

Your Looks, Creditworthiness May Go Hand In Hand, At Least In The Eyes Of Some Lenders

ScienceDaily (Mar. 15, 2009) - New research suggests that a person's appearance may play a role in whether they are deemed trustworthy by financial lenders. The study is summarized in a working paper by Jefferson Duarte at Rice University's Jones Graduate School of Management and Stephan Siegel and Lance Young, both of the University of Washington.

The paper, "Trust and Credit," found that borrowers on the peer-to-peer lending site Prosper.com who are perceived as trustworthy are more likely to have their loan requests granted. The research revealed that a seemingly untrustworthy person must promise to pay an interest rate almost 2 percent higher than those deemed trustworthy to have the same chance of getting a loan.

"We found that people take into account someone's appearance when engaging in commercial transactions - even in situations where a lot of information about the parties involved is available," said Duarte, visiting associate professor in management at Rice.

Using Prosper.com loan data

Duarte and his colleagues looked at 6,821 loan applications submitted to the popular online peer-to-peer lending site Prosper.com, where people seeking loans are matched up with people willing to lend money. At Prosper.com, borrowers submit information such as their credit profile, job history, education level and income along with terms of a loan they wish to obtain. The borrowers may also supply photographs and a statement about why they are seeking a loan or its intended use. At that point, lenders look at the borrowers' profiles. If lenders are interested in offering the borrower a loan, they place a bid for their business. If there are enough bids, the loan application is filled; otherwise, the loan application expires. Of the 6,821 applications used by the researchers, 733 became loans.

The researchers then turned to Amazon.com's Mechanical Turk (MTurk), a site that brings together people who need a task done with people seeking work. The research team supplied 25 MTurk "workers" with only the photographs of the borrowers and asked them to rate the borrowers' trustworthiness on a scale of 1 to 5. They were also asked to assess the probability that the person in the photograph would repay a \$100 loan. With these responses, the researchers built a measure of trustworthiness based on the photographs.

Armed with the physiognomy-based trustworthiness measures, the team found that perceived trustworthiness of borrowers correlates with the ratings on their credit history filed at Prosper.com. That is, the MTurk workers could distinguish people with high credit scores from people with low credit scores based solely on the photographs.

The researchers also found that people perceived as trustworthy default on their loans less often, even after accounting for credit scores. "This implies that the pictures revealed something about borrower creditworthiness that is not accounted for in traditional credit scoring models," Duarte said.

Another finding: Lenders on Prosper.com use the information in the picture when deciding to make a loan - even with all the information that is available about the borrower's credit history. People perceived as trustworthy get loans more often, even after accounting for traditional creditworthiness measures, such as credit scores.

Rice University (2009, March 15). Your Looks, Creditworthiness May Go Hand In Hand, At Least In The Eyes Of Some Lenders.

Fish consumption guidelines not environmentally sustainable

Recommendations to increase fish consumption because of health benefits may not be environmentally sustainable and more research is needed to clarify the benefits of omega-3 fatty acids, write Dr. David Jenkins of St. Michael's Hospital in Toronto and coauthors in an analysis in CMAJ <http://www.cmaj.ca/press/pg633.pdf>. Health agencies and the medical community around the world recommend the consumption of fish for health benefits and people in developed countries have been urged to increase their consumption of fatty fish 2 to 3 fold.

However, there has been insufficient attention given to studies that fail to show a significant health benefit from omega-3 fatty acids and the evidence that while some may benefit, others may not. This analysis looks at the evidence for the health benefits of fish.

The authors point out that even at current fish consumption levels, global fisheries are in severe crisis as demand outstrips supply and declining stocks are being diverted from local markets to affluent markets, with serious consequences for the food security of poorer countries and coastal communities. Global stocks have been declining since the late 1980s and there have been more than 100 cases of marine extinctions.

"These trends imply the collapse of all commercially exploited stocks by mid-century," state the authors. "Yet the dire status of fisheries resources is largely unrecognized by the public, who are both encouraged to eat more fish and are misled into believing we live in a sea of plenty."

Mini dinosaurs prowled North America

Paleontologists unlocking the diversity of prehistoric hunters with discovery of pint-sized cousin of Velociraptor

Massive predators like *Albertosaurus* and *Tyrannosaurus rex* may have been at the top of the food chain, but they were not the only meat-eating dinosaurs to roam North America, according to Canadian researchers who have discovered the smallest dinosaur species on the continent to date. Their work is also helping re-draw the picture of North America's ecosystem at the height of the dinosaur age 75 million years ago.

"*Hesperonychus* is currently the smallest dinosaur known from North America. But its discovery just emphasizes how little we actually know, and it raises the possibility that there are even smaller ones out there waiting to be found," said Nick Longrich, a paleontology research associate in the University of Calgary's Department of Biological Sciences. "Small carnivorous dinosaurs seemed to be completely absent from the environment, which seemed bizarre because today the small carnivores outnumber the big ones," he said. "It turns out that they were here and they played a more important role in the ecosystem than we realized. So for the past 100 years, we've completely overlooked a major part of North America's dinosaur community."



This is an artists' illustration of Hesperonychus elizabethae by University of Calgary paleontologist Nick Longrich.
Nick Longrich

In a paper published today in the scientific journal *Proceedings of the National Academy of Sciences*, Longrich and University of Alberta paleontologist Philip Currie describe a new genus of carnivorous dinosaur that was smaller than a modern housecat and likely hunted insects, small mammals and other prey through the swamps and forests of the late Cretaceous period in southeastern Alberta, Canada. Weighing approximately two kilograms and standing about 50 centimetres tall, *Hesperonychus elizabethae* resembled a miniature version of the famous bipedal predator *Velociraptor*, to which it was closely related. *Hesperonychus* ran about on two legs and had razor-like claws and an enlarged sickle-shaped claw on its second toe. It had a slender build and slender head with dagger-like teeth.

"It was half the size of a domestic cat and probably hunted and ate whatever it could for its size - insects, mammals, amphibians and maybe even baby dinosaurs," Longrich said. "It probably spent most of its time close to the ground searching through the marshes and forests that characterized the area at the end of the Cretaceous."

Fossilized remains of *Hesperonychus*, which means "western claw," were collected in 1982 from several locations including Dinosaur Provincial Park. The most important specimen, a well-preserved pelvis, was recovered by legendary Alberta paleontologist Elizabeth (Betsy) Nicholls, after which the species is named. Nicholls was the curator of marine reptiles at the Royal Tyrrell Museum in Drumheller and earned her MSc and PhD degrees at U of C. She passed away in 2004. The fossils remained unstudied for 25 years until Longrich came across them in the University of Alberta's collection in 2007. Longrich and Currie focused on fossilized claws and a well-preserved pelvis for their description.

"The claws were thought to come from juveniles- they were just so small. But when we studied the pelvis, we found the hip bones were fused, which would only have happened once the animal was fully grown", Longrich said. "Until now, the smallest carnivorous dinosaurs we have seen in North America have been about the size of a wolf. Judging by the amount of material that was collected, we believe animals the size of *Hesperonychus* must have been quite common on the landscape."

Currie and Longrich last year described the previous record-setting small North American dinosaur, a chicken-sized insectivore named *Albertonykus borealis*.

The discovery of *Hesperonychus* is the first sign of small carnivorous dinosaurs in North America and also extends the timeframe of small, birdlike dromaeosaurs known as the *Microraptorinae* in the fossil record by approximately 45 million years. Specimens from China have been found dating to 120 million years ago, while *Hesperonychus* appeared to have thrived until the end of dinosaur age in the late Cretaceous.

Wet combing more accurate than visual inspection for identifying active head lice infestation

Combing through a child's wet hair may lead to more accurate identification of active head lice infestation than visual inspection, according to a report in the March issue of *Archives of Dermatology*, one of the JAMA/Archives journals. However, visual inspection may yield a more precise assessment of the number of children who have eggs or nits (larvae) in their hair.

Head lice infestation (pediculosis capitis) is one of the most common childhood infections, affecting between 1 percent and 3 percent of 6- to 12-year-olds in industrialized nations, according to background information in the article. "In view of the high frequency of the infestation and the importance attributed to this parasitic skin disease by caregivers, governesses, teachers and health care providers, it comes as a surprise that the diagnostic accuracy of the techniques currently in use - visual inspection and wet combing - has never been determined appropriately," the authors write. Health care professionals and lay personnel frequently overdiagnose head lice infestation and fail to distinguish between active and extinct cases.

Claudia Jahnke, M.D., of the City Health Department, Braunschweig, Germany, and colleagues compared the two diagnostic methods in 304 students age 6 to 12 attending five German primary schools with head lice epidemics in 2007. Every child attending the schools was examined first by visual inspection, where an applicator stick was used to part the hair at the temples, behind the ears and on the neck. A second investigator, who did not know the results of the inspection, then applied a conditioner to wet the hair and combed from roots to ends with a fine-toothed comb. The conditioner was wiped on white sanitary paper and any object trapped within was examined with a magnifying glass.

Data from visual inspection were available for 304 children and from wet combing for 300 children. The presence of eggs or nits was detected in 79 children (26.3 percent) and lice in trophic stages (adults or nymphs) were seen in 21 children (7 percent).

"Visual inspection underestimated the true prevalence of active infestation by a factor of 3.5," the authors write. Wet combing had a significantly higher sensitivity for detecting active infestations, correctly identifying them in 90.5 percent of the children (vs. 28.6 percent for visual inspections). However, visual inspection had a higher sensitivity for the identification of historic infestations (86.1 percent vs. 68.4 percent).

"In contrast to settings in the developing world in which a high intensity of infestation is the rule, in industrialized countries most children carry only a few lice," the authors write. "In consequence, the optimal detection method should identify even a single louse and should have a high negative predictive value to exclude the possibility that individuals classified as negative for lice are actually false negative with the potential to spread the parasite. In this regard, wet combing is the only useful method if active infestation has to be ruled out."

"Because visual inspection is rapidly performed, requires no additional resources other than a reusable applicator stick and is more sensitive, this technique is the method of choice if the frequency of historic pediculosis capitis is to be determined," they conclude. (*Arch Dermatol.* 2009;145[3]:309-313. Available pre-embargo to the media at www.jamamedia.org.)

Guitarists' brains swing together

When musicians play along together it isn't just their instruments that are in time - their brain waves are too. Research published in the online open access journal *BMC Neuroscience* shows how EEG readouts from pairs of guitarists become more synchronized, a finding with wider potential implications for how our brains interact when we do.

Ulman Lindenberger, Viktor Mueller, and Shu-Chen Li from the Max Planck Institute for Human Development in Berlin along with Walter Gruber from the University of Salzburg used electroencephalography (EEG) to record the brain electrical activity in eight pairs of guitarists. Each of the pairs played a short jazz-fusion melody together up to 60 times while the EEG picked up their brain waves via electrodes on their scalps.

The similarities among the brainwaves' phase, both within and between the brains of the musicians, increased significantly: first when listening to a metronome beat in preparation; and secondly as they began to play together. The brains' frontal and central regions showed the strongest synchronization patterns, as the researchers expected. However the temporal and parietal regions also showed relatively high synchronization in at least half of the pairs of musicians. The regions may be involved in processes supporting the coordinated action between players, or in enjoying the music.

"Our findings show that interpersonally coordinated actions are preceded and accompanied by between-brain oscillatory couplings," says Ulman Lindenberger. The results don't show whether this coupling occurs in response to the beat of the metronome and music, and as a result of watching each others' movements and listening to each others' music, or whether the brain synchronization takes place first and causes the coordinated performance. Although individual's brains have been observed getting tuning into music before, this is the first time musicians have been measured jointly in concert.

A short video of the experiment is available here: <http://www.biomedcentral.com/imedia/2965745562100252/supp2.mpg>

1. Brains Swinging in Concert: Cortical Phase Synchronization While Playing Guitar

Ulman Lindenberger, Shu-Chen Li, Walter Gruber and Viktor Mueller BMC Neuroscience (in press)

First Treatment for Muscular Dystrophy in Sight: Scientists Harness Exon-Skipping in Large Animal to Successfully Treat Duchenne Muscular Dystrophy **Researchers from Children's National Medical Center and colleagues in Tokyo publish results, video of first successful trial in dogs with Duchenne muscular dystrophy**

WASHINGTON, DC - Genetic researchers at [Children's National Medical Center](#) and the National Center of Neurology and Psychiatry in Tokyo published the results of the first successful application of "multiple exon-skipping" to curb the devastating effects of [Duchenne muscular dystrophy](#) in an animal larger than a mouse. Multiple exon-skipping employs multiple DNA-like molecules as a "DNA band-aids" to skip over the parts of the mutated gene that block the effective creation of proteins.

[The study](#), conducted in Japan and the United States, published this month in the peer-reviewed journal of the American Neurological Association, the *Annals of Neurology*, treated dogs with naturally occurring canine X-linked muscular dystrophy, a disease which is genetically homologous to the Duchenne muscular dystrophy that strikes 1 of every 3,500 boys born in the United States and worldwide each year.

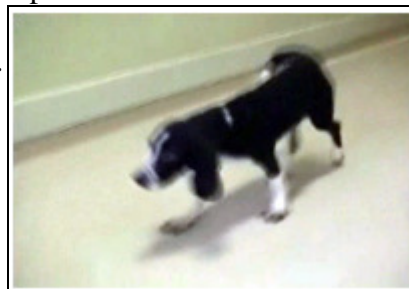
Duchenne muscular dystrophy, one of the most common lethal genetic disorders, is an X-linked genetic mutation that causes an inability of the body's cells to effectively create dystrophin - which builds muscle tissue. "Exon-skipping" employs synthetic DNA-like molecules called antisense as a DNA bandaid to skip over the parts of the gene that block the effective creation of dystrophin. Because the gene's mutation could affect any of its 79 exons and sometimes more than one single exon at a time, scientists employed a "cocktail" of antisense called morpholinos to extend the range of this application. By skipping more than a single exon, this so-called DNA band-aid becomes applicable to between 80 and 90 percent of Duchenne muscular dystrophy patients, including the mutation found in dogs. "This trial makes the much-talked about promise of exon-skipping as a systemic treatment for Duchenne muscular dystrophy in humans a real possibility in the near term," said Toshifumi Yokota, PhD, lead author of the study. "Of course this success has also introduced even more avenues for investigation, but these findings finally overcome a significant hurdle to our progress - we've solved the riddle of an effective system-wide delivery to muscle tissue, and seen promising results."

A new state-of-the-art facility at the National Center of Neurology and Psychiatry in Japan was utilized to carry out the research.

"This study delivers the proof-of-concept that systemic anti-sense therapy can be done in a large organism, in Duchenne muscular dystrophy or any disease", says [Eric Hoffman, PhD](#), a senior author of the study and director of the [Center for Genetic Medicine at Children's National Medical Center](#).

