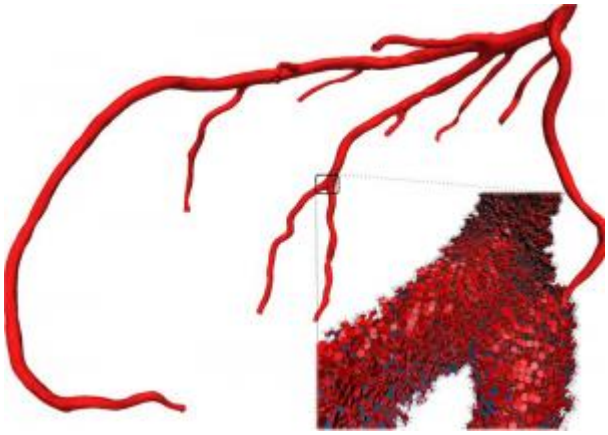
Adapted from materials provided by Royal Astronomical Society (RAS).

Journal Reference:

1. Gavin Ramsay, Iwona Kotko, Tom Barclay, Chris Copperwheat, Simon Rosen, C. Simon Jeffery, Tom Marsh, Danny Steeghs, Peter Wheatley. **Multi-wavelength observations of the helium dwarf nova KL Dra through its outburst cycle**. *Monthly Notices of the Royal Astronomical Society*, 2010; (accepted) [link]

http://www.sciencedaily.com/releases/2010/05/100524085514.htm

3-D Model of Blood Flow by Supercomputer Predicts Heart Attacks



Left coronary arteries showing the ramification of vessels and the red blood cells flowing in one subregion. The longest coronary arteries have a size of few centimeters and the red blood cells have a linear size of about 10 microns. (Credit: Image courtesy of Ecole Polytechnique Fédérale de Lausanne)

ScienceDaily (May 24, 2010) — Researchers at the EPFL Laboratory of Multiscale Modeling of Materials, in Switzerland, have developed a flowing 3-D model of the cardiovascular system that should allow for predictions of certain heart diseases before they become dangerous.

The supercomputer Cadmos, installed at the Ecole Polytechnique Fédérale de Lausanne (EPFL) in August of 2009, has bared one of its first fruits: the Laboratory of Multiscale Modeling of Materials has recently developed a computer program the accurately models the complex system of blood flow in the heart for individuals at an unheard-of precision of ten millionths of a meter or ten microns. These individual-specific models -- which take up to six hours using a supercomputer -- will allow for a detailed study of the cardiovascular system and lead to early predictions of heart conditions such as arteriosclerosis, or the hardening of arteries that often leads to heart attacks.

Plans are in the works to develop the program for individual PCs for clinical applications within the next two to three years."When studying the blood flow in arteries, one has to take into account a vast number of different fluid interactions that happen on different time scales and of different sizes," explains Simone Melchionna, who heads the project.

Based on a detailed heart scan, the simulation juggles over a billion different variables in order to represent a fluid containing ten-million red blood cells. Using another supercomputer based in Juelich (Germany), the research team has achieved even greater precision with their program that allows for the visualization of the interaction of plasma, red blood cells and even micro-particles. "We can evaluate all of the elements and how they interact with each other; move, stagnate and whirl and turn over each other," Melchionna adds.

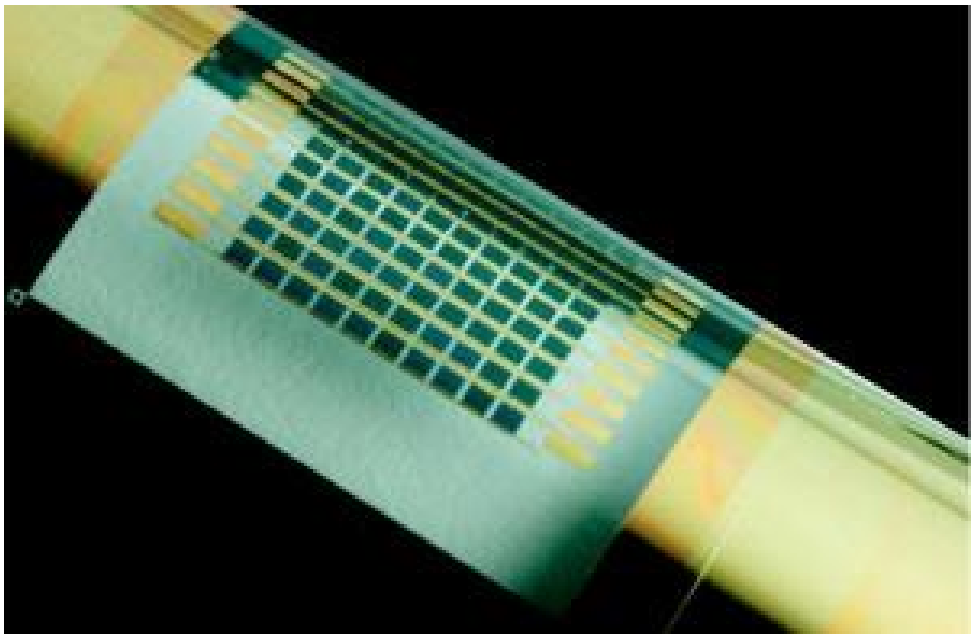
This precision will allow for the detection of the first signs of arteriosclerosis when the plaques begin to form on the artery's walls and disturb blood flow. This condition, which creates dangerous rigidity and blockage of these vital vessels, is the main cause of heart attacks -- responsible for 12% of deaths in the world. This mortality rate increases to 16% in richer countries, where greasy and cholesterol rich foods are more common. Early detection of the forces leading to arteriosclerosis is one element in the strategy developed by EPFL and the universities of Geneva and Lausanne to rationalize the investment in a supercomputer of 16,000 microprocessors -- the equivalent of 8,000 PCs.

Story Source:

Adapted from materials provided by Ecole Polytechnique Fédérale de Lausanne.

http://www.sciencedaily.com/releases/2010/05/100520102913.htm

Semiconductor Manufacturing Technique Holds Promise for Solar Energy



A flexible array of gallium arsenide solar cells. Gallium arsenide and other compound semiconductors are more efficient than the more commonly used silicon. (Credit: John Rogers)

ScienceDaily (May 24, 2010) — Thanks to a new semiconductor manufacturing method pioneered at the University of Illinois, the future of solar energy just got brighter.

Although silicon is the industry standard semiconductor in most electronic devices, including the photovoltaic cells that solar panels use to convert sunlight into energy, it is hardly the most efficient material available. For example, the semiconductor gallium arsenide and related compound semiconductors offer nearly twice the efficiency as silicon in solar devices, yet they are rarely used in utility-scale applications because of their high manufacturing cost.

U. of I. professors John Rogers and Xiuling Li explored lower-cost ways to manufacture thin films of gallium arsenide that also allowed versatility in the types of devices they could be incorporated into. "If you can reduce substantially the cost of gallium arsenide and other compound semiconductors, then you could expand their range of applications," said Rogers, the Lee J. Flory Founder Chair in Engineering Innovation, and a professor of materials science and engineering and of chemistry.

Typically, gallium arsenide is deposited in a single thin layer on a small wafer. Either the desired device is made directly on the wafer, or the semiconductor-coated wafer is cut up into chips of the desired size. The Illinois group decided to deposit multiple layers of the material on a single wafer, creating a layered, "pancake" stack of gallium arsenide thin films.

"If you grow 10 layers in one growth, you only have to load the wafer one time," said Li, a professor of electrical and computer engineering. "If you do this in 10 growths, loading and unloading with temperature ramp-up and ramp-down take a lot of time. If you consider what is required for each growth -- the machine, the preparation, the time, the people -- the overhead saving our approach offers is a significant cost reduction."

Next the researchers individually peel off the layers and transfer them. To accomplish this, the stacks alternate layers of aluminum arsenide with the gallium arsenide. Bathing the stacks in a solution of acid and an oxidizing agent dissolves the layers of aluminum arsenide, freeing the individual thin sheets of gallium arsenide. A soft stamp-like device picks up the layers, one at a time from the top down, for transfer to another substrate -- glass, plastic or silicon, depending on the application. Then the wafer can be reused for another growth.

"By doing this we can generate much more material more rapidly and more cost effectively," Rogers said. "We're creating bulk quantities of material, as opposed to just the thin single-layer manner in which it is typically grown."

Freeing the material from the wafer also opens the possibility of flexible, thin-film electronics made with gallium arsenide or other high-speed semiconductors. "To make devices that can conform but still retain high performance, that's significant," Li said.

In a paper to be published online May 20 in the journal *Nature*, the group describes its methods and demonstrates three types of devices using gallium arsenide chips manufactured in multilayer stacks: light sensors, high-speed transistors and solar cells. The authors also provide a detailed cost comparison.

Another advantage of the multilayer technique is the release from area constraints, especially important for solar cells. As the layers are removed from the stack, they can be laid out side-by-side on another substrate to produce a much larger surface area, whereas the typical single-layer process limits area to the size of the wafer."For photovoltaics, you want large area coverage to catch as much sunlight as possible. In an extreme case we might grow enough layers to have 10 times the area of the conventional route," Rogers said."You really multiply the area coverage, and by a similar multiplier you reduce the cost, while at the same time eliminating the consumption of the wafer," he said.

Among the paper's co-authors are two scientists from Semprius Inc., a North Carolina-based startup company that is beginning to use this technique to manufacture solar cells. A shift from silicon-based panels to more efficient gallium arsenide models could make solar power a more cost-effective form of alternative energy.

Next, the group plans to explore more potential device applications and other semiconductor materials that could adapt to multilayer growth.The Department of Energy and National Science Foundation-funded team also includes U. of I. postdoctoral researchers Jongseung Yoon, Sungjin Jo and Inhwa Jung; students Ik Su Chun and Hoon-Sik Kin; and electrical and computer engineering professor James Coleman, along with Ungyu Paik, of Hanyang University in Seoul, and Semprius scientists Matthew Meitl and Etienne Menard.

Story Source:

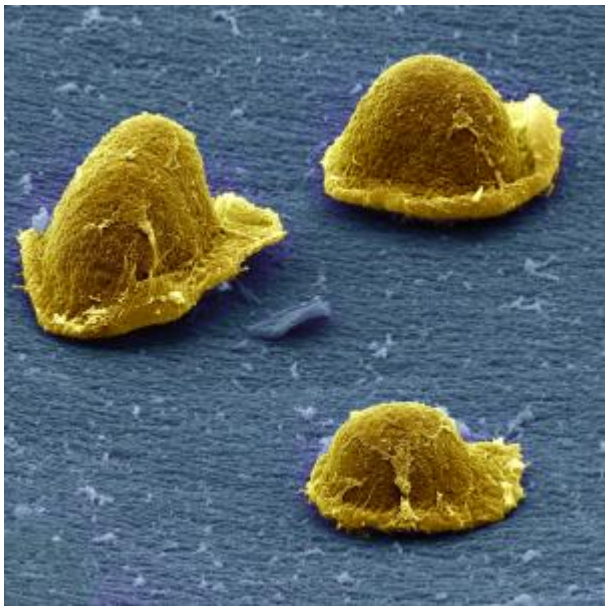
Adapted from materials provided by University of Illinois at Urbana-Champaign.

Journal Reference:

1. Jongseung Yoon, Sungjin Jo, Ik Su Chun, Inhwa Jung, Hoon-Sik Kim, Matthew Meitl, Etienne Menard, Xiuling Li, James J. Coleman, Ungyu Paik, John A. Rogers. **GaAs photovoltaics and optoelectronics using releasable multilayer epitaxial assemblies**. *Nature*, 2010; 465 (7296): 329 DOI: 10.1038/nature09054

http://www.sciencedaily.com/releases/2010/05/100520093036.htm

Small RNA Controls a Bacterium's Social Life



Myxococcus xanthus is capable of what is arguably the most sophisticated form of development among bacteria. When stressed, cells collaborate to create fruiting bodies (yellow), which can be composed of one cell type or multiple genetically distinct types. This social behavior is controlled by an sRNA molecule the scientists have named Pxr. (Credit: Image courtesy of Juergen Berger and Supriya Kadam)

ScienceDaily (May 24, 2010) — For the first time, biologists have directly shown how spontaneous mutation of a small RNA (sRNA) regulatory molecule can provide an evolutionary advantage. Reporting in this week's *Science*, Indiana University Bloomington scientists also identify the sRNA as a key regulator of social behavior in *Myxococcus xanthus*, a soil bacterium widely studied for its ability to cooperatively construct fruiting bodies that house stress-resistant spores when food runs out.

"We'd been asking how one of our experimental lineages had re-evolved the ability to make fruiting bodies and ended up discovering a completely new aspect of *Myxococcus* biology," said IU Bloomington evolutionary biologist Gregory Velicer.

A genetic change in the sRNA of interest, 'Pxr', had been previously found to give an evolved mutant of M. xanthus a competitive edge over both the mutant's immediate parent, a social "cheater" that does not make fruiting bodies, and that cheater's own ancestor, a cooperative wild-type strain that does construct fruiting bodies. IU Bloomington molecular biologist Yuen-Tsu Nicco Yu and Velicer had been investigating how the mutation converted the socially inept parental cheater into a new strain with a restored capacity to make fruiting bodies.

The scientists learned that the mutation of interest lay within the gene for an sRNA, a class of genetic elements in bacteria new enough to science that their molecular and evolutionary roles are only beginning to be understood.

"It's been known for some time that sRNAs are important regulators of gene expression in other species of bacteria," Velicer said. "However, we did not know that an sRNA plays a central role in controlling the main thing that makes *Myxococcus* interesting -- its incredibly sophisticated multicellular behavior."

Small RNA molecules are transcripts of an organism's genome, similar to the messenger RNAs (mRNAs) that encode proteins. Unlike mRNAs, however, the main function of sRNAs is to regulate the expression of other genes, which they accomplish by binding to target mRNAs or by interacting with proteins.

Scientists have known for decades that sRNAs regulate biological processes inside of cells, but speculation about how sRNAs evolve to increase evolutionary fitness has been based on inferences from comparing sequence differences that originated in the distant past, not on direct observation.

Unlike cells of its troglodytic bacterial cousins that merely cluster in biofilms, M. xanthus cells interact more intricately. Under favorable conditions, wild-type M. xanthus cells swarm in coordinated social groups, moving about and dividing to take advantage of available food, which is often other microbes that M. xanthus kills and consumes as prey. When stressed by lack of food, M. xanthus cells aggregate together and exchange chemical signals to form fruiting bodies, nub-shaped structures that may contain the progeny of several different lineages. Inside the nub, some cells are directed to form spores. The hardy spores have a drastically reduced metabolism and resist various stresses such as starvation, dehydration and temperatures that would kill growing cells.

Because some M. xanthus cells are directed to support the structure of the fruiting body while other, arguably more fortunate cells are directed to form surviving spores, many scientists believe M. xanthus represents a good model for studying the origins of cell differentiation within microbial social groups.

In previous research, Velicer had found that some M. xanthus strains behave as social cheaters that do not form fruiting bodies on their own but can instead exploit the benefits of fruiting bodies built by other cells. One such cheater named OC, or "obligate cheater," had spontaneously evolved in a previous experiment. OC cells produce as many as 100 times more spores than wild-type cells within fruiting bodies composed of both cell types, even though OC makes far fewer spores than wild-type cells in separate pure groups. But OC's cheating ways have a downside. As OC cells outcompete wild-type cells in mixed groups, subsequent generations have fewer wild-type cells. As the wild-type cooperators diminish in number, so do OC's opportunities for making spores. Eventually, populations in which OC and wild type are allowed to compete with one another over several cycles of development and growth crash to low numbers when the cheater cells become common.

During one such competition, a spontaneously mutated descendent of OC emerged in the population that not only outcompeted both OC and wild-type cells, but also demonstrated renewed capacity for making fruiting bodies and spores in pure culture. Velicer named the mutant PX (Phoenix) and used recently developed genome sequencing technology to identify a single point mutation (cytosine to adenine) that distinguishes PX from OC. Yu then performed experiments showing that this one mutation was indeed the direct cause of PX's emergence and success. However, the mechanism by which this mutation restored fruiting body development in PX remained a mystery.

In their current study, Yu and Velicer show that the single base mutation in PX restores fruiting body development by turning off a negative regulatory function of the sRNA Pxr. They found that in the wild-type strain, Pxr prevents fruiting bodies from forming when food remains abundant. However, when food runs low, wild-type cells open the gate for fruiting body formation to proceed by removing the blockage of development imposed by Pxr during growth. In contrast, in pure cultures of the cheater OC, Pxr prevents cells from ever triggering development because OC is defective at responding to a signal that would normally relax Pxr's blockage of development upon starvation.

Yu and Velicer further show that the single mutation in strain PX destroys the negative regulatory function of Pxr that OC is unable to remove upon starvation. This mutation in PX gives it a large advantage over both OC

and wild-type in mixed cultures and even causes PX to make about eight times more spores than wild-type in pure cultures. Deletion of the entire gene encoding Pxr was found to have a similar effect.

Yu and Velicer, along with graduate student Xi Yuan, also learned that Pxr has two forms, long and short, possibly because of an RNA nuclease that chews away the end of the long form. The scientists report preliminary evidence that the short version of Pxr may be the active form. If these hypotheses are confirmed, it would appear to be the first instance of a bacterial sRNA that must be processed to perform its function. In eukaryotes, processing of non-coding regulatory RNAs into active forms is common.

"Evolutionary studies like this one can provide powerful insights into the fundamental mechanisms by which model organisms work," Velicer said. "Now that genome sequencing is fast and cheap, we are going to see more reports showing exactly what mutations underlie evolutionary changes in fitness, behavior and metabolic abilities. We expect that many similar evolutionary studies in the future will discover important aspects of how organisms work that had not been revealed by traditional molecular genetic approaches."

This research was funded by a grant from the National Institutes of Health (GM 079690).

Story Source:

Adapted from materials provided by Indiana University.

Journal Reference:

1. Yuen-Tsu N. Yu, Xi Yuan, Gregory J. Velicer. **Adaptive Evolution of an sRNA That Controls Myxococcus Development**. *Science*, 2010; 328 (5981): 993 DOI: 10.1126/science.1187200

http://www.sciencedaily.com/releases/2010/05/100520141210.htm

Uncovering Lithium's Mode of Action

ScienceDaily (May 24, 2010) — Though it has been prescribed for over 50 years to treat bipolar disorder, there are still many questions regarding exactly how lithium works. However, in a study appearing in this month's *Journal of Lipid Research*, researchers have provided solid evidence that lithium reduces brain inflammation by adjusting the metabolism of the health-protective omega-3-fatty acid called DHA.

Inflammation in the brain, like other parts of the body, is an important process to help the brain combat infection or injury. However, excess or unwanted inflammation can damage sensitive brain cells, which can contribute to psychiatric conditions like bipolar disorder or degenerative diseases like Alzheimers.

It's believed that lithium helps treat bipolar disorder by reducing brain inflammation during the manic phase, thus alleviating some of the symptoms. Exactly how lithium operates, though, has been debated.

Mireille Basselin and colleagues at the National Institute of Aging and University of Colorado, Denver, took a detailed approach to this question by using mass spectrometry analysis to analyze the chemical composition of brain samples of both control and lithium-treated rats stressed by brain inflammation.

They found that in agreement with some other studies, rats given a six-week lithium treatment had reduced levels of arachidonic acid and its products, which can contribute to inflammation.

In addition, they also demonstrated, for the first time, that lithium treatment increased levels of a metabolite called 17-OH-DHA in response to inflammation. 17-OH-DHA is formed from the omega-3 fatty acid DHA (docosahexaenoic acid) and is the precursor to a wide range of anti-inflammatory compounds known as docosanoids. Other anti-inflammatory drugs, like aspirin, are known to also enhance docosanoids in their mode of action.

Basselin and colleagues noted that the concentration of DHA did not increase, which suggests that lithium may increase 17-OH-DHA levels by affecting the enzyme that converts DHA to 17-OH-DHA.

By reducing both pro-inflammatory AA products, and increasing anti-inflammatory DHA products, lithium exerts a double-protective effect which may explain why it works well in bipolar treatment. Now that its mechanism is a little better understood, it may lead to additional uses for this chemical.

Story Source:

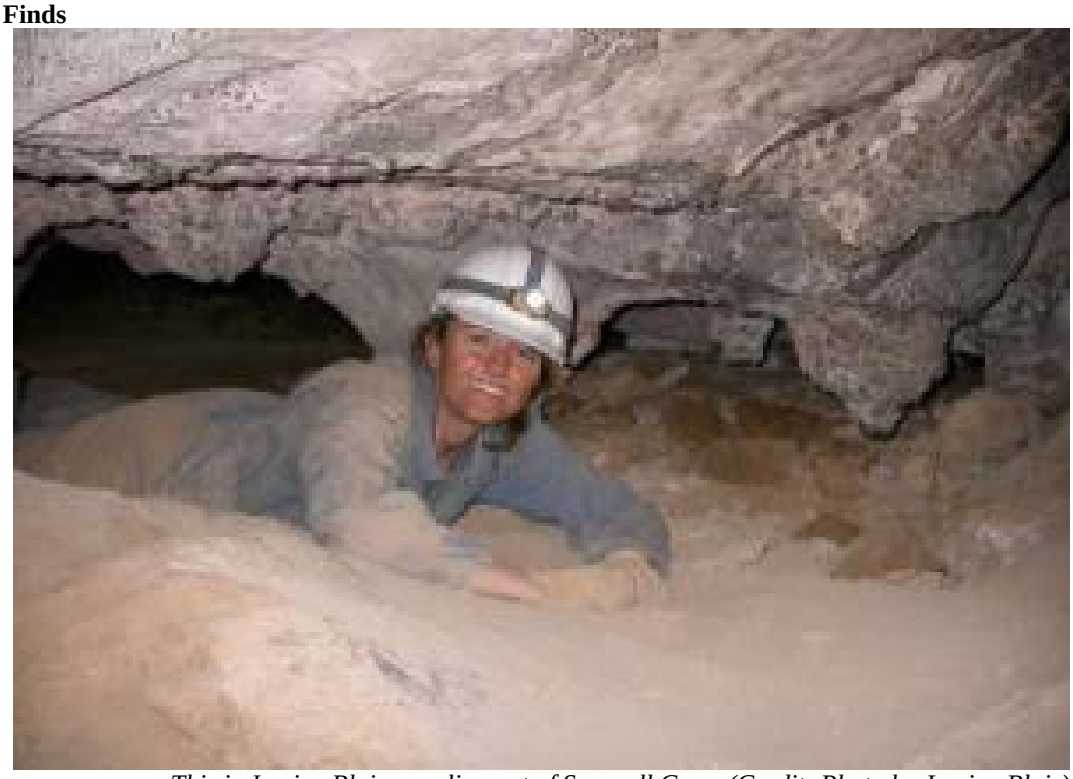
Adapted from materials provided by American Society for Biochemistry and Molecular Biology, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Basselin et al. **Lithium modifies brain arachidonic and docosahexaenoic metabolism in rat lipopolysaccharide model of neuroinflammation**. *The Journal of Lipid Research*, 2010; 51 (5): 1049 DOI: 10.1194/jlr.M002469

http://www.sciencedaily.com/releases/2010/05/100521191440.htm

Small Mammals -- And Rest of Food Chain -- At Greater Risk from Global Warming Than Thought, Research Finds



This is Jessica Blois crawling out of Samwell Cave. (Credit: Photo by Jessica Blois)

ScienceDaily (May 24, 2010) — The balance of biodiversity within North American small-mammal communities is so out of whack from the last episode of global warming about 12,000 years ago that the current climate change could push them past a tipping point, with repercussions up and down the food chain, say Stanford biologists. The evidence lies in fossils spanning the last 20,000 years that the researchers excavated from a cave in Northern California.

What they found is that although the small mammals in the area suffered no extinctions as a result of the warming that occurred at the end of the Pleistocene epoch, populations of most species nonetheless experienced a significant loss of numbers while one highly adaptable species -- the deer mouse -- thrived on the disruptions to the environment triggered by the changing climate.

"If we only focus on extinction, we are not getting the whole story," said Jessica Blois, lead author of a paper detailing the study to be published online by *Nature* on May 23. "There was a 30 percent decline in biodiversity due to other types of changes in the small-mammal community."

The double whammy of late Pleistocene warming, coupled with the coinciding arrival of humans on the North American continent, took a well-documented heavy toll on the large animals. Almost a third of the big, so-called "charismatic" animals -- the ones with the most popular appeal for humans, such as mammoths and mastodons, dire wolves and short-faced bears -- went extinct. But until now, little had been done to explore the effects of that climate shift on smaller fauna.

"We were interested in the small animals because we wanted to know about the response of the survivors, the communities of animals that are still on the landscape with us today," said Elizabeth Hadly, professor of

biology and a coauthor of the paper. "We focused not only on the Pleistocene transition, but also the last 10,000 or so years since then."

Blois and Hadly excavated deposits in Samwell Cave, in the southern Cascades foothills. They also sampled the modern small-mammal community by doing some live trapping in the area of the cave. Blois was a graduate student in biology when they did the work and Hadly her adviser. Radiocarbon dating of the samples was done by Jenny McGuire, a graduate student at the University of California-Berkeley.

The biggest change they saw in the fossil deposits was the manner in which different small-animal species were spread across the landscape. "In the Pleistocene, there were about as many gophers as there were voles as there were deer mice," Hadly said. "But as you move into the warming event, there is a really rapid reduction in how evenly these animals are distributed."

Some species became extremely rare, others quite common. And the species that became king of the landscape -- by virtue of its very commonness -- was the deer mouse.

"That is a pretty big, somewhat startling result," she said, noting that deer mice are so common in western landscapes that most people assume they have virtually always been so. "What these data tell us is that in the Pleistocene they were not dominant at all."

Prior to this study, Hadly said most researchers would not have expected species that survived the warming to show any effects. After all, they survived. "What we are saying is there was a big effect," she said. And as some species such as deer mice flourished, many other species declined.

"Local declines of species are the precursor of local extinction," said Rodolfo Dirzo, a biology professor at Stanford who was not involved in the study. Local population declines also imply disruption of the local ecosystem even without extinctions, he said.

"Small mammals are so common, we often take them for granted," Blois said. "But they play important roles within ecosystems, in soil aeration and seed dispersal, for example, and as prey for larger animals." And different small mammals play those roles differently.

"Deer mice just kind of eat everything, they live everywhere and they don't operate with the same complexity in an ecosystem that these other animals take as their roles," said Hadly. She said deer mice are considered a "weedy" species and, like the plants, don't have a strong habitat preference -- they are generalists that will move in wherever there is an opening. When they replace other small-mammal species, the effects ripple through the ecosystem.

Deer mice don't dig the elaborate deep burrows that gophers do, so the mice don't aerate soils as effectively. They also don't disperse seeds the same way as tree squirrels, the consummate hoarders -- and forgetters -- of seeds; each forgotten cache is another colonization opportunity for the trees.

Nor do the nocturnal mice feed predators the same way as ground squirrels or chipmunks, which are active in the daytime. If those species are supplanted by deer mice, the change can affect the food supply of hawks and other creatures that feed in the daytime.

"Even though all of the species survived, small-mammal communities as a whole lost a substantial amount of diversity, which may make them less resilient to future change," Blois said.

And according to Hadly, an extraordinarily rapid change is looming.

"The temperature change over the next hundred years is expected to be greater than the temperature that most of the mammals that are on the landscape have yet witnessed as a species," she said. "The small-mammal community that we have is really resilient, but it is headed toward a perturbation that is bigger than anything it has seen in the last million years."

Story Source:

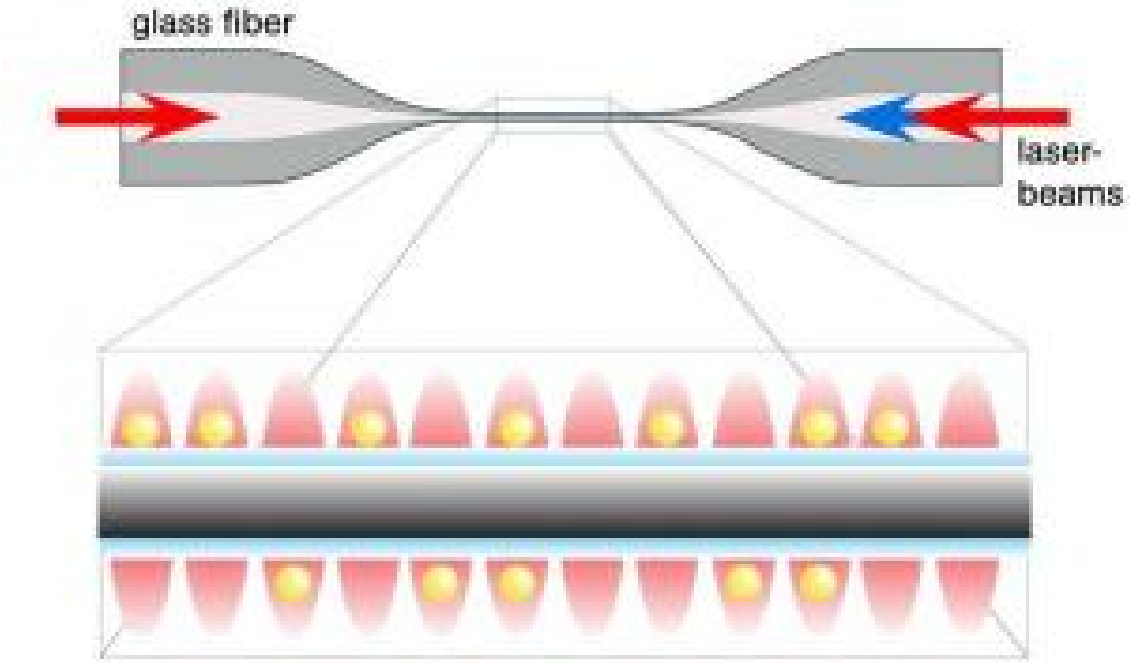
Adapted from materials provided by Stanford University, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Jessica L. Blois, Jenny L. McGuire & Elizabeth A. Hadly. **Small mammal diversity loss in response to late-Pleistocene climatic change**. *Nature*, 2010; DOI: 10.1038/nature09077

http://www.sciencedaily.com/releases/2010/05/100523205822.htm

Physicists Develop a Quantum Interface Between Light and Atoms



The Mainz quantum interface. Using laser light which travels through a tapered glass fiber, cesium atoms are trapped along its ultra-thin waist. The central part of the fiber is thinner than the wavelength of the light itself. As a consequence, the latter protrudes into the space surrounding the fiber and couples to the trapped atoms. (Credit: Copyright QUANTUM, JGU Mainz)

ScienceDaily (May 24, 2010) — Physicists at the Johannes Gutenberg University Mainz have developed a quantum interface which connects light particles and atoms. The interface is based on an ultra-thin glass fiber and is suitable for the transmission of quantum information. This is an essential prerequisite for quantum communication which shall be used for secure data transmission via quantum cryptography.

"Our quantum interface might also prove useful for the realization of a quantum computer," adds Professor Dr Arno Rauschenbeutel from the Institute of Physics at Mainz University.

Today, telephone and internet primarily rely on the optical transmission of data using glass fiber cables. In that sense, glass fiber networks can be considered as the backbone of the modern communication society. The light that travels through them is not a continuous flow of energy. It rather consists, as was discovered by Albert Einstein, of indivisible energy quanta, or photons. Each photon can then transmit one bit of information, corresponding to a zero or one.

In addition to being very efficient, this also opens the route towards entirely new ways of communication because, being quantum objects, photons can exist simultaneously in both states, zero and one. As an example, this property is what makes quantum cryptography possible and thereby enables absolute protection against eavesdropping.

