Infoteca's E-Journal

An Electronic Compilation of Scientific and Cultural Information by
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Mentor, Friend — or Both?

TAMPA — The session on mentoring minority doctoral students was proceeding swimmingly enough, as the panelists offered useful tips about how the traditional methods for guiding graduate students work (and don't) for students of color, earning the kind of head-nodding agreement that is typical at gatherings of like-minded people. That all changed when one of the presenters, Javier Cuevas of the University of South Florida, said that he had changed his mind in recent years about one key question.

"I used to think that you didn't have to have a close relationship with the student to be a mentor," Cuevas, an associate professor of molecular pharmacology and physiology at South Florida's College of Medicine, said at the session at the Compact for Faculty Diversity's Institute on Teaching and Mentoring here. "But I've come to believe that there's a huge difference between an adviser, who may only be concerned about the student's performance on a particular project, and someone who has truly taken on the role of mentor. To me, friendship is an essential component of being a true mentor."

The notion that a faculty mentor must — or at least should — be a friend to a graduate student or junior professor to be effective provoked intense debate among the several dozen academics in the room. "I agree that an emotional connection, a level of caring, is an essential component of being a mentor," said Alvin Fox, a professor of microbiology at the University of South Carolina School of Medicine and director of the medical school's Sloan Minority Ph.D. Program. "But friendship is not the correct term. I think it says something beyond that."

The discussion that unfolded over the next hour suggested that the scholars were divided more by rhetoric, perhaps, than by greatly diverging perceptions of what makes a mentor effective — and where the boundaries are between caring and friendship.

The philosophical question, "friend or no," emerged from what was otherwise mostly a nuts and bolts discussion about effective mentorships, in which Arizona State University's Carlos Castillo-Chavez discussed efforts there and elsewhere to encourage minority students to become mathematical scientists, and Gilbert John described Oklahoma State University's outreach to Native American graduate students.

When it was Cuevas's turn, he quickly made it clear that he was most interested in talking about what qualified as good mentoring, regardless of who was being mentored. "Whether one is African American, Hispanic, or Caucasian, good mentoring will help a student get through the program," he said.

His definition of "good mentoring," Cuevas said, required a faculty member working with a doctoral student or junior faculty member on two separate but complementary levels: first, professional and career development ("What does it take to be a pharmacy professor, a math professor? Giving them an understanding of the culture") and second, psychological and emotional support, especially for those who don't have a background in higher education and may be unprepared (or underprepared) to adjust to the lifestyle of a professor.

"Some mentors can't provide both of those components, and so a person might need one mentor for one aspect of their career, and a different mentor for the other," Cuevas said. But for those to whom he is a mentor, he said, "I think that providing that psychological and emotional support is a key component." The difference between a true mentor and an adviser who is a mere "supervisor" is that the latter "may not mind if you take 10 years to get through the program," Cuevas said. A mentor who cares about a student, he said, is "going to do what I can do in the rest of my life to make sure that the student moves through his or her career successfully."

Fox, the South Carolina professor, said he agreed that "emotional involvement" was important for a mentor, because "if you've got no soul, no heart, all you are is a supervisor." But "friendship," he said in an interview after the session, involves a "liking" that he said was not necessarily part of the mentor-mentee relationship.

Another professor in the audience, who asked not to be identified, went further. "My concern about this 'friend' thing," he said, is that some graduate students "come in with psychological problems that you

have nothing to do with," and the more an instructor got involved in their personal lives, the more entangling it could be. "I found it helpful to keep as much distance between this and you as you possibly can," he said.

"Those personal issues are outside of what we're supposed to be doing," Cuevas agreed. He clarified that his definition of "friendship" did not entail the sort of personal entanglements the others seemed to envision. "Of course there have to be certain boundaries; you can't have a relationship where there are no barriers, because if there aren't, that person may not look at you as a person who can provide guidance," he said.

Asked afterward to explain what the boundaries are, Cuevas said that he has "dinner parties at my house," but he makes it a point to ensure that the graduate students he works with "don't know what's happening in my personal life." A reporter asked whether "friendship" leads to involvement in a student's personal issues. Cuevas paused and thought. "There's a single parent in my lab who is struggling to get out of the lab on time," he said. "I tend to think it's okay for me to maybe offer some solutions, like finding closer day care, so in that way I do become involved in the personal life."

But Cuevas would not, he said, try to advise one of the students he works with about how to handle a destructive personal relationship, because he has no expertise in that role. "My answer there has to be, 'I can't help you,' and then direct them to the right person."

He added: "I do think you can be friends as a mentor. But you can be friends with somebody without being that person you hang out and have a beer with."

— Doug Lederman

The original story and user comments can be viewed online at http://insidehighered.com/news/2008/10/28/mentor.

Superstrong 'Buckypaper' Could Be Dream Material

Bill Kaczor, Associated Press

Oct. 17, 2008 -- It's called "buckypaper" and looks a lot like ordinary carbon paper, but don't be fooled by the cute name or flimsy appearance. It could revolutionize the way everything from airplanes to TVs are made.

Buckypaper is 10 times lighter but potentially 500 times stronger than steel when sheets of it are stacked and pressed together to form a composite. Unlike conventional composite materials, though, it conducts electricity like copper or silicon and disperses heat like steel or brass.

"All those things are what a lot of people in nanotechnology have been working toward as sort of Holy Grails," said Wade Adams, a scientist at Rice University.

That idea -- that there is great future promise for buckypaper and other derivatives of the ultra-tiny cylinders known as carbon nanotubes -- has been floated for years now. However, researchers at Florida State University say they have made important progress that may soon turn hype into reality.

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Buckypaper is made from tube-shaped carbon molecules 50,000 times thinner than a human hair. Due to its unique properties, it is envisioned as a wondrous new material for light, energy-efficient aircraft and automobiles, more powerful computers, improved TV screens and many other products.

So far, buckypaper can be made at only a fraction of its potential strength, in small quantities and at a high price. The Florida State researchers are developing manufacturing techniques that soon may make it competitive with the best composite materials now available.

"If this thing goes into production, this very well could be a very, very game-changing or revolutionary technology to the aerospace business," said Les Kramer, chief technologist for Lockheed Martin Missiles and Fire Control, which is helping fund the Florida State research.

The scientific discovery that led to buckypaper virtually came from outer space.

In 1985, British scientist Harry Kroto joined researchers at Rice for an experiment to create the same conditions that exist in a star. They wanted to find out how stars, the source of all carbon in the universe, make the element that is a main building block of life.

Everything went as planned with one exception.

"There was an extra character that turned up totally unexpected," recalled Kroto, now at Florida State heading a program that encourages the study of math, science and technology in public schools. "It was a discovery out of left field."

The surprise guest was a molecule with 60 carbon atoms shaped like a soccer ball. To Kroto, it also looked like the geodesic domes promoted by Buckminster Fuller, an architect, inventor and futurist. That inspired Kroto to name the new molecule buckminsterfullerene, or "buckyballs" for short.

For their discovery of the buckyball -- the third form of pure carbon to be discovered after graphite and diamonds -- Kroto and his Rice colleagues, Robert Curl Jr. and Richard E. Smalley, were awarded the Nobel Prize for chemistry in 1996.

Separately, Japanese physicist Sumio Iijima developed a tube-shaped variation while doing research at Arizona State University.

Researchers at Smalley's laboratory then inadvertently found that the tubes would stick together when disbursed in a liquid suspension and filtered through a fine mesh, producing a thin film -- buckypaper.

The secret of its strength is the huge surface area of each nanotube, said Ben Wang, director of Florida State's High-Performance Materials Institute.

"If you take a gram of nanotubes, just one gram, and if you unfold every tube into a graphite sheet, you can cover about two-thirds of a football field," Wang said.

Near-term uses for the buckypaper would be as electrodes for fuel cells, super capacitors and batteries, Wang said. Next in line, buckypaper could be a more efficient and lighter replacement for graphite sheets used in laptop computers to dissipate heat, which is harmful to electronics.

The long-range goal is to build planes, automobiles and other things with buckypaper composites. The military also is looking at it for use in armor plating and stealth technology.

"Our plan is perhaps in the next 12 months we'll begin maybe to have some commercial products," Wang said. "Nanotubes obviously are no longer just lab wonders. They have real world potential. It's real."

http://dsc.discovery.com/news/2008/10/17/buckypaper-material.html

British Architect to Redesign City Library

By ROBIN POGREBIN

Norman Foster, the eminent British architect who has made something of a specialty out of inserting contemporary designs into historic buildings, has been selected for a major renovation of the New York Public Library's landmark 1911 main building, on Fifth Avenue between 40th and 42nd Streets.

Mr. Foster and his London firm, Foster & Partners, are to create a new circulation library in a space below the library's Rose Reading Room and overlooking Bryant Park that now houses seven levels of stacks and a basement.

"It's the greatest project ever," Mr. Foster said in a telephone interview on Wednesday.

The area, which now measures 1.25 million cubic feet, will be completely reconfigured, with new rooms for children and teenagers and numerous computer work stations. The stacks are to move to an existing three-acre storage area beneath Bryant Park that is also to be renovated. Work is expected to be completed by 2013.

"We had to have someone as good as Carrère & Hastings," said Paul LeClerc, president of the library, referring to the original architects of the library's Beaux-Arts building, a city and national historic landmark. "We had to create a second masterpiece."

The project, which is expected to cost $250 million, is proceeding despite a steep economic downturn in which the city plans major budget cuts and in which fund-raising is expected to be an enormous challenge.

The overhaul has been planned in stages, library officials said, so adjustments can be made to the timetable, depending on how the economy fares. "It doesn't have to be done at once," said Marshall Rose, the library's chairman emeritus, who is head of the institution's building committee. "The way we've phased it, if the world got worse, we could proceed without losing our momentum. We may delay parts of it. But the thing is in motion."

The project is part of a $1.2 billion plan to update the entire library system through improvements to branch libraries, a larger endowment and the creation of two new libraries in Upper Manhattan and on Staten Island.

For this larger effort, the library has announced a $500 million private fund-raising campaign that has already brought in $300 million, including a$100 million gift from a trustee, the Wall Street financier Stephen A. Schwarzman, that was announced in March. The renovated main building will be named after Mr. Schwarzman, as will be noted discreetly on its facade.

The library also plans to raise money from the sale of its properties, including the Mid-Manhattan branch, on the east side of Fifth Avenue at 40th Street, which is in negotiations with a buyer, and the Donnell branch in Midtown, which was sold last year to Orient-Express Hotels Ltd. for $59 million.

"I'm very optimistic that we'll be able to do this," Mr. LeClerc said. He predicted that the renovated central library would "be a huge jolt of energy for the city when it's done, the biggest comprehensive library open in the world but also in human history."

During the selection process, Mr. Foster said he came to understand the New York Public Library's importance as a social nexus and a place to gain access to information. This made him newly appreciate the role his local library had played for him when he was growing up in Levenshulme, a suburb of Manchester, England. In preparation for his renovation proposal, Mr. Foster had a staff member photograph that branch "to remind myself of the debt I owed."

"If it hadn't been for the library, I probably wouldn't have gone to university," he said. "I discovered a whole world of literature — great writers — and also a world of architecture, like the original books of Corbusier."

"I remember discovering Frank Lloyd Wright through Henry-Russell Hitchcock," he added, referring to the architectural historian.

Mr. Foster's acclaimed work with prized historic buildings made him a particularly compelling candidate, the library said. He has designed glass-enclosed additions to the Reichstag in Berlin (1999), the British Museum in London (2000) and the Smithsonian American Art Museum and National Portrait Gallery in Washington (2007).

This is also not the first time that the architect has tackled a New York City landmark. His 2006 Hearst Tower project on Eighth Avenue at 57th Street in Manhattan involved planting a glass-and-steel tower atop a six-story Art Deco base dating from 1928.

Because the library is a landmark, its exterior, including its strip windows, will not be altered. “It will be a building within a building,” Mr. Rose said. “We’re not going to encroach on the landmark quality.”

While the library did not want a design that would overshadow its historic envelope and had considered architects with a more traditional aesthetic, the trustees wanted to commission a distinctive piece of contemporary architecture.

“This is now 2008, and when this happens, the library building will be 100 years old,” said Catherine Marron, the library’s chairwoman. “One has to embrace one’s time.”

Starting with about 30 candidates and narrowing the field to 10, the library was particularly impressed by Mr. Foster’s efforts, trustees said, declining to name the other architects considered. Mr. Foster or members of his team visited the library 19 times before offering their proposal, Mr. Rose said. They designed elaborate visual presentations and even a model, which library executives declined to describe, saying that it was strictly hypothetical and that a final design was more than a year away.

“They did do a knockout proposal,” Mr. LeClerc said. “It wasn’t, ‘This is what you’ve got to do.’ It was something that was indicative of the capacity of the firm to think very, very creatively about how this could be pulled off in a way that was really interesting — indeed, brilliant.”

The library was also reassured by “the scale and the power” of Mr. Foster’s firm, with 1,300 employees, Mr. LeClerc said. “This is a very, very complicated job,” he added. “We needed a firm that had a lot of breadth and depth.”

Because the stacks structurally support the reading room, for example, the reading room will have to be braced before the stacks are taken out. Mr. Foster’s firm has conducted engineering studies and evaluated the acoustics. Today about 1.2 million people visit the main library annually; when the new circulation library opens, that figure is expected to increase to about 4 million.

Some are bound to question whether the library can raise the necessary funds, given the current financial crisis. But library officials said they were determined to press on. “We are committed to this program,” Ms. Marron said. “We recognize the world is different than what it was, and it might take a longer time. We’re not going to be foolhardy.”

“Libraries are needed in times like this,” she added. “More people need to borrow books, to get job information — it’s free. So I think everybody strongly believes the library is needed more than ever.”

http://www.nytimes.com/2008/10/23/arts/design/23libr.html?_r=1&th&emc=th&oref=slogin

College Board Unveils Test for 8th Graders

You've heard of the SAT and the PSAT. Now the College Board is planning a new test for 8th graders, similar in many ways to the other tests.

At a briefing to unveil the program Wednesday, College Board officials said that the exam — ReadiStep — would help students, their families and their schools plan high school programs that would increase preparedness for college. The idea is that the test will be for diagnostic purposes, not for evaluating whether students get into certain programs or win scholarships. The test will be "a launchpad" that "can help teachers change the course of students' instruction," said Lee Jones, the College Board's senior vice president for college readiness.

Testing critics, however, said that the the test was unnecessary and appeared to be motivated by the growing competition faced by the College Board from the ACT.

ReadiStep will be a two-hour exam with three sections: critical reading, writing and mathematics (the same sections as are on the SAT). Unlike the SAT, on which a portion of the writing score is based on a student essay, all of the questions on ReadiStep will be multiple choice. The College Board declined to release sample questions. The test will be proctored by teachers, in schools, and will start next fall as schools sign up. The College Board said that it wanted to keep the test inexpensive and that the fees (to be less than $10 per test) would be paid by schools, not students.

Jones said that this test's focus would be on helping to identify strengths and weaknesses so students could use high school to effectively prepare for college. When reporters questioned Jones and others at the briefing about whether American schools really need another test, board officials said that there was no such test available now and that school leaders had been asking the College Board to create this test.

Asked for the names of school leaders who had made such requests, the College Board declined to release any but provided names of two educators instead. Both praised the idea of the report in interviews, but both also have College Board ties — with one serving as a trustee and another on the panel that provided advice on the mathematics portion of the new test.

James Choike, a mathematics professor at Oklahoma State University, who was on the test development committee, said that there are "valid concerns" that students get too much testing these days. But he said he saw value in the new test. Giving students "at an early stage a taste of an SAT-like examination," he said, could "raise collegiate aspiration levels."

While College Board officials said repeatedly that ReadiStep was needed because there is no test for those starting high school that is oriented around college preparation, others say that there is just such a test already: the ACT Explore program, which describes itself in much the same way as the College Board is describing its new test.

A spokesman for the ACT said that the organization hadn't studied the new College Board test and so couldn't comment on it. But the spokesman said that Explore has been around for 17 years, and has become quite popular. Last year, 980,000 students in 8th or 9th grade took the exam. It is based on a format similar to that of the ACT, with sections on English, math, reading and science.

Jesse Mermell, executive director of the National Center for Fair & Open Testing, which is a major critic of the College Board, called ReadiStep "a cynical marketing ploy designed to enhance test-maker revenues, not improve access to higher education." Mermell said that the College Board designed the new test "to lock 8th graders into the SAT series of exams before they can consider the increasingly popular alternatives of the ACT or test-optional admissions."

— Scott Jaschik

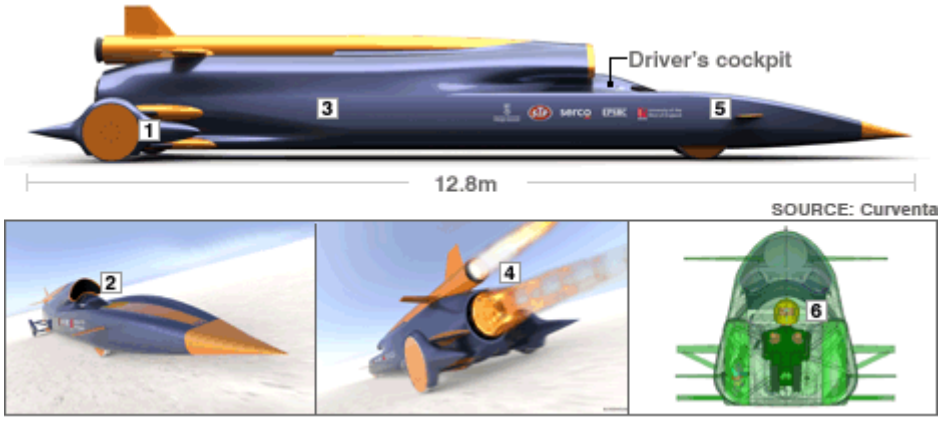
The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/10/23/readistep.

Supersonic car targets 1,000mph

By Jonathan Amos
Science reporter, BBC News

An animation of how the record attempt might look

The British team that claimed the land speed record in 1997, taking a car through the sound barrier for the first time, is planning to go even faster.



RAF pilot Andy Green made history in 1997 when he drove the Thrust SSC jet-powered vehicle at 763mph (1,228km/h).

Now he intends to get behind the wheel of a car that is capable of reaching 1,000mph (1,610km/h).

Known as Bloodhound, the new car will be powered by a rocket bolted to a Eurofighter-Typhoon jet engine.

The team-members have been working on the concept for the past 18 months and expect to be ready to make their new record attempt in 2011.

Bloodhound project leader Richard Noble told BBC News: "This is one of the most exciting things you can do on God's Earth; and when you've the opportunity to do it really, really well, with the latest technology, you can't resist the challenge."

> **The consequences if we don't inspire the next generation are that we will wither as a country**
> Lord Drayson
> UK science minister

The initial studies have illustrated just how grand a challenge it will be.

The 12.8m-long, 6.4-tonne Bloodhound SSC (Super Sonic Car) will be expected to travel faster than a bullet fired from a handgun.

Its 900mm-diameter wheels will spin so fast they will have to be made from a high-grade titanium to prevent them from flying apart.

The car will accelerate from 0-1,050mph (1,690km/h) in just 40 seconds; and at its maximum velocity, the pressure of air bearing down on its carbon fibre and titanium bodywork will exceed 12 tonnes per square metre.

"This is a big engineering adventure," commented Bloodhound's technical chief, John Piper.

"We've not seen anything yet which we can't overcome given the opportunity and the time. We don't have all the answers yet, but we have quite a few of them, and I'm sure other solutions will present themselves."

Wing Commander Green acknowledges there will be risks involved but says the car will be designed to maximise his safety.

"Does that make it zero-risk? No. Is life with zero-risk interesting? No.

"This is worth making a risk for because it's a huge challenge and a huge prize at the end, not just for the biggest record but to inspire the next generation of engineers, to share it with every schoolchild in the country," he said.

Inspiration is a key driver for the project. The genesis of the idea came from Lord Drayson, the UK's new science minister who also happens to be a racing driver.

He approached Noble and Green when he held a post in the Ministry of Defence to ask them if they could do something that would grab the attention of schoolchildren and turn them to careers in science and technology.

"The consequences if we don't inspire the next generation are that we will wither as a country," Lord Drayson told BBC News.

Please turn on JavaScript. Media requires JavaScript to play.

Wing Cdr Andy Green on the new attempt

"Over the centuries, we've been involved in some of the most important scientific discoveries. The Brits are good at science. We have got to make sure the next generation gets the vision, and has the opportunity to maintain that tradition."

As a consequence, a schools programme will be built around the project that aims to involve young people at every stage in the designing and building of the car.

The team's HQ in Filton, Bristol - the "home of Concorde" - will have a schools visitor centre featuring the "classroom of the future".

Richard Noble added: "Our industries are starved of engineers. There are real problems on the education front; and, of course, what we've got now is the environmental challenge coming up.

"There are a vast number of new products that are needed, and Britain simply isn't going to play unless we have the engineers."

Lord Drayson's role has also ensured one key element of Bloodhound has been made available to the project team: the EJ200 jet engine.

The Ministry of Defence is lending the team engines that were used in the flight development programme for the Typhoon. These test engines are beyond combat use but have more than sufficient working time left in them to power Bloodhound.

The EJ200 will produce about 20,000 lbs of thrust (90 kilonewtons) and will sit underneath a hybrid rocket engine that produces about 25,000 lbs of thrust (110kN)

The rocket will provide most of the power to get Bloodhound close to the speed of sound (Mach 1); the Typhoon engine will enable Andy Green to throttle up to the target speed of 1,000mph (Mach 1.4).

Apart from the not-insubstantial in-kind support of the MoD in the loan of the EJ200s, Bloodhound is a private project that will need to raise some £10m in financing.

Parallel to the design effort, a location for the record attempt is being sought. Thrust SSC broke the sound barrier in the Black Rock desert in Nevada, US.

It is known that a number of other teams are also planning an assault on Thrust SSC's mark.

"There are three cars out there right now with varying degrees of credibility and at various stages of advancement," said Andy Green.

"The competition for what we're doing is a very important part of it."

The initial design office for Bloodhound is based at the University of the West of England, where a full-scale mock-up of the supersonic car will be built shortly. Swansea University is also a key early sponsor of the project, assisting in aerodynamics research.

Jonathan.Amos-INTERNET@bbc.co.uk

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7685049.stm

Published: 2008/10/22 22:28:51 GMT

New feathered dinosaur discovered

By James Morgan
Science reporter, BBC News

The fossil of a "bizarre" feathered dinosaur from the era before birds evolved has been discovered in China.

Epidexipteryx was very bird-like, with four long ribbon-like tail feathers - probably used in display.

But the pigeon-sized creature shows no sign of the flight feathers seen in other bird-like dinosaurs, according to a report in the journal Nature.

The discovery highlights the diversity of species present in the Middle to Late Jurassic, just before birds arose.

The fossil was described by a team of palaeontologists led by Fucheng Zhang and Xing Xu, of the Chinese Academy of Sciences.

Dr Angela Milner, Associate Keeper of Palaeontology at the Natural History Museum, London, said: "This exquisitely preserved fossil is an exciting and totally unexpected find.

"It shows that feathers were likely being used for ornamentation for many millions of years before they were modified for flight.

"It provides fascinating evidence of evolutionary experiments with feathers that were going on before small dinosaurs finally took to the air and became birds."

Air of mystery

The discovery adds yet more complexity to the early history of the era when small meat-eating bipedal dinosaurs evolved into birds.

Many feathered dinosaurs have been unearthed at the now famous fossil site in Laioning Province in China. These include the oldest known bird, *Archaeopteryx* , which lived around 125 million years ago.

Epidexipteryx was a primitive, flightless member of the avialae clade, which lived a little before Archaeopteryx.

It was discovered at the Daohugou beds, in Nincheng County, Inner Mongolia, in sediments which have been dated to around 168-152 million years ago.

Phylogenetic analysis suggests the species is a member of a "bizarre lineage" known as the scansoriopterygidae (meaning "climbing wings").

The authors also note that it displays "an unexpected combination of characters" seen in several different groups of theropods - the bipedal dinosaurs which eventually gave rise to birds.

Freak experiment

It had a fluffy, down-like covering and sprouted two pairs of enormously long, ribbon-like shafted tail feathers. These were almost certainly used for display - making it the oldest known species to possess these.

But its limbs lacked contour feathers - a feature common to most modern birds.

Dr Zhang said: "Although possessing many derived features seen in birds... [*Epidexipteryx*] show some striking features... not known in any other theropod.

"The bizarre appearance... indicates that morphological disparity... close to the origin of birds is higher than previously assumed.

"The absence of... limb feathers suggests that display feathers appeared before aerofoil feathers and flight ability.

"It underscores the importance of Jurassic theropods for understanding avian origins."

Dr Graham Taylor, of Oxford University's Animal Flight Group, said: "This fossil is the latest in a string of feathered dinosaurs emerging from China, but is especially exciting for two reasons.

"Firstly, whereas other feathered dinosaurs date from after the appearance of the first known bird, this fossil appears to be much closer in age, so it opens a new window on the evolutionary events at the critical transition from dinosaurs to birds.

"Secondly, it has an exquisite set of ornamental tail feathers, suggesting that feathers were used in show even before they were used in flight."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7684796.stm

Published: 2008/10/22 23:30:10 GMT

Study probes clouds' climate role

An international team of scientists is hoping to shed light on how clouds over the Pacific Ocean are affecting global climate and weather systems.

The clouds, some of which are bigger than the US, reflect sunlight back into space and cool the ocean below.

The team hopes to learn more about the clouds' properties and if pollution from activities such as mining affect the formation of these systems.

The month-long study will involve more than 200 experts from 10 countries.

A team of 20 climate and cloud experts from the UK's National Centre for Atmospheric Science (NCAS) are taking part in the expedition, which will be based in Chile.

Hugh Coe, the lead scientist for the British consortium, said the project would help improve the accuracy of climate change models.

"These are some of the largest cloud systems in the world and we know that they must play a very significant role in climate change, yet we know that climate models do not represent them very well," he explained.

"This campaign is a fantastic opportunity to make cutting-edge measurements in a unique environment and merge them with state-of-the-art climate models.

"We hope to finally hit some of the uncertainties in current climate models on the head."

Cloud catching

Professor Coe and his colleagues will gather data via cloud and dust probes fitted to two research aircraft, which will be flown through the low-lying cloud masses, in order to understand how the systems form, how reflective they are, and what factors determine how long the clouds last.

The type of cloud being investigated is known as a marine stratocumulus.

They usually occur near land where deep, cold, upwelling water reaches the surface of the sea.

This water cools the surface air, resulting in condensation and cloud formation.

The clouds do not exceed 2km in altitude, and they are present nearly all year round in the South-East Pacific region.

It is already understood that the clouds play a role in influencing the planet's climate because the vast formations act like massive mirrors that reflect sunlight back into space and limit the amount of solar energy that reaches the Earth's surface.

However, the UK team will also be hoping to establish whether pollution from mining actives along the Chilean and Peruvian coasts affect the clouds' properties.

Tiny particles emitted during the mining processes are carried up into the atmosphere and form droplets when they come into contact with water vapour within the atmosphere.

The NCAS researchers will also gather data to assess whether the particles affect the amount of rain produced and if the particle-filled clouds are more reflective than normal clouds.

The UK project - funded by NCAS, the Natural Environment Research Council (Nerc) and the UK Met Office - is one part of an international three-year project called VOCALS, which is exploring how complex interactions between clouds, oceans and land affect the world's climate.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7682836.stm

Published: 2008/10/22 23:15:31 GMT

Drug may reverse MS brain damage

By Richard Warry
BBC News website health editor

A drug developed to treat leukaemia may be a powerful new weapon against multiple sclerosis, researchers say.

Alemtuzumab appears to stop progression of the disease in patients with early stage active relapsing-remitting MS - the most common form of the condition.

The University of Cambridge study, published in the New England Journal of Medicine, also suggests the drug may enable repair of previous damage.

However, it can produce potentially serious side-effects, they warn.

> **The ability of an MS drug to promote brain repair is unprecedented**
> Dr Alasdair Coles
> University of Cambridge

And the researchers stress their work is still at an early stage.

Alemtuzumab - a type of drug known as a monoclonal antibody - was created at Cambridge in the late 1970s, and has long been used to treat leukaemia by killing off the cancerous white cells of the immune system.

The latest three-year study, of 334 patients with relapsing-remitting MS which had yet to be treated, found that the drug cut the number of attacks of disease by 74% more than the reduction achieved by conventional interferon-beta therapy.

Alemtuzumab also reduced the risk of sustained accumulation of disability by 71% compared to beta-interferon.

People on the trial who received the drug also recovered some function that had been thought to be permanently lost, and as a result were less disabled after three years than at the beginning of the study.

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Tony Johnstone, a professional golfer, who was diagnosed with MS four years ago, on his treatment

In contrast, people given beta-interferon showed signs of progressively worsening disability.

This was confirmed by brain scans in which alemtuzumab patients showed signs that their brains had actually increased in size, while the beta-interferon patients' brains shrank over time.

The researchers said the findings suggested that alemtuzumab may allow damaged brain tissue to repair itself.

However, they stress that more work is needed to confirm the effects, before the drug can be considered for widespread NHS use.

Lead researcher Professor Alastair Compston said: "Alemtuzumab is the most promising experimental drug for the treatment of multiple sclerosis, and we are hopeful that the phase three trials will confirm that it can both stabilise and allow some recovery of what had previously been assumed to be irreversible disabilities."

Auto-immune disease

MS is caused by a fault in the body's immune system which leads it to attack nerve fibres and their protective insulation, the myelin sheath.

> **This news will rightly bring hope to people living with the condition day in, day out**
> Lee Dunster
> MS Society

This damage prevents the nerves from 'firing' properly, and then leads to their destruction, resulting in physical and intellectual disabilities.

Alemtuzumab works by destroying a type of white blood cell called a lymphocyte, which, in MS, plays a key role in causing the damage associated with the disease.

Effectively, this shuts down the immune system, allowing it to re-boot without the original fault.

Dr Alasdair Coles, who also worked on the study, said: "The ability of an MS drug to promote brain repair is unprecedented.

"We are witnessing a drug which, if given early enough, might effectively stop the advancement of the disease and also restore lost function by promoting repair of the damaged brain tissue."

During the trial, 20% of patients treated with alemtuzumab developed either an under-active or over-active thyroid gland.

A small number developed a low platelet count, rendering them vulnerable to bleeding, and in one case this led to a fatality. However, the researchers stress this complication can be easily treated if recognised early.

Lee Dunster, head of research at the MS Society, said: "This is the first drug that has shown the potential to halt and even reverse the debilitating effects of MS and this news will rightly bring hope to people living with the condition day in, day out.

"More work is needed to prove the drug's long-term effectiveness and we are very much looking forward to the results of the next stage of this important research."

Professor Paul Matthews, of Imperial College, London, described the trial as "compelling".

However, he said: "Alemtuzumab was associated with severe adverse events in a small proportion of the patients, suggesting that it would be unsuitable for any patient except those with very aggressive forms of the disease."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7680641.stm

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Diet drug 'doubles weight loss'

An anti-obesity drug vastly outperforms currently available rivals, early trials suggest.

Danish tests of tesofensine, reported in The Lancet, found dieting patients on the highest doses lost up to 12.8kg (28.2lbs) in six months.

This is twice the level achieved by drugs such as sibutramine and rimonabant.

But UK experts warned that more trials were needed, and expressed concerned the results may have been hyped.

> **At the moment there is a definite plateau which limits the effectiveness of current drugs, and if this new drug could break through that, that would be great**
> Dr David Haslam
> National Obesity Forum

Tesofensine first came to the attention of obesity researchers when it caused unintended weight loss when given to overweight patients with Parkinson's or Alzheimer's disease.

It works by changing the way that three nerve signalling chemicals, noradrenaline, dopamine, and serotonin have their effects on the brain.

This in turn reduces appetite, so that the person will eat smaller meals and have a reduced urge to snack.

The Danish study, led by Professor Arne Astrup, from the University of Copenhagen, split a group of 203 obese patients into two groups.

Both groups were given a once-daily pill to take, and told to go on a moderate diet, but half the pills were tesofensine, in varying doses, and the other half were "dummy" placebo pills.

After six months, all were re-measured, and the researchers found that while the placebo group had lost an average 2.2kg (4.85lbs) those taking tesofensine had lost much more.

On the lowest dose, the average weight loss was 6.7kg (14.8lbs), the medium dose produced 11.3kg weight loss (24.9lbs) and the highest dose 12.8kg (28.2lbs).

This performance is roughly twice that achieved by the best weight-loss drugs already approved for use in Europe.

Blood pressure warning

The drugs did produce side-effects, ranging from dry mouth and insomnia to nausea and diarrhoea, with the highest dose increasing patients' blood pressure, a concern given that many obese patients may have heart problems or diabetes.

The researchers said that the middle dose was more promising because it produced almost as great a weight loss as the highest dose, without the worst side-effect.

They called for bigger trials to confirm their result, and the drug is unlikely to become available across Europe until these are completed over the next couple of years.

Professor Steve O'Rahilly, an obesity expert at the University of Cambridge, said: "If we could treat obesity like we treat high blood pressure, with safe, effective and affordable drugs, this would be an enormous boon to health care.

"However, to date obesity drugs that have been effective have not been safe, and conversely those that are safer are relatively ineffective.

"The results with this new drug demonstrate that, over a six-month period, it is quite effective.

"However, as the drug is likely to have actions on parts of the brain not involved in weight control, the risk of serious side-effects on longer term administration will need to be watched very carefully."

Professor Iain Broom, of Robert Gordon University, said it was premature to claim that tesofensine significantly out-performed other anti-obesity drugs, as it had not been widely tested, unlike its rivals.

And Professor Mike Lean, a human nutrition expert from the University of Glasgow, said the drug seemed similar to sibutramine - which is licenced and has a very good safety record.

"The results are generally interesting but a lot more research is needed before anyone should be given it in routine practice."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7683642.stm

Published: 2008/10/22 23:20:50 GMT

Food 'poor' in hospital canteens

Many hospital canteens offer food laden with salt and fat, according to a leading consumer organisation.

Which? sent dieticians into 21 major hospitals across the UK, and found that most of the main meals served broke national guidelines.

Only four hospitals of the 21 had a "healthy option" on their menus.

Dieticians said the NHS should be setting a good example, but caterers said the study was based on a limited analysis of menus.

Although we did find some examples of good practice, most hospitals we visited really need to raise their game
Nikki Ratcliff
Which?

The NHS is the largest employer in the UK, with approximately 1.5 million staff, and serves approximately 300 million meals per year to staff, visitors and outpatients in hospital canteens and restaurants.

The research found all the hospitals served vegetarian options, but these tended to be "cheese-based" with high levels with fat.

In all, 67% of the dishes sampled had too much saturated fat, according to Food Standards Agency guidelines, and 86% had too much salt.

Which? also surveyed 1,500 of its members who had eaten in a hospital canteen in the previous year.

While almost half said the food was "excellent" or "good", one in five were unhappy with the options available.

Private profit

Nikki Ratcliff from Which? said: "The situation at the moment is farcical. Although we did find some examples of good practice, most hospitals we visited really need to raise their game."

A spokesman for the British Dietetic Association agreed that improvements were necessary, but said that as many hospitals used private catering contracts for their patient meals and canteens, it might be difficult to impose NHS standards directly on them.

She said: "The NHS does have to try to set a good example when it comes to healthy eating, and as most patients who use hospital canteens could probably lose a pound or two, then it makes sense to offer healthy options on the menu."

Liberal Democrat health spokesman Norman Lamb added: "The NHS should be at the forefront of efforts to reduce obesity, but instead they appear to be feeding the problem. "If schools can improve the meals they serve then so can hospitals."

Neil Watson-Jones, chairman of the Hospital Caterers' Association, said he was concerned that the survey seemed to be based on a "limited analysis" of the full range of dishes available at the hospitals in question.

He said hospitals were continuing to improve menus with extra healthier options.

"It's important to recognise that hospital catering outlets are required to be proactive in delivering income to support budgets and therefore have to respond to consumer demand and cater for customer choice."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7684212.stm

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Dons fear degrees are dumbed down

Most academics feel under increasing pressure to award undergraduates higher than deserved grades, a poll suggests.

The survey of 500 dons by Times Higher Education magazine showed 77% had felt coerced to award higher marks.

In June, the university watchdog - the Quality Assurance Agency - told BBC News Online that degree classifications were "arbitrary and unreliable".

The government says the UK's higher education sector has an international reputation for excellence.

The poll found more than two-thirds (69%) of university academics did not think a rise in the number of first-class and upper-second degrees was evidence of improving standards.

More than eight in 10 (82%) said resourcing constraints were affecting academic standards.

Seven in 10 (71.5%) said students were not better prepared for higher education than they were in the past and more than three-quarters (77.6%) said plagiarism was a growing problem at their university.

Overall, 52% said reports that universities were dumbing down were not overstated.

'Real issues'

Ann Mroz, editor of the Times Higher Education magazine, said the poll showed there were "real issues on the ground".

"Our readers told us that the increase in top degree classifications awarded over the past decade is less an indication of improving standards and more of pressure for constant improvement from Whitehall that has led to distortion of the system.

"While the mass expansion of higher education has undoubtedly been a good thing, inevitably the sector needs extra resources to cope."

Higher Education Minister David Lammy said the QAA had consistently found quality and standards were being maintained.

The survey results were published three days after it was announced universities would be trying out a more detailed way of recording student achievement.

A total of 18 UK universities are to test the new Higher Education Achievement Report, which aims to supplement the current grading system by showing more information about students' performance in individual modules and assessments.

Are affected by the issues in this story? Are you a university academic? What are your experiences? Send us your comments using the form below.

In most cases a selection of your comments will be published, displaying your name and location unless you state otherwise in the box below.

Name
Your E-mail address
Town & Country
Phone number (optional):
Comments
Story from BBC NEWS:
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Well, Excuuuuuse Meee!

Why humans are so quick to take offense, and what that means for the presidential campaign.

By Emily Yoffe
Updated Friday, Oct. 17, 2008, at 7:19 AM ET

"No man lives without jostling and being jostled; in all ways he has to elbow himself through the world, giving and receiving offense."—Thomas Carlyle

Rarely has it been thought that the way to show you deserve to be the most powerful person on earth is to demonstrate you're also the touchiest. This presidential campaign has been an offense fest. From the indignation over a fashion writer's observation about Hillary Clinton's cleavage, to the outraged response to the infamous Obama *New Yorker* cover, to the histrionics over "lipstick on a pig," taking offense has been a political leitmotif. ***Slate***'s John Dickerson observed that umbrage is this year's hottest campaign tactic. And we can assume it will reach an operatic crescendo in these final weeks before Election Day.

It's often the pettiest-seeming things that drive people mad. Or worse. Jostling our way through the world can have violent consequences. A significant percentage of murders occur between acquaintances with the flash point being a trivial insult. Sometimes it seems we live in a culture devoted to retribution on behalf of the thin-skinned—just think of university speech codes. Comedian Larry David even celebrates his skill at giving and taking offense on his television show *Curb Your Enthusiasm*.

Feeling affronted has global implications: Islamic organizations and countries seek to ban speech anywhere they decide is insulting to Islam, asserting that a perceived insult can justify a deadly response.

Study the topic of "taking offense" and you realize people are like tuning forks, ready to vibrate with indignation. So why do humans seem equipped with a thrumming tabulator, incessantly calculating whether we are getting proper due and deference?

We like to think we go through life as rational beings. Much of economic theory is based on the notion that humans make rational choices (which may mean that economists don't get out much). In 1982, some economists came up with a little game to study negotiating strategies. The results showed that rationality is subservient to more powerful drives—and demonstrated why human beings so easily conclude they are being wronged. The idea of the "ultimatum game" is simple. Player A is given 20 $1 bills and told that, in order to keep any of the money, A must share it with Player B. If B accepts A's offer, they both pocket whatever they've agreed to. If B rejects the offer, they both get nothing. Economists naturally expected the players to do the rational thing: A would offer the lowest possible amount—$1; and B, knowing $1 was more than zero, would accept. Ha!

In the years the game has been played, it's been found that almost half the A's immediately offer to split the money—an offer B's accept. When A offers $9 or even $8, B usually says yes. But when A's offer drops to $7, about half the B's walk away. The lower A's offer, the more likely the B's are to turn their backs on a few free dollars in favor of a more satisfying outcome: punishing the person who offended their sense of fairness. This impulse is not illogical; it is essential. In *Descartes' Error*, neurologist Antonio Damasio shows that humans who behave purely rationally are brain-damaged. Patients who have suffered injury to the areas in the brain that control emotion, but who retain their intellectual abilities, end up acting in socially aberrant ways.

Since the 1990s, building on the work of E.O. Wilson, father of sociobiology, a disparate band of researchers, from psychologists to zoologists, have been studying the origin and expression of moral emotions—our instinctive feelings of right and wrong. They say Homo sapiens did not invent morality; instead, we come equipped with it. Yes, we have to teach our children accepted rules of conduct and proper character. But Marc Hauser, a professor of psychology at Harvard, argues that they are readily able to learn because a moral template is already there, just as linguists believe children quickly pick up speech because they are born with intrinsic language-learning ability.

A paradox of human life is that the evolutionary forces that have made us cooperative and empathetic are the same ones that have made us prickly and explosive. Jonathan Haidt, a psychology professor at the University of Virginia, is a leading theorist in the field of moral psychology. He says the paired emotions of gratitude and vengeance helped us become the ultrasocial, ultrasuccessful species that we are. Gratitude allows us to expand our social network and recruit new allies; vengeance makes sure our new friends don't take advantage of us.

You could say our lives as social beings are ruled by the three R's: respect—the sense that proper deference has been paid to our status, reputation—the carefully maintained perception of our qualities, and reciprocity—the belief that our actions are responded to fairly. In other words, high school may be the most perfect recapitulation of the evolutionary pressures that shaped us as a species. Or politics. In a *Washington Post* article about John McCain's legendary temper, McCain acknowledged, "I've been known to forget occasionally the discretion expected of a person of my many years and station when I believe I've been *accorded a lack of respect I did not deserve*" (italics added).

For centuries, humans have believed that behaving morally required us to transcend our natures. According to 17th-century philosopher Thomas Hobbes, we are solitary savages; 18th-century philosopher Jean-Jacques Rousseau saw us as solitary nobles. They were both wrong, say the new theorists. If being solitary was our essential condition, writes Emory University primatologist Frans de Waal in *Primates and Philosophers*, then solitary confinement would not be the most extreme punishment available short of the death penalty. De Waal writes: "[D]escended from highly social ancestors—a long line of monkeys and apes—we have been group-living forever. Free and equal people never existed. Humans started out—if a starting point is discernible at all—as interdependent, bonded, and unequal."

Evolutionary biologist Dario Maestripieri calls the ability of macaque monkeys to monitor and maintain their social stature "Macachiavellian intelligence." Falling down in the social order can be deadly, he writes. The lowest macaques live on the edge of the group's territory, where they are bait for predators; they eat leftovers after the more powerful have had their fill; they have furtive sex when the dominants aren't looking. He argues it was the need to be ever vigilant to social nuance that was a driving force behind the leap in intelligence humans made.

It takes huge amounts of cognitive computing power just to keep track of who's doing what to whom and what that means to you. Back in the day, oh, 70,000 or so years ago, we couldn't just offload all this data processing to Facebook's algorithms. Around that time, some scholars think, the greatest advance in the ability to keep tabs on social standing happened: Humans acquired language.

Haidt writes in *The Happiness Hypothesis* about the theory that language allowed humans to replace grooming with gossip. "[O]nce people began gossiping, there was a runaway competition to master the arts of social manipulation, relationship aggression, and reputation management, all of which require yet more brain power." In other words, we may be less man-the-toolmaker, than man-the-offense-taker.

At a comedy club I was at once, a mild-looking woman stepped up to the mike and opened with "It's a good thing I don't own a gun, because I would shoot everybody." She got a laugh because everyone understood the desire to respond to daily insults—a rude store clerk, an aggressive driver, a disparaging co-worker—with extreme prejudice.

Paul Bloom writes in *Descartes' Baby* of the successful social animal, "It has to live in stable groups, and must be able to recognize distinct individuals, monitor those individuals' behavior, keep track of the cheaters, and adjust its own behaviors later on so as to punish them." This ability to judge how fairly others are behaving emerges well before humans master language. This study in *Nature* by Yale psychologists J. Kiley Hamlin, Karen Wynn, and Bloom found that groups of 6-month- and 10-month-old babies watching a film could not only distinguish between characters that either helped or hindered a wooden character that was stuck, but that virtually all the babies, when given the chance, reached for the helper, not the hinderer. (Watch a video here.)

Leda Cosmides and John Tooby, directors of the Center for Evolutionary Psychology at UC-Santa Barbara, have done experiments showing that when people play a game of logic—they are given a set of abstract rules and asked to select the correct cards based on the rules—most players can't figure it out. But when the rules are restated—they are told the game is about detecting violations of the legal drinking age, and the cards represent people at a bar—the majority of players can quickly solve the problem. Experiments such as this, writes neuropsychologist Michael Gazzaniga in *Human*, show that we have a finely developed ability to detect those who cheat in social exchanges.

Being on the alert for scoundrels is exhausting, and confronting those who violate social rules is potentially dangerous. But humans feel compelled to do it because without vigilance, fairness and cooperation break down. Gazzaniga cites experiments that show that individuals who take the risk of punishing cheaters enhance their own reputation within a group. (Here's a real-life example.)

Humans' sense of indignation is not just limited to violations against us. Even if you're able-bodied, think of how offended you feel when you see another able-bodied person pull into a handicapped parking spot. Most of us will just walk on, quietly irate, but a few will yell at the driver. These moral enforcers are vital to society. Frans de Waal writes that experiments with macaques show that if you remove the individuals who perform this policing function, hostilities increase among the entire band.

According to researchers, calibrating our responses to social interactions usually occurs below our conscious awareness. Yale psychologist John Bargh says getting on with life would be unmanageable if we didn't have a constantly running, under-the-surface sense of how to respond to situations. In his experiments, Bargh has shown that many of our social judgments and actions are automatic, and after the

fact our brains make up a justification. For example, he and colleagues flashed synonyms for rudeness or politeness at two groups of subjects at speeds faster than could be consciously registered. Later, the subjects were deliberately left to wait, ignored while the person who conducted the experiment engaged in a conversation. The people primed by the rude words interrupted at a rate more than three times that of the people primed for politeness.

We also are subject to a powerful need to mirror others. Bloom writes that this emerges on the first day of life—stick out your tongue at a newborn, and the infant is likely to stick its out in response. This imitative impulse lays the groundwork for empathy. But it also means that when someone confronts us with a nasty tone, we can end up mimicking it without even meaning to.

Across cultures, the traditional moral disciplinarian has been religion. Many of the researchers studying the origins of human moral emotions and behaviors say religion does not create morality; it is building on pre-existing patterns. University of Cambridge scientist Robert Hinde notes in *Why Gods Persist* that every human society has a code of conduct, and that code is usually "legitimated, purveyed, and stabilised by the religious system." Both Hinde and Haidt warn of the dangers of believing that new research on evolutionary morality means science has made religion obsolete. Haidt writes that natural selection must have "favored the success of individuals and groups that found ways (genetic or cultural or both) to use these gods to their advantage, for example as commitment devices that enhanced cooperation, trust, and mutual aid."

Most religions offer precepts that seek to dampen our touchy, selfish side. Confucius was asked, "Is there one word that can serve as a principle of conduct for life?" He replied, "It is the word 'shu'—reciprocity." Leviticus says, "Love your fellow as yourself." And in the Sermon on the Mount, Jesus spoke the Golden Rule: "So in everything do unto others what you would have them do to you." But a recurring source of offense is that while people can easily live with the fact that they fall short on "doing unto others," they often find it intolerable when others are not properly doing unto them.

Humans have superb abilities to evaluate the defects of everyone else. The glitch, Haidt says, is that we're blind to our own flaws. He points out that Jesus used this very metaphor when he said, "You hypocrite, first take the log out of your own eye, and then you will see clearly to take the speck out of your brother's eye." Haidt says we think that our perception of events is the objective truth, while everyone else's version is deluded by their self-interest.

It is at the intersection between the urge for cooperation and desire for self-interest that we experience so much internal turmoil and external conflict. Observing how others handle this balance has a great deal to do with how we judge their trustworthiness and their fitness. The presidential candidates present us with two stark leadership approaches: the cool, slow-to-anger reserve of Barack Obama; and the aggressive, man-of-honor style of John McCain. People instinctively weigh whether a leader who's laid back makes them worry that he won't stand up to enemies. And they consider that a hot-headed leader may be intimidating to foes, but that he also might create more of them.

Since the rest of us don't have a legion of advisers trying to help us calibrate our response to daily hostilities, is there a way for us to turn off the radar that's constantly scanning for offense? Not really. Being tuned in to the social clues around us is necessary. What we can work at is dialing down our response. Haidt advises that being aware of the forces that shaped and shape us can help us from letting them get the better of us.

"Once we're angry, irritated, we become prosecutors, and our reasoning gets hijacked by our need to build our own case," he says. So he suggests we can stop the prosecution by making even a small gesture of conciliation. We don't have to acknowledge we are wholly in the wrong, but changing our tone, conceding we shouldn't have said something, or said it in such a way, can trigger the reciprocity impulse in our opponent.

Some researchers recommend that when it comes to feeling offended, we could benefit from becoming a little bit Buddhist. Stephanie Preston, head of the University of Michigan's Ecological Neuroscience Lab, says: "The more attached you are to your sense of self, the more you see forces trying to attack that self. If you have a more Buddhist view, and are less attached to self, you are less likely to see offense."

Buddhist teacher Pema Chodron illustrates this in her book *Comfortable With Uncertainty*. She retells the parable of a man in a boat enjoying the serenity of the river at dusk. He sees another boat coming his way and is glad that someone else is sharing his pleasure. Then he realizes the other boat is heading toward him. He starts yelling to the boatman to turn aside, but the vessel just keeps coming faster and faster. "By this time he's standing up in his boat, screaming and shaking his fist, and then the boat smashes right into him. He sees that it's an empty boat. This is the classic story of our whole life situation. There are a lot of empty boats out there."

Emily Yoffe received research support for this article from a Templeton-Cambridge journalism fellowship in science and religion.

Emily Yoffe is the author of What the Dog Did: Tales From a Formerly Reluctant Dog Owner. *You can send your Human Guinea Pig suggestions or comments to* emilyyoffe@hotmail.com.