"Systemic treatment of the majority of Duchenne dystrophy will require multiple sequences to be delivered in the blood, and this study also is the first proof-of-principle of multiple exon-skipping in any organism," Shin'ichi Takeda, MD, another senior author, said. "In order to realize that promise in human trials, it also will be important to re-evaluate current measures of toxicity, efficacy, and marketing that ensure both safety for the patient, as well as rapid development and distribution of life-saving drugs.

The authors do note that significant steps still remain. Successful systemic treatment with morpholinos requires large doses of the antisense molecules - and the technology is costly and difficult to obtain.



[Video 1: Non-treated Dystrophic Dog \(7 months old\)](#)
[Video 2: Non-treated Dystrophic Dog \(7 months old\)](#)
[Video 3: Dystrophic Dog After 5x weekly 120 mg/Kg Cocktail PMO Injections \(7 months old\)](#)
[Video 4: Dystrophic Dog After 7 x 200 mg/Kg Cocktail PMO Injections \(4 months old\)](#)
[Video 5: Dystrophic Dog After 11x 120 mg/Kg Cocktail PMO Injections \(7 months old\)](#)

Additionally, treatment in this study showed diminished success at curbing muscle deterioration of the heart, meaning that a more effective and specific delivery system is needed to rescue the organ's delicate tissue in Duchenne muscular dystrophy patients. However, these early successes do show much promise for the oft-discussed exon-skipping method as an effective treatment for Duchenne muscular dystrophy and some other

genetic disorders. The post-treatment and non-treatment videos of the study are available on the [Annals of Neurology website](#).

The study was funded by the Foundation to Eradicate Duchenne, the U.S. Department of Defense CDMRP Program, the Jain Foundation, the Crystal Ball Event of Hampton Roads and the Muscular Dystrophy Association USA, the National Center for Medical Rehabilitation Research, a collaborative grant from the U.S. National Institutes of Health Wellstone Muscular Dystrophy Research Centers, and several Grants-in-Aid from the Ministry of Health, Labour, and Welfare of Japan.

Microscope Reveals How Bacteria "Breathe" Toxic Metals

COLUMBUS, Ohio - Researchers are studying some common soil bacteria that "inhale" toxic metals and "exhale" them in a non-toxic form. The bacteria might one day be used to clean up toxic chemicals left over from nuclear weapons production decades ago.

Using a unique combination of microscopes, researchers at Ohio State University and their colleagues were able to glimpse how the *Shewanella oneidensis* bacterium breaks down metal to chemically extract oxygen.

The study, published online this week in the journal *Applied and Environmental Microbiology*, provides the first evidence that *Shewanella* maneuvers proteins within the bacterial cell into its outer membrane to contact metal directly. The proteins then bond with metal oxides, which the bacteria utilize the same way we do oxygen.

The process is called respiration, and it's how living organisms make energy, explained Brian Lower, assistant professor in the School of Environment and Natural Resources at Ohio State. We use the oxygen we breathe to release energy from our food. But in nature, bacteria don't always have access to oxygen.

With better knowledge of the bacterium's abilities, scientists might one day engineer a *Shewanella* that would remediate nuclear waste more efficiently. "For instance, if you could enhance this bacterium's ability to reduce uranium by having it make more of these key proteins, that could perhaps be one way to clean up these sites that are contaminated," Lower said.

"Whether the bacteria are buried in the soil or underwater, they can rely on metals to get the energy they need," Lower said. "It's an ancient form of respiration. This kind of respiration is fascinating from an evolutionary standpoint, but we're also interested in how we can use the bacteria to remediate nasty compounds such as uranium, technetium, and chromium."

The last two are byproducts of plutonium. The United States Department of Energy is sponsoring the work in order to uncover new methods for treating waste from nuclear weapons production in the 1960s and '70s.

Shewanella is naturally present in the soil, and can in fact be found at nuclear waste sites such as the Hanford site in the state of Washington, Lower explained. With better knowledge of the bacterium's abilities, scientists might one day engineer a *Shewanella* that would remediate such waste more efficiently.

"For instance, if you could enhance this bacterium's ability to reduce uranium by having it make more of these key proteins, that could perhaps be one way to clean up these sites that are contaminated," he said. The danger at such waste sites is that the toxic metals are soluble, and so can leak into the local water supply. But these bacteria naturally convert the metals into an insoluble form. Though the metals would remain in place, they would be stable solids instead of unstable liquids.

For this study, Lower and his colleagues used an atomic force microscope (AFM) to test how the bacterium responded to the metallic mineral hematite.

An AFM works somewhat like a miniaturized phonograph needle: a tiny tip dangles from a cantilever above a surface that's being studied. The cantilever measures how much the tip rises and falls as it's dragged over the surface. It can measure features smaller than a nanometer (billionth of a meter), and detect atomic forces between the probe tip and the surface material.

They combined the AFM with an optical microscope to get a precise map of the bacteria's location on the hematite. Though the bacteria are very small - several hundred thousand of them could fit inside the period at the end of a sentence - they are still thousands of times bigger than the tip of an AFM probe. So the microscope was able to slide over the surface of individual bacteria to detect protein molecules on the cell surface and in contact with the metal.

The researchers coated their probe tip with antibodies for the protein OmcA, which they suspected *Shewanella* would use to "breathe" the metal. Whenever the probe slid over an OmcA protein, the antibody coating would stick to the protein. By measuring the tiny increase in force needed to pull the two apart, the researchers could tell where on the bacteria surface the proteins were located.

The microscope detected OmcA all around the edges of the bacteria, wherever the cell membrane contacted the hematite - which suggests that the protein does indeed enable the bacteria to "breathe" hematite. The protein was even present in a gelatinous ooze that was seeping from the bacteria. This suggests that *Shewanella* might create the ooze in order to obtain energy from a wider portion of the metal than it can directly touch, Lower said.

In the future, he and his partners want to test their new microscope technique on other types of cells. They also want to test whether *Shewanella* produces OmcA on the cell surface when exposed to uranium and technetium.

Lower's coauthors on the paper hail from Corning, Inc.; Pacific Northwest National Laboratory; Johannes Kepler University of Linz, Austria; Ecole Polytechnique Fe'de'rale de Lausanne, Switzerland; and Umea University, Sweden.*

First sister study results reinforce the importance of healthy living

Women who maintain a healthy weight and who have lower perceived stress may be less likely to have chromosome changes associated with aging than obese and stressed women, according to a pilot study that was part of the Sister Study. The long-term Sister Study is looking at the environmental and genetic characteristics of women whose sister had breast cancer to identify factors associated with developing breast cancer. This early pilot used baseline questionnaires and samples provided by participants when they joined the Sister Study.

Two recent papers published in *Cancer Epidemiology Biomarkers and Prevention* looked at the length of telomeres, or the repeating DNA sequences that cap the ends of a person's chromosomes. Telomere length is one of the many measures being looked at in the Sister Study. Telomeres protect the ends of chromosomes and buffer them against the loss of important genes during cell replication. Over the course of an individual's lifetime, telomeres shorten, gradually becoming so short that they can trigger cell death. The papers show that factors such as obesity and perceived stress may shorten telomeres and accelerate the aging process.

"Together these two studies reinforce the need to start a healthy lifestyle early and maintain it," said Linda Birnbaum, Ph.D., the director of the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health. The researchers who published these papers are from the NIEHS which sponsors the Sister Study.

The papers are the first findings coming out of the Sister Study. The Sister Study is just completing its enrollment of 50,000 women aged 35-74 to prospectively study risk factors for breast cancer. "We anticipate a wealth of information to come out of the Sister Study," said Dale Sandler, Ph.D., chief of the Epidemiology Branch at NIEHS and principal investigator of the Sister Study. "Not only do we hope to find out more about the environmental and genetic factors that might lead to breast cancer, we also want to learn more about how factors such as stress, diet and exercise might impact cancer and other disease risks."

One of the studies published this week found that women who were obese for a long time had reduced telomere length. The researchers looked at the relationship between various measures of current and past body size and telomere length in 647 women enrolled in the Sister Study. They found that women who had an overweight or obese body mass index (BMI) before or during their 30s, and maintained that status since those years, had shorter telomeres than those who became overweight or obese after their 30s. "This suggests that duration of obesity may be more important than weight change per se, although other measures of overweight and obesity were also important," said Sangmi Kim, Ph.D., epidemiologist and lead author on the paper. "Our results support the hypothesis that obesity accelerates the aging process," said Kim.

The other paper published in February looked at the association between telomere length and the perceived stress levels of 647 women enrolled in the Sister Study, and found that similar to the obesity finding, stress can also impact telomere length. The researchers extracted DNA from blood drawn during initial enrollment to estimate telomere length, and measured levels of stress hormones in urine samples the women provided. Additionally, the researchers used a standardized scale to characterize levels of perceived stress based on answers to questions about how stressful participants perceived their life situations. In general, the researchers report that women in the Sister Study typically reported low levels of perceived stress.

"Even so, women who reported above-average stress had somewhat shorter telomeres, but the difference in telomere length was most striking when we looked at the relationship between perceived stress and telomere length among women with the highest levels of stress hormones," said Christine Parks, Ph.D., an NIEHS epidemiologist and lead author on the paper. "Among women with both higher perceived stress and elevated levels of the stress hormone epinephrine, the difference in telomere length was equivalent to or greater than the effects of being obese, smoking or 10 years of aging."

The researchers also found that the effects of stress may be stronger in older women. They found that among women 55 years and older, those with higher perceived stress had 5 percent shorter telomeres than women with low stress levels. "More research is needed to determine if the shortening of telomeres in these women is related to aging or hormonal differences in the stress response, or simply represents the accumulated effects of stress across the lifespan," said Parks.

"These papers remind us that there are things people can do to modify their behavior and live healthier lives, such as maintain a healthy weight and cultivate healthy responses to stress," said Birnbaum.

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Kim S, Parks CG, DeRoo LA., Chen, H, Taylor JA, Cawthon RM, Sandler DP. *Obesity and Weight Gain in Adulthood and Telomere Length. Cancer Epidemiology Biomarkers & Prevention* 2009;18(3):816-20 March 2009.
Parks CG, Miller DB, McCanlies EC, Cawthon RM, Andrew ME, DeRoo LA, Sandler, DP. *Telomere Length, Current Perceived Stress, and Urinary Stress Hormones in Women. Cancer Epidemiology Biomarkers & Prevention* 2009; 18(2): 551-560. February 2009.

Watery asteroids may explain why life is 'left-handed'

* Updated 15:14 17 March 2009 by Hazel Muir

Soggy rocks hurtling through the solar system gave life on Earth an addiction to left-handed proteins, according to a new study. The research suggests that water on asteroids amplified left-handed amino acid molecules, making them dominate over their right-handed mirror images.

Curiously, almost every living organism on Earth uses left-handed amino acids instead of their right-handed counterparts. In the 1990s, scientists found that meteorites contain up to 15% more of the left version too. That suggests space rocks bombarding the early Earth biased its chemistry so that life used left-handed amino acids instead of right.

Amino acids, such as isovaline (illustrated), come in left- and right-handed forms, but almost every living organism on Earth uses left-handed forms. New research suggests that water on asteroids amplified a bias - possibly caused by polarised starlight - towards left-handed amino acids (Illustration: NASA/Mary Pat Hrybyk-Keith)

"Meteorites would have seeded the Earth with some of the prebiotic compounds like amino acids that are needed to get life started, and also biased the origin of life to the left-handed amino acid form," says Daniel Glavin at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Some have suggested that polarised starlight preferentially destroyed right-handed amino acids on asteroids. But this alone couldn't explain why the meteorite bias is so strong. Now Glavin and colleague Jason Dworkin have shown that water amplified the asymmetry.

They studied an amino acid called isovaline in six meteorites that showed evidence of ancient exposure to liquid water for about 1000 to 10,000 years. The longer water persisted in the rock, the stronger its left-handed isovaline bias, the team found.

This backs the idea that a tiny initial left-handed bias, possibly due to polarised starlight, was amplified in damp asteroids over time. In water, right- and left-handed forms stick together in pairs, forming crystals. Then something - perhaps polarised light - destroys more right-handed molecules in the liquid, creating an excess of lefties. This process goes on, leaving the left-handed molecules behind in the solution like wallflowers.

Journal reference: Proceedings of the National Academy of Sciences (DOI: 10.1073/pnas.0811618106)

Personality tests reveal the flip side of comedy

* 21:41 16 March 2009 by Ewen Callaway

You wouldn't know it from watching Chris Rock or Will Ferrell perform, but professional comedians are shyer than most other people, a new study suggests.

"I guess the stage gives them the opportunity to be what they want to be and may not necessarily represent their daily-life personalities," says Gil Greengross, an anthropologist at the University of New Mexico in Albuquerque. He and colleague Geoffrey Miller gave standardised personality tests to 31 professional comedians passing through Albuquerque's only comedy club, Laffs, which closed earlier this year.

Comic quiz

The 60-question test gauged the "big five" classic personality traits: openness to experience, conscientiousness, extroversion, agreeableness and neuroticism.

The comedians rated their agreement with statements such as "I think it's interesting to develop new hobbies", "At times I have felt bitter and resentful", and "Poetry has little or no effect on me".

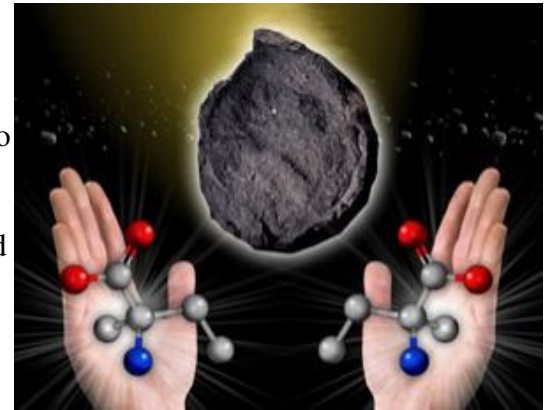
The researchers then compared their scores to those of 400 university students and 10 humour writers.

On average, the professional comics - all but three of them being men - scored highly on openness to new experience compared with students, yet lower than comedy writers.

The comedians also had lower scores on average for conscientiousness, agreeableness and extroversion, compared with the other groups. The team noticed no difference in neuroticism scores.

No laughing matter

"The fact is that a lot of the time they spend by themselves. They also travel a lot. That might explain why they do have introverted personalities," says Greengross, who performed the study as part of a dissertation on the evolutionary value of humour.



"Comedians are quite diverse," says the Irish comic Dara O'Briain. "The need for external validation is probably the one thing that unifies comedians."