In order to fully exploit the potential of quantum communication, however, one additionally needs the possibility to store the quantum information that is encoded on each photon. Photons themselves are not well suited for this purpose because one cannot hold them at a given position. Therefore, it would be much more

advantageous to transfer the quantum information to atoms. For this purpose one thus requires a quantum interface between photons and atoms which should ideally be easily integrated into glass fiber networks.

A group of physicists led by Professor Arno Rauschenbeutel at the Johannes Gutenberg University Mainz, Germany, has now realized such a glass fiber-based quantum interface. As reported by the research team in the current issue of the scientific journal *Physical Review Letters*, the central part of the work in Mainz is a glass fiber which has been heated and stretched until it measures only one hundredth of the diameter of a human hair.

Remarkably, this nanofiber is thinner than the wavelength of the light it guides. As a consequence, the light is no longer restricted to the inside of the nanofiber but laterally protrudes into the space surrounding the fiber. Using this so-called evanescent field, the scientists trapped cesium atoms after they have been cooled to a few millionth of a degree above absolute zero by irradiation with suitably chosen laser light. When trapped, the atoms are arranged in a regular pattern and are levitated 200 nm above the surface of the nanofiber. This distance might seem very small but it indeed is big enough to protect the atoms from the spurious influences of the fiber surface. At the same time, the atoms reside in the evanescent field and thus interact with the photons propagating through the nanofiber.

As was demonstrated by the Mainz researchers, this process is so efficient that only a couple of thousand atoms should suffice for a close to lossless transfer of quantum information between photons and atoms. Further possible applications of the Mainz quantum interface include the connection of different quantum systems. As an example, the trapped atoms could be brought into close vicinity of a superconducting quantum circuit in order to combine the advantageous properties of both systems. This would then be an important step towards the realization of a quantum computer.

Story Source:

Adapted from materials provided by Universitaet Mainz.

Journal Reference:

1. E. Vetsch, D. Reitz, G. Sagué, R. Schmidt, S. T. Dawkins, A. Rauschenbeutel. **Optical Interface Created by Laser-Cooled Atoms Trapped in the Evanescent Field Surrounding an Optical Nanofiber**. *Physical Review Letters*, 2010; 104 (20): 203603 DOI: 10.1103/PhysRevLett.104.203603

http://www.sciencedaily.com/releases/2010/05/100521092624.htm

Patients Have Misconceptions and High Levels of Anxiety About General Anesthesia

ScienceDaily (May 24, 2010) — Eight-five per cent of patients who took part in a survey shortly after day surgery said that they had been anxious about receiving a general anaesthetic, according to research in the May issue of the *Journal of Advanced Nursing*.

Seventeen per cent of respondents said they were very or extremely anxious, 22 per cent said they were quite anxious, 46 per cent said they were a little anxious and 15 per cent experienced no anxiety at all.

Key concerns included dying while asleep, not waking up after surgery, waking up during surgery and anxiety while waiting to go into surgery or arriving at the theatre door.

"Our survey underlines the importance of patients receiving planned and timely information about anaesthesia, prior to the day of surgery, in order to limit their anxiety" says Dr Mark Mitchell, senior lecturer in the Faculty of Health and Social Care at the University of Salford, UK.

"This should include information about how anaesthesia is managed, the notion of carefully controlled and supervised anaesthesia and dispelling misconceptions associated with general anaesthesia."

Patients scheduled for elective surgery in three day surgery units in England were invited to take part in the survey and 460 patients -- a response rate of 37 per cent -- completed the questionnaire within 24 to 48 hours of surgery.

The patients who took part were aged between 18 and 75, with an average age of 46, and 59 per cent were female. The majority had undergone gynaecological, general, orthopaedic, urological and ear, nose and throat surgery.

Patients were asked to indicate their anxiety levels about 24 different issues. This showed that:

- The top three concerns that made patients very anxious were the thought of not waking up (26 per cent), dying while asleep (25 per cent) and waking up during surgery (20 per cent).
- When the researchers combined all the patients who were anxious, the top five concerns were: waiting for their turn in theatre (59 per cent), the thought of arriving at the theatre door (56 per cent), dying while asleep or not waking up afterwards (both 48 per cent) and waking up during surgery (46 per cent).
- Forty-one per cent said that they didn't like the thought of having to put their trust in strangers and 12 per cent felt very anxious about this.
- Anxiety levels were lowest when it came to interactions with medical staff and the support of a partner or friend. Thirty per cent felt very calm about the anaesthetist explaining the procedure, 28 per cent about the anaesthetist visiting and 17 per cent about the nurse explaining the procedure. Twenty-six per cent felt very calm about having a friend or partner with them during recovery.

"Undergoing day surgery and general anaesthesia is very common" says Dr Mitchell. "The development of less invasive techniques means that the surgical effects on the body are now markedly reduced and, as a direct consequence, the amount of physical nursing care required before and after surgery is also considerable reduced.

"However, while patients need less physical nursing care, our survey shows that more attention needs to be paid to the psychological aspects of their care.

"The formal and timely provision of information about the planned surgery -- together with a patient-centred approach to the provision of information, such as pre-assessment clinics -- are vital first steps.

"It is clear from our study that many patients do not know how the anaesthesia process works and that this has led to misconceptions about, for example, waking up during surgery. It is vital to tackle these misconceptions if we are to reduce patient anxiety before day surgery."

Story Source:

Adapted from materials provided by Wiley-Blackwell, via EurekAlert!, a service of AAAS.

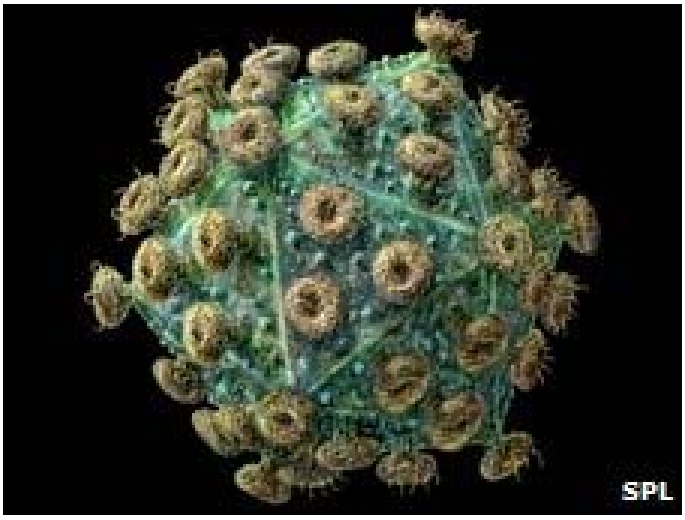
Journal Reference:

1. Mark Mitchell. **General anaesthesia and day-case patient anxiety**. *Journal of Advanced Nursing*, 2010; 66 (5): 1059 DOI: 10.1111/j.1365-2648.2010.05266.x

http://www.sciencedaily.com/releases/2010/05/100520093032.htm

HIV risk for men during pregnancy

Men have double the risk of catching HIV if their partner is pregnant, say researchers.



A study of more than 3,000 couples in Africa also backed previous research showing women are more susceptible to HIV infection when they are pregnant.

The researchers speculate that changes in a pregnant woman's immune system may contribute to the increased chance of her partner becoming infected.

A UK charity said the findings showed the importance of antenatal testing.

The findings have been presented at the International Microbicides Conference in Pittsburgh, alongside a separate study showing a microbicidal gel is safe to use during pregnancy to prevent HIV transmission.

Young women of reproductive age are among those at greatest risk of HIV infection in countries with high levels of disease.

Pregnancy risk

Several studies have suggested that during pregnancy women are more at risk of catching HIV from an infected partner, but this is the first time researchers have shown that men are more susceptible to infection if their partners are pregnant.

The study, carried out in Botswana, Kenya, Rwanda, South Africa, Tanzania, Uganda and Zambia, involved 3,321 couples in which one partner was HIV-infected and the other not.

Over two years there were 823 pregnancies, and analysis showed that pregnancy increased both male-to-female and female-to-male infection.

" **One of the biggest challenges we face in the UK is that one person in four with HIV doesn't even know they have the virus, because they haven't been tested** "
Jason Warriner, Terrence Higgins Trust

For women, it seemed that factors other than pregnancy contributed to the increased risk of HIV infection.

But in men, the link between pregnancy and their risk of infection was much clearer, even after accounting for other factors, such as having unprotected sex.

The findings also showed that measures of HIV infection such as viral load and CD4 count had no bearing on the man's risk of acquiring it.

Study leader Dr Nelly Mugo, from the University of Nairobi and the University of Washington in Seattle, said it could be that biological changes during pregnancy make a woman more infectious.

Jason Warriner, clinical director for Terrence Higgins Trust, said: "This shows why it's so important to have antenatal screening programmes in place.

"One of the biggest challenges we face in the UK is that one person in four with HIV doesn't even know they have the virus, because they haven't been tested.

"Along with promoting the use of condoms, screening programmes for at-risk groups would help bring down high levels of undiagnosed HIV and significantly reduce onward transmission."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8695458.stm

Published: 2010/05/23 23:16:36 GMT

Weight 'key' in kidney transplant

Matching up the weight of donors and recipients boosts success in kidney transplants, suggests French research.

A study of over 1,000 transplant patients found those receiving a small kidney in proportion to their weight were more at risk of complications.

In the Journal of the American Society of Nephrology, the researchers said the findings would give surgeons a new chance to improve long-term survival.

But a UK expert warned a donor shortage would limit weight-based matches.

The team followed the transplant patients for an average of six years after their operation.

Using a calculation based on the weight of the donor kidney, and the weight of the person having the transplant, they found that those receiving a small kidney for their size had more complications.

" **The problem is when you have a scarce resource of kidneys, taking account of weight would complicate what is already a complex allocation system** "
Keith Rigg, British Transplantation Society

These included high blood pressure, kidney scarring, and a 55% increased risk of transplant failure two years after the operation.

Study leader Professor Jean Paul Soulillou, from the French National Institute of Health and Medical Research, said from a clinical point of view the impact of the finding was similar to when researchers identified markers to enable tissue type to be matched to reduce the risk of rejection.

"This information is potentially useful for thousands of transplants and provides a new opportunity to improve long-term graft survival," he added.

Living donors

The vast majority of the transplants in the study were done with organs from dead donors.

In the UK, living donor kidney transplants are on the rise - with 927 carried out in 2008-2009 representing more than one in three of all kidney transplants.

Keith Rigg, consultant transplant surgeon in Nottingham and president of the British Transplantation Society, said doctors already consider body weight where possible in the case of transplants done with living donors.

"The interesting thing they have done here is to actually weigh the kidney.

"But the problem is when you have a scarce resource of kidneys, taking account of weight would complicate what is already a complex allocation system.

"In the long term, it is still better to have a transplant than remain on dialysis."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8697826.stm

Published: 2010/05/22 23:32:36 GMT

Heart attack survivors 'fear sex'

Heart attack survivors are highly likely to avoid sex, fearing it could kill them, US researchers say.

The team told an American Heart Association meeting that those whose doctors failed to talk to them about sex were most likely to avoid it.

Dr Stacy Tessler Lindau, who led the study of 1,700 people, said the chance of dying during sex was "really small".

The British Heart Foundation backed her call for doctors to discuss sex with their patients to allay their fears.

Experts say it is safe for heart attack survivors to start having sex again once they are capable of moderate exercise, such as climbing a few flights of stairs.

Sexual activity

The study of 1,184 men and 576 women who had experienced heart attacks were asked about their sexual activity prior to and after having a heart attack.

They were assessed one month after their heart attacks, and then again after a year.

" **You can't predict by looking at someone if they are sexually active** "
Dr Stacy Tessler Lindau, study author

The men, who had an average age of 59, were more likely to be married than the women, who had an average age was 61.

The men were also more likely to be sexually active prior to the heart attack.

But even after adjusting for these differences, patients who had been given instructions about resuming sexual activity when they were discharged from hospital were more likely to have sex in the following year.

Less than half of the men and about a third of the women had talked about their sex lives with their doctors.

And less than 40% of men and 20% of women talked to their doctors about sex in the 12 months after their heart attack.

One year on, more than two thirds of the men reported some sexual activity as did about 40% of women.

But men were 30% and women 40% more likely to report having less sex a year on, compared with before their heart attack, if they had not been given information on resuming sexual activity.

'Healthy sex life'

Dr Lindau said: "Most heart attack patients are sexually active. But for the most part, physicians just aren't discussing this topic with their patients after a heart attack."

She said that even when sex was discussed, there was nothing to show what the patients were being told - and whether the information was consistent.

But Dr Lindau stressed: "The likelihood of dying during sexual intercourse, even among people who have had a heart attack, is really small."

She said sex should not be dismissed as an issue simply because a patient was older or married.

"You can't predict by looking at someone if they are sexually active. Patients regard sex as an important part of their life, and they think it's appropriate for doctors to raise it as an issue."

Cathy Ross, a cardiac nurse at the British Heart Foundation, said patients should be given information about resuming their sex lives when they were discharged.

"Some people are scared of having sex after a heart attack in case the exertion causes another one. But this is extremely unlikely.

"You can still enjoy a happy and healthy sex life, even if you have a heart condition.

"As with any other type of exercise, sexual activity can bring on symptoms if you've a heart condition so keep medication like your GTN spray or tablets nearby.

"Caressing and being intimate is a good way to start resuming sexual relationships and increase your confidence."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8696801.stm

Published: 2010/05/21 23:39:23 GMT

Statin side-effect risk uncovered

GPs should think more carefully about prescribing cholesterol-busting drugs say researchers who highlighted a range of "unintended" side effects.

Some doses and types of statins are linked with a greater risk of adverse effects, including liver problems and kidney failure, the UK research showed.

Doctors will have access to a computer program based on the findings to help spot those most at risk.

Millions of UK adults take the drugs to reduce heart attack and stroke risk.

The researchers, from the University of Nottingham, stressed that for many people the benefits of statins outweighed any adverse effects, but the findings would help weigh up the pros and cons in each patient.

" **For people with, or at high risk of heart disease, the benefits of statins far outweigh this risk** "
June Davison, British Heart Foundation

There are plans to prescribe statins on the NHS in around one in four adults aged over 40.

The Department of Health had predicted prescriptions for the drugs would rise by 30% a year, as GPs find more and more people eligible.

At the moment, anyone judged to have a one in five or greater risk of developing cardiovascular disease over 10 years is advised to take a statin.

But there has been much debate over side effects and the latest research set out to confirm where the problems may lie in a "real life" population.

Unintended effects

Researchers looked at data from more than two million 30-84 year-olds from GP practices in England and Wales over a six-year period.

Adverse effects identified in the study, published in the British Medical Journal, include liver problems, acute kidney failure, muscle weakness and cataracts.

For kidney failure and liver dysfunction, higher doses of the drugs seemed to be associated with greater risk.

Risks of side-effects were greatest in the first year of use.

On the positive side, the analysis also showed no significant association between the use of statins and the risk of Parkinson's disease, rheumatoid arthritis, blood clot, dementia, osteoporotic fracture, or many cancers including gastric, colon, lung, renal, breast or prostate.

RISKS OF STATINS
For every 10,000 women treated with statins:
- 271 fewer cases of cardiovascular disease
- 8 fewer cases of oesophageal cancer
- 23 extra patients with acute kidney failure
- 73 extra patients with liver dysfunction
- 307 extra patients with cataracts
- 39 extra patients with muscle weakness Figures were similar for men, except there would be 110 extra cases of muscle weakness

Study leader Professor Julia Hippisley-Cox, who also works as a GP, said the computer programme they had devised meant GPs could work out which patients were most at risk of side-effects and whether their risk of heart disease was high enough to warrant them taking statins.

"People should be able to make an informed choice," she said.

"There are risks and benefits to all medicines, but if you have a patient at higher risk than average of something serious you might want to warn them to come back if they have problems."

June Davison, cardiac nurse at the British Heart Foundation, said: "We already know that a small number of people taking statins experience unwanted side effects.

"However, for people with, or at high risk of heart disease, the benefits of statins far outweigh this risk.

"Anybody experiencing side effects while taking statins should speak to their doctor."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8695102.stm

Published: 2010/05/20 23:02:16 GMT

Premature births 'down to genes'

Premature birth risk appears to be genetic, say researchers after finding early births tend to run in families.

Women born prematurely or who have brothers or sisters who were born too early are 50-60% more likely to have a premature baby themselves, they say.

The University of Aberdeen study is based on maternity records of 22,343 Scottish mothers and their daughters.

Obstetrics & Gynecology journal says the work may help others to predict and plan for these high risk births.

Premature birth is a leading cause of death in newborns and can lead to long-term problems such as cerebral palsy.

" **The development of a reliable test for premature birth is vital in ensuring our most vulnerable babies have the best possible outcomes** "
Andy Cole of Bliss charity

Attempts to predict and prevent spontaneous preterm births have been compromised by gaps in our understanding of what causes the condition, say the researchers.

Lead author of the study Dr Sohinee Bhattacharya said: "Our research supports a genetic predisposition to preterm birth.

"Further research should focus on the identification of candidate genes for the condition."

Inherited risk

The study authors say their findings should help because they are robust.

The dataset they used came from the Aberdeen Maternity Neonatal Databank which is considered unique and particularly useful to researchers.

This is because the city has such a stable population and the majority of women in the Aberdeen city area give birth in the same hospital.

All the records related to single births only and did not include twins or other multiple pregnancies.

The researchers found that mothers-to-be who had been born prematurely were, on average, 60% more likely to have a premature baby if it was their first pregnancy.

For any subsequent pregnancies their risk was 50%.

Andy Cole, Chief Executive of Bliss, the special care baby charity, said: "We welcome any research that helps us better understand the causes of preterm birth and identify those at high risk.

"While this study's findings are interesting, further research is still needed in this area.

"The development of a reliable test for premature birth is vital in ensuring our most vulnerable babies have the best possible outcomes."

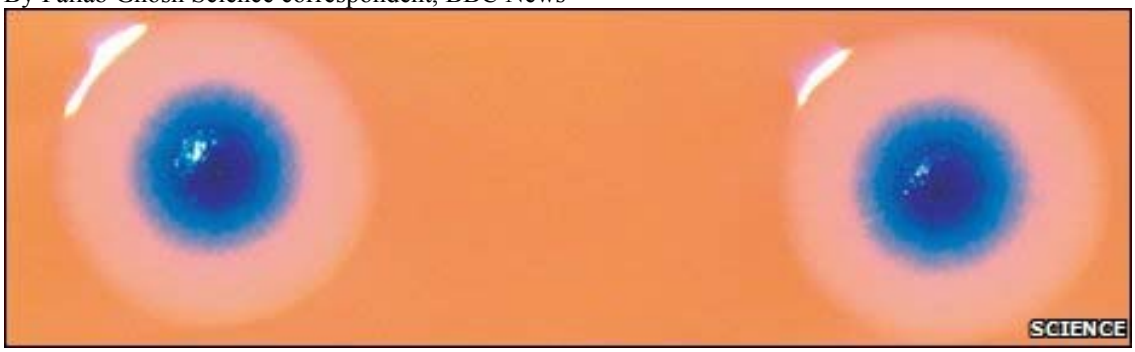
Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/8701628.stm

Published: 2010/05/25 00:27:18 GMT

Synthetic life patents 'damaging'

Page last updated at 21:02 GMT, Monday, 24 May 2010 22:02 UK

By Pallab Ghosh Science correspondent, BBC News



Details of the synthetic cell advance were announced last week

A top UK scientist who helped sequence the human genome has said efforts to patent the first synthetic life form would give its creator a monopoly on a range of genetic engineering.

Professor John Sulston said it would inhibit important research.

US-based Dr Craig Venter led the artificial life form research, details of which were published last week.

Prof Sulston and Dr Venter clashed over intellectual property when they raced to sequence the genome in 2000.

Craig Venter led a private sector effort which was to have seen charges for access to the information. John Sulston was part of a government and charity-backed effort to make the genome freely available to all scientists.

"The confrontation 10 years ago was about data release," Professor Sulston said.

"We said that this was the human genome and it should be in the public domain. And I'm extremely glad we managed to pull this out of the bag."

'Range of techniques'

Now the old rivals are at odds again over Dr Venter's efforts to apply for patents on the artificially created organism, nicknamed Synthia. The team outlined the remarkable advance last week in the prestigious journal Science.

But Professor Sulston, who is based at the University of Manchester, said patenting would be "extremely damaging".

"I've read through some of these patents and the claims are very, very broad indeed," Professor Sulston told BBC News.

"I hope very much these patents won't be accepted because they would bring genetic engineering under the control of the J Craig Venter Institute (JCVI). They would have a monopoly on a whole range of techniques."

A spokesman for Dr Venter, of the J Craig Venter Institute (JCVI) in Maryland and California, said: "There are a number of companies working in the synthetic genomic/biology space and also many academic labs.

"Most if not all of these have likely filed some degree of patent protection on a variety of aspects of their work so it would seem unlikely that any one group, academic centre or company would be able to hold a 'monopoly' on anything.

"As the JCVI team and Dr Venter have said, open dialogue and discussion on all issues surrounding synthetic genomics/biology, including intellectual property, is very necessary for this field so these questions and discussions are all very important."

Over-use?

Professor Sulston made the comments at the Royal Society in London where he was discussing a report entitled Who owns Science? The report was produced by the Institute of Science, Ethics and Innovation at Manchester University, which the professor chairs.

The study details an increased use of patents by researchers.

"My objections to patenting human genes or genes from existing living organisms is that they are inventions or discoveries," said Professor Sulston.

"The problem has become much worse since I raised the issue 10 years ago."

He believes that the over-use of patents is inhibiting research that could otherwise greatly benefit society, such as better healthcare for the poor.

Professor Sulston commented: "[It's fashionable to think] that it's important to have strong intellectual property and that it's essential for promoting innovation. But there's no evidence that it does promote innovation. There's an unwillingness to consider any problems."

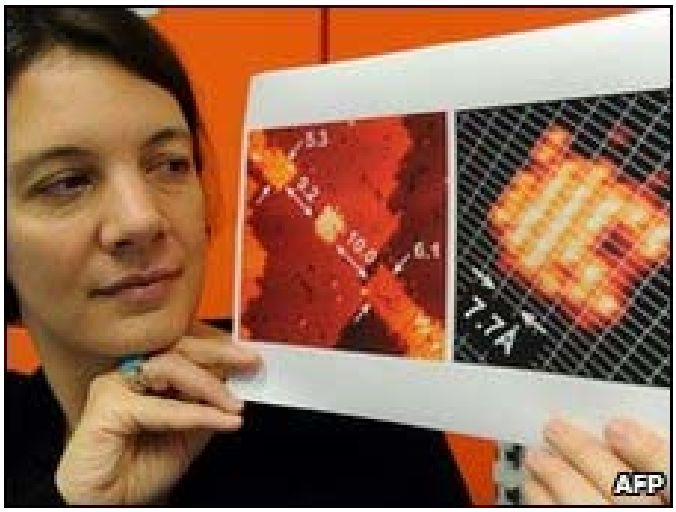
But he also believes that these arguments are now beginning to be accepted.

Last November, a US company, Myriad Genetics, lost parts of its patent rights on two breast cancer genes following a legal challenge by civil rights groups.

http://news.bbc.co.uk/2/hi/science_and_environment/10150685.stm

Seven atom transistor sets the pace for future PCs

Prof Simmons and her colleagues have swapped silicon atoms for phosphorus



Researchers have shown off a transistor made from just seven atoms that could be used to create smaller, more powerful computers.

Transistors are tiny switches used as the building blocks of silicon chips.

If the new atomic transistor can be made in large numbers it could mean chips with components up to 100 times smaller than on existing processors.

The Australian creators of the transistor hope it is also a step towards a solid-state quantum computer.

The transistor is not the smallest ever created as two research groups have previously managed to produce working single-atom transistors.

However, the device is many times smaller than the components found in chips in contemporary computers. On chips where components are 22 nanometres in size, transistor gates are about 42 atoms across.

The working transistor was created by replacing seven atoms in a silicon crystal with phosphorus atoms.

"Now we have just demonstrated the world's first electronic device in silicon systematically created on the scale of individual atoms," said Professor Michelle Simmons, lead researcher on the project at the University of New South Wales.

Moore's Law predicts that the amount of memory that can fit on a given area of silicon, for a fixed cost doubles every 12-18 months. The limit of this prediction is being tested as components get ever smaller and their computationally useful properties become less reliable.

If an entire chip could be made with every one of its billions of transistors made from the silicon crystals, it could mean an "exponential" leap in processing power, said Professor Simmons.

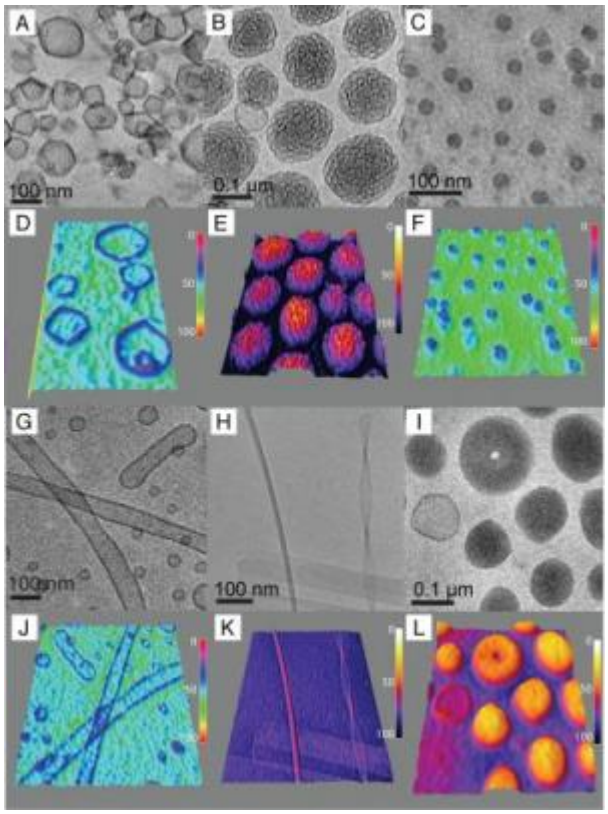
The researchers are a long way from a commercial process because the tiny transistor they created was handmade. The team used a scanning tunnelling microscope to move the phosphorus atoms into place.

The work on the tiny transistor is being carried out as part of a larger project to create a quantum computer.

The research team revealed their results in the journal Nature Nanotechnology.

http://news.bbc.co.uk/2/hi/technology/10146704.stm

Synthetic Biomaterials Mimic Cellular Membranes: Use in Nanomedicine, Drug Delivery



These are cryo-TEM and 3-D intensity profiles of (A and D) polygonal dendrimersomes. (B and E) Bicontinuous cubic particles co-exist with low concentration of spherical dendrimersomes. (C and F) These are micelles. (G and J) These are tubular dendrimersomes. (H and K) Rodlike, ribbon and helical micelles. (I and L) Disk-like micelles and toroids. (Credit: University of Pennsylvania)

ScienceDaily (May 23, 2010) — An international collaboration led by chemists and engineers from the University of Pennsylvania has prepared a library of synthetic biomaterials that mimic cellular membranes and that show promise in targeted delivery of cancer drugs, gene therapy, proteins, imaging and diagnostic agents and cosmetics safely to the body in the emerging field called nanomedicine.

The study appears in the current issue of the journal *Science*.

The research provides the first description of the preparation, structure, self-assembly and mechanical properties of vesicles and other selected complex nano-assemblies made from Janus dendrimers.

The so-called dendrimersomes are stable, bilayer vesicles that spontaneously form from the exact chemical composition of Janus dendrimers. The team reported a myriad of bilayer capsule populations, uniform in size, stable in time in a large variety of media and temperatures, that are tunable by temperature and chemistry with superior mechanical properties to regular liposomes and impermeable to encapsulated compounds. They are capable of incorporating pore-forming proteins, can assemble with structure-directing phospholipids and block copolymers and offer a molecular periphery suitable for chemical functionalization without affecting their self-assembly.

Co-authors Virgil Percec of Penn's Department of Chemistry and Daniel A. Hammer of Penn's Department of Bioengineering, joined by Frank Bates and Timothy Lodge of the University of Minnesota, Michael Klein of Temple University and Kari Rissanen of the Jyväskylä University, in Finland, have chemically coupled hydrophilic and hydrophobic dendrons to create amphiphilic Janus dendrimers with a rich palette of morphologies including cubosomes, disks, tubular vesicles and helical ribbons and confirmed the assembled structures using cryogenic transmission electron microscopy and fluorescence microscopy.

"Dendrimersomes marry the stability and mechanical strength obtainable from polymersomes, vesicles made from block copolymers, with the biological function of stabilized phospholipid liposomes," said Percec, the P. Roy Vagelos Chair and Professor of Chemistry at Penn, "but with superior uniformity of size, ease of formation and chemical functionalization."

"These materials show special promise because their membranes are the thickness of natural bilayer membranes, but they have superior and tunable materials properties," said Hammer, the Alfred G. and Meta A. Ennis Professor of Bioengineering at Penn. "Because of their membrane thickness, it will be more straightforward to incorporate biological components into the vesicle membranes, such as receptors and channels."

"No other single class of molecules including block copolymers and lipids is known to assemble in water into such a diversity of supramolecular structures," said Bates, the Regents Professor and Head of the Chemical Engineering and Materials Science Department at the University of Minnesota.

Self-assembled nanostructures, obtained from natural and synthetic amphiphiles, increasingly serve as mimics of biological membranes and enable the targeted delivery of drugs, nucleic acids, proteins, gene therapy and imaging agents for diagnostic medicine. The challenge for researchers is creating these precise molecular arrangements that combine to function as safe biological carriers while carrying payload within.

Janus dendrimer assemblies offer several advantages to other competing technologies for nano-particle delivery. Liposomes are mimics of cell membranes assembled from natural phospholipids or from synthetic amphiphiles, including polymersomes. But, liposomes are not stable, even at room temperature, and vary widely in size, requiring tedious stabilization and fractionation for all practical applications. Polymersomes, on the other hand, are stable but polydisperse, and most of them are not biocompatible, requiring scientific intervention to combine the best properties of both for nanomedicine. Dendrimersomes offer stability, monodispersity, tenability and versatility, and they significantly advance the science of self-assembled nanostructures for biological and medical applications.

The study was conducted by Percec, Daniela A. Wilson, Pawaret Leowanawat, Christopher J. Wilson, Andrew D. Hughes, Emad Aqad, Brad M. Rosen, Andreea O. Argintaru, Monika J. Sienkowska and Mark S. Kaucher of Penn's Department of Chemistry; Hammer of the Department of Bioengineering, the Department of Chemical and Biomolecular Engineering and the Institute for Medicine and Engineering at Penn; Dalia H. Levine and Anthony J. Kim of Penn's Department of Chemical and Biomolecular Engineering; Bates, Kevin P. Davis and Timothy P. Lodge of the University of Minnesota; Michael L. Klein and Russell H. DeVane of Temple University; Kari Rissanen and Jarmo Ropponen of the University of Jyväskylä in Finland; and Sami Nummelin of the University of Jyväskylä and Aalto University, both in Finland.

Research was funded by National Science Foundation-funded grants at the University of Pennsylvania and the University of Minnesota, as well as by the Academy of Finland, Temple University and the P. Roy Vagelos Chair at the University of Pennsylvania.

Adapted from materials provided by University of Pennsylvania.