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American Dream a Biological Impossibility, Neuroscientist Says
By Brandon Keim ✉October 21, 2008 | 12:03:27 PMCategories: Behavior

What if people are biologically unsuited for the American dream?
The man posing that troubling question isn't just another lefty activist. It's Peter Whybrow, head of the Semel Institute for Neuroscience and Behavior at UCLA.
"We've been taught, especially in America, that happiness will be at the end of some sort of material road, where we have lots and lots of things that we want," said Whybrow, a 2008 PopTech Fellow and author of *American Mania: When More Is Not Enough*. "We've set up all sorts of tricks to delude ourselves into thinking that it's fine to get what you want immediately."
He paints a disturbing picture of 21st century American life, where behavioral tendencies produced by millions of years of scarcity-driven evolution don't fit the social and economic world we've constructed. Our built-in dopamine-reward system makes instant gratification highly desirable, and the future difficult to balance with the present. This worked fine on the savanna, said Whybrow, but not the suburbs: We gorge on fatty foods and use credit cards to buy luxuries we can't actually afford. And then, overworked, underslept and overdrawn, we find ourselves anxious and depressed.
That individual weakness is reflected at the social level, in markets that have outgrown their agrarian roots and no longer constrain our excesses — resulting in the current economic crisis, in which America's unpaid bills came due with shocking speed.
But with this crisis, said Whybrow, comes the opportunity to rethink how Americans live, as individuals and as a nation, and build a country that works.
"We're primed for doing things immediately. We're poor at planning for the future, unless we get into circumstances like these, where we're forced to think cleverly about what to do next," he said. "In a way, this financial meltdown is a healthy thing for us. We'll think intuitively again."
Foremost among Whybrow's targets is the modern culture of spending on credit. "The instinctive brain is well ahead of the intellectual brain. Credit cards promise us that you can have what you want now, and postpone payment until later," he said. Buying just feels good, in a biological sense — and that instant reward outweighs the threat of future bills.
Of course, many people use credit cards to pay bills and put food on the table, rather than buy flat-screen televisions and new computers. "That unfortunate reality," said Whybrow, "is produced by an out-of-control economic system" geared toward perpetual growth. That is no more natural a state for markets than a mall food court is natural for individuals whose metabolic heredity treats fats and sugars as rarities.
"Once upon a time, this economic system worked. But for the invisible hand of the free market to function, it needed to be balanced. And that balance is gone," he said.

Markets were once agrarian institutions, said Whybrow, which balanced the gratification of individuals with the constraints of small communities, where people looked their trade partners in the eye, and transactions were bounded by time and geography. With those constraints removed, markets have engaged in the buy-now, pay-later habits of college kids who don't read the fine print on their credit card bills.

"You can think about markets in the same way as individuals who mortgaged their future — except markets did it with other people's money," he said. "You end up with a Ponzi scheme predicated on the idea that we can get something now, rather than having to wait. And it all comes back to the same instinctual drive."

And now that the fundamental excesses of our economy have been so painfully exposed, with trillions of dollars vanishing from the American economy in just a few days, we have to think about changing both the economy and ourselves.

The answers aren't easy, Whybrow cautioned — but they do exist. People can think creatively about jumping from the treadmills of bad jobs and unmeetable needs; and even if this isn't always possible, they can teach their children to live modestly and within their means. Urban engineers can design cities that allow people to live and work and shop in the same place. Governments can, at the insistence of their citizens, provide the social safety nets on which social mobility, stagnant for the last 50 years, is based. And we can — however much it hurts — look to Europe for advice.

"America has always believed that it was the perfect society. When you have that mythology driving your culture, it's hard to look around and say, 'Is someone else doing it better than us?'" said Whybrow. "But you can trace the situation we're in to our evolutionary origins. Now that we find ourselves in the middle of this pseudo-abundance, we're in trouble. And the fantasy that we can restart the American dream just isn't true."

http://blog.wired.com:80/wiredscience/2008/10/american-dream.html

Alternative Measure of Success

By Scott Jaschik

Get any group of college presidents, assessment experts or education researchers together, and it's not hard to get a consensus that the federal graduation rate is seriously if not fatally flawed.

According to the U.S. government, graduation rates are measured by the proportion of students who earn a degree within 150 percent of the expected time — six years for a bachelor's degree and three years for an associate degree. The formula counts only one group of students: first-time, full-time students. Not surprisingly, elite, residential colleges that serve well-prepared students do amazingly well by this methodology, routinely having rates in the 90s. But for many other colleges, the graduation rate is both irrelevant (they may have very few first-time, full-time students) and infuriating (the institution that takes full-time, first-time students that other institutions pass over may well be working harder and more effectively, but looks lousy by comparison to the wealthy institution that serves the wealthy.)

Much of the complaining comes from those institutions that believe the federal rate suggests that they aren't doing well when they are. But some experts say that the real problem with the rate is the educational problems it potentially ignores. At a time when more and more students are part time, enroll in multiple institutions, and drop in and out of colleges all the time, no data effectively measure how institutions are doing with this cohort.

While such complaints are widespread, and a few institutions periodically suggest alternative measures, few of those who complain have committed to putting forth their own measure of accountability — and using it.

The University of Alaska at Anchorage has just done that, and in the interest of getting critiques and inspiring others to develop their own new measures, the university wants to share its approach. Unlike most four-year institutions, Anchorage awards a range of associate degrees in addition to bachelor's and graduate degrees, so its efforts were designed with two- and four-year students in mind. It will continue to report its federal graduation rate, but for efforts to track its own performance, it is now using its alternative rate as well.

The Anchorage rate differs on just about everything from the federal rate: what counts as success, who is counted, and for how long.

If you want to understand why the federal rate is so irrelevant, according to Gary Rice, director of institutional planning, research and assessment at Anchorage, consider this statistic: Anchorage's low federal rate (about 18 percent) is based on cohorts that represent only 3-5 percent of each year's new students. Like many public colleges (and plenty of private ones), Anchorage's students simply don't fit the old-fashioned federal measure.

With the federal rate, "we're looking at one tree instead of a forest," said Rice.

So how to figure out a new system? Rice started off by seeing how long it takes Anchorage students to either succeed or fail at their educational goals. He determined that in a 10-year period, 95 percent of students have either had success (as they define it) or not. So the first decision was to use 10 years as a measure, not 6.

The next decision, Rice said, is to add back in everyone the federal rate excludes. Transfer students? Count 'em. Part timers? Count 'em. The cohort to be tracked over 10 years is everyone who has enrolled, not just those who fit the federal definition.

But perhaps the stickiest question is what to count as success. Here Anchorage has decided to track each new student on five questions:

> Are you back the next year?
>
> Did you transfer?

Did you graduate with a degree?

Did you graduate with an interim degree (short of your eventual goal)?

Are you achieving grades that qualify as a success to stay on track to earning a degree?

The approach, Rice said, reflects the many reasons students enroll at an institution like Anchorage. For students who enroll with the purpose of earning a bachelor's degree, that's a measure of success. But a student who comes for that purpose and earns an associate degree has also been helped. And a student who enrolls with the goal of transferring and does transfer is also helped — "and should be considered a success," he said.

By also tracking what students' goals are when they enroll, the Anchorage system comes up with two primary measures: 34 percent of those admitted in the last 10-year cohort measure met their educational degree goal, and an additional 50 percent "made progress" toward a goal.

Whether those are good figures is debatable, and Rice said that the Anchorage system could benefit from having other institutions — especially those serving similar student bodies — ask similar questions and run similar analyses of their data. He also acknowledged that other institutions or education researchers could differ on some of the measures — such as the use of 10 years for the time frame, or some of what counts as success. (And Rice said he would be happy to consider other measures that different colleges put forward.)

But by creating a new system, Rice said, the university can now use the rates in meaningful ways. It may, for example, now look at various subgroups — do part timers who want bachelor's degrees succeed? Do students who have enrolled elsewhere first have more or less success than other students? Do new students who hope to transfer actually do so? Only by building data around assumptions that fit their students can colleges hope to ask such questions and to identify weaknesses where new approaches may be needed, he said.

Institutions like Anchorage have duties to all of those cohorts, he added, and so should be measured on them.

"Any single metric can't recognize what we are charged with doing as an institution within society," Rice said. "We're not afraid of being held accountable, but we need to get on the national agenda the idea of creating new metrics."

Until there is one, Anchorage will attempt to use its metric to focus attention where needed, he said.

Randy L. Swing, executive director of the Association for Institutional Research, said his organization has been briefed on the Anchorage approach and he hopes it extends the national discussion about measuring success. Swing said that he thinks some institutions with more traditional student bodies and educational goals might think Alaska has gone too far in broadening the measures of success. He also warned that getting this discussion going may not be comfortable for everyone. He noted that for some institutions, alternative approaches may expose very low graduation rates or success rates.

But he said that what Anchorage is doing advances a cause on which there is broad agreement: "Everyone knows the current definition doesn't fit higher education."

The original story and user comments can be viewed online at
http://insidehighered.com/news/2008/10/22/alaska.

Cross-protective Vaccine May Treat Broad Spectrum Of Bacterial Diseases

Scientists Douglas Heithoff, left, and Michael Mahan with their new vaccine in a UCSB laboratory. (Credit: Image courtesy of University of California - Santa Barbara)

ScienceDaily (Oct. 23, 2008) — Doctors have always hoped that scientists might one day create a vaccination that would treat a broad spectrum of maladies. They could only imagine that there might be one vaccine that would protect against, say, 2,500 strains of Salmonella. And what if that same vaccine could help protect the elderly?

UCSB scientists Douglas Heithoff and Michael Mahan — along with University of Utah scientists Elena Enioutina, Diana Bareyan, and Raymond Daynes — believe their recent research suggests that might be possible in the not-too-distant future. In a paper to be published in the November edition of the journal Infection and Immunity, the researchers detail the path to creating a vaccine that confers protection against multiple strains of bacteria.

"Vaccines are great," Mahan said in an interview. "Second to water sanitation, they are the best medical invention of mankind." The problem with conventional vaccines is that they only protect against a limited number of closely related strains. "That is why flu vaccines need to be administered every year because different flu strains arise every year," Mahan said. This is what prompted the researchers to begin their quest for a more powerful vaccine that conferred protection against many strains.

The team focused on developing a vaccine against Salmonella, which causes food and blood poisoning — with over 1.5 million cases in the United States each year. "It's endemic worldwide," Mahan said. "It's not a carnivore issue — it's everybody's issue since fruits and vegetables are often the source of infection."

By disarming a "genetic switch," the research team has developed a vaccine that protects against many strains of Salmonella. The new vaccine stimulates the production of antibodies and immune cells that work together to kill bacteria. Also, the vaccine does not induce a specific class of inhibitory immune cells that are known to contribute to immune declines in cancer patients¬. This lack of "immune suppression" is an advantage of the new vaccine over conventional vaccines.

The researchers also showed a link between the immune declines observed in cancer patients and those occurring as part of the normal aging process. "This may explain why the elderly are more susceptible to infection and why they are more difficult to effectively vaccinate," Mahan said. "Protocols that remove these inhibitory cells may boost vaccine effectiveness in the elderly."

The impact on human health may come in the near term. The new vaccine is currently being tested in livestock — the main source of human infection. "The immunization of livestock can help human health by promoting food safety," Heithoff said. "Of course, the three principal issues for vaccines will always be safety-safety-safety — and we've put a lot of effort into it."

Funding for this research came from the National Institutes of Health, the United States Department of Agriculture, and the Mathers Research Foundation.

Adapted from materials provided by University of California - Santa Barbara.

http://www.sciencedaily.com:80/releases/2008/10/081021185055.htm

Chronic Inflammation Can Help Nurture Skin Cancer, Study Shows

ScienceDaily (Oct. 23, 2008) — Inflammation, a frontline defense against infection or disease, can help nurture skin cancer, researchers have found.IDO, an enzyme that works like a firefighter to keep inflammation under control, can be commandeered to protect early malignant cells, say Medical College of Georgia researchers studying an animal model of chronic inflammation and skin cancer.

"Inflammation should really help prevent a tumor," says Dr. Andrew Mellor, director of the MCG Immunotherapy Center and Georgia Research Alliance Eminent Scholar in Molecular Immunogenetics. In fact, there is strong evidence that inflammation triggers the immune response. "You want a good immune response; this is what protects you from pathogens," he says. "In this case, it's an unfortunate exploitation by malignant cells."In a study with Drs. George C. Prendergast and Alexander J. Muller at the Lankenau Institute of Medical Research in Philadelphia, researchers gave mice a single dose of a carcinogen at the same time they began painting a tiny portion of skin with a poison ivy derivative twice weekly for 20 weeks.

IDO quickly became part of the mix, creating a "suppressive" immune response that helped resulting precancerous cells grow into tumors, according to research published online in Proceedings of the National Academy of Sciences. When they used the same protocol in a mouse in which IDO had been genetically deleted, tumor development dropped off dramatically.The scenario is analogous to chronic sun exposure and skin cancer, says Dr. Mellor, the study's corresponding author. Ultraviolet radiation in sunlight causes malignant skin cells to appear but sun exposure also causes skin inflammation - evidenced by sunburn. The significance of the new study is that the researchers have shown that IDO, or indoleomine 2,3-dioxygenase, may be produced as a part of the inflammatory mix, which could then protect the malignant skin cells. "'Chronic' is the key word," Dr. Mellor says, noting high melanoma rates in Australians, for example, who live deep in the southern hemisphere.

"We have long suspected that IDO is a component of certain kinds of inflammation that create suppression," says Dr. Mellor. IDO's "firefighter" role probably resulted from the body's need to control inflammation in areas such as the gastrointestinal tract. The GI tract is constantly bombarded by food and microbes which could lead to debilitating and deadly inflammation."You really set a fire," Dr. Mellor says of inflammation. In fact, the English word inflammation comes from the Latin word inflamatio, which means to set a fire. But instead of helping protect healthy tissue as it does in the GI tract, IDO becomes problematic in cancer.

The latest finding shows IDO has a more important and earlier role than we thought in tumor formation, says Dr. Mellor. He and colleague Dr. David Munn led a research team that 10 years ago showed fetuses use IDO to avoid rejection by the mother's immune system. They and others have subsequently shown that tumors, including melanoma, as well as infectious agents such as HIV also use IDO to escape an immune attack. "IDO favors the tumor: The immune system basically sits back and watches the tumor grow," says Dr. Mellor.Transplant patients, who require generalized immune inhibitors to keep their transplanted organs, also can be victims of this suppressive inflammation, says Dr. Mellor, noting their high risk of lymphoma after a few years of therapy.

The IDO inhibitor they have been using for years in the lab is now under study in breast cancer patients receiving chemotherapy. Drs. Mellor and Munn also have recruited Dr. Yukai He, cancer vaccine researcher, to MCG to work with them on how vaccines designed to direct an immune attack can work synergistically with the IDO inhibitor.

Adapted from materials provided by Medical College of Georgia.

http://www.sciencedaily.com/releases/2008/10/081021120916.htm

Ecosystem-level Consequences Of Frog Extinctions

Frogs afflicted by the chytrid fungus, such as this brilliant forest frog, often have discolored skin that sloughs off easily. They can become sluggish and drag their back legs behind them. (Credit: Scott Connelly/UGA)

ScienceDaily (Oct. 23, 2008) — Streams that once sang with the croaks, chirps and ribbits of dozens of frog species have gone silent. They're victims of a fungus that's decimating amphibian populations worldwide.

Such catastrophic declines have been documented for more than a decade, but until recently scientists knew little about how the loss of frogs alters the larger ecosystem. A University of Georgia study that is the first to comprehensively examine an ecosystem before and after an amphibian population decline has found that tadpoles play a key role keeping the algae at the base of the food chain productive.

"Many things that live in the stream depend on algae as a base food resource," said lead author Scott Connelly, a doctoral student who will graduate in December from the UGA Odum School of Ecology. "And we found that the system was more productive when the tadpoles were there."

The results, which appear in the early online edition of the journal Ecosystems, demonstrate how the grazing activities of tadpoles help keep a stream healthy. The researchers found that while the amount of algae in the stream was more than 250 percent greater after the amphibian population decline, the algae were less productive at turning sunlight and nutrients into food for other members of the ecosystem. Without tadpoles swimming along the streambed and stirring up the bottom, the amount of sediment in the stream increased by nearly 150 percent, blocking out sunlight that algae need to grow.

The study is part of a larger effort known as the Tropical Amphibian Declines in Streams (TADS) project, which also involves researchers from Southern Illinois University, Drexel University and the University of Alabama. The project is now in its third round of funding by the National Science Foundation and was initiated by Catherine Pringle (UGA Odum School of Ecology) and Karen Lips (Southern Illinois University) in 2000 through a Small Grant for Exploratory Research (SGER) from the NSF. Connelly and Pringle are monitoring in-stream effects of the population decline on algae, while other team members are

studying how the loss of frogs impacts other organisms and the transfer of energy between streams and the terrestrial communities that surround them. Preliminary data show that the number of snakes that feed on frogs, for example, has plummeted after the population decline.

"We were there before, during and after the extinction event and were able to look at the ecosystem and measure how it changed," said Pringle, Distinguished Research Professor in the Odum School and study co-author. "Very rarely have scientists been able to do that with respect to any organism."

The chytrid fungus responsible for declines has steadily marched southeast across Costa Rica and through much of Panama like a storm front, killing up to 90 percent of frogs in afflicted streams. In 2003, the team set up research sites on two streams in the pristine and lush highlands of Panama. One study site had already suffered a catastrophic amphibian decline, while the other had a healthy population but, based on its location, was directly in the path of the fungal disease.

In the first stage of their research, Connelly and Pringle assessed ecosystem changes that occur when tadpoles are experimentally excluded from small areas of both the healthy stream and the frogless stream. They found that the absence of the tadpoles resulted in more sediment and less productive algae.

In late 2004, frogs in the formerly healthy stream began dying. The team reassessed the stream and found that impact of the frog die-off was even greater than they had predicted in their exclusion studies. "We predicted the direction of the change," Pringle said, "but underestimated its magnitude."

The UGA research team is continuing to monitor the health of the streams to get valuable, long-term data. So far the stream has not rebounded. "It's still sad going back," Connelly said, to which Pringle added: "Once the frogs die, it's like an incredible silence descends over the whole area. It's eerie."

To date, scientists have not found a way to stop the spread of the fungus in the wild. Broadly applying a fungicide to an entire watershed, Connelly said, would kill beneficial fungi that are necessary for a healthy ecosystem.

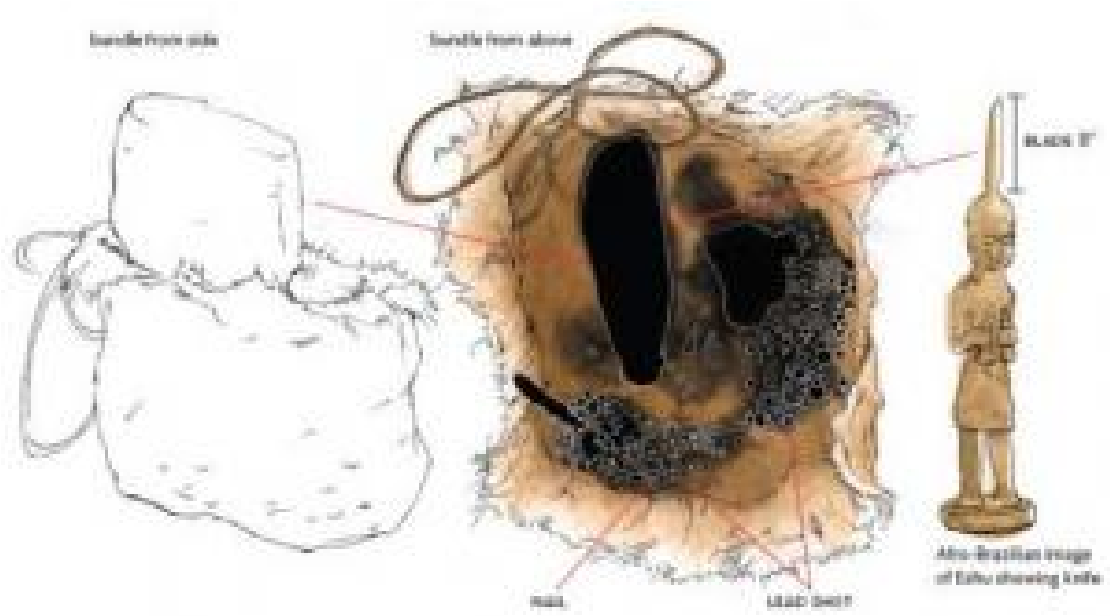
But scientists can cure individual frogs in captivity by simply swabbing them with a fungicide. Connelly has worked to protect frogs through Amphibian Ark, a global effort supported by zoos, botanical gardens, aquariums and research institutions that aims to ensure the survival of amphibians by collecting and breeding them. The Atlanta Botanical Garden is one of the key breeding sites.

"The one speck of hope is that if we're able to collect some of these rare animals, we can cure them," Connelly said. "As long as we have the money to keep a breeding program going, in the future it might be possible to reintroduce them into the wild."

Adapted from materials provided by University of Georgia.

http://www.sciencedaily.com/releases/2008/10/081016124252.htm

Archaeologists Find Unique, Early US Relic Of African Worship



How the African bundle might have looked 300 years ago. (Credit: Brian Payne, University of Maryland)

ScienceDaily (Oct. 23, 2008) — University of Maryland archaeologists have dug up what they believe to be one of the earliest U.S. examples of African spirit practices. The researchers say it's the only object of its kind ever found by archaeologists in North America - a clay "bundle" filled with small pieces of common metal, placed in what had been an Annapolis street gutter three centuries ago.

The bundle appears to be a direct transplant of African religion, distinct from hoodoo and other later practices blending African and European traditions.

"This is a remarkably early piece, far different from anything I've seen before in North America," says University of Maryland anthropologist Mark Leone, who directs the Archaeology in Annapolis project. "The bundle is African in design, not African-American. The people who made this used local materials. But their knowledge of charms and the spirit world probably came with them directly from Africa."

About the size of a football, the compacted clay and sand bundle originally sat in clear public view stationed in front of a house. X-rays show the object served as a container holding hundreds of pieces of lead shot, pins and nails intended to ward off or redirect spirits. A prehistoric stone axe extends upward from the top of the bundle.

Leone dates the object to about 1700, plus or minus 20 years, from a period when English beliefs in witchcraft could mingle more openly with the African.

"We're particularly intrigued by the placement of this bundle in so visible a spot, because it suggests an unexpected level of public toleration," says Maryland's Leone. "All the previous caches of African spirit practices we've found in Annapolis were at least fifty years younger. These had been hidden away and used in secret. But in this earlier generation, the Annapolis newspaper was filled with references to English magic and witchcraft, so both European and African spirit practices may have been more acceptable then. That changed with the growing influence of the Enlightenment."

After consulting with experts on West and Central-West African culture, Leone says the bundle might have origins in Liberia, Sierra Leone or Guinea among Yoruba or Mande speakers. It may have been fashioned in the image of a god and energized through its construction to invoke and disseminate spiritual power.

Clay Bundle

The Maryland team discovered the bundle four feet below Fleet Street in the Annapolis historic district - about 1,000 feet from the Maryland statehouse. It sat in the gutter of a much earlier unpaved street on a hill overlooking an inlet. Water would have run down the gutter, making it a vital conduit for spirits and a strategic spot to place a powerful charm, Leone says.

The bundle measures about 10 inches high, six inches wide and four inches thick. It remains intact, held together by the sand and clay. X-rays taken at the state of Maryland's conservation facility reveal the bundle's contents - about 300 pieces of lead shot, 25 common pins and a dozen nails. The blade of the stone axe points upward.

Originally, some kind of cloth or animal hide probably wound around the bundle forming a pouch that held the metal objects. But it has long since decomposed.

Interpretation

Leone immediately suspected that the object had African origins based on the materials and the construction, which differed from the hoodoo caches his teams have unearthed in Annapolis over the past two decades. To help identify the object, Leone consulted with Frederick Lamp, curator of African Art at the Yale University Art Gallery.

"The use of compacted clay and iron materials points to the African origin of this bundle," Lamp says. "Combining these materials was believed to increase the spiritual power of the objects."

Lamp adds that Mande groups, principally in Sierra Leone and Liberia, used packed clay as binders when building spiritual objects. If Yoruba in origin, the bundle would likely represent the image of Eshu Elegba, the god of chance, confusion and unpredictability, the god of the crossroads. The axe blade could replace the comb in other representations of the Eshu, and it is also indicative of the power of Shango, the god of thunder and the lightning bolt.

"We hope to open a scholarly debate," says Leone. "Further research may help pinpoint the bundle's cultural origins. Whoever made this understood that public invocations of magic were a source of social control," Leone says. "It radiates power. The construction was intended to amplify its influence over the spirit world."

English Magic

Before 1750, Annapolis' newspaper, The Maryland Gazette, frequently cited many-headed monsters, witchcraft trials in Europe, misshapen babies linked to magic, unaccounted appearances and disappearances and the world of pagan, non-Christian belief, explains Leone.

"English witchcraft in this period existed openly in public and was tolerated," he adds. "It's intriguing to speculate how English and African spirit beliefs may have interacted and borrowed from each other."

After 1750 though, the Gazette changed markedly. Leone says references to magic disappeared and the paper reflected the changing philosophy of the period.

Object of Display

Beginning October 21, the object is on display in the window of the Banneker-Douglass Museum, the state of Maryland's Center for African-American History and Culture.

The Annapolis Department of Public Works contracted for the archaeological excavation along Fleet and Cornhill streets in the city's historic district in advance of a project to lay underground utility cables. The area was part of early Annapolis' waterfront.

"We've been committed for a long time to uncovering our state capital's history, and yet the old never gets old, never ceases to astound me," says Annapolis Mayor, Ellen Moyer. "This latest discovery underscores just how deeply the city's European and African roots are intertwined."

Adapted from materials provided by University of Maryland.

http://www.sciencedaily.com/releases/2008/10/081021120755.htm

Biomarkers For Identifying Infant Infections

Premature infants are particularly susceptible to infections, owing to their underdeveloped physiology and requirement of numerous medical interventions. (Credit: Stephen Kingsmore, NCGR)

ScienceDaily (Oct. 23, 2008) — Infection is the leading cause of infant deaths worldwide, and particularly a common killer of weaker, pre-term infants. Current diagnostic tests can be slow and non-specific, but researchers have now identified potential biomarkers in the blood that can rapidly identify both the onset of infection and type of microbe.

The circulatory system is a major hotbed of immune system activity, so Stephen Kingsmore and colleagues analyzed plasma samples from 107 infected and non-infected premature infants to try and identify proteins that could reliably identify an infected state.

Their analysis revealed eight proteins, associated with immune responses like inflammation and blood coagulation, which were consistently over-expressed in infected neonates. In addition, the relative levels of these serum proteins could provide insight into the type of infection (for example, the inflammatory proteins IL-6 and IL-8 were 1000-fold higher in streptococcus infections compared to other types).

Kingsmore and colleagues do note that these biomarkers are not completely accurate and thus not ready for any routine use, but with additional studies using larger numbers on infants and different types of analysis (some of which are already underway), a reliable set of infection biomarkers may soon become available.

Journal reference:

1. Kingsmore et al. **Identification of Diagnostic Biomarkers for Infection in Premature Neonates**. *Molecular & Cellular Proteomics*, 2008; 7 (10): 1863 DOI: 10.1074/mcp.M800175-MCP200

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

http://www.sciencedaily.com/releases/2008/10/081014134108.htm

Cracking The Case Of Recycled Gadgets

ScienceDaily (Oct. 23, 2008) — Recycling devices built with plastic cases and other components, such as mobile phones, mp3 players, and personal digital assistants, is difficult and requires repetitive manual labour. However, a new approach to creating the fastenings and tabs for such devices based on the shape-memory effect in plastics could mean that disassembling such devices at end of life could be automated.

The approach would allow valuable components and metals to be recovered more efficiently from the millions of devices discarded every year, according to research to be published in the International Journal of Product Development.

Habib Hussein and David Harrison of the School of Engineering and Design at Brunel University, UK, explain that Europe's WEEE regulations, the Waste Electrical and Electronic Equipment directive, are aimed at tackling the growing stream of waste electrical and electronic goods in order to reduce landfill usage and waste that is incinerated. The regulations mean that there are now incentives to design equipment that is more recyclable.

"Product disassembly offers one method for reducing the landfill and enabling compliance with legislative targets by optimising the recovery of hazardous and valuable components during the recycling process. However, manual disassembly is a time-consuming and thus costly process, in terms of either financial or social impact," the researchers say.

They have now investigated the possibility of Active Disassembly using Smart Materials (ADSM). ADSM uses materials that can act as fasteners within a product, which at product end of life, can be undone simply by direct heating. This releases the fasteners causing the device case to fall apart without screws having to be undone or stiff clasps opened manually. This is one important design feature that might make recycling electronic devices with plastic cases much easier.

Their concept relies on the so-called shape memory effect in engineering plastics, or polymers. Plastics can be fabricated in one shape - the unfastened state - and then moulded a second time into a new shape - the fastened state. When the fastened state version is heated, the plastic will revert to its original, unfastened state, as it retains a molecular memory of the form in which it was originally produced.

The researchers have developed a case-fastening device based on one such shape memory polymer. Their tests demonstrated that lowering the device at end of life into hot water, leads to the fasteners reverting to their unfastened state and the case falling apart, on agitation. They have also shown that the fasteners retain their integrity for at least two years without disassembling spontaneously.

"Standard-engineering polymers may be used to produce reliable long-term shape memory effect fastening devices to enable the efficient end of life treatment of WEEE," the researchers conclude.

Adapted from materials provided by Inderscience, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081022222905.htm

Crossing Blood-Brain Barrier: Scientists Develop Drug Delivery System For Brain Cancers, Other Diseases

Less than five per cent of drugs (made up of very small molecules) are able to cross the barrier. But a new drug delivery system has now been developed that is capable of crossing the blood-brain barrier to reach and kill cancer cells in the brain. (Credit: iStockphoto/Vasiliy Yakobchuk)

ScienceDaily (Oct. 22, 2008) — Scientists have developed a new drug delivery system that is capable of crossing the blood-brain barrier to reach and kill cancer cells in the brain, according to research presented at the 20th EORTC-NCI-AACR [1] Symposium on Molecular Targets and Cancer Therapeutics in Geneva on 22 October.

Following successful preclinical studies, the technology is being evaluated in two phase I clinical trials in patients with malignant glioma and brain metastases.

The blood-brain barrier is formed by a network of closely sealed endothelial cells in the brain's capillaries, and it expresses a high level of proteins that pump foreign molecules away from the brain, while allowing others (such as glucose and insulin) that are necessary to the functioning of the brain cells to cross the barrier. This makes it very difficult for molecules, including anti-cancer drugs, to cross the blood-brain barrier and reach tumour cells in the brain.

Currently, less than five per cent of drugs (made up of very small molecules) are able to cross the barrier; one example is temozolomide, which is the only chemotherapy available for treating brain tumours such as glioblastoma multiforme and progressive anaplastic astrocytoma. These tumours have a poor prognosis and continue to grow, even after treatment with temozolomide. Therefore, new therapies for these hard-to-treat brain tumours are needed urgently.

In four related presentations to the symposium, scientists from Canada, the USA and France described how they are investigating a new drug delivery technology that provides a non-invasive and flexible way of transporting different drugs (for example, antibodies, proteins, peptides, siRNA, small molecules, etc.) across the blood-brain barrier and into the central nervous system.

The drug being evaluated in the four abstracts is called ANG1005. It is made up of one molecule of a peptide called Angiopep-2 joined together with three molecules of paclitaxel, a taxane chemotherapy drug.

Dr Reinhard Gabathuler, author of one of the abstracts and chief scientific officer at Angiochem Inc (Montreal, Canada) – the company that is developing the Angiopep technology and ANG1005 – explained: "Unlike invasive or pharmacological approaches to deliver drugs to the brain, the Angiopep technology utilises the physiological approach by making use of the receptors on the surface of the blood-brain barrier that are responsible for actively transporting necessary molecules across the barrier to the brain. The family of Angiopeps (including Angiopep-2) has been designed to interact with a specific receptor, Low Density Lipoprotein Receptor Related Protein-1 (LRP-1). This receptor has many functions, binds over 30 ligands [molecules] of various sizes, and is highly expressed at the blood-brain barrier."

In laboratory-based tests of ANG1005 on mice and rats, Dr Gabathuler, other scientists in the company and collaborators in the US and Canada found that the drug was transported rapidly across the blood-brain barrier and into the functional part of the brain, the parenchyma.

"In contrast to free paclitaxel, which is normally prevented from reaching the brain by the P-glycoprotein efflux pump, ANG1005 is efficiently transported across the blood-brain barrier, with approximately 100-fold higher transport rate compared to free paclitaxel and 10-fold higher transport rate than temozolomide," he said.

In addition, the drug resulted in a significant, 27% increase of survival of mice with glioblastoma tumours and a shrinking of glioblastoma tumours in rats.

A second study, led by Dr Francis Bichat, head of the scientific platform at Oncodesign (Dijon, France), evaluated the anti-cancer properties of the drug in cancer cell lines and mice, as well as investigating its toxicity and what happened to the drug in mice.

He found that ANG1005 had the same anti-cancer properties as did free paclitaxel (paclitaxel on its own) in cancer cell lines. Speaking before the conference, he said: "The anti-tumour activity of paclitaxel was maintained with ANG1005 compared with free paclitaxel. There was no loss of activity." He also found a significant inhibition of brain tumour growth in rats when they were treated with ANG1005, whereas tumours in rats that were treated with paclitaxel did not have their growth inhibited. "This is probably because free paclitaxel is not able to enter the brain," he said.

"The most interesting finding from this study is the potency of ANG1005 to bypass the blood-brain barrier and to allow paclitaxel into the brain where it shows anti-tumour activity," said Dr Bichat.

The success of these pre-clinical studies enabled Angiochem Inc to start two phase I clinical trials at cancer centres in the US: one in patients with advanced cancer and brain metastases, and the second in patients with recurrent malignant glioma.

These trials are still being conducted, but, as of 23 September 2008, 22 patients with advanced solid tumours (including breast cancer, melanoma, liver cancer and 15 patients with brain metastases) have been treated with ANG1005 in the first trial. The drug is given by intravenous infusion for one hour, every 21 days. At doses up to 500 mg/m2 the drug appears to be safe and well tolerated and no patient has discontinued due to adverse side-effects. The researchers are continuing to increase the dose.

Dr Jean-Paul Castaigne, president and chief executive officer of Angiochem Inc, who presented the clinical trials results, said: "To date, the safety and tolerability of ANG1005 has been excellent in patients with advanced solid tumours and brain metastases."

In the second trial in patients with recurrent malignant glioma, 12 patients had been treated by 23 September 2008 – eight with glioblastoma multiforme, one with anaplastic astrocytoma and three with anaplastic oligondendrocytoma.

Dr Castaigne said: "We have demonstrated that the drug is safe and tolerable up to and including doses of 75 mg/m2 and we are currently evaluating doses of 105 mg/m2. No patient has discontinued due to drug-related adverse side-effects. So far, all patients (with the exception of one) dosed up to 50 mg/m2 have had their disease progress following two cycles of treatment at six weeks. However, it should be noted that 50 mg/m2 of ANG1005 has an equivalent paclitaxel dose of only about 25 mg/m2, which is still quite low for appreciable cytotoxic effects."

He continued: "To date, treatment options for patients with recurrent malignant glioma are limited and prognosis is bleak because of the brain's highly evolved physiological structure. Results from both these trials show that Angiopep conjugates may provide a potentially safe and effective way to treat gliomas and other currently unmanageable diseases of the central nervous system. The Angiopep technology is well tolerated, since most of the side-effects observed to date with ANG1005 are caused by paclitaxel, the active drug component."

Both trials will be reporting their most important results by the end of 2008, and researchers are planning a continuation of the trial in patients with brain cancer in 2009.

Dr Castaigne said: "Angiochem's intention is to continue the early development of ANG1005 until proof-of-efficacy is obtained in either progressive malignant gliomas or brain metastases. We will seek to find a partner with significant oncology experience to carry forward the later development stages and marketing of ANG1005.

"Although other technologies have demonstrated abilities to cross the blood-brain barrier, we believe that the Angiopep technology is the furthest developed of the physiological approach and has significant advantages. ANG1005 is the company's first compound in clinical development using the Angiopep technology. We have been successful in conjugating other chemotherapeutics (e.g. doxorubicin and etoposide) to our technology; preclinical data have demonstrated success in delivering these compounds into the brain and retaining cytotoxic activities. Angiochem is also focusing considerable effort on the conjugation and delivery of other drug classes (including monoclonal antibodies, proteins, peptides, siRNA, etc.) to treat other CNS disorders."

[1] EORTC [European Organisation for Research and Treatment of Cancer, NCI [National Cancer Institute], AACR [American Association for Cancer Research].

Adapted from materials provided by ECCO-the European CanCer Organisation.

http://www.sciencedaily.com/releases/2008/10/081022073724.htm

Common Respiratory Syncytial Virus May Hide In The Lungs, Lead To Asthma, Researchers Report

Dr. Asuncion Mejias has shown that RSV may hide in the lungs even after other symptoms abate, ultimately resurfacing to cause recurrent wheezing and chronic airway disease. (Credit: Image courtesy of UT Southwestern Medical Center)

ScienceDaily (Oct. 22, 2008) — Conventional wisdom has been that respiratory syncytial virus (RSV) – a common virus that causes infection in the lungs – comes and goes in children without any long lasting impact.

A study conducted in mice by UT Southwestern Medical Center researchers, however, suggests that RSV may hide in the lungs even after other symptoms abate, ultimately resurfacing to cause recurrent wheezing and chronic airway disease.

"This research suggests that there's a potential new mechanism for asthma related to viral infections in children that could be associated with RSV," said Dr. Asuncion Mejias, assistant professor of pediatrics at UT Southwestern and senior author of a study available online and in the Nov. 15 issue of the Journal of Infectious Diseases. "These findings could aid in the development of preventive and therapeutic interventions for children with recurrent wheezing due to a virus such as RSV."

RSV is the leading cause of viral respiratory infections and hospitalizations in infants and children worldwide. Half of all babies develop an RSV infection within the first year of life and practically all have had at least one RSV infection by age 3, said Dr. Octavio Ramilo, professor of pediatrics at UT Southwestern and study co-author. About 3 percent to 10 percent of infants with RSV infections develop severe bronchitis and require hospitalization.

Most children recover within a week, but RSV can cause repeated infections throughout life. There is currently no vaccine available.

Dr. Ramilo said the team's findings contradict the current thinking that ribonucleic acid viruses like RSV are easily destroyed. "Whether RSV persists in children remains to be seen, but the fact that the virus persists in mice is amazingly powerful," he said.

The most striking finding, Dr. Mejias said, is that the amount of virus detected in the lungs of the mice directly correlates with the severity of airway hyperreactivity. Airway hyperreactivity, or episodes of bronchospasms in humans, is the main characteristic of asthma.

Doctors at UT Southwestern have previously shown that RSV infection could increase the risk of developing asthma. In 2004, researchers including Drs. Mejias and Ramilo monitored mice infected with RSV and found that infected mice were more likely to develop chronic lung disease than healthy mice. They also found that infected mice treated with an anti-RSV antibody had less virus in the lungs and not only showed improvement during the acute disease, but also developed significantly less airway hyperreactivity and lung inflammation during the chronic phase of the disease.

"If you use an antibody against RSV, you not only prevent acute disease from the infection but you can also prevent the development of the asthma phenotype, indicating that early interventions against the virus can have a long-term benefit," Dr. Mejias said.

To determine whether RSV persisted in the lungs, UT Southwestern researchers infected mice with live RSV, ultraviolet-light-treated RSV or heat-inactivated RSV. They then monitored the mice for 42 days, checking their pulmonary function and respiratory rate at set intervals. At the end of the study, the researchers found evidence of the virus in every mouse infected with live RSV, but not in the other groups.

While studies of adults with chronic obstructive pulmonary disease have suggested that RSV may persist, this is the first study to test the hypothesis in this animal model of RSV-induced asthma. The persistence of the virus in children has not been extensively researched, Dr. Ramilo said.

Dr. Mejias said the next step is to determine whether RSV persists in children.

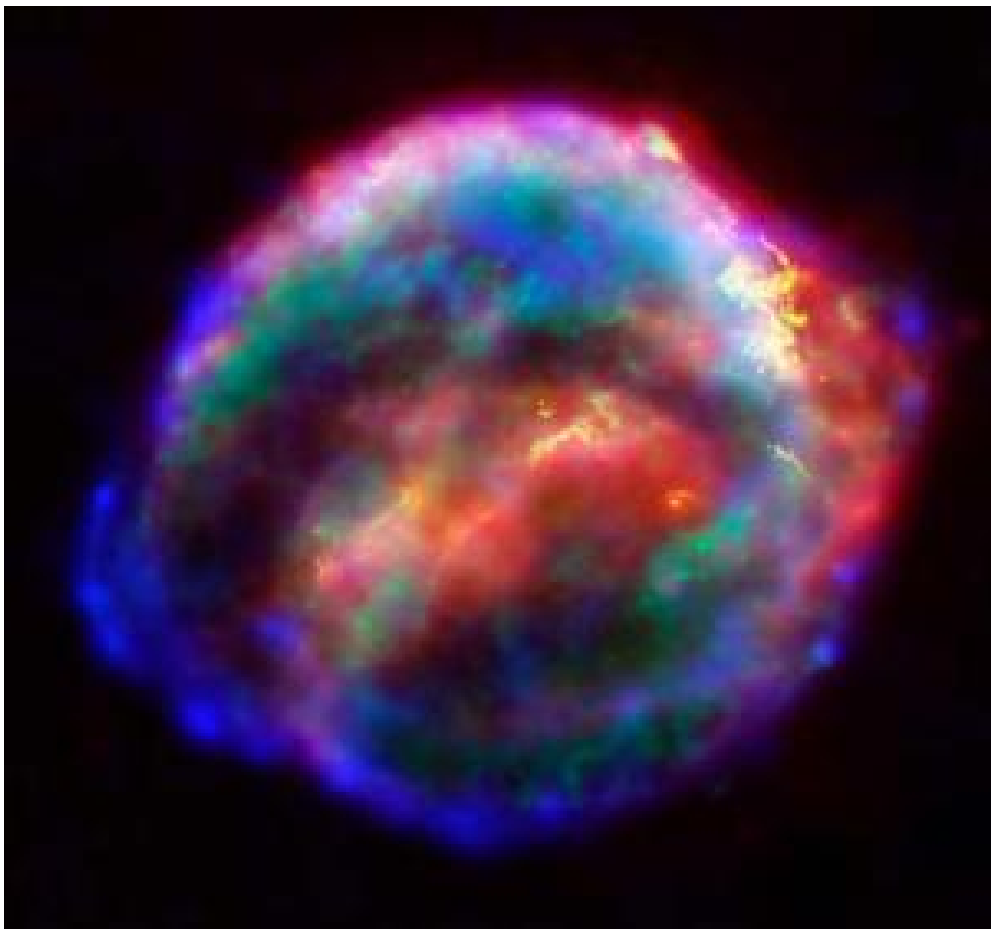
"We are currently doing a study in which we are treating kids with a new antibody that is very potent," she said. "The plan is to follow them for a year to see if aggressive treatment against the virus can prevent wheezing."

The National Institutes of Health, the American Lung Association and the RGK Foundation supported this work.

Adapted from materials provided by UT Southwestern Medical Center.

http://www.sciencedaily.com/releases/2008/10/081021120914.htm

Throwing Light On The Dark Side Of The Universe



Kepler's supernova remnant. (Credit: NASA, ESA, R. Sankrit, W. Blair (Johns Hopkins University))

ScienceDaily (Oct. 22, 2008) — Although we may believe humans know a lot about the Universe, there are still a lot of phenomena to be explained. A team of cosmologists from the University of the Basque Country are searching for the model that best explains the evolution of the Universe.

We usually have an image of scientists who study the Universe doing so peering through a telescope. And, effectively, this is what astrophysicists do: gather data about the observable phenomena of the Universe. However, in order to interpret this data, i.e. to explain the majority of the phenomena occurring in the Universe, complicated calculations with a computer are required and which have to be based on appropriate mathematical models. This is what the Gravitation and Cosmology research team at the University of the Basque Country (UPV/EHU) is involved in: analysing models capable of explaining the evolution of the Universe.

Supernovas, witnesses to acceleration

One of the phenomena that standard models of physics have not yet been able to explain is that of the accelerated expansion of the Universe. Although Einstein proposed a static model to describe the Cosmos, today it is well known, thanks to supernovas amongst other things, that it is, in fact, expanding. Supernovas are very brilliant stellar explosions that, precisely due to this, provide useful data for exploring very distant regions of the Universe. By measuring the quantity of light that gets to us from a

supernova, we can calculate its distance from us, and its colour indicates the speed at which it is distancing itself from us – the more reddish it is, the faster it is travelling.

In other words, comparing two supernovas, the one that is distancing itself more slowly from us is a more bluish colour. According to observations by astrophysiscists, besides supernovas distancing themselves from us, they are doing so more and more rapidly, i.e. distancing themselves at an accelerated velocity, just like the rest of the material of the Universe.

Looking for dark energy

The energy known to exist in the Universe, however, is not sufficient to cause such acceleration. Thus, the theory most widely accepted within the scientific community is that there exists a 'dark energy', i.e. an energy that we cannot detect except by the gravitational force that it produces. In fact, it is believed that 73% of the energy of the Universe is dark. The dark energy debate is not just any theory: its existence has not been proved but, without it, standard models of physics would not be able to explain many of the phenomena occurring in the Universe.

So, what is dark energy exactly? What are its characteristics and have these properties always been the same or have they changed over time? These are questions, amongst others, that researchers at the Faculty of Science and Technology at the UPV/EHU, under the direction of Dr. Alexander Feinstein, are seeking to answer.

The unique characteristic of dark energy known to us is that it possesses repulsive gravitational force. That is, unlike the gravity we know on Earth, this force tends to distance stars, galaxies and the rest of the structures of the Universe from each other. This would explain why the expansion of the Universe is not constant, but accelerated. Nevertheless, this phenomenon can only be detected when achieving observationally enormous, almost unimaginable distances. This is why it is so difficult to understand the nature of dark energy.

The theory of phantom energy

To what point can the Universe expand? If this repulsive force is ever more intense, might it be infinite? This is one of the problems that the UPV/EHU researchers are focusing on. Such powerful dark energy is known as phantom energy, with which the Universe is able to expand to such an extent that the structures we know today would disappear.

This research group considers that the phantom energy model may be the most suitable to explain the accelerated expansion of the Universe. Amongst other things, the team has come to this conclusion after analysing the distribution of galaxies and the background microwave radiation which has inundated all of the Cosmos since shortly after the Big Bang. These waves travel in every direction and enable the exploration of what occurred at tremendously remote instants in time, moments close to the start of it all.

Adapted from materials provided by Basque Research.

http://www.sciencedaily.com/releases/2008/10/081021094208.htm

U.S. Suicide Rate Increasing; Largest Increase Seen In Middle-aged White Women

ScienceDaily (Oct. 22, 2008) — The rate of suicide in the United States is increasing for the first time in a decade, according to a new report from the Johns Hopkins Bloomberg School of Public Health's Center for Injury Research and Policy.

The increase in the overall suicide rate between 1999 and 2005 was due primarily to an increase in suicides among whites aged 40-64, with white middle-aged women experiencing the largest annual increase. Whereas the overall suicide rate rose 0.7 percent during this time period, the rate among middle-aged white men rose 2.7 percent annually and 3.9 percent among middle-aged women.

By contrast, suicide in blacks decreased significantly over the study's time period, and remained stable among Asian and Native Americans.

The results are published online at the website of the American Journal of Preventive Medicine and will be published in the December print edition of the journal.

The researchers also conducted a detailed analysis of suicide methods across specific population groups. While firearms remain the predominant method, the rate of firearm suicides decreased during the study period. Suicide by hanging or suffocation increased markedly with a 6.3 percent annual increase among men, and a 2.3 percent annual increase among women. Hanging/suffocation accounted for 22 percent of all suicides by 2005, surpassing poisoning at 18 percent.

"The results underscore a change in the epidemiology of suicide, with middle-aged whites emerging as a new high-risk group," said study co-author Susan P. Baker, MPH, a professor with the Bloomberg School's Center for Injury Research and Policy. "Historically, suicide prevention programs have focused on groups considered to be at highest risk—teens and young adults of both genders as well as elderly white men. This research tells us we need to refocus our resources to develop prevention programs for men and women in their middle years."

Baker along with colleagues Guoqing Hu, PhD, Holly Wilcox, PhD, Lawrence Wissow, MD, MPH, analyzed data from the Web-based Injury Statistics Query and Reporting System (WISQARS) mortality reports, which provides data on deaths according to cause and intent of injury by age, race, gender and state. WISQARS mortality data are based on annual data files of the National Center for Health Statistics (NCHS) of the Centers for Disease Control and Prevention (CDC).

The reasons for the increase in the suicide rate are not fully understood. "While it would be straightforward to attribute the results to a rise in so-called mid-life crises, recent studies find that middle age is mostly a time of relative security and emotional wellbeing," said Baker. "Further research is warranted to explore societal changes that may be disproportionably affecting the middle-aged in this country."

The research was funded by the Center for Injury Research and Policy.

Adapted from materials provided by Johns Hopkins University Bloomberg School of Public Health.

http://www.sciencedaily.com/releases/2008/10/081021093938.htm

Ancient Bone Tool Sheds Light On Prehistoric Midwest

This awl, fashioned from a piece of deer bone, has been radiocarbon dated to 10,400 BP, making it the oldest organic implement yet documented in Indiana. It was discovered by University of Indianapolis students in 2003. (Credit: University of Indianapolis)

ScienceDaily (Oct. 22, 2008) — A prehistoric bone tool discovered by University of Indianapolis archeologists is the oldest such artifact ever documented in Indiana, the researchers say.

Radiocarbon dating shows that the tool – an awl fashioned from the leg bone of a white tail deer, with one end ground to a point – is 10,400 years old.

The find supports the growing notion that, in the wake of the most recent Ice Age, the first Hoosiers migrated northward earlier than previously thought. Sites from the Paleoindian and Early Archaic eras are more common in surrounding states such as Illinois and Ohio, which were not as heavily glaciated as Indiana.