Introversion isn't the first quality he would associate with his profession, but he says comedians tend to be more restrained than their on-stage performances suggest. "Being the funny guy among your friends is a very different skill than being funny to a bunch of total strangers," he told *New Scientist*.

Sex differences

Robert Provine, a developmental neurobiologist at the University of Maryland, Baltimore County, and author of the book *Laughter: A Scientific Investigation*, agrees with Greengross and Miller's findings. But he thinks another feature of comedians is even more noteworthy - their sex.

The vast majority of all professional comedians are men, he notes, adding that both women and men tend to laugh more at male speakers than female. Some researchers speculate that this is because humour is an adaptive trait that helps women assess the fitness of a potential mate.

Self-deprecation

Greengross and Miller also compared nine amateur comedians to professionals and found no statistical differences in their personality scores, despite obvious differences in their routines.

In another paper, he and Miller found that men and women see self-deprecating humour as an attractive trait in potential wives or husbands.

Greengross plans to look more closely at how personality traits affect a comedian's success. His interest in comedy is strictly professional - he has no plans to launch a career in the funny business, he jokes.

"You should go to amateur nights and see how bad people are," he says. "It's a really demanding job."

Journal reference: Personality and Individual Difference (DOI: 10.1016/j.paid.2009.01.045)

Researchers Find Sustained Improvement in Health in Experience Corps Tutors Over 55 ***Students are not the only ones who benefit from school-based tutoring***

Tutors over 55 who help young students on a regular basis experience positive physical and mental health outcomes, according to studies released by researchers at Washington University in St. Louis and Johns Hopkins University School of Medicine. The tutors studied were members of Experience Corps, an award-winning organization that trains thousands of people over 55 to tutor children in urban public schools across the country.

Researchers at Washington University's Center for Social Development assessed the impact of the Experience Corps program on the lives of its members and found that, compared with adults of similar age, demographics and volunteer history, Experience Corps tutors reported improvements in mental health and physical functioning (including mobility, stamina and flexibility) and maintained overall health longer. In addition, Experience Corps members reported more physical activity, larger social networks and higher self-esteem as a result of their participation.

Other key findings:

- . The comparison group's levels of depression and functional limitations increased over a two-year period, while Experience Corps members experienced a significant decrease in both of those categories.
- . Both the comparison group and the Experience Corps group reported a decline in health over the two-year study period, but the Experience Corps members reported significantly less decline, suggesting that the program postpones age-related loss of health.
- . After a year with Experience Corps, about two-thirds of the least active members reported that they became significantly more physically active and more engaged in social and community events.
- . 84% of Experience Corps members report that their circle of friends - a key measure of social well-being, particularly for aging adults - increased as a result of their involvement in the program.
- . 86% of Experience Corps members say their lives have improved because of their involvement with the program.

A separate study released in the March issue of the *Journal of Gerontology* by researchers at the Johns Hopkins University School of Medicine also found lasting, positive health impacts from participation in the program. The findings built on previous studies by the Hopkins researchers that have shown older adults who were physically inactive when they joined Experience Corps nearly doubled their activity level after just four to eight months of volunteering. The new Hopkins study found that for Experience Corps tutors in Baltimore - primarily African-American women over 60 - the women continued their increased level of activity for at least three years.

An earlier study, published by Johns Hopkins researchers in the *Journal of Gerontology* in January 2008, also found improvements in memory and executive function among Experience Corps tutors.

Lester Strong, CEO of Experience Corps, says the new research underscores the value of doing meaningful work in the second half of life. "Our members know that they are making a difference in the lives of students who desperately need academic help and encouragement. That keeps them going - and healthy."

Experience Corps members are diverse in many ways.

. Age: The average age of Experience Corps members is 65, but the age range of members in this study extends from 50 to 87.

. Race: About half (53%) of Experience Corps members are African American; 39% are white.

. Background: One-third of Experience Corps members have some higher education, and one in five is a retired educator (teacher, professor, administrator or classroom assistant).

. Income: 20% of Experience Corps members earn less than \$15,000 per year, while 15% earn more than \$75,000 per year.

Washington University researchers also studied the impact of Experience Corps tutoring on students' reading ability. The results, which demonstrate significant, positive gains in student learning, will be made available in April.

About Experience Corps

Experience Corps (www.experiencecorps.org), an award-winning program, engages people over 55 in meeting their communities' greatest challenges. Today, in 23 cities across the country, 2,000 Experience Corps members tutor and mentor elementary school students struggling to learn to read. Independent research shows that Experience Corps boosts student academic performance, helps schools and youth-serving organizations become more successful, and enhances the well-being of the older adults in the process.

Experience Corps is supported by public and private funders, including The Atlantic Philanthropies, the Robert Wood Johnson Foundation, the Corporation for National and Community Service (AmeriCorps), and the Deerbrook Charitable Foundation.

Study shows moderate intensity walking means 100 steps per minute 3000 steps in 30 minutes 5 times a week

San Diego, CA, March 17, 2009 – The benefits of moderate physical activity to general health and well-being are well known. It is recommended that people engage in 150 minutes per week of moderate intensity physical activity, equivalent to 30 minutes each day 5 times a week. Although pedometers are widely used as a physical activity monitoring tool, they are unable to measure activity intensity. Researchers have determined that a rate of at least 100 steps per minute achieves moderate intensity activity. Therefore a simple pedometer-based recommendation of 3000 steps in 30 minutes can get people started on a meaningful exercise program. The study is published in the May 2009 issue of the American Journal of Preventive Medicine.

While being monitored for oxygen uptake during walking on a treadmill, 58 women and 39 men completed 4 6-minute sessions at different treadmill speeds between 65 and 110 meters per minute. All wore pedometers and their heart rates were recorded. Using 3 METs, or metabolic equivalents, as the minimum level of oxygen demand which approximates moderate exercise, participants were monitored to determine whether they had reached the moderate-exercise level at a given treadmill speed. From these data, the researchers found that for men, step counts associated with walking at 3 METs were between 92 and 102 steps per minute. For women, the range was between 91 and 115 steps per minute.

Although a main finding of this study is that considerable error exists when using pedometer step counts to measure METs during treadmill walking, with only 50% of individuals correctly classified as walking at moderate intensity using step rate alone, the authors suggest that the pedometer can be used as a simple technique for anyone trying to meet exercise guidelines.

Lead investigator Simon J. Marshall, PhD, School of Exercise and Nutritional Sciences, San Diego State University, states, "We believe that these data support a general recommendation of walking at more than 100 steps per minute on level terrain to meet the minimum of the moderate-intensity guideline. Because health benefits can be achieved with bouts of exercise lasting at least 10 minutes, a useful starting point is to try and accumulate 1000 steps in 10 minutes, before building up to 3000 steps in 30 minutes. Individuals can monitor their progress using a simple pedometer and a wristwatch. The use of a single and simple pedometer-based guideline that is easy both to remember and measure may be more effective in a health communication strategy than the promotion of multiple guidelines and, therefore, messages."

The research was funded by an SIP research grant from the Centers for Disease Control and Prevention to the San Diego Prevention Research Center.

The article is "Translating Physical Activity Recommendations into a Pedometer-Based Step Goal: 3000 Steps in 30 Minutes" by Simon J. Marshall, PhD, Susan S. Levy, PhD, Catrine E. Tudor-Locke, PhD, Fred W. Kolkhorst, PhD, Karen M. Wooten, MA, Ming Ji, PhD, Caroline A. Macera, PhD, and Barbara E. Ainsworth, PhD. It appears in the American Journal of Preventive Medicine, Volume 36, Issue 5 (May 2009) published by Elsevier.

Use of religious coping associated with receiving intensive medical care near death

Patients with advanced cancer who used their religious faith to help cope were more likely to receive intensive life-prolonging medical care such as mechanical ventilation or cardiopulmonary resuscitation during their last week of life, according to a study in the March 18 issue of JAMA.

For patients facing a life-threatening illness, religious coping, such as through prayer, meditation and religious study can offer patients a sense of meaning, comfort, control and personal growth, according to background information in the article. "Positive religious coping has been widely associated with improved psychological adjustment to stressors including serious illness," the authors write. They add that religion may influence patients' medical decisions, but little is known about the associations between religious coping and the use of intensive life-prolonging care at the end of life.

Andrea C. Phelps, M.D., of Beth Israel Deaconess Medical Center, Boston, and colleagues examined the relationship between 345 patients with advanced cancer and their use of religious coping at the start of the study and their receipt of intensive medical care during their last week of life. Positive religious coping was assessed by a questionnaire. Interviews at the beginning of the study also assessed psychosocial and religious/spiritual measures, advance care planning and end-of-life treatment preferences. Patients were followed up until death, a median (midpoint) of 122 days after the assessment at the beginning of the study.

Patients were asked about how much they rely on religion to cope with illness. A total of 272 patients (78.8 percent) reported that religion helps them cope "to a moderate extent" or more and 109 (31.6 percent) endorsed the statement that "it is the most important thing that keeps you going." Most patients (55.9 percent) endorsed engaging in times of prayer, meditation, or religious study at least daily.

The researchers found that patients with a high level of positive religious coping at the start of the study had nearly three times the odds of receiving mechanical ventilation and intensive life-prolonging care in the last week of life compared with patients with a low level of religious coping.

A high level of positive religious coping was also significantly associated with preferring heroic measures (wanting physicians to do everything possible to keep the patient alive) compared with patients with a low level and was associated with less advance care planning in all forms: do-not-resuscitate order, living will and health care proxy/durable power of attorney.

"These results suggest that relying upon religion to cope with terminal cancer may contribute to receiving aggressive medical care near death," the authors write.

"Taken together, these results highlight the need for clinicians to recognize and be sensitive to the influence of religious coping on medical decisions and goals of care at the end of life. When appropriate, clinicians might include chaplains or other trained professionals (e.g., liaison psychiatrists) to inquire about religious coping during family meetings while the patient is in an intensive care unit and end-of-life discussions occurring earlier in the disease course. Because aggressive end-of-life cancer care has been associated with poor quality of death and caregiver bereavement adjustment, intensive end-of-life care might represent a negative outcome for religious copers. These findings merit further discussion within religious communities, and consideration from those providing pastoral counsel to terminally ill patients with cancer."

(JAMA. 2009;301[11]:1140-1147. Available pre-embargo to the media at www.jamamedia.org)

Frankincense oil - a wise man's remedy for bladder cancer



Boswellia carteri

Originating from Africa, India, and the Middle East, frankincense oil has been found to have many medicinal benefits. Now, an enriched extract of the Somalian Frankincense herb *Boswellia carteri* has been shown to kill off bladder cancer cells. Research presented in the open access journal, BMC Complementary and Alternative Medicine, demonstrates that this herb has the potential for an alternative therapy for bladder cancer.



Frankincense

Bladder cancer is twice as common in males as it is in females. In the US, bladder cancer is the fourth most common type of cancer in men, whilst in the UK it is the seventh most common cause of death amongst males.

HK Lin and his team, from the University of Oklahoma Health Sciences Center and Oklahoma City VA Medical Center, set out to evaluate frankincense oil for its anti-tumour activity in bladder cancer cells. The authors investigated the effects of the oil in two different types of cells in culture: human bladder cancer cells and normal bladder cells. The team found that frankincense oil is able to discriminate between normal and cancerous bladder cells in culture, and specifically kill cancer cells.

Gene expression analyses were performed to determine how frankincense oil affects bladder cancer cell survival. The team found that the oil suppresses cancer cell growth by arresting cell cycle progression and induces bladder cancer cell death by activating multiple cell death pathways.

Dr Lin said, "Frankincense oil may represent an inexpensive alternative therapy for patients currently suffering from bladder cancer."

Notes to Editors

1. Frankincense oil derived from Boswellia carteri induces tumor cell specific cytotoxicity

Mark Barton Frank, Qing Yang, Jeanette Osban, Joseph T Azzarello, Marcia R Saban, Ricardo Saban, Richard A Ashley, Jan C Welter, Kar-Ming Fung and Hsueh-Kung Lin BMC Complementary and Alternative Medicine (in press)

During embargo, article available here:

http://www.biomedcentral.com/imedia/9378358372323491_article.pdf?random=433357

After the embargo, article available at journal website: <http://www.biomedcentral.com/bmccomplementaltermmed/>

Cretaceous octopus with ink and suckers - the world's least likely fossils?

New finds of 95 million year old fossils reveal much earlier origins of modern octopuses. These are among the rarest and unlikeliest of fossils. The chances of an octopus corpse surviving long enough to be fossilized are so small that prior to this discovery only a single fossil species was known, and from fewer specimens than octopuses have legs.

Everyone knows what an octopus is. Even if you have never encountered one in the flesh, the eight arms, suckers, and sack-like body are almost as familiar a body-plan as the four legs, tail and head of cats and dogs. Unlike our vertebrate cousins, however, octopuses don't have a well-developed skeleton, and while this famously allows them to squeeze into spaces that a more robust animal could not, it does create problems for scientists interested in evolutionary history. When did octopuses acquire their characteristic body-plan, for example? Nobody really knows, because fossil octopuses are rarer than, well, pretty much any very rare thing you care to mention.

The body of an octopus is composed almost entirely of muscle and skin, and when an octopus dies, it quickly decays and liquefies into a slimy blob. After just a few days there will be nothing left at all. And that assumes that the fresh carcass is not consumed almost immediately by hungry scavengers. The result is that preservation of an octopus as a fossil is about as unlikely as finding a fossil sneeze, and none of the 200-300 species of octopus known today has ever been found in fossilized form. Until now, that is.

Palaeontologists have just identified three new species of fossil octopus discovered in Cretaceous rocks in Lebanon. The five specimens, described in the latest issue of the journal *Palaeontology*, are 95 million years old but, astonishingly, preserve the octopuses' eight arms with traces of muscles and those characteristic rows of suckers. Even traces of the ink and internal gills are present in some specimens. 'These are sensational fossils, extraordinarily well preserved' says Dirk Fuchs of the Freie University Berlin, lead author of the report. But what surprised the scientists most was how similar the specimens are to modern octopus: 'these things are 95 million years old, yet one of the fossils is almost indistinguishable from living species.' This provides important evolutionary information. "The more primitive relatives of octopuses had fleshy fins along their bodies. The new fossils are so well preserved that they show, like living octopus, that they didn't have these structures.' This pushes back the origins of modern octopus by tens of millions of years, and while this is scientifically significant, perhaps the most remarkable thing about these fossils is that they exist at all.

Notes to Editors:

1. The paper, "New Octopods (Cephalopoda: Coleoidea) from the Late Cretaceous (Upper Cenomanian) of Hakel and Hadjoula, Lebanon" By Dirk Fuchs, Giacomo Bracchi and Robert Weis is published in the current issue of Palaeontology. Copies of the paper can be obtained on request from Dirk Fuchs (details below).