Journal Reference:

1. Virgil Percec, Daniela A. Wilson, Pawaret Leowanawat, Christopher J. Wilson, Andrew D. Hughes, Mark S. Kaucher, Daniel A. Hammer, Dalia H. Levine, Anthony J. Kim, Frank S. Bates, Kevin P. Davis, Timothy P. Lodge, Michael L. Klein, Russell H. DeVane, Emad Aqad, Brad M. Rosen, Andreea O. Argintaru, Monika J. Sienkowska, Kari Rissanen, Sami Nummelin, and Jarmo Ropponen. **Self-Assembly of Janus Dendrimers into Uniform Dendrimersomes and Other Complex Architectures**. *Science*, 2010; 328 (5981): 1009 DOI: 10.1126/science.1185547

http://www.sciencedaily.com/releases/2010/05/100520141208.htm

Schooling Fish Offer New Ideas for Wind Farming

Ideas for wind farms are being tested by Caltech researcher John Dabiri based on concepts he's learned by observing schooling fish. Dabiri has established a wind farm north of Los Angeles to test his theories. (Credit: John Dabiri/Caltech)

ScienceDaily (May 23, 2010) — The quest to derive energy from wind may soon be getting some help from California Institute of Technology (Caltech) fluid-dynamics expert John Dabiri -- and a school of fish.

As head of Caltech's Biological Propulsion Laboratory, Dabiri studies water- and wind-energy concepts that share the theme of bioinspiration: that is, identifying energy-related processes in biological systems that may provide insight into new approaches to -- in this case -- wind energy.

"I became inspired by observations of schooling fish, and the suggestion that there is constructive hydrodynamic interference between the wakes of neighboring fish," says Dabiri, associate professor of aeronautics and bioengineering at Caltech. "It turns out that many of the same physical principles can be applied to the interaction of vertical-axis wind turbines."

The biggest challenge with current wind farms is lack of space. The horizontal-axis wind turbines most commonly seen -- those with large propellers -- require a substantial amount of land to perform properly. "Propeller-style wind turbines suffer in performance as they come in proximity to one another," says Dabiri.

In the Los Angeles basin, the challenge of finding suitable space for such large wind farms has prevented further progress in the use of wind energy. But with help from the principles supplied by schooling fish, and the use of vertical-axis turbines, that may change.

Vertical turbines -- which are relatively new additions to the wind-energy landscape -- have no propellers; instead, they use a vertical rotor. Because of this, the devices can be placed on smaller plots of land in a denser pattern. Caltech graduate students Robert Whittlesey and Sebastian Liska researched the use of vertical-axis turbines on small plots during a class research project supervised by Dabiri. Their results suggest that there may be substantial benefits to placing vertical-axis turbines in a strategic array, and that some configurations may allow the turbines to work more efficiently as a result of their relationship to others around them -- a concept first triggered by examining schools of fish.

In current wind farms, all of the turbines rotate in the same direction. But while studying the vortices left behind by fish swimming in a school, Dabiri noticed that some vortices rotated clockwise, while others rotated counter-clockwise. Dabiri therefore wants to examine whether alternating the rotation of vertical-axis turbines in close proximity will help improve efficiency. The second observation he made studying fish -- and seen in Whittlesey and Liska's simulation -- was that the vortices formed a "staircase" pattern, which contrasts with current wind farms that place turbines neatly in rows.

Whittlesey and Liska's computer models predicted that the wind energy extracted from a parcel of land using this staggered placement approach would be several times that of conventional wind farms using horizontal-axis turbines. Once they've identified the optimal placement, Dabiri believes it may be possible to produce more than 10 times the amount of energy currently provided by a farm of horizontal turbines. The results are sufficiently compelling that the Caltech group is pursuing a field demonstration of the idea.

Dabiri has purchased two acres of land north of Los Angeles, where he is establishing the Caltech Field Laboratory for Optimized Wind Energy (FLOWE). The pilot program at the site will feature six vertical turbines on mobile platforms.

Dabiri and his team will systematically move the turbines around, testing various configurations to find the most efficient patterns.

"Our goal is to demonstrate a new technology that enables us to extract significantly more wind energy from a given parcel of land than is currently possible using existing methods," says Dabiri. "We want to take advantage of constructive aerodynamic interference between closely spaced vertical-axis wind turbines. Our results can potentially make better use of existing wind farms, allow for wind farms to be located closer to urban centers -- reducing power transmission costs -- and reduce the size of offshore installations."

Three of Dabiri's turbines are being provided in partnership with Windspire Energy. In exchange for the use of the turbines, Dabiri will share his research results with the company. Each Windspire turbine stands approximately 30 feet tall and 4 feet wide, and can generate up to 1.2 kW of power.

"This leading-edge project is a great example of how thinking differently can drive meaningful innovation," says Windspire Energy President and CEO Walt Borland. "We are very excited to be able to work with Dr. Dabiri and Caltech to better leverage the unique attributes of vertical-axis technology in harvesting wind energy."

Three turbines from another manufacturer have been purchased; the six turbines give the pilot facility a total power capacity of 15 kW, enough to power several homes.

"This project is unique in that we are conducting these experiments in real-world conditions, as opposed to on the computer or in a laboratory wind tunnel," says Dabiri. "We have intentionally focused on a field demonstration because this can more easily facilitate a future expansion of the project from basic science research into a power-generating facility. Our ability to make that transition will depend on the results of the pilot program."

The initial phase of the study will attempt to demonstrate which configuration of units will improve power output and performance relative to a horizontal-axis wind turbine farm with a similar sized plot of land.

"In the future, we hope to transition to power-generation experiments in which the generated power can be put to use either locally or via a grid connection," Dabiri says.

The American Recovery and Reinvestment Act provided partial funding for this project.

For more information on FLOWE, visit: http://dabiri.caltech.edu/research/wind-energy.html.

Story Source:

Adapted from materials provided by California Institute of Technology.

http://www.sciencedaily.com/releases/2010/05/100517152532.htm

Invention Regulates Nerve Cells Electronically

Artist's concept of nerve cell signals. (Credit: iStockphoto)

ScienceDaily (May 22, 2010) — A major step toward being able to regulate nerve cells externally with the help of electronics has been taken by researchers at Linköping University and the Karolinska Institute in Sweden. The breakthrough is based on an ion transistor of plastic that can transport ions and charged biomolecules and thereby address and regulate cells.

The invention, which opens new avenues for controlling chemical signals, is being published in the coming issue of the scientific journal *Proceedings of the National Academy of Sciences*. The authors are Klas Tybrandt and Magnus Berggren of Linköping University, who developed the invention, and Karin Larsson and Agneta Richter-Dahlfors at the Karolinska Institute, who have used it in experiments with cultivated nerve cells.

The four scientists work at the OBOE Research Center, which is dedicated to the study and regulation of processes in living cells and tissue through the use of organic electronics.

Previously use has been made of nano-canals and nano-pores to actively control the concentration and transport of ions. But such components are difficult to produce and moreover function poorly when the salt content is high, which is a precondition in interaction with biological systems.

"To get around these problems, we exploited the similarity between ion-selective membranes -- plastics that only conduct ions of one charge -- and doped semiconductors, such as silicon. It was previously known that it is possible to produce diodes from such membranes. We took it a step further by joining two ion diodes into a transistor," says Klas Tybrandt, a doctoral candidate in organic electronics.

When an ion transistor was connected to cultivated nerve cells, it could be used to control the supply of the signal substance acetylcholin locally to the cells. The successful result demonstrates both that the component functions together with biological systems and that even tiny charged biomolecules can be transported without difficulty.

"Since the ion transistor is made of plastic, it can be integrated with other components we are developing. This means we can make use of inexpensive printing processes on flexible materials. We believe ion transistors will play a major role in various applications, such as the controlled delivery of drugs, lab-on-a-chip and sensors," says Magnus Berggren, Önnesjö professor of organic electronics.

The research center OBOE (organic bioelectronics) is funded by the Foundation for Strategic Research.

Story Source:

Adapted from materials provided by Expertanswer (Expertsvar in Swedish).

Journal Reference:

1. K. Tybrandt, K. C. Larsson, A. Richter-Dahlfors, M. Berggren. **Ion bipolar junction transistors**. *Proceedings of the National Academy of Sciences*, 2010; DOI: 10.1073/pnas.0913911107

http://www.sciencedaily.com/releases/2010/05/100521191111.htm

Gesture-Based Computing on the Cheap: Multicolored Gloves Making Minority Report-Style Interfaces More Accessible

The hardware for a new gesture-based computing system consists of nothing more than an ordinary webcam and a pair of brightly colored lycra gloves. (Credit: Jason Dorfman/CSAIL)

ScienceDaily (May 22, 2010) — Ever since Steven Spielberg's 2002 sci-fi movie *Minority Report*, in which a black-clad Tom Cruise stands in front of a transparent screen manipulating a host of video images simply by waving his hands, the idea of gesture-based computer interfaces has captured the imagination of technophiles.

Academic and industry labs have developed a host of prototype gesture interfaces, ranging from room-sized systems with multiple cameras to detectors built into laptops' screens. But MIT researchers have developed a system that could make gestural interfaces much more practical. Aside from a standard webcam, like those found in many new computers, the system uses only a single piece of hardware: a multicolored Lycra glove that could be manufactured for about a dollar.

Other prototypes of low-cost gestural interfaces have used reflective or colored tape attached to the fingertips, but "that's 2-D information," says Robert Wang, a graduate student in the Computer Science and Artificial Intelligence Laboratory who developed the new system together with Jovan Popović, an associate professor of electrical engineering and computer science. "You're only getting the fingertips; you don't even know which fingertip [the tape] is corresponding to." Wang and Popović's system, by contrast, can translate gestures made with a gloved hand into the corresponding gestures of a 3-D model of the hand on screen, with almost no lag time. "This actually gets the 3-D configuration of your hand and your fingers," Wang says. "We get how your fingers are flexing."

The most obvious application of the technology, Wang says, would be in video games: Gamers navigating a virtual world could pick up and wield objects simply by using hand gestures. But Wang also imagines that engineers and designers could use the system to more easily and intuitively manipulate 3-D models of commercial products or large civic structures.

Patchwork approach

The glove went through a series of designs, with dots and patches of different shapes and colors, but the current version is covered with 20 irregularly shaped patches that use 10 different colors. The number of colors had to be restricted so that the system could reliably distinguish the colors from each other, and from those of background objects, under a range of different lighting conditions. The arrangement and shapes of

the patches was chosen so that the front and back of the hand would be distinct but also so that collisions of similar-colored patches would be rare. For instance, Wang explains, the colors on the tips of the fingers could be repeated on the back of the hand, but not on the front, since the fingers would frequently be flexing and closing in front of the palm.

Technically, the other key to the system is a new algorithm for rapidly looking up visual data in a database, which Wang says was inspired by the recent work of Antonio Torralba, the Esther and Harold E. Edgerton Associate Professor of Electrical Engineering and Computer Science in MIT's Department of Electrical Engineering and Computer Science and a member of CSAIL. Once a webcam has captured an image of the glove, Wang's software crops out the background, so that the glove alone is superimposed upon a white background. Then the software drastically reduces the resolution of the cropped image, to only 40 pixels by 40 pixels. Finally, it searches through a database containing myriad 40-by-40 digital models of a hand, clad in the distinctive glove, in a range of different positions. Once it's found a match, it simply looks up the corresponding hand position. Since the system doesn't have to calculate the relative positions of the fingers, palm, and back of the hand on the fly, it's able to provide an answer in a fraction of a second.

Of course, a database of 40-by-40 color images takes up a large amount of memory -- several hundred megabytes, Wang says. But today, a run-of-the-mill desktop computer has four gigabytes -- or 4,000 megabytes -- of high-speed RAM memory. And that number is only going to increase, Wang says.

Changing the game

"People have tried to do hand tracking in the past," says Paul Kry, an assistant professor at the McGill University School of Computer Science. "It's a horribly complex problem. I can't say that there's any work in purely vision-based hand tracking that stands out as being successful, although many people have tried. It's sort of changing the game a bit to say, 'Hey, okay, I'll just add a little bit of information'" -- the color of the patches -- "'and I can go a lot farther than these purely vision-based techniques.'" Kry particularly likes the ease with which Wang and Popović's system can be calibrated to new users. Since the glove is made from stretchy Lycra, it can change size significantly from one user to the next; but in order to gauge the glove's distance from the camera, the system has to have a good sense of its size. To calibrate the system, the user simply places an 8.5-by-11-inch piece of paper on a flat surface in front of the webcam, presses his or her hand against it, and in about three seconds, the system is calibrated.

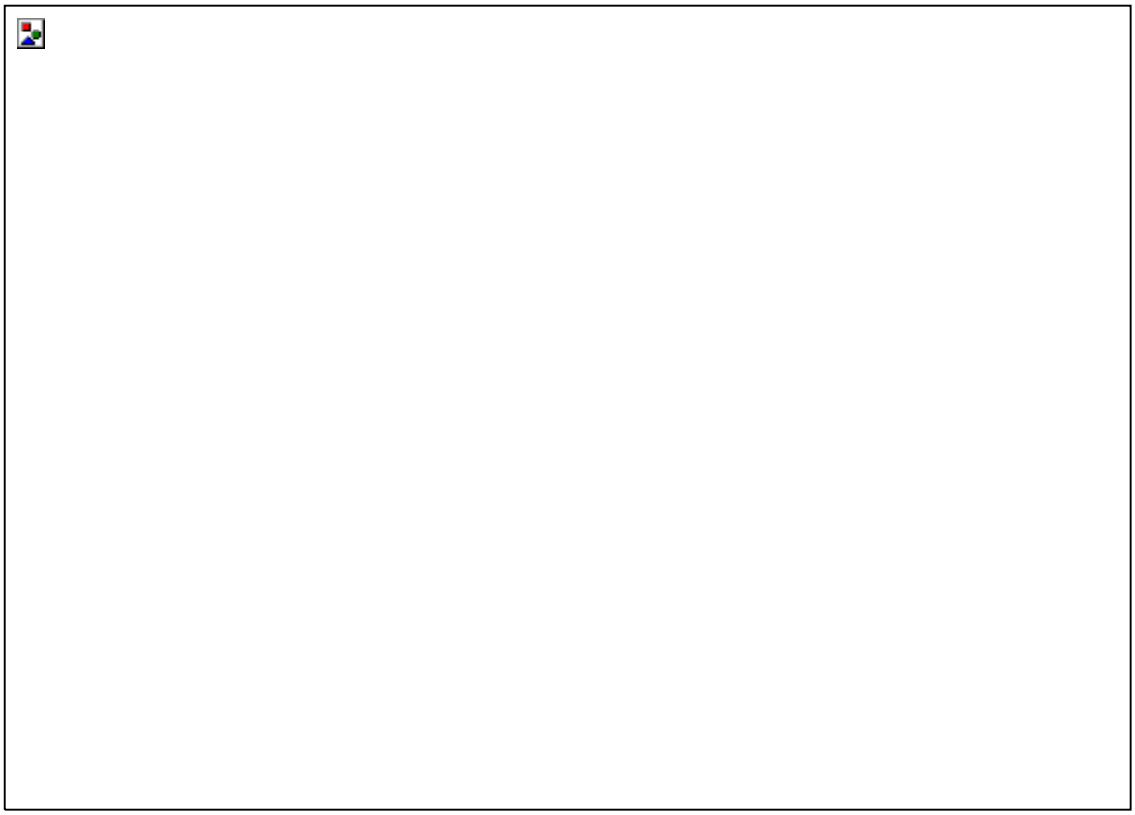
Wang initially presented the glove-tracking system at last year's Siggraph, the premier conference on computer graphics. But at the time, he says, the system took nearly a half-hour to calibrate, and it didn't work nearly as well in environments with a lot of light. Now that the glove tracking is working well, however, he's expanding on the idea, with the design of similarly patterned shirts that can be used to capture information about whole-body motion. Such systems are already commonly used to evaluate athletes' form or to convert actors' live performances into digital animations, but a system based on Wang and Popović's technique could prove dramatically cheaper and easier to use.

Story Source:

Adapted from materials provided by Massachusetts Institute of Technology. Original article written by Larry Hardesty, MIT News Office.

http://www.sciencedaily.com/releases/2010/05/100521213630.htm

Meaner Than Fiction: Reality TV High on Aggression, Study Shows



All the gossip, insults and dirty looks add up fast on popular reality shows, far outpacing the level seen in equally popular dramas, comedies and soap operas according to a new Brigham Young University study. (Credit: Image courtesy of Brigham Young University)

ScienceDaily (May 22, 2010) — All the gossip, insults and dirty looks add up fast on popular reality shows, far outpacing the level seen in equally popular dramas, comedies and soap operas according to a new Brigham Young University study.

The researchers looked at five reality shows and five non-reality shows and found 52 acts of aggression per hour on reality TV compared to 33 per hour for the non-reality programs.

"The Apprentice" topped the list at 85 acts of verbal or relational aggression per hour.

Simon Cowell and "American Idol"checked in a little lower at 57 aggressive acts per hour -- but then again, backbiting is tough to do while singing.

"I knew the level of aggression was going to be high, but I had no idea it was going to be this high," said Sarah Coyne, a BYU professor of family life and lead author of the study. Coyne's findings will appear in the June issue of The Journal of Broadcasting and Electronic Media.

The researchers analyzed 120 hours of programming and coded every instance of physical, verbal and relational aggression. The 10 shows selected for the study are popular with audiences in Britain, although several shows are American productions.

And despite the "reality" label, half of the aggression appeared to be incited by producers. One common tactic is to put participants in a booth and bait them into saying something nasty about their competitors.

What's the big deal?

Numerous other studies, including one by Coyne, demonstrate that meanness rubs off on viewers. And that was using very contrived and clearly fictional scenes.

"Of any type of program out there, I would think that reality programs are the most likely to be imitated," Coyne said. "All audiences think it won't affect them, but we aren't as immune as we think we are."

Professor David Nelson from BYU's School of Family Life is a coauthor on the study.

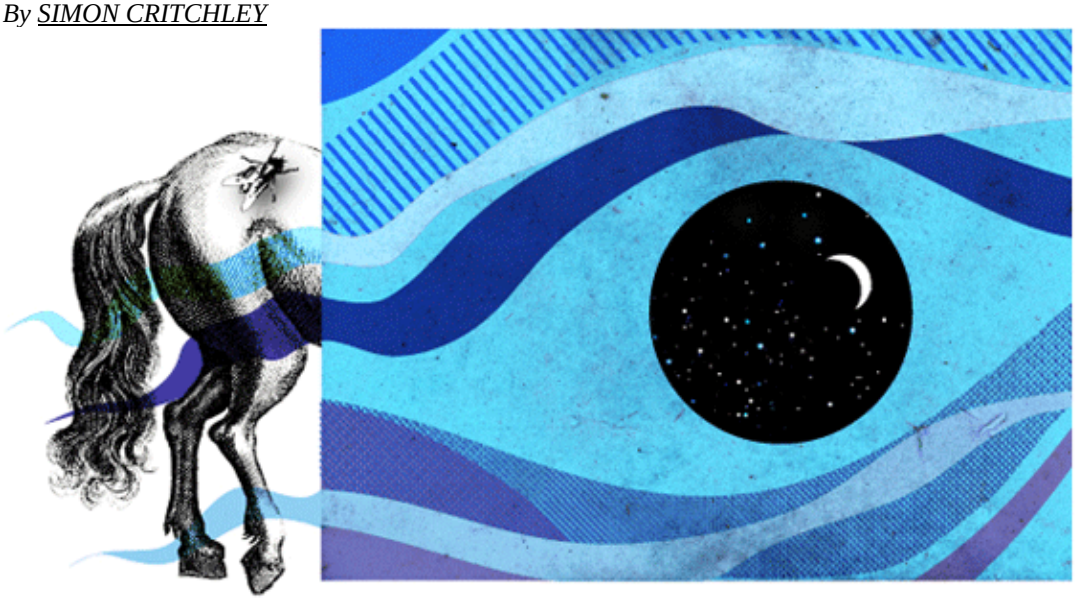
Story Source:

Adapted from materials provided by Brigham Young University.

http://www.sciencedaily.com/releases/2010/05/100521191235.htm

What Is a Philosopher?

By SIMON CRITCHLEY



Erin Schell

There are as many definitions of philosophy as there are philosophers – perhaps there are even more. After three millennia of philosophical activity and disagreement, it is unlikely that we'll reach consensus, and I certainly don't want to add more hot air to the volcanic cloud of unknowing. What I'd like to do in the opening column in this new venture — The Stone — is to kick things off by asking a slightly different question: what is a philosopher?

As Alfred North Whitehead said, philosophy is a series of footnotes to Plato. Let me risk adding a footnote by looking at Plato's provocative definition of the philosopher that appears in the middle of his dialogue, "Theaetetus," in a passage that some scholars consider a "digression." But far from being a footnote to a digression, I think this moment in Plato tells us something hugely important about what a philosopher is and what philosophy does.

Socrates tells the story of Thales, who was by some accounts the first philosopher. He was looking so intently at the stars that he fell into a well. Some witty Thracian servant girl is said to have made a joke at Thales' expense — that in his eagerness to know what went on in the sky he was unaware of the things in front of him and at his feet. Socrates adds, in Seth Benardete's translation, "The same jest suffices for all those who engage in philosophy."

What is a philosopher, then? The answer is clear: a laughing stock, an absent-minded buffoon, the butt of countless jokes from Aristophanes' "The Clouds" to Mel Brooks's "History of the World, part one." Whenever the philosopher is compelled to talk about the things at his feet, he gives not only the Thracian girl but the rest of the crowd a belly laugh. The philosopher's clumsiness in worldly affairs makes him appear stupid or, "gives the impression of plain silliness." We are left with a rather Monty Pythonesque definition of the philosopher: the one who is silly.

But as always with Plato, things are not necessarily as they first appear, and Socrates is the greatest of ironists. First, we should recall that Thales believed that water was the universal substance out of which all things were composed. Water was Thales' philosophers' stone, as it were. Therefore, by falling into a well, he inadvertently presses his basic philosophical claim.

But there is a deeper and more troubling layer of irony here that I would like to peel off more slowly. Socrates introduces the "digression" by making a distinction between the philosopher and the lawyer, or what Benardete nicely renders as the "pettifogger." The lawyer is compelled to present a case in court and time is of the essence. In Greek legal proceedings, a strictly limited amount of time was allotted for the presentation of cases. Time was measured with a water clock or *clepsydra*, which literally steals time, as in the Greek *kleptes*, a thief or embezzler. The pettifogger, the jury, and by implication the whole society, live with the constant pressure of time. The water of time's flow is constantly threatening to drown them.

The freedom of the philosopher consists in either moving freely from topic to topic or simply spending years returning to the same topic out of perplexity, fascination and curiosity.

By contrast, we might say, the philosopher is the person who has time or who takes time. Theodorus, Socrates' interlocutor, introduces the "digression" with the words, "Aren't we at leisure, Socrates?" The latter's response is interesting. He says, "It appears we are." As we know, in philosophy appearances can be deceptive. But the basic contrast here is that between the lawyer, who has no time, or for whom time is money, and the philosopher, who takes time. The freedom of the philosopher consists in either moving freely from topic to topic or simply spending years returning to the same topic out of perplexity, fascination and curiosity.

Pushing this a little further, we might say that to philosophize is to take your time, even when you have no time, when time is constantly pressing at your back. The busy readers of The New York Times will doubtless understand this sentiment. It is our hope that some of them will make the time to read The Stone. As Wittgenstein says, "This is how philosophers should salute each other: 'Take your time.' " Indeed, it might tell you something about the nature of philosophical dialogue to confess that my attention was recently drawn to this passage from Theaetetus in leisurely discussions with a doctoral student at the New School, Charles Snyder.

Socrates says that those in the constant press of business, like lawyers, policy-makers, mortgage brokers and hedge fund managers, become "bent and stunted" and they are compelled "to do crooked things." The pettifogger is undoubtedly successful, wealthy and extraordinarily honey-tongued, but, Socrates adds, "small in his soul and shrewd and a shyster." The philosopher, by contrast, is *free* by virtue of his or her otherworldliness, by their capacity to fall into wells and appear silly.

Socrates adds that the philosopher neither sees nor hears the so-called unwritten laws of the city, that is, the mores and conventions that govern public life. The philosopher shows no respect for rank and inherited privilege and is unaware of anyone's high or low birth. It also does not occur to the philosopher to join a political club or a private party. As Socrates concludes, the philosopher's body alone dwells within the city's walls. In thought, they are elsewhere.

This all sounds dreamy, but it isn't. Philosophy should come with the kind of health warning one finds on packs of European cigarettes: PHILOSOPHY KILLS. Here we approach the deep irony of Plato's words. Plato's dialogues were written after Socrates' death. Socrates was charged with impiety towards the gods of the city and with corrupting the youth of Athens. He was obliged to speak in court in defense of these charges, to speak against the water-clock, that thief of time. He ran out of time and suffered the consequences: he was condemned to death and forced to take his own life.

A couple of generations later, during the uprisings against Macedonian rule that followed the death of Alexander the Great in 323 B.C.E., Alexander's former tutor, Aristotle, escaped Athens saying, "I will not allow the Athenians to sin twice against philosophy." From the ancient Greeks to Giordano Bruno, Spinoza, Hume and right up to the shameful lawsuit that prevented Bertrand Russell from teaching at the City College of New York in 1940 on the charge of sexual immorality and atheism, philosophy has repeatedly and persistently been identified with blasphemy against the gods, whichever gods they might be. Nothing is more common in the history of philosophy than the accusation of impiety. Because of their laughable otherworldliness and lack of respect for social convention, rank and privilege, philosophers refuse to honor the old gods and this makes them politically suspicious, even dangerous. Might such dismal things still happen in our happily enlightened age? That depends where one casts one's eyes and how closely one looks.

Perhaps the last laugh is with the philosopher. Although the philosopher will always look ridiculous in the eyes of pettifoggers and those obsessed with maintaining the status quo, the opposite happens when the non-philosopher is obliged to give an account of justice in itself or happiness and misery in general. Far from eloquent, Socrates insists, the pettifogger is "perplexed and stutters."

Of course, one might object, that ridiculing someone's stammer isn't a very nice thing to do. Benardete rightly points out that Socrates assigns every kind of virtue to the philosopher apart from moderation. Nurtured in freedom and taking their time, there is something dreadfully uncanny about the philosopher, something either monstrous or god-like or indeed both at once. This is why many sensible people continue to think the Athenians had a point in condemning Socrates to death. I leave it for you to decide. I couldn't possibly judge.

Simon Critchley is chair of philosophy at the New School for Social Research in New York, and part-time professor at Tilburg University in the Netherlands. He is the author of several books, including "The Book of Dead Philosophers," and is moderator of this series.

http://opinionator.blogs.nytimes.com/2010/05/16/what-is-a-philosopher/

Failure to communicate

The inability of many students to write clear, cogent sentences has costly implications for the digital age

By Kara Miller
May 19, 2010

First, many seem to have received little writing instruction in high school. I initially noticed this as an undergraduate English major at Yale, where I helped peers revise their papers. I saw it again in graduate school at Tufts, where I taught freshman writing classes. And it has also struck me at Babson, where, for the past two years, I have instructed first-year students.

The second thing English teachers realize is that correcting students' papers is tremendously time consuming. I constantly do battle with myself to spend less than 20 minutes on a paper. At meetings, instructors are often urged not to exceed 15 minutes, but I frequently end up spending double that. This can be a genuinely frustrating experience: 50 papers stacked on the coffee table, 10 in the finished pile, and an entire afternoon gone.

But I can't help it; there's so much to correct. Subjects don't agree with verbs. "Its'' and "it's'' are used interchangeably. "They are'' is confused with "their.'' And facts too often function as topic sentences. Many of the students whose work I correct are smart, motivated, and quick to incorporate suggestions. But they have either forgotten the rules of writing, or they never learned them in the first place.

Some of the problem, of course, is carelessness. But much of it is not. I have read seniors' cover letters — letters that aim to snag them a dream job — and they're frequently riddled with both grammatical and stylistic mistakes.

Inadequate writing skills have led to concern in colleges across the country. In 2007, the National Assessment of Educational Progress found that just 24 percent of 12th-graders scored "proficient'' or better. That same year, more than 80 percent of students at the City University of New York had to enroll in remedial courses in reading, writing, or math.

Vartan Gregorian, the former president of Brown University, has expressed deep concern about the erosion of solid communication skills. "In an age overwhelmed by information (we are told, for example, that all available information doubles every two to three years), we should view this as a crisis, because the ability to read, comprehend, and write — in other words, to organize information into knowledge — can be viewed as tantamount to a survival skill.''

Which leads to a serious question: why do so many students come to college without a command of fundamentals?

To some degree, it's a mathematical problem. If it takes me all weekend to correct 40 papers, how can a high school English teacher begin to tackle 120 papers (four sections, 30 students per section) in a detail-oriented way?

The few teachers who do spend day and night reviewing papers deserve both a medal and a hefty raise. As they know, fixing students' writing is complex; it simply cannot be boiled down to a multiple-choice test or a series of right-and-wrong answers. Which may mean rethinking the way writing is taught in high school — and, perhaps, the way teachers are compensated.

We often belittle English teachers — if you speak and read English, how hard can it be to teach it? — but those with strong communication skills are both rare and valuable. Recall that when Massachusetts implemented a teachers' test 12 years ago, the public was shocked to discover that more than 30 percent of prospective teachers failed the literacy portion.

Though the media tend to focus on nationwide shortages of math and science teachers — which are indeed acute — finding, coaching, and retaining good English teachers is an underreported struggle. Indeed, as anyone who has received a poorly written e-mail, assessment, memo, cover letter, or report knows, writing — both good and bad — has real power. The National Commission on Writing (a part of the College Board) has calculated that "remedying deficiencies in writing costs American corporations as much as $3.1 billion annually.''

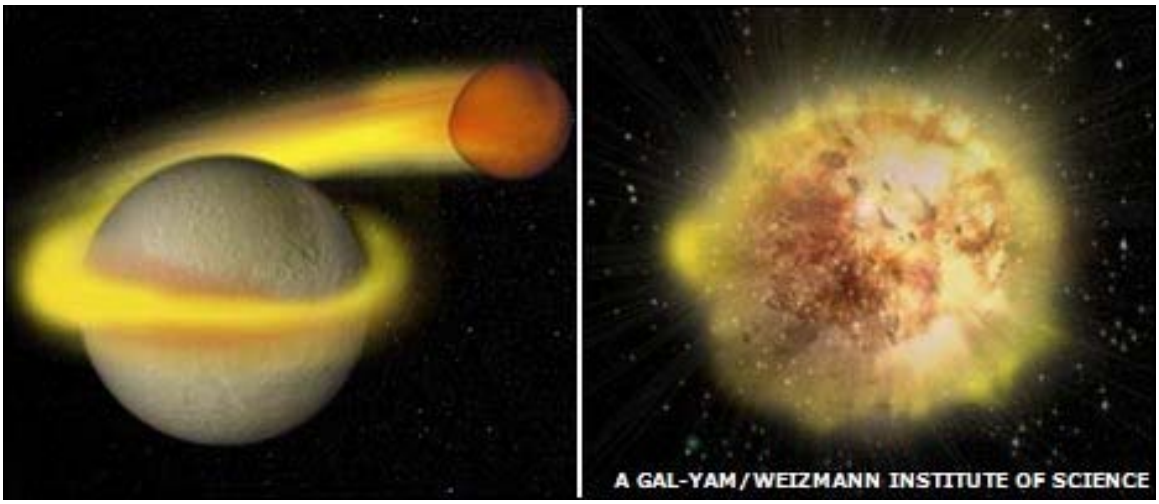
In an increasingly digital world, writing acts as a vehicle for knowledge — giving it short shrift in the classroom is a serious mistake.