“Indiana has been such a void,” said Associate Professor Christopher Schmidt, director of UIndy’s Indiana Prehistory Laboratory and president of the Indiana Archeology Council. “This bodes well for the future.”

The tool was found in 2003 in northwestern Indiana’s Carroll County by students participating in the university’s annual summer archeology field school. Schmidt has directed ongoing excavations since 2002 at the site near the small town of Flora, where a glacial lake attracted mastodon, giant beaver and smaller wildlife for thousands of years.

Stone tools thought to be from the same era have been found in Indiana, but because they are not made from organic materials, their age cannot determined precisely, only inferred from surrounding materials and comparison with similar artifacts. Tools made from biodegradable materials, such as bone, rarely survive intact from such ancient times.

Scratches and notches on the 5-inch bone awl indicate it probably was used in conjunction with a stone knife to punch holes in leather, perhaps for clothing. The nature of the activity suggests that the lifestyle of its users was more settled than nomadic.

“This tells us they’re pretty well established in northern Indiana,” Schmidt says. “This isn’t just people passing through. This is people settling down, making homes.”

The tool has undergone further analysis by Christopher Moore, who was among the UIndy students who found the tool and is now a graduate student at the University of Kentucky.

Moore and Schmidt describe the bone tool in the context of similar artifacts from around the country in an article titled “Paleoindian and Early Archaic Organic Technologies: A Review and Analysis,” to be published in an upcoming edition of North American Archaeologist.

The people who lived in Indiana 10,000 years ago are not well known, Schmidt says. No burials of this age have been found, and only a few sites this old have been documented.

“That’s what makes this site so interesting,” Schmidt says. “It gives us a glimpse into life not long after the glaciers had receded. It shows us a lake that was rich with life, some of which would soon go extinct, some of which is still with us today. And, despite the changes, it is clear those first people in Indiana were hardy and later flourished.”

Schmidt also offered praise for the residents of the Flora area, a close-knit German Baptist community that adheres to traditional farming practices but has been enthusiastic and generous toward the archeologists working in their midst.

“This particular dig has been wonderful because the people of Flora have been so gracious and supportive of our efforts,” Schmidt says. “They helped us at every turn. They gave us food, helped with our pumps, and even jumped into the pits to help with the digging.”

Adapted from materials provided by University of Indianapolis.

http://www.sciencedaily.com/releases/2008/10/081021214301.htm

Computer Model Against Unnecessary Use Of Antibiotics

ScienceDaily (Oct. 22, 2008) — Patients in intensive care units (ICU) are often administered antibiotics against ventilator-associated pneumonia, 'to be on the safe side'. Dutch researcher Stefan Visscher has developed a model that can quickly establish whether or not a patient has pneumonia. This can prevent unnecessary treatment with antibiotics.

In his thesis Stefan Visscher studied 238 cases of antibiotic treatment of which – with hindsight – only 157 patients were actually suffering from pneumonia. An absence of suitable patient-friendly tests makes it difficult to determine with certainty whether or not a patient has developed pneumonia.

Visscher developed and tested a Bayesian network model, a probabilistic model, that can distinguish between patients that do and do not have ventilator-associated pneumonia (VAP). His model calculates the probability that an individual patient is suffering from pneumonia, predicts which bacteria has caused it and indicates which antibiotic can best be prescribed. This method is more reliable than the cultures on which physicians currently base their decisions. The data needed to make the probability calculations are automatically retrieved from the electronic patient file.

In his model Visscher processed the clinical data and other details of all ventilated ICU patients over a period of three years. The computer models were initially based on expert knowledge. At a later stage this was enhanced with 'machine-learning' techniques in order to optimise the reliability of the predictions where needed.

Electronic patient file

Visscher's research is part of the TimeBayes project that is responsible for the implementation of the electronic patient file. The electronic patient file contains all relevant laboratory data and clinical patient information. The TimeBayes project develops methods, techniques and tools that use this information to help support physicians in their decisions. Visscher concludes that the new computer models form a basis for a reliable decision-support system for ICU-physicians. The next step should be to set up a large study to test the value of these models in daily practice.

Adapted from materials provided by Netherlands Organization for Scientific Research.

http://www.sciencedaily.com/releases/2008/10/081015100039.htm

Couples With Children With ADHD At Risk Of Higher Divorce Rates, Shorter Marriages

ScienceDaily (Oct. 22, 2008) — Parents of a child with attention deficit hyperactivity disorder (ADHD) are nearly twice as likely to divorce by the time the child is 8 years old than parents of children without ADHD, the first study to look at this issue in depth has shown.

Moreover, among couples in the study who were divorced, marriages involving children with ADHD ended sooner than marriages with no ADHD-diagnosed children.

William E. Pelham, Jr., Ph.D., professor of psychology and pediatrics at the University at Buffalo and director of UB's Center for Children and Families, is senior author on the study. Pelham is known internationally for his ADHD treatment and research, and each year conducts UB's Summer Treatment Program, a highly successful behavior-modification program that has helped hundreds of children with ADHD and has been replicated nationwide.

Brian T. Wymbs, who received his doctorate in clinical psychology at UB and is completing a postdoctoral fellowship at Western Psychiatric Institute and Clinic in Pittsburgh, Pa., is first author.

Results of the study appear in the October issue of the Journal of Consulting and Clinical Psychology.

Additional findings from a subset of divorced couples with children with ADHD showed that several characteristics within the family contribute individually to the risk of divorce: age of the child when diagnosed; race and ethnicity of the parents; severity of coexisting disorders in children with ADHD, such as oppositional-defiant disorder (ODD) and conduct disorder (CD); education levels of the parents; and a father's antisocial behavior (trouble with the law.)

"We believe this is the first study to find that both parent and child factors individually predict the rate and time of divorce," said Pelham. "Moreover, this is the only study to demonstrate that the severity of the child's disruptive behavior, specifically those with ODD or CD, increases the risk of divorce.

"Certainly we are not suggesting that having a child with ADHD is the only reason these marriages end in divorce," noted Pelham. "Disruptive child behavior likely interacts over time with other existing stress in the family to spark conflict in a marriage and, ultimately, divorce." Wymbs' research documents that when parents interact with an ADHD child, they are more distressed, argue with one another more and view one another as less supportive, compared to when they interact with a child without ADHD.

Data for the study was gathered from a subset of participants in a larger investigation called the Pittsburgh ADHD Longitudinal Study (PALS), which is funded by grants from the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA) to Pelham and Brooke Molina, Ph.D., from the University of Pittsburgh.

Some 282 adolescents and young adults who had been diagnosed with the disorder in childhood and their parents completed a series of questionnaires and diagnostic instruments, along with individual interviews. The child's birth date was used as the starting point of the time to divorce.

These results were compared with those from 206 demographically similar PALS participants without ADHD and their parents.

Results showed that 22.7 percent of parents of children with ADHD had divorced by the time the child was 8 years old, compared to 12.6 percent of parents in the control group. Divorce rates of parents with and without children with ADHD were not significantly different after children passed the 8-year mark.

"Families that 'survive' through that age, perhaps because they are low on all of the risk factors, apparently will make it through the rest of the child's childhood," Pelham said.

Of the characteristics that may contribute to risk of divorce, a father's antisocial behavior proved to be the largest factor. The rate of divorce also increased when mothers had substantially less education than fathers; children were diagnosed with ADHD at a younger age; families had racial or ethnic minority children and children had serious ODD or CD behavior problems. "With these findings in mind," Wymbs and Pelham said, "those who treat children with ADHD and disruptive behavior problems should take note if parents are having marriage problems and try to intervene to prevent the children from going through the trauma of divorce."

However, they also pointed out that for some couples who may have serious and frequent marital conflict and are raising difficult-to-manage children, divorce may be the best option for the children.

Adapted from materials provided by University at Buffalo.
http://www.sciencedaily.com/releases/2008/10/081021185207.htm

Study Of Polar Dinosaur Migration Questions Whether Dinosaurs Were Truly The First Great Migrators

Phil Bell holding a vertebra of a 70-million-year-old Saurolophus. (Credit: Image courtesy of University of Alberta)

ScienceDaily (Oct. 22, 2008) — Contrary to popular belief, polar dinosaurs may not have traveled nearly as far as originally thought when making their bi-annual migration.

University of Alberta researchers Phil Bell and Eric Snively have suggested that while some dinosaurs may have migrated during the winter season, their range was significantly less than previously thought, which means their treks were shorter. Bell and Snively's findings were recently published in Alcheringa: An Australasian Journal of Paleontology.

The idea that these animals may have travelled distances nine times further than mule deer or four times those of wildebeest would have made them the greatest migrators in history. "There are strong opinions regarding dinosaur migration, but we decided to take a different approach, looking at variables such as energy requirements," said Bell. Their research led them to suggest that migrating dinosaurs could have travelled up to 3,000 kilometres in a round trip—lasting perhaps up to six months—half of the distance suggested previously.According to Bell, the notion of migrating polar dinosaurs is not new; however, previously-held beliefs were that the animals followed the centrally shifting sunlight, or latitudinal "sun line," as part of their migration and would travel as far as 30 degrees of latitude, or 3,200 kilometres, in order to survive. Given their size and physiology, Bell and Snively have concluded that dinosaurs would have been incapable of sustaining the effort needed to make the trip. "When we looked at the energy requirements needed to support a three-tonne Edmontosaurus over this distance, we found it would have to be as energy efficient as a bird. No land animal travels that far today," said Bell.

Bell does not dispute the evidence of migration and points to discoveries of large bone beds as evidence that many dinosaurs also traveled. In order to sustain the herd, "it seemed to make sense that they would be moving to and from the poles," he said.

While this view of migration is feasible for some species of polar dinosaurs, it does not hold for all, Bell noted. "Many types of dinosaurs were surviving in polar latitudes at the time, and getting along quite fine," said Bell. "They were not physically able to remove themselves from the environment for a variety of reasons and had to adapt to the cold, dark winters just as the rest of us mammals do today."

Adapted from materials provided by University of Alberta.

http://www.sciencedaily.com/releases/2008/10/081021185205.htm

Marks The Spot: Sharpies Get Thumbs-up For Marking Surgery Sites

Discarding barely-used pre-surgery markers is was costing thousands of dollars a year. (Credit: Image courtesy of University of Alberta Faculty of Medicine & Dentistry)

ScienceDaily (Oct. 22, 2008) — A bit of good news out of the Faculty of Medicine & Dentistry at the University of Alberta for patients undergoing surgery or an invasive procedure, their surgeons and cost-conscious hospital administrators. It's standard practice for the surgeon or their designate, (in consultation with the patient when possible), to mark the operative/invasive site using a marking pen before an operation, a precaution to ensure surgeons cut the correct spot.

But there was concern that germs would be spread from one patient to the next, so it has also become common procedure to throw away the marker each time, costing thousands of dollars a year.

Turns out hospital staff were putting too fine a point on it, say a couple of infection control specialists at the U of A who looked into the matter. Associate professor Dr. Sarah Forgie of the Department of Pediatrics and pediatric infectious diseases resident Dr. Catherine Burton have shown that the tips of the Sharpies® don't spread infection since the ink has an alcohol base.

This has caught the attention of organizers of a major conference on infectious disease taking place in Washington, D.C., at the end of October. They have invited Burton to share her work with other disease control specialists from around the world, an honour for the resident.

After asking around and finding out that many of the surgical teams in Edmonton liked using Sharpie® brand markers, Forgie and Burton decided to put the common, everyday brand to the test along with another brand, the second one a sterile marker specifically intended for single use in operating rooms.

In a controlled experiment, marker tips were heavily contaminated with four types of bacteria that can cause surgical site infections; two of the germ types are of particular concern in hospitals since they are antibiotic-resistant, Burton explained.

After recapping the markers and letting them sit for 24 hours, Burton and Forgie found that the sterile, one-use marker, which has a non-alcohol-base ink, was still contaminated. But the Sharpies® were not.

In collecting an extremely large number of germs on the markers during their experiment, "we went much further than what would happen in real life," said Forgie.

She is confident that the marking tip of Sharpies® does not pose a risk of bacterial transmission. As long as the rest of the pen is cleaned with an alcohol swab between patients (just as is done with stethoscopes), the Sharpies® do not need to be discarded after each use. Safety is the priority, and in this case it can be done economically, Forgie said.

Adapted from materials provided by University of Alberta Faculty of Medicine & Dentistry.

http://www.sciencedaily.com/releases/2008/10/081021185211.htm

Evolution Of Genes That Trigger The Body's Immune Response To Viral Infection

ScienceDaily (Oct. 22, 2008) — Virginia Commonwealth University Institute of Molecular Medicine researchers have traced the evolutionary origin of two genes that serve as primary cellular sensors of infection with RNA viruses, such as influenza, poliovirus, West Nile virus, and HIV, which may ultimately provide researchers with insight into a possible new pathway for the development of innate immunity.

Recent studies by other investigators have provided information on exactly how humans respond to virus infection and the role of innate immunity in protection from viral pathogenesis. Induction of innate immunity is closely associated with the production of type I interferons. Interferons are a class of proteins that are secreted by the body in response to a viral infection such as rhinovirus, the cause of the common cold.

In the study, published online in the Early Edition of the Proceedings of the National Academy of Sciences the week of October 20-24, the VCU team reported that melanoma differentiation associated gene-5 (MDA-5) and retinoic acid inducible gene-I (RIG-I) originated specifically in mammals. These genes induce the production of type I interferons.

"Understanding how these unique genes developed and evolved provides a unique opportunity to understand the origins of innate immunity and to develop ways of exploiting this process to develop new types of therapies for pathogenic viruses," said lead investigator Paul B. Fisher, M.Ph., Ph.D., professor and chair of the Department of Human and Molecular Genetics and director of the VCU Institute of Molecular Medicine in the VCU School of Medicine.

According to Fisher, MDA-5, but not RIG-I, orthologs are found in fish, indicating that MDA-5 might have evolved before RIG-I. The unique domain arrangement of MDA-5 and RIG-I evolved independently by domain grafting and not by a simple gene-duplication event of the entire four-domain arrangement. This process may have been initiated by differential sensitivity of these proteins to viral infection.

"Our studies provide insights into the shuffling of gene regions, which culminated in a unique mechanism for protection against viral infection. Additionally, our phylogenetic analyses of these domains provides one of the first direct insights into the temporal pathways of development of innate immunity," said Fisher.

According to Fisher, expression of both MDA-5 and RIG-I can limit viral replication post-entry in cells. In this context, identifying drugs that can effectively turn on either or both of these genes offers promise for decreasing virus-induced pathogenesis.

In related work, the team has identified the promoter region, which controls expression of MDA-5 and RIG-I. Studies are now under way at the VCU Institute of Molecular Medicine and the Burnham Institute for Medical Research in La Jolla, Calif., to use these promoters as part of a screening paradigm to identify small molecules that can be developed into drugs to treat infectious diseases.

This work was supported by grants from the National Institutes of Health.

Adapted from materials provided by Virginia Commonwealth University.

http://www.sciencedaily.com/releases/2008/10/081021120951.htm

Fertilizers: A Growing Threat To Sea Life

Population growth, agricultural expansion, and urbanization have released nitrogen from the land and moved it to Chesapeake Bay, where it has accumulated and degraded both the natural wildlife and water quality. (Credit: iStockphoto/Brian Palmer)

ScienceDaily (Oct. 22, 2008) — A rise in carbon emissions is not the only threat to the planet. Changes to the nitrogen cycle, caused in large part by the widespread use of fertilizers, are also damaging both water quality and aquatic life. These concerns are highlighted by Professor Grace Brush, from Johns Hopkins University in Baltimore, USA, in her historical review of landscape changes around Chesapeake Bay, a large estuary on the Atlantic coast of the USA.

Professor Brush studied the organisms and materials preserved in sediments in Chesapeake Bay spanning 1000 to 14,000 years, alongside available historical records covering the past 300 years, to trace the history of changes to nitrogen loading in the estuary. She highlights how population growth, agricultural expansion, and urbanization have released nitrogen from the land and moved it to Chesapeake Bay, where it has accumulated and degraded both the natural wildlife and water quality.

The combination of the increasing use of fertilizers, deforestation and the draining of wetlands and floodplains to provide more land for crops, has led to an imbalance in the nitrogen cycle, in particular reduced opportunities for the natural removal of nitrogen. As a result, there is an excess of nitrogen in the estuary, also known as eutrophication. This in turn has led to the deterioration of the local ecosystem through reduced concentrations of oxygen in the bay, affecting both the water quality and the fish populations.

Providing food for an increasing population is the main reason for these changes, according to Professor Brush. Although the estuary supplied an abundance of fish species, humans also need plant-based food products in their diets, hence the increase in grasslands and use of fertilizers. She adds that aquatic

deterioration is not unique to Chesapeake but a global phenomenon. Marine "dead zones" with low oxygen and/or toxic algae, caused primarily by the run-off of fertilizers from the land, as well as a greater reliance on fossil fuel, are on the increase.

Professor Brush concludes her review by looking at the likely implications of this imbalanced nitrogen cycle on future ecosystems as well as ways to improve water quality. She recommends multiple processes to reduce nitrogen accumulation, both natural and engineered, and notes that ultimately the decision to proceed will come down to politics.

Brush comments, "The future of the Chesapeake and coastal regions in general will depend very much on the recognition of the importance of nitrogen removal for goals other than restoring the fishery, how successful the various tools for nitrogen removal are, and the willingness of the public to pay for the implementation of those tools that can successfully achieve multiple goals."

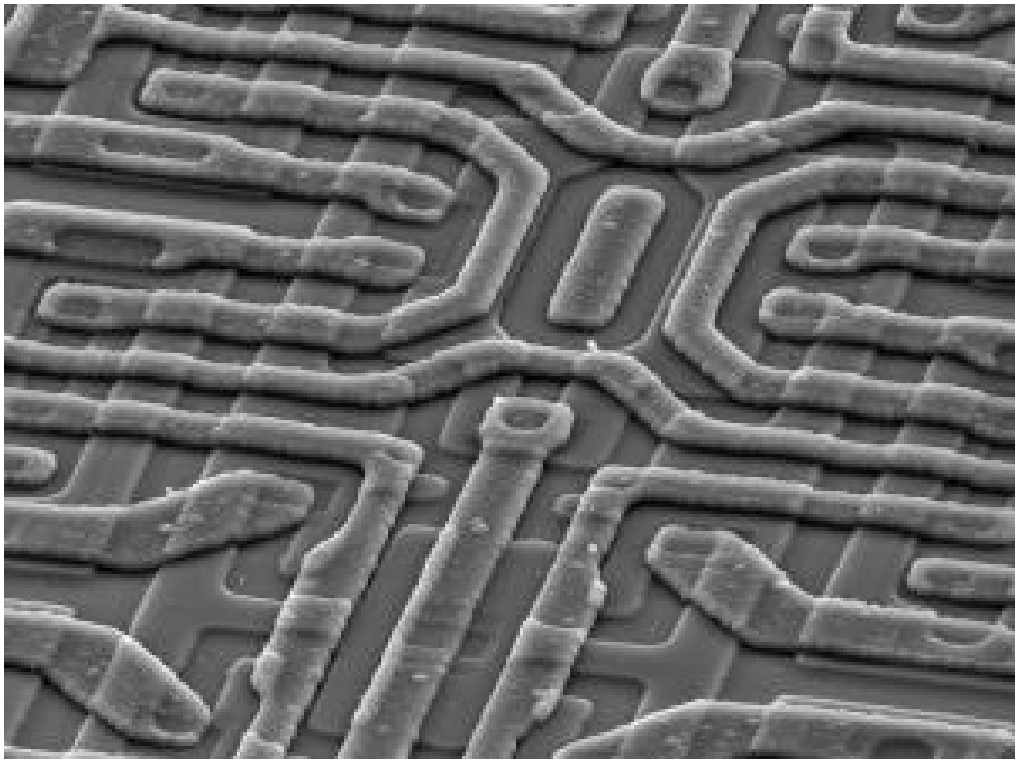
Journal reference:

1. Brush et al. **Historical Land Use, Nitrogen, and Coastal Eutrophication: A Paleoecological Perspective**. *Estuaries and Coasts*, 2008; DOI: 10.1007/s12237-008-9106-z

Adapted from materials provided by Springer.

http://www.sciencedaily.com/releases/2008/10/081021120927.htm

Physicists Find New State Of Matter In 'Transistor': Huge Implications For New Electronic Devices



The number of transistors that can be inexpensively crammed onto a single computer chip has been doubling approximately every two years, a trend known as Moore's Law. But there are limits, experts say. (Credit: iStockphoto/Julie Macpherson)

ScienceDaily (Oct. 22, 2008) — McGill University researchers have discovered a new state of matter, a quasi-three- dimensional electron crystal, in a material very much like those used in the fabrication of modern transistors. This discovery could have momentous implications for the development of new electronic devices.

Currently, the number of transistors that can be inexpensively crammed onto a single computer chip increases exponentially, doubling approximately every two years, a trend known as Moore's Law. But there are limits, experts say. As chips get smaller and smaller, scientists expect that the bizarre laws and behaviours of quantum physics will take over, making ever-smaller chips impossible.

This discovery, and other similar efforts, could help the electronics industry once traditional manufacturing techniques approach these quantum limits over the next decade or so, the researchers said. Working with one of the purest semiconductor materials ever made, they discovered the quasi-three-dimensional electron crystal in a device cooled at ultra-low temperatures roughly 100 times colder than intergalactic space. The material was then exposed to the most powerful continuous magnetic fields generated on Earth. Their results were published in the October issue of the journal Nature Physics.

Two-dimensional electron crystals were discovered in the laboratory in the 1990s, and were predicted as far back as 1934 by renowned Hungarian physicist Eugene Wigner.

"Picture a sandwich, and the ham in the middle is your electrons," explained Dr. Guillaume Gervais, director of McGill's Ultra-Low Temperature Condensed Matter Experiment Lab. "In a 2D electron crystal, the electrons are squeezed between two materials and they're very two dimensional. They can move on a plane, like billiard balls on a pool table, but there's no up and down motion. There's a thickness, but they're stuck."

Until an accidental discovery during one of Gervais's earliest ultra-low temperature experiments in 2005, however, no one predicted the existence of quasi-three-dimensional electron crystals.

"We decided to tweak the two-dimensionality by applying a very large magnetic field, using the largest magnet in the world at the Magnet Lab in Florida," he said. "You only have access to it for about five days a year, and on the third day, something totally unexpected popped."

Gervais's "pop" was the startling transformation of a two-dimensional electron system inside the semiconducting material into a quasi-three-dimensional system, something existing theory did not predict.

"It's actually not quite 3-D, it's an in-between state, a totally new phenomenon," he said. "This is the kind of thing the theoreticians love. Now they're scratching their heads and trying to fine-tune their models."

The importance of this discovery to micro-electronics and computing could be profound. Since the invention of the integrated circuit in 1958, Moore's Law has powered the ever-accelerating home electronics, personal computer and Internet revolutions which have changed the world. But, Gervais explained, Moore's Law is not an irresistible force, and some time in the next decade, it will inevitably collide with the immovable object of the laws of physics.

"In a standard transistor, you have a gate and the electron flow is controlled by it like a a faucet would control a gas flow," he said. "You can understand the particles as independent units, which lets us treat them as ones and zeroes or on and off switches in digital computing.

"However, once you get down to the nano scale, quantum forces kick in and the electrons may condense into a collective state and lose their individual nature. Then all sorts of bizarre phenomena pop up. In some cases, the electrons may even split. Concepts of 'on' and 'off' lose all meaning under these conditions."

"This issue is academic, but it's not just academic. The same semiconductor materials we're working with are currently used in cellphones and other electronic devices. We need to understand quantum effects so we can use them to our own advantage and perhaps reinvent the transistor altogether. That way, progress in electronics will keep happening ."

Adapted from materials provided by McGill University.

http://www.sciencedaily.com/releases/2008/10/081021185213.htm

A Large Spiral Galaxy, NGC 7331, In All Its Splendor

NGC 7331 imaged with the LAICA camera attached to the Zeiss 3.5 m telescope of Calar Alto Observatory. (Credit: Vicent Peris, Gilles Bergond; Image courtesy of Calar Alto Observatory-CAHA)

ScienceDaily (Oct. 22, 2008) — The spiral galaxy NGC 7331, in Pegasus, can be seen with small telescopes under dark skies as a faint fuzzy spot. It is an island universe similar to our own Galaxy (or maybe somewhat larger) and placed at a distance of 50 million light-years. NGC 7331 was discovered by Wilhelm Herschel in 1784, and it shows all its magnificence in long-exposure photographs taken through large telescopes.

This Calar Alto image offers one of the best snapshots ever obtained of this stellar system. It was produced with the camera LAICA attached to the 3.5 m telescope of Calar Alto Observatory. The warped disk of NGC 7331 shows its outstanding spiral structure shinning behind a number of stars belonging to our Galaxy, and in front of a rich background populated by an overwhelming variety of distant galaxies. A good fraction of the field of view is occupied by a thin haze of the ghostly, fuzzy and dusty nebulae known as galactic cirrus.

From galactic cirrus to stars and galaxies

Galactic cirrus are diffuse clouds made up from dust, complex organic molecules and gas. Normal reflection nebulae are strongly lighted by one or several close and hot stars, but galactic cirrus shine due to the reflection of faint and diffuse light coming from the Galaxy as a whole. These structures, better seen in the lower part of the image, have been caught thanks to the darkness of Calar Alto skies, to the quality of the instruments used and thanks to the complex and careful method applied to process the data. Vicent Peris, author of this image, explains that " good data and careful digital processing allow to assert

that all diffuse traits in the image are real, with the only exception of the bluish halo around the brightest star".

This image is outstanding first and foremost for the variety of objects that it contains. It will be a good challenge for astronomers to get the nature of each of these bodies, from point-like foreground stars to faint background galaxies, and to the intricate structure of the main galaxy.

Image processing: shapes and colour

Good image processing should not benefit one kind of objects at the expense of others but, instead, it has to aim at an equilibrium. To reach this goal, the image of NGC 7331 has been processed using wavelet techniques, a mathematical procedure that allows the separation of structures present in the image according to their characteristic sizes, hence allowing an individual processing to each level. The final result significantly improves the original quality. That is why this image contains accurate representations of objects as different as the foreground nebulae (belonging, as all individual stars, to our own Galaxy) or the external haloes of small and big galaxies, and the internal structures of all of them.

Colour is, also, a very important side of this photograph. The chromatic balance has been obtained assuming that all the light coming from the main galaxy, as a whole, is white. This reference allows to distinguish which parts of NGC 7331 are bluer or redder. This also makes possible to compare the hue of the main galaxy with that of its smaller neighbours and background objects.

The data

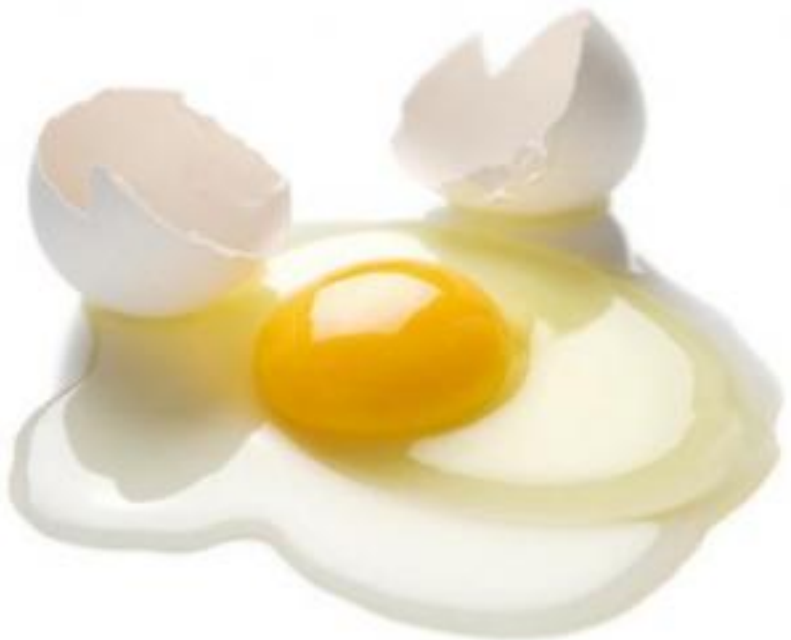
The image was obtained with the LAICA (Large Area Imager for Calar Alto) camera attached to the prime focus of the 3.5 m Zeiss telescope of Calar Alto Observatory. The view corresponds to one of the four detectors of this camera and covers an apparent field of view of 15 × 15 arcminutes. North is up, East is left [North is right, East is up, if the image is rotated]. The picture is composed from different individual shots through Johnson filters B and V, and Sloan r' (5 images of 10 minutes and 3 of 1 minute both in B and r', plus 3 shots of 10 minutes and 3 of 1 minute in V: 2 hours and 19 minutes as total integration time).

The observations were planned by Vicent Peris, who also processed the images with the software PixInsight. The data were taken by Gilles Bergond.

Adapted from materials provided by Calar Alto Observatory-CAHA.

http://www.sciencedaily.com/releases/2008/10/081020095952.htm

Egg Whites Solve The 3-D Problem



Egg whites are a good tool for develop three-dimensional cell culture systems because they are easy and cheap to obtain and they are transparent, allowing the researchers to see the cells under a microscope. (Credit: iStockphoto)

ScienceDaily (Oct. 22, 2008) — The real world is three-dimensional. That's true even in the laboratory, where scientists have to grow cells to study how they develop and what happens when their growth is abnormal.

More and more laboratories are seeking to develop three-dimensional cell culture systems that allow them to test their new techniques and drugs in a system that more closely mimics the way in which cells grow. However, a big sticking point is the cost of commercial media for growing such cultures.

Dr. Steffi Oesterreich, associate professor in the Lester and Sue Smith Breast Center at Baylor College of Medicine, and Dr. Benny A. Kaipparettu, a postdoctoral associate in her laboratory, found a solution – chicken egg whites. Their process has garnered attention in other laboratories around the world. A report on their technique appeared in a recent issue of the journal BioTechniques, which featured their article on its cover.

"It's important because the architecture of the cell is different in two dimensions compared to three," she said. "Understanding how the cell communicates, how protein work requires three dimensions."

For example, breast cells in the mammary gland form ducts through which milk flows when a woman breastfeeds.

"These are the same cells that cause cancer," said Oesterreich. "When you put these cells in the egg white preparation, it forms a structure like a duct. In the two-dimensional form, the cells cannot form a duct."

Only a three-dimensional culture allows cells to signal or send messages to one another as they would in a normal environment. Understanding cell signaling has become an increasingly important part of understanding how cells operate normally and what does wrong when they do not.

The use of a three-dimensional cell culture systems has become so important that the National Cancer Institute has launched a new Tumor Microenvironment Network focusing on studies of the cellular microenvironment – relying heavily on three-dimensional culture systems and encouraging initiatives to improve techniques.

Oesterreich and Kaipparettu in cooperation with others in their laboratory found that chicken eggs whites enabled them to grow both normal and tumors cells in three-dimensions.

"We have known for centuries that a baby chick can grow in three dimensions in an egg shell without any external support," said Kaipparettu. "Now we have found that Mother Nature has provided us a valuable tool for medical research. It gives an 'eggcellent' tool for researchers around the world to perform three-dimensional cellular research."

They are seeking a patent on the process, and hoping to find corporate partners.

Egg whites are a good tool because they are easy and cheap to obtain and they are transparent, allowing the researchers to see the cells under a microscope.

"It seemed a good idea and we thought we would try it," said Kaipparettu.

Others who took part in this research include Isere Kuiatse, Bonita Tak-Yee Chan, Meju Benny Kaipparettu, and Adrian V. Lee, all of BCM.

Funding for this project came from Baylor College of Medicine.

Journal reference:

1. Abraham Kaipparettu et al. **Novel egg white–based 3-D cell culture system**. *BioTechniques*, 2008; 45 (2): 165 DOI: 10.2144/000112883

Adapted from materials provided by Baylor College of Medicine.

http://www.sciencedaily.com/releases/2008/10/081007123651.htm

Waterless' Concrete Seen As Building Block On Moon

UAHuntsville Professor Houssam Toutanji shows samples of waterless concrete. (Credit: Image courtesy of University of Alabama Huntsville)

ScienceDaily (Oct. 22, 2008) — Dr. Houssam Toutanji, a professor at The University of Alabama in Huntsville, has published an article that will demonstrate a concept of creating concrete structures on the lunar surface without the use of water.

Traditional concrete comprises a binder — cement and water — mixed with aggregates. While some parts of the Moon may have water, that resource may be more valuable for astronaut's consumption rather than building structures.

His research shows that those astronauts can turn to a new type of waterless concrete that uses lunar soil as the aggregate and sulfur as a binding agent.

Toutanji, who is also chair of the civil and environmental engineering department at UAHuntsville, has spent years studying the characteristics of cementitious materials, said he anticipates concrete to play a major role in constructing facilities on the lunar surface to survive the harsh environment on the Moon's surface.

NASA is searching for a means to use resources that are available from the surface of the moon, according to Toutanji.

"The difficulty of transporting materials from Earth will place a premium on resourcefulness and ingenuity," he said.

Toutanji was co-author of the article along with Dr. Richard N. Grugel, a geological engineer at NASA's Marshall Space Flight Center.

Journal reference:

1. . **Unconventional Approach**. *Civil Engineering*, October 2008

Adapted from materials provided by University of Alabama Huntsville, via Newswise.

http://www.sciencedaily.com/releases/2008/10/081017090612.htm

$2 Egg-beater Could Save Lives In Developing Countries

Whitesides' egg-beater centrifuge. (Credit: Image courtesy of Royal Society of Chemistry)

ScienceDaily (Oct. 22, 2008) — Plastic tubing taped to a handheld egg-beater could save lives in developing countries, the Royal Society of Chemistry's journal Lab on a Chip reports.

The low-cost centrifuge replacement can separate plasma from blood in minutes, which is used in tests to detect lethal infectious diseases responsible for half of all deaths in developing countries.

George Whitesides and colleagues at Harvard University, US, say the plasma obtained is easily good enough to use in tests to detect diseases such as Hepatitis B and cysticercosis.

"The object was to separate serum [plasma] from blood using readily-obtained materials in a resource-constrained environment," explains Whitesides.

The equipment can be bought from shops for around two dollars. It needs no special training to use, no electricity or maintenance, and can be sterilised with boiling water and reused.

The user can even prepare several samples at once - just by taping more lengths of tubing to the beater.

Contrast this with the bulky, sensitive commercial centrifuges, costing thousands of dollars and requiring extensive operation training, and it's easy to see how this development could save lives.

"This technique is simple and works remarkably well," says Doug Weibel, an expert in microbiology at the University of Wisconsin-Madison, US. "This technique complements several other 'simple solutions' that the Whitesides group has developed to tackle point-of-care diagnostics in resource-poor settings."

Reference: G. Whitesides et al, Lab Chip, 2008, DOI: 10.1039/b809830c

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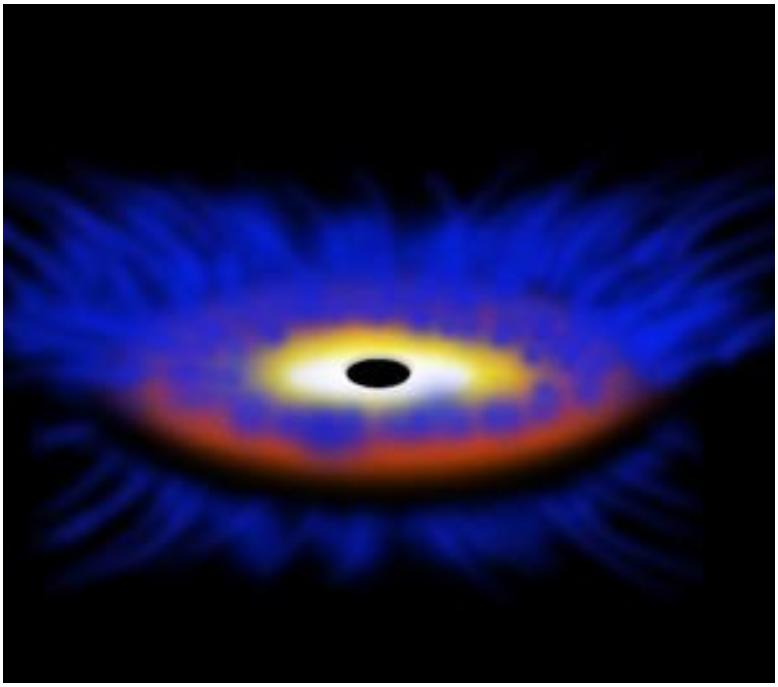
Adapted from materials provided by Royal Society of Chemistry.

http://www.sciencedaily.com/releases/2008/10/081015110226.htm

Serendipitous Observations Reveal Rare Event In Life Of Distant Quasar



University of Florida and University of California-Santa Cruz astronomers are the first to discover the onset of a huge flow of gas from a quasar, or the super-bright core of an extremely remote young galaxy still being formed. The gas was expelled from the quasar and its enormous black hole sometime in the space of four years around 10 billion years ago -- an extremely brief and ancient blip that would have gone unnoticed were it not for two separate observational efforts. In this artist's depiction, the outflow of blue gas surrounds the black hole in the quasar. (Credit: University of Florida/Myda Iamiceli)

ScienceDaily (Oct. 22, 2008) — A bit of serendipity has given astronomers a surprise view of a never-before-observed event in the birth of a galaxy.

University of Florida and University of California-Santa Cruz astronomers are the first to discover the onset of a huge flow of gas from a quasar, or the super-bright core of an extremely remote young galaxy still being formed. The gas was expelled from the quasar and its enormous black hole sometime in the space of four years around 10 billion years ago – an extremely brief and ancient blip noticed only by a sharp-eyed undergraduate and the unlikely convergence of two separate observational efforts.

“It was completely serendipitous,” said Fred Hamann, a UF astronomy professor. “In fact, the only way it could have happened is through serendipity.”

Quasars are enormously bright cores of very distant galaxies thought to contain “super-massive” black holes a billion times larger than our sun. They are seen only in the centers of very distant galaxies that formed long ago — galaxies whose light is just now reaching Earth after billions of years in transit. The quasar in question occurred about 10.3 billion years ago.

The black holes within quasars are invisible, but the cosmic material cascading toward them builds up and forms hot “accretion” disks, the source of quasars’ intense light. Some of the incoming material also can be expelled from quasars to form enormous gas clouds that zoom out at extremely high speeds. With the quasar in question, the gas is flowing at an astonishing rate of 58 million mph, Hamann said.

But while astronomers had observed the presence of such gas clouds with other quasars, they had never witnessed one actually coming into being — until now.

Hamann said the discovery was initiated when Kyle Kaplan, an undergraduate at UC-Santa Cruz, earlier this spring noticed peculiarities in the spectra, or wavelengths of light, that had been observed and recorded from the quasar. The spectra were gathered in 2006 as part of an effort to study the galaxies between the quasar and Earth.

UC-Santa Cruz Professor Jason Prochaska was aware of Hamann's work on quasars and asked him to take a look.

When Hamann and other astronomers checked the spectra against the spectra of the same region recorded in a separate sky survey in 2002, they were surprised to discover that there were zero indications of the gas cloud.

"So that's how we know this appeared between 2002 and 2006," he said.

Daniel Progra, a physics professor at the University of Nevada, Las Vegas and an expert on gas outflows from astronomical objects, indicated the discovery is a lucky one.

"I am most excited about this work," he said. "We humans cannot directly monitor changes in quasars as they take very many years. Therefore, a discovery of a change over a few years is very interesting. It is not unexpected, but chances are very small."

He said the discovery supports a computer model he developed that predicts the gas outflows are dynamic and complicated.

Hamann said the discovery also opens a window to understanding more about how quasars come into being.

"The fact that we saw one appear in so short a time frame means that it's a volatile type of structure," he said. "It could be an evolutionary phase, or maybe a transition stage from one phase to another."

It also poses interesting questions about the role of quasars in the formation of galaxies. Astronomers hope future observations will prove telling, Hamann said.

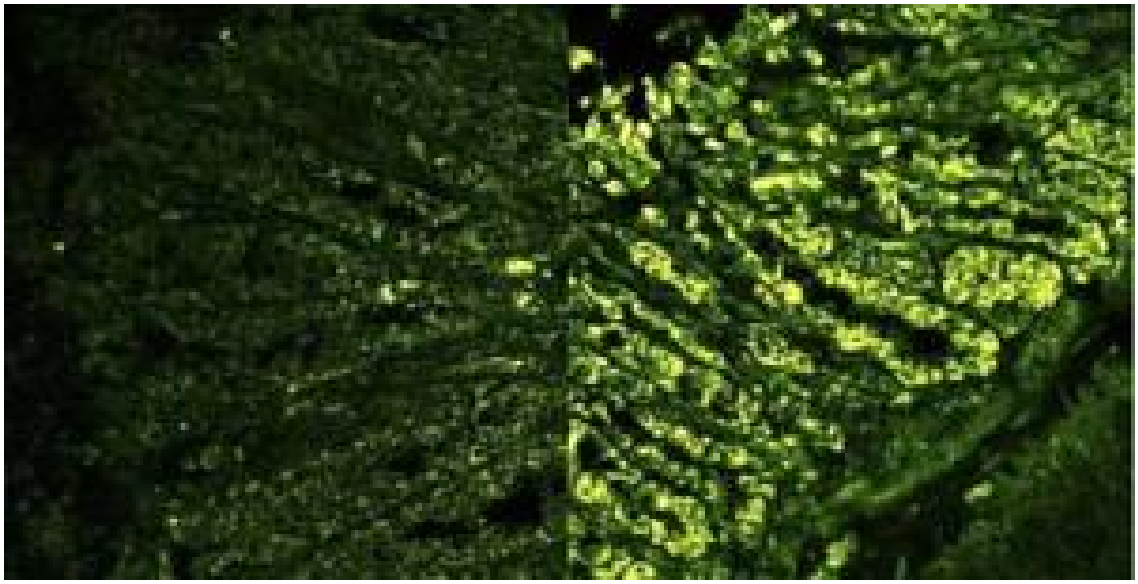
"One interesting question in astronomy is 'how does the evolution of quasars relate to the evolution of galaxies?,'" he said. "The matter ejected from quasars might be the key to this relationship because it can disrupt or regulate the formation of galaxies around quasars. This discovery is a small piece of that story that we can see happening in real time, and what we are going to do now is keep watching."

A paper about the research appeared online this month in the Letters of the Monthly Notices of the Royal Astronomical Society. Other astronomers and authors of the paper are Paola Rodriquez Hidalgo, a UF graduate student, and Stephane Herbert-Fort, a University of Arizona graduate student.

Adapted from materials provided by University of Florida.

http://www.sciencedaily.com/releases/2008/10/081021185209.htm

Mechanical Pressure Accelerates Early Stages Of Colon Cancer



On these images of mouse intestinal villi, green labeling reveals the expression of the Myc oncogene. In the two cases, a copy of the APC gene is inactivated. In the absence of mechanical pressure (left), the Myc oncogene is little expressed, whereas when the intestine is compressed (right), Myc is strongly expressed. The results are identical with the Twist gene. (Credit: Copyright Joanne Whitehead/Institut Curie)

ScienceDaily (Oct. 22, 2008) — Genes are not the be all and end all of carcinogenesis. At the Institut Curie, the team of Emmanuel Farge, Inserm Director of Research (UMR 168 CNRS/Institut Curie), has just shown, in collaboration with the Sylvie Robine and her group (UMR144 CNRS/Institut Curie), that mechanical pressure can alter gene expression, and in particular activate the oncogenes(1) Myc and Twist, which are implicated in the early stages of colon cancer.

Although inactivation of the APC gene remains the genetic precondition for the development of this type of cancer, mechanical pressure on the colon speeds up carcinogenesis in animal models. And what if the increase if tumor mass were itself the cause of this pressure? This discovery reported in Human Science Frontier Journal opens up new horizons in research into the mechanical sensitivity of tumors.

Cancer stems from alteration in a cell's genetic material. Yet a single event is not enough to transform a health cell into a cancer cell. Rather, cancer results from a succession of accidents. The APC (adenomatous polyposis coli) gene is mutated in 80% cases of colon cancer. This alteration is often described as the initiator of carcinogenesis. Although the loss of APC is necessary for development of a colon tumor, it is not sufficient. Other perturbations are needed.

At the Institut Curie, the Mechanics and Genetics of Embryo and Tumor Development team headed by Emmanuel Farge(2) is studying the effect of mechanical stress on gene expression during tumor and embryo development. Farge and colleagues recently demonstrated that morphogenetic movements, which occur in early development of Drosophila embryo, trigger expression of the Twist gene, which controls the differentiation of gastric tissues. They have studied the changes induced by mechanical pressure on the expression of the protein ß-catenin and of two oncogenes controlled by it: Myc, which is involved in tumor growth, and Twist, which contributes to the invasiveness of tumors. The deregulation of ß-catenin is often described as being correlated with loss of the APC gene, in development of colon cancer.

What happens when pressure is applied to the colon of a mouse that has already "lost" a copy of the APC gene? Farge and colleagues observed a relocalization of ß-catenin from the cytoplasm towards the nucleus of the cells, followed by activation of the expression of the oncogenes Myc and Twist, which can then play their full part in carcinogenesis. In the absence of one copy of the APC gene, mechanical pressure of the order of magnitude equivalent to that exerted by intestinal transit would therefore stimulate tumor development.

Mechanical stress is therefore likely to affect the gene expression profile in colon cells already carrying an APC mutation. The events leading to formation of a cancer are not only, therefore, the prerogative of genetics: perturbations in the tumor environment can also participate. Mechanical sensitivity thus becomes a player in carcinogenesis.

So, while the mutation of the APC gene initiates tumor development, growth in tumor mass could accelerate development by compressing neighboring tissues.

Not all then is purely "genetic" or "cellular" in the development of the colon cancer and certain stages could result from mechanical effects. This discovery should prompt reassessment of preventive and therapeutic approaches, at least in colon cancer, and even in oncology in general.

(1) Genes associated with cancers
(2) Emmanuel Farge is Inserm Director of Research in UMR 168 CNRS/Institut Curie.

Journal reference:

1. DESPRAT Desprat et al. **Tissue Deformation Modulates Twist Expression to Determine Anterior Midgut Differentiation in Drosophila Embryos**. *Developmental Cell*, September 2008; 15 (3): 470 DOI: 10.1016/j.devcel.2008.07.009

Adapted from materials provided by Institut Curie.

http://www.sciencedaily.com/releases/2008/10/081017082011.htm

Workmen 'ignoring asbestos risk'

Some 4,000 people a year are dying from the effects of asbestos, the Health and Safety Executive has said.

The HSE says a quarter of the victims are former tradesmen, but it fears today's plumbers, electricians and joiners underestimate the ongoing risk.

Asbestos was used for fire-proofing and insulation until a ban in 2000, but it remains in some 500,000 UK buildings.

But the Ucatt union said the HSE is failing to fully investigate workers' complaints about exposure to asbestos.

It can cause cancers and lung illness if its dust is inhaled.

Exposure to the material remains the biggest single cause of work-related deaths, likely to peak at around 5,000 per year in the next five years, the HSE says.

On Monday, Selfridges replaced the display windows of its 100-year-old Oxford Street store in London after the substance was found in some of the frames.

Exposure kills

If asbestos fibres are disturbed by drilling or cutting during refurbishment, they can prove deadly.

Illnesses, most notably the lung cancer mesothelioma, typically take between 20 and 50 years to develop, depending on the levels and frequency of exposure.

The majority of those affected today are former employees in industries such as shipbuilding and the railways.

ASBESTOS CAN BE FOUND:
In the form of sprayed coating as fire protection on beams
As pipe lagging
In vinyl and thermoplastic floor tiles and their backing
As insulating board on ceiling, window and door panels
In cement roof sheeting
In textured coatings like artex

The HSE says research suggests exposure kills on average six electricians, three plumbers and six joiners every week and it fears those numbers could grow in the future because of complacency.

It believes only one in 10 current tradesmen recognises the danger and is launching a campaign to raise awareness.

Former carpenter Tom King, 65, from south east London, was diagnosed with mesothelioma - cancer of the lining of the lung - two years ago.

He had cut and fitted asbestos boards as a trainee, before its dangers were known, and the illness forced him to retire.

But Mr King said young tradesmen were failing to heed the warnings.

"My son took over my business and the labourers who work for him are half-hearted about wearing a mask, even though they know what happened to me," he said.

"Some of them don't seem to have been taught that it's still in a lot of old buildings."

'Cruel disease'

HSE disease reduction programme director Steve Coldrick said: "We have a legacy of 500,000 commercial or industrial buildings in this country which still contain asbestos and the it is tradesmen who are at risk from it now.

"Unless we make them really understand the problems it can cause, in 20 or 50 years time we will have even more people dying."

But Alan Ritchie, general secretary of builders' union Ucatt, said members who raised concerns about working with asbestos were rapidly losing confidence in the HSE.

"When investigating these complaints, rather than talk to the workers whose health is being put at risk, they instead simply speak to the management, who invariably give the organisation a clean bill of health."

'Woeful' underestimate

Meanwhile Prof Rory O'Neill, of Stirling University's Occupational and Environmental Health Research Group, said the HSE's figures were a "woeful" underestimate of the death rate.

"A more realistic figure would be 5-6,000," he said, adding that the HSE lacked resources to carry out necessary checks.

Jill Morrell, from the British Lung Foundation said: "The asbestos-related cancer mesothelioma is a cruel disease which as yet has no cure.

"We must do all we can to prevent more people dying from this preventable disease"

Despite the warnings, the HSE stresses that asbestos which is sealed and in good condition rarely poses a risk unless it is disturbed.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/7682295.stm

Published: 2008/10/22 12:18:06 GMT

Pupils to receive finance lessons

Children in England are to have lessons in how to manage their finances, under a new £11.5m government scheme.

The My Money programme will be rolled out to primary and secondary school pupils, covering topics such as how money is used and debt.

The Personal Finance Education Group charity is leading the programme.

A survey it commissioned to mark the launch suggests children are becoming more aware of the credit crunch as parents discuss finances more openly.

New territory

The Populus poll of 1,000 parents and children, aged seven to 15, at the end of August found 70% were discussing money more than at the same time last year.

A third of families had opted not to take a holiday this year and 62% had stopped having takeaways and meals out.

Financial capability education has always been high on the government's agenda
Ed Balls, Children's Secretary

A third of parents (36%) had already switched to doing their weekly shopping at a value supermarket, with a further 19% planning to do so in the future.

Over half (56%) had stopped trips to the cinema and other entertainment-related trips.