2. Dirk Fuchs is at the Institut für Geologische Wissenschaft, Fachrichtung Paläontologie, Freie University Berlin, Germany.

3. Larger images of the following picture and others can be obtained from Dirk Fuchs (details below).

4. Palaeontology is published by the Palaeontological Association, a registered charity that promotes the scientific study of fossils. It is one of the world's leading learned societies in this field. For further information about the Association and its activities, or forthcoming papers of interest in Palaeontology, contact the Publicity Officer, Mark Purnell, publicity@palass.org

Brothers in arms

Researchers from Helmholtz-Centre in Braunschweig and immunologists from Magdeburg investigate the connection of flu and pneumonia

A joint venture from researchers from the Helmholtz-Centre for Infection Research (HZI) in Braunschweig, the Otto-von-Guericke-University in Magdeburg, and the Karolinska institute in Sweden have taken an in-depth look at the connection between flu infection and pneumonia. Their results, recently released in the scientific journal "PLoS One", have disproven a common theory about flu-like pneumonia.

Some viral infections trigger a decrease of immune cells in the blood – a so-called "lymphopenia". The reasons behind it and whether this is the case with influenza are unknown. To investigate the latter, HZI researchers infected mice with flu viruses and measured the amount of immune cells in the animal's blood every day. Some days later, flu-infected mice received a dosage of pneumonia bacteria usually harmless for healthy mice. While the flu-infected mice did develop a superinfection & subsequently died, surprisingly, they were not suffering from lymphopenia. The healthy, non-flu-infected mice defeated the bacteria successfully and recovered.

To discover whether a lack of immune cells encourages an infection with pneumonia bacteria in general, an artificial drug-induced lymphopenia was established in the mice. Without infecting these lymphopenic mice with flu viruses, they received pneumonia bacteria. Despite a severe lack of immune cells, the mice recovered completely.

With these results, the researchers could show that influenza facilitates and intensifies an infection from pneumonia bacteria, while disproving the common idea that this is caused by a lack of immune cells. "This result was an enormous surprise for us because it directly contradicts widespread assumptions", says Sabine Stegemann, researcher in the groups "Immune regulation" at the HZI and "Molecular Immunology" at the Otto-von-Guericke-University in Magdeburg.

"Now we want to understand the reasons for the increased susceptibility", says Matthias Gunzer, head of the group in Magdeburg. "It could be interplay of weakened mucous membranes and scavenger cells that induce ideal conditions for pneumonia bacteria to create a deadly lung infection. Another reason may be a reaction of the host immune system: It disables hyperactive flu-fighting immune cells to inhibit destruction of healthy lung tissue. "The immune system keeps itself under control and that makes it easy for pneumonia bacteria to infect the lung", says Gunzer.

Article: Stegemann S, Dahlberg S, Kröger A, Gereke M, Bruder D, et al. 2009 Increased Susceptibility for Superinfection with Streptococcus pneumoniae during Influenza Virus Infection Is Not Caused by TLR7-Mediated Lymphopenia. PLoS ONE 4(3): e4840. doi:10.1371/journal.pone.0004840

'Consciousness signature' discovered spanning the brain

* 00:00 17 March 2009 by Anil Ananthaswamy

Electrodes implanted in the brains of people with epilepsy might have resolved an ancient question about consciousness.

Signals from the electrodes seem to show that consciousness arises from the coordinated activity of the entire brain. The signals also take us closer to finding an objective "consciousness signature" that could be used to probe the process in animals and people with brain damage without inserting electrodes.

Previously it wasn't clear whether a dedicated brain area, or "seat of consciousness", was responsible for guiding our subjective view of the world, or whether consciousness was the result of concerted activity across the whole brain.

Probing the process has been a challenge, as non-invasive techniques such as magnetic resonance imaging and EEG give either spatial or temporal information but not both. The best way to get both simultaneously is to implant electrodes deep inside the skull, but it is difficult to justify this in healthy people for ethical reasons.



Brain scans have long been used to try to find the "seat of consciousness" in the brain (Image: Harry Sieplinga / HMS Images / The Image Bank)

Brainy opportunity

Now neuroscientist Raphaël Gaillard of INSERM in Gif sur Yvette, France, and colleagues have taken advantage of a unique opportunity. They have probed consciousness in 10 people who had intercranial electrodes implanted for treating drug-resistant epilepsy.

While monitoring signals from these electrodes, Gaillard's team flashed words in front of the volunteers for just 29 milliseconds. The words were either threatening (kill, anger) or emotionally neutral (cousin, see).

The words were preceded and followed by visual "masks", which block the words from being consciously processed, or the masks following the words weren't used, meaning the words could be consciously processed. The volunteers had to press a button to indicate the nature of the word, allowing the researchers to confirm whether the volunteer was conscious of it or not.

Between the 10 volunteers, the researchers received information from a total of 176 electrodes, which covered almost the whole brain. During the first 300 milliseconds of the experiment, brain activity during both the non-conscious and conscious tasks was very similar, indicating that the process of consciousness had not kicked in. But after that, there were several types of brain activity that only occurred in the individuals who were aware of the words.

Lost seat

First, there was an increase in the voltage levels of the signals in their brains. Second, the frequency and phase of neurons firing in different parts of the brain seemed to synchronise. Then some of these synchronised signals appeared to be triggering others. For example, activity in the occipital lobe seemed to cause activity in the frontal lobe.

Because this activity only occurred in volunteers when they were aware of the words, Gaillard's team argue that it constitutes a consciousness signature. As much of this activity was spread across the brain, they say that consciousness has no single "seat". "Consciousness is more a question of dynamics, than of a local activity," says Gaillard.

Bernard Baars of the Neuroscience Institute in San Diego, California, who proposed a "global access" theory of consciousness in 1983 agrees: "I'm thrilled by these results."

He says they provide the "first really solid, direct evidence" for his own theory. He also says that having such a signature will make it easier to look for signs of consciousness in people with brain damage, infants and animals with the help of non-invasive techniques such as EEG.

Journal reference: PLoS Biology, DOI: 10.1371/journal.pbio.1000061

Fossil of 'ultimate predator' unearthed in Arctic

* 15:44 17 March 2009 **by Andy Coghlan**

Fossil remains of a huge and fearsome marine predator, dubbed "Predator X", have been discovered in Svalbard, a remote Norwegian Arctic archipelago.

About 15 metres long and weighing 45 tonnes, the creature is a new species of pliosaur, and ruled the Jurassic seas some 147 million years ago.

Predator X had a head twice the size of Tyrannosaurus rex and its bite had four times the force, at around 15,000 kilograms (33,000 pounds) over the whole jaw. Its teeth were each around 30 centimetres (1 foot) long.

The remains were discovered in June 2008 during a two-week expedition led by Jørn Hurum of the Natural History Museum at the University of Oslo.



Predator X would have normally used its two front flippers to swim, save the rear two for bursts of speed on the chase
(Illustration: Atlantic Productions)

'Ultimate predator'

"Its anatomy, physiology and hunting strategy all point to it being the ultimate predator – the most dangerous creature to patrol the Earth's oceans," according to the museum.

The key find enabling the dimensions of the beast to be calculated was a spherical bone called the basioccipital condyle, which connected the base of the skull to the spine.

"The condyle we found measures 15 centimetres in diameter, the largest of any known pliosaur species," explains Hurum. "By comparison, the condyle of T. Rex measures just 8 centimetres, meaning that Predator X's skull was at least double the size," he says.

Giant jigsaw

In all, the team found 20,000 fragments of the creature's skeleton, which is being assembled at the museum.

Analyses of bones from the four flippers suggest that the animal cruised using just two fore-flippers – using the back pair for extra speed when pursuing and capturing prey.

Predator X's brain was of a similar type and size, proportionally, to that of today's great white shark, the team says.

The full details of the find are to be published later this year, and a documentary following the expedition will be shown around the world from May.

Synthesizing the most natural of all skin creams

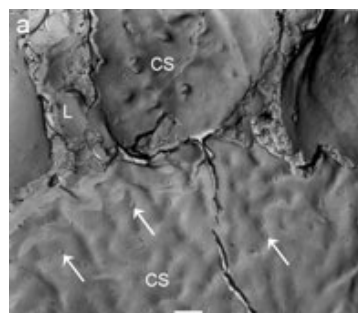
Research done at the ESRF by scientists from Leiden University could help millions of people with skin problems

Even after nine months soaking in the womb, a newborn's skin is smooth – unlike an adult's in the bath.

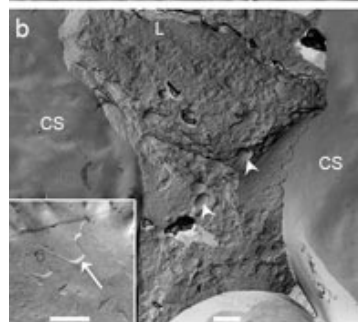
While occupying a watery, warm environment, the newborn manages to develop a skin fully equipped to protect it in a cold, dry and bacteria-infected world. A protective cream called Vernix caseosa (VC), which covers the fetus and the newborn, aids in the growth of skin both before and after birth. VC provides 'waterproofing' in utero, allowing skin to grow in wet conditions, while after birth it hydrates and cleanses, even healing when applied to ulcers. Prof. Joke Bouwstra, a specialist in the skin barrier and its synthesis at Leiden University, and her colleague Robert Rißmann set out to study VC in detail and has produced a synthetic version of this natural buttery ointment which shows the same structure and unique properties. As well as helping pre-term babies develop essential protection against temperature changes, dehydration and infection, artificial VC could also benefit sufferers of skin disease.

Like most moisturising creams, VC is mostly water. Its outstanding properties come from the addition of just 10% each of lipid molecules and dead skin cells (corneocytes), so the exact composition of the mixture is important.

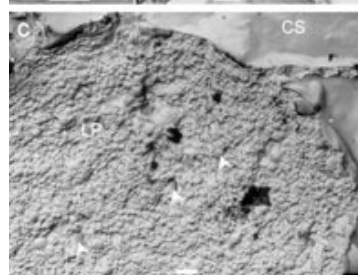
For the lipids, X-ray diffraction measurements at the Dutch/Flemish DUBBLE beamline at the ESRF (European Synchrotron Radiation Facility) allowed the Leiden researchers to find the proportions of the various forms in the cream, even distinguishing between complex molecules differing in chain length. The corneocytes were also studied using electron microscopy, yielding their size, shape and water content.



Micrograph (a) shows a certain state of order in the VC structure. Corneocytes (C) are surrounded by lipid domains (L). Spherical structures (arrow heads) are also observed. The image includes a scale bar.



Micrograph (b) shows lipid material accumulated between corneocytes and forming lipid pools (LP). Underlines the presence of a cornified envelope (arrow) on the boundary of the cell. The inner cellular network consisting of keratin fibers is also clearly visible. The image includes a scale bar.



Micrograph (c) shows a high accumulation of lipid (LP) and spherical structures. The image includes a scale bar.

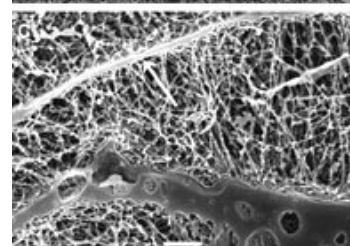
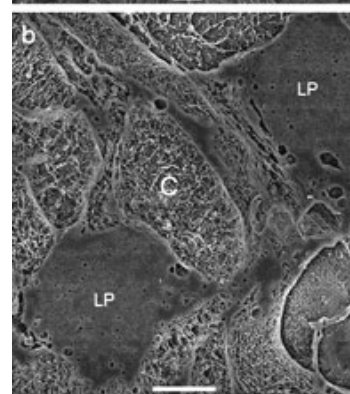
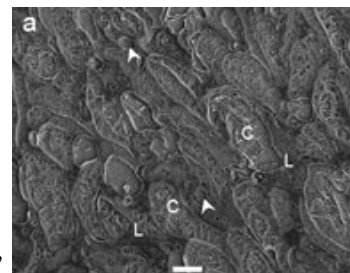


Figure 1: Structure of Vernix caseosa (VC) is characterized by corneocytes embedded in lipid domains. Cryo Scanning Electron Microscopy (cryo-SEM) pictures of VC show corneocytes (C), which are surrounded by lipid domains (L). Spherical structures (arrow heads) can also be observed. (a) A certain state of order can be seen. (b) Lipid material is accumulated between corneocytes and form lipid pools (LP) as depicted. (c) underlines the presence of a cornified envelope (arrow) on the boundary of the cell. The inner cellular network consisting of keratin fibers is also clearly visible. Bars = (a) 10 μm , (b) 5mm, and (c) 1 μm . Image courtesy of R.R.Rißmann.

version.

Figure 2: Lipids of VC are sandwiched between corneocytes. Micrographs obtained by FFEM depict smooth cell surfaces, indicated by CS. Intercellular lipid material has a very heterogeneous appearance (L). In addition, spherical structures could again be observed (arrow heads). (a) Cell surfaces (CS), characterized by a patchy pattern (arrows), and intercellular lipids (L). The step in the inset of (b) (arrow) indicates a fracture across a lamellar structure, which only occasionally appeared. (c) A high accumulation of lipid (LP) and spherical structures could be observed. Bars = 1 μm . Image courtesy of R.R.Rißmann.

A readily available natural source of the sort of fat molecules needed is lanolin, the oil found in sheep's wool, which is currently used as a skin treatment by some nursing mothers. The team isolated the fats which were the closest match to the measurements they had of VC, and used them to create a synthetic solution with the same behaviour. The corneocytes were synthesized by M.H.M. Oudshoorn from the Utrecht University. When

combined, these synthetic ingredients made a cream which looked the same using both x-ray measurements and light microscopy as VC, while allowing the researchers to alter the water content and other properties at will. After pre-clinical testing, the developed creams showed great potential for use on disrupted and underdeveloped skin: the skin barrier recovered much more quickly when synthetic VC was applied. These promising results will give rise to future clinical studies, in order to prove the benefits of the newly developed creams in treating healthy, dry and diseased human skin.

Reference: Robert Rißmann, Development of a vernix caseosa substitute. A novel strategy to improve skin barrier function and repair . Ph. D. thesis defended 17 March 2009 at Leiden University, Faculty of mathematics and sciences (The Netherlands). Thesis supervisors: J. Bouwstra (Leiden University) and W. Hennink (Utrecht University) Co-supervisor: Ponc (Leiden University)

Studies show that nice guys finish first in business world

When it comes to leading a team tasked with developing new products and bringing them to market, new research from North Carolina State University shows that being nice and playing well with others gives you a very real competitive advantage. One new study shows that project managers can get much better performance from their team when they treat team members with honesty, kindness and respect. A second study shows that product development teams can reap significant quality and cost benefits from socializing with people who work for their suppliers.