Kara Miller teaches at Babson College. ■

http://www.boston.com/bostonglobe/editorial_opinion/oped/articles/2010/05/19/failure_to_communicate/

Stellar blast sparks controversy
By Victoria Gill
Science reporter, BBC News

Astronomers have put forward opposing explanations for what could be a new type of exploding star or supernova.



Supernova 2005E was initially picked up by telescopes back in 2005 and has been carefully examined by scientists.

They now report, in the journal Nature, that the explosion does not match known types of supernova.

In the same issue of the journal, however, another research team offers a different explanation for a very similar stellar phenomenon.

Until now, two main types of supernova had been documented.

The first (type Ia) is caused by the violent thermonuclear explosion of an old, dead star - or a white dwarf.

Type II supernovae are triggered when a young, massive star runs out of nuclear fuel and collapses under its own weight.

" **Our study has rescued the standard theory of stellar evolution** "
Professor Koji Kawabata Hiroshima University

In this case, the researchers say that the amount of material hurled out from SN 2005E was too small for it to have come from an exploding young giant.

And its location - far from the busy "stellar nurseries" where new stars form - suggested that this was an older star that had had time to move away from its birthplace.

The material being blasted into space by SN 2005E also contained unusually high levels of the elements calcium and titanium.

Dr Hagai Perets, who led the study, began his examination of the strange supernova whilst working at the Weizmann Institute of Science in Rehovot, Israel.

He is now based at the Harvard-Smithsonian Center for Astrophysics in Massachusetts, US, and said: "It was clear that we were seeing a new type of supernova."

But another research team, led by Professor Koji Kawabata from Hiroshima University in Japan examined a supernova called SN 2005cz, which had very similar properties.

Professor Kawabata and his team argued that this event was in fact a collapsing giant.

"These properties are best explained by a core-collapse supernova at the low-mass end of the range of massive stars that explode," he and his colleagues wrote in their paper.

They say that this star represents a boundary between stars that end their lives with a gigantic supernova explosion and those that do not explode.

"Our study has rescued the standard theory of stellar evolution," said Professor Kawabata. "This supernova was faint and gone quickly, [which] is probably a main reason why we have not [seen] this kind of supernova before".

Thief star

" **Practically every chemical element in the Universe, other than hydrogen and helium, is made in stars** "

Dr Mark Sullivan, Oxford University

Dr Perets' team carried out simulations that revealed the strange event appeared to involve two stars - a pair of white dwarves - and that one of them was "stealing helium" from the other.

They suggested that, once the mass of accumulated helium reached a critical point, the thief star became very hot and dense and a nuclear explosion occurred, producing other elements, such as calcium and titanium.

"The donor star is probably completely destroyed in the process, but we're not quite sure about the fate of the thief star," said Dr Avishay Gal-Yam, also from the Harvard-Smithsonian Center.

Mark Sullivan, an astronomer from the University of Oxford in the UK, said the possibility of a new class of supernova was "very exciting".

"We've known about the two main types of supernovae for decades, so to find something different, and with a new explosion mechanism, obviously changes our view of the way that stars explode and chemical elements get recycled," he told BBC News.

He continued: "Practically every chemical element in the Universe, other than hydrogen and helium, is made in stars."

Dr Sullivan explained that the only way for these elements to get from the stars in which they are made into us is when they get recycled in supernova explosions.

"A new type of supernova explosion gives us new insights into how some of these elements get recycled and end up in our Solar System," he added.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8692150.stm

Published: 2010/05/19 17:07:36 GMT

Ancient octopus mystery resolved

Page last updated at 17:19 GMT, Wednesday, 19 May 2010 18:19 UK

By Rosalind Pidcock Science reporter, BBC News

Trapped air in the shells of rare octopuses is the key to their survival in the deep sea, say scientists.

Females of the argonaut family (Argonautidae) release trapped air from their shells to control very precisely their movement through the water.

This ability has puzzled naturalists for over 2,000 years, dating back to observations made by Aristotle in 300 BC.

Research published in the Royal Society journal, Proceedings B, finally explains why it may have evolved.

The Australian researchers describe how the mechanism enables the creatures to conserve energy, avoid predators and protect eggs during the brooding stage.

The study, led by Dr Julian Finn of Museum Victoria in Melbourne, is the first to observe directly how this unique species of octopus captures air at the sea surface and uses it to its advantage.

"It wasn't until I actually got an argonaut in the water that I really saw the true marvel of these animals," said Dr Finn.

Unlike any other species of octopus, the female argonaut, which can be up to 50cm (20 inches) in length, makes itself a paper-thin shell. It secretes this shell, made of calcium carbonate, from two web structures on the sides of its body.

The males are much smaller, typically only a centimetre in length, and do not produce shells.

Mythical Creatures

Air pockets have been observed before within the shells of both wild and captive argonauts, also known as "paper nautiluses", but their origin and purpose has until now been a mystery.

"This mythical story began around the time of Aristotle that the argonaut female actually lived in the shell and raised those webs as sails as she sailed across the ocean," explained Dr Finn.

The new findings show that the female argonaut takes in air at the sea surface through a funnel as it rotates its shell anti-clockwise. It then seals off an air pocket in the top, or apex, of the shell using a second webbed pair of tentacles.

As it dives to depths of up to 750m (almost half a mile) below the surface, it adjusts the amount of air in its shell to match its own density with that of the seawater, keeping it "neutrally buoyant" and enabling it to swim effortlessly.

This contrasts with most other cephalopods - the class of animals that includes octopuses, squid and cuttlefish - which expend vast amounts of energy to maintain their position.

Underwater Control

The female argonaut can also counteract the considerable weight of its eggs, which it releases into its shell during the reproductive period, to carefully avoid bumping them on the sea floor.

By keeping a safe position in mid-water, argonauts can also steer clear of disturbance by surface waves and predators from above, such as birds.

Once believed to hinder the females, it is now thought that argonauts evolved this remarkable mechanism from ancestors that lived on the seafloor, allowing the species to expand its range into mid-depths.

"The female argonaut knows exactly what she was doing. Underwater she was completely in control," added Dr Finn.

http://news.bbc.co.uk/2/hi/science_and_environment/10127611.stm

Climate change is 'distraction' on malaria spread

By Richard Black Environment correspondent, BBC News

Mosquito nets are proving effective - where they are available

Climate change will have a tiny impact on malaria compared with our capacity to control the disease, a study finds.

Noting that malaria incidence fell over the last century, researchers calculate that control measures have at least 10 times more impact than climate factors.

Research leader Peter Gething from Oxford University described the climate link as an "unwelcome distraction" from the main issues of tackling malaria.

The paper, by scientists in the UK, US and Kenya, is published in Nature.

"We were looking to quantify something that perhaps we already knew with regard to the interaction of climate and malaria," Dr Gething told BBC News.

"A lot of the studies proposing there would be a dramatic increase in a warmer world have been met with guarded criticism, and often what's been said about them surpasses what the actual science indicates.

"So this redresses the balance a bit."

Reducing misery

The starting points for the research are other projects that mapped the range and endemicity of malaria across the world in 1900 and in 2007.

"Endemicity" is a measure of how far a disease penetrates through a population.

We have to bear in mind there are other factors that are moving much faster than climate change

Dr Chris Drakeley London School of Hygiene and Tropical Medicine

The last century saw deployment of anti-malarial drugs and a range of control measures, from marsh drainage to insecticides to bednets, across the tropical regions that are the disease's hinterlands.

Over the 107 years spanning these two studies, these measures were highly effective in curbing malaria.

They reduced its impact across virtually all of its range, and eliminated it in huge swathes of Asia, North America and Europe.

Yet all this happened during a century when the Earth's average temperature rose by abut 0.7C - raising the question of whether warmer temperatures and wetter conditions in some regions really would influence malaria transmission.

Plugging these figures into computer models of disease spread showed that control measures as deployed in the real world had an impact at least an order of magnitude greater than any climatic influence.

When deployed at optimum efficiency, they were about two orders of magnitude more influential.

"I'd say what we've shown is that if we can provide people with existing technologies such as drugs and bednets, we have the capacity as a global community to reduce the misery this disease causes," said Dr Gething.

"Climate change is, in our view, an unwelcome distraction from the main issues."

Uncertainty rains

Chris Drakeley, director of the Malaria Centre at the London School of Hygiene and Tropcial Medicine, suggested the group's conclusions were broadly correct.

"I am slightly sceptical of the furore surrounding (malaria and) climate change in the sense that we have to bear in mind there are other factors that are moving much faster than climate change," he said.

"I don't doubt climate change is happening, but we have also seen an increase in the coverage of treatment, and in the last 20 years there has been a huge amount of information and education on malaria made available in Africa; and that's all changed much faster than the climate."

Although individual studies and reports down the years have flagged up climate change as likely to increase the spread of malaria markedly, the 2007 Intergovernmental Panel on Climate Change (IPCC) report did not.

It concluded that although climatic change would alter the prospects for malaria, science could not yet predict where, when and how.

Climate change was very likely to "have mixed effects on malaria; in some places the geographical range will contract, elsewhere the geographical range will expand and the transmission season may be changed," it concluded.

While correlations had been observed between disease transmission and local climate changes in some regions, "there is still much uncertainty about the potential impact of climate change on malaria at local and global scales," it said.

http://news.bbc.co.uk/2/hi/science_and_environment/10127989.stm

Wild Birds Opt for Conventional Food Over Organic, Study Shows

Dunnock on feeder. (Credit: North News and Pictures / Copyright Newcastle University)

ScienceDaily (May 20, 2010) — The nutritional benefits of organic food have been called into question by new research which shows wild garden birds prefer conventional seed to that which has been organically-grown.

A three-year study by Newcastle University has found that wild birds are not swayed by the organic label, but instead prefer the more protein-rich, conventional food that will help them to survive the winter.

Published in the *Journal of the Science of Food and Agriculture*, lead researcher Dr Ailsa McKenzie said the findings were likely to be of "considerable interest to the general public in the debate over the relative merits of consuming organic food."

"Our results suggest that the current dogma that organic food is preferred to conventional food may not always be true," explains Dr McKenzie, based in the School of Biology at Newcastle University.

"Protein is an essential nutrient in the diet of all birds and mammals and getting enough of it -- especially in winter -- can be hard.

"We showed that when given free choice, wild birds opt for the conventional food over the organic, and the most likely explanation is its higher protein content.

"This study is only looking at one aspect of the organic food debate -- it does not take into account the long-term health implications of using chemical fertilisers and pesticides, or the often negative environmental impact of conventional farming; for example, other work has shown that pesticides can strongly reduce availability of seeds for birds.

"But it does raise questions about the nutritional benefits of organic food and what consumers are being led to believe."

Global demand for organic produce is increasing by £4billion annually -- the organic market now accounts for between two and three per cent of all food purchased in Europe and the USA.

One key reason why consumers buy organic food is because they consider it to be better for human and animal health. While this may indeed be the case, these are not necessarily the only factors governing food choice in animals and birds.

To carry out the study the Newcastle team set up feeding stations in more than 30 gardens across the North of England. Organic and non-organic wheat seeds (both of the same variety) were placed in adjacent bird feeders and then the rate at which the birds ate the different seeds was monitored over a six week period.

Half way through the experiment the feeders were swapped around. The experiment was repeated in a second winter with different wheat samples.

The birds showed a strong preference for the conventional seed, eating significantly more of this than the organic. When the feeder positions were switched, the birds 'learnt' the new position of the conventional seed and continued to select it in preference to the organic.

Analysis of the wheat found the conventionally-grown seeds to have an average 10 per cent higher protein content than the organic seeds. Other differences between the samples (e.g. in mycotoxin levels, grain size, energy content or pesticide residues) could not explain the preferences shown by the birds.

The garden bird work was confirmed by laboratory studies on canaries, also showing a significant preference for conventionally- over organically-grown seeds.

Dr McKenzie explained: "Conventionally-grown crops tend to contain significantly higher levels of protein than those grown organically due to the application of inorganic nitrogen fertilisers in conventional farming systems.

"This makes our findings potentially applicable across many food types and suggests the issues surrounding organic food are not as cut and dried as some might think."

Story Source:

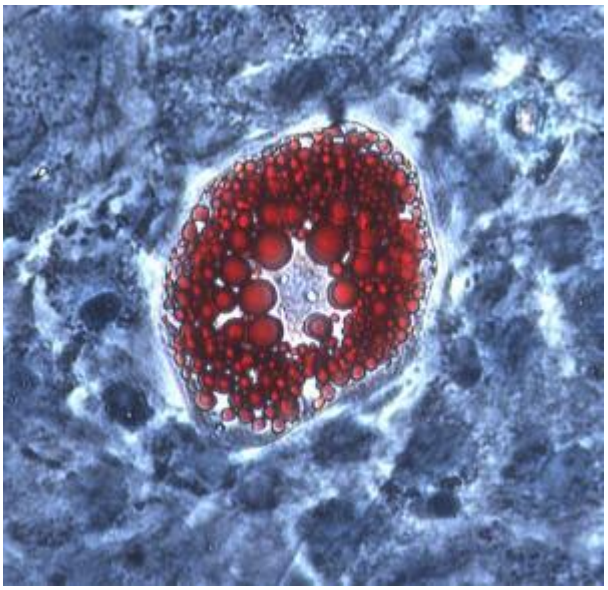
Adapted from materials provided by Newcastle University.

Journal Reference:

1. Ailsa McKenzie and Mark Whittingham. **Birds Select Conventional Over Organic Wheat When Given Free Choice**. *Journal of the Science of Food and Agriculture*, 2010; DOI: 10.1002/jsfa.4025

http://www.sciencedaily.com/releases/2010/05/100518230515.htm

Stages from Early to Mature Cell Offer Clues for Anti-Obesity Drug Development



Mature fat cell. (Credit: Mitchell A. Lazar, M.D., Ph.D., University of Pennsylvania School of Medicine)

ScienceDaily (May 20, 2010) — Getting from point A to B may sound simple, but not so in the formation of fat cells.

In a finding with potential drug-development implications, Mitchell A. Lazar, M.D., Ph.D., director of the Institute for Diabetes, Obesity, and Metabolism at the University of Pennsylvania School of Medicine, and colleagues report in the current issue of *Genes & Development* the discovery of an intermediate state between early-stage fat cells and fully mature ones that is only present transiently during the fat-cell formation process. This intermediate state is induced by hormones related to cortisol, which are known to contribute to obesity and metabolic disturbances in people.

New therapies for obesity or metabolic diseases such as diabetes could potentially target this transition state toward a maturing fat cell.

The transition state -- present within 24 hours of the start of the fat-cell differentiation process -- is defined by chemical changes to genetic material called chromatin, which package a cell's DNA. These changes kick start the expression of regulatory proteins and provide a cellular memory that allows the cell to continue developing even after the signal to undergo this transition has waned.

Probing the Genome

Like all cells in the body, fat cells arise from stem cells. Embryonic stem cells give rise to another type of stem cell, which in turn gives rise to early-stage fat cells. Upon stimulation, those early cells complete their differentiation to become fully mature fat cells. Lazar and his team asked: What are the molecular players required to induce the final transformation?

Using a cell culture system, the team, led by postdoctoral researcher **David Steger**, **PhD**, probed genes involved in fat-cell development and function for chromatin changes that were associated with the start of mature fat-cell formation. They found chromatin changes near a gene encoding the master regulator of differentiation, PPAR-gamma, which is also a target of anti-diabetic drugs.

"That gave us confidence to interrogate the whole genome," Lazar says.

The team scanned the genome for regions that were modified within 24 hours of the onset of fat-cell differentiation and analyzed those regions for potential binding sites for proteins that induce the expression of other genes. These proteins activate the genes whose proteins cause changes in cellular behavior and function.

Complex Control System

The researchers found that many of the chromatin-modified regions contained binding sites for two proteins, CEBP-beta and the glucocorticoid receptor (GR). In turn, these proteins recruit additional proteins to their locations along chromosomes. The result is a protein complex that nudges the precursor fat cell to become a mature fat cell.

That the glucocorticoid receptor is part of this transition state is remarkable, Lazar says, in that the growth factor complex required to induce fat-cell formation includes dexamethasone, one type of gluococorticoid hormone. No one had ever considered why dexamethasone was required to make this transition happen, Lazar says. "The dexamethasone is stimulating the hormone receptor to bind transiently at this site and create the transition state." This happens at dozens of sites in the cell genome, and the hormone is the coordinating signal.

On the basis of their findings, Lazar and his colleagues propose a model in which, upon stimulation of pre-fat cells, CEBP-beta, GR, and other proteins assemble near the PPAR-gamma gene and activate it. Once that happens, the circuit is on, even if the fat-cell-forming stimulus should disappear. In what the investigators call a "feedforward loop," the PPAR-gamma protein induces its own expression, as well as that of another master regulatory gene, CEBP-alpha. CEBP-alpha, in turn, activates *its* expression as well as that of PPAR-gamma. More importantly, both proteins also induce the expression of fat-cell genes, thereby committing the cell to its ultimate fate.

"The idea that a transient hormone signal coordinates many locations throughout the genome in the process of making a fat cell is surprising and informative," Lazar says.

And that state -- or rather, the molecular players that comprise it -- could provide a useful target for anti-obesity drug development, he adds.

The study was supported by the National Institutes for Diabetes, Digestive and Kidney Diseases,the George S. Cox Medical Research Institute, and by the Picower Foundation.

Story Source:

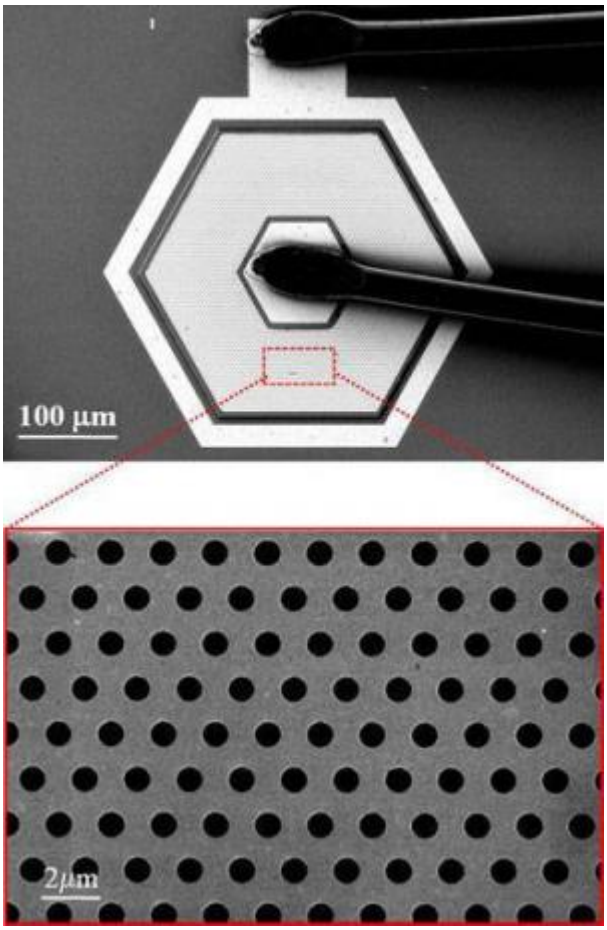
Adapted from materials provided by University of Pennsylvania School of Medicine.

Journal Reference:

1. David J. Steger, Gregory R. Grant, Michael Schupp, Takuya Tomaru, Martina I. Lefterova, Jonathan Schug, Elisabetta Manduchi, Christian J. Stoeckert, Jr, Mitchell A. Lazar. **Propagation of adipogenic signals through an epigenomic transition state**. *Genes & Development*, 2010; 24: 1035-1044 DOI: 10.1101/gad.1907110

http://www.sciencedaily.com/releases/2010/05/100517144818.htm

Nanotech Discovery Could Lead to Breakthrough in Infrared Satellite Imaging Technology



Rensselaer Polytechnic Institute Professor Shan-Yu Lin has developed a new nanotechnology-based "microlens" that uses gold to boost the strength of infrared imaging and could lead to a new generation of ultra-powerful satellite cameras and night-vision devices. The device, pictured, leverages the unique properties of nanoscale gold to "squeeze" light into the tiny holes in its surface. (Credit: Image courtesy of Rensselaer Polytechnic Institute)

ScienceDaily (May 20, 2010) — Researchers from Rensselaer Polytechnic Institute have developed a new nanotechnology-based "microlens" that uses gold to boost the strength of infrared imaging and could lead to a new generation of ultra-powerful satellite cameras and night-vision devices.

By leveraging the unique properties of nanoscale gold to "squeeze" light into tiny holes in the surface of the device, the researchers have doubled the detectivity of a quantum dot-based infrared detector. With some refinements, the researchers expect this new technology should be able to enhance detectivity by up to 20 times.

This study is the first in more than a decade to demonstrate success in enhancing the signal of an infrared detector without also increasing the noise, said project leader Shawn-Yu Lin, professor of physics at Rensselaer and a member of the university's Future Chips Constellation and Smart Lighting Engineering Research Center.

"Infrared detection is a big priority right now, as more effective infrared satellite imaging technology holds the potential to benefit everything from homeland security to monitoring climate change and deforestation," said Lin, who in 2008 created the world's darkest material as well as a coating for solar panels that absorbs 99.9 percent of light from nearly all angles.

"We have shown that you can use nanoscopic gold to focus the light entering an infrared detector, which in turn enhances the absorption of photons and also enhances the capacity of the embedded quantum dots to convert those photons into electrons. This kind of behavior has never been seen before," he said.

Results of the study were published online recently by the journal *Nano Letters*. The paper also will appear in a forthcoming issue of the journal's print edition. The U.S. Air Force Office of Scientific Research funded this study.

The detectivity of an infrared photodetector is determined by how much signal it receives, divided by the noise it receives. The current state-of-the art in photodetectors is based on mercury-cadmium-telluride (MCT)

technology, which has a strong signal but faces several challenges including long exposure times for low-signal imaging. Lin said his new study creates a roadmap for developing quantum dot infrared photodetectors (QDIP) that can outperform MCTs, and bridge the innovation gap that has stunted the progress of infrared technology over the past decade.

The surface plasmon QDIPs are long, flat structures with countless tiny holes on the surface. The solid surface of the structure that Lin built is covered with about 50 nanometers -- or 50 billionths of a meter -- of gold. Each hole is about 1.6 microns -- or 1.6 millionths of a meter -- in diameter, and 1 micron deep. The holes are filled with quantum dots, which are nanoscale crystals with unique optical and semiconductor properties.

The interesting properties of the QDIP's gold surface help to focus incoming light directly into the microscale holes and effectively concentrate that light in the pool of quantum dots. This concentration strengthens the interaction between the trapped light and the quantum dots, and in turn strengthens the dots' ability to convert those photons into electrons. The end result is that Lin's device creates an electric field up to 400 percent stronger than the raw energy that enters the QDIP.

The effect is similar to what would result from covering each tiny hole on the QDIP with a lens, but without the extra weight, and minus the hassle and cost of installing and calibrating millions of microscopic lenses, Lin said.

Lin's team also demonstrated in the journal paper that the nanoscale layer of gold on the QDIP does not add any noise or negatively impact the device's response time. Lin plans to continue honing this new technology and use gold to boost the QDIP's detectivity, by both widening the diameter of the surface holes and more effective placement of the quantum dots.

"I think that, within a few years, we will be able to create a gold-based QDIP device with a 20-fold enhancement in signal from what we have today," Lin said. "It's a very reasonable goal, and could open up a whole new range of applications from better night-vision goggles for soldiers to more accurate medical imaging devices."

Co-authors of the paper are Rensselaer Senior Research Scientist James Bur, graduate student Chun-Chieh Chang, and Research Associate Yong-Sung Kim; Yagya D. Sharma, Rajeev V. Shenoi, and Sanjay Krishna of the Center for High Technology Materials at the University of New Mexico, Albuquerque; and Danhong Huang of the Space Vehicles Directorate at the Air Force Research Laboratory, Kirtland Air Force Base.

Story Source:

Adapted from materials provided by Rensselaer Polytechnic Institute.

Journal Reference:

1. Chun-Chieh Chang, Yagya D. Sharma, Yong-Sung Kim, Jim A. Bur, Rajeev V. Shenoi, Sanjay Krishna, Danhong Huang, Shawn-Yu Lin. **A Surface Plasmon Enhanced Infrared Photodetector Based on InAs Quantum Dots**. *Nano Letters*, 2010; 10 (5): 1704 DOI: 10.1021/nl100081j

http://www.sciencedaily.com/releases/2010/05/100518170220.htm

Growers Can Boost Benefits of Broccoli and Tomatoes

Agronomic practices can greatly increase the cancer-preventive phytochemicals in broccoli and tomatoes. (Credit: iStockphoto/Kostyantin Pankin)

ScienceDaily (May 20, 2010) — A University of Illinois study has demonstrated that agronomic practices can greatly increase the cancer-preventive phytochemicals in broccoli and tomatoes.

"We enriched preharvest broccoli with different bioactive components, then assessed the levels of cancer-fighting enzymes in rats that ate powders made from these crops," said Elizabeth Jeffery, a U of I professor of food science and human nutrition.

The highest levels of detoxifying enzymes were found in rats that ate selenium-treated broccoli. The amount of one of the cancer-fighting compounds in broccoli was six times higher in selenium-enriched broccoli than in standard broccoli powder, she said.

Selenium-treated broccoli was also most active in the liver, reaching a level of bioactivity that exceeded the other foods used in the experiment.

"We were intrigued to find that selenium initiated this amount of bioactivity," she said.

Along with garlic and other plants of the allium family, broccoli and other plants of the brassica family are unique in having a methylating enzyme that enables plants to store high concentrations of selenium, she said.

"Our bodies need a certain amount of selenium, but many areas of the world, including parts of the United States and vast areas of China, have very little selenium in the soil," she said.

"Not only could selenium in broccoli deliver this necessary mineral, it also appears to rev up the vegetable's cancer-fighting power," she added.

Jeffery is now working to determine whether selenium compounds are directly responsible for the increase in bioactivity or if selenium acts indirectly by directing new synthesis of the broccoli bioactives called glucosinolates.

In a previous study, Jeffery and U of I colleague John W. Erdman Jr. showed that tomato and broccoli powders eaten together are more effective in slowing prostate cancer in laboratory rats than either tomato or broccoli alone.

In their current research, they are experimenting with ways to increase the bioactive components in these foods in order to test the efficacy of enriched broccoli and tomatoes in a new prostate cancer study.

Rats were fed diets with food powders containing 10 percent of either standard broccoli; standard tomato; lycopene-enriched tomato; tomato enriched with lycopene and other carotenoids; broccoli sprouts, which contain very high levels of cancer-fighting compounds; or broccoli grown on soil treated with selenium.

The scientists found that greater amounts of bioactive components in the food powders translated into increased levels of the compounds in body tissue and increased bioactivity in the animals.

Carotenoid-enriched tomatoes produced more bioactivity in the liver than lycopene-enriched or standard tomatoes, yielding the most cancer-preventive benefits.

"Carotenoids, which are phytochemical pigments found in fruits and vegetables, are thought to be excellent antioxidants and effective in cancer prevention," said Ann G. Liu, a U of I graduate student who worked on the study.

"A good rule is: the brighter the color, the higher the carotenoid content. If you're growing or buying tomatoes, select plants or produce that are a very bright red. High-lycopene tomatoes are now available through garden catalogs," she added.

"This research shows that you can greatly increase a food's bioactive benefits through normal farming practices, without resorting to genetic engineering. Farmers have traditionally been more concerned about yield than nutritional composition. Now we're asking, can we grow more nutritional broccoli and tomatoes? And the answer is a definite yes," said Jeffery.

The study was published in the *Journal of Agricultural and Food Chemistry.* Liu and Sonja E. Volker co-authored the paper with Jeffery and Erdman.

Story Source:

Adapted from materials provided by University of Illinois College of Agricultural, Consumer and Environmental Sciences, via EurekAlert!, a service of AAAS.

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http://www.sciencedaily.com/releases/2010/05/100514123504.htm

Poor Children More Vulnerable to Effects of Poor Sleep

ScienceDaily (May 20, 2010) — Elementary-school-age children from poor families are more vulnerable to the effects of poor sleep than their peers. That's the finding of a new study that assessed the ties between children's sleep and their emotional development.

The study, by researchers at Auburn University, appears in the May/June 2010 issue of the journal *Child Development.*

The researchers looked at how sleep disruptions -- namely, the amount, quality, and schedule of sleep -- affect children's adjustment. They examined more than 140 children in third to fifth grades, of whom three-quarters were White and almost a quarter were African American. Families varied widely in terms of annual income and parents' education and jobs.

The study gathered information from parents' and children's reports, as well as motion sensors worn by the children at night to examine their sleep. The researchers looked at relations between sleep and emotional development when children were in third and fifth grades; they also compared how children's sleep when they were in third grade was related to their well-being when they were in fifth grade.

Findings indicate that children from poorer families had higher levels of externalizing symptoms (such as aggression and delinquency) and internalizing symptoms (such as depression, anxiety, and low self-esteem) when they slept poorly. Conversely, when these children slept better, their levels of symptoms were similar to those of other children from nonpoor families.

A similar pattern held for African-American children. Lack of sleep may combine with other stressors in the lives of low-income and minority children to contribute to the higher levels of behavior problems. However, for minority children, getting a good sleep protects against a wide range of adjustment problems, the authors suggest.

This research adds to the mounting evidence linking sleep to day-to-day functioning in childhood, and highlights the role of sleep in a wide range of behavioral problems in high-risk children."The significance of children's sleep to their development is receiving increased attention," according to Mona El-Sheikh, Alumni Professor of Human Development and Family Studies at Auburn University and the study's lead author."Our findings can inform intervention programs as well as parent education programs. Programs that are tailored to families' resources and challenges are likely to be more effective."

The study was funded, in part, by the National Science Foundation.

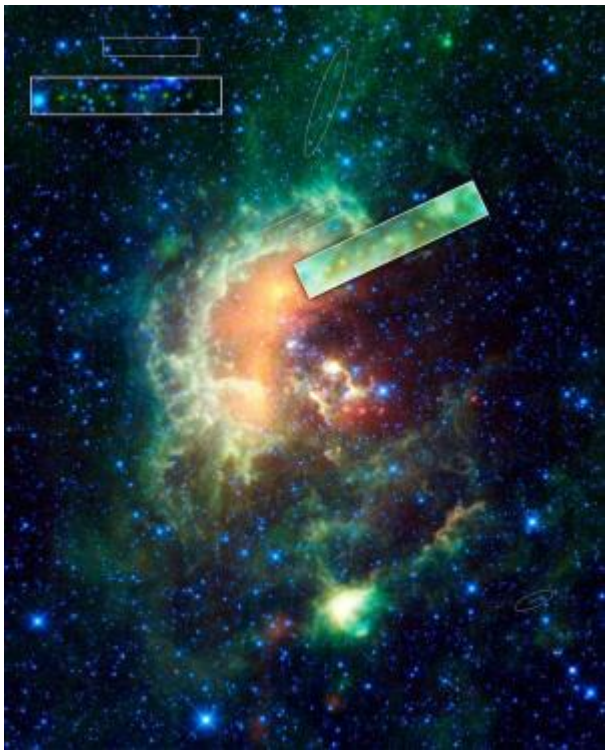
Adapted from materials provided by Society for Research in Child Development, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Mona El-Sheikh, Ryan J. Kelly, Joseph A. Buckhalt, J. Benjamin Hinnant. **Children's Sleep and Adjustment Over Time: The Role of Socioeconomic Context**. *Child Development*, May 13 2010 (p 870-883) DOI: 10.1111/j.1467-8624.2010.01439.x

http://www.sciencedaily.com/releases/2010/05/100514074917.htm

Asteroid Caught Marching Across Tadpole Nebula



This image from WISE shows the Tadpole nebula. (Credit: NASA/JPL-Caltech/UCLA)

ScienceDaily (May 19, 2010) — A new infrared image from NASA's Wide-field Infrared Survey Explorer, or WISE, showcases the Tadpole nebula, a star-forming hub in the Auriga constellation about 12,000 light-years from Earth. As WISE scanned the sky, capturing this mosaic of stitched-together frames, it happened to catch an asteroid in our solar system passing by. The asteroid, called 1719 Jens, left tracks across the image, seen as a line of yellow-green dots in the boxes near center. A second asteroid, called 1992 UZ5, was also observed cruising by, as highlighted in the boxes near the upper left (the larger boxes are blown-up versions of the smaller ones).