The increase in conversations about money at home was often taking parents into new territory.

More than three-quarters (77%) said they would normally try to avoid exposing their children to money concerns.

Almost a third (30%) avoided the topic of money at home and a quarter of these said that was because childhood should be a carefree time.

Speaking ahead of the launch of My Money, Mr Balls said: "Financial capability education has always been high on the government's agenda.

"This research demonstrates that it is more crucial than ever that young people are fully equipped with the confidence, skills and knowledge to manage their money effectively both now and when they become adults."

Research phase

Chief executive of the Personal Finance Education Group Wendy van den Hende said: "The spending changes that many families are making can actually provide an opportunity to get conversations started at home and talk about practical ways of managing money.

"Delivering money lessons with real-life relevance is central to the My Money financial education programme launching today."

The My Money programme is in its research phase and is currently making an audit of what aspects of finance are currently covered in schools.

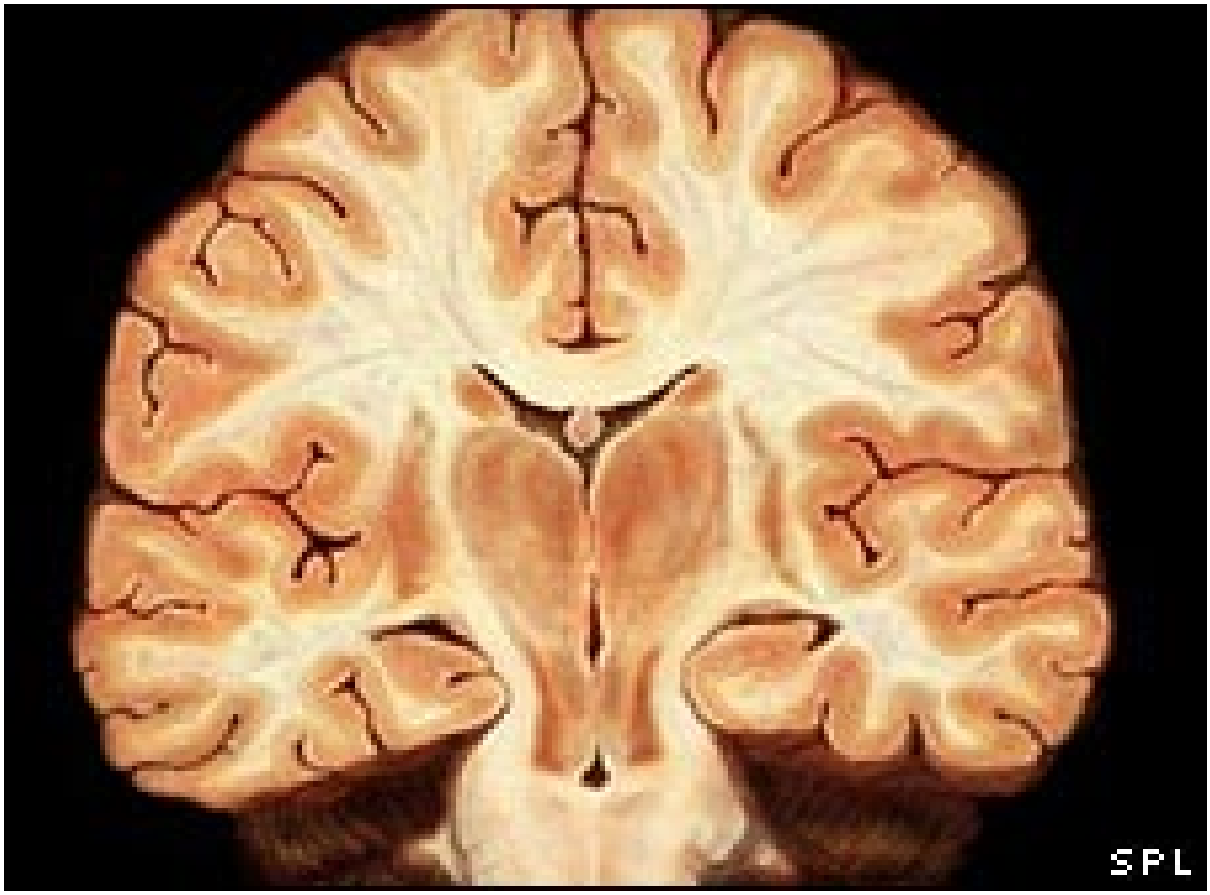
Similar lessons will be introduced to schools across Scotland from next year, as part of the Scottish Government's Curriculum for Excellence programme.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/uk_news/education/7682512.stm

Published: 2008/10/21 23:15:24 GMT

Fatty acids clue to Alzheimer's

Controlling the level of a fatty acid in the brain could help treat Alzheimer's disease, an American study has suggested.



Tests on mice showed that reducing excess levels of the acid lessened animals' memory problems and behavioural changes.

Writing in Nature Neuroscience, the team said fatty acid levels could be controlled through diet or drugs.

A UK Alzheimer's expert called the work "robust and exciting".

There are currently 700,000 people living with dementia in the UK, but that number is forecast to double within a generation.

Over-stimulation

Scientists from Gladstone Institute of Neurological Disease and the University of California looked at fatty acids in the brains of normal mice and compared them with those in mice genetically engineered to have an Alzheimer's-like condition.

They identified raised levels of a fatty acid called arachidonic acid in the brains of the Alzheimer's mice.

This is cause for cautious optimism, as fatty acid levels can be controlled to some extent by diet and drugs
Rebecca Wood, Alzheimer's Research Trust

Its release is controlled by the PLA2 enzyme.

The scientists again used genetic engineering to lower PLA2 levels in the animals, and found that even a partial reduction halted memory deterioration and other impairments.

Dr Rene Sanchez-Mejia, who worked on the study, said: "The most striking change we discovered in the Alzheimer's mice was an increase in arachidonic acid and related metabolites [products] in the hippocampus, a memory centre that is affected early and severely by Alzheimer's disease."

He suggested too much arachidonic acid might over-stimulate brain cells, and that lowering levels allowed them to function normally.

Dr Lennart Mucke, who led the research, added: "In general, fatty acid levels can be regulated by diet or drugs.

"Our results have important therapeutic implications because they suggest that inhibition of PLA2 activity might help prevent neurological impairments in Alzheimer's disease.

"But a lot more work needs to be done before this novel therapeutic strategy can be tested on humans."

'Cautious optimism'

Rebecca Wood, chief executive of the UK's Alzheimer's Research Trust, said: "This research on mice suggests a connection between fatty acids and the abnormal brain activity that exists in Alzheimer's disease.

"This is cause for cautious optimism, as fatty acid levels can be controlled to some extent by diet and drugs.

"However, it is not yet clear if these findings are applicable to humans, and a lot more research is needed before any human trials can be conducted."

Professor Clive Ballard, director of Research at the Alzheimer's Society, said the work was "robust and exciting".

He added: "This is a novel and potentially exciting area of research, but it is still at a very early stage.

"Much more research is needed to see if fatty acids could lead to a treatment for those living with the devastating effects of Alzheimer's disease."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7676606.stm

Published: 2008/10/19 23:03:11 GMT

Parents 'wrong' on child weight

Many parents overlook their child's unhealthy weight because they believe it is normal, research suggests.

Data on 2,100 Australian children found 40% of parents with an overweight or underweight child had not spotted this.

Among children, the underweight were more likely to think of themselves as average than the overweight.

The University of Melbourne researchers said parents would not act to help their children gain or lose weight if they did not see the problem.

> **We live in a society where being big is becoming far more common, and is seen as normal**
> Tam Fry
> National Obesity Forum

Child obesity is thought to be increasing fast in many countries, and experts are hunting for effective ways to intervene, both at school, and home.

The Australian research shows just how hard it could be to challenge parents' perceptions of their children.

The Melbourne researchers analysed the 2,100 children using both Body Mass Index and waist circumference, to try to establish which fell into the "underweight", "overweight" and "average" groups.

They then compared these results with the recorded perceptions of their parents.

In total 43% of parents of overweight or underweight children placed their child in the "average" bracket.

For overweight children alone, this rose to nearly half. Remarkably, a very small percentage of parents had even more extreme views, assessing an overweight child as underweight, or vice versa.

The parents of boys were less likely to make a correct assessment.

When the children themselves were asked, six out of 10 underweight girls and half of underweight boys did not assess their weight correctly.

Big society

Dr Pene Schmidt, who led the research, said: "Parents are more likely to take the necessary preventative actions if the perception of their child's weight - whether underweight or overweight - is correct."

Tam Fry, from the National Obesity Forum, said that the results were "unsurprising".

He said: "There was recent research in this country which showed that a similar proportion of health professionals were unable to make the distinction.

"We live in a society where being big is becoming far more common, and is seen as normal."

He said that it was hard for health visitors and doctors to intervene if they were likely to meet a hostile response from the parent.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7676015.stm

Published: 2008/10/19 23:09:44 GMT

High summits 'could harm brain'

Top mountaineers may be suffering subtle brain damage each time they reach the upper slopes of the world's highest peaks, say scientists.

Italian researchers scanned "world-class" climbers before and after expeditions, publishing their results in the European Journal of Neurology.

They found changes in brain tissue even though, outwardly, the climbers had no obvious new neurological problems.

The most likely cause was a lack of oxygen at high altitudes, they said.

> **Most climbers are aware that if you are going over 8,000 metres, there may be a small amount of damage to the brain associated with that**
> Dr Mike Grocott
> University College London

At the summit of Everest, the world's highest mountain, the concentration of oxygen in the air is reckoned to be only a third of that found at sea level, more than 8,000m lower.

All of the nine male climbers involved in the study, at the IRCCS Fondazione Santa Lucia in Rome, had reached their summit without the use of a supply of extra oxygen, a frequent practice among leading mountaineers.

Before the trip, they underwent MRI scans, and were checked for any neurological illnesses, then matched against "control subjects" of the same age and sex, who had never climbed above 3,000m.

Three of the climbers reached the top of at least one 8,000m peak, while the remainder reached altitudes of at least 7,500m, spending in excess of 15 days above 6,500m.

When they were scanned eight weeks after returning, compared with the "controls", there was a fall in the density and volume of brain tissue in two parts of the brain, the "left pyramidal tract" and the "angular gyrus".

Memory worry

However, Dr Margherita Di Paola, who led the study, said that this reduction did not appear to have a direct impact on their neurological performance.

"The climbers in our study did not suffer any significant neuropsychological changes after the expedition," she said.

However, some abnormal results on both the "before" and "after" tests, she said, might be the result of small, progressive brain damage caused by repeated trips to high-altitude.

These included tests on memory and brain functions such as the ability to anticipate outcomes and adapt to changing situations.

Dr Mike Grocott, from University College London, who has himself helped carry out research high on Everest into the effects of altitude, said that there was other evidence of the potential impact of high-altitude mountaineering on the brain.

He said: "Most climbers are aware that if you are going over 8,000m, there may be a small amount of damage to the brain associated with that.

"Even a year later, people might not be as sharp as they were before."

He said that the research did not show this type of climbing to be unacceptably dangerous, but should be viewed alongside other sports such as football, where studies suggests that even too much time spent heading the ball could cause subtle brain injuries.

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7676028.stm

Published: 2008/10/19 23:11:05 GMT

Archaeological Dig Uncovers Roman Mystery

Archeologist Roger Wilson pulls out the clay amphora from its 1,500 year hiding place. (Credit: Photo courtesy of Roger Wilson)

ScienceDaily (Oct. 14, 2008) — University of British Columbia archaeologists have dug up a mystery worthy of Indiana Jones, one that includes a tomb, skeletons and burial rites with both Christian and pagan elements.

This summer, Prof. Roger Wilson led excavations at Kaukana, an ancient Roman village located near Punta Secca, a small town in the south-eastern province of Ragusa in Sicily.

Combing through the sand-buried site, the 15-member team made a series of startling discoveries. Central to the mystery was finding a tomb inside a room in a house dating from the sixth century AD.

Wilson explains that tombs during this period are normally found only in cemeteries outside the built-up area of a town, or around the apse of a church. And since the building was substantial with mortared walls and internal plaster, this would have been likely a tomb for the wealthy.

“It’s extremely unusual to find an elite burial set inside a house in the middle of a settlement, even as late as the sixth century,” says Wilson, who heads UBC’s Department of Classical, Near Eastern and Religious Studies.

The UBC initiative -- in collaboration with Prof. Giovanni Di Stefano of the Superintendency for the Cultural Heritage of Ragusa -- is the first major exploration of this historic site since 1972.

Locals first stumbled upon the late Roman village during the 1960s when a bulldozer preparing for new houses uncovered the tops of some 24 ancient buildings. Only a few, among them a church, were explored at the time, by renowned Italian archaeologist Paola Pelagatti.

Wilson directed students from UBC and Sicily in their painstaking work, focusing on what proved to be an "exceptionally well-preserved" structure on the south side of Kaukana, only yards from the beach. The walls uncovered stand nearly six feet high.

Once the cover was lifted off the tomb, one team member spent 10 days sieving the contents with great care. Two skeletons were found. One was of a woman between the ages of 25 and 30, with teeth in excellent condition and no signs of arthritis.

"She was in pretty good nick, so we know this wasn't a peasant working in the field," says Wilson.

The other skeleton was a child of indeterminate sex between the ages of five and seven. The position of their bones showed that the woman had been laid to rest first. The tomb was then re-opened to bury the child and the woman's spinal column was pushed to one side. A hole in the stone slab covering the tomb allowed visitors to pour libations for the dead.

"This shows that the long-established, originally pagan, rite of offering libations to the dead clearly continued into early Byzantine times," observes Wilson.

Yet, the presence of a Christian cross on a lamp found in the room and on the underside of a grave slab suggests that the deceased were Christian. As well, the skeletons were wrapped in plaster, a practice believed to be Christian for preserving the body for resurrection.

"It is the first plaster burial recorded in Sicily, although the practice is known from Christian communities in North Africa," says Wilson.

What also intrigued the archaeologists was learning that the tomb was opened one further time, an intrusion that disturbed the bones of the child and caused its skull to be placed upside down. Wilson says he wondered whether it was grave robbers in search of expensive jewelry or other loot.

"But the tomb was tidied up again afterwards."

Around the tomb was plentiful evidence of periodic feasting in honour of the dead. The archaeologists found cooking pots, glass and several large clay containers (amphorae), of which one is virtually intact. These would have been used to carry oil and wine to the site. The team also found the remains of two hearths where meals had been prepared.

As well, the room was designed with niches along one wall. Wilson says a knife, seafood, and fragments of stemmed goblets and other glass vessels were left on these shelves, "as though placed there after the last party."

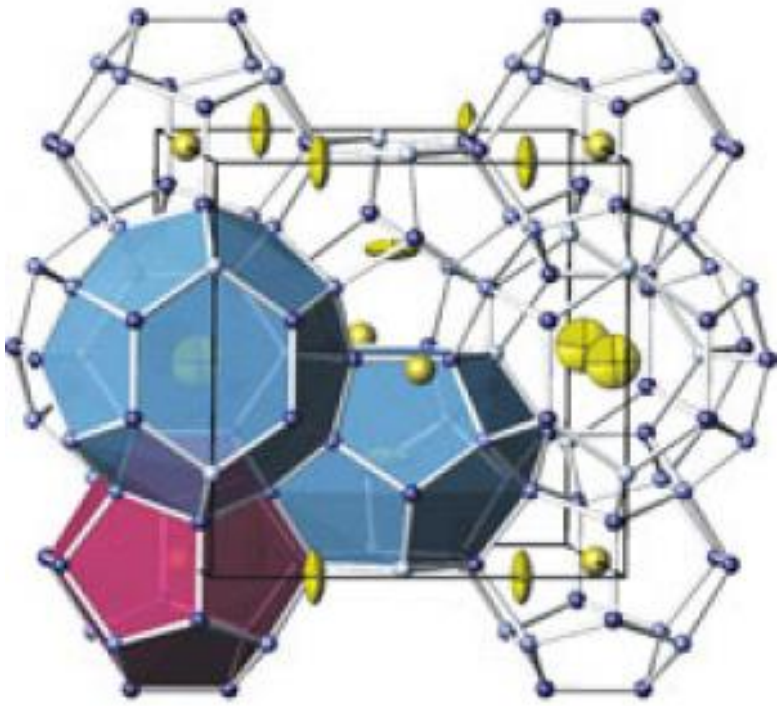
UBC's snapshot of late Roman and early Byzantine life has stirred considerable interest among the Italian media and historians worldwide. With support for three years of study from the Social Sciences and Humanities Research Council of Canada, Wilson says the team is eager to further unravel the skeins of history.

When they return to Kaukana next summer, they will attempt to solve the riddles encountered this first year. "Along with questions of when the house was built and whether it was still occupied when the tomb was inserted, we want to find out why the woman and child were buried in the tomb at all."

Adapted from materials provided by University of British Columbia.

http://www.sciencedaily.com:80/releases/2008/10/081013210144.htm

New Knowledge About Thermoelectric Materials Could Give Better Energy Efficiency



The crystal structure of a 'nano-cage'. Where it beforehand was believed that the unique properties of the materials solely could be ascribed to the movements of the heavy 'guest'-atoms in the cages, it has now been shown that the entire atomic scale movements of the cage should be given credit (Credit: Image courtesy of University of Copenhagen)

ScienceDaily (Oct. 14, 2008) — Researchers at the University of Århus, Risø-DTU and the University of Copenhagen stand jointly behind new data, just published in Nature Materials, that describes properties of thermoelectric materials, which is of great importance for their practical application.

In the long term the new knowledge can be used to develop motors that are more fuel-efficient and for more environmentally friendly cooling methods.

Thermoelectric materials can be assembled into units, which can transform the thermal difference to electrical energy or vice versa - electrical current to cooling. An effective utilization requires however that the material supplies a high voltage and has good electrical, but low thermal conductivity.

"The new knowledge explains exactly why some thermoelectric materials can have the desired low thermal conductivity without degrading the electrical properties. This can be crucial for the conversion of wasted heat, for example, from vehicle exhaust emissions. Leading car manufacturers are now working to develop this possibility and the first models are close to production. The technology is expected to give the cars considerably improved fuel economy," explains Bo B. Iversen, Professor at iNANO at the University of Århus.

The new knowledge can also contribute to the development of new cooling methods, so that one avoids the most common, but very environmentally damaging greenhouse gas (R-134a). All of which is a gain for the environment.

In the Nature Materials article the researchers have studied one of the most promising thermoelectric materials in the group of clathrates, which create crystals full of ‘nano-cages'.

"By placing a heavy atom in each nano-cage, we can reduce the crystals' ability to conduct heat. Until now we thought that it was the heavy atoms random movements in the cages that were the cause of the poor thermal conductivity, but this has been shown to not be true," explains Asger B. Abrahamsen, senior scientist at Risø-DTU.

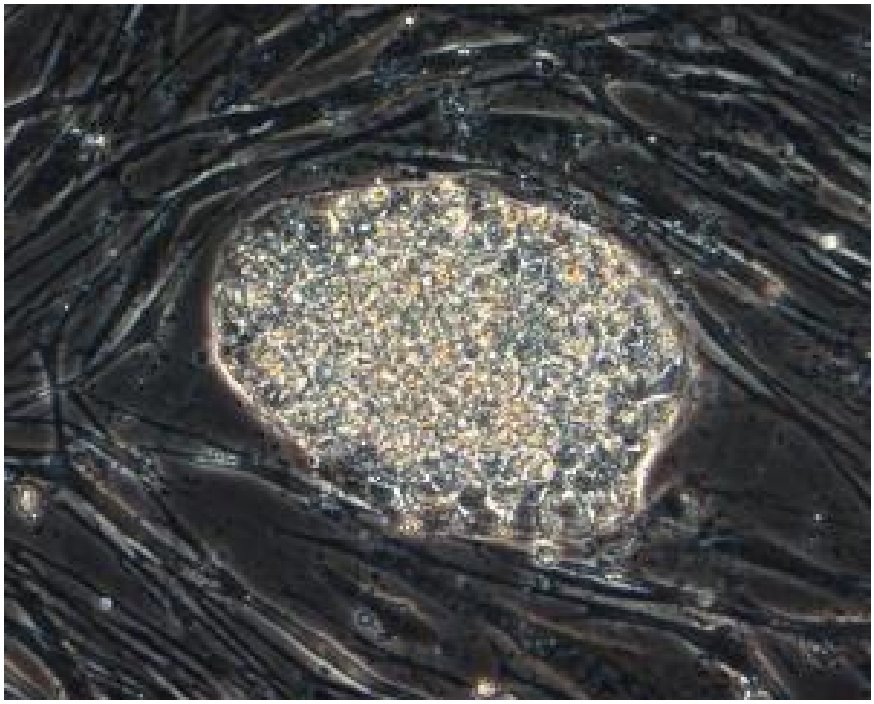
The researchers have used the technique of neutron scattering, which gives them opportunity to look into the material and see the atoms' movements.

"Our data shows that, it is rather the atoms' shared pattern of movement that determines the properties of these thermoelectric materials. A discovery that will be significant for the design of new materials that utilize energy even better," explains Kim Lefmann, associate professor at the Nano-Science Center, the Niels Bohr Institute at the University of Copenhagen.

Adapted from materials provided by University of Copenhagen.

http://www.sciencedaily.com/releases/2008/10/081007102841.htm

Five Basic Things To Know About Stem Cell Research



A magnified image of thousands of human embryonic stem cells growing together as a colony growing on top of mouse feeder cells. (Credit: Image courtesy of University of Michigan Health System)

ScienceDaily (Oct. 14, 2008) — In just a few weeks, Michigan voters will have an important decision to make when casting their ballots. Not just who they want to be president, or to represent them in Congress, but what they want the state to do about stem cells. And the way they vote on a ballot measure called Proposal 2 will determine the fate of a Michigan law that currently restricts research using embryonic stem cells.

Meanwhile, in other states, stem cells are emerging as a key issue in many races.

To cast an educated vote on stem cells, voters in Michigan and beyond must understand a complex, fast-emerging new field of medicine – no easy task. Stem cell research is generating great interest and investment worldwide because it could lead to possible treatments for spinal cord injuries, Parkinson's disease, juvenile diabetes and other diseases. But some aspects of embryonic stem cell research may pose an ethical or moral dilemma for some people.

The main thing is to understand the goals of stem cell research and to sort out fact from fiction. There are several key facts that citizens can keep in mind as they navigate through a flood of often conflicting information about stem cell research, say University of Michigan stem cell scientists Sean Morrison, Ph.D., and Sue O'Shea, Ph.D. Morrison directs the Center for Stem Cell Biology at U-M's Life Sciences Institute and is a faculty member at the U-M Medical School. O'Shea directs the Michigan Center for Human Embryonic Stem Cell Research at the Medical School.

Here are the five key things they feel every voter should know about stem cells:

1. Scientists generally agree it's crucial to push forward rapidly in all three key areas of stem cell research: embryonic stem cells, tissue/adult stem cells and induced pluripotent (or "reprogrammed") stem cells.

Around the world, these three kinds of stem cells are under intense study for possible treatments for conditions from spinal cord injuries to juvenile diabetes. It would be shortsighted to pursue only one kind, O'Shea says, because each may hold particular promise for understanding and treating specific diseases. "Results in one area of research will continue to shed light on work in the others," she notes.

Some intriguing new studies suggest that understanding how embryonic stem cells behave will bring new insights into cancer. And learning how embryonic stem cells can go awry may make it possible to intervene and avoid birth defects.

Morrison observes that much of the attention has focused on embryonic stem cells.

"Embryonic stem cells are one type of stem cell that people are very excited about because these are cells that come from the very earliest stages of embryonic development, from microscopically small clumps of cells. And these cells have the capacity to make every cell type in the body in unlimited quantities," he says. "So, when you're trying to cure a public health problem, the capacity of embryonic stem cells to make any cell type in unlimited quantities is a powerful advantage."

2. Embryonic stem cells that scientists study come from early-stage embryos.

These embryos are created in fertility clinics for the purpose of fertility treatment. But for a variety of reasons, not all embryos can be used for fertility treatment, and many embryos are discarded. In Michigan, it currently is legal to discard embryos that cannot be used for fertility treatment. It is not, however, legal to use them in medical research that might help patients. Proposal 2 would give patients the option of donating for medical research embryos that cannot be used for fertility treatment and would otherwise be discarded. Many of these surplus embryos, which number about 400,000 nationwide, are otherwise discarded.

"The embryos that are used for research are microscopically small clumps of cells, smaller than the period at the end of a sentence on a piece of paper," says Morrison. "They have no specialized tissues of any type; there's no nervous system, there's no heart, there are no limbs. These are clumps of cells that oftentimes in a fertility clinic don't develop in a healthy manner and that doctors would not be willing to implant in patients."

Scientists in most states, but not Michigan, are allowed to use embryos from these clinics to create stem cell lines and develop disease therapies in their laboratories.

Things are moving fast in the embryonic stem cell field. Clinical trials — research studies involving human patients — are expected to begin in the next few years for embryonic stem cell-based treatments for juvenile diabetes, macular degeneration and spinal paralysis.

The cells scientists use come from embryos just five days after fertilization. Embryos at this stage, called blastocysts, are spheres containing about 100 cells that have not yet differentiated into more specialized cells. If some of these cells are placed in a lab dish in the right conditions, they can become stem cell lines that can be maintained indefinitely in an undifferentiated state, or guided to become specific types of cells.

Scientists want to use these embryonic cells because they have the capacity to turn into any of the 200 cell types in the body. These "master cells" promise to provide large enough quantities of specialized nerve, pancreas or other cells to effectively help patients whose own cells are not functioning.

3. Adult stem cells are like supporting actors in the quest for stem cell treatments.

Adult stem cells are more specialized cells that arise from embryonic stem cells. Also known as tissue-specific stem cells, they are present in adults – but contrary to their name, they're also found in children, newborn infants and developing fetuses. They have the ability to make one or two kinds of cells, such as blood and immune system cells, brain or muscle cells. Adult stem cells have a more limited capacity to replace themselves than do embryonic stem cells.

Says Morrison, "There are many different types of adult stem cells present throughout our tissues. They differ from embryonic stem cells in that they're already partially specialized, so that blood-forming stem cells in the bone marrow can give rise to all types of blood cells, but not to cell types in other tissues. Adult stem cells are still useful, but they're more specialized than embryonic stem cells and they don't have the same capacity to give rise to unlimited numbers of specialized cells."

Decades of work with adult blood stem cells have led to successful bone marrow transplant treatments that are used today to treat people who have leukemia, lymphoma and some inherited blood disorders. Today, blood stem cells can often be isolated from the blood rather than bone marrow.

While adult stem cell research holds much promise, blood stem cells offer the only proven therapies that can be carried out using adult stem cells. The claim that adult stem cells have been used to cure more than 70 diseases has been widely discredited.

Although scientists continue to try to expand the use of adult stem cells, a key limitation remains. So far, it has been very difficult to get many types of adult stem cells to reproduce in sufficient amounts to lead to effective treatments.

4. Induced pluripotent stem cells, or iPS cells, are adult cells reprogrammed to behave like embryonic stem cells.

Recently, Japanese and American scientists have developed a third type of stem cell, which are skin cells that have been "reprogrammed" to be similar to embryonic stem cells.

About these cells, which are called "induced pluripotent cells", Morrison says, "This is exciting because it will really enhance our ability to study particularly inherited human diseases. But these cells aren't ready for prime time in terms of clinical use because the reprogramming process involves the use of viruses, which predispose those cells to cancer, and so none of the reprogrammed lines that we have so far at least would ever be usable in patients."

The discovery of iPS cells demonstrates the promise of embryonic stem cell research to lead to breakthroughs that would change the future of medicine; the ability to reprogram adult human cells was discovered as a result of research on human embryonic stem cells. While iPS cells are an exciting discovery, scientists agree it is too early to assess the technique's full potential and determine whether the reprogrammed cells truly can function the way embryonic stem cells do.

5. Michigan scientists want to explore all types of stem cells to look for treatments or cures. But they currently lack a key tool: the ability to develop their own embryonic stem cell lines.

Most Michigan scientists, along with many Michigan citizens affected by debilitating diseases, want current state law to be changed. If the Proposal 2 ballot initiative passes, the law would change to allow Michigan scientists to do what they currently cannot: develop new embryonic stem cell lines using early-stage embryos from fertilization clinics that would otherwise be discarded.

"Under current law, we in Michigan can study cell lines that are created outside of the state, but we can't derive our own new lines within the state," Morrison explains. "That's a crippling problem because most of the lines that we would like to be able to study, in order to study the diseases that affect the people of Michigan, don't exist yet."

O'Shea notes an important fact about Proposal 2: it requires that the allowed embryos are ones that couples designate for research. The proposal outlaws the sale or purchase of embryos for research and states the research needs to abide by federal law.

Here's the text that Michigan voters will see on their ballots:

A Proposal To Amend The State Constitution To Address Human Embryo And Human Embryonic Stem Cell Research In Michigan

The proposed constitutional amendment would:

Expand use of human embryos for any research permitted under federal law subject to the following limits: the embryos

- are created for fertility treatment purposes;
- are not suitable for implantation or are in excess of clinical needs;
- would be discarded unless used for research;
- were donated by the person seeking fertility treatment.

Provide that stem cells cannot be taken from human embryos more than 14 days after cell division begins.

Prohibits any person from selling or purchasing human embryos for stem cell research.

Prohibits state and local laws that prevent, restrict or discourage stem cell research, future therapies and cures.

Should this proposal be adopted?

Adapted from materials provided by University of Michigan Health System.

http://www.sciencedaily.com/releases/2008/10/081013132250.htm

Why Starving Cells Prolong Life

ScienceDaily (Oct. 14, 2008) — Cellular damage due to stress is an important factor in ageing processes. It is, thus, amazing that starving, which is a stress factor per se, decelerates ageing processes and extends the lifespan of organisms. It has long been known that proteins from the sirtuin family contribute to this mechanism. To date, the exact function of the seven members of the sirtuin family in mammals has, however, not yet been clarified.Results obtained in studies performed by protein research scientists in Bochum and Dortmund under the auspices of Assistant Professor Dr. Clemens Steegborn (Institute for Physiological Chemistry at RUB) have supplied first insights into this phenomenon. The scientists identified initial functions of the two human sirtuins Sirt3 and Sirt5 that reside in mitochondria, the energy supplying "cellular power stations."

Influence on the cellular self-destruction program The mitochondria within the cell are responsible for the provision of energy by utilizing food molecules. This fact suggests that sirtuins located at this site should be involved in the life-prolonging effect of nutritional deficiency. The scientists did, however, discover that Sirt5 is not only located within the mitochondria, but also within the so-called intermembrane space between the exterior and interior membrane of the mitochondria. At this site, Sirt5 can modify the protein cytochrome c, which plays a major role in both, energy generation and the cellular self-destruction program, i.e. apoptosis, the reaction to extreme cellular stress. Dr. Steegborn states "that malfunctioning of apoptosis could be an explanation for the presumed role of Sirt 5 in some forms of cancer, but that the precise function of Sirt5 and the modification of cytochrome c have not yet been finally clarified."

Use of alternative sources of energy The scientists were, however, able to identify a precisely defined function for Sirt3. They were able to show that two central metabolic enzymes are altered and thereby activated. This activation enables the cells, if subject to a lack of food, to make use of other sources of energy and to use these effectively. More specifically, Sirt3 activates special forms of these enzymes that simultaneously form NADPH, which is required for the regeneration of cellular anti-stress systems. This explains how increased Sirt3 activity during starvation can contribute to a prolonged lifespan.

Long-term target: healthy aging Diverse research groups have been able to show that increased sirtuin activity can increase the lifespan of model organisms. The situation is, however, more complex in human beings because different sirtuins are located at diverse sites in the cell and all have specific functions. The current research work, performed by the scientists in Bochum and Dortmund, are a first step towards the comprehension of these processes. Exact understanding of the specific functions is however a prerequisite to enable utilization of the correct sirtuin as target molecule for the desired therapeutic effect. Dr. Steegborn assumes that this will probably not lead to a life-prolonging elixir. The scientists do, however, hope to be able to identify agents that enable the treatment of age-related diseases. This in turn would enable "healthy aging."

Journal reference:

1. Schlicker et al. **Substrates and Regulation Mechanisms for the Human Mitochondrial Sirtuins Sirt3 and Sirt5**. *Journal of Molecular Biology*, 2008; 382 (3): 790 DOI: 10.1016/j.jmb.2008.07.048

Adapted from materials provided by Ruhr-Universitaet-Bochum, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081013111940.htm

Huge Gap Between World Demand For Fish And What Can Be Sustainably Harvested

Trina Galloway makes sure the ecosystem for small cod babies is in order with a view to cod farming. (Credit: Thor Nielsen/SINTEF Media)

ScienceDaily (Oct. 13, 2008) — The President of SINTEF Fisheries and Aquaculture, Karl Andreas Almås, crouches over his laptop, opens one of his presentations and finds an illustration. It shows one red curve and one blue one. He then indicates the point where they meet each other, then frowns and says the message he cannot repeat often enough: There is a huge gap between world demand for fish and what we can harvest from the world's natural stocks. The figures are clear: If we don't do something about the over fishing, the stocks of wild fish will be dealt a death blow.

At the same time, the world's population continues to grow – and with it the global demand for food.

"On a global basis today, we have an average annual consumption of 15-16 kilos of fish per person," says Almås. "If we are going to continue consuming at this rate, we need to double the production of farmed fish within the next 20 years. Doing this in a sustainable manner will be a major challenge."

Balancing act

As well as expressing his concern, the president is also optimistic. As the head of Europe's largest research institution for fisheries and aquaculture technology, he knows more than most about the conditions in the sea and how this can be achieved.

According to Almås, there are two main parts to the work towards sustainable aquaculture, but they are closely connected:

One is to develop technology for more selective and gentle capture of species in the sea to enable natural growth in the stocks and only capture the quality we actually want. This must also occur without the fishing fleet using large energy consumption.

The other is to increase the efficiency of the aquaculture sector. The president's figures show that the difference between fish production in 1980 and that which we will require in 2030 is a full 60 – 70 million tonnes of farmed fish. This means among other things we must stop using fish as feed for farmed fish. Fish caught at sea must be human food. Therefore, we need to find feed alternatives that can be captured lower in the food chain. Plant oils and proteins may be utilised as ingredients for feed in the

aquaculture industry, and this is an area some research scientists are working on. Another alternative is to convert natural gas to bio proteins, so-called single-cell proteins.

Last, but by no means least, we need to succeed in finding some new species of farmed fish and develop technology that enables a smarter and more cost-effective production of the fish species we are already farming.

If Almås achieves his visions of technological development and knowledge transfer, there will be few quiet days for he and his colleagues at SINTEF SeaLab at Brattørkaia in Trondheim Harbour. However, they are already well on the way to finding solutions for the challenges.

Trawling down in the food chain

One of the research scientists eager to put fresh aquaculture knowledge into practice is Research Director Håvard Røsvik. Together with product designer and colleague Mads Heide, he is working on the final polish of a new animation. It demonstrates one of the research scientist's pet projects: a bubble trawler, which until now the world has not seen equal to. Soundtracks featuring the cries of sea gulls, the splashing of waves and the sound of boat motors turn the film clip into a living description of the trawler that utilises air bubbles instead of a net to surface its prey: the 3 mm long, protein-rich Calanus finmarchicus.

"This tiny creature, which has its natural place long down in the food chain, contains large amounts of proteins as well as marine fats," says Røsvik.The film shows the boat chugging off on the smooth sea, while releasing air bubbles down into the sea. As Calanus finmarchicus contains many hairs on its tiny body, it attaches itself to the air bubbles in the same manner as a nail attaches itself to a magnet, and floats up to the surface. The tiny creatures are then collected in a fine-mesh cloth and enter the catch chamber with the assistance of a pump system. Seemingly, it is just as simple as it is genial. (Se egen sak. S... red. anm.)

The challenge previously has been to capture a sufficient volume of the little chap. With this trawler, it is likely that large enough volumes can be captured to make it profitable. There is certainly enough to capture: Calculations show there are 300-400 million tonnes in Norwegian waters alone.

"Capturing just one percent of this biomass would cover the requirements for the Norwegian aquaculture industry," says Røsvik.

The 90 degree effect

Another challenge Røsvik and his colleagues are working on is selective capture: Developing trawler systems that make it possible to catch fish of the correct size without damaging the small fish.

"Trawling accounts for 40 percent of the world's total fisheries production," says Røsvik. "As such, improvements to this method of fishing will produce major consequences for the different fish stocks and the areas in which they live."

A simple, but extremely effective solution to make trawling gentler and more selective has been to turn the trawl net 90 degrees.

"This is one idea that we tested in our flume tank in Hirtshals in Denmark," says Røsvik. "Scientists knew that fish were often damaged in the codend because turbulence occurs around traditional codends, causing them to swing from side to side."

However, by turning the meshes in the codend, the SINTEF research scientists utilised a recipe that did not cause turbulence: namely that the meshes in an outstretched position remain as wide open as possible. It yielded results. The cross-section was 12 times greater and the swinging movements were dramatically reduced compared to traditional codends. Further, the meshes remain open when the trawl is stretched. This means that the small fish escape and the fish that are large enough are damaged to a much lesser extent. Energy consumption was also reduced. A large proportion of the trawling fleets fishing whitefish off the coasts of Iceland, Scotland and New Zealand have now adopted this idea.

Cod farming

In the basement at SINTEF SeaLab, Trina Galloway stands bent over a tank of young cod. Galloway is working on areas including the development of new farmed species. She is now studying the result of one of the department's latest trials: 15 cm long "teenagers" swimming around in the tanks in the name of research. In two years, these will be large cod that fetch a high price at seafood restaurants. But whether they grow up and become saleable, healthy and good fish is not something we can take for granted. It is the result of many years' research, trial and error and then yet more research.

One of the challenges associated with farming cod has been to find suitable feed for the recently hatched fish larvae. While salmon larvae hatch with a large built-in packed lunch and develop a functional digestive system relatively quickly, cod require specially developed, live plankton, which is 100 percent research-based!"On the cod's part, hatching the eggs is not enough," says the biologist. "We need to have control of the entire life cycle, including the factors that contribute to the fish that hatch growing up. The conditions need to be optimal."

Ecosystem in the "cod kindergarten"

What appear to the uninitiated like ordinary plastic tanks with small creepy-crawlies swimming around are actually small, but exactly balanced ecosystems. In each tank, phytoplankton, zooplankton and fish larvae are living in perfect harmony, and physical factors such as water flow, temperature and light are precisely matched. At the end of the hall, there is a two metre high white plastic container filled with a gurgling yellowy-green soup. This is the heart of the facility: a bio filter or "live storeroom" containing the optimal bacterial flora for cod babies, and which supplies the facility's tanks with mature, re-circulated water.

For small, sensitive, young fish, it is particularly important to have stable growing conditions early in their childhood.

"This is the marine fish hatchery of the future," says Galloway.

From mono to poly

But the future of the aquaculture industry will offer challenges other than good water for the hatcheries and new feed alternatives. Better utilisation of both the fish farming area and the energy in the feed will be important.

"On average, the salmon utilise only 20-25 percent of the energy in the feed for growth," says Galloway. "The remainder is separated as waste or disappears out of the cages."

With this in mind, the research scientists have designed a system for three farmed species. The idea is to cultivate species that live in different stages of the food chain in the same place.

"If we succeed with keeping salmon, mussels and kelp in the same system, the feed will be fully utilised because the mussels and kelp eat the feed not consumed by the fish," explains Galloway.

Operating aquaculture in this way is relatively new in Norway, but not totally uncommon in fish farming counties in the east. SINTEF research scientists will pursue the idea and develop it for the open sea - and it is precisely far out at sea that the fish farms of the future will be located.

Aquaculture off-shore

"If the aquaculture industry is going to grow globally, this must happen at sea," says Arne Fredheim. "Fish farming in rough and open sea is something we can do well in Norway, and this knowledge is in demand from clients worldwide."There are many reasons why the aquaculture sector is aiming for the open sea. The water quality here is better than the limited areas near land and the temperature is more stable – a factor that improves the quality of the fish meat. Moreover, the flow rate increases, and with it the supply of oxygen to the cages.

He is now working to develop fish farms for the open sea. Fredheim is Director of CREATE, a centre for research-based innovation in aquaculture technology and one of the areas of strategic focus for the Research Council of Norway within innovation. He and his research colleagues at NTNU and SINTEF have received NOK 80 million. One of the research scientists' visions is an advanced fish farm that can "think for itself". Such fish farms will be able to float to more optimal locations when required and submerge in the sea when exposed to rough weather.

Even though this vision is unlikely to be a reality for at least 10 or 15 years, the technology for fish farms in the open sea is already in place."Our part is to view the total, integrated process, from the technological and operational sides through to the biological challenges," says Fredheim.

Today the research scientists are working on developing such fish farms through different projects. One of the challenges is to find out how long a submergible cage should use on its ascent back to the surface.

"Some fish species can actually get a sort of decompression sickness," says Fredheim. "Ascending too quickly will, for example, burst a cod's air bladder. Maybe it is ideal that a cage uses several days to complete the ascent up to the surface."

Utilising the whole fish

One floor above the laboratory's "fish kindergarten", Marit Aursand is sitting at her desk thumbing through a report. The report is about "functional food", one of the hottest concepts within food technology. Functional food is food that in addition to providing nutrition contains properties beneficial to your health. One such example is food to reduce cholesterol, which is already available on shop shelves. This is a growing market. As Research Director at the Department of Processing Technology, this is an area in which Aursand is particularly interested."One of our main challenges is more of what we catch needs to be used as human food, and the parts that cannot be used for food can be used for marine oils, animal feed or health products," says Aursand.

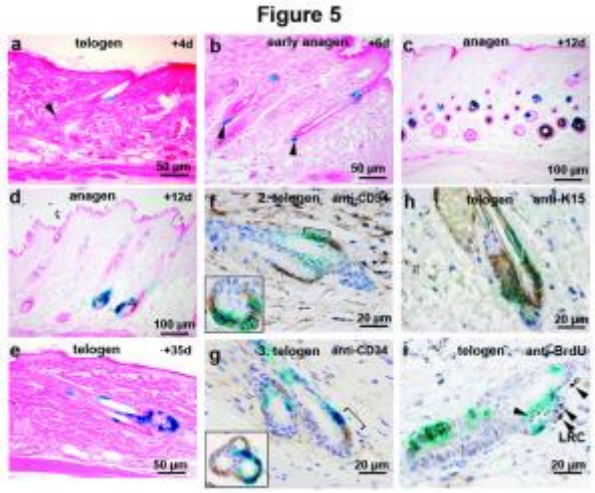
"Products like this can be added to other food to provide health benefits. Healthy fish oil can, for example, be added to yoghurt. Fish have the potential for 100 percent utilisation. If we manage to develop automation processes to achieve this objective, this can become an important industry for Norway."

And with Marit Aursand's vision, along with new solutions for fishing equipment, fishing methods and fish farming on both land and at sea, maybe we can see hope for the new face of the sea?

Adapted from materials provided by SINTEF, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081013111947.htm

New Properties Of Skin Stem Cells



Recent research from the Swedish medical university Karolinska Institutet reveals completely new properties of the skin's stem cells. (Credit: Rune Toftgård)

ScienceDaily (Oct. 13, 2008) — Recent research from the Swedish medical university Karolinska Institutet reveals completely new properties of the skin's stem cells – discoveries that contradict previous findings. The studies, which are published in Nature Genetics, show amongst other things, that hair follicle stem cells can divide actively and transport themselves through the skin tissue.

"The stem cells don't behave at all in the way we'd previously thought, and are found in unexpected places", says Professor Rune Toftgård, one of the scientists at Karolinska Institutet responsible for the study. "We're now investigating the part played by the stem cells in the wound-healing process and the development of basal cell carcinoma, the most common form of skin cancer."

The stem cells examined by the present study are found in the skin's hair follicles, around which the cells are able to move depending on their stage of growth. The scientists believe that their growth is governed by previously known mechanism called Hedgehog signalling.

Mutations in the genes that control this signal system can cause the delayed deactivation of signal transference; the signals thus continue uninhibited, which increases the risk of cancer.

Journal reference:

1. Viljar Jaks, Nick Barker, Maria Kasper, Johan H van Es, Hugo J Snippert, Hans Clevers, Rune Toftgård. **Lgr5marks cycling, yet long-lived, hair follicle stem cells**. *Nature Genetics*, AOP 12 October 2008 DOI: 10.1038/ng.239

Adapted from materials provided by Karolinska Institutet.

http://www.sciencedaily.com/releases/2008/10/081013111934.htm

Paleozoic 'Sediment Curve' Provides New Tool For Tracking Sea-floor Sediment Movements

Ancient sediments like these in Brittany, France, help reconstruct Paleozoic sea-level history. (Credit: Bil Haq, NSF)

ScienceDaily (Oct. 13, 2008) — As the world looks for more energy, the oil industry will need more refined tools for discoveries in places where searches have never before taken place, geologists say.

One such tool is a new sediment curve (which shows where sediment-on-the-move is deposited), derived from sediments of the Paleozoic Era 542 to 251 million years ago, scientists report in this week's issue of the journal Science. The sediment curve covers the entire Paleozoic Era.

"The new Paleozoic sea-level sediment curve provides a way of deriving predictive models of sediment migration on continental margins and in interior seaways," said Bilal Haq, lead author of the Science paper and a marine geologist at the National Science Foundation (NSF). The paper's co-author is geologist Stephen Schutter of Murphy Oil International in Houston, Tx.

"The sediment curve is of interest to industry, and also to scientists in academia," said Haq, "as the rise and fall of sea-level form the basis for intepretations of Earth history based on stratigraphy."

Through stratigraphy, the study of rock layering (stratification), scientists can derive a sequence of time and events in a particular region. Recent advances in the field of stratigraphy, including better time-scales for when sediments were deposited, and availability of data on a worldwide basis, are allowing scientists to reconstruct sea level during the Paleozoic.

The rises and falls of sea level during this period form the basis of stratigraphic interpretations of geology not only in the sea, but on land. These sea level increases and decreases are used extensively, Haq said, in predictive models of sediment movements.

The current Science paper is a shorter version of the results of a global synthesis of Paleozoic stratigraphy on which the authors have worked for many years.

"We hope that the publication of a sediment curve for this entire era will enhance interest in Paleozoic geology," said Haq, "and help the exploration industry in its efforts to look at older and deeper sediments."

Adapted from materials provided by National Science Foundation.

http://www.sciencedaily.com/releases/2008/10/081002172538.htm

'Caffeine Receptor' Solved: Structure Of Important Neurological Receptor Defined

The new study reveals the structure of the human A_{2A} adenosine receptor (sometimes referred to as the "caffeine receptor"), shedding light on the large and medically important family of G protein-coupled receptors. (Credit: Image courtesy of Scripps Research Institute)

ScienceDaily (Oct. 13, 2008) — Scientists from The Scripps Research Institute have determined the structure of an adenosine receptor that plays a critical role in a number of important physiological processes including pain, breathing, and heart function. The findings could lead to the development of a new class of therapeutics for treating numerous neurological disorders, including Parkinson's and Huntington disease.

The study was published on October 2, 2008, in Science Express, an advance, online publication of selected research papers from the journal Science.

"We are developing a robust platform for studying human G protein-coupled receptor structure and function," Raymond Stevens, a Scripps Research scientist and professor. "This work lays a strong foundation for understanding drug-receptor interactions. We expect to continue our work and develop a deep understanding as to how drugs interact with the broader class. The findings—and our future

research—could one day lead to the development of a novel class of therapeutics with improved pharmaceutical properties."

The new study defined the structure of the human A_{2A} adenosine receptor—sometimes referred to as the "caffeine receptor"—which falls in the larger family of G protein-coupled receptors (GPCR).

"Last year, we determined the structure of the β2-adrenergic G protein-coupled receptor with multiple ligands," said Stevens. "The big question then was—is it going to be another 10 years until we get the next new receptor? The answer is 'no.' It has taken less than a year to determine this new structure. Our expectation is that even more will come out in the next few years."

Because of the importance of GPCRs to health and medicine and previous lack of knowledge about their structure, the Stevens lab's 2007 research solved the structure of the β2-adrenergic G protein-coupled receptor and was selected as one of the top 10 breakthroughs of the year by Science magazine.

"The National Institutes of Health supports programs specifically designed to develop technology to elucidate the structures of membrane proteins such as G-protein coupled receptors, which are critical for almost all aspects of health and disease," said Jeremy M. Berg, director of the NIH's National Institute of General Medical Sciences. "The recent successes with the new methods foreshadow exciting future advances in determining the structures of other medically important proteins."

In the new study, the Stevens laboratory worked with the IJzerman laboratory at the Leiden/Amsterdam Center for Drug Research in The Netherlands, to illuminate the A_{2A} adenosine receptor. This receptor is blocked by methylxanthines like caffeine, which prevents the binding of other naturally occurring ligands. Interestingly, there is evidence that coffee drinkers have a lower risk of Parkinson's disease.

Because membrane proteins like adenosine receptors have been notoriously difficult to crystallize—a key step in determining the structure of a molecule through the technique of x-ray crystallography—the scientists bound the A_{2A} adenosine receptor to a high-affinity antagonist, ZM241385. ZM241385, which had been developed as a potential drug to combat Parkinson's disease, stabilizes the receptor.

With the two molecules bound together, the scientists were able to obtain crystals of the complex, and determine its structure.

A Big Surprise

The crystallographic model of the A_{2A} receptor bound to ZM241385 reveals features distinct from previously reported GPCR structures.

With over one thousand members, G protein-coupled receptors are one of the most diverse protein families in the human genome. They transduce or convert extracellular stimuli into intracellular signals through a number of signaling pathways including neurotransmitters, light, hormones, lipids, and proteins. Because of their diverse signaling pathways, approximately one third, and perhaps as many as half, of currently marketed drugs are designed to target these receptors.

Extracellular adenosine plays an important role in physiology and initiates most of its effects through the activation of four GPCR subtypes, A_1, A_{2A}, A_{2B}, and A_3. Each of these four receptors plays an essential role in responding to adenosine in the central nervous system in pain regulation, cerebral blood flow, basal ganglia functions, respiration, and sleep.

In the new study, the A_{2A} adenosine-ligand bound structure suggests that there is no general receptor binding pocket conserved across the adenosine receptor family. Rather, the pocket itself can vary in position and orientation, yielding more opportunity for receptor diversity and ligand selectivity.

"A big surprise for us seeing the structure was that the ligand was in an extended conformation and pointed perpendicular to the membrane, interacting with the extracellular loops," Stevens said.