The first study, co-authored by NC State's Dr. Jon Bohlmann, focused on cross-functional product development teams, which bring together engineers, researchers and business personnel. The diverse backgrounds of the team members means there is a focus on finance and marketing, as well as design and functionality, from the beginning of the product-development process. But that diversity also makes effective communication essential, in order to ensure that team members are collaborating rather than working at cross-purposes.

The Bohlmann study finds that "interactional fairness perception" affects "cross-functional communication." In other words, Bohlmann explains, "If you think you are being treated well, you are going to work well with others on your team."

Bohlmann, an associate professor of marketing at NC State, says that the study evaluated whether team members felt they were being well treated by their project leader. This evaluation included questions as to whether team members felt their leader was honest, kind and considered the viewpoints of team members. Bohlmann says the results of the study show that if a team's leader was perceived as "basically being a nice guy," then "team members showed a significant increase in commitment to the team's success and to the project they were working on." This increase in commitment is important, Bohlmann explains, because it leads to enhanced performance in meeting team goals.

If the Bohlmann study tells us that nice guys finish first, a study co-authored by NC State's Dr. Rob Handfield finds that playing well with others can give a company an edge when it comes to product development. Specifically, the Handfield study shows that significant cost and quality benefits can result from informal socializing between employees of a product-development company and those companies that supply the product developers with material and labor.

Handfield explains that informal socializing, "like going out to dinner after a meeting," can lead to considering new ideas that take advantage of the different perspectives and experience that suppliers can provide – and ultimately provide product developers with meaningful input. For example, Handfield says, "Suppliers may point out that components which are already being produced in bulk would serve as well as the custom-made, and expensive, parts being envisioned by product designers. Why reinvent the wheel? We already have one that works fine." Handfield is the Bank of America University Distinguished Professor of Supply Chain Management at NC State.

The Bohlmann study was co-authored by Tianjiao Qiu of California State University, Long Beach, and William Qualls and Deborah E. Rupp of the University of Illinois at Urbana-Champaign.

The Handfield study was co-authored by Paul D. Cousins of the Manchester Business School, Kenneth J. Petersen of Colorado State University and Benn Lawson of Queen's University in Belfast.

The Bohlmann study, "The Effect of Interactional Fairness on the Performance of Cross-Functional Product Development Teams: A Multilevel Mediated Model," and the Handfield study, "Knowledge Sharing in Interorganizational Product Development Teams: The Effect of Formal and Informal Socialization Mechanisms," were both published in the March issue of the Journal of Product Innovation Management.

Better by design: Engineering flu vaccines

New method could improve vaccines for both seasonal flu and bird flu

HOUSTON - (March 17, 2009) - A new computerized method of testing could help world health officials better identify flu vaccines that are effective against multiple strains of the disease. Rice University scientists who created the method say tests of data from bird flu and seasonal flu outbreaks suggest their method can better gauge the efficacy of proposed vaccines than can tests used today.

Rice's Michael Deem, the lead scientist on the project, will present the group's results March 19 at the American Physical Society's 2009 meeting in Pittsburgh. The results are also slated to appear in the forthcoming book "Influenza: Molecular Virology" from Horizon Scientific Press.

Avian flu, or bird flu, is a particularly deadly type of flu that's transmitted from birds to humans. It hasn't yet evolved into a form that can be transmitted readily between humans, but scientists and world health authorities are trying to prepare for a potential outbreak. Because the virus mutates continually, creating a vaccine in advance is problematic. For example, scientists have already found that a vaccine designed for the 1997 strain of bird flu does not work against a 2003 strain.

"Current vaccines contain only a single version of a given flu subtype," Deem said. "We wanted to gauge the effectiveness of a vaccine that contained multiple versions of a given subtype."

World health authorities currently test the efficacy of proposed flu vaccines using either ferrets, which can contract the same forms of flu as people, or genetic assays. Rice's new computerized method could be a cheaper and faster alternative.

This is a diagram of the influenza virus. NIAID / Wikipedia

With the new method, flu virus mutations are assigned numerical scores. Deem, Rice's John W. Cox Professor of Bioengineering and professor of physics and astronomy, and colleagues developed the method so they could assign a number that captured the amount of difference or similarity between strains. The method can also be used to test how effective a vaccine will be against divergent strains. To verify this, the team checked their results against flu vaccine data collected by the World Health Organization from 1971 to 2004.

"For seasonal influenza, we validated our model against observational data compiled by the World Health Organization's Global Influenza Surveillance Network," Deem said. "We also ran tests against bird flu data. We found that multiple-component bird flu vaccines appeared to be helpful in controlling the simultaneous multiple introduction of bird flu strains."

Influenza viruses are like chameleons. They constantly change the patterns on their outer surface to avoid being targeted by antibodies. This rapid mutation rate is the reason seasonal flu vaccines must be changed annually. However, the vaccines sometimes offer less than ideal protection against newly evolved strains. It takes about six months to produce annual vaccine supplies; also, ideal vaccine strains are often difficult to produce by the standard hen's egg technology, and alternative strains are substituted.

"Oftentimes, bird flu seems to emerge with multiple strains, and something similar can happen with newly released or evolved strains of seasonal flu as well," Deem said. The computational approach Deem will discuss is able to estimate the need for and the efficacy of a multiple-component vaccine in the face of the emergence of multiple flu strains.

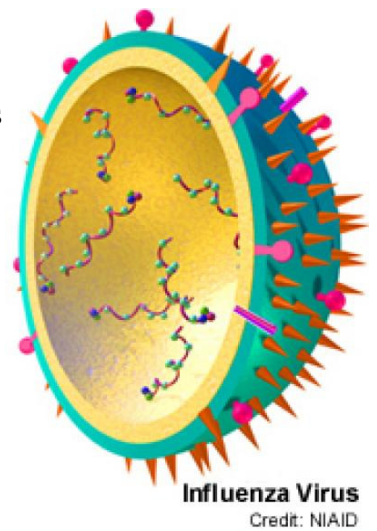
Each year, world health authorities create a flu vaccine that protects against three types of seasonal flu - two subtypes of type A flu and one subtype of type B.

Aspirin recommendation underscores need for physicians and patients to discuss benefits and risk

American College of Preventive Medicine applauds task force for improving guidelines

Washington, DC - The President of the American College of Preventive Medicine commended the U.S. Preventive Services Task Force (USPSTF) today for its recommendations on aspirin use for primary prevention of heart attack and stroke, released in the March 17 issue of the *Annals of Internal Medicine*, citing its improved specificity over previous guidelines.

The task force recommends aspirin use for prevention of cardiovascular disease when the benefits clearly outweigh the risks or harms. The task force found that men between the ages of 45 and 79 should use aspirin to reduce their risk for heart attacks when the benefits outweigh the harms for potential gastrointestinal bleeding; and that women between the ages of 55 and 79 should use aspirin to reduce their risk for ischemic stroke when the benefits outweigh the harms for potential gastrointestinal bleeding. The task force also recommended



against the use of aspirin for stroke prevention in women younger than 55 years and for myocardial infarction prevention in men younger than 45 years.

"The task force has taken positive steps to lend clarity to patients and physicians about the value of aspirin for prevention of cardiovascular events," says ACPM President Mark B. Johnson, MD, MPH, FACPM. "The new guidelines make it clear that physicians, as a matter of routine practice, should be discussing the pros and cons of daily aspirin use with patients in the target groups."

An ACPM-sponsored survey published in the May 2007 edition of the American Journal of Preventive Medicine found a conversation between the patient and physician to be the strongest predictor of appropriate aspirin use, and that only about one in three patients who are at high risk are actually taking daily aspirin. A separate study by the Partnership for Prevention found that 45,000 lives could be saved each year if 90% of the target population took a low-dose aspirin every day. These studies led the American Medical Association to adopt a policy to increase education among physicians on the importance of appropriate aspirin counseling.

With today's release, the USPSTF updates its aspirin recommendations from 2002, which called on clinicians to discuss aspirin use for primary prevention with adults who are at increased risk for cardiovascular disease. The new USPSTF findings actually recommend aspirin use where benefits outweigh the harms, and further define the appropriate age and gender groupings for which aspirin is indicated.

"We think the new guidelines provide another tool in the armamentarium of the physician and the patient for assuring that a discussion about cardiovascular risk and potential aspirin use routinely takes place in the clinical setting," says David Shih, MD, MS, ACPM senior director of medical affairs. ACPM is leading the development of the national initiative, "Aspirin Talks: Start a Life-Saving Conversation," whose goal is to improve appropriate aspirin use to prevent heart attacks and strokes. Under the initiative ACPM is developing and testing an office-level intervention designed to help clinicians engage in a conversation about aspirin, featuring a tool kit with physician, patient, and clinic aids to facilitate aspirin therapy counseling.

More information about ACPM's aspirin initiative can be found at <http://www.acpm.org/aspirin/>. To view the USPSTF recommendation, visit <http://www.ahrq.gov/clinic/uspstf/uspstfasm.htm>.

Contrary to widely held beliefs, romance can last in long-term relationships, say researchers

WASHINGTON – Romance does not have to fizzle out in long-term relationships and progress into a companionship/friendship-type love, a new study has found. Romantic love can last a lifetime and lead to happier, healthier relationships.

"Many believe that romantic love is the same as passionate love," said lead researcher Bianca P. Acevedo, PhD, then at Stony Brook University (currently at University of California, Santa Barbara). "It isn't. Romantic love has the intensity, engagement and sexual chemistry that passionate love has, minus the obsessive component. Passionate or obsessive love includes feelings of uncertainty and anxiety. This kind of love helps drive the shorter relationships but not the longer ones."

These findings appear in the March issue of *Review of General Psychology*, published by the American Psychological Association.

Acevedo and co-researcher Arthur Aron, PhD, reviewed 25 studies with 6,070 individuals in short- and long-term relationships to find out whether romantic love is associated with more satisfaction. To determine this, they classified the relationships in each of the studies as romantic, passionate (romantic with obsession) or friendship-like love and categorized them as long- or short-term.

The researchers looked at 17 short-term relationship studies, which included 18- to 23-year-old college students who were single, dating or married, with the average relationship lasting less than four years. They also looked at 10 long-term relationship studies comprising middle-aged couples who were typically married 10 years or more. Two of the studies included both long- and short-term relationships in which it was possible to distinguish the two samples.

The review found that those who reported greater romantic love were more satisfied in both the short- and long-term relationships. Companion-like love was only moderately associated with satisfaction in both short- and long-term relationships. And those who reported greater passionate love in their relationships were more satisfied in the short term compared to the long term. Couples who reported more satisfaction in their relationships also reported being happier and having higher self-esteem.

Feeling that a partner is "there for you" makes for a good relationship, Acevedo said, and facilitates feelings of romantic love. On the other hand, "feelings of insecurity are generally associated with lower satisfaction, and in some cases may spark conflict in the relationship. This can manifest into obsessive love," she said.

This discovery may change people's expectations of what they want in long-term relationships. According to the authors, companionship love, which is what many couples see as the natural progression of a successful

relationship, may be an unnecessary compromise. "Couples should strive for love with all the trimmings," Acevedo said. "And couples who've been together a long time and wish to get back their romantic edge should know it is an attainable goal that, like most good things in life, requires energy and devotion."

Article: "Does a Long-Term Relationship Kill Romantic Love?" Bianca P. Acevedo, PhD, and Arthur Aron, PhD, Stony Brook University; *Review of General Psychology*, Vol. 13, No. 1.

Full text of the article is available from APA Public Affairs Office and at <http://www.apa.org/journals/releases/gpr13159.pdf>.

Goodbye needle, hello smoothie

New generation oral vaccine uses dairy probiotics to protect against disease

CHICAGO - Instead of a dreaded injection with a needle, someday getting vaccinated against disease may be as pleasant as drinking a yogurt smoothie.

A researcher from the Northwestern University Feinberg School of Medicine has developed a new oral vaccine using probiotics, the healthy bacteria that are found in dairy products like yogurt and cheese. He has successfully used the approach in a preclinical study to create immunity to anthrax exposure. He also is using the method to develop a breast cancer vaccine and vaccines for various infectious diseases.

This new generation vaccine has big benefits beyond eliminating the "Ouch!" factor. Delivering the vaccine to the gut - rather than injecting it into a muscle - harnesses the full power of the body's primary immune force, which is located in the small intestine.

The dendritic cell (green) engulfs the lactobacilli (small blue dots), which release the vaccine. The dendritic cells will induce the proliferation and the activation of T and B cells which will eliminate the infected cells. Mansour Mohamadzadeh

"This is potentially a great advance in the way we give vaccines to people," said Mansour Mohamadzadeh, the lead author and an associate professor of medicine in gastroenterology at the Feinberg School.

"You swallow the vaccine, and the bacteria colonize your intestine and start to produce the vaccine in yogurt," Mohamadzadeh said. "Then it's quickly dispatched throughout your body. If you can activate the immune system in your gut, you get a much more powerful immune response than by injecting it. The pathogenic bacteria will be eliminated faster."

Most vaccines consist of protein and won't maintain their effectiveness after being digested by the stomach. However, the lactobacillus protects the vaccine until it is in the small intestine. The Northwestern study was reported in a recent issue of the *Proceedings of the National Academy of Science*.

There are other advantages to the new oral vaccine. Probiotics, which are natural immune stimulators, eliminate the need for a chemical in traditional vaccines that inflames the immune system and triggers a local immune response. The chemical, called an adjuvant, may cause side effects such as dizziness, arm swelling and vomiting. Probiotic vaccines also are inexpensive to produce.

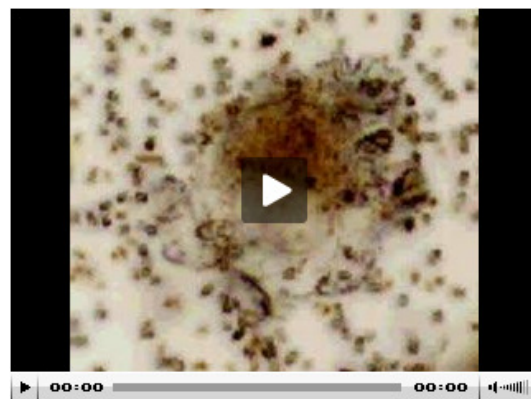
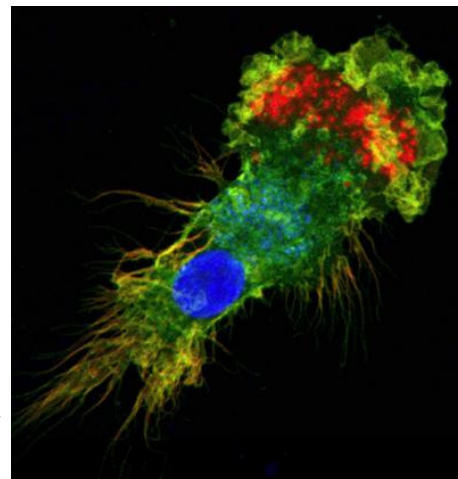
The specially engineered vaccine gives more immune bang for the buck than an injected one because it induces a local and a systemic immune response. The vaccine targets the first line of gut immune cells called dendritic cells - the commanders-in-chiefs of the immune system. They engulf the vaccine then instruct the immune system's foot soldiers - killer T-cells and B-cells - to seek out and destroy any cells in the body infected with a particular bacterium or virus.