But that's not all that WISE caught in this busy image -- two satellites orbiting above WISE (highlighted in the ovals) streak through the image, appearing as faint green trails. The apparent motion of asteroids is slower than satellites because asteroids are much more distant, and thus appear as dots that move from one WISE frame to the next, rather than streaks in a single frame.

This Tadpole region is chock full of stars as young as only a million years old -- infants in stellar terms -- and masses over 10 times that of our sun. It is called the Tadpole nebula because the masses of hot, young stars are blasting out ultraviolet radiation that has etched the gas into two tadpole-shaped pillars, called Sim 129 and Sim 130. These "tadpoles" appear as the yellow squiggles near the center of the frame. The knotted regions at their heads are likely to contain new young stars. WISE's infrared vision is helping to ferret out hidden stars such as these.

The 1719 Jens asteroid, discovered in 1950, orbits in the main asteroid belt between Mars and Jupiter. The space rock, which has a diameter of 19 kilometers (12 miles), rotates every 5.9 hours and orbits the sun every 4.3 years.

Twenty-five frames of the region, taken at all four of the wavelengths detected by WISE, were combined into this one image. The space telescope caught 1719 Jens in 11 successive frames. Infrared light of 3.4 microns is color-coded blue: 4.6-micron light is cyan; 12-micron-light is green; and 22-micron light is red.

WISE is an all-sky survey, snapping pictures of the whole sky, including everything from asteroids to stars to powerful, distant galaxies.

JPL manages WISE for NASA's Science Mission Directorate, Washington. The principal investigator, Edward Wright, is at UCLA. The mission was competitively selected under NASA's Explorers Program managed by the Goddard Space Flight Center, Greenbelt, Md. The science instrument was built by the Space Dynamics Laboratory, Logan, Utah, and the spacecraft was built by Ball Aerospace & Technologies Corp., Boulder, Colo. Science operations and data processing take place at the Infrared Processing and Analysis Center at the California Institute of Technology in Pasadena. Caltech manages JPL for NASA.

More information is online at http://www.nasa.gov/wise and http://wise.astro.ucla.edu .

Story Source:

Adapted from materials provided by NASA/Jet Propulsion Laboratory.

http://www.sciencedaily.com/releases/2010/05/100517234711.htm

Oncolytic Viruses Mediating Anti-Tumor Immunity in Human Cancer Patients

ScienceDaily (May 19, 2010) — Researchers from the University of Helsinki, and Oncos Therapeutics, a biotech company developing new cancer therapeutics based on the next generation oncolytic viruses, published initial results from their Advanced Therapy Access Program in *Cancer Research*. The therapy program is based on scientific research at the University of Helsinki and serves as the foundation for ongoing clinical development.

The results demonstrate an anti-tumor immunity of oncolytic viruses -- published for the first time in humans -- and indicate the strong efficacy of the next generation viruses against solid tumor cancers. As of today, 200 patients have been treated with oncolytic virus therapy in the company's Advanced Therapy Access Program.

"This is the first time it has been shown in humans that oncolytic viruses can be used for the induction of anti-tumor immunity. The GMCSF -armed oncolytic adenovirus can mediate anti-tumor immunologic responses by recruiting natural killer cells and by the induction of tumor-specific cytotoxic T-cells," explains research professor Akseli Hemminki, the CSO and co-founder of Oncos.

"Anti-tumor immunity plays a major role in the strong efficacy results. We are starting clinical trials with CGTG-102, which is further improved compared of the virus described in this publication," comments Pekka Simula, the CEO and co-founder of Oncos.

The *Cancer Research* article reports strong safety and efficacy results in patients with advanced cancer progressing after available chemotherapy options. Out of the 15 radiologically evaluable patients 2 had complete responses (13%), 5 patients had stable disease (33 %) and 1 had a partial response (6 %). Therefore, the clinical benefit rate was 47% according to the RECIST criteria. Responses were frequently seen in both injected and non-injected tumors. The safety profile was favorable with no grade 4-5 side effects realized.

"It has been impressive to see how powerful and consistent the oncolytic adenovirus platform is for directing the body's own immune system against tumor cells" says Dr. Vincenzo Cerullo, the scientist who led the project at the University of Helsinki Cancer Gene Therapy Group (CGTG).

Story Source:

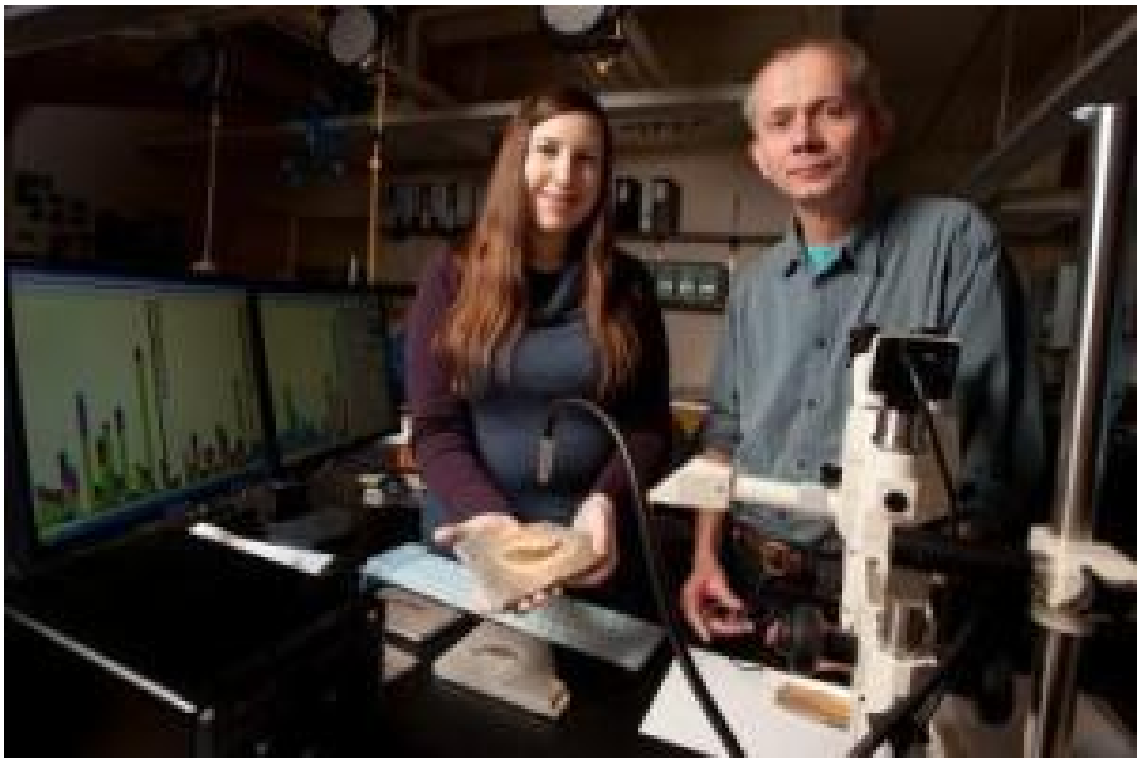
Adapted from materials provided by University of Helsinki, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Vincenzo Cerullo, Sari Pesonen, Iulia Diaconu, Sophie Escutenaire, Petteri T. Arstila, Matteo Ugolini, Petri Nokisalmi, Mari Raki, Leena Laasonen, Merja Särkioja, Maria Rajecki, Lotta Kangasniemi, Kilian Guse, Andreas Helminen, Laura Ahtiainen, Ari Ristimäki, Anne Räisänen-Sokolowski, Elina Haavisto, Minna Oksanen, Eerika Karli, Aila Karioja-Kallio, Sirkka-Liisa Holm, Mauri Kouri, Timo Joensuu, Anna Kanerva, and Akseli Hemminki. **Oncolytic Adenovirus Coding for Granulocyte Macrophage Colony-Stimulating Factor Induces Antitumoral Immunity in Cancer Patients**. *Cancer Research*, 2010; DOI: 10.1158/0008-5472.CAN-09-3567

http://www.sciencedaily.com/releases/2010/05/100518131714.htm

Prehistoric Fish Extinction Paved the Way for Modern Vertebrates; Event of Unknown Origin Occurred as First Vertebrates Tested Land



Lauren Sallan and Professor Michael Coates handle a actinopterygian fossil in their Culver Hall lab Oct. 6, 2009. Sallan and Coates found that an extinction event 360 million years ago set the stage for modern vertebrate evolution. The research was published online May 17 by the Proceedings of the National Academy of Sciences. (Credit: Photo by Jason Smith/University of Chicago)

ScienceDaily (May 19, 2010) — A mass extinction of fish 360 million years ago hit the reset button on Earth's life, setting the stage for modern vertebrate biodiversity, a new study reports.

The mass extinction scrambled the species pool near the time at which the first vertebrates crawled from water towards land, University of Chicago scientists report. Those few species that survived the bottleneck were the evolutionary starting point for all vertebrates -- including humans -- that exist today, according to a study published in the *Proceedings of the National Academy of Sciences*.

"Everything was hit, the extinction was global," said Lauren Sallan, University of Chicago graduate student and lead author of the paper. "It reset vertebrate diversity in every single environment, both freshwater and marine, and created a completely different world."

The Devonian Period, which spanned from 416 to 359 million years ago, is also known as the Age of Fishes for the broad array of species present in Earth's aquatic environments. Armored placoderms such as the gigantic Dunkleosteus and lobe-finned fishes -- similar to the modern lungfish -- dominated the waters, while ray-finned fishes, sharks, and tetrapods were in the minority.

But between the latest Devonian Period and the subsequent Carboniferous period, placoderms disappeared and ray-finned fishes rapidly replaced lobe-finned fishes as the dominant group, a demographic shift that persists to today.

"The Devonian period is known as the Age of Fishes, but it's the wrong kind of fish," Sallan said. "Just about everything dominant in Devonian died at the end of the period and was replaced."

"There's some sort of pinch at the end of the Devonian," said second author Michael Coates, PhD, professor of organismal biology and anatomy at the University of Chicago. "It's as if the roles persist, but the players change: the cast is transformed dramatically. Something happened that almost wiped the slate clean, and, of the few stragglers that made it through, a handful then re-radiate spectacularly."

Scientists have long theorized that the Late Devonian Kellwasser event -- considered to be one of the "Big Five" extinctions in Earth's history -- was responsible for a marine invertebrate species shake-up. But an analysis of the vertebrate fossil record by Sallan and Coates, pinpointed a critical shift in their diversity to the Hangenberg extinction event 15 million years later.

Prior to the extinction, lobe-finned forms such as Tiktaalik and the earliest limbed tetrapods such as Ichthyostega had made the first tentative "steps" toward a land-dwelling existence. But after the extinction, a long stretch of the fossil record known as "Romer's Gap," is almost barren of tetrapods, a puzzle that had confused paleontologists for many years. Sallan and Coates' data suggest that the 15-million-year gap was the hangover after the traumatic Hangenberg event.

"The gap is real. Something that is classically seen after an extinction event is a gap in the records of survivors," Sallan said. "You have a very low diversity fauna, because most things have been killed off."

When tetrapods finally recovered, those survivors were likely the great-great-grandfathers to the vast majority of land vertebrates present today. Modern vertebrate traits -- such as the motif of five-digit limbs that is shared by all mammals, birds, and reptiles in utero -- may have been set by this early common ancestor, the authors propose.

"Extinction events remove a huge amount of biodiversity," Coates said. "That shapes in a very significant way the patchiness of biodiversity that persists to the present day."

The analysis benefitted from recent advances in filling in the vertebrate fossil record, Coates said. Previously, estimates of the earlier extinction had been made using fossils of invertebrates such as mollusks and clams, which are far more abundant. With a larger dataset of vertebrates and analytical techniques borrowed from modern ecology, Sallan and Coates were able to see the abrupt changes in species composition before and after the Hangenberg event.

"It's a big extinction during what was already considered a critical time in vertebrate evolution, so it's surprising that it went unnoticed for so long," Sallan said. "But it took the right methods to reveal its magnitude."

What remains mysterious is exactly what happened 360 million years ago to trigger this mass extinction, the authors said. Other researchers have found evidence of substantial glacier formation at the end of the Devonian period, which would dramatically lower sea levels and affect the life within. The first appearance of forest-like environments in some regions might also have produced atmospheric changes catastrophic to animal life.

The research also raises questions about the pattern of evolution after the extinction event. It remains unclear why groups that were abundant before the event did not recover, while other groups spread and diversified in radical new ways. Regardless of these questions, the consequences are still being felt hundreds of millions of years later, the authors said.

"It is a pivotal episode that shaped modern vertebrate biodiversity," Coates said. "We are only now beginning to place that important event in the history of life and the history of the planet, which we weren't able to do before."

Funding for the research was provided by the National Science Foundation, the University of Chicago Hinds Fund, the Paleontological Society, the Palaeontological Association, the American Society of Ichthyologists and Herpetologists, and the Evolving Earth Foundation.

Story Source:

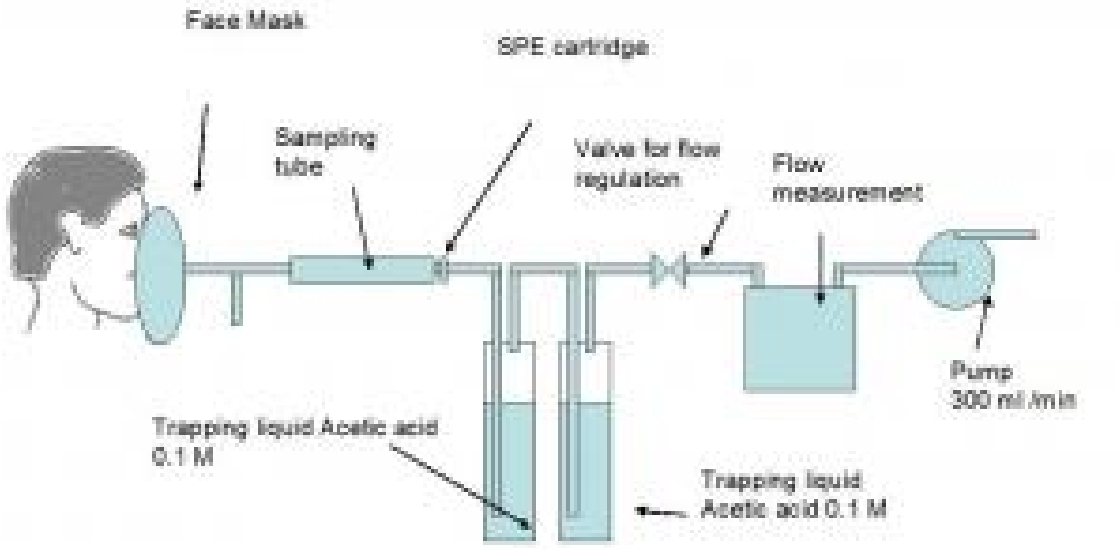
Adapted from materials provided by University of Chicago Medical Center, via EurekAlert!, a service of AAAS.

Journal Reference:

1. Lauren Cole Sallan, Michael I. Coates. **End-Devonian extinction and a bottleneck in the early evolution of modern jawed vertebrates**. *Proceedings of the National Academy of Sciences*, 2010; DOI: 10.1073/pnas.0914000107

http://www.sciencedaily.com/releases/2010/05/100517152518.htm

New Technique Enables Drugs Tests Via Exhaled Breath



Olof Beck study illustration. (Credit: Copyright Olof Beck, Karolinska Institutet)

ScienceDaily (May 19, 2010) — A new study from the Swedish medical university Karolinska Institutet presents a new technique that makes drug testing possible through exhaled air for the first time. By examining people who had received emergency care for an amphetamine overdose, the researchers found that in all cases there were traces of amphetamine and metamphetamine in the exhaled breath.

"Traditionally, drugs tests have been carried out using urine and blood samples," says Professor Olof Beck, who led the study. "In recent years we've been trying to find simpler alternatives using saliva, which, unfortunately, has proved difficult. Our results open the way for a new kind of drugs test, which is simple and safe to conduct and that requires no integrity-violating monitoring or medical staff."

Drug abuse is a huge social problem and drugs tests are used widely and comprehensively by the healthcare and social services, the legal system, at workplaces and schools. Reliable drugs tests are important for making correct diagnoses and for keeping tabs on drug users to ensure that they are following their prescribed treatment. Alcohol use can easily be checked in a breathalyser, and the technology is available for conducting measurements in a way that does not violate a person's integrity. Measurements of other substances in the exhaled breath are also available for diagnosing diseases such as cancer, asthma and diabetes.

In this present study, which is published in the latest issue of *The Journal of Analytical Toxicology*, scientists at Karolinska Institutet have developed a new and unique method for collecting narcotic substances from the exhaled breath. This they did by asking subjects to breathe into a specially designed mask for ten minutes, whereupon the exhaled air was collected and passed through a filter, which trapped the narcotic substances. These filters were then analysed using combined liquid chromatography and tandem mass-spectrometry, techniques that are highly sensitive and reliable.

The researchers took samples from 12 patients who had been admitted into emergency care with toxic symptoms after having taken amphetamines. The samples were taken after the effects of the drug had worn off and with the permission of the regional ethical review board in Stockholm. The ingestion of the drug was confirmed in the patient group through urine and blood samples. In all cases, the researchers were able to

ascertain the presence of amphetamine and metamphetamine (a narcotics-classed central-stimulating substance similar to amphetamine) in the exhaled breath as well. The measured excretion rate was between 0.2 and 139 pg/min, which is very low compared to the blood and urine. No amphetamine or metamphetamine were detected in samples from healthy controls.

"The results are convincing and very promising," says Professor Beck. "The study is the first to report the possibility of measuring drugs in the exhaled breath, and represents a unique, unexpected finding. We now have to move on to other drugs that are of interest for this type of breath test, and to develop the sampling and analysis methods. An instrument like a breathalyser for drugs would be the optimal solution for the efficient control of drug use by motorists, for example."

The study was conducted by researchers at the clinical pharmacology division of the Department of Medicine, Solna and at the Psychiatry Unit at the Department of Clinical Science, Karolinska Institutet, and was financed by Vinnova (the Swedish Governmental Agency for Innovation Systems), the Stockholm County Council and the Swedish Research Council.

Story Source:

Adapted from materials provided by Karolinska Institutet.

Journal Reference:

1. Olof Beck, Kathinka Leine, Göran Palmskog & Johan Franck. **Amphetamines Detected in Exhaled Breath from Drug Addicts: A New Possible Method for Drugs-of-Abuse Testing**. *Journal of Analytical Toxicology*, 2010: 34 (5): 233-237 [link]

http://www.sciencedaily.com/releases/2010/05/100519081438.htm

Airplanes That Would Use 70 Percent Less Fuel Than Current Models

MIT's D "double bubble" series design concept is based on a modified "tube-and-wing" structure that has a very wide fuselage to provide extra lift. The aircraft would be used for domestic flights to carry 180 passengers in a coach cabin roomier than that of a Boeing 737-800. (Credit: MIT/Aurora Flight Sciences)

ScienceDaily (May 19, 2010) — In what could set the stage for a fundamental shift in commercial aviation, an MIT-led team has designed a green airplane that is estimated to use 70 percent less fuel than current planes while also reducing noise and emission of nitrogen oxides (NOx).

The design was one of two that the team, led by faculty from the Department of Aeronautics and Astronautics, presented to NASA last month as part of a $2.1 million research contract to develop environmental and performance concepts that will help guide the agency's aeronautics research over the next 25 years. Known as "N+3" to denote three generations beyond today's commercial transport fleet, the research program is aimed at identifying key technologies, such as advanced airframe configurations and propulsion systems, that will enable greener airplanes to take flight around 2035.

MIT was the only university to lead one of the six U.S. teams that won contracts from NASA in October 2008. Four teams -- led by MIT, Boeing, GE Aviation and Northrop Grumman, respectively -- studied concepts for subsonic (slower than the speed of sound) commercial planes, while teams led by Boeing and Lockheed-Martin studied concepts for supersonic (faster than the speed of sound) commercial aircraft. Led by AeroAstro faculty and students, including principal investigator Ed Greitzer, the H. Nelson Slater Professor of Aeronautics and Astronautics, the MIT team members include Aurora Flight Sciences Corporation and Pratt & Whitney.

Their objective was to develop concepts for, and evaluate the potential of, quieter subsonic commercial planes that would burn 70 percent less fuel and emit 75 percent less NOx than today's commercial planes. NASA also wanted an aircraft that could take off from shorter runways. Designing an airplane that could meet NASA's aggressive criteria while accounting for the changes in air travel in 2035 -- when air traffic is expected to double -- would require "a radical change," according to Greitzer. Although automobiles have undergone extensive design changes over the last half-century, "aircraft silhouettes have basically remained the same over the past 50 years," he said, describing the traditional, easily recognizable "tube-and-wing" structure of an aircraft's wings and fuselage.

Two planes for two missions

The MIT team met NASA's challenge by developing two designs: the 180-passenger D "double bubble" series to replace the Boeing 737 class aircraft, currently used for domestic flights, and the 350 passenger H "hybrid wing body" series to replace the 777 class aircraft now used for international flights.

The engineers conceived of the D series by reconfiguring the tube-and-wing structure. Instead of using a single fuselage cylinder, they used two partial cylinders placed side by side to create a wider structure whose cross-section resembles two soap bubbles joined together. They also moved the engines from the usual wing-mounted locations to the rear of the fuselage. Unlike the engines on most transport aircraft that take in the high-speed, undisturbed air flow, the D-series engines take in slower moving air that is present in the wake of the fuselage. Known as the Boundary Layer Ingestion (BLI), this technique allows the engines to use less fuel for the same amount of thrust, although the design has several practical drawbacks, such as creating more engine stress.

According to Mark Drela, the Terry L. Kohler Professor of Fluid Dynamics and lead designer of the D series, the design mitigates some of the drawbacks of the BLI technique by traveling about 10 percent slower than a 737. To further reduce the drag and amount of fuel that the plane burns, the D series features longer, skinnier wings and a smaller tail. Independently, each tweak might not amount to much, but the "little 5-percent changes add up to one big change," Drela said. Although the plane would travel slightly slower than a 737, he said that some of this time could be recovered because the plane's wider size should allow for quicker loading and unloading.

Not only does the D series meet NASA's long-term fuel burn, emissions reduction and runway length objectives, but it could also offer large benefits in the near future because the MIT team designed two versions: a higher technology version with 70 percent fuel-burn reduction, and a version that could be built with conventional aluminum and current jet technology that would burn 50 percent less fuel and might be more attractive as a lower risk, near-term alternative.

Carl Burleson, the director of the Federal Aviation Agency's Office of Environment and Energy, said that in addition to its "really good environmental performance," the D series is impressive because its bubble design is similar enough to the tube-and-wing structure of current planes that it should be easier to integrate into airport infrastructure than more radical designs. "You have to think about how an airport structure can support it," he said. " For some other designs, you could have to fundamentally reshape the gates at airports because the planes are configured so differently."

Although the H series utilizes much of the same technology as the D series, including BLI, a larger design is needed for this plane to carry more passengers over longer distances. The MIT team designed a triangular-shaped hybrid wing body aircraft that blends a wider fuselage with the wings for improved aerodyamics. The large center body creates a forward lift that eliminates the need for a tail to balance the aircraft.

The large structure also allows engineers to explore different propulsion architectures for the plane, such as a distributed system of multiple smaller engines. Although the H series meets NASA's emissions-reduction and runway-length goals, the researchers said they will continue to improve the design to meet more of NASA's objectives.

The MIT team expects to hear from NASA within the next several months about whether it has been selected for the second phase of the program, which will provide additional funds to one or two of the subsonic teams in 2011 to research and develop the technologies identified during the first phase. The researchers acknowledge that some propulsion system technology still needs to be explored. They have proposed evaluating the interactions between the propulsion system and the new aircraft using a large-scale NASA wind tunnel. Even if the MIT designs are not chosen for the second phase, the researchers hope to continue to develop them, including testing smaller models at MIT's Wright Brothers' Wind Tunnel and collaborating with manufacturers to explore how to make the concepts a reality.

Story Source:

Adapted from materials provided by Massachusetts Institute of Technology. Original article written by Morgan Bettex, MIT News Office.

http://www.sciencedaily.com/releases/2010/05/100517162834.htm

Dopamine System in Highly Creative People Similar to That Seen in Schizophrenics, Study Finds

In a new study, researchers in Sweden show that the dopamine system in healthy, highly creative people is similar in some respects to that seen in people with schizophrenia. (Credit: iStockphoto/Evgeny Terentev)

ScienceDaily (May 19, 2010) — New research shows a possible explanation for the link between mental health and creativity. By studying receptors in the brain, researchers at Karolinska Institutet have managed to show that the dopamine system in healthy, highly creative people is similar in some respects to that seen in people with schizophrenia.

High creative skills have been shown to be somewhat more common in people who have mental illness in the family. Creativity is also linked to a slightly higher risk of schizophrenia and bipolar disorder. Certain psychological traits, such as the ability to make unusual pr bizarre associations are also shared by schizophrenics and healthy, highly creative people. And now the correlation between creativity and mental health has scientific backing.

"We have studied the brain and the dopamine D2 receptors, and have shown that the dopamine system of healthy, highly creative people is similar to that found in people with schizophrenia," says associate professor Fredrik Ullén from Karolinska Institutet's Department of Women's and Children's Health, co-author of the study that appears in the journal *PLoS ONE*.

Just which brain mechanisms are responsible for this correlation is still something of a mystery, but Dr Ullén conjectures that the function of systems in the brain that use dopamine is significant; for example, studies have shown that dopamine receptor genes are linked to ability for divergent thought. Dr Ullén's study measured the creativity of healthy individuals using divergent psychological tests, in which the task was to find many different solutions to a problem.

"The study shows that highly creative people who did well on the divergent tests had a lower density of D2 receptors in the thalamus than less creative people," says Dr Ullén. "Schizophrenics are also known to have low D2 density in this part of the brain, suggesting a cause of the link between mental illness and creativity."

The thalamus serves as a kind of relay centre, filtering information before it reaches areas of the cortex, which is responsible, amongst other things, for cognition and reasoning.

"Fewer D2 receptors in the thalamus probably means a lower degree of signal filtering, and thus a higher flow of information from the thalamus," says Dr Ullén, and explains that this could a possible mechanism behind the ability of healthy highly creative people to see numerous uncommon connections in a problem-solving situation and the bizarre associations found in the mentally ill.

"Thinking outside the box might be facilitated by having a somewhat less intact box," says Dr Ullén about his new findings.

Story Source:

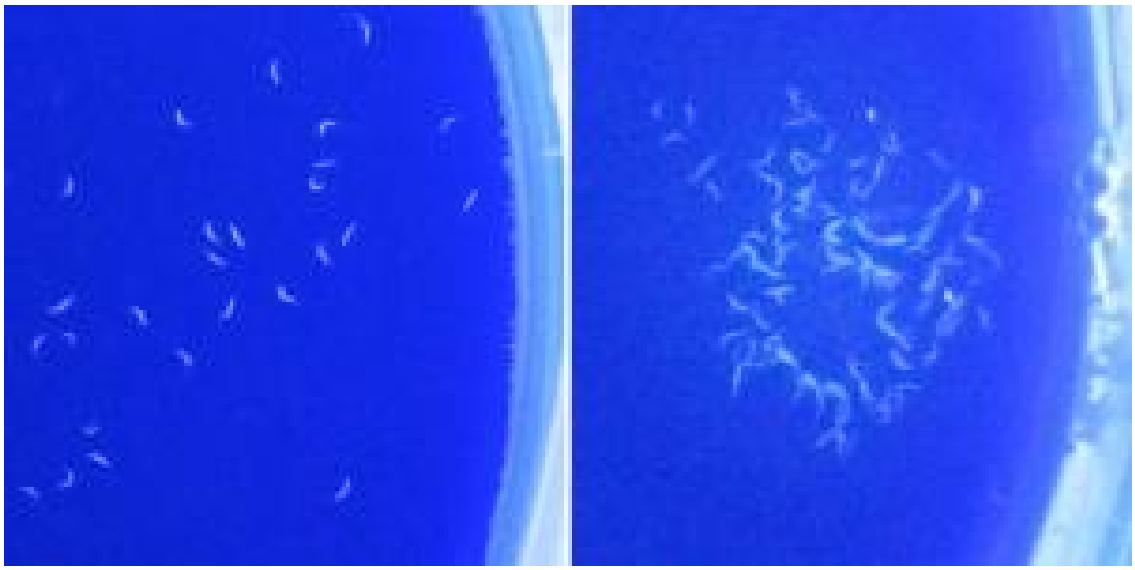
Adapted from materials provided by Karolinska Institutet.

Journal Reference:

1. Örjan de Manzano, Simon Cervenka, Anke Karabanov, Lars Farde, Fredrik Ullén, Aldo Rustichini. **Thinking Outside a Less Intact Box: Thalamic Dopamine D2 Receptor Densities Are Negatively Related to Psychometric Creativity in Healthy Individuals**. *PLoS ONE*, 2010; 5 (5): e10670 DOI: 10.1371/journal.pone.0010670

http://www.sciencedaily.com/releases/2010/05/100518064610.htm

Extending Lifespan Has Mixed Effects on Learning and Memory



As part of an experiment to assess learning and memory in C. elegans roundworms, the image on the left shows worms that have not yet been trained to associate food with a drop of the chemical butanone that has been placed on the right side of the Petri dish. After training, the worms in the image on the right can be seen clustering around butanone that has been added. By testing normal worms as well as worms with genetic mutations that increase lifespan, the researchers were able to explore how factors that extend longevity affect learning and memory. (Credit: Coleen Murphy lab)

ScienceDaily (May 19, 2010) — Decreasing the intake of calories and tweaking the activity of the hormone insulin are two methods long known to increase lifespan in a wide range of organisms.

In particular, studies have shown that longevity can be extended by reducing activity in the insulin-signaling pathway -- a chain of events through which insulin influences numerous biological processes, including metabolism, stress response and development.

Now, a team of Princeton biologists has found the first evidence that these mechanisms also have an impact on cognitive function.

By studying worms, the scientists were able to analyze the effects of caloric restriction and reduced insulin signaling on declines in learning and memory brought on by age. The findings have implications for the development of treatments that simultaneously help people live longer and prevent the devastating losses in memory that so often occur with age. Their results are published in the May 18 edition of the journal *Public Library of Science Biology.*

"The assumption in the field of longevity research has been that organisms able to live longer will function longer as well," said Coleen Murphy, an assistant professor of molecular biology and the Lewis-Sigler Institute for Integrative Genomics at Princeton, and the senior author on the paper. "It seems we need to revisit that. Different mechanisms of longevity extension may be beneficial to certain functions and detrimental to others, so it may be the case that treatments that target more than one longevity regulator will be the right approach to take."