This feature can be seen as the rationale for A_{2A} receptor selectivity and may help in the design of new chemical entities with increased selectivity for this important drug target.

Stevens has focused on the structural studies of G protein-coupled receptors for almost two decades. He is the director of the RoadMap Joint Center for Innovative Membrane Protein Technologies (2003), and a co-investigator of the PSI-2 Accelerated Technology Center for Gene to 3D Structures (2005), both projects in collaboration with the Peter Kuhn laboratory at Scripps Research and funded by the National Institutes of Health, focused on the development of technologies to accelerate the study of human membrane protein structural biology.

The other authors of the study, The 2.6 Å Crystal Structure of a Human A2A Adenosine Receptor Bound to an Antagonist, are Veli-Pekka Jaakola, Mark T. Griffith, Michael A. Hanson, Vadim Cherezov, and Ellen Y.T. Chien of The Scripps Research Institute and J. Robert Lane and Adriaan P. IJzerman of the Leiden/Amsterdam Center for Drug Research, The Netherlands.

The study was supported by the National Institutes of Health, Pfizer, and the Dutch Top Institute Pharma.

Adapted from materials provided by Scripps Research Institute.

http://www.sciencedaily.com/releases/2008/10/081006102607.htm

H. Pylori Bacteria May Help Prevent Some Esophageal Cancers

Electron micrograph of H. pylori. (Credit: Yutaka Tsutsumi, M.D. Professor Department of Pathology Fujita Health University School of Medicine / courtesy of Wikimedia Commons)

ScienceDaily (Oct. 13, 2008) — Some bacteria may help protect against the development of a type of esophageal cancer, known as adenocarcinoma, according to a new review of the medical literature. These bacteria, which are called Helicobacter pylori, live in the stomachs of humans.

The review, published in the October issue of Cancer Prevention Research, a journal of the American Association for Cancer Research, found that people who had H. pylori strains carrying a gene called CagA were almost half as likely to get adenocarcinoma of the esophagus, a cancer that develops in the tube that passes food from the throat to the stomach.

"CagA- positive strains of H. pylori may decrease the risk of adenocarcinoma by reducing acid production in the stomach and, therefore, reducing acid reflux to the esophagus," said study co-author Farin Kamangar, M.D., Ph.D., a research fellow at the National Cancer Institute. "It may also work by decreasing the production of the hormone ghrelin, which is secreted from the stomach to stimulate appetite. A reduction in the level of ghrelin may lead to lower rates of obesity, an important risk factor for adenocarcinoma."

H. pylori, estimated to be present in about half the world's population, is a known cause of stomach cancer and ulcers. Advancements in sanitation and antibiotics have made H. pylori less common and have consequently lowered the incidence stomach cancer and ulcers. However, as H. pylori, including CagA-positive H. pylori, has become less common, esophageal adenocarcinomas have increased. The study suggests that the declining rates of H. pylori in developed populations may be partly responsible for this increase. Once a rare cancer, esophageal adenocarcinomas now constitute approximately half of all esophageal cancers cases in Western Countries like the U.S. and United Kingdom.

Although H. pylori was first discovered in the early 1980s, Kamangar says humans already had been living with the bacteria for 60,000 years. The bacteria were once present in the stomachs of just about everyone. Despite its potential for causing stomach cancer and ulcers, H. pylori's long history of co-existence with humans suggests it also may have some beneficial effects, including possible roles in reducing diarrheal diseases and asthma, Kamangar said.

For the study, Kamangar and co-author Farhad Islami of the University of Tehran in Iran analyzed results from 19 published studies examining the associations of H. pylori with esophageal adenocarcinoma and esophageal squamous cell carcinoma, another type of esophageal cancer.

Adapted from materials provided by American Association for Cancer Research, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081006092511.htm

'New prostate' grown inside mouse

Scientists have grown new prostate glands in mice, in another advance for stem cell technology.

The team from San Francisco were able to isolate single cells with the ability to generate an entire prostate.

The technique, reported in the journal Nature, could shed light on how prostate tumours develop.

However, any thoughts it could lead to transplants in men who have had the gland removed to beat cancer have been played down.

> **This discovery will be a significant boost to prostate cancer research**
> Professor Malcolm Alison
> Barts and The London School of Medicine and Dentistry

The prostate is found near the bladder, and helps make and expel semen, but is a common source of cancer, especially in older men.

A quarter of all new cancers diagnosed in men are prostate cancers, and 10,000 die from the disease every year in the UK.

The US researchers were able to track down a type of stem cell which divides to form the different cell types in the gland.

When these mouse stem cells were transplanted back into mice, they developed into entirely new glands.

However, this does not mean that entirely new prostates can be fabricated for men who have lost them.

Any new gland would have to be not only connected back to the urethra - the tube which carries urine from the bladder to the outside of the body, but also somehow to the complex system of nerves controlling its activity.

Even if this complex surgery were possible, many doctors would argue that the benefits of having the gland as an older man do not entirely justify it.

Not needed

Prof Robin Lovell-Badge, MRC National Institute for Medical Research, said: "Of course the main clinical problem with the prostate gland is not a need for additional ones, but their overgrowth, which often turns to prostate cancer.

"However, knowing the identity of these stem cells may eventually allow the development of therapies that specifically target these cells in a way that keeps them under control."

Professor Malcolm Alison, Professor of Stem Cell Biology at Barts and The London School of Medicine and Dentistry, agreed, saying that, in older men, the prostate tended to be a cause of "serious medical problems".

"However, it is a widely held view that cancers originate from normal stem cells, so this discovery will be a significant boost to prostate cancer research aimed at understanding how this deadly disease develops."

John Neate, the chief executive of The Prostate Cancer Charity, said: "This study is an important piece in the jigsaw of our understanding of the role that stem cells play in the prostate.

"It gives very clear evidence of the existence of stem cells in the prostate of mice. Scientists think they may work in a similar way in humans.

"Much research is being undertaken to unravel the role stem cells may play in the development of cancer and how they may respond differently to treatments."

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7685105.stm

Published: 2008/10/24 16:07:35 GMT

'One-stop' embryo test unveiled

A gene mapping test could tell parents-to-be if embryos are affected by almost any inherited disease, UK scientists have claimed.

The team from London's Bridge Centre say the £1,500 test could detect any of the 15,000 inherited diseases in weeks.

Current tests are either focused on a specific gene mutation, or take a lot longer to give results.

But other experts warned the fertility regulator would have to ensure there were strict limits on the test's use.

> **If you can screen for anything, where do you draw the line?**
> Dr Mark Hamilton, British Fertility Society

At the moment, clinics can test embryos before they are implanted in a woman's womb to see if they carry a specific genetic mutation, if a family is affected by a condition such as cystic fibrosis.

Another test was developed by a team at Guy's Hospital in London two years ago, which looks at genetic "fingerprint" by looking at a whole DNA of a cell.

But the claims for this new technique, called karyomapping which analyses chromosomes, is that it is a universal 'one size fits all' test.

Mapping patterns

A single-cell is taken from an eight-day-old embryo, created using IVF.

DNA samples are then taken from the parents - and their parents.

Usually, another member of the family, most likely a child affected by the relevant condition, also provides a sample.

All those family members' DNA is then compared, looking at 300,000 specific DNA markers, allowing scientists create a map of the family's genetics.

This means they can, for example, identify if there is a block of DNA which has been passed on by the paternal grandfather to an affected child and if it is also present in the embryo - because the markers will be the same for all three.

For example, the gene for cystic fibrosis lies on chromosome 7. If the paternal grandfather was a carrier, and the embryo has inherited a section of DNA at that particular position, the embryo will have the faulty gene.

The same check can be carried out across all chromosomes to allow screening for multiple genes.

'**Preventing suffering**'

Professor Alan Handyside, who has developed the test, told the BBC: "The current tests can only identify a small number of defects."

"One of the main things for patients is that, quite often, there isn't a test for their particular condition. This is a single test - a universal method."

He said the test could also be used, more controversially, to detect a genetic profile which showed a susceptibility to conditions such as heart disease or cancer.

The test is currently being trialled at the Bridge Centre, but is being used alongside conventional pre-implantation genetic testing so doctors can check the results.

Once Professor Handyside has enough data he will need to apply to the fertility regulator, the Human Fertility and Embryology Authority, for a licence to use the test.

An HFEA spokeswoman said its licensing committee would be able to set conditions on what it could be used for.

Dr Mark Hamilton, chairman of the British Fertility Society, said: "The effectiveness and efficiency of the procedure is quite exciting, and the fact it's quicker means it could be helpful to couples at risk of inherited diseases - and that in itself is significant.

"We can currently test for several hundred conditions, but the claim is that the spectrum of conditions which could be screened for is enormous

"But obviously, the ethical question is, if you can screen for anything, where do you draw the line?"

Story from BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7688299.stm

Published: 2008/10/24 11:38:56 GMT

Female Plant 'Communicates' Rejection Or Acceptance Of Male

Red hibiscus flower. Researchers have identified pollen proteins that may contribute to the signaling processes that determine if a plant accepts or rejects individual pollen grains for reproduction. (Credit: iStockphoto/Adam Dodd)

ScienceDaily (Oct. 24, 2008) — Without eyes or ears, plants must rely on the interaction of molecules to determine appropriate mating partners and avoid inbreeding. In a new study, University of Missouri researchers have identified pollen proteins that may contribute to the signaling processes that determine if a plant accepts or rejects individual pollen grains for reproduction.

Like humans, the mating game isn't always easy for plants. Plants rely on external factors such as wind and animals to bring them potential mates in the form of pollen grains. When pollen grains arrive, an introduction occurs through a "conversation" between the pollen (the male part of the flower) and the pistil (the female part of the flower). In this conversation, molecules take the place of words and allow the pollen to identify itself to the pistil. Listening in on this molecular conversation may provide ways to control the spread of transgenes from genetically-modified crops to wild relatives, offer better ways to control fertilization between cross species, and lead to a more efficient way of growing fruit trees.

"Unlike an animal's visual cues about mate selection, a plant's mate recognition takes place on a molecular level," said Bruce McClure, associate director of the Christopher S. Bond Life Sciences Center and researcher in the MU Interdisciplinary Plant Group and Division of Biochemistry. "The pollen must, in some way, announce to the pistil its identity, and the pistil must interpret this identity. To do this, proteins from the pollen and proteins from the pistil interact; this determines the acceptance or rejection of individual pollen grains."

In the study, researchers used two specific pistil proteins, NaTTS and 120K, as "bait" to see what pollen proteins would bind to them. These two pistil proteins were used because they directly influence the growth of pollen down the pistil to the ovary where fertilization takes place.

Three proteins, S-RNase-binding protein (SBP1), the protein NaPCCP and an enzyme, bound to the pistil proteins. This action suggests that these proteins likely contribute to the signaling processes that affect the success of pollen growth.

"Our experiment was like putting one side of a Velcro strip on two pistil proteins and then screening a collection of pollen proteins to see which of the pollen proteins have the complementary Velcro strip for binding," McClure said. "If it sticks, it's a good indication that the pollen proteins work with the pistil proteins to determine the success of reproduction."

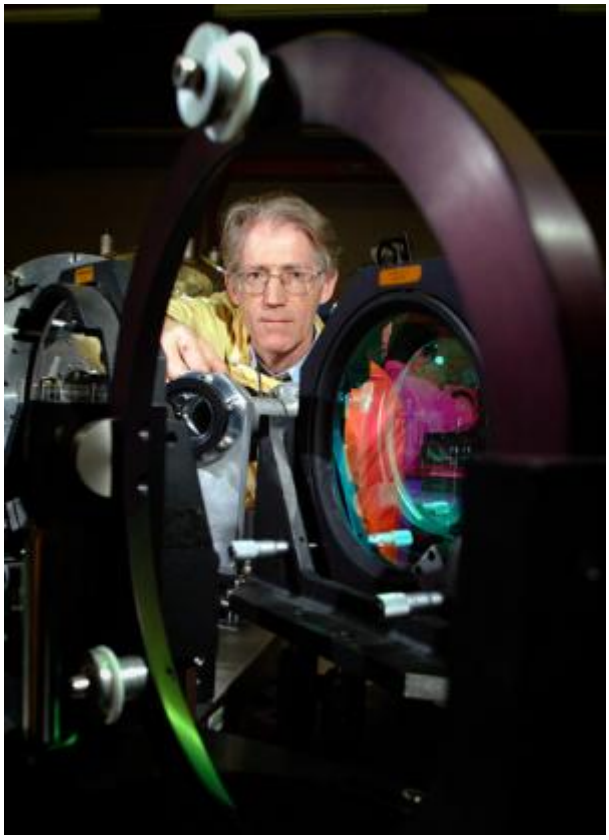
In previous studies, McClure showed that S-RNase, a protein on the pistil side, caused rejection of pollen from close relatives by acting as a cytotoxin, or a toxic substance, in the pollen tube.

For their study, the MU team used Nicotiana alata, a relative of tobacco commonly grown in home gardens as "flowering tobacco." The study, "Pollen Proteins Bind to the C-Terminal Domain of Nicotiana Alata Pistil Arabinogalactan Proteins," was published in the Journal of Biological Chemistry and was co-authored by McClure; Kirby N. Swatek, biochemistry graduate student; and Christopher B. Lee, post-doctoral researcher at the Bond Life Sciences Center.

Adapted from materials provided by University of Missouri-Columbia.

http://www.sciencedaily.com/releases/2008/10/081023113107.htm

Secrets From Within Planets Pave Way For Cleaner Energy



Adjusting optics in the Vulcan Lasers target area east. (Credit: Image courtesy of Science and Technology Facilities Council)

ScienceDaily (Oct. 24, 2008) — Research that has provided a deeper understanding into the centre of planets could also provide the way forward in the world's quest for cleaner energy.

An international team of scientists, led by the University of Oxford, working alongside researchers at the Science and Technology Facilities Council's (STFC) Central Laser Facility, has gained a deeper insight into the hot, dense matter found at the centre of planets and as a result, has provided further understanding into controlled thermonuclear fusion.

The full paper on this research has been published, 19 October, in the scientific journal, Nature Physics.

This deeper insight into planets could extend our comprehension of fusion energy – the same energy that powers the sun, and laser driven fusion as a future energy source. Fusion energy is widely considered an attractive, environmentally clean power source using sea water as its principal source of fuel, where no greenhouse gasses or long lived radioactive waste materials are produced.

Using STFC's Vulcan laser, the team has used an intense beam of X-rays to successfully identify and reproduce conditions found inside the core of planets, where solid matter has a temperature in excess of 50,000 degrees. The understanding of the complex state of matter in these extreme conditions represents one of the grand challenges of contemporary physics. The results from the Vulcan experiments are intended to improve our models of Jupiter and Saturn and to obtain better constraints on their composition and the age of the Solar System.

Using inelastic X-ray scattering measurements on a compressed lithium sample, it was shown how hot, dense matter states can be diagnosed and structural properties can be obtained. The thermodynamic properties – temperature, density and ionisation state, were all measured using a combination of non-invasive, high accuracy, X-ray diagnostics and advanced numerical simulations. The experiment has revealed that the matter at the centre of planets is in a state that is intermediate between a solid and a gas over lengths larger than 0.3 nanometres. To put this into context, 1 nanometre equates to less than 1/10000th of a human hair! Results showed that extreme matter behaves as a charged liquid, but at smaller distances it acts more like a gas.

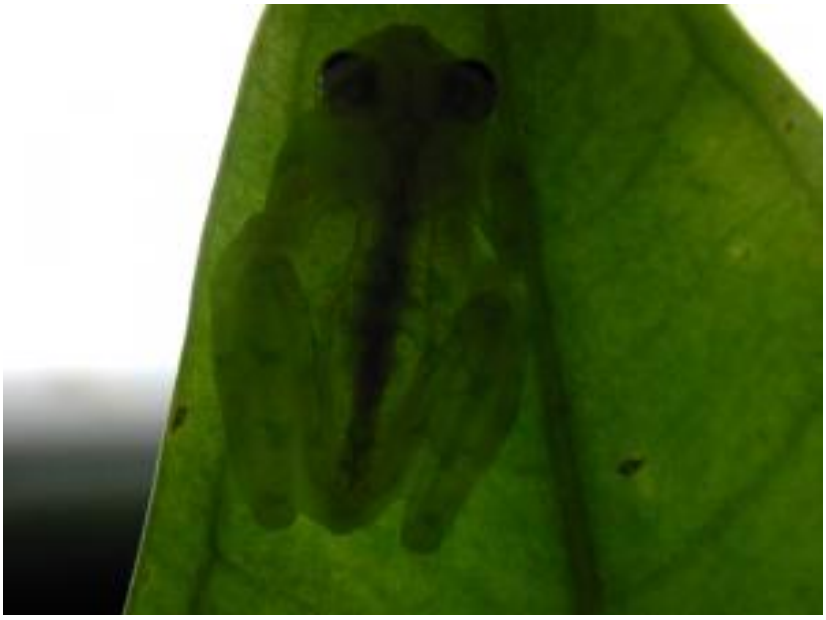
Dr Gianluca Gregori, of the University of Oxford and STFC's Central Laser Facility said: "The study of warm dense matter states, in this experiment on lithium, shows practical applications for controlled thermonuclear fusion, and it also represents significant understanding relating to astrophysical environments found in the core of planets and the crusts of old stars. This research therefore makes it not only possible to formulate more accurate models of planetary dynamics, but also to extend our comprehension of controlled thermonuclear fusion where such states of matter, that is liquid and gas, must be crossed to initiate fusion reactions. This work expands our knowledge of complex systems of particles where the laws that regulate their motion are both classical and quantum mechanical. "

Professor Mike Dunne, Director of the Central Laser Facility at STFC said: "Using high power lasers to find solutions to astrophysical issues is an area that has been highly active at STFC for some time. We are very excited that the Vulcan laser has contributed to such a significant piece of research. The use of extremely powerful lasers is proving to be a particularly effective approach to delivering long-term solutions for carbon-free energy."

Adapted from materials provided by Science and Technology Facilities Council.

http://www.sciencedaily.com/releases/2008/10/081023100552.htm

Modern Genetics Versus Ancient Frog-killing Fungus



A photo is of the frog species Hylalinobatrachium valerioi, one of the many species in decline in Central America. (Credit: This photo was taken by University of Idaho postdoctoral researcher Jeanne Robertson during field research in Parque Nacional El Cope, Panema)

ScienceDaily (Oct. 24, 2008) — Scientists at the University of Idaho currently are involved in a CSI-like investigation of a killer known to have been running rampant for the past decade. But the killer's name can't be found on the FBI's Most Wanted list. Instead, it's on the minds of ecologists on every continent in the world.

Its name is Batrachochytrium dendrobatidis (Bd). It is a "chytrid" fungus that lives on keratin, a type of protein found in the skin of amphibians, and is particularly deadly for certain species of frogs. A summary of key findings from the 2004 Global Amphibian Assessment states that 43 percent of all frog species are declining in population, with less than 1 percent showing increases. Although there are many reasons for frog decline, including climate change and habitat loss, Bd seriously is affecting a growing number of species.

"This fungus is really bizarre," said Erica Bree Rosenblum, assistant professor of biological sciences at the University of Idaho and lead author of the study published this week in the Proceedings of the National Academy of Sciences (PNAS). "It's a member of an group of ancient fungi that are at least a half billion years old. But it only recently began killing amphibians and unequivocally is responsible for a lot of the catastrophic frog die-offs during the past decade."

Previous studies have shown that once Bd is introduced to a habitat, up to 50 percent of amphibian species and 80 percent of individuals may die within one year. The fungus has been studied for the past decade, yet scientists still do not know much about how Bd kills its host.

However, Rosenblum's new paper brings scientists one step closer to solving the mystery. The study uses some of the most advanced genetic technology available in an attempt to understand how the fungus works at the most basic level. It identifies several gene families for future study, including one strong candidate that may be a key element in the killing process.

Because the fungus is so ancient, it differs wildly from most species scientists study, and many of its genes have unknown functions. To combat these unknowns, Rosenblum and her colleagues sequenced Bd's entire genome and compared the expression of genes in two phases of the fungus's life - the zoospore and sporangia stages.

The zoospore stage is the earliest form of the fungus when it is just a single cell swimming around looking for a host on which to grow. Once it embeds itself into an amphibian's skin, it grows into a more complex form called the sporangia stage. In this stage, Bd grows on the keratin in the frog's skin, creating more zoospores to spread the disease and often killing the host.

By looking at which genes are turned on when the fungus actively is destroying the skin, but are turned off when the fungus is doing little more than swimming around, scientists hoped to find candidates for genes responsible for both spreading the fungus and killing the frogs.

"We care about the zoospores because that's the stage it is swimming around and finding frogs to infect," said Rosenblum. "And we care about the sporangia stage because that's when Bd is actually killing the frogs."

The study flags many genes as potentially important, but Rosenblum identifies one family as particularly interesting. The family of genes in question, known as fungalysin metallopeptidase, has only one or few representative in similar fungi that do not kill frogs. But in this deadly fungus, genes in the family appear 29 times. Additionally, the genes generally are turned on when the fungus is infecting frogs, but turned off in the zoospore stage.

Although this gene family is an excellent candidate for the pathogen's killing ability, it is not certain. Discovering for sure which genes raise or lower the fungi's killing ability is a long process, partly because the fungus is so far removed from other organisms in the evolutionary tree.

"This fungus is strange and different, partly because it is so ancient," said Rosenblum. "One of the really amazing and wonderful things about this genetic technology is that we can take something we don't know anything about, sequence its whole genome, look at what each gene is doing in different life stages, and learn a tremendous amount about the organism."

Rosenblum and her team will continue their quest to stop Bd from killing off frog species in several ways. They currently are comparing active genes in Bd grown on frog skin to Bd grown in a test tube without exposure to keratin. Also, they plan to sequence genomes from different strains of Bd that kill less efficiently, or other, similar fungi that don't kill amphibians at all.

They also will study the parasite from the other side of the coin – the frog's point of view. By comparing different species of frogs, some of which are not killed by Bd, they hope to discover what genes make different species more or less susceptible to the fungus.

"The strength of these studies is the collaboration of ecologists and disease biologists," said Rosenblum. "We are not just choosing one factor to study. Looking at absolutely every gene in the genome is now a financially and practically feasible thing to do."

Adapted from materials provided by University of Idaho. Original article written by Ken Kingery.

http://www.sciencedaily.com/releases/2008/10/081014111403.htm

Highest Silicon Solar Cell Efficiency Ever Reached

Professor Martin Green and Dr. Anita Ho-Baillie with a silicon wafer which contains six large PERL cells of the type which set the world record. (Credit: Australian Research Council)

ScienceDaily (Oct. 24, 2008) — University of New South Wales' ARC Photovoltaic Centre of Excellence has created the first silicon solar cell to achieve the milestone of 25 per cent efficiency.

The UNSW ARC Photovoltaic Centre of Excellence already held the world record of 24.7 per cent for silicon solar cell efficiency. Now a revision of the international standard by which solar cells are measured, has delivered the significant 25 per cent record to the team led by Professors Martin Green and Stuart Wenham and widened their lead on the rest of the world.

Centre Executive Research Director, Scientia Professor Martin Green, said the new world mark in converting incident sunlight into electricity was one of six new world records claimed by UNSW for its silicon solar technologies.

Professor Green said the jump in performance leading to the milestone resulted from new knowledge about the composition of sunlight.

"Since the weights of the colours in sunlight change during the day, solar cells are measured under a standard colour spectrum defined under typical operational meteorological conditions," he said.

"Improvements in understanding atmospheric effects upon the colour content of sunlight led to a revision of the standard spectrum in April. The new spectrum has a higher energy content both down the blue end of the spectrum and at the opposite red end with, dare I say it, relatively less green."

The recalibration of the international standard, done by the International Electrochemical Commission in April, gave the biggest boost to UNSW technology while the measured efficiency of others made lesser gains. UNSW's world-leading silicon cell is now six per cent more efficient than the next-best technology, Professor Green said. The new record also inches the UNSW team closer to the 29 per cent theoretical maximum efficiency possible for first-generation silicon photovoltaic cells.

Dr Anita Ho-Baillie, who heads the Centre's high efficiency cell research effort, said the UNSW technology benefited greatly from the new spectrum "because our cells push the boundaries of response into the extremities of the spectrum".

"Blue light is absorbed strongly, very close to the cell surface where we go to great pains to make sure it is not wasted. Just the opposite, the red light is only weakly absorbed and we have to use special design features to trap it into the cell," she said.

Professor Green said: "These light-trapping features make our cells act as if they were much thicker than they are. This already has had an important spin-off in allowing us to work with CSG Solar to develop commercial 'thin-film' silicon-on-glass solar cells that are over 100 times thinner than conventional silicon cells."

ARC Centre Director, Professor Stuart Wenham said the focus of the Centre is now improving mainstream production. "Our main efforts now are focussed on getting these efficiency improvements into commercial production," he said. "Production compatible versions of our high efficiency technology are being introduced into production as we speak."

The world-record holding cell was fabricated by former Centre researchers, Dr Jianhua Zhao and Dr Aihua Wang, who have since left the Centre to establish China Sunergy, one of the world's largest photovoltaic manufacturers. "China was the largest manufacturer of solar cells internationally in 2007 with 70 per cent of the output from companies with our former UNSW students either Chief Executive Officers or Chief Technical Officers", said Professor Green.

Adapted from materials provided by University of New South Wales, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081023100536.htm

Seeing Red -- In The Number 7

Digit-colour synaesthetes will experience certain numbers in specific colours: for example, they might experience the number seven as red. (Credit: iStockphoto)

ScienceDaily (Oct. 24, 2008) — Hypnosis can induce synaesthetic experiences – where one sense triggers the involuntary use of another – according to a new study by UCL (University College London) researchers. The findings suggests that people with synaesthesia, contrary to popular belief, do not necessarily have extra connections in their brain; rather, their brains may simply do more 'cross talking' and this can be induced by changing inhibitory processes in the average brain.

People living with synaesthesia (known as synaesthetes) experience abnormal interactions between the senses. Digit-colour synaesthetes, for instance, will experience certain numbers in specific colours (for example, they might experience the number seven as red). A possible reason put forward for this phenomenon is the existence of extra connections between brain areas in synaesthetes, but the new study, published in the journal Psychological Science, suggests otherwise.

To explore the alternative theory of more cross talk (disinhibition) between brain areas in synaesthetes, Dr Roi Cohen Kadosh and colleagues used posthypnotic suggestion to show that people who are not synaesthetes can be induced to have synaesthetic experiences.

After inducing digit-colour synaesthesia, the volunteers reported similar experiences to those undergone by real synaesthetes in their everyday life. For example, one participant described seeing the numbers on car number plates in specific colours, while walking around under posthypnotic suggestion. Moreover, hypnotized participants failed trick tests which were also failed by real synaesthetes: in one test, when subjects were hypnotized to experience seven as red, they could not detect the number when a black seven was presented on a red background.

Dr Roi Cohen Kadosh, UCL Institute of Cognitive Neuroscience, says: "Our study shows that posthypnotic suggestion can induce synaesthetic experiences in people, suggesting that extra brain connections are not needed to experience cross-sensory interactions and that it is more cross talk within

the brain that causes these experiences. This takes us one step closer to understanding the causes of synaesthesia and abnormal cross-brain interactions."

Journal reference:

1. Roi Cohen Kadosh et al. **Induced cross-modal synesthetic experience without abnormal neuronal connections**. *Psychological Science*, (in press)

Adapted from materials provided by Association for Psychological Science.

http://www.sciencedaily.com/releases/2008/10/081022135803.htm

Child Abuse Increases Risk For Later Sexually Coercive Behavior In Some Men

ScienceDaily (Oct. 24, 2008) — Boys who experienced childhood physical or sexual abuse are more likely to use sexually coercive behavior against an unwilling female partner when they are adolescents and young adults.

Researchers trying to identify factors that put men at risk for committing sexual coercion have found that being victims of both childhood physical and sexual abuse made them 4 ½ times more likely to engage in sexually coercive behavior than men who were not abused, said Erin Casey, a University of Washington Tacoma assistant professor of social work.

She emphasized that this study focused on sexually coercive behavior, defined in this study as insisting on or making someone have sex when they didn't want to.

"Although there can be physical force involved in sexual coercion, it more often involves such tactics as pressure, persuasion, insistence, manipulation and lying to have sex with an unwilling female partner."

Men who experienced some form of childhood abuse accounted for less than 30 percent of the nearly 5,650 males surveyed, but they accounted for 45 percent of the group reporting sexually coercive behavior, added Casey, the lead author of a new study appearing in the online edition of the Journal of Interpersonal Violence. Men who experienced only physical abuse were half again as likely to engage in sexual coercion as those who were not victimized. The number of men who experienced only sexual abuse as a child was too small, less than one-half of 1 percent, to make any valid statistical conclusions.

"The higher the frequency of childhood abuse the more likely an adolescent or young adult was to engage in sexually coercive behavior," she said. However, Casey stressed that this study and previous research have found that the majority of child abuse survivors do not use abusive behavior in adulthood.

The study also found that 55 percent of the men who reported coercive behavior did not experience any childhood sexual or physical abuse.

"There is a lot of evidence indicating sexual coercion and aggression is a complex behavior with an array of risk factors. There is this whole group of men for whom we have yet to fully understand what their risk factors are. They are relatively 'average' men without terrible childhood histories, but who engage in this hurtful behavior," Casey said.

UW researchers used data collected in the National Longitudinal Study of Adolescent Health, which is a representative survey of more than 20,000 young people. These youth were interviewed three times over a six-year period, starting when their average age was 16.

For the sexual coercion study, the sample consisted of 5,649 young men surveyed when they were 22 and who reported they had had sex at least once in their lifetimes and were exclusively heterosexual. A total 5.6 percent reported perpetuating sexual coercion with a female intimate partner.

The UW researchers found two other factors – delinquent behavior and the age they first had sex – that, coupled with childhood abuse, were risks for committing later sexual coercion. Men who experienced childhood sexual abuse were more likely to report becoming sexually active at a young age and going on to sexually coercive behavior. Physical abuse in childhood was associated with delinquency among a small number of adolescent boys. Previous research has found that delinquent peer groups may engage in such behaviors as "trash-talking about girls and having impersonal attitudes about sexual relationships," Casey said.

In addition, the study found no link between alcohol problems or the coexistence of drinking and sex in early adolescence and subsequent sexually coercive behavior.

"Although we have prevention programs for general populations, like college students, those programs don't reliably change attitudes, and so far have had very little success in reducing rates of sexual assault. We need to understand more about what allows 'average' guys to use this hurtful behavior in order to enhance our prevention efforts. We really don't have all the data we need to understand the true prevalence of this behavior," she said.

Co-authors of the study are Blair Beadnell, a UW research scientist in the School of Social Work, and Taryn Lindhorst, a UW associate professor of social work. The Harry Frank Guggenheim Foundation and the UW Graduate School Dissertation Fund supported the research.

Adapted from materials provided by University of Washington.

http://www.sciencedaily.com/releases/2008/10/081021185103.htm

'THE PHILIPPE DE MONTEBELLO YEARS'

A Banquet of World Art, 30 Years in the Making

By HOLLAND COTTER

Exhibitions come and go; they are what museums do. Collections are slowly built and stay; they are what museums are. "The Philippe de Montebello Years: Curators Celebrate Three Decades of Acquisitions" at the Metropolitan Museum of Art plays both sides of this dynamic. It catches a monumental institution at a moment of major change.

As the title implies, the show is a tribute to Mr. de Montebello, who is leaving the Met after being its director for more than 30 years. For the occasion, curators in 17 of the museum's departments have chosen objects in their fields of expertise from the permanent collection. These have been assembled and intermeshed under the coordinating eye of Helen C. Evans, curator of Byzantine art.

Collaborative though it is, the cavalcade of world cultures that rolls through the museum's second-floor special-exhibition galleries is very much Mr. de Montebello's creation. Everything in them was acquired under his aegis. Curators may have proposed specific items, and donors offered others, but it was Mr. de Montebello who ultimately signed off on the acquisitions, giving each his famously resonant, bass-baritone "O.K."

And there were many O.K.'s: some 84,000 in total. The 300 objects in the show represent a tiny fraction, and a madly eclectic one. Chinese scrolls, Greek vessels, Oceanic effigies and an 18th-century American pickle holder share the spotlight, with no object privileged as better — grander, rarer, prettier — than any other. This is a wonder-cabinet situation, an exercise in proprietorial pride, an unabashed, if surprisingly low-key, display of fabulousness.

It is also one of the more radical exhibitions of Mr. de Montebello's tenure. As director, his goal was to create a culturally inclusive museum, and he did. Yet within that museum, cultures were sorted out and confined within traditional, in many cases artificial, borders. In this show the borders are down: all

cultures share a common space; they mingle, exchange ideas and vibes, and sometimes clash, as they do in real life.

Real life, or at least contemporary life, has never gained full admission to the Met in the de Montebello era. When culture wars raged outside in the 1980s and '90s, the museum barely acknowledged them. Mr. de Montebello declared himself elitist, and proud. Uplift, not political relevance, was art's proper sphere. The chill, bracing perspective of a "new" art history, which posits that art is ideologically manipulative and is as often as not an advertisement for top-down social power, has found scant response here.

There isn't much evidence of such cultural commentary in the show, either, except perhaps incidentally, in the way certain objects line up. When standing at the entrance to one gallery, it is possible to imagine that the American Indians in Delacroix's painting "The Natchez" are under fire, both from an ornate French flintlock gun mounted on the wall nearby and from Augustus Saint-Gaudens's gilded statue of Diana, who aims an arrow in their direction from halfway across the room.

What's most interesting about the show, politically, is the leveling process it represents. At the Met we are accustomed to seeing Greek art, seedbed of Western classicism, isolated from the rest of the museum in immaculate, light-flooded halls, a kind of sanitary zone. Here it's throw into the mix, and that changes our thinking about it. Classicism begins to look like an impure, iffy proposition in an installation halfway through the show, where the marble head of a startled-looking Hellenistic goddess is sandwiched between Brancusi's neo-Cycladic "Bird in Space" (1923) and a Grecian evening gown designed, around 1965, by Madame Grès. Athena meets Modernist abstraction, and abstraction meets Ava Gardner.

One of the Met's most exquisite Gothic sculptures, a 15th-century Virgin and Child from the Cloisters, is in the same room. So is a Charles Rennie Mackintosh washstand, and a red-pine bust of the 18th-century Russian military leader Aleksandr Menshikov, who looks like a crazed Dr. Strangelove in a massive fright wig. (Mr. de Montebello took one glance at this piece and decided that the Met had to have it.)

Under the circumstances, everything registers as both high and low. Uplift means whatever turns you on. Beauty, as a concept, is relative, and not necessarily elevated. Art assumes different meaning and value depending on how you view it: as a social historian, a finely attuned connoisseur or as a recreational window-shopper. Much of the work is just plain great no matter where you're coming from. Almost everything in the first room is, beginning with a scroll painting of a horse named Night-Shining White from Tang-dynasty China, its surface swarming with seals left by admirers since the eighth century.

The Met's oldest African piece is here: a twisting terra-cotta figure of a man, his back covered with boils or jewels — was he meant to record or ward off a plague? — from Djenné in Mali. From India comes a red sandstone Buddha, but also an Islamic inscription carved in relief, its letters as slender, upright and dense as bamboo shoots in a grove.

European painting was Mr. de Montebello's original field of expertise, and he has made some amazing catches. Vermeer's extraterrestrial "Study of a Young Woman" is one. It took up residence in the museum in 1979. Another is a full-length self-portrait of Peter Paul Rubens with his second wife, Helena Fourment. It's a heartbreaker. The artist, then in his 60s — he wouldn't live much longer — gazes down tenderly and regretfully at his young wife, with her pearlescent skin and baby-fine hair, as they walk through the Garden of Love. The picture is said to be one of Mr. de Montebello's Met favorites. Mine too.

As marvelous as much of the work is, the show was not designed as a greatest-hits display. Its stated purpose was to give a sense of how Mr. de Montebello fleshed out the unbalanced collection he found when he began as director. In the early 1970s a small Chinese painting collection occupied a few cases lining the Great Hall balcony. In 1981 he inaugurated a majestic suite of galleries to hold what has grown to be the largest collection of classical Chinese painting outside of Asia.

Through the 1980s the museum's Indian and Southeast Asian collection languished on the same balcony, having no place else to go. One of its treasures, a standing bronze Shiva or deified king from 11th-century Cambodia, was stuck in a dark niche, sometimes lighted, sometimes not. In 1994 the museum carved out the equivalent of a whole new interior wing for this material. The Cambodian Shiva is in the show.

Sometimes a single object can fill a huge void. The virtual absence of significant Ethiopian art from the African collection was remedied in 1998 when the museum acquired a magnificent 14th-century Gospel, illuminated with figures dressed in robes of saturated yellows and reds.

The small but growing Korean holdings were put on the international map with the purchase at auction, for more than $1.5 million, of a gilt-bronze bodhisattva in 2003. A 17th-century Japanese koto the size of a compact car introduced a plangent East Asian note to the Met's musical-instruments orchestra. And there was Duccio di Buoninsegna's tiny, transporting "Madonna and Child." Mr. de Montebello broke the bank for it, and good for him. Much bigger money is spent on absolute nothings. The picture looks more precious by the day.

One could go on, and the exhibition does, with mini-shows along its route in the form of cases filled with very small things: Roman rings, Tiffany pins, Mesopotamian seals, Indonesian earrings, Egyptian amulets, daguerreotypes (Frederick Douglass, Tom Thumb), and teensy paintings, among them a remarkable 1828 watercolor-on-ivory called "Beauty Revealed" by Sarah Goodridge of Boston, depicting a pair of exposed breasts, her own.

(You'll find images and descriptions of all of these objects on the Met Web site that serves as a catalog for the show: metmuseum.org/curators_celebrate.)The whole business ends with a nothing-but-the-finest flourish in a gallery of masterpiece drawings: Leonardo, Michelangelo, Titian, Raphael, Poussin and a smudgy, rare little two-sided scrap by the Netherlandish painter Gerard David that joined the all-star lineup just this year.

If late-20th-century names are scarce, that's probably just as well. Despite the presence in the show of first-rank paintings by Mark Rothko and Jasper Johns, contemporary art has not been the strength of a museum that has tended in the past three decades to favor huffy-puffy old master-ish types like Lucian Freud. One hopes that Mr. de Montebello's appointed successor, Thomas P. Campbell, a Met curator, will feel free to explore other paths.

Mr. Campbell, like Mr. de Montebello, is a European-art specialist. The two immense tapestry exhibitions he mounted at the Met were, to the surprise of many, among the museum's strongest recent draws. Mr. de Montebello was surely not surprised. He knows fantastic when he sees it and, in a curatorial intervention, he requested that his tribute exhibition open with a tapestry — 16th-century, Flemish — called "The Triumph of Fame."

It depicts the allegorical figure of Fame, tall and slender, surrounded by writers renowned for their praise of the past, all gathered together like expectant picnickers in a flowery field. A close look reveals that some of the flowers are in full bloom, others have gone to seed, some are still in bud: the cyclical story of art and life, institutions and collections. But while Fame and his friends seem to wait for a feast to arrive, ours is already here. Mr. de Montebello has been providing it, special delivery, for 30 years. Farewell, and hail.

"The Philippe de Montebello Years: Curators Celebrate Three Decades of Acquisitions" remains at the Metropolitan Museum of Art through Feb. 1; 1000 Fifth Avenue and 82nd Street, (212) 535-7710, metmuseum.org.

http://www.nytimes.com/2008/10/24/arts/design/24phil.html?_r=1&ref=design&oref=slogin

'PICASSO'S 'MARIE-THÉRÈSE'

Picasso in Lust and Ambition

By HOLLAND COTTER

Picasso was one of 20th-century art's major makers and shapers. He was also one of its most prolific purveyors of kitsch. I would place a high percentage of his output in the kitsch category. That would include some of the dozen closely related paintings in the exhibition "Picasso's 'Marie-Thérèse' " at Acquavella Galleries, and for sure the centerpiece picture, "La Rêve" ("The Dream"), once famous for its $139 million price tag and even more famous for its ruinous run-in with a stray elbow.

The paintings at Acquavella, all done in or around 1932, have several narratives going for them; the first and most familiar, and the one people seem to love best, is called "Picasso in Love," subtitled "Love (or Lust) as the Wellspring of Art." The erotic muse in this case was Marie-Thérèse Walter, a French teenager whom Picasso met and sweet-talked on a Paris street in 1927, when he was 45 and married. Soon they were lovers. He found himself rejuvenated, walking on air. He painted many pictures using her as a model. Some are in the show.

The rest of the story is not so happy. In 1935 Marie-Thérèse had his child, but Picasso's attention wandered. He found other mistresses and new wives, though he kept in affectionate touch with Ms. Walter through the years. Four years after he died, she committed suicide.

Then there's another tale, less about love, more about art. In Paris in 1931 Picasso saw a retrospective of his rival Henri Matisse and instantly decided that he, too, had to have a retrospective, a big one in Paris, within a year. And it would not freeze him in the past but project him into the present as the vital, fertile, better-than-ever artist he considered himself to be.

With this promotional vision in mind, he set to work. In a matter of a few months he had whipped up all but one of the paintings in the Acquavella show. Some he apparently finished in a matter of hours. And perhaps because of the capstone role they would play in the survey, he made them crowd-pleasing as

possible: alternately soft-porn sexy and sentimental, with eye-catching colors, art historical references (Ingres, Matisse, Cézanne) and enough kooky distortion to maintain an avant-garde cred.

Ms. Walter, with her blond hair, voluptuous figure and aquiline nose — there are lots of photographs of her at Acquavella — was the passive vehicle for all this. And the combination of model, well-tried formal moves and deadline adrenaline worked. The retrospective was a hit. The Acquavella show is designed to be a hit too, which leads to a third story, about how and why it came to be. The short answer is because of "The Dream." That much-published painting belongs to Stephen A. Wynn, the Las Vegas casino czar. He bought it in 2001, reportedly for $42 million. Its previous owner had paid $48.4 million for it a few years earlier.

In 2006 Mr. Wynn decided to sell the picture through Acquavella Galleries and found a ready buyer in a fellow billionaire art accumulator, the hedge fund mogul Steven A. Cohen. They settled on a price of $139 million, the highest on record for any piece of art. Then there was a mishap. One day, while giving some friends a tour of his collection, Mr. Wynn stopped in front of "The Dream" to say a few words and accidentally slammed his elbow through the canvas. Ouch. Naturally, the impending sale was off. Conservators were called in. Could they repair the damage? They could, and they did.

Beyond this point the tale grows a little hazy. Mr. Wynn decided he didn't want to sell "The Dream" after all — something about his wife taking the accident as an omen. Yet here it is, in his dealer's gallery on the Upper East Side, surrounded by a king's ransom of other Marie-Thérèse paintings on loan from the Guggenheim Museum, the Museum of Modern Art, the Metropolitan Museum, Tate Modern and Mr. Cohen. The gallery insists that nothing in the show is for sale, that the whole thing is a kind of connoisseurial offering, no commercial strings attached.

The show — which comes with a catalog, security guards and a procession of street banners — does serve some practical purposes, though. It lets the world see, in person and up close, how successful the repair job on "The Dream" has been. (The punched hole was in the area of the Marie-Thérèse's left forearm.) You'd never guess there had been a problem. And it is probably no accident of timing that a Nov. 6 Christie's sale finds a 1934 Picasso painting of Marie-Thérèse and her sister on offer, for an estimated $18 million to $25 million. Whatever, the show is worth a visit. Most of the paintings are more than familiar. Some, particularly those in which Picasso turns his lover into a kind of mollusk or starfish, are more interesting than others. But as the only major Picasso show in town — unless you count MoMA's collection — it's a must-see.

As for "The Dream," it's not too good because it's so ordinary. Marie-Thérèse, with large, lumpish, standard-issue Picasso limbs, sits in a chair asleep, head to one side, one breast exposed, a smile on her lipstick-red lips. It's hard not to notice that her face is split down the middle and that one half, the top, has the shape of a phallus. So she's dreaming about her terrific older lover, and that's all that's on her mind, and that makes her smile?

Please, Pablo, give us a break. This is an eroticism on the level of all those images of the artist as minotaur ravishing his models that you churned out by the thousands and that no one takes seriously any more, if anyone ever did. Still, kitsch, once acknowledged as such, has its appeal. And despite the gallery's nothing-is-for-sale protestations and an economic crisis that deepens by the day, "The Dream" may well find its way back to the market, though who knows at what price now. Would that the economy could be restored as easily as Mr. Wynn's patched-up picture.

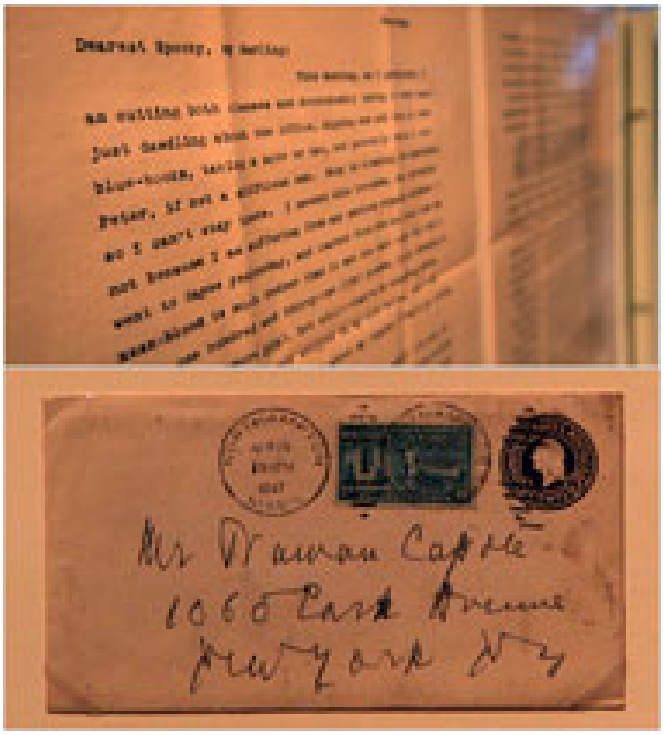
"Picasso's 'Marie-Thérèse' " remains at Acquavella Galleries, 18 East 79th Street, Manhattan, through Nov. 29; acquavellagalleries.com.

http://www.nytimes.com/2008/10/24/arts/design/24pica.html?ref=design

'YADDO: MAKING AMERICAN CULTURE'

Shadows of Yaddo

By CHARLES McGRATH



In 1899 Katrina Trask, desolate over the death of their four children, proposed to her husband, Spencer, that they turn Yaddo, their 400-acre estate outside Saratoga Springs, N.Y., into an artists' retreat. He was a baron of the Gilded Age. She was a pre-Raphaelite figure who wore gauzy white dresses and wrote poetry about the days of King Arthur, and she imagined the place as a perpetual house party of writers, artists and musicians.

"Some of them will see the Muses," she said. "Some of them will drink of the Fountain of Hippocrene, and all of them will find the Sacred Fire and light their torches at its flame."

The colony, which is the subject of "Yaddo: Making American Culture," an absorbing new exhibition that opens on Friday at the New York Public Library, welcomed its first artists in 1926 and has always had an unreal, Gatsbylike quality. Unlike the MacDowell Colony, the artists' retreat in Peterborough, N.H., which opened 19 years earlier and cultivates an air of New England simplicity, Yaddo (meant to rhyme with "shadow") is over the top. Many of the guests stay in the Trasks' 55-room mansion, which is itself a kind of fantasy, an imitation Austrian castle. They may not have sipped the waters of Hippocrene, but they have drunk just about everything else, despite a rule that used to require them to tipple only in their rooms. And countless torches of the romantic sort have been kindled and extinguished there.

John Cheever used to boast that he had enjoyed sex on every flat surface in the mansion, not to mention the garden and the fields. Yaddo has always been the kind of place where artists can, if they choose, experience a lifetime's worth of relationships in a month or so. It was at Yaddo that Newton Arvin, a literary critic and professor at Smith College, met and began a long affair with the young Truman Capote, or "Precious Spooky," as he calls him in a couple of charming letters, on display at the library, that manage to combine endearments with sound literary observation.

The novelist Henry Roth met his wife, the composer Muriel Parker, there, and the novelist Josephine Herbst started enduring relationships with the painter Marion Greenwood and the poet Jean Garrigue (who was also having an affair with another Yaddo resident, Alfred Kazin).

A computer display, if the bugs are ever worked out, will enable the viewer to search through the many other friendships and liaisons that began at Yaddo, but the database leaves out the innumerable one-night or one-week stands.

If "Yaddo: Making American Culture" has a fault, it's that it neglects the kind of silliness and high jinks that have taken place there: guests prancing naked through the hallways or sliding on trays down the main staircase. The closest the exhibition gets to nudity in a display is a series of photographs showing the painter Philip Guston for some reason decorating the bare torso of the writer William Gass with a clock in back and a window shade in front.

There is also a painting by Mr. Guston, one by Milton Avery and some prints by Philip Reisman, among others, though Yaddo's record in the visual arts is not as strong as in the literary ones. And there are recordings of some of the music played at Yaddo concerts during the '30s and '40s when, under the leadership of a tireless Aaron Copland, it became a hotbed of contemporary composition.

But the heart of the exhibition, organized by Micki McGee, a sociologist who teaches at Fordham and also edited the exhibition catalog, is letters, dozens and dozens of them, most of them typed, single-spaced, some on carbon paper, many with X-outs and interlinear insertions. In this age of the word processor they seem touchingly quaint, more primitive almost than the handwritten ones, many of which display a degree of penmanship that now seems virtuosic.

The central figure in most of the correspondence, now housed in the library's manuscripts and archives division, is Elizabeth Ames, a Minnesotan Quaker who was Yaddo's director for 46 years and eventually took to wearing white dresses herself, like the reincarnation of Katrina Trask. She ran the place as if it were a private club, inviting (with the help of a tractable admissions committee) those she liked and excluding those she didn't. Henry Miller was apparently blackballed, and so was the artist Eva Hesse, probably Yaddo's most embarrassing rejection. "Bad taste and weak form," an admissions report says.

The critic Morton Dauwen Zabel, a member of the admissions committee, wrote a note dismissing the Beats, in particular Allen Ginsberg and Lawrence Ferlinghetti. "It is fairly certain that difficulties would result from their visits," he warned. He also raised some doubts about Gore Vidal.