In the study, Mohamadzadeh fed mice the new oral anthrax vaccine, and then exposed them to anthrax bacteria. Eighty percent of the mice survived, which is comparable to the results when mice were injected with anthrax vaccine, he said.

The dendritic cell engulfs the lactobacilli, which release the vaccine. The dendritic cells will induce the proliferation and the activation of T and B cells which will eliminate the infected cells. Mansour Mohamadzadeh

"Their immune response was higher and more robust than with the injected vaccine," Mohamadzadeh said. The mice generated a much higher T and B immunity against the pathogenic bacteria.

Mohamadzadeh's vaccine technology can be applied to many other diseases. He is developing an oral vaccine for breast cancer using probiotics. The vaccine would use the Her2/neu breast cancer antigen, a protein highly produced by breast tumor cells, and train the immune system to destroy any cells producing Her2/neu, he said.



In addition, Mohamadzadeh has developed a "multi-tasking" cancer vaccine against breast, colon and pancreatic cancer that soon will be tested in mouse models. The technology also can be used to develop a probiotic vaccine for HIV, hepatitis C and the flu, he said. Terrence Barrett, M.D., chief and professor of gastroenterology at the Feinberg School, said delivering a vaccine to the gut is the most logical route. "Nature isn't used to seeing antigens injected into a muscle," said Barrett, who also is a physician at Northwestern Memorial Hospital. "The place where your immune system is designed to encounter and mount a defense against antigens is your gut." *The study was funded by the National Institutes of Health and the North Carolina Dairy Foundation.*



Really?

The Claim: Hay Fever Can Lead to Other Allergies

By ANAHAD O'CONNOR

THE FACTS With spring just around the corner, millions of hay fever sufferers are gearing up for another season of sneezing, sniffing and congestion.

But many hay fever sufferers are unaware that a pollen allergy can result in an allergy to fruits and vegetables, known as oral allergy syndrome.

Scientists say this occurs when the immune system mistakes the proteins in some fruits and vegetables for molecules of pollen that have a similar structure. When the fruit or vegetable protein is consumed, antibodies attack it, setting off mild symptoms that can last for several minutes and include swelling and itching in the mouth, ears and lips. As many as 70 percent of those with hay fever are affected.

Leif Parsons

Research shows that certain allergies usually correspond to specific fruits. People with an allergy to ragweed typically have allergies to gourds, like squash, zucchini, cucumbers and any kind of melon. An allergy to birch pollen usually corresponds to allergies to apples, apricots, pears, peaches and cherries. An allergy to mugwort can mean problems with carrots, celery and some spices; an allergy to grass pollen may lead to trouble with tomatoes, potatoes and oranges.

But simple steps can solve the problem. Cooking and microwaving are usually enough to denature the proteins. And peeling can do the trick, since the proteins are often found in skin.

THE BOTTOM LINE An allergy to pollen can cause allergies to fresh fruits and vegetables.

Personal Health

No Single Path for Cancer Care in Elderly

By JANE E. BRODY

Elliot was 83 when a routine checkup that included a digital rectal exam suggested prostate cancer. A biopsy then revealed that he had an aggressive form of the disease. His doctor recommended treatment despite Elliot's age and several existing problems, including mild cases of high blood pressure, Type 2 diabetes, depression and angina, all of which were being treated with medication.

Elliot also has leg pain that limits his walking. But none of his health problems interferes with his weekly bridge game or nights out for the theater, concerts and dining. When cancer popped into the equation, Elliot, a man with a self-deprecating sense of humor always at the ready, said he was just not inclined to let it end his life.

So when the doctor suggested hormone and radiation therapy, five days a week for nine weeks, Elliot did not hesitate. Except for some radiation-induced fatigue that he noticed only after therapy was over, he sailed through the treatment. Three months after finishing his therapy, his P.S.A., a blood test for possible cancer, registered zero, suggesting that the malignancy was destroyed.

The outcome for Elliot is a direct assault on the oft-given advice that most cancers affecting people his age be left to take their course. The theory is that either the treatment will kill them or destroy their quality of life, or some other health problem will kill them before the cancer does.

But there is a great paucity of factual information to support either a wait-and-watch approach or an aggressive approach to treating cancer in the elderly.

Although about 60 percent of newly diagnosed cancers occur in people 65 and older, there is little research to help doctors and patients decide how, when and even whether to treat the many forms of cancer that afflict older people, especially those with other ailments that can complicate therapy.

Limited Research

For a variety of reasons, older cancer patients are rarely included in clinical trials that test new therapies, so relatively little is known about potential responses to treatment under various circumstances.

Research protocols commonly eliminate people with chronic health problems, in case the therapy makes those problems worse or the medications patients are taking interact poorly with the treatment being studied. Another deterrent is limited longevity in the elderly, making it difficult to determine the long-term effectiveness of a treatment.

Patients themselves can be a problem, if they fear “being experimented upon,” if they are not physically able to get to treatment facilities, or if the research protocols are too difficult for them to understand and follow.

Despite the limited research, one fact is clear: there is no “one size fits all” treatment for cancer in the elderly. Whether the patient is 60, 80 or 100, a host of factors - medical, practical and emotional - must be taken into account when devising a therapeutic plan. To the distress of some families, decisions are too often based more on a patient’s chronological than physiological age.

“The doctor may be dealing with two 65-year-old patients with the same disease,” Dr. Jerome W. Yates, national vice president for research at the American Cancer Society, said in an interview. “Yet one is like a 55-year-old, healthy, strong and resilient, and the other is more like an 85-year-old, frail and chronically ill. Each should be treated differently.”

Treatment decisions should be influenced by patients’ physical and mental health, of course, but also by their financial status, living situations, family support systems and ability to get to and from the treatment facility, Dr. Yates said.

Don’t Forget the Patient

Still another consideration, Dr. Yates said, and not a small one, is what the patient wants. He described a former patient, a 78-year-old woman with diabetes who had lost a leg to osteogenic sarcoma. The cancer had spread to her lungs, and she faced possible treatment with chemotherapy that would cause nausea and hair loss and carried the risk of a fatal lung infection. Her four college-educated children agreed with the doctor’s suggestion to skip chemotherapy and administer comfort care, since treating her cancer was likely to kill her.

“But she said she wanted to be treated - she was adamant,” recalled Dr. Yates, who will be leaving the cancer society for the National Institute on Aging. “To my surprise, she had a dramatic response to the treatment. Her lung tumors all but disappeared, and she lived another two years.”

Barbara and Charles Given, family care cancer specialists at Michigan State University, told a national conference on cancer and aging in 2007 that older patients, “when they are selected carefully, appear to tolerate and respond well to cancer treatments.”

They added that older patients who have had surgery for lung cancer or have been treated for cancers of the colon, rectum, breast or prostate, or non-Hodgkin’s lymphoma, “all have tolerated and shown positive responses to their treatments.” And those with a life expectancy of more than five years have also benefited from additional therapies, like postoperative radiation or chemotherapy, they reported.

Still, out of fear that the side effects of cancer treatment will hasten an older patient’s death or destroy the quality of the remaining years of life, doctors often undertreat the elderly, indirectly hastening their death with less-than-optimal therapy.

In other cases, elderly cancer patients are overtreated despite the likelihood of life-threatening complications, because doctors fear being accused of giving up or are pressured by family members to provide therapy that is medically inappropriate.

Full Disclosure

One of the greatest challenges clinicians face with elderly cancer patients is incomplete information about their health.

“There is often a lack of documentation about pre-existing problems,” Dr. Yates said. “A patient may suffer from chronic alcoholism or a psychiatric condition that would interfere with cancer treatment, yet such problems are often not disclosed. Or, if an older person has five or six medical conditions, it’s not unusual for them to mention only the most prominent condition, the one that bothers them most at the moment.”

Patients should be prepared to give their full medical history, and caregivers and family members should help fill in the blanks if necessary. In addition, Dr. Yates suggested that treatment decisions for the elderly be family decisions, since older patients must often depend on their children to make therapy happen.

But he also warned that family members should not insist on aggressive treatment that the doctor considers futile. If the family has good reason to doubt the doctor’s judgment, an independent second opinion should be sought, he said.

There are nonthreatening ways to expand the conversation about treatment options, Dr. Yates said, starting with a couple of perfectly reasonable questions for the doctor: “Is this the best option? If this were your mother or father, what would be your recommendation?”

Prostate Test Found to Save Few Lives

By GINA KOLATA

The PSA blood test, used to screen for prostate cancer, saves few lives and leads to risky and unnecessary treatments for large numbers of men, two large studies have found.

The findings, the first based on rigorous, randomized studies, confirm some longstanding concerns about the wisdom of widespread prostate cancer screening. Although the studies are continuing, results so far are considered significant and the most definitive to date.

The PSA test, which measures a protein released by prostate cells, does what it is supposed to do - indicates a cancer might be present, leading to biopsies to determine if there is a tumor. But it has been difficult to know whether finding prostate cancer early saves lives. Most of the cancers tend to grow very slowly and are never a threat and, with the faster-growing ones, even early diagnosis might be too late.

The studies - one in Europe and the other in the United States - are "some of the most important studies in the history of men's health," said Dr. Otis Brawley, the chief medical officer of the American Cancer Society.

In the European study, 48 men were told they had prostate cancer and needlessly treated for it for every man whose death was prevented within a decade after having had a PSA test.

Dr. Peter B. Bach, a physician and epidemiologist at Memorial Sloan-Kettering Cancer Center, says one way to think of the data is to suppose he has a PSA test today. It leads to a biopsy that reveals he has prostate cancer, and he is treated for it. There is a one in 50 chance that, in 2019 or later, he will be spared death from a cancer that would otherwise have killed him. And there is a 49 in 50 chance that he will have been treated unnecessarily for a cancer that was never a threat to his life.

Prostate cancer treatment can result in impotence and incontinence when surgery is used to destroy the prostate, and, at times, painful defecation or chronic diarrhea when the treatment is radiation.

As soon as the PSA test was introduced in 1987, it became a routine part of preventive health care for many men age 40 and older. Experts debated its value, but their views were largely based on less compelling data that often involved statistical modeling and inferences. Now, with the new data, cancer experts said men should carefully consider the possible risks and benefits of treatment before deciding to be screened. Some may decide not to be screened at all.

For years, the cancer society has urged men to be informed before deciding to have a PSA test. "Now we actually have something to inform them with," Dr. Brawley said. "We've got numbers."

The publication of data from the two new studies should change the discussion, said Dr. David F. Ransohoff, an internist and cancer epidemiologist at the University of North Carolina. "This is not relying on modeling anymore," he said. "This is not some abstract, pointy-headed exercise. This is the real world, and this is real data."

Dr. H. Gilbert Welch, a professor of medicine at Dartmouth who studies cancer screening, also welcomed the new data. "We've been waiting years for this," he said. "It's a shame we didn't have it 20 years ago."

Both reports were published online Wednesday by The New England Journal of Medicine. One involved 182,000 men in seven European countries; the other, by the National Cancer Institute, involved nearly 77,000 men at 10 medical centers in the United States.

In both, participants were randomly assigned to be screened - or not - with the PSA test, whose initials stand for prostate-specific antigen. In each study, the two groups were followed for more than a decade while researchers counted deaths from prostate cancer, asking whether screening made a difference.

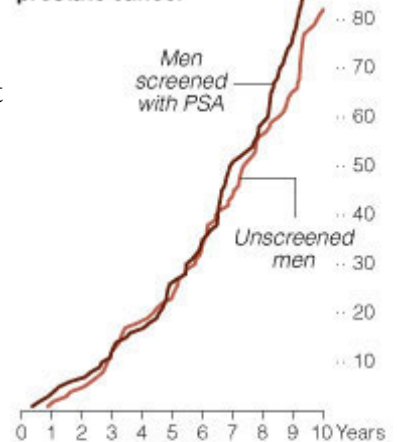
The European data involved a consortium of studies with different designs. Taken together, the studies found that screening was associated with a 20 percent relative reduction in the prostate cancer death rate. But the number of lives saved was small - seven fewer prostate cancer deaths for every 10,000 men screened and followed for nine years.

The American study, led by Dr. Gerald L. Andriole of Washington University, had a single design. It found no reduction in deaths from prostate cancer after most of the men had been followed for 10 years. Every man has been followed for at least seven years, said Dr. Barnett Kramer, a study co-author at the National Institutes of Health. By seven years, the death rate was 13 percent lower for the unscreened group.

Two New Studies

A study of 77,000 American men found that those who received annual PSA blood tests for prostate cancer did not have a reduced rate of death.

Number of deaths from prostate cancer



A second study (not shown) of 182,000 Europeans found that for every man whose death was prevented, 48 men received risky and unnecessary treatment.

Sources: *New England Journal of Medicine*; H. Gilbert Welch THE NEW YORKTIMES

The European study saw no benefit of screening in the first seven years of follow-up.

Screening is not only an issue in prostate cancer. If the European study is correct, mammography has about the same benefit as the PSA test, said Dr. Michael B. Barry, a prostate cancer researcher at Massachusetts General Hospital who wrote an editorial accompanying the papers. But prostate cancers often are less dangerous than breast cancers, so screening and subsequent therapy can result in more harm. With mammography, about 10 women receive a diagnosis and needless treatment for breast cancer to prevent one death. With both cancers, researchers say they badly need a way to distinguish tumors that would be deadly without treatment from those that would not.

When the American and European studies began, in the early 1990s, PSA testing was well under way in the United States, and many expected that the screening test would make the prostate cancer death rate plummet by 50 percent or more. Dr. Brawley was at the cancer institute then, though not directly involved with its prostate cancer screening study. But he saw the reactions.

Some urologists said the study was unethical, because some people would not be screened, and demanded it be shut down, he said. One group of black urologists encouraged black men not to participate because blacks have a greater risk of prostate cancer and it seemed obvious they should be screened.