When Murphy and her colleagues looked at the effects of caloric restriction on cognitive function in *C. elegans* roundworms, they found that restricting calories impaired long-term memory in early adulthood. But surprisingly, the worms did not suffer further memory reduction with age, suggesting that caloric restriction may guard against memory loss over time.

The scientists also studied worms with genetic mutations that allowed the researchers to assess separately the impact of reducing the activity in the insulin-signaling pathway. In contrast to the worms that were eating less, the worms with reduced insulin signaling demonstrated improved long-term memory performance in early adulthood and maintained learning ability better with age. However, these worms were not protected against age-related declines in long-term memory.

The team also found that molecular mechanisms underlying cognitive function in worms are the same as those previously discovered in higher organisms, including mammals, suggesting that the study has far-reaching implications.

C. elegans has long been used for research on aging and longevity, owing to the worm's simple nervous system, relatively short lifespan of just two to three weeks, and the fact that the worms experience many signs of aging. This includes reduced motility and muscle deterioration, which are seen in other organisms, including humans. Additionally, scientists conducting extensive work on the worms previously have identified several *C. elegans* mutants with long lifespans, which provide opportunities to explore the molecular and genetic pathways that allow these mutants to live up to 50 percent longer than normal worms. Previous research in this area includes extensive work over the past two decades by Cynthia Kenyon and her research team at the University of California, San Francisco to identify the genes that affect longevity in *C. elegans*. Murphy, currently Princeton's Richard B. Fisher Preceptor in Integrative Genomics, was a postdoctoral scientist in Kenyon's lab from 2000 until 2005.

Until now, however, scientists have not known whether the roundworms experience declines in cognitive function related to age that are so often seen in humans, Murphy said. Also unknown was whether such declines, if they exist, affect mutant worms with long lifespans in the same way or on the same time scale.

In seeking to explore these questions, the researchers found themselves facing a challenge: How do you assess learning and memory in worms?

Taking a hint from Russian scientist Ivan Pavlov, famous for his early 20th-century experiments that taught dogs to associate food with the ringing of a bell, Princeton graduate student Amanda Kauffman trained worms to associate food -- in the case of *C. elegans*, bacteria are food -- with a chemical called butanone. The worms are not normally attracted to butanone, which smells something like a cloying combination of butterscotch and acetone, but they learned to move toward the chemical after training sessions in which they were fed in the presence of butanone.

After training, the researchers assessed learning and memory by re-exposing the worms to butanone and observing the degree to which the animals moved toward the chemical to which they normally would be averse. The biologists trained and tested worms of a variety of ages to assess the cognitive abilities of young, middle-aged and old worms.

The number and duration of the training sessions had a marked effect on how long the worms were observed to remember the food-butanone association. The researchers found that, after a single 30-minute training session, young worms moved toward butanone when tested immediately, but they retained this short-term memory less than two hours. Following a series of seven training sessions, young worms were found to form long-term memories that lasted at least 16 hours -- a large chunk of time in the lifespan of a worm that lives

only about two and a half weeks. In the average person, this would equate to remembering something for around three to six years. Further tests indicated that about half of this long-term memory faded within 24 hours, and the food-butanone association was entirely forgotten 40 hours after training. For the average person, this would equate to forgetting something after about eight to 15 years.

According to Murphy, the memory tests revealed that, relatively early in their short lives, the worms began to lose their ability to learn and retain information, with deficits starting to appear in the second day of adulthood. By the fourth day of adulthood, the worms had lost the ability to form long-term memories entirely.

After using the learning and memory tests to assess cognitive function in normal worms, the biologists did the same tests on two strains of *C. elegans* mutants with abnormally long lifespans.

One of the mutants tested has a defect in a gene known as daf-2, which controls the formation of the worm's insulin receptor, the researchers explained. This defect reduces the worm's ability to respond to the insulin hormone, and the gene is known to regulate survival, resistance to stress and the maintenance of motility in the worms. A similar gene in humans is known to regulate aging.

The other mutant has a genetic defect that makes it difficult for the worms to ingest food, forcing the animals to eat less. To date, caloric restriction has been observed to extend lifespan in every organism tested, including worms, mice and monkeys, Murphy said. While the reasons for this are still under investigation, scientists generally believe that the benefits of caloric restriction go well beyond preventing diseases associated with obesity, such as heart disease and diabetes, Murphy added. It appears that limiting food intake actually slows the aging process.

When the Princeton biologists conducted the learning and memory tests on the two strains of *C. elegans* mutants, they were surprised at the different effects on learning and memory arising from caloric restriction and reduction in the activities of the insulin-signaling pathways.

Young worms whose calories were restricted had normal short-term memories, but their long-term memories were severely impaired; the memories faded within 24 hours, as opposed to 40 hours in normal worms. The researchers determined this by analyzing the degree to which the worms moved toward the butanone in the memory tests.

But the worms did not experience a decline with age in their long-term memories, weak though they were; they were able to form long-term memories even four days into adulthood, by which time normal worms have lost this ability entirely.

In contrast, the strain of young worms with reduced activity in their insulin-signaling pathways had longer short-term memories -- lasting about six hours, or three times as long as in normal worms -- and long-term memories that lasted far longer than the 40 hours in normal worms. Additionally, these mutants retained the ability to learn much longer than normal worms. But their ability to form long-term memories faded at the same rate as in normal worms -- by day four of adulthood, the worms could no longer make long-term associations.

By looking at the molecular mechanisms at play in the worms, the biologists determined that the differences in the effects of caloric restriction and reduced insulin signaling on age-related decline in long-term memory appear to be linked to expression of a protein called CREB.

In their experiments, the researchers found that the presence of CREB, which binds to DNA and regulates the expression of genes, is crucial for the formation of long-term memories in *C. elegans*, but not required for learning or short-term memory. Previous studies have shown that CREB is required for long-term memory in numerous organisms, including sea slugs, fruit flies and mammals.

For example, the Princeton team observed that higher levels of CREB protein were found in young *C. elegans* with defective insulin receptors, which accounts for the heightened long-term memories observed in these worms. Similarly, CREB levels in the worms that were genetically altered to eat less were quite low, but they did not diminish with age. This could explain why these worms had poor long-term memories at a young age, but did not experience memory loss over time.

The research shows that different factors that extend longevity affect cognitive function in very different ways, having both positive and negative effects over the course of an organism's lifetime. While the work suggests that it may one day be possible to harness those mechanisms that protect against age-related memory loss in treatments that extend life and promote healthy brain functioning, Murphy pointed out that the results must be interpreted with a mix of caution and optimism in terms of potential applicability to the development of medical therapies for people.

"I'm optimistic because we know these longevity mechanisms in *C. elegans* are conserved in higher organisms, and there are reasons to believe that they could have similar effects on lifespan and cognitive function in humans," she said. "But these results also suggest that not every way of extending lifespan is good for cognitive function, which has huge implications for the development of therapies to maintain memory."

In future research, the biologists intend to examine the genetic underpinnings of learning, memory, and age-related cognitive decline in *C. elegans* using DNA microarray technology, Murphy said. Researchers in her lab also plan to use the worms to screen a library of chemicals known to be active in humans to assess their effects on age-related declines in cognitive function in worms.

In addition to Murphy and Kauffman, the research team included research specialist Jasmine Ashraf, graduate student Jessica Landis, and class of 2008 undergraduate Michael Corces-Zimmerman. The research was supported by the Alfred P. Sloan Foundation, the Pew Charitable Trusts, the McKnight Foundation, the W. M. Keck Foundation and the National Institutes of Health.

Story Source:

Adapted from materials provided by Princeton University. Original article written by Hilary Parker.

Journal Reference:

1. Kauffman AL, Ashraf JM, Corces-Zimmerman MR, Landis JN, Murphy CT. **Insulin Signaling and Dietary Restriction Differentially Influence the Decline of Learning and Memory with Age**. *PLoS Biology*, 2010; 8 (5): e1000372 DOI: 10.1371/journal.pbio.1000372

http://www.sciencedaily.com/releases/2010/05/100518180844.htm

Using a Pest's Chemical Signals to Control It

ARS scientists are developing a mimic of the neuropeptides of the pea aphid (shown here) as a biocontrol agent for this and other insect pests. (Credit: Photo courtesy of Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org)

ScienceDaily (May 19, 2010) — Agricultural Research Service (ARS) scientists are tapping into the biochemistry of one of the world's most damaging insect pests to develop a biocontrol agent that may keep the pest away from gardens and farms.

Aphids spread diseases that cost gardeners and farmers hundreds of millions of dollars each year. Some of the insecticides available are not environmentally friendly, and because aphids are developing insecticide resistance, some growers are being forced to use more of the chemicals.

Ronald J. Nachman, a chemist with the ARS Southern Plains Agricultural Research Center at College Station, Texas, is working with chemical signals known as neuropeptides that aphids and other organisms use to control and regulate a wide range of body functions, such as digestion, respiration, water intake and excretions. The effect triggered by the chemical signal is normally turned off when the neuropeptide is broken down by enzymes in the body. Nachman is developing neuropeptide mimics, or analogues, with slightly altered molecular structures that will not break down. His goal is to kill the pest by disrupting its digestion, water intake or some other biological function.

Nachman, along with Guy Smagghe of Ghent University in Belgium and other colleagues, mixed five candidate analogues into dietary solutions and fed each one to 20 caged pea aphid (*Acyrthosiphon pisum*) nymphs. The scientists found that one of the formulations killed 90 to 100 percent of the aphids within three days, at a rate and potency comparable to insecticides now on the market. The study was recently published in the journal *Peptides*.

Any biocontrol agent would have to be thoroughly tested before being released for commercial use. Nachman is continuing to test and evaluate the neuropeptide mimics. But he said the molecular structures of the class of

neuropeptide he is studying, known as insect kinins, are so unique that such a biocontrol agent is unlikely to have any effect on humans, plants or other types of organisms.

Story Source:

Adapted from materials provided by USDA/Agricultural Research Service. Original article written by Dennis O'Brien.

Journal Reference:

1. Guy Smagghe, Kamran Mahdian, Pawel Zubrzak, Ronald J. Nachman. **Antifeedant activity and high mortality in the pea aphid Acyrthosiphon pisum (Hemiptera: Aphidae) induced by biostable insect kinin analogs**. *Peptides*, 2010; 31 (3): 498 DOI: 10.1016/j.peptides.2009.07.001

http://www.sciencedaily.com/releases/2010/05/100517172256.htm

Valuing $0

By ROB WALKER

Lewis Hyde wrote "The Gift" decades ago for an audience of artists, writers and other people who create. He advised these readers that for their expression to endure — to become what we might think of as art — it could not be "tailored to the demands of the market." Rather, such work must be made within the context of what he called "a gift economy," distinct from the "market economy."

Chris Anderson, addressing an audience of entrepreneurs and other business people immersed in marketplace thinking, cited Hyde's work in his book "Free," published last year. "A larger gift economy of deeds, the things we do for each other without charge" has become more visible than ever, thanks in large part to the Internet, he argued. As one example, he cited 12 million blogs written by people sharing "billions of words," mostly for no measurable marketplace reward.

The overlap between Hyde's idea of a gift and Anderson's idea of free is, at best, limited. But Anderson has a point. Think not just of written words but of images, artworks, videos, songs, craft how-to pages and on and on. Surely it's the case that never before have so many creators offered so much to so many for $0. A result, in effect, is a gift glut.

To the extent that this is framed as a problem, it's invariably discussed as a challenge for business or for cultural consumers. To me, it seems far more challenging for the gift givers. Those who see the world in a market-economy way — Anderson's readers, let's say — can find many examples of how those with a profit motive might capitalize on or leverage the no-charge offerings of the creative masses; the valuations of various Web 2.0 enterprises that do precisely this suggest that the market economy seems to be adjusting to this incursion of the gift economy rather nicely. For the consumer, meanwhile, it's a bonanza. Even the most hardened skeptic of the self-expression free-for-all has to admit that plenty of nonprofessional creators, ignoring the wants and needs of the market, have produced priceless gifts for the rest of us to enjoy. On the other hand, even the most ardent enthusiast of giveaway culture has to admit that a lot of what's on offer is not only free but worthless. That is to say, with so many gifts out there, some $0 things seem more valuable than others.

To Hyde, a creative "gift" had a particular set of meanings. It referred to an artist's talent and inspiration, but also to the spirit in which a creation is offered to others. "The artist who hopes to market work that is the realization of his gifts cannot begin with the market," he wrote. "He must create for himself that gift-sphere in which the work is made." This idea is illuminated, among other ways, by comparisons to tribal cultures that

maintain social ties through the ritualized giving and sharing of ceremonial objects.

I couldn't help noticing the way one anthropological account Hyde cited described certain shared items: "long, thin, red strings, and big white worn-out objects, clumsy to sight and greasy to touch." The lesson there is that a product of the gift sphere may be pure, but even a sharing economy depends on somebody's wanting what's being offered — or at least not dismissing it as greasy. In a different context, Russell Belk, a consumer-behavior expert and marketing professor at York University in Toronto, once defined the "perfect gift" as having specific characteristics, including the notion that it is something the recipient is "delighted" to receive.

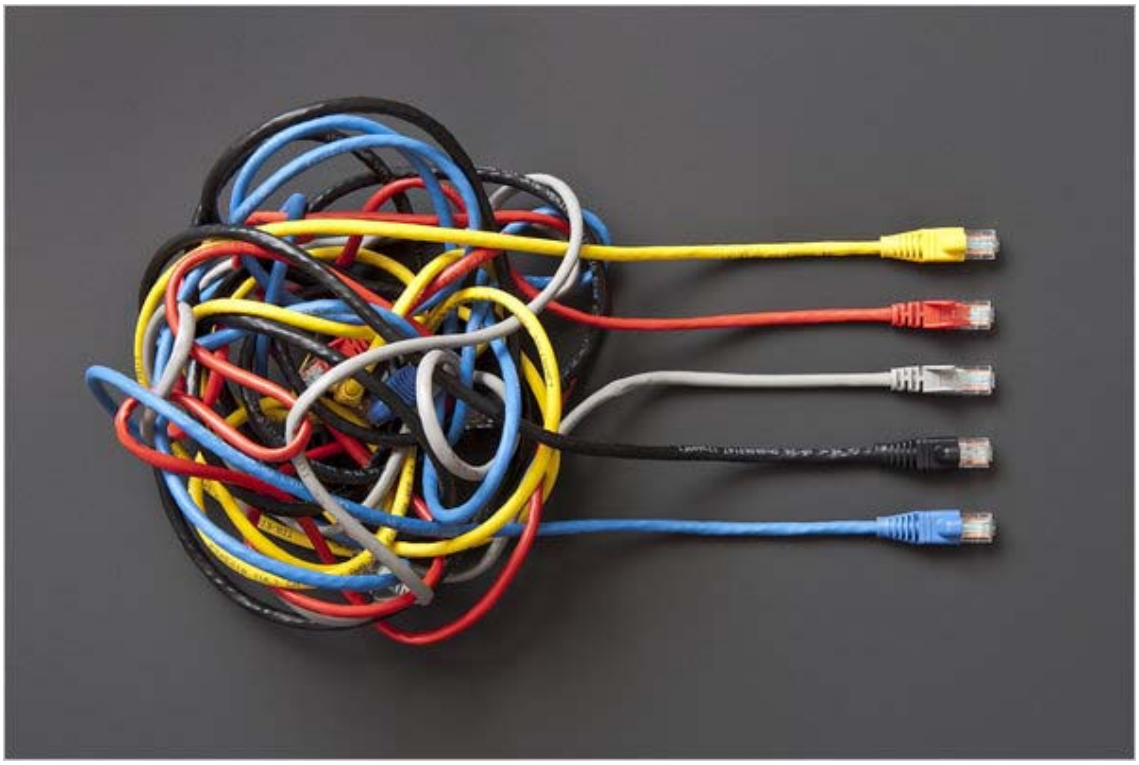
We tend to focus on the breakout successes of democratized culture-making. But there is also a great deal of creative expression out there of the type Hyde had in mind that nonetheless qualifies as an unwanted gift: the unlinked-to blog post, the unliked Facebook page, the unfavorited Flickr photo, the unwatched YouTube video, the unretweeted link and all the other expressions that are ignored or overlooked or simply not rewarded with positive feedback. In a recent 25th anniversary edition of "The Gift," Hyde pointed out the emergence of various Web projects with gift-economy structures, notably the open-source-software movement. But at the same time, much about the Web prods the gift giver into a very marketlike mind-set. Hyde warned that the more we gauge creative successes through Nielsen ratings and box-office rankings and the like, "the less gifted we will become." The newer and more accessible economy of sharing means that practically everything is subject to some kind of rating or ranking, all the time. And that's exactly what makes it so hard for any given sharer to judge what his or her gift is really, finally, worth.

You could conclude, of course, that $0 offerings faring poorly in this system must be failing to attract admirers because they are undeserving; they are at the low end of the spectrum of gift worth, and their lousy numbers prove it. But to say that is to argue that even — maybe especially — in the new gift sphere, market measures rule.

http://www.nytimes.com/2010/05/16/magazine/16fob-consumed-t.html?partner=rss&emc=rss

The Death of the Open Web

By VIRGINIA HEFFERNAN



The Web is a teeming commercial city. It's haphazardly planned. Its public spaces are mobbed, and signs of urban decay abound in broken links and abandoned projects. Malware and spam have turned living conditions in many quarters unsafe and unsanitary. Bullies and hucksters roam the streets. An entrenched population of rowdy, polyglot rabble seems to dominate major sites. People who find the Web distasteful — ugly, uncivilized — have nonetheless been forced to live there: it's the place to go for jobs, resources, services, social life, the future. But now, with the purchase of an iPhone or an iPad, there's a way out, an orderly suburb that lets you sample the Web's opportunities without having to mix with the riffraff. This suburb is defined by apps from the glittering App Store: neat, cute homes far from the Web city center, out in pristine Applecrest Estates. In the migration of dissenters from the "open" Web to pricey and secluded apps, we're witnessing urban decentralization, suburbanization and the online equivalent of white flight.

The parallels between what happened to cities like Chicago, Detroit and New York in the 20th century and what's happening on the Internet since the introduction of the App Store are striking. Like the great modern American cities, the Web was founded on equal parts opportunism and idealism. Over the years, nerds, students, creeps, outlaws, rebels, moms, fans, church mice, good-time Charlies, middle managers, senior citizens, starlets, presidents and corporate predators all made their home on the Web. In spite of a growing consensus about the dangers of Web vertigo and the importance of curation, there were surprisingly few "walled gardens" online — like the one Facebook purports to (but does not really) represent. But a kind of virtual redlining is now under way. The Webtropolis is being stratified. Even if, like most people, you still surf the Web on a desktop or laptop, you will have noticed pay walls, invitation-only clubs, subscription programs, privacy settings and other ways of creating tiers of access. All these things make spaces feel "safe" — not only from viruses, instability, unwanted light and sound, unrequested porn, sponsored links and pop-up

ads, but also from crude design, wayward and unregistered commenters and the eccentric voices and images that make the Web constantly surprising, challenging and enlightening. When a wall goes up, the space you have to pay to visit must, to justify the price, be nicer than the free ones. The catchphrase for software developers is "a better experience." Behind pay walls like the ones on Honolulu Civil Beat, the new venture by the eBay founder Pierre Omidyar, and Rupert Murdoch's Times of London, production values surge. Cool software greets the paying lady and gentleman; they get concierge service, perks. Web stations with entrance fees are more like boutiques than bazaars.

The far more significant development, however, is that many people are on their way to quitting the open Web entirely. That's what the 50 million or so users of the iPhone and iPad are in position to do. By choosing machines that come to life only when tricked out with apps from the App Store, users of Apple's radical mobile devices increasingly commit themselves to a more remote and inevitably antagonistic relationship with the Web. Apple rigorously vets every app and takes 30 percent of all sales; the free content and energy of the Web does not meet the refined standards set by the App Store. For example, the Weather Channel Max app, which turns the weather into a thrilling interactive movie, offers a superior experience of meteorology to that of Weather.com, which looks like a boring cluttered textbook: white space, columns of fussy bullet points and thumbnail images. "The App Store must rank among the most carefully policed software platforms in history," the technology writer Steven Johnson recently noted in The Times. Policed why? To maintain the App Store's separateness from the open Web, of course, and to drive up the perceived value of the store's offerings. Perception, after all, is everything: many apps are to the Web as bottled water is to tap — an inventive and proprietary new way of decanting, packaging and pricing something that could once be had free.

Apps sparkle like sapphires and emeralds for people bored by the junky nondesign of monster sites like Yahoo, Google, Craigslist, eBay, YouTube and PayPal. That sparkle is worth money. Even to the most committed populist there's something rejuvenating about being away from an address bar and ads and links and prompts — those constant reminders that the Web is an overcrowded and often maddening metropolis and that you're not special there. Confidence that you're not going to get hustled, mobbed or mugged — that's precious, too. I see why people fled cities, and I see why they're fleeing the open Web. But I think we may also, one day, regret it.

CITY NUMBERS

On the Net, Apple types may be fleeing the hordes, but in life the young and educated are heading to urban centers. Check out these and other findings by the **Brookings Institution** at brookings.edu/metro.

WHET YOUR APPETITE

Still don't really know what an app is? Don't buy an iPad yet; watch video reviews of apps free on YouTube. Search "**iPad app reviews**" for funny homemade demos. Don't miss **Xeni Jardin**'s on boingboingvideo.

ALCHEMY

The Elements, a ravishing multimedia periodic-table app based on "The Elements," by **Theodore Gray**, may blow your mind and teach you chemistry. Think, like President Obama, that the iPad is just a "distraction"? The Elements shows otherwise. At the App Store.

http://www.nytimes.com/2010/05/23/magazine/23FOB-medium-t.html?ref=magazine?src=smt3

The Moral Life of Babies

By PAUL BLOOM


Not long ago, a team of researchers watched a 1-year-old boy take justice into his own hands. The boy had just seen a puppet show in which one puppet played with a ball while interacting with two other puppets. The center puppet would slide the ball to the puppet on the right, who would pass it back. And the center puppet would slide the ball to the puppet on the left . . . who would run away with it. Then the two puppets on the ends were brought down from the stage and set before the toddler. Each was placed next to a pile of treats. At this point, the toddler was asked to take a treat away from one puppet. Like most children in this situation, the boy took it from the pile of the "naughty" one. But this punishment wasn't enough — he then leaned over and smacked the puppet in the head.

This incident occurred in one of several psychology studies that I have been involved with at the Infant Cognition Center at Yale University in collaboration with my colleague (and wife), Karen Wynn, who runs the lab, and a graduate student, Kiley Hamlin, who is the lead author of the studies. We are one of a handful of research teams around the world exploring the moral life of babies.

Like many scientists and humanists, I have long been fascinated by the capacities and inclinations of babies and children. The mental life of young humans not only is an interesting topic in its own right; it also raises — and can help answer — fundamental questions of philosophy and psychology, including how biological evolution and cultural experience conspire to shape human nature. In graduate school, I studied early language development and later moved on to fairly traditional topics in cognitive development, like how we come to understand the minds of other people — what they know, want and experience.

But the current work I'm involved in, on baby morality, might seem like a perverse and misguided next step. Why would anyone even entertain the thought of babies as moral beings? From Sigmund Freud to Jean Piaget to Lawrence Kohlberg, psychologists have long argued that we begin life as amoral animals. One important

task of society, particularly of parents, is to turn babies into civilized beings — social creatures who can experience empathy, guilt and shame; who can override selfish impulses in the name of higher principles; and who will respond with outrage to unfairness and injustice. Many parents and educators would endorse a view of infants and toddlers close to that of a recent Onion headline: "New Study Reveals Most Children Unrepentant Sociopaths." If children enter the world already equipped with moral notions, why is it that we have to work so hard to humanize them?

A growing body of evidence, though, suggests that humans do have a rudimentary moral sense from the very start of life. With the help of well-designed experiments, you can see glimmers of moral thought, moral judgment and moral feeling even in the first year of life. Some sense of good and evil seems to be bred in the bone. Which is not to say that parents are wrong to concern themselves with moral development or that their interactions with their children are a waste of time. Socialization is critically important. But this is not because babies and young children lack a sense of right and wrong; it's because the sense of right and wrong that they naturally possess diverges in important ways from what we adults would want it to be.

Smart Babies

Babies seem spastic in their actions, undisciplined in their attention. In 1762, Jean-Jacques Rousseau called the baby "a perfect idiot," and in 1890 William James famously described a baby's mental life as "one great blooming, buzzing confusion." A sympathetic parent might see the spark of consciousness in a baby's large eyes and eagerly accept the popular claim that babies are wonderful learners, but it is hard to avoid the impression that they begin as ignorant as bread loaves. Many developmental psychologists will tell you that the ignorance of human babies extends well into childhood. For many years the conventional view was that young humans take a surprisingly long time to learn basic facts about the physical world (like that objects continue to exist once they are out of sight) and basic facts about people (like that they have beliefs and desires and goals) — let alone how long it takes them to learn about morality.

I am admittedly biased, but I think one of the great discoveries in modern psychology is that this view of babies is mistaken.

A reason this view has persisted is that, for many years, scientists weren't sure how to go about studying the mental life of babies. It's a challenge to study the cognitive abilities of any creature that lacks language, but human babies present an additional difficulty, because, even compared to rats or birds, they are behaviorally limited: they can't run mazes or peck at levers. In the 1980s, however, psychologists interested in exploring how much babies know began making use of one of the few behaviors that young babies can control: the movement of their eyes. The eyes are a window to the baby's soul. As adults do, when babies see something that they find interesting or surprising, they tend to look at it longer than they would at something they find uninteresting or expected. And when given a choice between two things to look at, babies usually opt to look at the more pleasing thing. You can use "looking time," then, as a rough but reliable proxy for what captures babies' attention: what babies are surprised by or what babies like.

The studies in the 1980s that made use of this methodology were able to discover surprising things about what babies know about the nature and workings of physical objects — a baby's "naïve physics." Psychologists — most notably Elizabeth Spelke and Renée Baillargeon — conducted studies that essentially involved showing babies magic tricks, events that seemed to violate some law of the universe: you remove the supports from beneath a block and it floats in midair, unsupported; an object disappears and then reappears in another location; a box is placed behind a screen, the screen falls backward into empty space. Like adults, babies tend to linger on such scenes — they look longer at them than at scenes that are identical in all regards except that they don't violate physical laws. This suggests that babies have expectations about how objects should behave. A vast body of research now suggests that — contrary to what was taught for decades to legions of psychology undergraduates — babies think of objects largely as adults do, as connected masses that move as units, that are solid and subject to gravity and that move in continuous paths through space and time.

Other studies, starting with a 1992 paper by my wife, Karen, have found that babies can do rudimentary math with objects. The demonstration is simple. Show a baby an empty stage. Raise a screen to obscure part of the stage. In view of the baby, put a Mickey Mouse doll behind the screen. Then put another Mickey Mouse doll behind the screen. Now drop the screen. Adults expect two dolls — and so do 5-month-olds: if the screen drops to reveal one or three dolls, the babies look longer, in surprise, than they do if the screen drops to reveal two.

A second wave of studies used looking-time methods to explore what babies know about the minds of others — a baby's "naïve psychology." Psychologists had known for a while that even the youngest of babies treat people different from inanimate objects. Babies like to look at faces; they mimic them, they smile at them. They expect engagement: if a moving object becomes still, they merely lose interest; if a person's face becomes still, however, they become distressed.

But the new studies found that babies have an actual understanding of mental life: they have some grasp of how people think and why they act as they do. The studies showed that, though babies expect inanimate objects to move as the result of push-pull interactions, they expect people to move rationally in accordance with their beliefs and desires: babies show surprise when someone takes a roundabout path to something he wants. They expect someone who reaches for an object to reach for the same object later, even if its location has changed. And well before their 2nd birthdays, babies are sharp enough to know that other people can have false beliefs. The psychologists Kristine Onishi and Renée Baillargeon have found that 15-month-olds expect that if a person sees an object in one box, and then the object is moved to another box when the person isn't looking, the person will later reach into the box where he first saw the object, not the box where it actually is. That is, toddlers have a mental model not merely of the world but of the world as understood by someone else.

These discoveries inevitably raise a question: If babies have such a rich understanding of objects and people so early in life, why do they seem so ignorant and helpless? Why don't they put their knowledge to more active use? One possible answer is that these capacities are the psychological equivalent of physical traits like testicles or ovaries, which are formed in infancy and then sit around, useless, for years and years. Another possibility is that babies do, in fact, use their knowledge from Day 1, not for action but for learning. One lesson from the study of artificial intelligence (and from cognitive science more generally) is that an empty head learns nothing: a system that is capable of rapidly absorbing information needs to have some prewired understanding of what to pay attention to and what generalizations to make. Babies might start off smart, then, because it enables them to get smarter.

Nice Babies

Psychologists like myself who are interested in the cognitive capacities of babies and toddlers are now turning our attention to whether babies have a "naïve morality." But there is reason to proceed with caution. Morality, after all, is a different sort of affair than physics or psychology. The truths of physics and psychology are universal: objects obey the same physical laws everywhere; and people everywhere have minds, goals, desires and beliefs. But the existence of a universal moral code is a highly controversial claim; there is considerable evidence for wide variation from society to society.

In the journal Science a couple of months ago, the psychologist Joseph Henrich and several of his colleagues reported a cross-cultural study of 15 diverse populations and found that people's propensities to behave kindly to strangers and to punish unfairness are strongest in large-scale communities with market economies, where such norms are essential to the smooth functioning of trade. Henrich and his colleagues concluded that much of the morality that humans possess is a consequence of the culture in which they are raised, not their innate capacities.

At the same time, though, people everywhere have *some* sense of right and wrong. You won't find a society where people don't have some notion of fairness, don't put some value on loyalty and kindness, don't distinguish between acts of cruelty and innocent mistakes, don't categorize people as nasty or nice. These universals make evolutionary sense. Since natural selection works, at least in part, at a genetic level, there is a logic to being instinctively kind to our kin, whose survival and well-being promote the spread of our genes. More than that, it is often beneficial for humans to work together with other humans, which means that it would have been adaptive to evaluate the niceness and nastiness of other individuals. All this is reason to consider the innateness of at least basic moral concepts.

In addition, scientists know that certain compassionate feelings and impulses emerge early and apparently universally in human development. These are not moral concepts, exactly, but they seem closely related. One example is feeling pain at the pain of others. In his book "The Expression of the Emotions in Man and Animals," Charles Darwin, a keen observer of human nature, tells the story of how his first son, William, was fooled by his nurse into expressing sympathy at a very young age: "When a few days over 6 months old, his nurse pretended to cry, and I saw that his face instantly assumed a melancholy expression, with the corners of his mouth strongly depressed."

There seems to be something evolutionarily ancient to this empathetic response. If you want to cause a rat distress, you can expose it to the screams of other rats. Human babies, notably, cry more to the cries of other babies than to tape recordings of their *own* crying, suggesting that they are responding to their awareness of someone else's pain, not merely to a certain pitch of sound. Babies also seem to want to assuage the pain of others: once they have enough physical competence (starting at about 1 year old), they soothe others in distress by stroking and touching or by handing over a bottle or toy. There are individual differences, to be sure, in the intensity of response: some babies are great soothers; others don't care as much. But the basic impulse seems common to all. (Some other primates behave similarly: the primatologist Frans de Waal reports that chimpanzees "will approach a victim of attack, put an arm around her and gently pat her back or groom her." Monkeys, on the other hand, tend to shun victims of aggression.)

Some recent studies have explored the existence of behavior in toddlers that is "altruistic" in an even stronger sense — like when they give up their time and energy to help a stranger accomplish a difficult task. The psychologists Felix Warneken and Michael Tomasello have put toddlers in situations in which an adult is struggling to get something done, like opening a cabinet door with his hands full or trying to get to an object out of reach. The toddlers tend to spontaneously help, even without any prompting, encouragement or reward.