But inevitably, as the exhibition makes plain, it proved impossible to keep real-world controversy from the gates of Yaddo. After much debate, black artists were admitted in 1941, which is sooner than black players were welcomed into baseball but a little tardy if you consider that Booker T. Washington had been a household guest of the Trasks. In the beginning blacks appear to have been held to a higher standard of conduct. James Baldwin was mercilessly dunned for a $35 phone bill he had run up, and he was never invited back.

In the late '40s there was a "red scare at Yaddo," instigated by the poet Robert Lowell, who was then drinking heavily and in a phase of religious and political mania. He accused Agnes Smedley, the author of several books on China and a particular favorite of Elizabeth Ames, who allowed her to live at Yaddo for five uninterrupted years, of being a Russian spy. Lowell called for the removal of Ms. Ames, whom he claimed was "deeply and mysteriously" involved in treasonous political activity. The affair eventually fizzled out, and Ms. Ames kept her job, but not without factions, hearings, petitions and a blizzard of letters.

In 1960 Newton Arvin, another Ames favorite, who had become a fixture at Yaddo and a board member, was arrested by state troopers in Northampton, Mass., and was eventually convicted of trafficking in

homosexual pornography. Ms. Ames and others agonized over what to do but sadly concluded that Mr. Arvin, as a convicted felon, had to step down from the board, though he was still welcome as a guest. He never went back and died, broken-hearted, three years later. The exhibition includes two samples of the kind of beefcake the police discovered in Mr. Arvin's apartment: issues of Grecian Guild Pictorial and Trim: Young America's Favorite Physique Publication, far tamer, it turns out, than the underwear ads in today's Times Square.

Yaddo isn't for everyone. Nelson Algren lasted one day. Betty Friedan went stir crazy after three. After two visits Mario Puzo (whom the picky Mr. Zabel thought "fundamentally a C to C plus" writer) cut short a third.

"The older I get the more Italian-peasant I get and so I can't be happy unless I'm bossing a bunch of kids around and hearing a lot of noise," he wrote in apology. But those who stayed got a tremendous amount of work done, the writers especially.

Near the exit of the exhibition there's a tower of books published by guests at Yaddo, mostly between 1926 and 1980, the years covered by the show, with a few latecomers thrown in for good measure. They're stacked horizontally, six abreast and perilously high. If you were to try to pull out, say, "Herzog," "Operation Shylock" or one of Eudora Welty's story collections, you would cause a life-threatening landslide. It's enough to make you think gratefully of the medieval monk who figured out how to shelve books vertically.

"Yaddo: Making American Culture" is on view through Feb. 15 at the New York Public Library; (212) 592-7730, nypl.org.

http://www.nytimes.com/2008/10/24/arts/design/24yadd.html?ref=design

'POMPEII AND THE ROMAN VILLA'

Pompeii Style, B.C.E. (Before Catastrophic Eruption)

By KAREN ROSENBERG

WASHINGTON

The eruption of Vesuvius in A.D. 79 was both a natural and a cultural disaster. At the time the surrounding region of Campania was a resort destination for the Roman aristocracy. Enticed by water views, pleasant temperatures, sea breezes and thermal baths, emperors from Caesar to Caligula vacationed in sprawling villas along the Bay of Naples. Rich Romans followed, hoping to rub shoulders with politicians during their season of leisure. Artists flocked to the nearby cities of Pompeii and Herculaneum, where they thrived on commissions for villa décor.

All of this ended, famously, with a blast of hot lava, but Roman "villa society" has often served as a benchmark for wealthy citizens wishing to assert their status and taste. The Getty Villa in Malibu, Calif., for instance, is a meticulous recreation of the Villa dei Papiri at Herculaneum.

Many other examples come to mind when wandering through "Pompeii and the Roman Villa: Art and Culture Around the Bay of Naples," at the National Gallery here. The villas of the richest and most powerful Romans had private theaters, sports arenas and spa facilities — antecedents of the hedge-fund palaces with private skating rinks and museums that define present-day Greenwich, Conn. Pompeii was destroyed by seismic activity rather than credit-default swaps, but there are some eerie parallels between its frozen-in-time culture of excess and our own staggering economy.

Organized by Carol C. Mattusch, a professor of art history at George Mason University, the exhibition includes recent discoveries on view in the United States for the first time, as well as finds from excavations dating to the mid-18th century. The loans come from the Museo Archeologico Nazionale in Naples, Italy; from site museums at Pompeii, Boscoreale, Torre Annunziata and Baia; and from other museums and private collections in the United States and Europe.

The galleries unfold according to the floor plan of a typical villa, starting with a "cave canem" ("beware of the dog") sign at the entrance and continuing through an atrium, gardens and dining room. The installation — which includes decorative columns, wall borders, living plants and reproductions of mosaics — works hard to maintain the illusion of classical architecture in the National Gallery's stark and unprepossessing East Building.

One theme of the exhibition is the tension between modesty and extravagance, Apollonian restraint and Dionysian indulgence. (As Kenneth Lapatin notes in a catalog essay, the Latin term luxuria derives from the verb luxor, to sprain or dislocate.) Cato the Elder and other moralists cautioned against the excessive display of wealth, but their words had more traction in the city of Rome than in the villas along the Bay of Naples.

A highlight of the exhibition is a triclinium, or open dining room, from the site of Moregine, on the outskirts of Pompeii. Its frescoes, found in 1959 and excavated in 1999-2000, depict Apollo, the god of learning, and his muses — figures intended to stimulate properly intellectual dinner conversation.

As in a typical villa, the dining area overlooks a set of "gardens" decorated with Dionysian sculpture: wild animals, maenads, satyrs, even a hermaphrodite. Nearby, a bronze shows Dionysus's pudgy and intoxicated companion, Silenos, astride a wineskin. Ancient Romans could recline on the triclinium's long benches, discussing music, literature and other refined topics, while contemplating a vista of ecstatic abandon.

Further proof of indulgence can be found in jewelry and smaller decorative objects. An intricate emerald necklace and a set of pearl earrings, excavated in the late 1980s at the Villa at Oplontis, are among the treasures on view. They were discovered, along with several skeletons, in a room at the front of the villa — an indication that people tried to wear or carry their most valuable possessions as they fled the eruption.

Larger sculptures and furnishings reflect the passion of educated, well-off Romans for all things Greek. As the Roman poet Horace summarized: "Captured Greece took captive her savage conqueror and brought civilization to rustic Latium." A bust of Homer, statues and mosaics of Alexander the Great and a gladiator helmet embossed with scenes from the Iliad are a few of the relevant archaeological finds.

Whether purchasing antiquities or commissioning reproductions from local artists, elite Romans gave little regard to the original context of Greek sculpture. Archaic and classical works were displayed side by side, and deities that might have served a ritual function in ancient Greece were reincarnated as home décor. In one of many examples in the exhibition, a bronze statue in the style of a kouros doubles as a trayholder.

The illusion of antiquity could be enough to fool a collector or impress a houseguest. Another bronze kouros sculpture, a bust, has an irregular lower edge that gives it the appearance of a fragment of a full-length statue.

Abruptly concluding the villa tour, the exhibition, which will travel after its stay at the National Gallery to the Los Angeles County Museum of Art, takes a morbid but fascinating turn, jumping ahead to the 18th-century rediscovery of Pompeii and the site's subsequent hold on the popular imagination. A 10-minute historical video on the eruption of Vesuvius, which includes footage from "Spartacus" and other Hollywood films about ancient Rome, eases the transition.

In the next few galleries, paintings and sculptures echoing Edward Bulwer-Lytton's 1834 novel, "The Last Days of Pompeii," show Romans panicking and collapsing, as Vesuvius spews ash and flame. During the 18th and 19th centuries, the still active volcano was a popular stop on the Grand Tour and a fixture in paintings by British and French artists like Joseph Wright and Pierre-Henri de Valenciennes.

In an 1813 painting by Valenciennes featured in the exhibition, Pliny the Elder and his nephew Pliny the Younger witness the eruption from the beach at Stabiae. (The elder Pliny died during the day's events; the younger survived to give a remarkable account of the event in a letter to the historian Tacitus.)

Also on display are ephemera from the tourist economy that developed around Pompeii; these include photographs of casts made by pouring plaster into the cavities left by decayed bodies. It is easy to see how these nauseating artifacts might have appealed to death-obsessed Victorians.

On a more materialist level, the lure of Pompeii is best depicted in "The Sculpture Gallery" (1874), a painting by the 19th-century British artist Lawrence Alma-Tadema (a successful painter of Classical ruins and an associate of the Pre-Raphaelites.) In this ostentatious scene the artist portrays himself and his family as ancient Romans examining works of art for possible purchase.

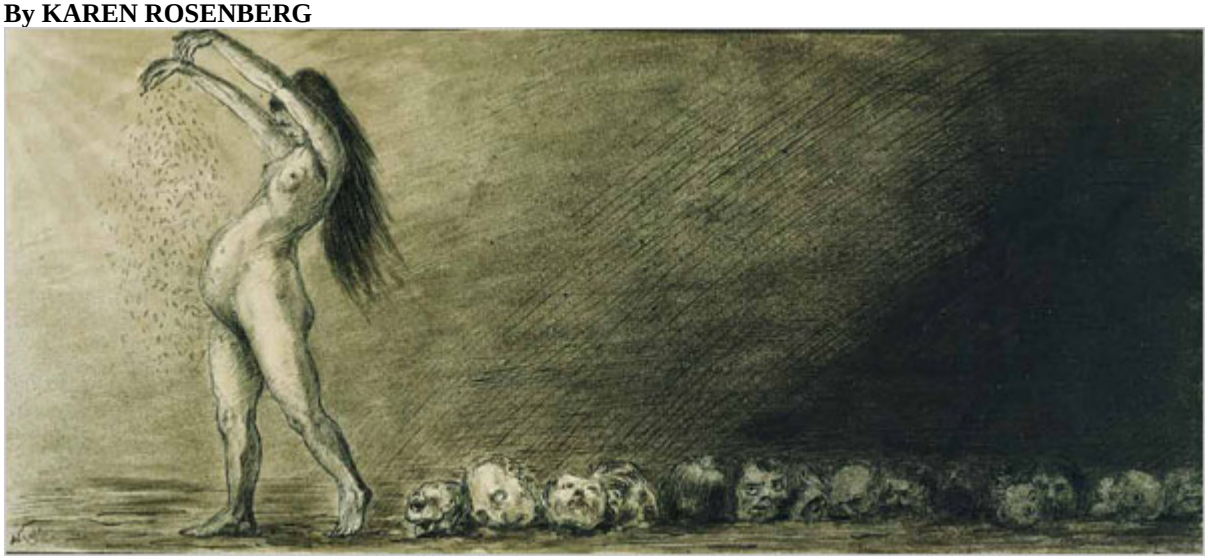
The painting, and the exhibition, each make the point: every culture finds affirmation of its taste and sophistication in a previous golden age.

"Pompeii and the Roman Villa: Art and Culture Around the Bay of Naples" continues through March 22 at the National Gallery of Art, Washington; (202) 842-6176, nga.gov.

http://www.nytimes.com/2008/10/24/arts/design/24pomp.html?ref=design

Mapping the Shadowy Corners of the Subconscious

By KAREN ROSENBERG



The Austrian artist Alfred Kubin (1877-1959) began his career just as Freud released "The Interpretation of Dreams." Accordingly, the Neue Galerie's "Alfred Kubin: Drawings, 1897-1909" is replete with the terrors of the freshly analyzed psyche. Monsters, demons and mythical beasts roam free; humans abandon themselves to bestial impulses. Done in black-and-white pen, ink and spray on heavy paper used for cartography, Kubin's drawings map the shadowy corners of the unconscious.

The show, organized by Annegret Hoberg of the Städtische Galerie im Lenbachhaus, Munich's municipal gallery, also offers viewers an alternative to the image of Viennese art as sumptuous, decorative and refined. You would never guess that Kubin was a contemporary of Gustav Klimt; he is closer in spirit to the Belgian James Ensor and the Norwegian Edvard Munch, visionaries who expressed modernity's spiritual toll and anticipated some of the horrors of the 20th century.

Like the Symbolist artists Odilon Redon, Max Klinger and Félicien Rops, Kubin was inspired by literature: he read (and illustrated) Gogol, Dostoyevsky and Poe. The writings of Nietzsche and Schopenhauer, current at the time, also offered countless points of departure for artists who wished to agonize over the human condition.

Playing to the art's dark themes, the Neue Galerie's third floor has been made over in the sensationally macabre style of a Tim Burton movie. The walls are painted black and brown; red crushed-velvet curtains hang in the doorways; and Kubin's death mask is displayed in a coffinlike glass case. These ghoulish touches are gratuitous and a bit puzzling. They seem designed to make the exhibition more appealing to the young, but parents may have reservations about the often explicit sex-and-death imagery.

Freud would have had a field day with Kubin's childhood. Kubin did not meet his father, a land surveyor for the monarchy, until age 2. At 10, he witnessed the death of his mother. As he later recalled, "her familiar face suddenly turned pinched and alien." He added that over the course of his life, "I often stood at deathbeds, but what I saw there could no longer influence the impression of that first death." Further complicating his fragile mental state, Kubin was seduced at 11 by a pregnant woman.

These events marred Kubin's life as a young adult. At 19, he tried to commit suicide on his mother's grave; later, in the army, he had a nervous breakdown. He would go on to have a long and happy marriage

and a peaceful life in the countryside of Zwickeldt, where he continued to work. The drawings at the Neue Galerie, however, cover Kubin's most anxious and productive period, during which he often drew in spurts prompted by fevers and hallucinations.

Early drawings attest to Kubin's Oedipal animosity toward his father, which often materialized in disagreements over finances. "Father and Son" (1900) shows an old man in a rocking chair; his hair flows over the chair's back and through the fists of a younger man, who is shaking it to release a pile of coins.

Much creepier are the drawings of women, particularly pregnant women, who are often depicted as femmes fatales. In "The Egg" (1901-2) Kubin drew a skeletal female with an enormous, swollen belly standing next to an open grave. In "Earth: Mother of Us All" (1900), a pregnant sorceress sows seeds from her raised arms; disembodied heads lie on the ground behind her.

Kubin also depicted women as victims, often of sexual aggression. Two particularly sinister drawings show naked women being menaced by apes; in another pair of images, aptly titled "Sucking Creature" (1903-5), giant squids, or octopi, attach tentacles to female flesh.

Kubin's imagination was certainly active, but the apparitions of his fellow visionaries also found their way into his nightmares. Redon's composite figures, often floating and seemingly lighted from within, are a frequent reference. So are Goya's "Capriccios" and Hieronymus Bosch's "Garden of Earthly Delights."

The Goya comparison can be misleading. Despite Kubin's many renderings of kings, emperors and warring crowds, he was not really a political artist. Even the severed heads of "Monument" and "Self-Observation" are discussed, in the show's extensive catalog, as expressions of a generic modernist alienation or of Kubin's well-chronicled sexual paranoia.

The storybook quality of many of the images is typical of Symbolist art, but it also reflects Kubin's literary aspirations. The show includes drawings that accompanied his sole novel, "The Other Side" (1908), a grim, dystopian fantasy about the decline of an isolated city named Perle. The book was praised by Kafka, who later incorporated elements of the story into "The Castle." The pictures offer few clues to the book's byzantine narrative, but Kubin's cityscapes and map of Perle are atypically light-handed and fanciful.

Kubin seemed to dream in black and white; he wasn't much of a painter or a colorist, even though he associated with Kandinsky and Klee. His temperas and gouaches have the look of bad science-fiction illustrations or second-rate Max Ernsts.

From our post-Freudian vantage point, Kubin's art can look comically grotesque. His personal traumas were real, however, as was the climate of apprehension in turn-of-the-century Austria. Later, after one world war and in the early stages of another, Kubin wrote in his diary: "Perhaps that is precisely what life is: a dream and an anxiety."

"Alfred Kubin: Drawings, 1897-1909" continues through Jan. 26 at the Neue Galerie, 1048 Fifth Avenue, at 86th Street; (212) 628-6200, neuegalerie.org.

http://www.nytimes.com/2008/10/16/arts/design/16neue.html

How Breastfeeding Transfers Immunity To Babies

BYU microbiology professor Eric Wilson led a research team that included undergraduates Kathryn Distelhorst (r) and Elizabeth Nielsen Low that showed how breastfeeding passes mothers' immunity on to babies. (Credit: Image courtesy of Brigham Young University)

ScienceDaily (Oct. 27, 2008) — A BYU-Harvard-Stanford research team has identified a molecule that is key to mothers' ability to pass along immunity to intestinal infections to their babies through breast milk.

The study highlights an amazing change that takes place in a mother's body when she begins producing breast milk. For years before her pregnancy, cells that produce antibodies against intestinal infections travel around her circulatory system as if it were a highway and regularly take an "off-ramp" to her intestine. There they stand ready to defend against infections such as cholera or rotavirus. But once she begins lactating, some of these same antibody-producing cells suddenly begin taking a different "off-ramp," so to speak, that leads to the mammary glands. That way, when her baby nurses, the antibodies go straight to his intestine and offer protection while he builds up his own immunity.

This is why previous studies have shown that formula-fed infants have twice the incidence of diarrheal illness as breast-fed infants.

Until now, scientists did not know how the mother's body signaled the antibody-producing cells to take the different off-ramp. The new study identifies the molecule that gives them the green light.

"Everybody hears that breastfeeding is good for the baby," said Eric Wilson, the Brigham Young University microbiologist who is the lead author on the study. "But why is it good? One of the reasons is that mothers' milk carries protective antibodies which shield the newborn from infection, and this study

demonstrates the molecular mechanisms used by the mother's body to get these antibody-producing cells where they need to be."

Understanding the role of the molecule, called CCR10, also has implications for potential future efforts to help mothers better protect their infants.

"This tells us that this molecule is extremely important, so if we want to design a vaccine for the mother so she could effectively pass protective antibodies to the child, it would be absolutely essential to induce high levels of CCR10," said Wilson.

Speaking broadly about the long-term applications of this research, BYU undergraduate Elizabeth Nielsen Low, a co-author on the paper, said, "If we know how these cells migrate, we'll be able to hit the right targets to get them to go where we want them."

Daniel Campbell is a researcher at the Benroya Research Institute in Seattle, a nonprofit organization that specializes in the immune system, and was not affiliated with this study.

"The molecular basis for this redistribution [of the mother's cells] has not been well characterized, but Dr. Wilson's work has begun to crack that code and define the molecules responsible for this cellular redistribution and passive immunity," Campbell said. "It is important work that fundamentally enhances our understanding of how immunity is provided to the [baby] via the milk. Dr. Wilson's study will certainly form the basis for many other studies aimed at uncovering how the immune system is organized, particularly at mucosal surfaces."

To conduct their research, the team used so-called "knock-out mice" that had been genetically engineered to lack the CCR10 molecule. Whereas normal lactating mice had hundreds of thousands of antibody-producing cells in their mammary glands, the BYU team found that the knock-out mice had more than 70 times fewer such cells. Tests verified that the absence of CCR10 was responsible for the deficiency.

Surprisingly, the research also showed that CCR10 does not play the same crucial role in signaling antibody-producing cells to migrate to the intestine. Another molecule is their "traffic light."

The findings will be published in the Nov. 1 issue of the Journal of Immunology.

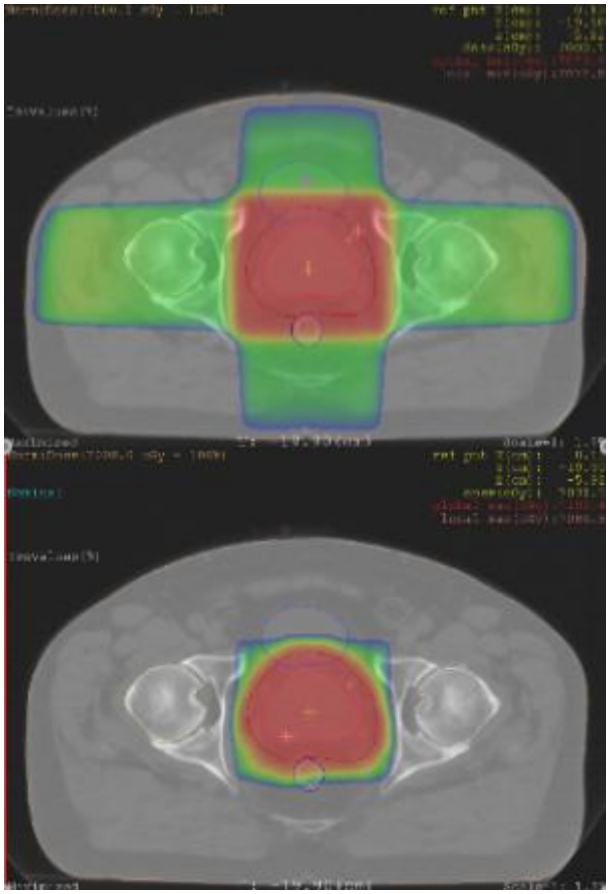
The study was supported by Wilson's grant from the National Institutes of Health, funding which continues for another 18 months and supports his and his students' further investigation into the cells behind transfer of immunity in breast milk.

Wilson's other students who are also co-authors on the paper are Yuetching Law, Kathryn Distelhorst and Erica D. Hill. The Harvard Medical School co-authors are Olivier Morteau, Craig Gerard, Bao Lu, Sorina Ghiran and Miriam Rits. The Stanford University School of Medicine co-authors are Raymond Kwan, Nicole H. Lazarus and Eugene C. Butcher.

Adapted from materials provided by Brigham Young University.

http://www.sciencedaily.com/releases/2008/10/081026101713.htm

Optimized Radiation For Prostate Cancer Therapy



Top: 4-field-box with photons. Bottom: 4-field-box with protons. (Credit: Image courtesy of Vienna University of Technology)

ScienceDaily (Oct. 27, 2008) — The determination of the precise anatomical location of a tumor is the prerequisite for setting optimal parameters for radiation treatment of prostate cancer. This approach guarantees that the ionizing radiation only destroys tumorous cells and does not affect other organs in the vicinity of the prostate.

In a cooperative study with Innsbruck Medical University and the East-Vienna Center of Social Medicine, two physicists of Vienna University of Technology (TU), evaluated the mean deviation of radiation parameters for prostate cancers and compared various sources of radiation.

Vienna (TU). - Movement inaccuracies of up to two centimeters may occur in prostate radiation. “During the radiation treatment, patients have to lie on a table for some 20 minutes without moving. Over time, the muscles relax and the pelvis drops. As a consequence, the radiation may focus on the bladder or other organs. In our calculations, we concentrated on the precision of localizing the prostate and on improvement potentials in treatment,” explained Karin Poljanc, Assistant Professor at the Atomic Institute of Austrian Universities.

In a study conducted in cooperation with SMZ Ost (East-Vienna Center of Social Medicine, Danube Hospital), Poljanc and her research associates, Tanja Futschek and Leila Teymournia, used a number of ultrasound examinations that allowed for a precise localization of the patients’ organs from the outside.

In a next step, the scientists analyzed the positioning of 60 patients, and evaluated the deviation of radiation in various spatial directions, such as to the right or left, and upward or downward (using 420 radiation plans for thirty patients). While it takes more time, an ultrasound system makes the shifts in position visible and traceable. If the deviation exceeds 0.8 cm, the radiology technicians are responsible for returning the patient to the correct position to ensure that the radiation only targets the specified area.

In the subsequent study phase, Poljanc and her group calculated normal tissue compensation rates and the probability of tumor control. "This provides us with an overview of the probability that the tumor is targeted directly and the probability of side effects for individual patients," notes Poljanc. These approaches serve as forecasts and provide clues for the likelihood of healing.

After a study period of some 2.5 years, with generous sponsorship of the Anniversary Fund of the Austrian National Bank, the scientists were able to implement the calculated average positioning inaccuracies in a radiation planning system. Sums up Leila Teymournia: "Depending on the calculation model used, the normal tissue compensation rate can vary widely in the results. While the use of Model A may yield a negligible complication rate, the same process calculated with Model B shows a deviation of up to 40 percent."

Due to the absence of biological parameters, major discrepancies may result with different models. Nevertheless, the results of calculations can provide physicians with data for improving patient positioning accuracy and therefore, and improvement of treatment success.

As part of their study of different radiation sources, Karin Poljanc, Tanja Futschek, and Leila Teymournia found that localization aids, such as ultrasound systems, are indispensable for accurate proton therapy of prostate carcinomas. In most cases, this combination leads to therapy results with a high level of tissue preservation.

The future establishment of the cancer research and therapy center "Med-AUSTRON" in Wiener Neustadt will implement such a treatment method in Austria.

Adapted from materials provided by Vienna University of Technology, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081016084047.htm

How Does Climate Change Affect The Water Cycle?

A flooded reservoir in Mexico. (Credit: Courtesy IUCN, Copyright Jim Thorsell)

ScienceDaily (Oct. 27, 2008) — Climate change is having an impact on the water cycle, raising the issue of whether we should be investing in adapting to these impacts or focusing on more pressing water resource issues, such as providing water and sanitation for increasing populations? If investment in adapting to climate change is a priority, then is it best to invest in protecting natural ecosystems or developing engineered infrastructure?

"The traditional way of handling extreme events such as floods and droughts, with engineering works should be complemented with the ecosystems approach which integrates the management of land and water that promotes conservation and sustainable use in an equitable way", says Dr. Max Campos, Review Editor for the Latin American Chapter for IPCC Impacts and Adaptation Report .

"Climate change is indeed an important issue, but it needs to be seen in context of the many other global challenges affecting water resources such as population growth, urbanization and land use change. Adaptation is vital – but we need to adapt to the full range of factors that are stressing water resources,

and not focus on human-forced climate change to the exclusion of everything else", says Oliver Brown from the International Institute for Sustainable Development (IISD).

"It should be a must for vulnerable communities whether in the developed or developing world to ensure that their development ambitions are prepared for climate change. Adaptation should not be limited to the rich", said Dr. Henk Van Schaik, Deputy Programme Coordinator UNESCO-IHE. He argued that vulnerable communities in the developed world are preparing and investing to protect their societies, economies and environments to the impacts of climate change. This is not so in transition economies nor in developing countries.

Going beyond the issue of investment in pressing development issues or adaptation measures, is the question of looking at natural versus engineered solutions.

"Conventional approaches to climate change adaptation range from water conservation and efficient use to new operational techonologies", says Dr Mark Smith, Head of the IUCN Water Programme. "Dams and reservoirs are still considered as the most effective structural means of risk management. But we need to start thinking of the environment as infrastructure for adaptation as well. Health and intact river basins, wetlands and floodplains make us less vulnerable to climate change. Lowering risk is a good reason for investing in watersheds and the environment."

Adapted from materials provided by IUCN.

http://www.sciencedaily.com/releases/2008/10/081013143031.htm

Soil Conservation And River Management Tied Together

Sediment flowing in the Potomac River, Maryland, U.S. Sediment in rivers comes from erosion of the landscape as well as the erosion and collapse of the banks themselves. Just how much each source contributes to a river – and how it affects the flow and path of that river – is the subject of new research. (Credit: Copyright Michele Hogan)

ScienceDaily (Oct. 27, 2008) — Sediment in rivers comes from erosion of the landscape as well as the erosion and collapse of the banks themselves. Just how much each source contributes to a river – and how it affects the flow and path of that river – is the subject of research by Peter Whiting, professor of geological sciences at Case Western Reserve University.

Taking measure of certain radionuclides found in the soil, including beryllium and lead, at various points along a 423-km-long section of the Yellowstone River, Whiting has determined how much of the sediment in the Yellowstone came from runoff and how much came from the streambanks. For example, streambank erosion contributes approximately 50 percent of the sediment at measurement sites up-river, increasing to 89 percent at Billings, Mont. In river basins where significant portions of the surrounding landscape are used for agriculture or forestry, the percentage of sediment coming from streambank erosion drops below 50%.

Whiting will present his findings on October 6, at the 2008 Joint Meeting of the Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, and Gulf Coast Association of Geological Societies in Houston..

Radionuclides occur in soil both from natural processes and as fallout from nuclear testing. Beryllium and lead are found in greater concentrations at the surface of the soil. All the beryllium will be found in the top two centimeters of the surface soil but lead will be found to greater depth.

Beryllium and lead have markedly different half-lives. Lead has a 20-year half life, while that of Beryllium is only 53 days. Comparing the activities of both elements in the river's suspended sediment to the surrounding landscape and streambanks helps provide a detailed profile of where the sediment originates.

"We need to understand the sources of the sediment in our rivers if we want to address stewardship of our rivers," said Whiting.

For instance, fine sediment carried into rivers can cloud the water and can choke out freshwater bugs and fish that require cleaner water. Fine sediment deposited on the stream bottom can smother eggs laid by fish including salmon and walleye. To preserve these populations of fish, we often try to rehabilitate streams by reducing the amount of sediment supplied to the stream. But to try to reduce the supply, and one needs to understand whether it is activities eroding the landscape – urbanization, farming, or timbering – or it is the streambanks that are the primary cause of the problem.

"In using radionuclides as markers in our research, we are helping to develop new tools for the advancement of soil and river stewardship," said Whiting.

Adapted from materials provided by Case Western Reserve University, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081001125956.htm

Physical And Interpersonal Warmth Linked

Simply handling a hot cup of coffee can change one's attitude toward a stranger. (Credit: iStockphoto)

ScienceDaily (Oct. 27, 2008) — Do people trust others more when they experience physical warmth? That's the theory of CU-Boulder Assistant Professor Lawrence E. Williams, who says simply handling a hot cup of coffee can change one's attitude toward a stranger.

In a paper published in the Oct. 24 issue of Science, Williams details a study he conducted with Yale University's John A. Bargh that shows a link between the way unsuspecting subjects rated a hypothetical person's personality and whether or not they had held a warm or cold beverage just prior to the test.

"The basic scientific implication is about exploring the link between the physical world and the psychological world," said Williams, an assistant professor of marketing at CU's Leeds School of Business. "It's at the same time subtle and very powerful -- a repeated association of physical warmth that is learned over a lifetime."

Williams asserts that people naturally speak about others being "warm" or "cold," and prefer to spend time with those they perceive as "warm."

"When we use these terms, we're not really concerned with physical temperature, but our findings suggest that our dual use of the word "warm" is neither haphazard nor accidental."

For the experiment, Williams enlisted the help of a confederate, who escorted the test subjects from the lobby of a psychology building and rode the elevator to the test area with them. The confederate carried a clipboard, two textbooks and a cup of hot or iced coffee and knew nothing of the hypothesis being tested. During the trip to the test area, the confederate asked the subject to hold the cup of coffee while she recorded their name and the time of their participation.

Holding the hot cup, Williams hypothesized, would prime the subject to have a more positive appraisal of a hypothetical person they read about once they reached the testing room. And according to his data, Williams was right: People who had briefly held the hot coffee cup perceived the target person as being significantly "warmer" than did those who had briefly held the cup of iced coffee.

In a similar study, Williams repeated the same experiment using not coffee, but hot and cold compress pads. To eliminate any inadvertent influence on the experiment by the confederate, the study subjects were asked to retrieve either a hot or cold pad and to evaluate it under the guise of a product test.

After rating the effectiveness of the pads, the study subjects were given a choice of reward for participating in the study: either a Snapple beverage or a $1 gift certificate to a local ice cream shop. In some cases the reward offer was framed as a gift to "treat a friend" and in others as a personal reward. Regardless of which gift was offered, those primed with coldness were more likely to choose a gift for themselves, while those primed with warmth were more likely to choose the gift for a friend.

"Experiences of physical temperature per se affect one's impressions of and pro-social behavior toward other people, without one's awareness of such influences," said Williams. "At a board meeting, for instance, being willing to reach out and touch another human being, to shake their hand, those experiences do matter although we may not always be aware of them. In a restaurant, it's been shown that wait staff who touch customers usually get a better tip. It's a nice gesture, but it also has a warming effect."

Williams said the research could have marketing implications because it shows just how strong the bond is between the physical and the psychological world.

"In a point-of-service or communications interaction, paying attention to the fact that customers are tied to the physical world in which buying behavior occurs is important," said Williams. "If you are running a promotion outdoors on a cold day, maybe giving away a warm cookie will help you make connections with consumers. It gives marketers and managers more tools to work with."

Adapted from materials provided by University of Colorado at Boulder.

http://www.sciencedaily.com/releases/2008/10/081023144059.htm

Biodiversity In A Warmer World

How will a warmer world affect seasonal behavior such as the flowering of these Cuipo trees in Panama? (Credit: Marcos Guerra, STRI)

ScienceDaily (Oct. 27, 2008) — Will climate change exceed life's ability to respond? Biodiversity in a Warmer World, published in the Oct. 10, 2008 issue of the journal, Science, illustrates that cross-disciplinary research fostered by the Smithsonian Tropical Research Institute in Panama clearly informs this urgent debate.

As an extremely diverse region of rainforest and coral reefs, the tropics may have the most to lose as a result of global warming. Some disagree, arguing that tropical organisms will be favored as their ranges expand into temperate areas. Few empirical studies provide specific answers to help us choose conservation and mitigation measures.

Science asked Jens Svenning, University of Aarhus, Denmark and Richard Condit of the Smithsonian's Global Earth Observatory Network to review two papers about species range change:

In a range analysis for plants and insects on a mountain slope in Costa Rica, Colwell et al. show that a 3.2˚ C increase in temperature threatens 53 percent of the area's species with lowland extinction and 51 percent with range shift gaps, meaning that they have nowhere else to go.

The other study they reviewed, by Moritz et al., follows historical range expansions and contractions for small mammals in Yosemite National Park in California, USA and shows that ranges may contract dangerously as they are pushed further and further up mountain slopes.

To provide the proper perspective for this work Svenning, who held a postdoctoral fellowship with the Smithsonian's GEO network in 2000-2002 and Condit cite empirical work by colleagues at the Smithsonian and others:

In a 2001 Science article by STRI staff scientist Carlos Jaramillo et al., plant pollen diversity in rock cores from northern South America revealed that warming events in the tropics over 60 million years were not particularly detrimental, with the caveat that warming in fragmented landscapes or crossing a temperature threshold could cause severe extinctions in the future.

Extant species that evolved in warmer climates should retain the ability to tolerate warmer climates in the future, as argued in a 2001 issue of Science by Eldredge Bermingham, director of STRI and Christopher Dick, professor of ecology and evolutionary biology at the University of Michigan at Ann Arbor.

It is not clear which factors (temperature, moisture, competition with other species, habitat limitation) are the primary causes of tropical extinctions. Drought tolerance, however, definitely limits tropical plant distributions. This was reported in the May 2007 issue of Nature by Bettina Engelbrecht, research associate and lecturer at San Francisco State University, and colleagues.

Condit and Svenning also cite their own studies from the tropics and temperate areas where other drivers of extinction are at work. They call for more discoveries of the sort that often result when researchers are brought together in places like STRI's facilities in Panama, where camaraderie fuels critical ecological research within an intellectual context that encourages a deep time and wide world perspective.

Journal reference:

1. Jens-Christian Svenning and Richard Condit. **Biodiversity in a Warmer World**. *Science*, 2008; 322: 206-207

Adapted from materials provided by Smithsonian Tropical Research Institute, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081009144059.htm

Thinking It Through: Scientists Call For Policy To Guide Biofuels Industry Toward Sustainability

The Farm Bill promotes the production of "advanced biofuels" made from the inedible parts of corn and other cellulosic plant matter. (Credit: U.S. Geological Survey)

ScienceDaily (Oct. 27, 2008) — As the United States and other nations commit to the path of biofuels production, a group of scientists is calling for sustainable practices in an industry that will, as MBL scientist Jerry Mellilo says, "reshape the Earth's landscape in a significant way."

In a paper published in the Oct. 3 issue of Science magazine, Melillo and 22 co-authors call for science-based policy in the emerging global biofuels industry, which by 2050 could command as much land as is currently farmed for food.

"The identification of unintended consequences early in the development of alternative fuel strategies will help to avoid costly mistakes and regrets about the effects on the environment," the authors write. Melillo is co-director of the Marine Biological Laboratory's (MBL) Ecosystems Center, and the other authors are environmental scientists, agronomists, and economists from numerous organizations in the United States and Brazil.

The biofuels industry in the United States has significant momentum, but no environmental performance standards are currently in place. In May, the 2008 Farm Bill was passed, which provides subsidies for growers of biofuels crops and for refiners who convert those crops to ethanol. Also, the U.S. Legislature approved a mandate in 2007 for the production of 16 billion gallons of cellulosic ethanol per year by 2022.

"We have a lot of information that can help policy makers think through the long-term consequences of this kind of mandate," Melillo says. "We can help society avoid or at least reduce some of the negative consequences of the expansion of biofuels programs in the United States and around the world. Science can help all of us use renewable resources, such as biofuels, in a sustainable way."

The Farm Bill specifically subsidizes the production of "advanced" or cellulosic biofuels, which are biofuels, such as ethanol, derived by processing the complex organic molecule, cellulose, which makes up a large amount of most plant materials. In the United States today, we produce most of the biofuel ethanol from the fermentation of sugars and starches from corn kernels. Melillo says, "The new Farm Bill promotes the use of the inedible parts of corn, the cellulose-rich stalks and stover, for biofuels. Further down the line, it is expected that perennial, cellulose-rich plants such as switchgrass, miscanthus (a tropical grass), willow, and poplar will be grown specifically for biofuels production."

"Many of the problems associated with biofuels are more generally problems with agriculture," Melillo says. Current grain-based biofuel cropping systems are known to cause environmental harm, including soil erosion and depletion, nitrogen fertilizer pollution, and a decline in biodiversity leading to pest management issues. The switch to perennial biofuels crops, such as grasses, shrubs and trees, can mitigate some of these problems and prevent competition with food production. Still, if these crops are sited on marginal lands rather than on cropland, the land could require sizeable inputs of water, nutrients, and energy to become productive.

"If it takes a lot of inputs and if negative environmental consequences persist, then you clearly diminish the benefit you would derive from biofuels production," Melillo says. All the tradeoffs between alternative biofuels strategies need to be carefully considered, the authors write.

One motive for biofuels production is to increase domestic energy security by reducing reliance on imported oil. In addition, introducing biofuels into the nation's energy portfolio promises to reduce the amount of CO2 and greenhouse gases going into the atmosphere by fossil-fuel burning. But this, too, must be carefully thought through by the use of scientific analyses, Melillo says. In some parts of the world, the decision is being made to burn forests to clear land for biofuels crops, which releases a large amount of CO2 into the atmosphere just to set the cropland up. "You have to go into that game knowing you are creating a carbon debt; knowing you are borrowing a lot of carbon from nature where it is stored in plants, and putting it into the atmosphere. In this case, you must recognize that you will not invoke carbon savings from biofuels for a while, perhaps a very long while," Melillo says. "You don't want this to be an unrecognized, unintended consequence."

"Sustainable biofuel production systems could play a highly positive role in mitigating climate change, enhancing environmental quality, and strengthening the global economy," the authors conclude, "but it will take sound, science-based policy and additional research effort to make this so."

Journal reference:

1. G. Philip Robertson et al. **Sustainable Biofuels Redux**. *Science*, 2008; 322 (5898): 49-50 DOI: 10.1126/science.1161525

Adapted from materials provided by Marine Biological Laboratory.

http://www.sciencedaily.com/releases/2008/10/081002172438.htm

Climate Change, Acid Rain Could Be Good For Forests

Michigan Tech forest productivity research. (Credit: Image courtesy of Michigan Technological University)

ScienceDaily (Oct. 26, 2008) — After more than 20 years of research in the northern hardwood forests of Michigan, scientists at Michigan Technological University's School of Forest Resources and Environmental Science have reached a surprising conclusion: Moderate increases in temperature and nitrogen from atmospheric pollution actually improve forest productivity.

Andrew Burton, an associate professor at Michigan Tech and head of the National Institute for Climatic Change Research's Midwestern Regional Center, is part of a team of researchers that has been monitoring and measuring the temperature, moisture levels and nitrogen deposited by acid rain or varying levels of experimental nitrogen at four forest sites ranging from northwestern to southern Michigan since 1987. He's found that the trees grow faster at higher temperatures and store more carbon at greater concentrations of nitrogen, a chemical constituent of acid rain, providing there is sufficient moisture.

"It may well be that increasing temperature and nitrogen deposition are good things, up to a point," Burton said.

The rise in temperature is extending the growing season, he explained. So far, Burton and colleagues have measured 10 to 11-day longer growing seasons. “Our growing season isn't that long in the first place,” he pointed out, “so 10 or 11 days is significant.”

A longer growing season could benefit the timber industry, enabling them to harvest more wood. Now that woody biomass is being investigated as an alternative energy source by Michigan Tech and others, increased forest productivity could become a critical factor.

The research, which started out as an acid rain study in 1987, has grown into one of the longest continuous research studies supported by the National Science Foundation. A new five-year grant of $151,628 will fund the research through 2012.

"It is really unusual to receive NSF funding for nearly 20 years," Burton remarked.

The latest grant will fund ongoing measurements tree growth and the the build-up of organic matter in the soil at the four sites: near Twin Lakes in the northwestern Upper Peninsula of Michigan, at Pellston, near Petoskey, Mich., at Mesick, near Traverse City, and north of Grand Rapids near the Silver Lake Sand Dunes in southern Michigan.

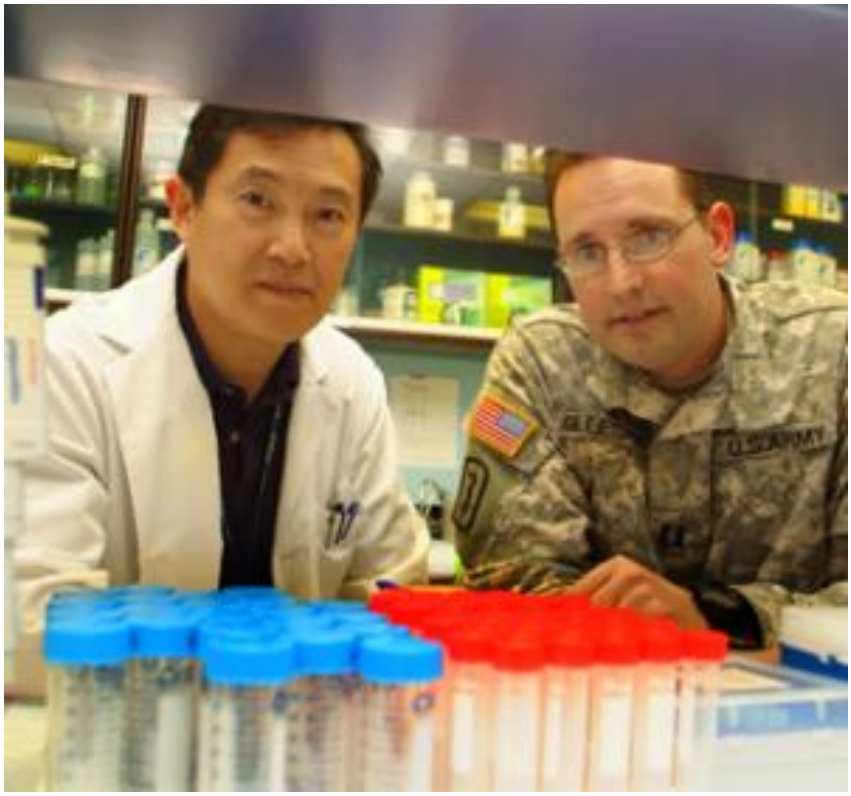
Burton and his fellow researchers, Don Zak at the University of Michigan and Kurt Pregitzer at the University of Nevada-Reno, want to discover if the increased annual growth of the forests is offset by an increase in tree mortality. They also will examine whether the woody debris on the forest floor will decompose more slowly as nitrogen levels are increased, further increasing the ecosystem's ability to store carbon.

Burton calls the new work "a window into the future," an opportunity to see if there is a tipping point beyond which increased nitrogen harms rather than helps the forests.

Adapted from materials provided by Michigan Technological University.

http://www.sciencedaily.com/releases/2008/10/081021214850.htm

Green Tea May Delay Onset Of Type 1 Diabetes



A powerful antioxidant in green tea may prevent or delay the onset of type 1 diabetes, Medical College of Georgia researchers say. (Credit: Image courtesy of Medical College of Georgia)

ScienceDaily (Oct. 26, 2008) — A powerful antioxidant in green tea may prevent or delay the onset of type 1 diabetes, Medical College of Georgia researchers say.

Researchers were testing EGCG, green tea's predominant antioxidant, in a laboratory mouse with type 1 diabetes and primary Sjogren's syndrome, which damages moisture-producing glands, causing dry mouth and eyes.

"Our study focused on Sjogren's syndrome, so learning that EGCG also can prevent and delay insulin-dependent type 1 diabetes was a big surprise," says Dr. Stephen Hsu, molecular/cell biologist in the School of Dentistry.

They found it also worked well in their original disease focus.

In the mouse, EGCG reduced the severity and delayed onset of salivary gland damage associated with Sjogren's syndrome, which has no known cure.

"EGCG modulates several important genes, so it suppresses the abnormality at the molecular level in the salivary gland. It also significantly lowered the serum autoantibodies, reducing the severity of Sjogren's syndrome-like symptoms," Dr. Hsu says. Autoantibodies are antibodies the body makes against itself.

Both type 1 diabetes and Sjogren's syndrome are autoimmune diseases, which cause the body to attack itself. Autoimmune disorders are the third most common group of diseases in the United States and affect

about 8 percent of the population, says Dr. Hsu. Sjogren's syndrome can occur alone or secondary to another autoimmune disease, such as lupus, rheumatoid arthritis or type 1 diabetes.

The study, published in the Oct. 24 issue of Life Sciences, supports earlier research showing EGCG's impact on helping prevent autoimmune disease.

Researchers treated a control group of mice with water and a test group with a purified form of EGCG dissolved in the drinking water. At 16 weeks, the EGCG-fed mice were 6.1 times more likely to be diabetes-free than the water-fed group, and 4.2 times more likely at 22 weeks.

"Previous studies used another animal model that developed type 1 diabetes only after an injected chemical killed the insulin-producing cells. That may not accurately resemble disease development in humans, because type 1 diabetes is a genetic disease," says Dr. Hsu, the study's corresponding author.

"Our study is significant because we used a mouse model with the genetic defects that cause symptoms similar to human type 1 diabetes and Sjogren's syndrome, so the immune cells attack the pancreas and salivary glands until they are no longer functional."

Another related finding was that even when salivary cells were under attack, they seemed to be rapidly reproducing in the control group. The proliferation was suppressed in the EGCG-fed group.

"It's kind of counterintuitive – why would there be proliferation of the glandular cells occurring when the present cells are not secreting saliva?" says Dr. Kevin Gillespie, first author of the study he conducted for his master's research project at MCG.

The proliferation phenomenon also can be observed in psoriasis, an autoimmune disease affecting the skin and joints, says Dr. Hsu. "Normal skin cells turn over every 30 days or so, but skin cells with psoriasis turn over every two or three days." Dr. Hsu's group previously found that green tea polyphenols, including EGCG, inhibited rapid proliferation in an animal model for human psoriasis.

"We never thought proliferation was going on to this extent in the salivary gland, but we now believe it is tightly associated with Sjogren's syndrome," he says.

The next step is to observe Sjogren's syndrome in human salivary gland samples to determine whether the study findings hold up in humans.

"If the abnormal expression of these genes is the same in humans as in the animal model, then the second stage will be intervention and treatment with a pure form of EGCG," says Dr. Hsu.

"The benefit of using green tea in preventing or slowing these autoimmune diseases is that it's natural and not known to harm the body," says Dr. Gillespie, periodontics chief resident at Fort Gordon's Tingay Dental Clinic. "EGCG doesn't have the negative side-effects that can be associated with steroids or other medications that could otherwise be prescribed."

Adapted from materials provided by Medical College of Georgia.

http://www.sciencedaily.com/releases/2008/10/081023144119.htm

Victorian Manchester Home To First Youth Gangs

William Brooks was a well-known street fighter, and one of the leaders of the Greengate scuttlers in 1894. (Credit: Image courtesy of University of Liverpool)

ScienceDaily (Oct. 26, 2008) — A historian at the University of Liverpool has uncovered extensive archive material detailing the activities of the 'scuttlers' - one of Britain's earliest youth cults.

Records from the late Victorian period detail more than 30 years of territorial battles in the streets and music halls of Manchester, where youthful gang members were easily identified by their fringed hair, tilted caps and bell-bottomed trousers.

Gang fights were known as 'scuttles', and as many as 500 young people would take part in pitched battles between rival gangs.

Dr Davies explains: "The archival records from this period are so vast that it took 15 years to pull all the material together. By combining press reports with police, prison and court records we get a real picture of what life was like for young people going through the new, compulsory school system and out into the mills and factories of Manchester.

"Gang members were relentless in their violence and would take possession of their favourite music halls and attack any members of rival gangs that entered the hall using sharpened belt buckles or knives as weapons. Each gang wanted to be recognised as the toughest in the city, and scuttlers would walk as far as five miles to take on a rival gang.

"Manchester's gangs were motivated by the excitement of battle and the status it gave them. In Liverpool, where youth unemployment was much higher, gangs were more likely to be formed for the purpose of street robbery and there is much less evidence of territorial violence here.

"Some Manchester gangs actually found inspiration for their style in continental wars such as the 'Russians' and the 'Turks' who re-enacted the Russo-Turkish war of 1877-8 on what is now the site of the City of Manchester Stadium, built for the Commonwealth Games."

Gang members were recruited from the age of 14 up to 21, and included girls as well as boys. Female 'scuttlers' were condemned by the press who believed that they stirred up fights by flirting with boys from rival districts. Young women, however, often took an active part in fights between rival gangs.

Dr Davies added: "One 'scuttler' whose career the newspapers followed in detail was John-Joseph Hillier. Born in Ireland in 1875, he grew up in Salford and was a gang member at the age of 14. He went on to lead the 'Deansgate Mob', based in Manchester city centre. The boys frequented the Casino – a popular music hall – and regularly clashed with opposing gangs inside the hall. Hillier was repeatedly jailed for his attacks with a butcher's knife. The newspapers called him the 'King of the Scuttlers', a title he later had sewn onto the front of his jersey."

The research is published in the book, The Gangs of Manchester, and will be launched at a public reading on Wednesday, 22 October at Manchester Central Library. The book is also being adapted into a play and will be performed at Manchester's Library Theatre in 2009.