Some thought that they would see fewer cancer deaths among screened men as quickly as five years. But it became clear that screening would not have a large, immediate effect - if it did, the studies would have been stopped and victory declared. Cancer researchers began turning to less rigorous sources of data, with some arguing that screening was preventing cancer deaths and others arguing it was not.

In the United States, many men and their doctors have made up their minds - most men over age 50 have already been screened, and each year more than 180,000 receive a diagnosis of prostate cancer. In Europe, said Dr. Fritz H. Schröder of Erasmus University, the lead author of the European study, most men are not screened. "The mentality of Europeans is different," he said, and screening is not so highly promoted.

Both studies will continue to follow the men. It remains possible that the United States study will eventually find that screening can reduce the prostate cancer death rate, researchers say, or that both studies will conclude that there is no real reduction.

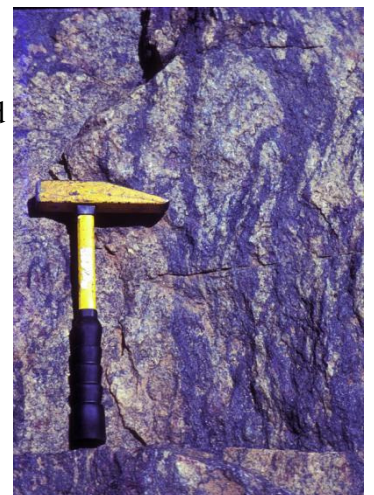
"I certainly think there's information here that's food for thought," Dr. Brawley said. The benefits of prostate cancer screening, he said, are "modest at best and with a greater downside than any other cancer we screen for."

Earth's crust melts easier than previously thought

MU researchers found that strain heating can play an important role in crustal melting

COLUMBIA, Mo. – A University of Missouri study published in Nature this week has found that the Earth's crust melts easier than previously thought. In the study, researchers measured how well rocks conduct heat at different temperatures and found that as rocks get hotter in the Earth's crust, they become better insulators and poorer conductors. This finding provides insight into how magmas are formed and will lead to better models of continental collision and the formation of mountain belts.

"In the presence of external heat sources, rocks will heat up more efficiently than previously thought," said Alan Whittington, professor of geological sciences in the MU College of Arts and Science. "We applied our findings to computer models that predict what happens to rocks when they get buried and heat up in mountain belts, such as the Himalayas today or the Black Hills in South Dakota in the geologic past. We found that strain heating, caused by tectonic movements during mountain belt formation, quite easily triggers crustal melting."



In the study, researchers used a laser-based technique to determine how long it took heat to conduct through different rock samples. In all of the samples, thermal diffusivity, or how well a material conducts heat, decreased rapidly with increasing temperatures. Photo courtesy of Alan Whittington.

In the study, researchers used a laser-based technique to determine how long it took heat to conduct through different rock samples. In all of the samples, thermal diffusivity, or how well a material conducts heat, decreased rapidly with increasing temperatures. Researchers found the thermal diffusivity of hot rocks and magmas to be half that of what had been previously assumed.

"Most crustal melting on the Earth comes from intrusions of hot basaltic magma from the Earth's mantle," said Peter Nabelek, professor of geological sciences in the MU College of Arts and Science. "The problem is that during continental collisions, we don't see intrusions of basaltic magma into continental crust. These experiments suggest that because of low thermal diffusivity, strain heating is much faster and more efficient, and once rocks get heated, they stay hotter for much longer. Of course, these processes take millions of years to

occur and we can only simulate them on a computer. This new data will allow us to create computer models that more accurately represent processes that occur during continental collisions."

The study, "Temperature-dependent thermal diffusivity of the Earth's crust and implications for magmatism," was published in this week's Nature and was co-authored by Whittington, Nabelek and Anne Hofmeister, a professor at Washington University. The National Science Foundation funded this research.

New research suggests common anti-seizure medications may increase risk of cardiovascular problems

Novel approach studies anticonvulsant drugs effect on C-reactive protein levels

PHILADELPHIA – An important clinical repercussion in the treatment of epilepsy has been discovered by a research team led by Scott Mintzer, M.D., assistant professor in the Department of Neurology and the Jefferson Comprehensive Epilepsy Center at Jefferson Medical College of Thomas Jefferson University. The team has determined that two of the most commonly prescribed anti-seizure medications may lead to significantly increased levels of cholesterol, C-reactive protein and other markers of cardiovascular disease risk. The finding – set to be published in the March 18th online edition of *Annals of Neurology* – may help doctors manage the care of patients with seizures more effectively by prescribing different anti-seizure medications that will not adversely affect cardiovascular health.

The study involved two of the most widely-prescribed anticonvulsants – phenytoin (Dilantin®) and carbamazepine (Tegretol®, Carbatrol®) – which have potent effects on many enzymes in the body involved in different areas of metabolism. The researchers recruited 34 epilepsy patients taking either one of those two drugs who were being switched over to one of two newer anti-seizure drugs which do not widely affect enzymes – lamotrigine (Lamictal®) or levetiracetam (Keppra®). The goal was to determine if the change affected the patients' cholesterol levels and other key markers of cardiovascular disease.

Just 6 weeks after the patients' drugs were switched, there were significant declines in total cholesterol, non-high-density lipoprotein (commonly referred to as 'bad') cholesterol, triglycerides and C-reactive protein, suggesting the older, commonly-used drugs might substantially increase the risk of cardiovascular disease.

"The epilepsy patients in this study saw a rapid and clinically significant improvement in several markers related to cardiovascular disease, including a decrease in total cholesterol that averaged 26 points. This is almost certainly not due to some positive effect from the new drugs. It's a consequence of being taken off the older ones, which were causing the cholesterol and other markers to be elevated in the first place," said Dr. Mintzer. "While more investigation is needed, these results may help physicians better understand the risks of these drugs and choose the most appropriate treatment for their epilepsy patients, especially those who are already at risk for cardiovascular disease or have a family history of it."

According to the Epilepsy Foundation, which also funded this study, there are almost three million people living with epilepsy with an additional 200,000 new diagnoses being made each year. Dilantin is the most commonly prescribed anticonvulsant in this country, and has been since its discovery in 1938. Throughout the industrialized world, Tegretol has been the most commonly prescribed anticonvulsant for more than 20 years. The results of this study could have far-reaching effects on how the millions of current, and future patients are, or will be, treated.

PSA screening cuts deaths by 20 percent

Screening for prostate cancer can reduce deaths by 20%, according to the results of the European Randomized Study of Screening for Prostate Cancer (ERSPC) published online 1700 hours CET, today 18 March (NEJM, Online First).* ERSPC is the world's largest prostate cancer screening study and provides robust, independently audited evidence, for the first time, of the effect of screening on prostate cancer mortality.

The study commenced in the early 1990s involving eight countries – Belgium, Finland, France, Italy, Netherlands, Spain, Sweden and Switzerland - with an overall follow-up of up to 12 years. Participants totalled 182,000 but then narrowed down to 162,000 men in seven countries, aged 55-69; only those who had not been screened could take part. The findings are being unveiled at the 24th Annual Congress of the European Association of Urology (EAU) in Stockholm, Sweden (17 - 21 March 2009).

By initially screening men 55 to 69 years with the PSA marker and offering regular follow up, this led to an increase in early detection. Deaths due to metastasized disease were then reduced. Exact data showed that on average for every 1,408 men screened, 48 had cancer diagnosed and received treatment, resulting in saving one life. Screening took place on average every four years with a mean follow-up over nine years. The cut-off value was a PSA level of 3.0 ng/ml or more. Men with this reading were then offered a biopsy.

Prof Fritz Schröder, international coordinator of the ERSPC study explained: "The study shows that PSA screening delivers a 20% reduction in mortality from prostate cancer. This provides decision makers on screening policies with important new data on the effectiveness of PSA testing in preventing deaths."

"However, the ERSPC is also near to completing additional studies on quality of life and cost-effectiveness and these must be assessed before making a decision about the appropriateness of a national prostate screening policy." Worldwide, prostate cancer is the second leading cause of cancer death. Separate ERSPC findings already confirm that approximately 30% of detected cancers actually have non-aggressive features and are 'indolent' or slow growing. This overdiagnosis is an unavoidable effect from all cancer screening procedures. With prostate cancer, a new, more conservative form of monitoring, 'Active Surveillance', might be an important method to help avoid early invasive treatment. **<http://content.nejm.org/cgi/content/full/NEJMoa0810084>*

Depressed people have trouble learning "good things in life"

Columbus, Ohio – While depression is often linked to negative thoughts and emotions, a new study suggests the real problem may be a failure to appreciate positive experiences.

Researchers at Ohio State University found that depressed and non-depressed people were about equal in their ability to learn negative information that was presented to them. But depressed people weren't nearly as successful at learning positive information as were their non-depressed counterparts.

"Since depression is characterized by negative thinking, it is easy to assume that depressed people learn the negative lessons of life better than non-depressed people – but that's not true," said Laren Conklin, co-author of the study and a graduate student in psychology at Ohio State. The study appears in the March issue of the *Journal of Behavior Therapy and Experimental Psychiatry*.

Researchers tested 34 college students, 17 of whom met criteria for clinical depression and 17 of whom were not depressed. This study is one of the first to be able to link clinical levels of depression to how people form attitudes when they encounter new events or information, said Daniel Strunk, co-author of the study and assistant professor of psychology at Ohio State.

Strunk said the key to conducting this study was the use of a computer game paradigm co-developed at Ohio State in 2004 by Russell Fazio, a professor of psychology and co-author of this new study. Fazio and his collaborators, Natalie Shook, a PhD graduate of Ohio State now at Virginia Commonwealth University and J. Richard Eiser of the University of Sheffield (England) have used the game in many studies examining differences in the development of positive and negative attitudes.

The developers affectionately call the game "BeanFest." It involves people encountering images of beans on the computer screen. The beans could be good or bad, depending on their shape and the number of speckles they had. Good beans earned the players points, while bad beans took points away. The goal was to earn as many points as possible.

While the game may seem trivial to a naive audience, Strunk said it offers a unique and powerful way to measure how people learn new attitudes. "Before, if researchers wanted to investigate how people formed new attitudes, it was very difficult to do," Strunk said. If researchers asked about real-life issues, the problem is that prior learning and attitudes may impact how people respond to new information. But in this game, participants don't have any prior knowledge or attitudes about the beans so researchers could learn how they formed their attitudes in a novel situation, without interference from past experiences.

In the game phase of this study, participants had to choose whether they would accept a bean when it appeared on the screen. If they accepted the bean, the points were added or deducted from their total. If they rejected the bean, they were still told how many points they would have earned or lost if they had accepted it.

Each of the 34 beans was shown three times during the game phase, giving the participants a good opportunity to learn which beans were good and which were bad. Then, in the test phase, participants had to indicate whether beans they learned about in the game phase were "good" (choosing it would increase points) or "bad" (choosing it would decrease points). The researchers tallied how well participants did in correctly identifying positive and negative beans.

The non-depressed students correctly identified 61 percent of the negative beans, which was about the same as the depressed students, who correctly identified 66 percent of the "bad" beans. But while the non-depressed students correctly identified 60 percent of the positive beans, depressed students correctly classified only 49 percent of these good beans. Non-depressed students identified the good beans better than the depressed students, who failed to identify good beans better than chance. "The depressed people showed a bias against learning positive information although they had no trouble learning the negative," Strunk said.

One of measures researchers used in the study classified whether the depressed participants were currently undergoing a mild, moderate or severe episode of depression. In the study, those undergoing a severe depressive episode did more poorly on correctly choosing positive beans than those with mild depression, further strengthening the results.

While more research is needed, Conklin and Strunk said this study suggests possible ways to improve treatment of depressed people. "Depressed people may have a tendency to remember the negative experiences

in a situation, but not remember the good things that happened," Conklin said. "Therapists need to be aware of that." For example, a depressed person who is trying out a new exercise program may mention how it makes him feel sore and tired - but not consider the weight he has lost as a result of the exercise. "Therapists might focus more on helping their depressed clients recognize and remember the positive aspects of their new experiences," Strunk said. **Written by Jeff Grabmeier**

Mild obesity takes years off your life

* 00:01 18 March 2009 **by Michael Marshall**

If you are moderately overweight, you will probably live two to four years less than if you stick to your ideal weight, according to a major new study of obesity and mortality. The research may help to resolve a long-standing controversy about whether mild obesity is actually a health risk. While it is accepted that being severely overweight reduces life expectancy, the effects of being slightly overweight have been hotly debated.

A team led by Richard Peto and Gary Whitlock of the Clinical Trial Service Unit at the University of Oxford, pulled together data from 57 studies, as part of a major study called the Prospective Studies Collaboration.

They looked at almost 900,000 people, mostly from Europe and North America, to see whether those with a higher body mass index (BMI) were more likely to die early.

BMI is a measure of how obese a person is, based on their weight and height (calculate yours here). The ideal range is 22.5 to 25 kilograms per square metre. People whose BMI was higher than 25 kg/m² had shorter lifespans on average.

Middle-aged spread

Those who were moderately overweight, with a BMI between 30 and 35 kg/m², lived two to four years less. This level of mild obesity is now common, particularly among middle-aged people.

People who were severely obese, with a BMI between 40 and 45 kg/m², lived eight to ten years less on average – a reduction comparable to that caused by smoking. This level of morbid obesity is still rare.

The increase in early mortality was caused by a range of diseases, including heart disease, stroke, diabetes, liver disease, kidney disease, some forms of cancer and lung disease.

Whitlock says, "Excess weight shortens human lifespan. If you are becoming overweight or obese, avoiding further weight gain could well add years to your life."

Journal reference: The Lancet, DOI: 10.1016/S0140-6736(09)60318-4 (in press)

Some schools may be breeding grounds for teen killers

* 12:55 18 March 2009 **by Linda Geddes**

SCHOOL shootings like the one that devastated the small German town of Winnenden on 11 March may not just be random acts of violence. A review of similar killings in the US, and of general school aggression, indicates that some schools are more likely than others to be breeding grounds for killers. Schools can't be blamed for an individual's actions, but they may be able to reduce the chance of a killer emerging from their gates.

The rare nature of school shootings makes them tough to study in a systematic way. But between July 1999 and June 2006 there were eight school shootings in which more than one person was killed in the US alone. Such case studies allow researchers to start drawing some parallels.

Traci Wike and Mark Fraser at the University of North Carolina, Chapel Hill, reviewed studies of shooting incidents, such as those at Columbine High School, Colorado, in 1999 and at Virginia Tech in 2007, and of general school aggression. They identified shared characteristics that might have helped to shape the killers (Aggression and Violent Behaviour, DOI: 10.1016/j.avb.2009.01.005).