Is any of the above behavior recognizable as moral conduct? Not obviously so. Moral ideas seem to involve much more than mere compassion. Morality, for instance, is closely related to notions of praise and blame: we want to reward what we see as good and punish what we see as bad. Morality is also closely connected to the ideal of impartiality — if it's immoral for you to do something to me, then, all else being equal, it is immoral for me to do the same thing to you. In addition, moral principles are different from other types of rules or laws: they cannot, for instance, be overruled solely by virtue of authority. (Even a 4-year-old knows not only that unprovoked hitting is wrong but also that it would continue to be wrong even if a teacher said that it was O.K.) And we tend to associate morality with the possibility of free and rational choice; people *choose* to do good or evil. To hold someone responsible for an act means that we believe that he could have chosen to act otherwise.

Babies and toddlers might not know or exhibit any of these moral subtleties. Their sympathetic reactions and motivations — including their desire to alleviate the pain of others — may not be much different in kind from purely nonmoral reactions and motivations like growing hungry or wanting to void a full bladder. Even if that is true, though, it is hard to conceive of a moral system that didn't have, as a starting point, these empathetic capacities. As David Hume argued, mere rationality can't be the foundation of morality, since our most basic desires are neither rational nor irrational. " 'Tis not contrary to reason," he wrote, "to prefer the destruction of

the whole world to the scratching of my finger." To have a genuinely moral system, in other words, some things first have to matter, and what we see in babies is the development of *mattering*.

Moral-Baby Experiments

So what do babies really understand about morality? Our first experiments exploring this question were done in collaboration with a postdoctoral researcher named Valerie Kuhlmeier (who is now an associate professor of psychology at Queen's University in Ontario). Building on previous work by the psychologists David and Ann Premack, we began by investigating what babies think about two particular kinds of action: helping and hindering.

Our experiments involved having children watch animated movies of geometrical characters with faces. In one, a red ball would try to go up a hill. On some attempts, a yellow square got behind the ball and gently nudged it upward; in others, a green triangle got in front of it and pushed it down. We were interested in babies' expectations about the ball's attitudes — what would the baby expect the ball to make of the character who helped it and the one who hindered it? To find out, we then showed the babies additional movies in which the ball either approached the square or the triangle. When the ball approached the triangle (the hinderer), both 9- and 12-month-olds looked longer than they did when the ball approached the square (the helper). This was consistent with the interpretation that the former action surprised them; they expected the ball to approach the helper. A later study, using somewhat different stimuli, replicated the finding with 10-month-olds, but found that 6-month-olds seem to have no expectations at all. (This effect is robust only when the animated characters have faces; when they are simple faceless figures, it is apparently harder for babies to interpret what they are seeing as a social interaction.)

This experiment was designed to explore babies' expectations about social interactions, not their moral capacities per se. But if you look at the movies, it's clear that, at least to adult eyes, there is some latent moral content to the situation: the triangle is kind of a jerk; the square is a sweetheart. So we set out to investigate whether babies make the same judgments about the characters that adults do. Forget about how babies expect the ball to act toward the other characters; what do babies themselves think about the square and the triangle? Do they prefer the good guy and dislike the bad guy?

Here we began our more focused investigations into baby morality. For these studies, parents took their babies to the Infant Cognition Center, which is within one of the Yale psychology buildings. (The center is just a couple of blocks away from where Stanley Milgram did his famous experiments on obedience in the early 1960s, tricking New Haven residents into believing that they had severely harmed or even killed strangers with electrical shocks.) The parents were told about what was going to happen and filled out consent forms, which described the study, the risks to the baby (minimal) and the benefits to the baby (minimal, though it is a nice-enough experience). Parents often asked, reasonably enough, if they would learn how their baby does, and the answer was no. This sort of study provides no clinical or educational feedback about individual babies; the findings make sense only when computed as a group.

For the experiment proper, a parent will carry his or her baby into a small testing room. A typical experiment takes about 15 minutes. Usually, the parent sits on a chair, with the baby on his or her lap, though for some studies, the baby is strapped into a high chair with the parent standing behind. At this point, some of the babies are either sleeping or too fussy to continue; there will then be a short break for the baby to wake up or calm down, but on average this kind of study ends up losing about a quarter of the subjects. Just as critics describe much of experimental psychology as the study of the American college undergraduate who wants to make some extra money or needs to fulfill an Intro Psych requirement, there's some truth to the claim that this developmental work is a science of the interested and alert baby.

In one of our first studies of moral evaluation, we decided not to use two-dimensional animated movies but rather a three-dimensional display in which real geometrical objects, manipulated like puppets, acted out the

helping/hindering situations: a yellow square would help the circle up the hill; a red triangle would push it down. After showing the babies the scene, the experimenter placed the helper and the hinderer on a tray and brought them to the child. In this instance, we opted to record not the babies' looking time but rather which character they reached for, on the theory that what a baby reaches for is a reliable indicator of what a baby wants. In the end, we found that 6- and 10-month-old infants overwhelmingly preferred the helpful individual to the hindering individual. This wasn't a subtle statistical trend; just about all the babies reached for the good guy.

(Experimental minutiae: What if babies simply like the color red or prefer squares or something like that? To control for this, half the babies got the yellow square as the helper; half got it as the hinderer. What about problems of unconscious cueing and unconscious bias? To avoid this, at the moment when the two characters were offered on the tray, the parent had his or her eyes closed, and the experimenter holding out the characters and recording the responses hadn't seen the puppet show, so he or she didn't know who was the good guy and who the bad guy.)

One question that arose with these experiments was how to understand the babies' preference: did they act as they did because they were attracted to the helpful individual or because they were repelled by the hinderer or was it both? We explored this question in a further series of studies that introduced a neutral character, one that neither helps nor hinders. We found that, given a choice, infants prefer a helpful character to a neutral one; and prefer a neutral character to one who hinders. This finding indicates that both inclinations are at work — babies are drawn to the nice guy and repelled by the mean guy. Again, these results were not subtle; babies almost always showed this pattern of response.

Does our research show that babies believe that the helpful character is *good* and the hindering character is *bad*? Not necessarily. All that we can safely infer from what the babies reached for is that babies prefer the good guy and show an aversion to the bad guy. But what's exciting here is that these preferences are based on how one individual treated another, on whether one individual was helping another individual achieve its goals or hindering it. This is preference of a very special sort; babies were responding to behaviors that adults would describe as nice or mean. When we showed these scenes to much older kids — 18-month-olds — and asked them, "Who was nice? Who was good?" and "Who was mean? Who was bad?" they responded as adults would, identifying the helper as nice and the hinderer as mean.

To increase our confidence that the babies we studied were really responding to niceness and naughtiness, Karen Wynn and Kiley Hamlin, in a separate series of studies, created different sets of one-act morality plays to show the babies. In one, an individual struggled to open a box; the lid would be partly opened but then fall back down. Then, on alternating trials, one puppet would grab the lid and open it all the way, and another puppet would jump on the box and slam it shut. In another study (the one I mentioned at the beginning of this article), a puppet would play with a ball. The puppet would roll the ball to another puppet, who would roll it back, and the first puppet would roll the ball to a different puppet who would run away with it. In both studies, 5-month-olds preferred the good guy — the one who helped to open the box; the one who rolled the ball back — to the bad guy. This all suggests that the babies we studied have a general appreciation of good and bad behavior, one that spans a range of actions.

A further question that arises is whether babies possess more subtle moral capacities than preferring good and avoiding bad. Part and parcel of adult morality, for instance, is the idea that good acts should meet with a positive response and bad acts with a negative response — justice demands the good be rewarded and the bad punished. For our next studies, we turned our attention back to the older babies and toddlers and tried to explore whether the preferences that we were finding had anything to do with moral judgment in this mature sense. In collaboration with Neha Mahajan, a psychology graduate student at Yale, Hamlin, Wynn and I exposed 21-month-olds to the good guy/bad guy situations described above, and we gave them the opportunity to reward or punish either by giving a treat to, or taking a treat from, one of the characters. We

found that when asked to give, they tended to chose the positive character; when asked to take, they tended to choose the negative one.

Dispensing justice like this is a more elaborate conceptual operation than merely preferring good to bad, but there are still-more-elaborate moral calculations that adults, at least, can easily make. For example: Which individual would you prefer — someone who rewarded good guys and punished bad guys or someone who punished good guys and rewarded bad guys? The same amount of rewarding and punishing is going on in both cases, but by adult lights, one individual is acting justly and the other isn't. Can babies see this, too?

To find out, we tested 8-month-olds by first showing them a character who acted as a helper (for instance, helping a puppet trying to open a box) and then presenting a scene in which this helper was the target of a good action by one puppet and a bad action by another puppet. Then we got the babies to choose between these two puppets. That is, they had to choose between a puppet who rewarded a good guy versus a puppet who punished a good guy. Likewise, we showed them a character who acted as a hinderer (for example, keeping a puppet from opening a box) and then had them choose between a puppet who rewarded the bad guy versus one who punished the bad guy.

The results were striking. When the target of the action was itself a good guy, babies preferred the puppet who was nice to it. This alone wasn't very surprising, given that the other studies found an overall preference among babies for those who act nicely. What was more interesting was what happened when they watched the bad guy being rewarded or punished. Here they chose the punisher. Despite their overall preference for good actors over bad, then, babies are drawn to bad actors when those actors are punishing bad behavior.

All of this research, taken together, supports a general picture of baby morality. It's even possible, as a thought experiment, to ask what it would be like to see the world in the moral terms that a baby does. Babies probably have no conscious access to moral notions, no idea why certain acts are good or bad. They respond on a gut level. Indeed, if you watch the older babies during the experiments, they don't act like impassive judges — they tend to smile and clap during good events and frown, shake their heads and look sad during the naughty events (remember the toddler who smacked the bad puppet). The babies' experiences might be cognitively empty but emotionally intense, replete with strong feelings and strong desires. But this shouldn't strike you as an altogether alien experience: while we adults possess the additional critical capacity of being able to consciously reason about morality, we're not otherwise that different from babies — our moral feelings are often instinctive. In fact, one discovery of contemporary research in social psychology and social neuroscience is the powerful emotional underpinning of what we once thought of as cool, untroubled, mature moral deliberation.

Is This the Morality We're Looking For?

What do these findings about babies' moral notions tell us about adult morality? Some scholars think that the very existence of an innate moral sense has profound implications. In 1869, Alfred Russel Wallace, who along with Darwin discovered natural selection, wrote that certain human capacities — including "the higher moral faculties" — are richer than what you could expect from a product of biological evolution. He concluded that some sort of godly force must intervene to create these capacities. (Darwin was horrified at this suggestion, writing to Wallace, "I hope you have not murdered too completely your own and my child.")

A few years ago, in his book "What's So Great About Christianity," the social and cultural critic Dinesh D'Souza revived this argument. He conceded that evolution can explain our niceness in instances like kindness to kin, where the niceness has a clear genetic payoff, but he drew the line at "high altruism," acts of entirely disinterested kindness. For D'Souza, "there is no Darwinian rationale" for why you would give up your seat for an old lady on a bus, an act of nice-guyness that does nothing for your genes. And what about those who donate blood to strangers or sacrifice their lives for a worthy cause? D'Souza reasoned that these

stirrings of conscience are best explained not by evolution or psychology but by "the voice of God within our souls."

The evolutionary psychologist has a quick response to this: To say that a biological trait evolves for a purpose doesn't mean that it always functions, in the here and now, for that purpose. Sexual arousal, for instance, presumably evolved because of its connection to making babies; but of course we can get aroused in all sorts of situations in which baby-making just isn't an option — for instance, while looking at pornography. Similarly, our impulse to help others has likely evolved because of the reproductive benefit that it gives us in certain contexts — and it's not a problem for this argument that some acts of niceness that people perform don't provide this sort of benefit. (And for what it's worth, giving up a bus seat for an old lady, although the motives might be psychologically pure, turns out to be a coldbloodedly smart move from a Darwinian standpoint, an easy way to show off yourself as an attractively good person.)

The general argument that critics like Wallace and D'Souza put forward, however, still needs to be taken seriously. The morality of contemporary humans really does outstrip what evolution could possibly have endowed us with; moral actions are often of a sort that have no plausible relation to our reproductive success and don't appear to be accidental byproducts of evolved adaptations. Many of us care about strangers in faraway lands, sometimes to the extent that we give up resources that could be used for our friends and family; many of us care about the fates of nonhuman animals, so much so that we deprive ourselves of pleasures like rib-eye steak and veal scaloppine. We possess abstract moral notions of equality and freedom for all; we see racism and sexism as evil; we reject slavery and genocide; we try to love our enemies. Of course, our actions typically fall short, often far short, of our moral principles, but these principles do shape, in a substantial way, the world that we live in. It makes sense then to marvel at the extent of our moral insight and to reject the notion that it can be explained in the language of natural selection. If this higher morality or higher altruism were found in babies, the case for divine creation would get just a bit stronger.

But it is not present in babies. In fact, our initial moral sense appears to be biased toward our own kind. There's plenty of research showing that babies have within-group preferences: 3-month-olds prefer the faces of the race that is most familiar to them to those of other races; 11-month-olds prefer individuals who share their own taste in food and expect these individuals to be nicer than those with different tastes; 12-month-olds prefer to learn from someone who speaks their own language over someone who speaks a foreign language. And studies with young children have found that once they are segregated into different groups — even under the most arbitrary of schemes, like wearing different colored T-shirts — they eagerly favor their own groups in their attitudes and their actions.

The notion at the core of any mature morality is that of impartiality. If you are asked to justify your actions, and you say, "Because I wanted to," this is just an expression of selfish desire. But explanations like "It was my turn" or "It's my fair share" are potentially moral, because they imply that anyone else in the same situation could have done the same. This is the sort of argument that could be convincing to a neutral observer and is at the foundation of standards of justice and law. The philosopher Peter Singer has pointed out that this notion of impartiality can be found in religious and philosophical systems of morality, from the golden rule in Christianity to the teachings of Confucius to the political philosopher John Rawls's landmark theory of justice. This is an insight that emerges within communities of intelligent, deliberating and negotiating beings, and it can override our parochial impulses.

The aspect of morality that we truly marvel at — its generality and universality — is the product of culture, not of biology. There is no need to posit divine intervention. A fully developed morality is the product of cultural development, of the accumulation of rational insight and hard-earned innovations. The morality we start off with is primitive, not merely in the obvious sense that it's incomplete, but in the deeper sense that when individuals and societies aspire toward an enlightened morality — one in which all beings capable of reason and suffering are on an equal footing, where all people are equal — they are fighting with what

children have from the get-go. The biologist Richard Dawkins was right, then, when he said at the start of his book "The Selfish Gene," "Be warned that if you wish, as I do, to build a society in which individuals cooperate generously and unselfishly toward a common good, you can expect little help from biological nature." Or as a character in the Kingsley Amis novel "One Fat Englishman" puts it, "It was no wonder that people were so horrible when they started life as children."

Morality, then, is a synthesis of the biological and the cultural, of the unlearned, the discovered and the invented. Babies possess certain moral foundations — the capacity and willingness to judge the actions of others, some sense of justice, gut responses to altruism and nastiness. Regardless of how smart we are, if we didn't start with this basic apparatus, we would be nothing more than amoral agents, ruthlessly driven to pursue our self-interest. But our capacities as babies are sharply limited. It is the insights of rational individuals that make a truly universal and unselfish morality something that our species can aspire to.

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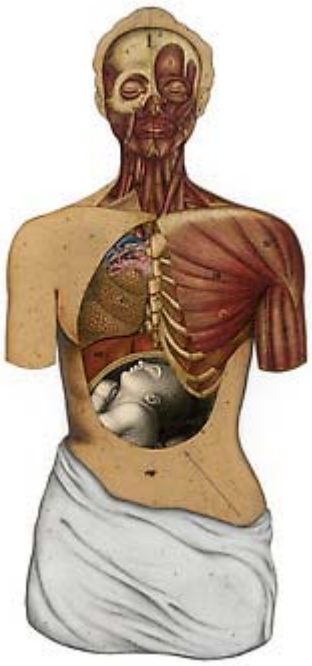
http://www.nytimes.com/2010/05/09/magazine/09babies-t.html?ref=magazine

Pregnant and Pained

By LISA SANDERS, M.D.



Even sitting quietly in the hospital bed, the young woman looked out of breath. The muscles of her neck were pulled tight, and she lifted her shoulders as she inhaled, as if simply taking in air required work. According to the chart that Dr. Roxanne Wadia had glanced through, the patient was five months pregnant. But her arms and legs were thin and wasted-looking, and she had only a tiny hint of the expected baby bump. Her eyes were sunken, and her skin was sallow. Looking at her new patient, Wadia, a resident in her second year of training at Tufts Medical Center in Boston, felt her own heart quicken. The patient was clearly sick. The doctor gave her patient oxygen and then sat down to take a history.

The troubles started when she became pregnant, the patient told her. She had barely missed her period when she started throwing up. She was hungry, but even the thought of food made her stomach heave. She could hardly get herself out of bed. Her OB-GYN gave her all kinds of medicines, but none of them worked. Finally, she had lost so much weight that her doctor put her on intravenous feedings. She put the weight back on and then a little more, but she still felt sick. “Even now,” she said, “I can hardly eat a thing without vomiting.”

But that wasn’t why she was here now, she told the young doctor. No sooner had she got the vomiting under control than she developed a terrible cough. She didn’t have a fever, but the racking cough made her body ache all over. Her husband said it sounded as if she were coughing up a lung. Her OB said it was probably a virus. Whatever it was, it didn’t go away. Over the next several days, the cough became almost constant, and with every cough came pain — a pain that felt like a gigantic claw squeezing her chest and back. Finally her husband called the OB, who sent her to the hospital. After much discussion about the risks of radiation during pregnancy, a chest X-ray was done. The lower third of her right lung was filled with fluffy white where it should appear almost solid black. Pneumonia, they told her. She was admitted to her local hospital in Cape Cod, and she started on antibiotics. But she still didn’t get better. The next day her fever spiked to 101.5. The day after that she started coughing up blood. The doctors switched to other antibiotics. When that didn’t help, they sent her to Boston.

On exam, the patient had no fever, but her heart was beating rapidly. Her breathing slowed somewhat after she was given oxygen but was still faster than expected. When Wadia put her stethoscope on the patient’s back to listen to her breath, she heard another sound as well — a sound like crisp paper being crumpled. But it was distant, as if it were in another room. The rest of the exam was unremarkable.

Wadia settled down with the stack of papers that traveled with the patient from the last hospital. She was impressed with the doctors’ thoughtful approach to this complicated patient. The patient had been admitted with what looked like a run-of-the-mill pneumonia caused by a run-of-the-mill bacterium. When the infection didn’t respond to antibiotics, they considered other possibilities. Could she have a pulmonary embolus — a clot from somewhere in the body that traveled and became wedged in the arteries of her lungs? That could certainly cause a cough and shortness of breath. It could even cause the bloody sputum and the fever. And a

pregnant woman was at higher risk for a pulmonary embolism because the hormones of pregnancy made the blood thicker and more prone to clot. Spending so much time in bed because of nausea also increased her risk of a clot. Her doctors had looked in several different ways but hadn't seen one.

Was the problem related to her heart? That could cause the cough, the shortness of breath and the crinkly noise in her chest. This patient had no history of heart abnormality, but sometimes a new problem can develop or an old problem can be unmasked during pregnancy. But an echocardiogram, an ultrasound of the heart, was normal. If it wasn't a clot or a problem with her heart, maybe it *was* an infection, but not one caused by a common bug. Could it be tuberculosis or H.I.V.? Could it be a fungus? None of those would respond to the antibiotics she'd been given. At a bigger hospital, like Tufts, doctors would be able to put a camera, known as a bronchoscope, into her lungs to look for evidence of some of the more unusual causes of pneumonia.

Late in the evening Roxanne Wadia called Dr. Geraldine Finlay, the attending physician in charge of this patient's care and the doctor who would perform the "bronch." Finlay, a pulmonologist, listened as the resident laid out the patient's story. When Finlay heard that the young woman had gotten worse on antibiotics and begun coughing up blood, she immediately suspected that this wasn't an infection but a blood clot in the lungs — a pulmonary embolus.

A common error in medicine is the assumption that tests provide definitive answers. In the math and science classes doctors take leading up to medical school, we work through a problem, come up with an answer and then check the back of the book to see if we got it right. We treat medical tests as if they provide these back-of-the-book answers. They don't. A medical test is simply another clue in the puzzle.

The doctors at the first hospital were worried about a pulmonary embolus. They looked for it three times over the course of the patient's stay, using several different tests. None found evidence of a clot. Because of their concerns about the fetus's exposure to radiation, they avoided the most sensitive test for this potentially life-threatening condition, a CT angiogram — a scan in which injected contrast material makes the blood vessels and obstructing clots easily visible. There was a long silence on the phone once the resident finished her presentation. Finally Finlay spoke. She told the resident that she was very concerned about a pulmonary embolism. They had to get a CT scan of the patient's chest right away. Although radiation carries a risk to the fetus, the risk of an untreated embolism was much greater.

Wadia ordered the CT scan to look for a blood clot. Moments later she got a call from the radiology suite. Did she know that the patient was pregnant? It took some prodding, but Wadia was able to persuade the radiology tech to do the scan. Finlay got the results as she drove to the hospital in the predawn hours. What the doctors thought was pneumonia from the X-ray was actually a massive clot in the right side of the lung — a clot so large that part of the patient's lung had collapsed. The patient was quickly started on anticoagulants, drugs that, though they can't dissolve a clot that has already formed, can prevent any further damage to the lungs from new clots.

Pulmonary embolus, while rare, is the most common cause of death in pregnant women in the developed world. It's tough to diagnose in part because it can look like so many other diseases, and because there is no perfect test for it. And when it's missed, it can be deadly. I spoke with the patient recently. She is still waiting to deliver the baby. Roxanne Wadia was surprised by the results of the CT scan. She couldn't believe that she nearly missed this important diagnosis. But she is determined not to miss it again.

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http://www.nytimes.com/2010/05/09/magazine/09FOB-diagnosis-t.html?ref=magazine

The Data-Driven Life

By GARY WOLF

Humans make errors. We make errors of fact and errors of judgment. We have blind spots in our field of vision and gaps in our stream of attention. Sometimes we can't even answer the simplest questions. Where was I last week at this time? How long have I had this pain in my knee? How much money do I typically spend in a day? These weaknesses put us at a disadvantage. We make decisions with partial information. We are forced to steer by guesswork. We go with our gut.

That is, some of us do. Others use data. A timer running on Robin Barooah's computer tells him that he has been living in the United States for 8 years, 2 months and 10 days. At various times in his life, Barooah — a 38-year-old self-employed software designer from England who now lives in Oakland, Calif. — has also made careful records of his work, his sleep and his diet.

A few months ago, Barooah began to wean himself from coffee. His method was precise. He made a large cup of coffee and removed 20 milliliters weekly. This went on for more than four months, until barely a sip remained in the cup. He drank it and called himself cured. Unlike his previous attempts to quit, this time there were no headaches, no extreme cravings. Still, he was tempted, and on Oct. 12 last year, while distracted at his desk, he told himself that he could probably concentrate better if he had a cup. Coffee may have been bad for his health, he thought, but perhaps it was good for his concentration.

Barooah wasn't about to try to answer a question like this with guesswork. He had a good data set that showed how many minutes he spent each day in focused work. With this, he could do an objective analysis. Barooah made a chart with dates on the bottom and his work time along the side. Running down the middle was a big black line labeled "Stopped drinking coffee." On the left side of the line, low spikes and narrow columns. On the right side, high spikes and thick columns. The data had delivered their verdict, and coffee lost.

He was sad but also thrilled. Instead of a stimulating cup of coffee, he got a bracing dose of truth. “People have such very poor sense of time,” Barooah says, and without good time calibration, it is much harder to see the consequences of your actions. If you want to replace the vagaries of intuition with something more reliable, you first need to gather data. Once you know the facts, you can live by them.

Five years ago, Ben Lipkowitz, who is now 28, was living with some friends in Bloomington, Ind., and he found himself wondering how much time he spent doing one of his roommates’ dishes. Lipkowitz had a handheld electronic datebook that he purchased on a trip to Tokyo, and on May 11, 2005, at 2:20 p.m., he started using it to keep a record of his actions. Instead of entering his future appointments, he entered his past activities, creating a remarkably complete account of his life. In one sense this was just a normal personal journal, albeit in a digital format and unusually detailed. But the format and detail made all the difference. Lipkowitz eventually transferred the data to his computer, and now, using a few keyboard commands, he can call up his history. He knows how much he has eaten and how much he has spent. He knows what books he has read and what objects he has purchased. And of course, he knows the answer to his original question. “I was thinking I was spending an hour a day cleaning up after this person,” Lipkowitz says. He shrugs. “It turned out it was more like 20 minutes.”

Another person I’m friendly with, Mark Carranza — he also makes his living with computers — has been keeping a detailed, searchable archive of all the ideas he has had since he was 21. That was in 1984. I realize that this seems impossible. But I have seen his archive, with its million plus entries, and observed him using it. He navigates smoothly between an interaction with somebody in the present moment and his digital record, bringing in associations to conversations that took place years earlier. Most thoughts are tagged with date, time and location. What for other people is an inchoate flow of mental life is broken up into elements and cross-referenced.

These men all know that their behavior is abnormal. They are outliers. Geeks. But why does what they are doing seem so strange? In other contexts, it is normal to seek data. A fetish for numbers is the defining trait of the modern manager. Corporate executives facing down hostile shareholders load their pockets full of numbers. So do politicians on the hustings, doctors counseling patients and fans abusing their local sports franchise on talk radio. Charles Dickens was already making fun of this obsession in 1854, with his sketch of the fact-mad schoolmaster Gradgrind, who blasted his students with memorized trivia. But Dickens’s great caricature only proved the durability of the type. For another century and a half, it got worse.

Or, by another standard, you could say it got better. We tolerate the pathologies of quantification — a dry, abstract, mechanical type of knowledge — because the results are so powerful. Numbering things allows tests, comparisons, experiments. Numbers make problems less resonant emotionally but more tractable intellectually. In science, in business and in the more reasonable sectors of government, numbers have won fair and square.

For a long time, only one area of human activity appeared to be immune. In the cozy confines of personal life, we rarely used the power of numbers. The techniques of analysis that had proved so effective were left behind at the office at the end of the day and picked up again the next morning. The imposition, on oneself or one’s family, of a regime of objective record keeping seemed ridiculous. A journal was respectable. A spreadsheet was creepy.

And yet, almost imperceptibly, numbers are infiltrating the last redoubts of the personal. Sleep, exercise, sex, food, mood, location, alertness, productivity, even spiritual well-being are being tracked and measured, shared and displayed. On MedHelp, one of the largest Internet forums for health information, more than 30,000 new personal tracking projects are started by users every month. Foursquare, a geo-tracking application with about one million users, keeps a running tally of how many times players “check in” at every locale, automatically building a detailed diary of movements and habits; many users publish these data widely. Nintendo’s Wii Fit,

a device that allows players to stand on a platform, play physical games, measure their body weight and compare their stats, has sold more than 28 million units.

Two years ago, as I noticed that the daily habits of millions of people were starting to edge uncannily close to the experiments of the most extreme experimenters, I started a Web site called the Quantified Self with my colleague Kevin Kelly. We began holding regular meetings for people running interesting personal data projects. I had recently written a long article about a trend among Silicon Valley types who time their days in increments as small as two minutes, and I suspected that the self-tracking explosion was simply the logical outcome of this obsession with efficiency. We use numbers when we want to tune up a car, analyze a chemical reaction, predict the outcome of an election. We use numbers to optimize an assembly line. Why not use numbers on ourselves?

But I soon realized that an emphasis on efficiency missed something important. Efficiency implies rapid progress toward a known goal. For many self-trackers, the goal is unknown. Although they may take up tracking with a specific question in mind, they continue because they believe their numbers hold secrets that they can't afford to ignore, including answers to questions they have not yet thought to ask.

Ubiquitous self-tracking is a dream of engineers. For all their expertise at figuring out how things work, technical people are often painfully aware how much of human behavior is a mystery. People do things for unfathomable reasons. They are opaque even to themselves. A hundred years ago, a bold researcher fascinated by the riddle of human personality might have grabbed onto new psychoanalytic concepts like repression and the unconscious. These ideas were invented by people who loved language. Even as therapeutic concepts of the self spread widely in simplified, easily accessible form, they retained something of the prolix, literary humanism of their inventors. From the languor of the analyst's couch to the chatty inquisitiveness of a self-help questionnaire, the dominant forms of self-exploration assume that the road to knowledge lies through words. Trackers are exploring an alternate route. Instead of interrogating their inner worlds through talking and writing, they are using numbers. They are constructing a quantified self.

UNTIL A FEW YEARS ago it would have been pointless to seek self-knowledge through numbers. Although sociologists could survey us in aggregate, and laboratory psychologists could do clever experiments with volunteer subjects, the real way we ate, played, talked and loved left only the faintest measurable trace. Our only method of tracking ourselves was to notice what we were doing and write it down. But even this written record couldn't be analyzed objectively without laborious processing and analysis.

Then four things changed. First, electronic sensors got smaller and better. Second, people started carrying powerful computing devices, typically disguised as mobile phones. Third, social media made it seem normal to share everything. And fourth, we began to get an inkling of the rise of a global superintelligence known as the cloud.

Millions of us track ourselves all the time. We step on a scale and record our weight. We balance a checkbook. We count calories. But when the familiar pen-and-paper methods of self-analysis are enhanced by sensors that monitor our behavior automatically, the process of self-tracking becomes both more alluring and more meaningful. Automated sensors do more than give us facts; they also remind us that our ordinary behavior contains obscure quantitative signals that can be used to inform our behavior, once we learn to read them.

"When you have small, distributed battery-powered sensors, you want to collect all biometric data," says Ken Fyfe, one of the pioneers of wearable tracking devices. In the mid-'90s, Fyfe was teaching engineering at the University of Alberta in Edmonton, where his specialty was acoustics and vibration. He was also a runner, in a family of runners. His sons were national competitors at 400 and 800 meters. At the time, runners who

wanted to know more about the mechanics of their performance — their stride, their cadence, the way their motion changed as they grew tired — had to go into a lab and be filmed. “You would run in a room on a treadmill with reflective stickers on your hips, knees, ankles and feet,” Fyfe recalls.

Taking video of people in motion, and then analyzing the video, seemed like a roundabout way to get data. Why not use an accelerometer, which can directly measure changes in speed and direction? Accelerometers had long been used in industry and cost several hundred dollars each. Then accelerometers were developed to trigger the air bags in cars. Massive purchases in the automotive industry drove the cost down. The size and power demands shrank, too. Suddenly, it seemed less crazy to put an accelerometer on your body.

Fyfe guessed that there would be plenty of interest in something like a personal speedometer, a wearable instrument that displayed how far you’d gone and your average speed. So he tried to invent one. “I worked on it every weekend for three years,” Fyfe says. He put accelerometers into a molded plastic insert. The insert fit into a shoe, and data were transmitted wirelessly to a sports watch. But there was a problem. The numbers produced by a motion sensor don’t necessarily say anything about a runner’s pace and distance. They give you the acceleration of a runner’s foot — that’s all. Some method — a formula or algorithm — is needed to translate the data into the information you want, and the method must work for almost everybody under a wide range of conditions: stopping and starting, jumping over a curb, limping because of an injury. Developing these algorithms took up most of Fyfe’s time during the years he perfected his system.