Adapted from materials provided by University of Liverpool.

http://www.sciencedaily.com/releases/2008/10/081021190638.htm

Dolphins Use Complex Coordination During Predation, High-tech Acoustics Study Finds

Spinner dolphins (Credit: Image courtesy of Oregon State University)

ScienceDaily (Oct. 26, 2008) — Spinner dolphins have long been known for their teamwork in capturing prey but a new study using high-tech acoustics has found that their synchronization is even more complex than scientists realized and likely evolved as a strategy to maximize their energy intake.

The study, by scientists at Oregon State University and the University of Hawaii, found that dolphins engage in a highly choreographed night-time "dance" to enclose their prey, and then dart into the circle of confused fish in organized pairs to feed for about 15 seconds, before backing out and letting the next pairs in line take their turn.

Results of the study were published this week in the journal, Acoustical Society of America.

"Synchronized swimmers have nothing on spinner dolphins," said Kelly Benoit-Bird, a marine ecologist at Oregon State University and lead author on the study. "The degree of synchrony they display when feeding is incredible – especially considering that they're doing it at night, several meters below the surface where they can't see their prey or each other."

The study is important, scientists say, because it greatly expands knowledge of spinner dolphin behavior and it opens up new fields of scientific inquiry into underwater ecosystems made possible by technological advancements in acoustical monitoring. It was funded by the National Science Foundation and the Office of Naval Research.

Much of the knowledge about spinner dolphin feeding has been anecdotal because they are primarily nocturnal in their feeding, Benoit-Bird pointed out. However, acoustical eavesdropping allowed the scientists to "view" the dolphins' behavior without interrupting their routine with lights and underwater cameras. In their study off the coast of Oahu, Hawaii, the scientists used sonar readings from a "multi-beam echo-sounder" to monitor groups of spinner dolphins. The animals' systematic approach to feeding was eye-opening.

Initially a small group of about 20 dolphins would swim side-by-side in a straight line until finding concentrations of prey – in this case, lanternfish. When they got to within five meters of their prey, they would pull into a tight circular formation and sequentially swim up and down vertically, in essence, doing "the wave" like fans at a sporting event, Benoit-Bird said.

"They were using their bodies like a plow," she said. "We're not sure if they were creating a pressure barrier or trying to confuse the prey. But the result among the lanternfish was chaos."

As the lanternfish became concentrated, the dolphins tightened their circle and formed 10 pairs. The pairs at one o'clock and seven o'clock would move in, feed for 15 seconds, and retreat back to the circle. Then the pairs at two o'clock and eight o'clock would do likewise.

The feeding would last for about five minutes, during which time each dolphin got two opportunities to feed, and then the group rose as one to the surface to breathe, maintaining their circle. The dolphins would take one breath, Benoit-Bird said, and then dive down and begin the process anew.

"If one or two individual dolphins would break the circle or head to the surface to breathe, it breaks their whole system up," Benoit-Bird said. "They never did. So then you have to ask: How do they communicate with each other, and how do they pass on that knowledge to their young?"

The researchers are still working on the latter puzzle, but their acoustical monitoring study found that much of what scientists had assumed about dolphin communication may, in fact, be wrong in this species. In a companion article also published in Acoustical Society of America, the researchers describe how they used underwater hydrophones to listen to the dolphins during their feeding forays.

Dolphins are often vocal and their use of frequency-modulated whistles was thought by many to cue their coordinated behavior. But the researchers found they didn't use those whistles at all while hunting prey – just during non-foraging times or when they were surfacing. Instead, they used a series of "clicks," with the highest click rates taking place just prior to foraging.

"Whistles are omni-directional, like turning on a light bulb in a room," Benoit-Bird said. "Clicks, on the other hand, are directional like a laser. We think it may be a strategy to communicate only within the group and not to other potential lanternfish predators. Tuna and billfish are looking for the same prey and they can hear the whistles but not the clicks because the frequencies are too high and so focused.

"If you're lined up to eat this great smorgasbord, would you want to tell the tuna next door about it?"

Benoit-Bird's co-principal investigator on both papers was Whitlow W.L. Au, from the University of Hawaii.

Spinner dolphins are found primarily in tropical and subtropical waters, offshore and near island chains. They grow to a length of about six to seven feet, and feed on small, deep-ocean prey including lanternfish, shrimp and juvenile squid.

During their hunting forays, these athletic, acrobatic dolphins catch and consume a single fish at a time and each lanternfish may only be 3-5 inches long. To match their 3,200-calorie-per-day diet, they need to

eat at least 650 fish each night – plus enough extra to fuel the energy they burn during the hunt, perhaps another 200 to 300 fish.

"To make that work, they need to eat about a fish a minute," Benoit-Bird said, "and we think that's why they've developed this elaborately complex system of group predation. Dolphins can't open their mouths like baleen whales and swallow large amounts of food at once. They have to target individual fish and it's too difficult and energy-consuming to hunt solo."

"It's tough to make a living in the subtropical ocean, which is something of a biological desert," she added. "They've had to adapt these unique behavioral methods to maximize their ability to capture prey."

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

http://www.sciencedaily.com/releases/2008/10/081021093946.htm

Human Brain Minimizes Energy Expenditure And Integrates Gravity Into The Action Plan

ScienceDaily (Oct. 26, 2008) — When reaching for an object, the brain prepares neural commands sent to the target muscles to minimize energy expenditure, according to a study published in PLoS Computational Biology by neuroscientists and mathematicians from the INSERM and ENSTA.

How the human brain organizes and controls our actions is a crucial question in life sciences. In recent decades, an important theoretical advance has been the use of computational models and the assumption that the brain behaves like an optimal controller. In most studies, an optimality criterion is chosen a priori and assumed to produce smooth and harmonious movements, as those recorded experimentally. Most existing models, however, fail to explain how our interactions with the external environment are integrated into optimization processes.

In particular, gravity is one of the constraints that permanently act upon the movements of living organisms. The simple observation of vertical arm movements reveals that muscle activity when moving upwards differs from when moving downwards. This led the authors to surmise that the brain takes advantage of gravitational force during movement, trying to optimize energy consumption.

The discovery of this biological rule has resulted from the use of a hypothetical-deductive mathematical method which predicted short periods of muscle inactivation and direction-dependent hand kinematics. These predictions have been verified experimentally using human volunteers. Moreover, they have demonstrated a necessary and sufficient condition of optimal control for arm movements which is a novelty in motor control studies.

The authors explain how the brain plans movements by integrating biological and environmental constraints and the method may be of potential value for understanding motor dysfunction and guiding subsequent rehabilitation programs. Moreover, it opens the prospect of studying brain functions by a cooperative interaction of mathematicians and neuroscientists. Interestingly, the paper is a clear demonstration that mathematical principles and theories, formerly used for understanding the non-living world, are now used for understanding how biological organisms integrate these laws.

Journal reference:

1. Berret B, Darlot C, Jean F, Pozzo T, Papaxanthis C, et al. **The Inactivation Principle: Mathematical Solutions Minimizing the Absolute Work and Biological Implications for the Planning of Arm Movements**. *PLoS Comput Biol*, 2008; 4 (10): e1000194 DOI: 10.1371/journal.pcbi.1000194

Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081023222250.htm

Phony Friends? Rejected People Better Able To Spot Fake Smiles

Individuals who are experiencing rejection are better at picking up subtle social cues. Socially rejected people are particularly good at discerning fake smiles from real ones. (Credit: iStockphoto/Dori OConnell)

ScienceDaily (Oct. 26, 2008) — "There are hundreds of languages in the world, but a smile speaks them all." It's true too—next time you are lost in a foreign country, just flash a smile and the locals will be happy to help you find your way. An honest smile can convey a wide range of meanings, from being happy to having fun. Although, not all smiles are genuine. All of us have "faked a smile" at some point.

Now, a new study might make us think twice about sending out a phony grin. It has been shown that individuals who are experiencing rejection are better at picking up subtle social cues and according to a recent study published in the October issue of Psychological Science, a journal of the Association for Psychological Science, socially rejected people are particularly good at discerning fake smiles from real ones.

Psychologist Michael J. Bernstein and his colleagues from Miami University wanted to see to what extent rejected individuals would be able to identify the authenticity of a facial expression. The researchers induced feelings of social rejection in a group of the participants by making them think about a time when they felt socially isolated. Conversely, another group of participants were asked to recall times they felt accepted or included in a group.

A control group of participants were asked to recall the previous morning's activities (resulting in neutral feelings). The participants then viewed videos of people smiling—some of the videos showed people expressing genuine smiles and the rest depicted people with fake smiles. Participants were to indicate which of the videos contained real smiles.

The results show that socially rejected individuals are better at distinguishing fake smiles from real smiles compared to individuals who feel socially accepted or who were in the control group. The authors propose that socially rejected people have an increased motivation to be accepted, thus making them more sensitive to specific social cues indicating opportunities for inclusion. The authors conclude, "It seems essential to detect legitimate signs of positivity that indicate possible reaffiliation with other people. Otherwise, rejected individuals could miss out on new chances for acceptance or 'waste' affiliation efforts on people who are not receptive."

Adapted from materials provided by Association for Psychological Science.

http://www.sciencedaily.com/releases/2008/10/081024103215.htm

Why Some People Have A Better Head For Languages

ScienceDaily (Oct. 26, 2008) — Learning a second language is usually difficult and often when we speak it we cannot disguise our origin or accent. However, there are important differences between individuals with regard to the degree to which a second language is mastered, even for people who have lived in a bilingual environment since childhood.

Members of the Cognitive Neuroscience Research Group (GRNC) linked to the Barcelona Science Park, have studied these differences. By comparing people who are able to perceive a second language as if they were native speakers of that language with people who find it very difficult to do so, they have observed that the former group is also better at distinguishing the sounds of their own native language. However, there is no difference between the two groups when they hear sounds that do not form part of the language.

The results of this research, "are very promising for predicting an individual's aptitude for learning languages and could be useful for designing strategic protocols and programs that optimize successful learning outcomes", explains Begoña Díaz of the GRNC, one of the authors of the study, together with Albert Costa and Núria Sebastián from the Department of Basic Psychology in the Faculty of Psychology of the University of Barcelona (UB), who also form part of the GRNC. The researchers Carles Escera, from the Department of Psychiatry and Clinical Psychobiology at the UB, and Cristina Baus, from the Department of Cognitive Psychology in the Faculty of Psychology of the University of La Laguna (Tenerife) also worked on the study.

In order to study individual differences in the perception of speech, the authors of the research evaluated the perceptive abilities of 126 university students born in the Barcelona area, who came from families that only speak Spanish and who therefore learned Catalan when they started compulsory schooling. Thus all of them were born and brought up, and lived in a bilingual environment. This population is ideal for the study as Catalan has some vowel sounds that most native Spanish speakers find particularly difficult to perceive.

From the initial cohort, 31 people were selected who corresponded to two different groups: the most and the least successful when it came to perceiving the sounds of the second language (Catalan). The ability of the brain to register differences when faced with audio stimuli was measured for these 31 individuals. To do this, the electrophysiological response of their brains to different sounds was recorded and the amplitude of an electrical wave called the mismatch potential was calculated. Since the amplitude of this wave increases with the increasing ability of the brain to register an auditory change, comparing the amplitude of the mismatch potential between the different groups allows us to establish whether there are differences in auditory processing.

In order to assess the subjects' general auditory capacity (non-linguistic) all 31 of the selected participants listened to tones composed of different frequencies, of different lengths and which were ordered differently. Linguistic auditory capacity was measured by exposure to vowel sounds in the mother tongue (Spanish) and to vowel sounds in a language that was unknown to the participants (Finnish). The results showed similar amplitudes of the mismatch potential for the two groups when the participants listened to sounds that were not from their language. In contrast, when they heard sounds from their own language (Spanish) the amplitude of the wave was significantly larger for those individuals who perceive the second language (Catalan) better.

"Therefore, these results show that there is a positive correlation between specific speech discrimination abilities and the ability to learn a second language, which means that the individual ability to distinguish the specific phonemes of the language, both in the case of the mother tongue and in the case of other languages, is, without a doubt, a decisive factor in the learning process, and the ability to speak and master other languages," concludes Begoña Díaz.

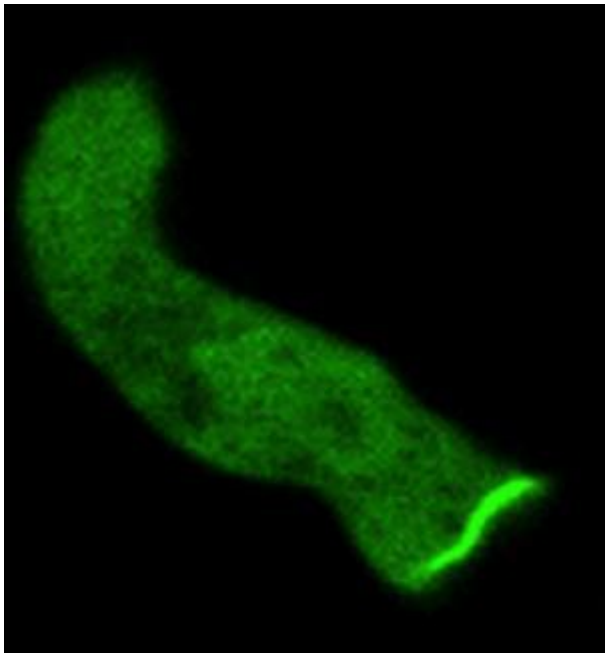
Journal reference:

1. Diaz et al. **From the Cover: Brain potentials to native phoneme discrimination reveal the origin of individual differences in learning the sounds of a second language**. *Proceedings of the National Academy of Sciences*, 2008; 105 (42): 16083 DOI: 10.1073/pnas.0805022105

Adapted from materials provided by Barcelona Science Park, via AlphaGalileo.

http://www.sciencedaily.com/releases/2008/10/081023101345.htm

Protein Compass Guides Amoebas Toward Their Prey



Green lights activated compass protein at the leading edge of an amoeba hunting for food. (Credit: Firtel lab/UCSD)

ScienceDaily (Oct. 26, 2008) — Amoebas glide toward their prey with the help of a protein switch that controls a molecular compass, biologists at the University of California, San Diego have discovered.

Their finding, recently detailed in the journal Current Biology, is important because the same molecular switch is shared by humans and other vertebrates to help immune cells locate the sites of infections.

The amoeba Dictyostelium finds bacteria by scent and moves toward its meal by assembling a molecular motor on its leading edge. The active form of a protein called Ras sets off a cascade of signals to start up that motor, but what controlled Ras was unknown.

Richard Firtel, professor of biology along with graduate student Sheng Zhang and postdoctoral fellow Pascale Charest tested seven suspect proteins by disrupting their genes. One called NF1, which matches a human protein, proved critical to chemical navigation.

NF1 turns Ras off. Without this switch mutant amoebas extended false feet called pseudopodia in all directions and wandered aimlessly as Ras flickered on and off at random points on their surfaces. “You have to orient Ras in order to drive your cell in the right direction,” Firtel said.

In contrast, normal amoebas with working versions of NF1 elongate in a single direction and head straight for the most intense concentration of bacterial chemicals, the team reports.

The biochemical components of the system match those found in vertebrate immune cells called neutrophils that hunt down bacterial invaders, suggesting that the switch might be a key navigational control for many types of cells, Firtel said. “The pathway and responses are very similar and so are the molecules.”

The US Public Health Service funded this work.

Adapted from materials provided by University of California - San Diego.

http://www.sciencedaily.com/releases/2008/10/081023144057.htm

Cancer Vaccine Shows Promise In Patients With Bowel, Kidney And Prostate Cancer

ScienceDaily (Oct. 26, 2008) — Analysis of data from several phase I and II clinical trials of a new cancer vaccine has shown it is capable of eliciting an immune response in most patients with bowel, kidney and prostate cancer, and that it may provide clinical benefit.

In a news briefing at the 20th EORTC-NCI-AACR Symposium on Molecular Targets and Cancer Therapeutics in Geneva (Thursday 23 October), Dr Richard Harrop, vice-president of clinical immunology at Oxford BioMedica, a UK-based biotechnology company – said: "Our exploratory analyses of data from nine different trials of TroVax® demonstrate significant associations between immune responses and overall survival in patients with colorectal cancer, renal cancer and prostate cancer.

"While it is essential that these observations are confirmed in large, randomised studies, collectively the data suggest that TroVax could provide some clinical benefit to cancer patients. In addition, the data show the vaccine is well tolerated by patients."

TroVax is made up of a modified virus (Modified Vaccinia Ankara (MVA)), which acts as a vehicle to transport a second component, a gene that produces an antigen that is present in most solid tumours, called 5T4. TroVax is injected into patients whose solid tumours have the 5T4 tumour antigen present, so that the vaccine can trigger the body's natural immune responses to mobilise against 5T4.

"The virus acts as both a 'vehicle' to deliver the 5T4 antigen and as an 'adjuvant', which helps to ensure we stimulate a strong immune response to the 5T4 antigen," explained Dr Harrop. "Antibody and cellular responses can occur in response to both the viral vector (MVA) and to the 5T4 antigen."

The analysis, presented at the symposium in Geneva, looked at data from 189 patients who had taken part in nine trials of TroVax in the UK and USA. The patients received an average of five injections (with a range of 1-12), and it was well tolerated by patients when given either on its own or in combination with other anti-cancer treatments. Of 180 patients tested for antibody responses after vaccination, 88% (159) showed positive responses to 5T4 and 98% (176) showed positive responses to MVA.

The highest levels of antibody responses were detected after an average of two vaccinations for the MVA part of the vaccine and after four for 5T4. Dr Harrop said: "This was expected because MVA is a foreign virus which the immune system responds to more quickly than to a 'self antigen' such as 5T4."

He continued: "When looking at the results from all the trials (colorectal, renal and prostate cancer patients), the magnitude of the 5T4-specific antibody response was associated with increased patient survival. Indeed, a doubling of the average number of antibodies in the patients between the first and third injections was associated with a reduction in the relative risk of death of 17%. This effect was strongest in colorectal cancer patients.

"Both the magnitude and the frequency of immune responses elicited against our tumour target (5T4) are exceptionally high and could be considered 'best in class'. Since cancer vaccines rely on the induction of immune responses to be able to work, this is a very important attribute of TroVax."

Cancer vaccines have been criticised in recent years because they usually fail to live up to their early promise. Apart from the vaccines against cervical cancer and Oncophage™ (vitespen, approved in Russia for the treatment of kidney cancer), there are no other licensed cancer vaccines. Dr Harrop said there were a number of reasons for this, which included the tools used to assess efficacy, the fact that vaccines on their own are more likely to slow disease progression or clear small tumours rather than cause large

reductions in tumour burdens, and the fact that they are probably more likely to work in patients with early stage disease but have to be tested in patients with late stage cancer and large tumour burdens.

"To run a trial in patients with early-stage disease is extremely time-consuming and costly and therefore impossible for most small biotech companies. We are fortunate in this matter in that we have backing from a UK consortium (QUASAR) and our partner sanofi-aventis to run a large (over 3000 patients) phase III study in early stage colon cancer patients. Such a large study would normally be out of the question for a company of our size and is a great opportunity to investigate whether there is a survival advantage in patients treated with TroVax," he said.

"At this stage we can say that the fact we have been able to identify correlations between the anti-tumour (5T4) immune response and clinical benefit (e.g. increased time to disease progression or increased patient survival) in multiple independent trials for several cancers is very encouraging. It gives a strong indication that the immune response we are inducing with TroVax appears to be doing something which is associated with benefit to the patient."

In addition to the phase III trial in early stage colon cancer patients, the effect of TroVax is being monitored in a current phase III trial of 733 kidney cancer patients. Although a review by the independent Data Safety Monitoring Board (DSMB) in July noted that this study would not meet its pre-defined primary endpoint (overall survival) the DSMB supported continuation of follow-up of the patients.

"We are very hopeful that the ongoing phase III trial in kidney cancer and two planned studies in metastatic colorectal and early stage colon cancer respectively will provide an opportunity to demonstrate that TroVax can provide clinical benefit to patients without the often severe side-effects which are associated with many cancer therapeutics," concluded Dr Harrop.

Adapted from materials provided by ECCO-the European CanCer Organisation, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081023195220.htm

Seabass And Chips: Harnessing Science To Predict Ocean Climate Change

Prototype wave energy device on test in Galway Bay. (Credit: Image courtesy of Marine Institute - Foras na Mara)

ScienceDaily (Oct. 26, 2008) — Cod, salmon and eels and other native cold water fish might eventually become a rarity in Irish waters—and not necessarily because of overfishing, pollution or habitat destruction. Long-term changes in the temperature and salt content of our regional seas, brought about by climate change, may force species such as these into deeper, colder waters and replace them with warm water species such as sea bass and boarfish.

As an island off the Atlantic coast of Western Europe, Ireland is an ideal laboratory from which to study the effects of climate change on the oceans, which in turn are the largest drivers of weather patterns on the planet. Almost 70% of the earth is covered by the sea, which acts not only as a transporter of solar heat from the equator to the poles, but also as the world's largest natural processor of atmospheric carbon dioxide. Understanding the interactions between the oceans and the atmosphere is one of the greatest challenges facing climate scientists—not least of which is the difficulty in telling which changes occur naturally and which might be due to global warming.

These challenges were identified as part of Sea Change-A National Strategy for Marine Research, Technology and Innovation 2006-2013 under which a special Marine Climate Change (MCC) Programme of research was set up in 2007 under the national Strategy for Science, Technology and Innovation and funded with €2.2 million. Its strategy for measuring, understanding and predicting subtle changes in complex natural marine systems into the future was to start by establishing what historic records of climate-related phenomena already existed from the past. From there it will develop sophisticated computer models that can explain what happened in years gone by and then, once those historic records are fully understood, it will use those models to look forward and predict the future.

"We set about working in three teams," explained Dr Glenn Nolan of the Marine Institute, who is heading up the MCC Programme, "one here at the Marine Institute, looking primarily at oceanographic and marine fisheries data, one at NUI Galway looking at the phenomenon of ocean acidification due to rising atmospheric carbon dioxide levels, and one at NUI Maynooth examining the Burrishoole Catchment information and the effects of climate change on migratory fish. The first year or so was spent researching relevant historic records. These included: over fifty years of continuous data from the Burrishoole River Catchment system at Newport in County Mayo, which would give us an idea of what might be happening to anadromous fish such as salmon, sea trout and eels; catch records of the annual groundfish survey carried out by the Marine Institute, which would show us how commercial marine fish stocks were being

effected; seawater temperature recordings from the Malin Head observatory in Donegal dating back to 1958; and samples taken by the continuous plankton recorder network all over Europe."

As well as looking back into the past, the three MCC teams also looked to cutting-edge technology to measure what is going on in the present. Data from the network of floating weather buoys around the coast, readings from underwater "gliders" and observations made from space by satellites are all being analysed at the Marine Institute's headquarters at Oranmore to make sense of what has been going on in our seas over the last fifty years, what is happening today and, using a new supercomputer system, to produce forecasts of what might reasonably be expected to happen in the future. Even now, some worrying trends in the data are starting to emerge, which confirms anecdotal information that the seas around Ireland are warming up.

Oceanographers have long known that seawater surface temperature in the Atlantic Ocean rises and falls naturally over a cycle of between 50 – 58 years according to a phenomenon called the Atlantic Multidecadal Oscillation (AMO). At present the Atlantic is in its warm phase, which is expected to further increase the temperature of the ocean's surface around Ireland for the next fifteen to thirty years. On top of this naturally occurring increase however, records of sea surface temperature kept at the Malin Head observatory in Donegal since 1958 demonstrate that the present warm cycle is half a degree warmer than the last one. Furthermore, the Malin Head data shows an increasing rate of warming since the 1990s, with the warmest years on record occurring since 1995. This is consistent with datasets from other sources that show a gradually upward trend in Irish sea surface temperatures averaging

0.3 o C over the 1850-2006 period.

But the worrying thing is that the sharpest rates of increase have been since the late 1990s, with the warmest years on record being 2006, 2005 and 2003. This suggests that even though the AMO will reduce seawater temperatures as the warm phase abates in around the year 2020, the increases could be even greater when it rises again, fifty years on. Clearly, the seas around Ireland are getting warmer beyond the limits of natural fluctuations, and that trend is continuing upwards.

In addition, the amount of salt in the sea (the salinity) around Ireland is also showing an upward trend. These warmer and saltier conditions, which are becoming increasingly like the Mediterranean rather than the Atlantic, are having a gradual but profound change on the marine animals and plants that live there. Sample records from the Continuous Plankton Recorder (CPR) survey carried out over the years shows that microscopic plant species (called Phytoplankton) that used to only bloom during the spring and summer, now appear to have an extended growth season.

Further up the food chain there is some evidence that species of microscopic carnivores called zooplankton have extended their range northwards associated with warm water currents that can extend further north in some years, depending on the balance of water current regimes in the North Atlantic. This change in turn is reflected in the abundance of large carnivorous fish which rely on these zooplankton as food in their own early stages of life. Records from the Marine Institute's annual ground fish stock survey of commercial species over the years show a gradual decline in coldwater species such as cod, with an increasing abundance of warmer water species such as lesser spotted dogfish, poor cod and even boarfish. Seawater temperature and the availability of zooplankton may also be driving the large changes in population size of salmon, sea trout and eel observed by analysing records of the Burrishoole Catchment in Mayo. Such "anadromous" fish species, which also spend part of their lives in freshwater, will also be effected by any variations in river flow, water levels or freshwater food abundance brought about by climate change, which makes them doubly vulnerable.

"If we can identify and understand the complex web of climate change on species such as salmon and eel, and in particular the impacts of climate change at the catchment, river and stream scale, vital to their very survival, we will have uncovered a crucial piece in the jigsaw puzzle," says Dr Rowan Fealy of the Maynooth Group. "The Burrishoole catchment provides a unique opportunity in which we can study such

phenomena and hopefully enable us to project both the direction and magnitude of future changes, so that adequate adaptation strategies can be developed to minimise or even manage the impacts of climate change on these species."

While changes in commercial fish species are inconvenient for the fishing industry, they can at least be adapted to over time as boats move from fishing one set of species to another. What is much more worrying on a global scale is the theory that increased atmospheric carbon dioxide could increase the acidity of the oceans. Carbon dioxide, when dissolved in water, produced carbonic acid. Seawater, which contains hundreds of chemicals acting together in a chemical "ecosystem" to create an ongoing balance between acidity and alkalinity, is buffered to withstand a certain amount of this gas. Indeed, the tiny plants living in the ocean rely on carbon dioxide and sunlight to produce life giving oxygen.

Theoretically, if the ocean's continue to absorb carbon dioxide at rates described for the past century the elevated acidity of the seawater might affect the plankton communities that live there and reduce their productivity.

As Dr Colin O'Dowd of NUI Galway explains, "There are two components to the CO2 study: the first is to quantify the flux of carbon dioxide between the atmosphere and the ocean and its impact on carbon dioxide concentrations in the sea; the second component is to quantify the impact of carbon dioxide concentrations in seawater on the carbonate chemistry system, total alkalinity and ultimately ocean acidification."

The flux study involves continuous measurements of carbon dioxide flux both at NUI Galway's Mace Head Research Station on the west coast, supported by a Marine Institute marine chemistry buoy moored a couple of kilometres offshore, and on board the research vessel RV Celtic Explorer. "This programme is initially enabling capacity within Ireland to conduct such studies and will provide a basis for longer-term assessment of changes in the carbonate system and the level of ocean acidification ultimately required to predict risk to marine ecosystems," says Dr. O'Dowd.

While the picture painted so far may seem gloomy, it has to be remembered that the differences in ocean temperature so far recorded are extremely small. It must also be pointed out that a rise in ocean temperature could also bring with it opportunities as well as threats. Rising water temperatures could bring with them more southerly fish species such as sea bass, red mullet and John Dory, while a longer tourist season and increased visitor numbers to Ireland could lead to increased employment in the tourism industry.

It is also worth pointing out that the sea offers a major source of renewable energy that creates no carbon dioxide emissions whatsoever. Quarter scale prototype devices capable of generating electricity from the motion of ocean waves are already being tested at the Marine Institute's wave energy test site off Spiddal, in County Galway in collaboration with Sustainable Energy Ireland. Plans to test larger scale devices are also well advanced.

In any event, the more we know about the complex systems of the ocean through research, technology and innovation, the more chance we have to predict change, to take mitigating actions to reduce negative effects and to investigate sustainable alternatives. It really is all about knowledge.

Sea bass and chips anyone?

Adapted from materials provided by Marine Institute - Foras na Mara.

http://www.sciencedaily.com/releases/2008/10/081023222558.htm

Spirituality Protects Against Depression Better Than Church Attendance

ScienceDaily (Oct. 26, 2008) — Those who worship a higher power often do so in different ways. Whether they are active in their religious community, or prefer to simply pray or meditate, new research out of Temple University suggests that a person's religiousness – also called religiosity – can offer insight into their risk for depression.

Lead researcher Joanna Maselko, Sc.D., characterized the religiosity of 918 study participants in terms of three domains of religiosity: religious service attendance, which refers to being involved with a church; religious well-being, which refers to the quality of a person's relationship with a higher power; and existential well-being, which refers to a person's sense of meaning and their purpose in life.

In a study published on-line this month in Psychological Medicine, Maselko and fellow researchers compared each domain of religiosity to their risk of depression, and were surprised to find that the group with higher levels of religious well-being were 1.5 times more likely to have had depression than those with lower levels of religious well-being.

Maselko theorizes this is because people with depression tend to use religion as a coping mechanism. As a result, they're more closely relating to God and praying more.

Researchers also found that those who attended religious services were 30 percent less likely to have had depression in their lifetime, and those who had high levels of existential well-being were 70 percent less likely to have had depression than those who had low levels of existential well-being.

Maselko says involvement in the church provides the opportunity for community interaction, which could help forge attachments to others, an important factor in preventing depression. She added that those with higher levels of existential-well being have a strong sense of their place in the world.

"People with high levels of existential well-being tend to have a good base, which makes them very centered emotionally," said Maselko. "People who don't have those things are at greater risk for depression, and those same people might also turn to religion to cope."

Maselko admits that researchers have yet to determine which comes first: depression or being religious, but is currently investigating the time sequence of this over people's lives to figure out the answer.

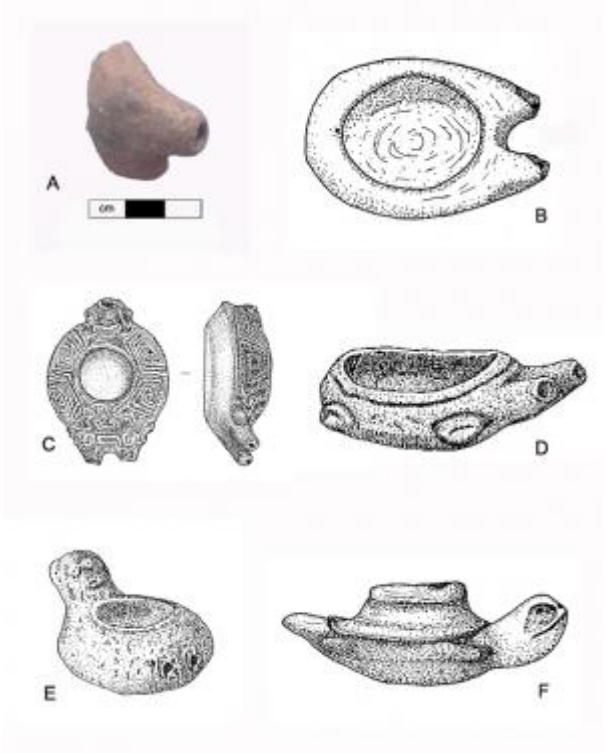
"For doctors, psychiatrists and counselors, it's hard to disentangle these elements when treating mental illness," she said. "You can't just ask a patient if they go to church to gauge their spirituality or coping behaviors. There are other components to consider when treating patients, and its important information for doctors to have."

Other authors on this study are Stephen Gilman, Sc.D., and Stephen Buka, Sc.D., from the department of Public Health at Harvard University and Brown University Medical School. This research was funded by a grant from the National Institutes of Mental Health and by the Jack Shand Award from the Society for the Scientific Study of Religion.

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

http://www.sciencedaily.com/releases/2008/10/081023120228.htm

First Inhabitants Of Caribbean Brought Drug Heirlooms With Them



Examples of inhaling bowls that were likely used for the ingestion of hallucinogenic substances. (Credit: Image courtesy of Dr. Scott M. Fitzpatrick, Department of Sociology & Anthropology, NC State University)

ScienceDaily (Oct. 25, 2008) — A new study led by North Carolina State University's Dr. Scott Fitzpatrick is the first to show physical evidence that the people who colonized the Caribbean from South America brought with them heirloom drug paraphernalia that had been passed down from generation to generation as the colonists traveled through the islands.

The research team used a dating technique called luminescence to determine the age of several artifacts found on the Caribbean island of Carriacou, in the West Indies, and discovered that the items dated back to between roughly 400 and 100 B.C. These dates are well before Carriacou was colonized in approximately A.D. 400. Luminescence testing involves heating a substance and measuring the amount of light it gives off to determine how long ago it was last heated.

Heirlooms are portable objects that are inherited by family members and kept in circulation for generations, Fitzpatrick says, and are frequently part of important rituals. The objects tested for this study are ceramic inhaling bowls that were likely used for the ingestion of hallucinogenic substances. Fitzpatrick says the luminescence dates of the bowls, as well as analysis of the material from which the bowls were made, indicate that the artifacts "appear to have been transported to Carriacou when it was colonized – possibly hundreds of years after they were made."

Fitzpatrick, an assistant professor of anthropology at NC State, says scholars have long thought that the people who settled the Caribbean islands likely brought heirlooms with them – but says the bowls "are the first physical evidence we've found to support that claim."

Journal reference:

1. Fitzpatrick et al. **Evidence for inter-island transport of heirlooms: luminescence dating and petrographic analysis of ceramic inhaling bowls from Carriacou, West Indies**. *Journal of Archaeological Science*, October 2008; DOI: 10.1016/j.jas.2008.08.007

Adapted from materials provided by North Carolina State University.

http://www.sciencedaily.com/releases/2008/10/081020093410.htm

Development Puts An End To Evolution Of Endless Forms

ScienceDaily (Oct. 25, 2008) — Researchers have put forward a simple model of development and gene regulation that is capable of explaining patterns observed in the distribution of morphologies and body plans (or, more generally, phenotypes).

The study, by Elhanan Borenstein of the Santa Fe Institute and Stanford University and David Krakauer of the Santa Fe Institute was published in this month's issue of PLoS Computational Biology.

Nature truly displays a bewildering variety of shapes and forms. Yet, with all its magnificence, this diversity still represents only a tiny fraction of the endless 'space' of possibilities, and observed phenotypes actually occupy only small, dense patches in the abstract phenotypic space. Borenstein and Krakauer demonstrate that the sparseness of variety in nature can be attributed to the interactions between multiple genes and genetic controls involved in the development of organisms – a much simpler explanation than previously suggested.

Borenstein and Krakauer further integrated their model with phylogenetic dynamics, allowing developmental plans to evolve over time. They showed that this hybrid developmental-phylogenetic model reproduces patterns that are observed in the fossil record, including increasing variation between taxonomic groups, accompanied by decreasing variation within groups. This pattern is consistent with the Cambrian radiation associated with a rapid proliferation of highly disparate, multicellular animals, and suggests that much of the variation seen today is as a result of simpler genetic controls dating from much earlier in evolutionary time.

The findings presented in this study also bear directly on issues of convergence (when very different organisms independently evolve similar features). By including a model of development, rather different genotypes can produce very similar phenotypes. Consequently, convergent evolution, which the vast space of genotypes would suggest to be rare, is allowed to become much more common.

One of the paradoxical implications of this study has been to show how innovations in development that lead to an overall increase in the number of accessible phenotypes, can lead to a reduction in selective variance. In other words, while the potential for novel phenotypes increases, the fraction of space these phenotypes occupies tends to contract.

They concluded that "The theory presented in our paper complements the view of development as a key component in the production of endless forms and highlights the crucial role of development in constraining (as well as generating) biotic diversity."

Journal reference:

1. Borenstein E, Krakauer DC. **An End to Endless Forms: Epistasis, Phenotype Distribution Bias, and Nonuniform Evolution**. *PLoS Comput Biol*, 2008; 4 (10): e1000202 DOI: 10.1371/journal.pcbi.1000202

Adapted from materials provided by Public Library of Science, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081023222252.htm

Potential Strategy To Eliminate Poisonous Protein From Alzheimer Brains Identified

ScienceDaily (Oct. 25, 2008) — Scientists at the Gladstone Institute of Neurological Disease (GIND) have identified a new strategy to destroy amyloid-beta (AB) proteins, which are widely believed to cause Alzheimer's disease (AD). Li Gan, PhD, and her coworkers discovered that the activity of a potent AB-degrading enzyme can be unleashed in mouse models of the disease by reducing its natural inhibitor cystatin C (CysC).

All of us produce AB proteins in the brain. However, in most people, the proteins never build up to dangerous levels because they are cleared away by enzymes that destroy them. Previously Dr. Gan's laboratory had shown that cathepsin B (CatB) is such an AB-degrading enzyme. In the latest issue of the journal Neuron, the researchers report a highly effective approach to promote CatB-mediated clearance of AB ."Many groups have developed drugs to block the production of AB, but the efficacy and safety of this approach remains to be demonstrated in clinical trials," said GIND Director Lennart Mucke, MD "By identifying an effective strategy to enhance the removal of AB, this research provides a very promising alternative or complementary therapeutic avenue."

or from High levels of AB in the brain may result from overproduction of AB an inability to eliminate it from the brain. While most work has focused on the first option, the latter has been problematic. For example, efforts to develop a vaccine that would trigger the immune system to eliminate AB have shown limited success and resulted in adverse side effects.

"Our strategy to harness the activity of a powerful AB-degrading enzyme takes advantage of the brain's own defense system to remove the toxic AB build-up," said Dr. Gan. "In principle, one could boost the activity of CatB by expressing more of it in the brain or by reducing the activity of CysC, its natural inhibitor. We focused on the latter strategy because it has greater long-term therapeutic potential."

Many enzymes that degrade proteins are kept in check by regulators called protease inhibitors. The activity of CatB is regulated by the protease inhibitor CysC. By reducing CysC activity, the scientists were able to unleash the AB-degrading power of CatB, effectively preventing the build-up of AB in mouse models of AD.

To examine the impact of this manipulation on brain function, Dr. Gan's team measured brain cell activities that relate closely to learning and memory. Increasing CatB activity by lowering CysC levels prevented AB-induced deficits in those cellular activities. The investigators also tested the modified AD mice for learning and memory in a water maze. Higher levels of CatB activity improved the ability of AD to learn the maze and to retain the new information. Increasing CatB activity also prevented the premature mortality that is typically seen in these Alzheimer models.

"Our results suggest that CysC reduction has major therapeutic potential," Dr. Gan said. "The next step will be to develop pharmacological approaches to inhibit CysC in the human brain."

Binggui Sun, Yungui Zhou, Brian Halabisky, Iris Lo, Seo-Hyun Cho, Nino Devidze, Sarah Mueller-Steiner, Xin Wang, and Anders Grubb also contributed to the study. The work was supported in part by the National Institute on Aging (NIA), California Department of Health and Human Services. Additional funding was provided by Hellman Family Fund and Gladstone Institutes.

Adapted from materials provided by Gladstone Institutes, via EurekAlert!, a service of AAAS.

http://www.sciencedaily.com/releases/2008/10/081023144055.htm

Physical Strength, Fighting Ability Revealed In Human Faces

A mechanism exists within the human brain that enables people to determine with uncanny accuracy the fighting ability of men around them by honing in on their upper body strength. What's more, that assessment can be made even when everything but the men's faces are obscured from view. (Credit: iStockphoto/Duncan Walker)

ScienceDaily (Oct. 25, 2008) — For our ancestors, misjudging the physical strength of a would-be opponent might have resulted in painful — and potentially deadly — defeat.

Now, a study conducted by a team of scientists at the University of California, Santa Barbara has found that a mechanism exists within the human brain that enables people to determine with uncanny accuracy the fighting ability of men around them by honing in on their upper body strength. What's more, that assessment can be made even when everything but the men's faces are obscured from view.

A paper highlighting the researchers' findings appears in the current issue of the Proceedings of the Royal Society.

"Assessing fighting ability was important for our ancestors, and the characteristic that the mind implicitly equates with fighting ability is upper body strength," said Aaron Sell, a postdoctoral fellow at UCSB's Center for Evolutionary Psychology and the paper's lead author. "That's the component of strength that's most relevant to premodern combat. The visual assessment of fighting ability is almost perfectly correlated with the perception of strength, and both closely track actual upper body strength. What is a bit spooky is that upper body strength can even be read on a person's face.

Sell conducted the study with Leda Cosmides, a professor of psychology and co-director of the Center for Evolutionary Psychology; John Tooby, a professor of anthropology and also co-director of the Center for

Evolutionary Psychology; Michael Gurven, an associate professor of anthropology; and graduate students Daniel Sznycer and Christopher von Rueden.

The study consisted of four sections, each of which asked the test subjects to assess the physical strength of individuals based on photographs of their faces, their bodies, or both. Subjects were asked to rank the physical strength or fighting ability of the people in the photographs on a scale of one to seven. When the photographs depicted men whose strength had been measured precisely on weight-lifting machines, the researchers found an almost perfect correlation between perceptions of fighting ability and perceptions of strength. "When you see that kind of correlation it's telling you you're measuring the same underlying variable," said Tooby.

They also found that perceptions of strength and fighting ability reflected the target's actual strength, as measured on weight-lifting machines at the gym. In other sections of the study, the researchers showed that this result extended far beyond the gym. Both men and women accurately judge men's strength, whether those men are drawn from a general campus population, a hunter-horticulturalist group in Bolivia, or a group of herder-horticulturalists living in the Argentinian Andes.

Leg strength was measured along with upper body strength in both the United States and Bolivian populations, but the results showed that perceptions of men's strength and fighting ability reflect upper body strength, not that of legs. "That makes sense," said Cosmides. "If, for example, you're trying to lift something really heavy, or run a long distance, your lower body — your legs — will also be significant. But for fighting at close quarters, it's the upper body that really matters."

Added Tooby: "Whether people are assessing toughness or strength, it's upper body strength they implicitly register. And that's the critical information our ancestors needed in deciding — or feeling — whether to surrender a disputed resource or escalate aggressively."

The researchers suggest that the ability to judge physical strength and fighting ability serves different, but equally important, purposes for men and women. In men, the mechanism is a barometer for measuring potential threats and determining how aggressive or submissive they should be when facing a possible enemy. For women, the mechanism helps identify males who can adequately protect them and their children. Men have a lot more experience with rough and tumble play and direct experience with fighting, yet women are just as good at assessing these variables. The authors also point out that neither men nor women fare as well in assessing women's strength. This is entirely expected because, ancestrally, inflicting violence was mostly the province of men.

"The next step is to isolate what it is in the face that indicates upper body strength," said Sell. He suggests that the correlation may lie in the heavier brow ridge and thicker jaw that result from increased levels of testosterone. "Many studies have been done on the effects of testosterone on the face. There's a good chance testosterone is involved in regulating the body for battle, and men with high testosterone — those with a heavy brow ridge and thicker jaw — developed bodies that were more prepared for combat."

"One reason we evolved the ability to perceive physical strength in the face may be that it's where we focus our attention when we look at someone," said Cosmides.

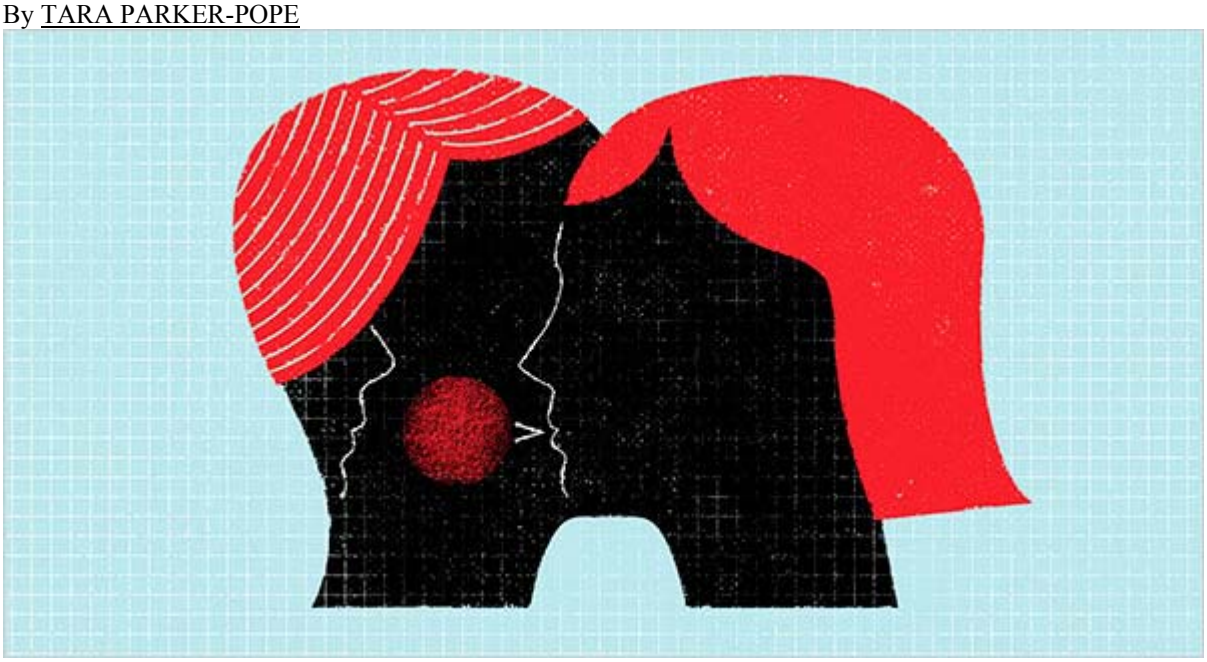
"Even if we are able to see someone's body, we always look at the face. It's so rich in social information – – what a person is thinking or feeling — and adding the assessment of physical strength is a huge benefit. A person who is angry and strong offers a much greater threat than the person who is angry but weak."

Adapted from materials provided by University of California - Santa Barbara.

http://www.sciencedaily.com/releases/2008/10/081022135809.htm

Love, Sex and the Changing Landscape of Infidelity

By TARA PARKER-POPE



If you cheated on your spouse, would you admit it to a researcher?

That question is one of the biggest challenges in the scientific study of marriage, and it helps explain why different studies produce different estimates of infidelity rates in the United States.

Surveys conducted in person are likely to underestimate the real rate of adultery, because people are reluctant to admit such behavior not just to their spouses but to anyone.

In a study published last summer in The Journal of Family Psychology, for example, researchers from the University of Colorado and Texas A&M surveyed 4,884 married women, using face-to-face interviews and anonymous computer questionnaires. In the interviews, only 1 percent of women said they had been unfaithful to their husbands in the past year; on the computer questionnaire, more than 6 percent did.

At the same time, experts say that surveys appearing in sources like women's magazines may overstate the adultery rate, because they suffer from what pollsters call selection bias: the respondents select themselves and may be more likely to report infidelity.

But a handful of new studies suggest surprising changes in the marital landscape. Infidelity appears to be on the rise, particularly among older men and young couples. Notably, women appear to be closing the adultery gap: younger women appear to be cheating on their spouses nearly as often as men.

"If you just ask whether infidelity is going up, you don't see really impressive changes," said David C. Atkins, research associate professor at the University of Washington Center for the Study of Health and Risk Behaviors. "But if you magnify the picture and you start looking at specific gender and age cohorts, we do start to see some pretty significant changes."

The most consistent data on infidelity come from the General Social Survey, sponsored by the National Science Foundation and based at the University of Chicago, which has used a national representative

sample to track the opinions and social behaviors of Americans since 1972. The survey data show that in any given year, about 10 percent of married people — 12 percent of men and 7 percent of women — say they have had sex outside their marriage.

But detailed analysis of the data from 1991 to 2006, to be presented next month by Dr. Atkins at the Association for Behavioral and Cognitive Therapies conference in Orlando, show some surprising shifts. University of Washington researchers have found that the lifetime rate of infidelity for men over 60 increased to 28 percent in 2006, up from 20 percent in 1991. For women over 60, the increase is more striking: to 15 percent, up from 5 percent in 1991.

The researchers also see big changes in relatively new marriages. About 20 percent of men and 15 percent of women under 35 say they have ever been unfaithful, up from about 15 and 12 percent respectively.

Theories vary about why more people appear to be cheating. Among older people, a host of newer drugs and treatments are making it easier to be sexual, and in some cases unfaithful — Viagra and other remedies for erectile dysfunction, estrogen and testosterone supplements to maintain women's sex drive and vaginal health, even advances like better hip replacements.

"They've got the physical health to express their sexuality into old age," said Helen E. Fisher, research professor of anthropology at Rutgers and the author of several books on the biological and evolutionary basis of love and sex.

In younger couples, the increasing availability of pornography on the Internet, which has been shown to affect sexual attitudes and perceptions of "normal" behavior, may be playing a role in rising infidelity.

But it is the apparent change in women's fidelity that has sparked the most interest among relationship researchers. It is not entirely clear if the historical gap between men and women is real or if women have just been more likely to lie about it.

"Is it that men are bragging about it and women are lying to everybody including themselves?" Dr. Fisher asked. "Men want to think women don't cheat, and women want men to think they don't cheat, and therefore the sexes have been playing a little psychological game with each other."

Dr. Fisher notes that infidelity is common across cultures, and that in hunting and gathering societies, there is no evidence that women are any less adulterous than men. The fidelity gap may be explained more by cultural pressures than any real difference in sex drives between men and women. Men with multiple partners typically are viewed as virile, while women are considered promiscuous. And historically, women have been isolated on farms or at home with children, giving them fewer opportunities to be unfaithful.

But today, married women are more likely to spend late hours at the office and travel on business. And even for women who stay home, cellphones, e-mail and instant messaging appear to be allowing them to form more intimate relationships, marriage therapists say. Dr. Frank Pittman, an Atlanta psychiatrist who specializes in family crisis and couples therapy, says he has noticed more women talking about affairs centered on "electronic" contact.

"I see a changing landscape in which the emphasis is less on the sex than it is on the openness and intimacy and the revelation of secrets," said Dr. Pittman, the author of "Private Lies: Infidelity and the Betrayal of Intimacy" (Norton, 1990). "Everybody talks by cellphone and the relationship evolves because you become increasingly distant from whomever you lie to, and you become increasingly close to whomever you tell the truth to."