Thanks to faster computers and clever mathematical techniques, Fyfe and other inventors are turning messy data from cheap sensors into meaningful information. “The real expertise you need is signal processing and statistical analysis,” says James Park, the chief executive and co-founder of Fitbit, a company that makes a tracker released late last year. The Fitbit tracker is two inches long, half an inch wide and shaped like a thick paperclip. It tracks movement, and if you wear it in a little elastic wristband at night, it can also track your hours of sleep. (You are not completely still when sleeping. Your pattern of movement, however, can be correlated with sleeping and waking, just as the acceleration of a runner’s foot reveals speed.) Park and his partner, Eric Friedman, first showed their prototype at a San Francisco business conference in the summer of 2008. Five weeks later, Park and Friedman, who are both 33, had $2 million in venture capital, and they were flying back and forth to Singapore to arrange production. Last winter they shipped their first devices.

At nearly the same time, Philips, the consumer electronics company, began selling its own tiny accelerometer-based self-tracker, called DirectLife, which, like the Fitbit, is meant to be carried on the body at all times. Zeo, a company based in Newton, Mass., released a tracker contained in a small headband, which picks up electrical signals from the brain, and uses them to compile the kind of detailed record of light sleep, deep sleep and REM sleep that, until now, was available only if you spent the night in a sleep-research clinic. Lately I’ve been running into people who say they wear it every night. And Nike recently announced that its Nike+ system, one of the first personal speedometers, has been used by more than 2.5 million runners since its release in 2006.

Ken Fyfe’s accelerometer-based tracking system is used with sports watches by Adidas and Polar. In 2006 he sold his company, Dynastream, for $36 million to Garmin, which makes navigation equipment commonly used in cars and airplanes and which is now branching out into personal tracking. Fyfe’s former company stayed in Alberta, where it continues to sell tracking components. A low-power data-transmission protocol they invented is in new blood-pressure cuffs, glucose monitors, blood-oxygenation sensors, weight scales and sleep monitors, all of which are aimed at the consumer market.

Web entrepreneurs like to talk about democratizing communication. Fyfe’s dream is to democratize objective research on human subjects. “Until we came up with this technology, you couldn’t do this kind of analysis unless you could get into a lab,” he says. “Now you can.”

At the center of this personal laboratory is the mobile phone. During the years that personal-data systems were making their rapid technical progress, many people started entering small reports about their lives into a phone. Sharing became the term for the quick post to a social network: a status update to Facebook, a reading list on Goodreads, a location on Dopplr, Web tags to Delicious, songs to Last.fm, your breakfast menu on Twitter. "People got used to sharing," says David Lammers-Meis, who leads the design work on the fitness-tracking products at Garmin. "The more they want to share, the more they want to *have* something to share." Personal data are ideally suited to a social life of sharing. You might not always have something to say, but you always have a number to report.

This is how the odd habits of the ultrageek who tracks everything have come to seem almost normal. An elaborate setup is no longer necessary, because the phone already envelops us in a cloud of computing. This term, "the cloud," has some specialized meanings among software architects, but fundamentally the cloud is just a poetic label for the global agglomeration of computer resources — the processors, hard drives, fiber-optic cables and so on — that allow us to access our private data from any Internet connection. We entrust all kinds of things to the cloud: our mail and our family photographs; the places we go and the list of people we call on the phone. When Jeff Clavier, the founder of SoftTech VC, a Silicon Valley venture capital firm, invested in a small financial company called Mint (now part of Intuit), he was warned that ordinary people were unlikely to trust their bank passwords and credit-card details to the cloud. "About 1.5 million people did it," Clavier says.

One of the reasons that self-tracking is spreading widely beyond the technical culture that gave birth to it is that we all have at least an inkling of what's going on out there in the cloud. Our search history, friend networks and status updates allow us to be analyzed by machines in ways we can't always anticipate or control. It's natural that we would want to reclaim some of this power: to look outward to the cloud, as well as inward toward the psyche, in our quest to figure ourselves out.

SOPHIE BARBIER, a 47-year-old teacher in Palo Alto, is a cyclist who regularly logs her time, distance and heart rate during a ride. "Training logs have been around forever," she told me. "But the more variables I added, the more curious I got." Along with her cycling stats, Barbier began scoring her mood, sleep and ability to focus, as well as her caffeine consumption, and noting the days her menstrual cycle began and ended.

After surgery for a back problem, Barbier had trouble sleeping. On CureTogether, a self-tracking health site, she learned about tryptophan, a common amino acid available as a dietary supplement. She took the tryptophan, and her insomnia went away. Her concentration scores also improved. She stopped taking tryptophan and continued to sleep well, but her ability to concentrate deteriorated. Barbier ran the test again, and again the graph was clear: tryptophan significantly increased her focus. She had started by looking for a cure for insomnia and discovered a way to fine-tune her brain.

It is tempting to dismiss reports of such experiments as trivial anecdotes, or the placebo effect. I took Barbier's results to a friend of mine, Seth Roberts, an emeritus professor of psychology at the University of California, Berkeley, and an expert on self-experimentation. "There is a large difference between what Barbier did and the minimal story of somebody who takes a pill looking for a certain effect and then finds it," he pointed out. "First, she wrote the numbers down, so the results are not subject to memory distortion. Second, she changed the conditions several times. Every switch is a test of her original theory."

Roberts told me about his own method of measuring mental changes, a quick test he programmed on his computer that involves 32 easy arithmetic problems. The test takes about three minutes, and he has found that it can detect small changes in cognitive performance. He has used his self-tracking system to adjust his diet, learning that three tablespoons daily of flaxseed oil reliably decreases the amount of time it takes him to do math. Consuming a lot of butter also seems to have a good effect.

Self-experiments like Barbier's and Roberts's are not clinical trials. The goal isn't to figure out something about human beings generally but to discover something about yourself. Their validity may be narrow, but it is beautifully relevant. Generally, when we try to change, we simply thrash about: we improvise, guess, forget our results or change the conditions without even noticing the results. Errors are possible in self-tracking and self-experiment, of course. It is easy to mistake a transient effect for a permanent one, or miss some hidden factor that is influencing your data and confounding your conclusions. But once you start gathering data, recording the dates, toggling the conditions back and forth while keeping careful records of the outcome, you gain a tremendous advantage over the normal human practice of making no valid effort whatsoever.

I recently received an e-mail message from a 26-year-old filmmaker named Toli Galanis, who keeps track of about 50 different streams of personal data, including activities, health, films watched and books read, the friends he talks with and the topics they discuss. While Galanis acknowledged that he gets pleasure from gathering data and organizing it intelligently, it was a different aspect of his report that caught my attention. "I know that immediately after watching a bad movie I am more apt to be negative about my career prospects as a filmmaker," he wrote, explaining that tracking has made him better able to detect the influence of seemingly trivial circumstances on his mood and decisions.

The idea that our mental life is affected by hidden causes is a mainstay of psychology. Facility in managing the flow of thought and emotion is a sign of happiness and good adjustment. But how is it done? Nearly every therapeutic prescription involves an invitation to notice, to pay attention. Once we have a notion in our sights, we can attack it with an arsenal of tools: cognitive, psychoanalytic, even spiritual. But none of these will tell us if we've missed something. You may simply have failed to notice a debilitating habit, a negative correlation, a bad influence.

Galanis's realization that bad movies subject him to professional discouragement is the type of insight that will seem accessible to anybody blessed with a modest amount of self-awareness; finding it is no more difficult than catching sight of a dollar in the street and picking it up. But for every one you grab, how many do you overlook?

It's not only the context of our thoughts that escapes us. Our actions do, too. Since 2004, Terry Paul, an educational entrepreneur and philanthropist, has been working on a digital device that tucks into specially designed toddlers' clothing and can be used to predict language development through tracking the number of conversational exchanges a child has with adults. It cost Paul $32 million to perfect the system that takes the noisy sounds of a baby's environment and translates it into reliable data. As a commercial enterprise, it was unsuccessful. His device, called the LENA monitor, is used for academic research but never took off as a consumer product. When I tell parents about it, most of them are horrified. They imagine a nightmare of surveillance and an inducement to neurotic competition: who wants a digital recorder that grades you on how you talk to your kid?

Were we to submit to such a test, however, many of us would fare poorly. Parents, in fact, overestimate how much they talk to their preverbal children. Users of the LENA monitor can be awkwardly surprised. A mother I spoke with recently began monitoring after her daughter was prescribed a seizure medication that was associated with language delays. "It became very clear to us that my husband's words were less than mine," she said. He needed to try to talk to his daughter more. Until he saw the data, he had no idea that his attention was wandering.

Of course, sometimes we fail to notice what we do because we are motivated not to notice it. We are ashamed of ourselves, so we lie to ourselves. Shaun Rance started tracking his drinking two years ago, after his father was given a diagnosis of end-stage liver disease. He didn't pledge to stop drinking; he didn't do a searching moral inventory; he just started counting, using the anonymous Web site drinkingdiary.com. He found that his externalized memory was very powerful. Having a record of every drink he took sharpened his awareness and

increased his feeling of self-mastery — and reduced his drinking. Because his tally is held by a machine, he doesn't feel any of the social shame that might make him, consciously or not, underestimate his drinking. "I don't lie to the diary," he says. After all, it is silly to posture in front of a machine. The tracking system is an extension of a basic faculty of Rance's consciousness, there to remind him where he stands, and it does its work without emotion. As far as he's concerned, that's a virtue.

There may be new domains of our biology that we can incorporate into our sense of self. "We know about asleep, awake, hungry, depressed, cold, drowsy, nauseous," says Dave Marvit, a vice-president at Fujitsu Laboratories of America, where he is leading a research project on self-tracking. "But what about hypoxic, anemic, hyperglycemic?" If we had a gentle signal about how much sugar was in our blood, would we change how we ate? Would it change how we feel?

Drinking. Talking. Being discouraged by a movie. Giving a moment's attention to a feeling of anger or elation, a small surge of energy or a metabolic dip. These are the materials of daily life. They barely stand out against the background of what we take for granted, and yet picking up these weak signals gives us leverage. Margaret Morris, a clinical psychologist and a researcher at Intel, recently ran a series of field trials using a mobile phone for tracking emotion. At random times, the phone rang and quizzed its owner about his or her mood. A man in one of Morris's studies reviewed the trends in his data and noticed that his foul mood began at the same time every day. He had a rushed transition from work to home. While unfinished tasks were still on his mind, new demands crowded in. The stress followed him for the rest of the evening. The data showed him where the problem was. With help, he learned to take a short mental break right there. He was much relieved.

The contrast to the traditional therapeutic notion of personal development is striking. When we quantify ourselves, there isn't the imperative to see through our daily existence into a truth buried at a deeper level. Instead, the self of our most trivial thoughts and actions, the self that, without technical help, we might barely notice or recall, is understood as the self we ought to get to know. Behind the allure of the quantified self is a guess that many of our problems come from simply lacking the instruments to understand who we are. Our memories are poor; we are subject to a range of biases; we can focus our attention on only one or two things at a time. We don't have a pedometer in our feet, or a breathalyzer in our lungs, or a glucose monitor installed into our veins. We lack both the physical and the mental apparatus to take stock of ourselves. We need help from machines.

Watch out for those machines, though. Humans know a special trick of self-observation: when to avert our gaze. Machines don't understand the value of forgiving a lapse, or of treating an unpleasant detail with tactful silence. A graph or a spreadsheet talks only in numbers, but there is a policeman inside all of our heads who is well equipped with punishing words. "Each day my self-worth was tied to the data," Alexandra Carmichael, one of the founders of the self-tracking site CureTogether, wrote in a heartfelt blog post about why she recently stopped tracking. "One pound heavier this morning? You're fat. Skipped a day of running? You're lazy. It felt like being back in school. Less than 100 percent on an exam? You're dumb." Carmichael had been tracking 40 different things about herself. The data she was seeing every day didn't respect her wishes or her self-esteem. It was awful, and she had to stop.

Electronic trackers have no feelings. They are emotionally neutral, but this very fact makes them powerful mirrors of our own values and judgments. The objectivity of a machine can seem generous or merciless, tolerant or cruel. Designers of tracking systems are trying to finesse this ambivalence. A smoking-cessation program invented by Pal Kraft, a Norwegian researcher at the University of Oslo, automatically calls people who are trying to quit, asking them every day whether they've smoked in the last 24 hours. When the answer is yes, a recorded voice delivers an encouraging message: *All is well, take it easy, try again.* This mechanical empathy, barely more human than a recorded voice on the customer-service line, can hardly be expected to fool anybody. But a long line of research in human-computer interaction demonstrates that when machines

are given humanlike characteristics and offer emotional reassurance, we actually do feel reassured. This is humbling. Do we really feel better when a computer pats us on the back? Yes, we do.

Jon Cousins is a 54-year-old software entrepreneur and former advertising executive who was given a diagnosis in 2007 of bipolar affective disorder. Cousins built a self-tracking system to help manage his feelings, which he called Moodscope; now used by about 1,000 others, Moodscope automatically sends e-mail with mood-tracking scores to a few select friends. “My life was changed radically,” Cousins told me recently in an e-mail message. “If I got the odd dip, my friends wanted to know why.” Sometimes, after he records a low score, a friend might simply e-mail: “?” Cousins replies, and that act alone makes him feel better. Moodscope is a blended system in which measurement is supplemented by human sympathy. Self-tracking can sometimes appear narcissistic, but it also allows people to connect with one another in new ways. We leave traces of ourselves with our numbers, like insects putting down a trail of pheromones, and in times of crisis, these signals can lead us to others who share our concerns and care enough to help.

Often, pioneering trackers struggle with feelings of being both aided and tormented by the very systems they have built. I know what this is like. I used to track my work hours, and it was a miserable process. With my spreadsheet, I inadvertently transformed myself into the mean-spirited, small-minded boss I imagined I was escaping through self-employment. Taking advantage of the explosion of self-tracking services available on the Web, I started analyzing my workday at a finer level. Every time I moved to a new activity — picked up the phone, opened a Web browser, answered e-mail — I made a couple of clicks with my mouse, which recorded the change. After a few weeks I looked at the data and marveled. My day was a patchwork of distraction, interspersed with valuable, but too rare, periods of focus. In total, the amount of uninterrupted close attention I was able to muster in a given workday was less than three hours. After I got over the humiliation, I came to see how valuable this knowledge was. The efficiency lesson was that I could gain significant benefit by extending my day at my desk by only a few minutes, as long as these minutes were well spent. But a greater lesson was that by tracking hours at my desk I was making an unnecessary concession to a worthless stereotype. Does anybody really believe that long hours at a desk are a vocational ideal? I got nothing from my tracking system until I used it as a source of critical perspective, not on my performance but on my assumptions about what was important to track.

People are not assembly lines. We cannot be tuned to a known standard, because a universal standard for human experience does not exist. Bo Adler, a young computer scientist at Fujitsu Laboratories of America, is one of the most committed self-trackers I’ve ever met: during his most active phase he wore a blood-pressure cuff, pulse oximeter and accelerometer all day long, along with a computer on a harness to collect the data. Adler has sleep apnea, and he is trying to figure it out. When he became too self-conscious going to the gym in his gear, he wore a Google T-shirt to throw people off. Maybe he was a freak, but at least people could mistake him for a millionaire freak.

“Here’s what they told me was the normal surgical course of treatment,” Adler explained. “First they were going to cut out my tonsils, and if that didn’t work, they would break my jaw and reset it to reposition my tongue, and finally they would cut out the roof of my mouth. I had one question: What if my case is different? They said, ‘Let’s try the standard course of treatment first, and if that doesn’t work, then we’ll know your case is different.’ ” Adler recognized what this proposal meant: it meant that his doctors had no cure for different. They wanted to see him as a standard case, because they have treatments for the standard cases. Before Adler underwent surgery, he wanted some evidence that he was a standard case. Some of us aren’t standard, after all; perhaps many of us aren’t.

Adler’s idea that we can — and should — defend ourselves against the imposed generalities of official knowledge is typical of pioneering self-trackers, and it shows how closely the dream of a quantified self resembles therapeutic ideas of self-actualization, even as its methods are startlingly different. Trackers focused on their health want to ensure that their medical practitioners don’t miss the particulars of their

condition; trackers who record their mental states are often trying to find their own way to personal fulfillment amid the seductions of marketing and the errors of common opinion; fitness trackers are trying to tune their training regimes to their own body types and competitive goals, but they are also looking to understand their strengths and weaknesses, to uncover potential they didn't know they had. Self-tracking, in this way, is not really a tool of optimization but of discovery, and if tracking regimes that we would once have thought bizarre are becoming normal, one of the most interesting effects may be to make us re-evaluate what "normal" means.

"My girlfriend thinks I'm the weird person when I wear all these devices," Bo Adler says. "She sees me as an oddity, but I say no, soon everybody is going to be doing this, and you won't even notice."

Gary Wolf writes about science and social issues for Wired, where he is a contributing editor. This is his first article for the magazine.

http://www.nytimes.com/2010/05/02/magazine/02self-measurement-t.html?ref=magazine

Global universities

An old idea refashioned

How to create a higher-education supermarket

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The Great Brain Race: How Global Universities Are Reshaping the World. By Ben Wildavsky. *Princeton University Press; 248 pages; $26.95 and £18.95.* Buy from Amazon.com, Amazon.co.uk

THE word "globalisation" usually conjures up images of globe-spanning companies and distance-destroying technologies. The Rupert Murdochs and Lloyd Blankfeins of this world are generally seen as its champions. Its enablers are the laws of comparative advantage and economies of scale.

In "The Great Brain Race" Ben Wildavsky points to another mighty agent of globalisation: universities. These were some of the world's first "global" institutions. In the Middle Ages great universities such as Paris and Bologna attracted "wandering scholars" from across Europe. In the 19th century Germany's research universities attracted scholars from across the world. In the early 20th century philanthropists such as Cecil Rhodes and William Harkness established scholarships to foster deeper links between countries. By the 1960s globe-trotting professors were so commonplace that they had become the butt of jokes. (What is the difference between God and professor so and so? God is everywhere. Professor so and so is everywhere but here.) Academic globalisation has gone into overdrive in the modern university. Some of this is along familiar lines—academics collaborating with ever more foreign colleagues and sabbatical-seekers contriving to spend ever more time abroad. But Mr Wildavsky demonstrates that globalisation is now much more complicated than just cross-border collaboration spiced up with junkets.

Universities are obsessed by the global marketplace for students and professors. They are trying to attract as many students from abroad as possible (not least because foreign students usually pay full fees). Nearly 3m students now spend some time studying in foreign countries, a number that has risen steeply in recent years. Universities are also setting up overseas. New York University has opened a branch in Abu Dhabi. Six American universities have created a higher-education supermarket in Qatar. Almost every university worth its name has formed an alliance with a leading Chinese institution. But globalisation is going deeper than just the competition for talent: a growing number of countries are trying to create an elite group of "global universities" that are capable of competing with the best American institutions. China and India are focusing resources on a small group. The French and German governments are doing battle with academic egalitarians in an attempt to create European Ivy Leagues. Behind all this is the idea that world-class universities can make a disproportionate contribution to economic growth.

This is a fascinating story. But Mr Wildavsky, a former education reporter who now works for both the Kauffman Foundation and the Brookings Institution, is too earnest a writer to make the best of it. He wastes too much ink summarising research papers and quoting "experts" uttering banalities. And he fails to point out the humour of sabbatical man jet-setting hither and thither to discuss such staples of modern academic life as poverty and inequality. Mr Wildavsky should spend less time with his fellow think-tankers (who are mesmerised by the idea of a global knowledge economy) and more talking to students, who experience the disadvantages as well as the advantages of the new cult of globalisation at first hand.

http://www.economist.com/culture/displaystory.cfm?story_id=16103856&fsrc=rss

Overwhelmed? Welcome the Age of Curation

- By Eliot Van Buskirk
- May 14, 2010 |

Forrester Research analyst Sarah Rotman Epps coined a phrase Friday for something many have been talking about since Apple launched the iPad about six weeks ago. "Curated computing" refers to the way Apple staff examines each piece of software written for iPhone OS devices before allowing it into (or blocking it from) the App Store.

Epps is almost certainly not among the first 10,000 people on the planet to observe that the iPhone OS does not allow users to install whatever programs they wish, unless the devices are jailbroken.

For that reason, it's tempting to write off her coinage as an attention-grabbing rehash of a well-worn meme — especially because she plans to take this show on the road at conferences to talk about this observation. That knowledge itself is anything but revelatory to anyone who has been paying even slight attention to what has already been said about the iPhone OS over the past few years.

However, Epps is onto something with this word, *curated*.Curation is the positive flip side of Apple's locked-down approach, decried as a major, negative development in computing by many observers, present company included. Who would have thought that in 2010, so many people would pay good money for a computer that only runs approved software?It runs counter to the idea, prized by geeks, that computing equals freedom. If it were Microsoft doing this, we'd all be storming the Gates with torches and pitchforks.

Nonetheless, the Age of Curation (see? anyone can coin a catchphrase) began long before today's conversation about curated computing. In this Age of Digital Excess (oops, there I go again), we're surrounded by too much music, too much software, too many websites, too many feeds, too many people, too many of their opinions and so on.

Curation is already fundamental to the way in which we view the world these days, and the iPad is hardly the first technology to recognize this.

For example:

1) Facebook curated the web.

When given the option to create our own webpages online, most of us recoiled from that open-ended freedom, though many embraced it initially. Even if you took the time to learn HTML and keep your page updated, there was no guarantee that your friends would be able to find it.

That's why personal websites remain the domain of geeks while Facebook (and its predecessors), LinkedIn, Tumblr, Flickr and other pre-fab web-presence providers flourish, despite valid privacy concerns. When faced with social freedom on the web, we chose social curation instead, and now we're dealing with that choice.

2) Music curation vs. music criticism

In the old days all music fans actually had to pay for albums, which meant they had to be careful with their choices. They turned to people called "music critics," which publications hired to help guide purchasing decisions, because there was no way to find out how something sounded on your own unless you stumbled

across it on the radio or stood in line at record stores that allowed free previews on headphones.Today, you can discover in seconds how nearly any band in the world sounds, assuming it wants to be heard, on YouTube, MySpace, Spotify, The Pirate Bay and other services. At that point, the role of the music critic shrinks considerably and becomes more about curation than criticism.The fact that your favorite MP3 blog mentions something at all is more important than what they say about it, because you can then download or stream the song and decide for yourself.

3) News publications filter the news.

Before the internet and Google all we had was curated news, in that readers typically got all of their news from one or two paper publications, which are closed systems. When the news went online and the internet opened up news distribution, aggregation became important.

A Google News search on a current event typically reveals thousands of articles on the same topic, and the sheer number of current events being reported has skyrocketed in the past decade, which has made curation important once again. Like baleen whales, news reporters and editors filter through a sea of information to find the relevant, true and interesting bits, so that readers whose days are dedicated to other matters don't have to manage that on their own.

Original reporting is still as important as it was before — perhaps even more so, because being "patient zero" on a story is a great way to get everyone else to link back to you.

4) Consumption devices curate functionality.

Finally, we arrive at the sort of curation Epps is talking about. The Kindle, cellphone, MP3 player, GPS and other specific-purpose devices curate functionality in order to deliver a better experience than a general-purpose desktop computer could ever deliver. This holds especially true for devices designed around consumption, such as portable MP3 players or big-screen televisions.IPhone OS devices including Epps' iPad, however, offer a multitude of functionalities because of their ability to install thousands of programs, curated though they may be. When a "curated computing" device offers general functionality and a large screen, geeks get nervous because they view it as a blow against computing freedom.

But unless demand for general, non-curated computing devices dries up, they needn't worry. After all, just because Facebook exists doesn't mean you can't still post your own webpage.Still don't believe we live in the Age of Curation, of which the iPad is just a recent manifestation? Go save everything you run across to read later using Instapaper, even from your Twitter and newsreader feeds (themselves forms of curation), which you can then read on the functionality-curating iPad and Kindle devices.

If that's not enough, try GiveMeSomethingToRead or Longform.org, both of which curate specifically for Instapaper itself.

Read More http://www.wired.com/epicenter/2010/05/feeling-overwhelmed-welcome-the-age-of-curation/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+wired%2Findex+%28Wired%3A+Index+3+%28Top+Stories+2%29%29&utm_content=Google+Reader#ixzz0ozOBdXrM

http://www.wired.com/epicenter/2010/05/feeling-overwhelmed-welcome-the-age-of-curation/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+wired%2Findex+%28Wired%3A+Index+3+%28Top+Stories+2%29%29&utm_content=Google+Reader

Why are political memoirs so disappointing?

Will Gordon Brown's memoirs be any more thrilling than most political autobiographies, asks Dominic Sandbrook.

By Dominic Sandbrook
Published: 7:00AM BST 15 May 2010

Tony Blair's memoirs are to be published this September, and will be followed inevitably by Gordon Brown's
Photo: REX

Some years ago, researching my first book, I went to see the retired American politician Eugene McCarthy, who had been the Democratic Senator from Minnesota for 20 years and famously ran for President to oppose the Vietnam War in 1968. Like most politicians of his generation, McCarthy had written an autobiography, but it was so terse and tedious that I was convinced he had a rich store of anecdotes and confessions squirrelled away somewhere.

He was in his mid-80s and in poor health: surely, I reasoned, he would take this last chance to come clean, to unburden himself of his insider knowledge, his regrets, his unfulfilled ambitions. And then, after we had shaken hands and I had turned on my tape recorder, he started talking, and I realised I had overlooked one vital thing. He was a politician.

It is perfectly possible that when Tony Blair's memoirs are published this September, to be followed inevitably by a doorstopper from Gordon Brown and perhaps a suitably feline volume from Peter Mandelson, we will marvel at their introspective insight, documentary accuracy and unsparing honesty.

Possible, yes; but not very likely. If the record of recent political memoirs is any guide, anyone hoping that the demise of New Labour will bring explosive revelations about Gordon's temper, George's intellect or the real reason that we went into Iraq is destined for disappointment.

Even the title of Blair's book, *The Journey*, makes it sound ominously like a self-improvement manual, explaining how the dullest and dowdiest reader can follow in the footsteps of a man who made it all the way from Scotland's most prestigious public school to Cliff Richard's Caribbean villa. And since Gordon Brown's entire career was marked by his obsession with hoarding the facts and maintaining rigorous control over the narrative, readers eager for a Caledonian version of St Augustine's *Confessions* would do better to look elsewhere.

The astonishing thing about political memoirs is that we keep buying them. Just as governments, however bright-eyed and bushy-tailed at the outset, inevitably let us down, so politicians' autobiographies generally turn out to be sensationally disappointing.

Random House paid a whopping £5 million for Tony Blair's life story, yet if previous PMs' memoirs are anything to go by, it is unlikely to prove a great beach read. Merely to turn the pages of Jim Callaghan's *Time and Chance* or Ted Heath's *The Course of My Life*, even for political junkies like me, is to be plunged into an unremittingly gloomy world of inedible state banquets and interminable economic summits, the pages sucked dry of any life, zest or colour.

Across the flat grey oceans of prose, occasional fragments bob to the surface like reminders of a lost world: "I circulated a memorandum to the Cabinet… I explained to the TUC General Council… Music and sailing continued to provide me with much-needed relaxation…" Can anyone honestly claim to have read these books for pleasure?

It would be unfair, though, to judge all politicians' memoirs by these standards. Prime ministerial autobiographies inevitably suffer because their ghostwriters try to make them sound statesmanlike, taking out the jokes and the stories about late-night boozing.

The American president Lyndon Johnson, a famously foul-mouthed Texan with an eye for the ladies and a decidedly peculiar fondness for making his aides talk to him while he sat on the lavatory, was horrified when he discovered that his ghostwriters had tried to reproduce his homespun southern style. Out went all the quips and asides, and the result, *The Vantage Point*, has a good claim to being the most boring and pointless book ever published.

By contrast, Bill Clinton tried to write his memoirs himself, but (in characteristically undisciplined style) got in a mess by writing far too much on the early years and leaving too little time to cover the rest. The result weighed four pounds and made him $15 million, but the reviews were not kind: "a card-index, scissors-and-paste job of gossip, congressional in-fighting and legislative score-keeping", one reviewer called it.

If there was a golden age of political memoirs, at least on this side of the Atlantic, it came in the late 1980s, when Denis Healey and Roy Jenkins published their long and elegant recollections of the Wilson years. Unusually for political autobiographies, both of these books can still be read for pleasure, although they still have their irksome aspects. Jenkins's book, for example, has rather too much pompous self-justification for his failure to land the top job ("I always sensed that I would enjoy Prime Minister more when it was over than while it was taking place").

Healey's autobiography, meanwhile, is devoted to intellectual one-upmanship, with excursions into Leavisite literary theory, discussions of the "separation of art into Romantic and Classical", and references to Woolf, Dante, Marvell, Heine and Blake on the first three pages alone. For Healey, even this was not enough: a few years later, perhaps provoked by his rival Jenkins's good reviews, he published a second book devoted to his "appreciation of the arts", *My Secret Planet*, which set an all-time record for showing off. An equivalent volume from John Prescott or Bob Ainsworth is probably too much to hope for.

In truth, though, the Jenkins and Healey books are jewels amid great piles of rubble, their voices almost drowned out by the relentless droning of Michael Heseltine's *Life in the Jungle*, Norman Fowler's *Ministers Decide* or Gillian Shephard's *Shephard's Watch*. (Who on earth thinks up these titles, by the way?) Here, party conferences are forever leaping to their feet to applaud the author's blistering rhetoric, Cabinet colleagues are always swooning at their devastating insight, and ordinary passers-by are constantly stopping to thank them for their public service.

Even Tony Benn's diaries, which are chock-full of insights on British politics since the 1960s, are stuffed with moments of stomach-turning self-congratulation. And through them all runs a strain of Pooterish banality, never bettered than when, in one of Benn's recent entries, a wasp works its way into his underpants and stings him on the penis. There is such a thing, it turns out, as being too honest.

Given their record in government, unsparingly honest revelations from Tony Blair or Gordon Brown seem about as likely as a political comeback by Stephen Byers. A few decades ago, we might have expected more from their supporting cast. But while Jenkins and Healey were well-rounded men who had served in wartime and as Cabinet ministers spent hours reading, gossiping, travelling and boozing, their latter-day equivalents are infinitely less interesting figures. Geoff Hoon may yet surprise us all, but somehow I doubt it.

Instead, I am pinning my hopes on the member of the New Labour high command with the most disputatious reputation – and by coincidence, the only one who kept a contemporary record. True, the expurgated version of Alastair Campbell's diaries was a very damp squib indeed, except perhaps for the revelations about Tony Blair's "Austin Powers" dress sense. But the first volume of the uncut edition, covering the years running up to 1997, is scheduled for publication at the beginning of June. Maybe, just maybe, the supreme spin-doctor will come clean at last, casting new light on the extraordinary machinations that propelled New Labour.

MEMORIES ARE MADE OF THIS...

Denis Healey, *The Time of My Life*

Learned and boisterous, like their author, the former Chancellor's memoirs give an inside view of the turbulent Wilson years.

Roy Jenkins, *The Life at the Centre*

Elegant, witty and just a little bit pompous, Roy Jenkins's autobiography is widely seen as a classic of the genre.

Tony Blair, *The Journey*

The moving story of one man's struggle from life in the Ugly Rumours to American stardom and the pleasure of the sun bed.

Alistair Campbell, *Diaries Volume One: Prelude to Power*

Originally censored to spare Gordon Brown's blushes, the spin master's diaries should give an unparalleled insight into the rise and fall of New Labour.

http://www.telegraph.co.uk/news/newstopics/politics/7725493/Why-are-political-memoirs-so-sappointing.html