While infidelity rates do appear to be rising, a vast majority of people still say adultery is wrong, and most men and women do not appear to be unfaithful. Another problem with the data is that it fails to discern when respondents cheat: in a troubled time in the marriage, or at the end of a failing relationship.

"It's certainly plausible that women might have increased their relative rate of infidelity over time," said Edward O. Laumann, professor of sociology at the University of Chicago. "But it isn't going to be a huge number. The real thing to talk about is where are they in terms of their relationship and the marital bond."

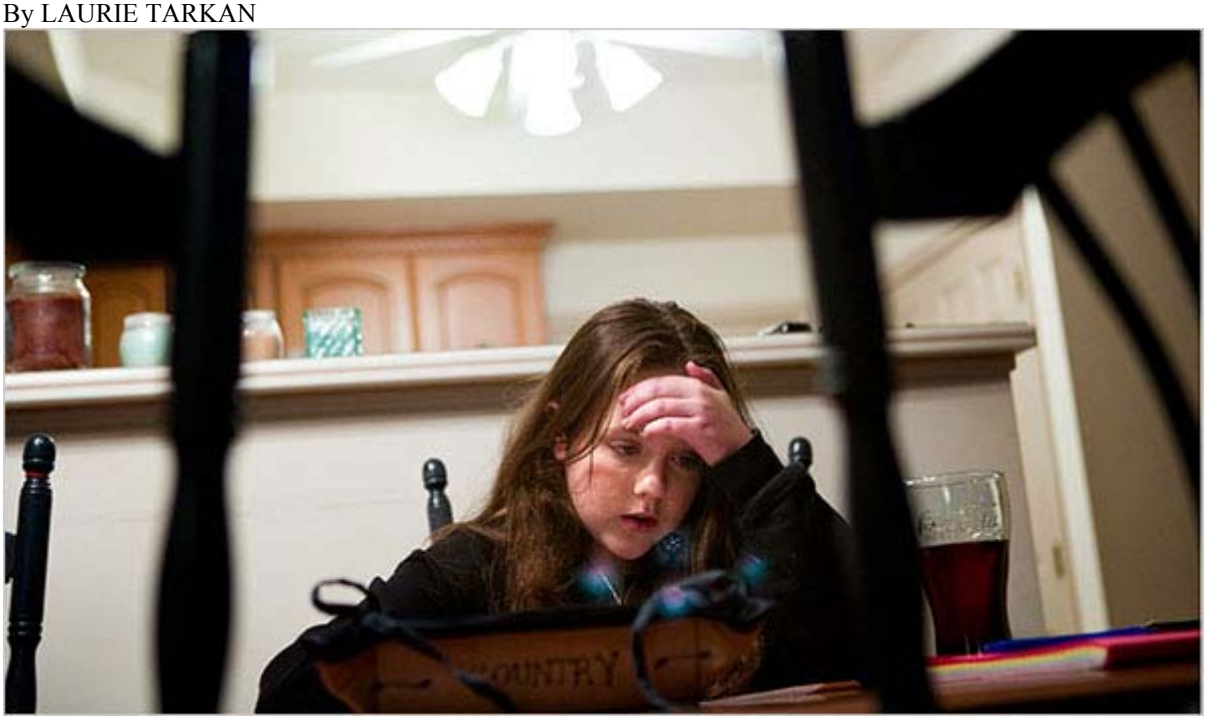
The General Social Survey data also show some encouraging trends, said John P. Robinson, professor of sociology and director of the Americans' Use of Time project at the University of Maryland. One notable shift is that couples appear to be spending slightly more time together. And married men and women also appear to have the most active sex lives, reporting sex with their spouse 58 times a year, a little more than once a week.

"We've looked at that as good news," Dr. Robinson said.

http://www.nytimes.com/2008/10/28/health/28well.html?_r=1&nl=8hlth&emc=hltha1&oref=slogin

A Rise in Kidney Stones Is Seen in U.S. Children

By LAURIE TARKAN



To the great surprise of parents, kidney stones, once considered a disorder of middle age, are now showing up in children as young as 5 or 6.

While there are no reliable data on the number of cases, pediatric urologists and nephrologists across the country say they are seeing a steep rise in young patients. Some hospitals have opened pediatric kidney stone clinics.

"The older doctors would say in the '70s and '80s, they'd see a kid with a stone once every few months," said Dr. Caleb P. Nelson, a urology instructor at Harvard Medical School who is co-director of the new kidney stone center at Children's Hospital Boston. "Now we see kids once a week or less."

Dr. John C. Pope IV, an associate professor of urologic surgery and pediatrics at the Monroe Carell Jr. Children's Hospital at Vanderbilt in Nashville, said, "When we tell parents, most say they've never heard of a kid with a kidney stone and think something is terribly wrong with their child."

In China recently, many children who drank milk tainted with melamine — a toxic chemical illegally added to watered-down milk to inflate the protein count — developed kidney stones.

The increase in the United States is attributed to a host of factors, including a food additive that is both legal and ubiquitous: salt.

Though most of the research on kidney stones comes from adult studies, experts believe it can be applied to children. Those studies have found that dietary factors are the leading cause of kidney stones, which are crystallizations of several substances in the urine. Stones form when these substances become too concentrated.

Forty to 65 percent of kidney stones are formed when oxalate, a byproduct of certain foods, binds to calcium in the urine. (Other common types include calcium phosphate stones and uric acid stones.) And the two biggest risk factors for this binding process are not drinking enough fluids and eating too much salt; both increase the amount of calcium and oxalate in the urine.

Excess salt has to be excreted through the kidneys, but salt binds to calcium on its way out, creating a greater concentration of calcium in the urine and the kidneys.

"What we've really seen is an increase in the salt load in children's diet," said Dr. Bruce L. Slaughenhoupt, co-director of pediatric urology and of the pediatric kidney stone clinic at the University of Wisconsin. He and other experts mentioned not just salty chips and French fries, but also processed foods like sandwich meats; canned soups; packaged meals; and even sports drinks like Gatorade, which are so popular among schoolchildren they are now sold in child-friendly juice boxes.

Children also tend not to drink enough water. "They don't want to go to the bathroom at school; they don't have time, so they drink less," said Dr. Alicia Neu, medical director of pediatric nephrology and the pediatric stone clinic at Johns Hopkins Children's Center in Baltimore. Instead, they are likely to drink only once they're thirsty — but that may be too little, too late, especially for children who play sports or are just active.

"Drinking more water is the most important step in the prevention of kidney stones," Dr. Neu said.

The incidence of kidney stones in adults has also been rising, especially in women, and experts say they see more adults in their 20s and 30s with stones; in the past, it was more common in adults in their 40s and 50s.

"It's no longer a middle-aged disease," Dr. Nelson said. "Most of us suspect what we're seeing in children is the spillover of the overall increase in the whole population."

The median age of children with stones is about 10.

Many experts say the rise in obesity is contributing to kidney stones in children as well as adults. But not all stone centers are seeing overweight children, and having a healthy weight does not preclude kidney stones. "Of the school-age and adolescent kids we've seen, most of them appear to be reasonably fit, active kids," Dr. Nelson said. "We're not seeing a parade of overweight Nintendo players."

Dr. Slaughenhoupt has seen more overweight children at his clinic. "We haven't compared our data yet," he said, "but my sense is that children with stones are bigger, and some of them are morbidly obese."

Dr. Pope, in Nashville, agreed. His hospital lies in the so-called stone belt, a swath of Southern states with a higher incidence of kidney stones, and he said doctors there saw two to three new pediatric cases a week.

"There's no question in my mind that it is largely dietary and directly related to the childhood obesity epidemic," he said.

Fifty to 60 percent of children with kidney stones have a family history of the disease. "If you have a family history, it's important to recognize your kids are at risk at some point in their life," Dr. Nelson said. "That means instilling lifelong habits of good hydration, balanced diet, and avoiding processed high-salt, high-fat foods."

There is also evidence that sucrose, found in sodas, can also increase risk of stones, as can high-protein weight-loss diets, which are growing in popularity among teenagers.

A common misconception is that people with kidney stones should avoid calcium. In fact, dairy products have been shown to reduce the risk of stones, because the dietary calcium binds with oxalate before it is absorbed by the body, preventing it from getting into the kidneys.

Children with kidney stones can experience severe pain in their side or stomach when a stone is passing through the narrow ureter through which urine travels from the kidneys to the bladder. Younger children may have a more vague pain or stomachache, making the condition harder to diagnose. Children may feel sick to their stomach, and often there is blood in the urine.

One Saturday last February, 11-year-old Tessa Cesario of Frederick, Md., began having back pains. An aspiring ballerina who dances en pointe five nights a week, she was used to occasional aches and strains. But this one was so intense that her parents took her to the doctor.

The pediatrician ordered an X-ray, and when he phoned with the results, her parents were astonished.

“I was afraid he was calling to say she pulled something and wouldn’t be able to dance,” said her mother, Theresa Cesario. Instead, they were told that Tessa had a kidney stone.

“I thought older men get kidney stones, not kids,” Ms. Cesario said.

The treatment for kidney stones is similar in children and adults. Doctors try to let the stone pass, but if it is too large, if it blocks the flow of urine or if there is a sign of infection, it is removed through one of two types of minimally invasive surgery.

Shock-wave lithotripsy is a noninvasive procedure that uses high-energy sound waves to blast the stones into fragments that are then more easily passed. In ureteroscopy, an endoscope is inserted through the ureter to retrieve or obliterate the stone.

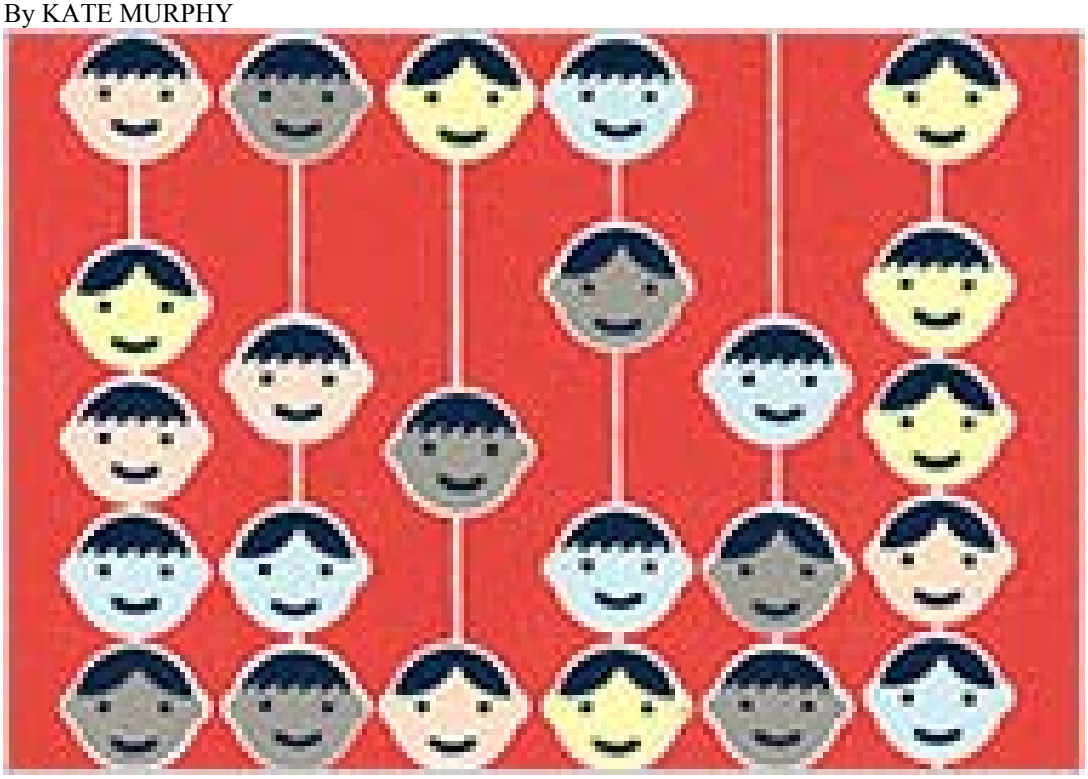
Tessa Cesario is taking a wait-and-see approach. Her stone is not budging, so her parents are putting off surgery until they can work it into her dance schedule. In the meantime, she has vastly reduced her salt intake by cutting back on sandwich meats, processed soups and chips.

And, her mother said, “she drinks a ton more water.”

http://www.nytimes.com/2008/10/28/health/28kidn.html?nl=8hlth&emc=hltha1

21-Year Study of Children Set to Begin

By KATE MURPHY



After nearly a decade of planning, researchers will begin recruiting pregnant women in January for an ambitious nationwide study that will follow more than 100,000 children from before birth until age 21.

The goal of the federally financed project, the National Children's Study, is to gain a better understanding of the effects of a wide array of factors on children's health.

"What we are doing is bold and needs to be bold in order to answer some pressing questions," said the study's director, Dr. Peter C. Scheidt, a pediatrician on the staff of the child-health division of the National Institutes of Health.

Investigators hope to find explanations for the rising rates of premature births, childhood obesity, cancer, autism, endocrine disorders and behavioral problems. To that end, they will examine factors like genetics and child rearing, geography, exposure to chemicals, nutrition and pollution.

While few quarrel with the goal, some experts worry that the expansive project will take resources away from smaller and more focused perinatal and pediatric research, particularly when budgets are certain to be strained by the financial crisis. The total cost is estimated to be $2.7 billion.

Participating mothers and children (fathers will be encouraged but not required to take part) will be given periodic interviews and questionnaires. They will further be asked to submit samples of blood, urine and hair. Air, water and dust from their environments will also be sampled and tested.

"Something like this has never been done in this country," said a principal investigator for the study, Dr. Philip J. Landrigan, professor and chairman of community and preventive medicine at Mount Sinai School of Medicine in Manhattan. "It's past time for us to do this."

Studies of comparable size and scope are under way in Britain, Denmark and Norway.

Conceived during the Clinton administration and authorized by the Children's Health Act of 2000, the National Children's Study is being led by a group of federal agencies. Besides the health institutes, they are the Department of Health and Human Services, the Centers for Disease Control and Prevention, the Environmental Protection Agency and the Department of Education.

Since 2000, more than 2,400 health care, environmental and technology professionals have met in panels for hundreds of hours to work out such details as sampling methodology, data collection and privacy protection.

Subjects will be chosen from 105 counties to achieve a representative mix of racial, ethnic, religious, social, cultural and geographic characteristics. Forty regional centers will administer the study — mostly well-known medical institutions like Mount Sinai, the University of North Carolina School of Medicine and the University of Texas Health Science Center-Houston.

Dr. Russ Hauser, a professor of environmental and occupational epidemiology at the Harvard School of Public Health who served on a National Academy of Sciences committee that reviewed the study's design, said the study would be "worthy and feasible" as long as it was properly financed.

But other experts questioned whether it was worth the cost. "The question isn't whether the goals can be accomplished," said Dr. Arthur Reingold, professor of epidemiology at the School of Public Health at the University of California, Berkeley. "It's more a question of is this the best use of almost $3 billion, particularly when it will inevitably take funding from other research, especially with the economy falling to pieces."

Researchers involved in the study counter that it will more than pay for itself by leading researchers to the causes or contributing factors for so many childhood disorders. Dr. Landrigan said a "dress rehearsal" of the study, which began in 2001 with 1,500 subjects from New York and California, has already shown that pregnant women exposed to organophosphates in pesticides were more likely to have babies with small brains and impaired cognition.

Another concern is that the study's advisory board — which is choosing the chemical exposures to be studied — includes scientists from 3M and Pfizer, who have apparent conflicts of interest.

But Richard Wiles, executive director of the nonprofit Environmental Working Group, said that since there were only 2 such scientists among the board's 33 members, he hoped they would not have undue influence.

http://www.nytimes.com/2008/10/28/health/research/28chil.html?nl=8hlth&emc=hltha2

The Mysterious Cough, Caught on Film

By DENISE GRADY

In Roald Dahl's novel "The B.F.G.," the title character, a big friendly giant, captures dreams in glass jars. At Pennsylvania State University, a professor of engineering has captured something less whimsical but no less ephemeral — a cough — on film.

The image, published online Oct. 9 by The New England Journal of Medicine, was created by schlieren photography, which "takes an invisible phenomenon and turns it into a visible picture," said the engineering professor, Gary Settles, who is the director of the university's gas dynamics laboratory.

Schlieren is German for "streaks"; in this case it refers to regions of different densities in a gas or a liquid, which can be photographed as shadows using a special technique.

"In my lab we use this technique a lot," Dr. Settles said. "Often it's used for other things, like in supersonic wind tunnels, to show shock waves around high-speed aircraft."

The process involves a small, bright light source, precisely placed lenses, a curved mirror, a razor blade that blocks part of the light beam and other tools that make it possible to see and photograph disturbances in the air. In the world of gas dynamics, a cough is merely "a turbulent jet of air with density changes."

Though coughs spread tuberculosis, SARS, influenza and other diseases, surprisingly little is known about them. “We don’t have a good understanding of the air flow,” Dr. Settles said.

To map a cough, he teamed up with Dr. Julian Tang, a virus expert from Singapore. A healthy student provided the cough. The expelled air, traveling at 18 miles per hour, mixed with cooler surrounding air and produced “temperature differences that bend light rays by different amounts,” Dr. Settles said.

He went on: “The next thing is, you get a couple of people in front of the mirror talking, or one coughs on another, and you see how the air flow moves, how people infect one another. Or you look at how coughing can spread airborne infection in a hospital. This is really a suggestion for how we might study all that. The techniques used in wind tunnels can be used to study human diseases.”

Other schlieren images show the churning air and shock waves that emanate from a pistol’s firing; an Airedale sniffing a small flower; and the unseen, shimmering world around a candle burning in a breeze.

The final photograph, in a full-scale mock-up of an aircraft cabin, captures in microseconds the flash of an explosion under a mannequin in an airplane seat and the propagation of shock waves into the cabin. The blast was a re-creation of a terrorist’s attempt in 1994 to bring down a Philippine Airlines flight with a nitroglycerin bomb. The plane did not crash, but the explosion did kill the passenger seated over the bomb. The simulation used a less intense explosion than the actual bombing.

“The simulation helps to understand how the energy of an onboard blast reverberates around the cabin,” Dr. Settles said, “and it is also useful to check the results of computer blast simulations.”

http://www.nytimes.com/2008/10/28/science/28cough.html?nl=8hlth&emc=hltha2

Prevention: Chest Compressions, to a Disco Beat

By ERIC NAGOURNEY

Well, you can tell by the way he pounds your chest, he's an E.R. man, and his tempo is best.

That's right — "Stayin' Alive," the song some people might pay to get out of their head, may be just what their heart needs if it suddenly stops.

Researchers say the Bee Gees song, from the 1977 hit movie "Saturday Night Fever," offers almost the perfect pace for performing chest compressions on people who have had heart attacks. Emergency workers doing cardiopulmonary resuscitation are advised to press down on the chest 100 times a minute. "Stayin' Alive" has 103 beats a minute.

The findings were presented at a recent conference of the American College of Emergency Physicians by Dr. David Matlock of the University of Illinois College of Medicine at Peoria.

This is not to say that people would actually be forced to listen to the song.

"We're not advocating turning on the song in the middle of a resuscitation," Dr. Matlock said. "If it helps people to sing it out loud, I guess that's O.K."

For several years, Dr. Matlock said, emergency workers have been told that compressions done to the tempo of the song are more likely to conform to the recommendations of the American Heart Association. Doing it right can triple the survival rate, the researchers said. But no one had proved that the song actually helped.

For the study, researchers had 10 doctors and 5 medical students practice compressions while listening to the music. When they were retested five weeks later without the song, they did the compressions at an average rate of 113 a minute, within the acceptable range.

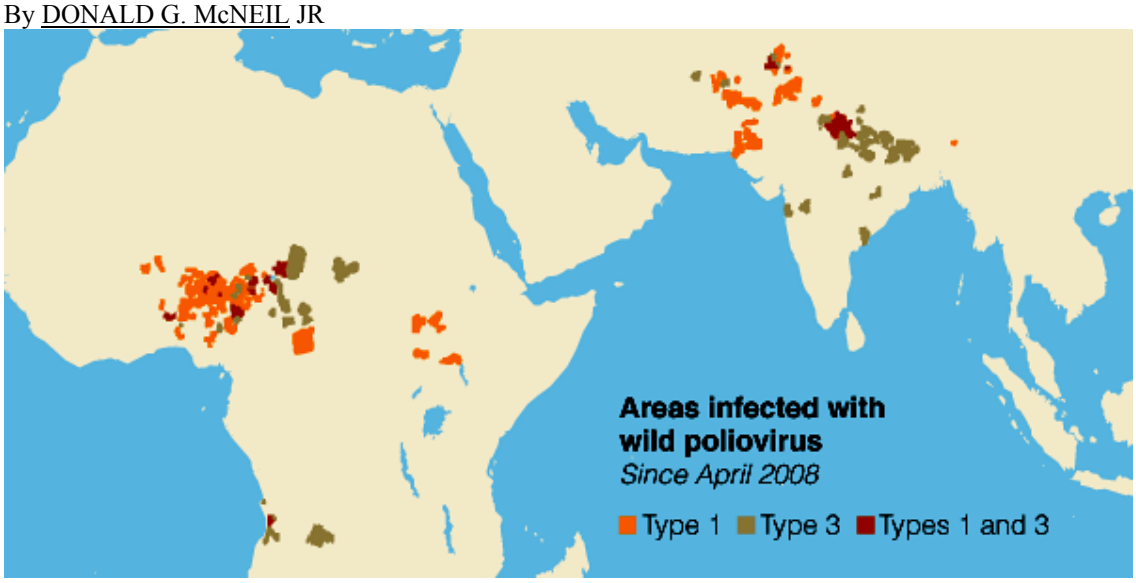
"Stayin' Alive," by the way, is not the only song found to be helpful. "Another One Bites the Dust," by Queen, may also work.

"Obviously," Dr. Matlock said, " 'Stayin' Alive's a little more appropriate for the situation."

http://www.nytimes.com/2008/10/28/health/research/28prev.html?nl=8hlth&emc=hltha2

Polio Spreads to New Countries and Increases Where It's Endemic

By DONALD G. McNEIL JR



Polio infections are increasing and spreading to new countries, according to case counts recently released by the World Health Organization.

Since April, outbreaks have been found in 10 countries beyond the 4 in which polio is considered endemic — Afghanistan, India, Nigeria and Pakistan. And in those four countries, the number of cases is more than double the number found by this time in 2007.

In Africa, cases have been found as far south as Angola and as far west as Ethiopia. Each detected case implies another 200 cases with few or no symptoms, experts say.

There have been outbreaks of both type 1 and type 3 polio, which frustrate W.H.O. plans, begun in 2005, to concentrate on a monovalent vaccine against type 1. Recent studies show that vaccine to be far more effective against type 1 than the old trivalent vaccine was. But it does not protect against type 3, and a new monovalent vaccine against that is being introduced. (Type 2 was eliminated in 1999.)

Pakistan, which has seen a rapid rise in cases, now has 86,000 vaccination teams going house to house and dosing children at train stations and border crossings. But tribal areas on the Afghan border and contiguous parts of Afghanistan are barely covered because travel is unsafe for vaccinators.

The Indian Academy of Pediatrics has endorsed adding injectable vaccine as a backup for those who can afford it, because it can protect children whose oral doses are eliminated by diarrhea.

Nigeria, whose northern provinces are the epicenter of Africa's epidemic, recently dismissed the head of its national vaccination program.

http://www.nytimes.com/2008/10/28/health/28glob.html?nl=8hlth&emc=hltha3

Workout Regimens You Can Live With

By JOHN HANC

SWIM, bike, run, rake leaves. Climb monkey bars if you're a child, do water aerobics if you're older. Do whatever you like. Just keep moving.

That, in essence, is the message of the physical activity guidelines announced this month by the federal Department of Health and Human Services. The basic recommendations — including the core guideline that Americans should get about 150 minutes of moderately intense activity per week — have not really changed from the ones announced in 1996 by the surgeon general's office.

What is different is the emphasis on the variety of activities — including daily chores — that can reap the profound health benefits of exercise.

There is no "one size fits all." Instead, the guidelines are broken into specific recommendations for adults, children, people over 65 and others. And while sustained aerobic activities are the foundation, there are other types of activities — muscle-building and flexibility-enhancing — that are also important.

Here are some ideas on filling your own exercise prescription.

For the Time-Crunched

Can't find five days a week to exercise? Train three days instead, but pick up the pace. Richard Cotton, an exercise physiologist with the American College of Sports Medicine, recommends a Wednesday-Saturday-Sunday routine. That way, he said, "you're only getting into one of your workdays, but you don't have any more than two days off at a time."

Training for 30 minutes three times a week may fall short of the 150-minute goal, but the guidelines allow for as little as 75 minutes of exercise a week, provided the activities are higher in intensity. Mr. Cotton called that high-return-on-investment activity, and suggested using interval training to achieve it. Here's how:

After a five-minute warm-up (on a treadmill or stationary bike, in a pool or even walking or jogging around a park), pick up the pace for five minutes, then go a little easier for three minutes. Repeat that

pattern for the rest of the 30 minutes, making sure to end with an easy-effort, three- to four-minute cool-down. On an intensity scale of 1 to 10 (with 1 being the easiest effort, and 10 being all-out), your hardest intervals should be at 7 to 8, and recoveries at 5 to 6.

The same is true with strength training. Work the major muscles groups during at least two sessions a week. Mr. Cotton said you can begin to meet that part of the guidelines through a 10-minute workout using just three bodyweight exercises — abdominal crunches, back extensions and push-ups. For details on the program, visit www.myexerciseplan.com/assessment. Look for the Basic Bodyweight Strength Plan under "Keep It Simple."

The Older Set

Older adults should try to get in 150 minutes of moderately intense activity and at least two sessions of strength training a week. You can accumulate those minutes by walking or joining an exercise class for older adults. For strength training, work with resistance bands, do bodyweight exercises or just climb stairs.

One key change in these guidelines is the stipulation that older adults should do exercises to maintain or improve their balance and to help avoid falls. Walking backward or on your toes can do that. In her forthcoming book, "Fitness After 40" (Amacom), Dr. Vonda Wright of the University of Pittsburgh Medical Center recommends a body movement that she calls "the stork." Stand with your feet slightly apart. Raise one knee, while keeping your arms to the sides or your hands on your hips. Hold for 30 seconds, then switch legs. Repeat. If you have trouble at first, place your fingertips on a hard surface until you can balance.

For Children

The guidelines stipulate at least 60 minutes a day of moderate or vigorous activity for children from the ages of 6 to 17. That may sound like a challenge for parents whose children seem to prefer Xbox to exercise. But Stephen J. Virgilio, chairman of the physical education department at Adelphi University in Garden City, N.Y., said that is an obstacle that can be overcome.

"Research shows that when kids are given the opportunity to be physically active, they will be," Dr. Virgilio said. "It's up to adults to create that opportunity."

But don't expect your children to work out the way you do. "Children are intermittent learners and intermittent exercisers," said Dr. Virgilio, author of the book "Active Start for Healthy Kids" (Human Kinetics). "They tend to start and rest and then start up again."

Children can accumulate exercise minutes in various ways over a typical day. A younger child could walk to school and back (20 minutes), kick a ball around after school (20 minutes), climb the monkey bars on the playground (10 minutes) and ride a bike with friends (10 minutes).

For an older child, the 60 minutes of daily aerobic and bone- and muscle-strengthening activities might be accumulated like this: walk the dog (10 minutes), shoot basketballs with friends (30 minutes) and stretch or do push-ups and sit-ups while watching TV (20 minutes).

Getting Started

The people who accrue the greatest health benefits from exercise go from doing nothing to doing something.

"A one-minute walk isn't going to do much for your health, but it is a way to start," said Dr. Steve Blair, an epidemiologist at the University of South Carolina whose research over the last 20 years formed much of the basis for the new federal guidelines. "Next week, can we do two minutes? Then the third week, three minutes. Eventually you'll be up to 30 minutes."

Even then, it doesn't have to be 30 minutes at a time. "Ten minutes in the morning, 10 minutes when you come home. Weekends, try to get up to 30 minutes," said Bill Haskell, an emeritus professor at the Stanford University School of Medicine.

Although the guidelines urge adults to "strongly consider walking" as a way to get aerobic activity, biking and swimming are excellent choices, too. You can also get in those minutes through day-to-day activities —"heavy" gardening (defined as continuous digging or hoeing), brisk raking of leaves, aggressive scrubbing or cleaning of floors. As public health officials have been saying for a decade, exercise can be engineered into daily routines: Taking the stairs instead of the elevator or parking at the far end of the lot.

As for resistance training, you don't have to wait. "Some find that by doing some strengthening first, walking becomes easier," Dr. Blair said.

For Those Who Can't Do Enough

If you're reading this on the elliptical machine while waiting for your personal trainer to arrive, and hoping that you'll still have time to make your yoga class, chances are you're already meeting the guidelines. In the past, you might have been cautioned against going much further. Not now. If you are reaching 150 minutes, "we see general health-risk reductions of 25 percent," Dr. Haskell said. "If you go above that, from say 150 to 300 minutes, we're seeing reductions of 40 percent."

If you want to raise the duration or intensity of your regimen, consider these combinations:

¶Riding a stationary bicycle for 45 minutes two days a week; playing basketball for 60 minutes on two days; doing calisthenics on three days.

¶Running for 45 minutes three or four days a week; doing circuit weight training in the gym (without stopping from exercise to exercise and getting both an aerobic and strengthening workout) two or three days a week

¶Playing soccer for 90 minutes one day; walking briskly for 15 minutes, three days a week; lifting weights on two days.

And as you increase your exercise time beyond 150 minutes, remember the 10 percent rule: To reduce the risk of injury, increase your training by no more than 10 percent a week.

http://www.nytimes.com/2008/10/23/health/nutrition/23fitness.html?nl=8hlth&emc=hltha4

Stories in the Service of Making a Better Doctor

By PAULINE W. CHEN, M.D.

The white-coated crowd with stethoscopes slung casually around their necks would have looked familiar to anyone who has attended morning hospital rounds. Resident physicians and medical students milled about, chatting animatedly, and at the appointed hour, the attending physician signaled to begin.

But instead of filing toward a patient's room, the group at Saint Barnabas Medical Center in Livingston, N.J., settled into a conference room at the end of the hall, not to recite details of patient cases but to read "Empty Pockets," a personal essay by Dr. Kevan Pickrel from The Annals of Internal Medicine. In the piece, Dr. Pickrel describes being unable to save a 36-year-old woman, then going to the waiting room to inform the woman's family of her death:

"The youngest daughter sat on Dad's lap looking at pictures in an outdoors magazine. The older sat watching her hands rest in her lap. [The] husband's eyes lifted to me and met mine. I didn't, couldn't, say a word.... He turned back toward his daughters, a single father, and they lifted their eyes to his. As he drew a breath to begin, his eldest daughter knew."

After the reading, the attending physician, Dr. Sunil Sapra, looked up at the group assembled. "Do you identify with any of these situations?" he asked.

"Yes, it happens all the time," a resident responded immediately. Others nodded in agreement, and one resident flicked a tear away.

The next morning, in a similar room at New York-Presbyterian Hospital in upper Manhattan, a group of obstetrics and gynecology residents gathered to read E.B. White's short story "The Second Tree From the

Corner." Told from the perspective of an anxiety-ridden patient, the story ends with the main character finding meaning in his life and suddenly feeling liberated:

"He felt content to be sick, unembarrassed at being afraid; and in the jungle of his fear he glimpsed (as he had so often glimpsed them before) the flashy tail feathers of the bird courage."

As the reading ended, one of the young doctors commented on how personally fulfilling it was to help her patients and how those feelings invigorated her, even after many hours of work. Other doctors in the room nodded in agreement.

While it has long been understood that clinical practice influenced the youthful writing of doctor-authors like Chekhov and William Carlos Williams, there is now emerging evidence that exposure to literature and writing during residency training can influence how young doctors approach their clinical work. By bringing short stories, poems and essays into hospital wards and medical schools, educators hope to encourage fresh thinking and help break down the wall between doctors and patients.

"We're teaching the humanities to our residents, and it's making them better doctors," said Dr. Richard Panush, a rheumatologist and chairman of the department of medicine at Saint Barnabas.

The idea of combining literature and medicine — or narrative medicine as it is sometimes called — has played a part in medical education for over 40 years. Studies have repeatedly shown that such literary training can strengthen and support the compassionate instincts of doctors.

Dr. Rita Charon and her colleagues at the program in narrative medicine at Columbia University's College of Physicians and Surgeons found, for example, that narrative medicine training offered doctors opportunities to practice skills in empathy. Doctors exposed to literary works were more willing to adopt another person's perspective, even after as few as three or four one-hour workshops.

"You want people to be able to leave their own individual place," Dr. Charon said, "and ask what this might be like for the child dying of leukemia, the mother of that child, the family, the hospital roommate."

Over the last 15 years, an ever-increasing number of medical schools have begun offering narrative medicine to medical students. These courses often involve writing, reading and discussing works by authors as diverse as Leo Tolstoy, Virginia Woolf, Lori Moore and various doctor-authors. Students then explore the relevance of these texts, and their own writing, to their clinical work.

But until recently, few educators have attempted to bring such literary training into residency programs.

Residency is the most intense period of a young doctor's life. The years spent squirreled away in hospitals and clinics are rich in clinical learning, but the wealth of that experience comes at the cost of free time.

And with time at a premium, residency program directors and clinical educators have been hesitant to add narrative medicine to their curricula, particularly since it has never been clear that such an addition would have any effect other than further overworking the trainees.

That could be changing.

For over a year now, Dr. Panush, a tall, bespectacled, soft-spoken man with the lean physique of a runner, has been systematically incorporating literature into the daily rounds of every one of the internal medicine residents at Saint Barnabas Medical Center.

As part of the Accreditation Council for Graduate Medical Education's Education Innovations Project, Dr. Panush and his faculty colleagues bring poetry, short stories and essays to rounds each day and discuss them in the context of the patients they see. These daily discussions, supplemented by offsite weekly conferences, form the core of the residents' narrative medicine experience.

One year into the program, Dr. Panush and his colleagues looked at the effect of these daily discussions on the residents and their patients. What they found were significant improvements in patient evaluations of residents and patients' health and quality of life, from hospital admission to discharge.

A handful of other residency programs across the country have taken steps toward establishing narrative medicine training for their residents, including Vanderbilt University's Department of Surgery and New York/Presbyterian Hospital-Columbia's Department of Obstetrics and Gynecology. As with the program at Saint Barnabas, it has been the doctors within these departments who have initiated the workshops, sessions and lectures.

"As we improve the technology of medicine, we also need to remember the patient's story," said Dr. A. Scott Pearson, an associate professor of surgery at Vanderbilt University Medical Center.

To that end, Dr. Pearson has completed a pilot study examining the feasibility of incorporating narrative medicine into Vanderbilt's surgical residency and has plans to make such training available eventually to all surgical residents at his medical center. Dr. Pearson believes that narrative medicine will not only help residents reflect on what they are doing and how they might do better, but may also aid surgical educators in teaching professionalism and communication skills.

"Narrative medicine changed my entire approach to medicine," said Dr. Abigail Ford, a senior resident in obstetrics and gynecology at New York-Presbyterian Hospital/Columbia who studied under Dr. Charon as a medical student. "As a doctor you are really a co-author of patients' experiences and need to hear their story and take it on."

With her former professor's guidance, as well as the support of Dr. Rini Ratan, the residency program director, Dr. Ford has initiated a narrative medicine program for her fellow obstetrics and gynecology residents. While the program is still in its first year, "we've always run over," said Dr. Ford. "People have to be dragged away."

"Our hope is to look at it in terms of physician empathy," added Dr. Ratan, "Does it add anything? Does it prevent natural jadedness over the course of the busy training process? Does it prevent burnout?"

In the near future, Dr. Ratan and Dr. Ford also hope to begin doing the kind of patient outcome evaluations that Dr. Panush and his colleagues have begun.

"To do what we're doing is pretty simple," said Dr. Panush. "But the measurement stuff is harder. The program needs to be supported institutionally and internally."

Despite such challenges, the effects of these programs are striking. Dr. Benjamin Kaplan, a second-year resident at Saint Barnabas, remarked on the transformation he saw in fellow resident physicians during the first year of the humanities program.

"Their management of patients changed," Dr. Kaplan said. "They remembered to do things that I don't think they would have otherwise done, like always talking to the family, gently touching patients, and continually explaining the course of treatment and what the doctors are thinking so patients know."

And the time commitment? “It does get pretty busy,” Dr. Kaplan conceded. “But if you want to make time for it, you can. Spending a half hour a day to remember that we are all human, not just doctors or pharmacists or nurses or patients, is important enough that I think you should do it.”

Although it is still too early to determine the long-term effects of narrative medicine on doctors in training, residents were quick to note that certain essays, short stories and poems they have read on rounds continue to influence their work.

Dr. Ramesh Guthikonda, a second-year resident at Saint Barnabas, spoke about a poem called “When You Come Into My Room,” by Stephen A. Schmidt. In the poem, published in The Journal of the American Medical Association, a man struggling with chronic illness lists all that he believes a doctor meeting him should know:

“When you come into my hospital room, you need to know the facts of my life

that there is information not contained in my hospital chart

that I am 40 years married, with four children and four grandchildren....

that I love earthy sensuous life, beauty, travel, eating, drinking J&B scotch, the theater, opera, the Chicago Symphony, movies, all kinds, water skiing, tennis, running, walking, camping...

that I am chronically ill, and am seeking healing, not cure.”

The poem so affected Dr. Guthikonda that he began regularly asking his patients about their hobbies and families, and he enrolled in a Spanish class so he could learn to better pronounce their names. “My rapport with patients, especially with my Hispanic patients, was not up to the mark,” he said. “I never asked about the patients’ lives, about who they are. I am much more sensitive to those issues now.”

Reflecting on the changes in Dr. Guthikonda, Dr. Panush said, “We changed the way he thinks and does medicine. You can’t put a p-value on that.”

http://www.nytimes.com/2008/10/24/health/chen10-23.html?nl=8hlth&emc=hltha8

Nurses Speak Out, About Doctors

By ABIGAIL ZUGER, M.D.

Reflections on Doctors
Nurses' Stories About Physicians and Surgeons. Edited by Terry Ratner, R.N. Kaplan Publishing. 195 pages. $14.95

In our transparency-seeking, report-card-issuing, memoir-happy climate, not much about medicine goes unexamined these days. One exception, oddly, is an aspect that used to be at the center of attention: the ever-titillating relationship between doctors and nurses.

From Cherry Ames to Dr. Kildare, the folks in the stiff, white uniforms once waltzed around providing vicarious fun for all. A few serious academic analyses from those days confirmed the intensely stereotypic sexual gamesmanship and complicated power plays underlying even trivial doctor/nurse interactions.

Now, of course, all that has changed, with nursing established as a powerful and educated profession, with gender stereotypes erased, salary disparities shrinking and job descriptions overlapping.

But has it really changed? Do we know for sure? In theory, doctors and nurses are now heading for a happy paradise of equality, collaboration and mutual respect. Human nature being what it is, though, one wonders if we are not first condemned to weather a Reconstruction-type era of confusion and ongoing mutual abuse, as all parties struggle to regain their footing.

In the meantime, not many bulletins are coming in from the field. You can bet that no doctor out there is planning to publish a manuscript entitled “Reflections on Nurses” any time soon. I am assuming my colleagues concur that such a project would be best left for retirement incommunicado somewhere on a distant Pacific atoll, where the mailman never calls.

It is hard to say which would prompt more angry letters: outlining some of the bad nursing care the present system enables, or searching for exactly the right words to describe the miraculous best. “Saintly,” “selfless” and “devoted” all have condescending paternalistic overtones. “Professional” is just too cold. There is a limit to how many times you can use “fabulous” in one piece of writing. Better to keep quiet, we say, cowards all.

But nurses are made of sterner stuff. In “Reflections on Doctors,” they have produced something quite extraordinary in recent medical writings: a compilation of 19 brief essays musing on the current relationship between the species. The book comes from Kaplan Publishing, whose guides take aspiring professionals from SAT preparation to licensure, and it is apparently intended to prepare incoming nurses for the terrain.

It does so not by theory but by anecdote: these contributors hail from the trenches rather than the executive offices or classrooms, and while some are writers by avocation, few can muster anything in the way of literary style. Still, their casual stories deliver a remarkably wide perspective on their subject.

Karen Klein recounts the two occasions in the course of a career when she refused to take a doctor's orders. The first time netted her a heartfelt apology when her judgment proved correct; the second time, for an equally correct judgment call, she got only a bloody handprint on the back of her uniform as the irritated doctor gave her a shove in the direction of the job she refused to do.

A heavily symbolic handprint, that, and in self-consciously literary hands it could have been fashioned into quite the metaphor. This nurse only hopes the doctor "got the help he needed."

Other stories are similarly matter of fact. Cara Muhlhahn, a nurse-midwife in New York City, describes a complicated cord-around-the-neck home delivery: "Yay! One more unnecessary Caesarean avoided because of excellent clinical management and great collaboration with doctors." Paula Sergi, a public health nurse, writes about the workaholic doctor she wound up marrying, "the person behind the woman who attends social functions alone."

Anna Gregory, an occupational health nurse, ruefully reflects on her looping career arc: as a nurse she increasingly took on "the doctor's job"; now, training as a doctor, she worries that when she finishes "all the docs will have been replaced by nurses."

In war-torn Kosovo, a team of hip young female women's health doctors and nurses groan when an elderly Albanian pediatrician joins their team, only to become captivated despite themselves by the old crone's clinical prowess.

Each story represents a step in understanding the inherent differences that separate the professions. While working as a rehabilitation nurse, Mindy Owen stumbles on a big one in caring for a quadriplegic teenager, the victim of a car accident. She becomes transfixed by a picture of the boy with his old basketball team, and shows the photograph to the boy's doctor. "Never do that again," he snaps. Only then does she realize that the doctor takes the photograph as a reproof, a message that because he cannot "fix" the patient, he has failed.

Nursing is intensely reality-based; medicine, often, not so much. "It was the first time I really understood the philosophy of some physicians," the nurse writes, "and the definition of failure to a doctor."

These nurses despise the lazy and arrogant doctors they come across (one wonders if the modern empowered nurse elicits worse behavior from these characters than did the old subservient model). They adore the paragons who spend endless hours with chronically ill patients and then happily play Santa Claus at the Christmas party.

Mostly, though, they write in shades of gray, describing interactions and relationships that are colorless, courteous, businesslike. You might actually call them dull. You wouldn't get a minute of good television out of them. You might, however, get some good medical care.

http://www.nytimes.com/2008/10/28/health/28book.html?nl=8hlth&emc=hltha8

A Growing Array of Options for Fibroids

By LESLIE BERGER

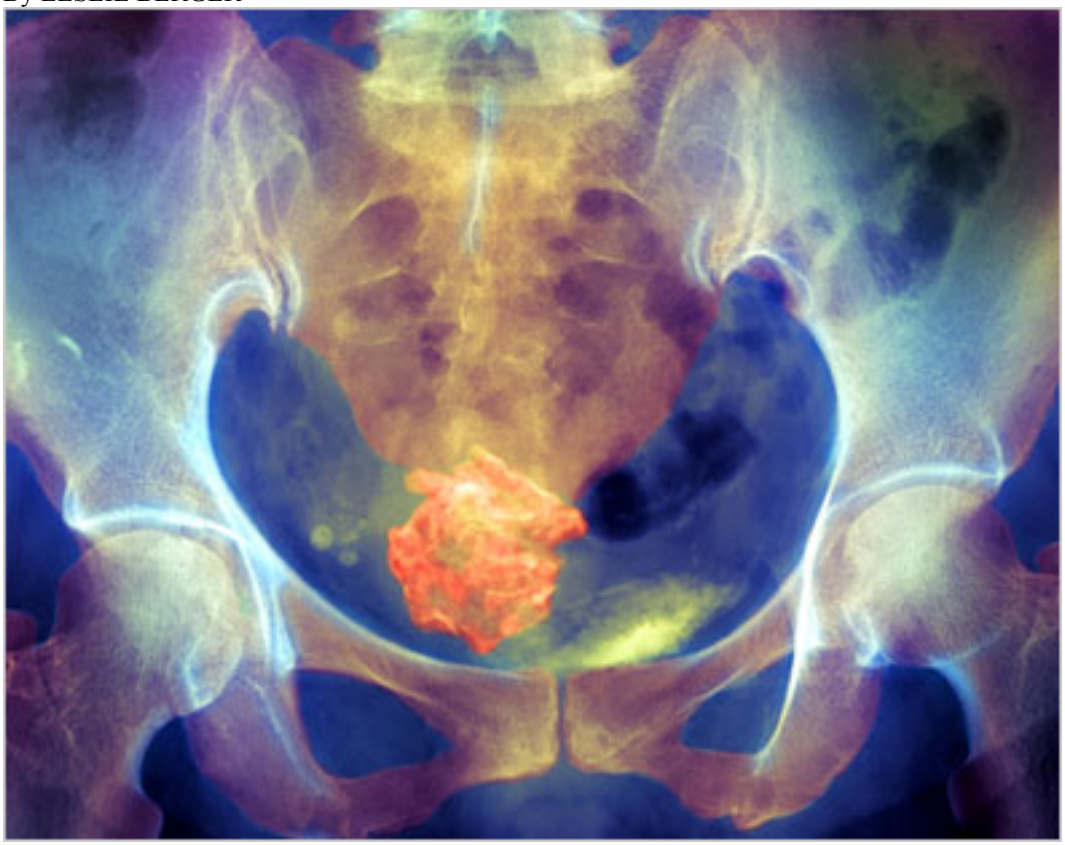


Photo Researchers

Not so long ago, women typically had babies in their 20s, developed fibroids in their 30s and underwent hysterectomies in their 40s. For most, at least, that was the typical progression. But these days, as more women hold demanding jobs, many delay childbearing — and most expect more say in their health care. Hysterectomy is just one choice in a growing menu of treatments for uterine fibroids, one of the most common and least discussed of female afflictions.

Several procedures, each new one less invasive than the last, have become available in the last decade, enabling women to avoid major surgery, protect their fertility and return to work within days rather than weeks.

With myomectomy, for example, doctors cut out the fibroids but leave the uterus intact. A technique called uterine artery embolization shrinks fibroids by blocking their blood supply. And with M.R.I.-guided ultrasound, tightly focused ultrasound beams zap fibroids, using magnetic resonance imaging to guide the process.

Moreover, new medicines are in development, including a class of drugs called progesterone receptor modulators that may shrink fibroids without inducing menopause and bone loss, as existing medications do.

All the new treatments, as well as more sophisticated diagnostic techniques, are part of a growing interest in a condition long considered too unpleasant and embarrassing to talk about, even though nearly three-quarters of women are affected.

"Because fibroids are benign, we overlook the significant burden on health," said Dr. Barbara J. Davis of Millennium Pharmaceuticals, a drug researcher who was the principal investigator for the Fibroid Growth Study, a four-year project tracking 100 women that was sponsored by the National Institutes of Health. The study is one of several reflecting increased interest in, and financing for, fibroid research in the past decade. Although the study is finished, the results are still being analyzed.

Fibroids, which are abnormal, multishaped growths of tissue and fat, appear in only one place in the body: the uterus. The tumors are almost always benign but can grow to the size of a football and cause menstrual bleeding and pelvic pain so severe that some women plan their schedules around their monthly periods. The excessive bleeding is not only disruptive but can also lead to anemia.

Depending on their size and location, fibroids can also reduce fertility by as much as 70 percent and and cause several obstetric complications, including premature birth.

Though scientists still do not know what causes fibroids, they believe the answer will not only lead to new treatments for the disease but also shed light on the origins of cancer.

"If we could understand why fibroids remain benign even though they're so prevalent and so large, we might be able to learn something about how to stop malignant tumors," said Cheryl Walker, a researcher at the M.D. Anderson Cancer Center in Texas. Her lab discovered fibroids in a species of rodent called the Eker rat that turned out to be remarkably similar to those found in humans.

"Mother Nature gave us a wonderful model," said Dr. Walker, who is continuing to study the genetic makeup of the rats' fibroids as well as their response to potential drugs.

In both Eker rats and humans, pregnancy appears to protect against fibroids. That supports one theory that modern women may be suffering more from the benign tumors than their ancestors, who spent most of their short lives either pregnant or nursing, with fewer menstrual cycles and less hormonal fluctuation to disturb the uterus.

"I call it my broken light bulb hypothesis," said Dr. Elizabeth A. Stewart, a professor of obstetrics and gynecology at the Mayo Clinic. "If you keep flicking it on and off it will eventually blow."

Though hysterectomy remains the only foolproof cure for fibroids, alternative treatments continue to gain popularity and surgical techniques continue to be refined. Myomectomy, for example, once required surgery to open up the abdomen. Today it can be done laparoscopically, through a small incision into the navel, or hysteroscopically, by vaginally inserting a telescope through the cervix and into the uterus.

Uterine artery embolization, originally used to treat postpartum hemorrhage, was introduced in the United States in 1997 after first being used for fibroids in France. The patient is sedated, a catheter is inserted into her groin, and tiny plastic pellets are blown in until they plug up the blood vessels feeding the fibroids. The patient is usually released after an overnight stay at the hospital, followed by a week of rest at home.

Once the fibroids are deprived of blood, they usually shrink within a few menstrual cycles. Symptoms like pain, bleeding and frequent urination ease in 85 to 95 percent of patients, said Dr. James B. Spies of Georgetown University, an interventional radiologist who has performed the procedures on thousands of patients, including Secretary of State Condoleezza Rice.

"She went back to work in something like three days, which wasn't my recommendation, but she's a very dynamic person," Dr. Spies said.

In M.R.I.-guided ultrasound, the newest and least invasive of the procedures, tightly focused ultrasound waves burn up the fibroids "like a magnifying glass with the sun's rays," said Dr. James Segars, head of fibroid research for the National Institute of Child Health and Human Development. During the outpatient procedure, the woman lies inside an M.R.I. tube, while the images help the doctor focus high-intensity beams on her fibroids.

A big caveat to all these new treatments is that the fibroids can grow back, prompting the need for more procedures. And because the techniques are still so new, their effect on fertility, despite preserving the uterus, is not yet known.

Still, most experts agree that they represent a huge boon to millions of women who have been suffering in silence.

"This is an incredibly interesting disease," Dr. Walker said. "It's the elephant in the room in that it has a huge impact on women's lives, yet you almost don't hear it discussed because it's not cancer."

http://health.nytimes.com/ref/health/healthguide/esn-fibroids-ess.html