"Shootings appear more likely in schools characterised by a high degree of social stratification and low bonding and attachment between teachers and students," Wike says. "They provide rewards and recognition for only an elite few, and create social dynamics that promote disrespectful behaviour, bullying, and peer harassment."

Large, academically competitive schools with an obvious "in-group" are at greatest risk, she adds. The level of attachment that pupils feel towards a school may also affect displays of violence. "No shooting has involved a student who was attached and committed to school," Wike says.

Alienation and hostility

Of course, personal factors can't be ignored – and may be more important than environmental ones. Tim Kretschmer, who killed 15 people last week at Winnenden before turning the gun on himself, displayed many of the characteristics associated with other school shooters, such as anger at a girl, a fascination with violent video games and access to guns.

But that doesn't mean schools can't play a role in reducing the alienation and hostility that seem to push such individuals over the edge. Tackling feelings of isolation in schools might work better than trying to pick out

"the tiny handful of kids who are going to take a gun and massacre their peers", says Catherine Bradshaw of Johns Hopkins Bloomberg School of Health in Baltimore, Maryland.

In the US at least, school shootings seem to be declining. According to the US Centers for Disease Control and Prevention, the number of school-associated murders fell between 1992 and 2006, while multiple-victim homicides by students have been stable since 1992, with a small peak in the late 1990s.

MIT: Why we have difficulty recognizing faces in photo negatives ***Work could impact computer vision, autism studies***

CAMBRIDGE, Mass.-Humans excel at recognizing faces, but how we do this has been an abiding mystery in neuroscience and psychology. In an effort to explain our success in this area, researchers are taking a closer look at how and why we fail.

A new study from MIT looks at a particularly striking instance of failure: our impaired ability to recognize faces in photographic negatives. The study, which appears in the Proceedings of the National Academy of Sciences this week, suggests that a large part of the answer might lie in the brain's reliance on a certain kind of image feature.

The work could potentially lead to computer vision systems, for settings as diverse as industrial quality control or object and face detection. On a different front, the results and methodologies could help researchers probe face-perception skills in children with autism, who are often reported to experience difficulties analyzing facial information.

Anyone who remembers the days before digital photography has probably noticed that it's much harder to identify people in photographic negatives than in normal photographs. "You have not taken away any information, but somehow these faces are much harder to recognize," says Pawan Sinha, an associate professor of brain and cognitive sciences and senior author of the PNAS study. Sinha has previously studied light and dark relationships between different parts of the face, and found that in nearly every normal lighting condition, a person's eyes appear darker than the forehead and cheeks. He theorized that photo negatives are hard to recognize because they disrupt these very strong regularities around the eyes.

To test this idea, Sinha and his colleagues asked subjects to identify photographs of famous people in not only positive and negative images, but also in a third type of image in which the celebrities' eyes were restored to their original levels of luminance, while the rest of the photo remained in negative. Subjects had a much easier time recognizing these "contrast chimera" images. According to Sinha, that's because the light/dark relationships between the eyes and surrounding areas are the same as they would be in a normal image. Similar contrast relationships can be found in other parts of the face, primarily the mouth, but those relationships are not as consistent. "The relationships around the eyes seem to be particularly significant," says Sinha.

Other studies have shown that people with autism tend to focus on the mouths of people they are looking at, rather than the eyes, so the new findings could help explain why autistic people have such difficulty recognizing faces, says Sinha.

The findings also suggest that neuronal responses in the brain may be based on these relationships between different parts of the face. The team found that when they scanned the brains of people performing the recognition task, regions associated with facial processing (the fusiform face areas) were far more active when looking at the contrast chimeras than when looking at pure negatives.

Other authors of the paper are Sharon Gilad of the Weizmann Institute of Science in Israel and MIT postdoctoral associate Ming Meng, both of whom contributed equally to the work..

The research was funded by the Alfred P. Sloan Foundation and the Jim and Marilyn Simons Foundation.

Light to moderate drinking and socialization are jointly good for cardiovascular health

* While heavy drinking is associated with a greater risk of stroke, light-to-moderate drinking has been linked to a lesser risk of ischemic stroke and coronary heart disease.

* New findings show that social support may enhance the beneficial effects of light-to-moderate alcohol consumption on risk of cardiovascular disease.

While heavy drinking is associated with a greater risk of stroke, light-to-moderate drinking has been linked to a lesser risk of ischemic stroke and coronary heart disease. Other studies have shown that more social support is linked to less risk of mortality and cardiovascular disease. A Japanese examination of the effects of social support on the relationship between drinking and cardiovascular disease has found that the health benefits of light-to-moderate drinking are more pronounced in men with greater social support.

Results will be published in the June issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"In Japan, drinking is divided into two main patterns," said Hiroyasu Iso, a professor of public health at Osaka University and corresponding author for the study. "One pattern is drinking alone and/or with family at home during the evening. Another pattern – especially for middle-aged business men – is social drinking with co-workers, friends, and neighbors. Social drinking is common."

"Alcohol can play a key role," concurred Takeshi Tanigawa, a professor in the department of public health at Ehime University Graduate School of Medicine, "for socializing as well as some business discussions. In urban areas, alcohol consumption is often used as a business tool. In rural areas, people often have a drink with classmates and people in the same community. Alcohol consumption can be used to maintain human relationships between father and son, senior and junior, community to community. Collectively, these socializing customs may help to create a stress-free space for those persons surrounded by dozens of stresses, especially in the workplace."

"Prior to our research," said Iso, "no study had examined whether psychosocial factors modify the association between alcohol consumption and risks of stroke and coronary heart disease."

Iso and his colleagues examined 19,356 men 40 to 69 years of age who were enrolled in the Japan Public Health Center-based Prospective Study. Their alcohol consumption was classified into seven categories: never, past, occasional, 1-149, 150-299, 300-449, or ≥ 450 grams/week. Measures used were alcohol consumption, risk of cardiovascular disease, and social support.

"We found the reduced risks of total stroke, ischemic stroke, and total cardiovascular disease associated with light-to-moderate drinking were more pronounced in men with high social support, probably due to avoidance of unhealthy behaviors and enhancement of stress buffering," said Iso. "In our study, compared with light-to-moderate drinkers with high social support, those with low social support had more unhealthy lifestyles such as physical inactivity, no job and fewer opportunities for medical checkups. Also, a potential pathway by which poor social support may lead to cardiovascular disease is mental stress. Mental stress activates neuro-endocrine components, including the hypothalamic-pituitary-adrenal-axis and autonomic nervous system, which lead to an increased risk of cardiovascular disease."

"In short," said Tanigawa, "moderate to light alcohol consumption with high social support is good for your health. Drinking with a good friend appropriately makes you feel happy and healthy. So drink with good friends for health," he advised. Tanigawa also recommended karaoke bars as one way for business persons to cope with stress. "Singers use deep breathing, which is good for the parasympathetic nervous system. After singing, they usually receive applause. It is a good kind of social support, and helps in the face of adverse occasions or stressful events."

Iso agreed that moderate alcohol consumption and socialization is good for one's health. "But remember that this beneficial effect of social support is confined to light-to-moderate drinking," he said. "Heavy drinking is risky irrespective of social support level. We believe that this also holds for other ethnic populations."

Alcoholism: Clinical & Experimental Research (ACER) is the official journal of the Research Society on Alcoholism and the International Society for Biomedical Research on Alcoholism. Co-authors of the ACER paper, "Alcohol Consumption, Social Support and Risk of Stroke and Coronary Heart Disease among Japanese Men: The JPHC Study," were: Satoyo Ikehara of the Department of Social Environmental Medicine at Osaka University; Kazumasa Yamagishi of the Department of Public Health Medicine at the University of Tsukuba; Seiichiro Yamamoto of Cancer Information Services and Surveillance Division at the National Cancer Center in Tokyo; and Manami Inoue and Shoichiro Tsugane of the Epidemiology and Prevention Division at the National Cancer Center in Tokyo. The study was funded by the Ministry of Health, Labor and Welfare Japan.

Low to moderate, not heavy, drinking releases 'feel-good' endorphins in the brain

* Scientists know that alcohol affects the brain, but the specifics are unclear.

* New findings show that low and moderate but not high doses of alcohol increase the release of beta-endorphin.

* Beta-endorphin release produces a general feeling of well-being that reinforces the desire to drink.

Scientists know that alcohol affects the brain, but the specifics remain unclear. One possibility is that alcohol may increase or decrease the release and the synthesis of endogenous opioid peptides – endorphins, enkephalins and dynorphins – in distinct brain regions important for drug addiction. For the first time, a rodent study has confirmed that low to moderate levels of alcohol alter beta-endorphin release in the midbrain/Ventral Tegmental Area (VTA) region, producing the pleasant effects that likely reinforce alcohol consumption.

Results will be published in the June issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Some of the functions of opioid peptides are similar to those of the opiate morphine," explained Christina Gianoulakis, a professor in the departments of psychiatry and physiology at McGill University, and the study's corresponding author. "Like morphine, endogenous opioid peptides can induce analgesia and a mild euphoric effect, reduce anxiety, and may lead to a general feeling of well being. Therefore, increased release of endogenous opioid peptides in response to drinking could be partially responsible for the mild euphoric and anxiolytic effects associated with low to moderate amounts of alcoholic beverages." Gianoulakis is also with the Douglas Mental Health University Institute.

"The brain's natural opioids have been implicated in many physiological functions such as pain and pleasure," added Dzung Anh Le, a senior scientist at the Centre for Addiction and Mental Health, University of Toronto. "Alcohol has long been thought to release these peptides, but previously the only way to confirm this was to rely on test tube experiments using extracted tissue samples, and findings from these studies were indirect and offered extremely limited interpretation."

Le said that researchers suspected that dopamine was a key brain chemical in one of the most heavily implicated pathways likely involved in drug and alcohol addiction, the VTA. "One mechanism by which alcohol produces its euphoric or rewarding effects is through the stimulation of natural opioid peptides in the VTA, which consequently activates dopamine in this critical pathway," Le said. "Until now, no one has been able to answer whether alcohol is actually capable of triggering opioid release in the VTA."

Researchers injected male Sprague-Dawley rats with either saline or alcohol (0.8, 1.2, 1.6, 2.0, and 2.4 grams alcohol/kg of body weight). Using an in vivo microdialysis technique, study authors tracked the response of endorphins, enkephalins, and dynorphins at the level of the midbrain, including the VTA.

"We found that low to moderate but not high doses of alcohol increase the release of beta-endorphin in the VTA, one of the brain regions shown to be important for mediating the rewarding effect of alcohol," said Gianoulakis. "This supports a role of beta-endorphin in mediating some of the rewarding effects of alcohol. However, the same doses of alcohol that increase beta-endorphin release in the VTA have no significant effect on the release of enkephalins and dynorphins, the other two families of endogenous opioid peptides we examined."

Gianoulakis said that readers should remember that it is the low to moderate doses of alcohol that are associated with mild euphoria, decreased anxiety and a general feeling of well being. "On the other hand, high doses of alcohol are known to induce sedative and hypnotic effects, and often increase rather than decrease anxiety."

"This research has confirmed a role of endogenous opioids in mediating alcohol addiction, and has delineated a pathway within which they may be involved," said Le. "It also goes further to specifically isolate an opioid peptide that may be most critically involved in a specific region of the brain. Endorphins are the natural peptides that most closely mimic the pharmacological properties of morphine, and of the three opioid families, they likely produce the greatest 'high.'"

Furthermore, Le added, methods used in this study are groundbreaking. "Dr. Gianoulakis and her team can track changes over time in living and freely moving animals," he said. "This has a profound implication on research in this area, as the effects of alcohol can be measured from an intact 'living' brain, in animals that are relatively uninhibited and unstressed within their environment."

Both Gianoulakis and Le said these findings will help future treatment options.

"VTA beta-endorphin appears to play a significant role in alcohol reinforcement, and may partially explain the effectiveness of naltrexone – an opioid receptor antagonist currently used as treatment of alcoholism – in reducing alcohol consumption by some individuals," said Gianoulakis.

"While current alcoholism treatment blocks opioids in a nonspecific fashion, this research suggests that a more targeted approach would be more beneficial," said Le. "Researchers now have to specifically target endorphins in the VTA to see if it really does affect alcohol abuse and craving."

"Readers should understand that drinking only low amounts of alcohol will increase endorphin release and produce pleasant effects," said Gianoulakis. "Thus, if after consumption of about two drinks of alcohol an individual does not experience the pleasant effects of alcohol, he or she should stop drinking. Consumption of high amounts of alcohol will not only fail to increase the release of endorphins, but may stimulate other systems in the brain that may lead to the development of anxiety and depression."

Alcoholism: Clinical & Experimental Research (ACER) is the official journal of the Research Society on Alcoholism and the International Society for Biomedical Research on Alcoholism. Co-authors of the ACER paper, "Effect of Acute Ethanol Administration on the Release of Opioid Peptides from the Midbrain Including the Ventral Tegmental Area," were: Samuel Jarjour of the Department of Psychiatry at McGill University, and the Douglas Mental Health University Institute; and Li Bai of the Douglas Mental Health University Institute. The study was funded by the Natural Sciences and Engineering Research Council of Canada.

Language of music really is universal, study finds

Native African people who have never even listened to the radio before can nonetheless pick up on happy, sad, and fearful emotions in Western music, according to a new report published online on March 19th in *Current Biology*, a Cell Press publication. The result shows that the expression of those three basic emotions in music can be universally recognized, the researchers said.

"These findings could explain why Western music has been so successful in global music distribution, even in music cultures that do not as strongly emphasize the role of emotional expression in their music," said Thomas Fritz of the Max-Planck-Institute for Human Cognitive and Brain Sciences.

The expression of emotions is a basic feature of Western music, and the capacity of music to convey emotional expressions is often regarded as a prerequisite to its appreciation in Western cultures, the researchers explained. In other musical traditions, however, music is often appreciated for other qualities, such as group coordination in rituals.

In the new study, Fritz, Stefan Koelsch, and their colleagues wanted to find out whether the emotional aspects of Western music could be appreciated by people who had no prior exposure to it. Previous studies had asked similar questions about people with little experience with a particular musical form, for instance Westerners listening to Hindustani music, they said. But to really get at musical universals requires participants who are completely naïve to Western music.

Fritz enlisted members of the Mafa, one of about 250 ethnic groups in Cameroon. He traveled to the extreme north of the Mandara mountain ranges, where they live, with a laptop and sun collector to supply electricity in his backpack.

Their studies showed that both Western and Mafa listeners, who had never before heard Western music, could recognize emotional expressions of happiness, sadness, and fear in the music more often than would be expected by chance. However, they report that the Mafa showed considerable variability in their performance, with two of twenty-one study participants performing at chance level.

Both groups relied on similar characteristics of music to make those calls; both Mafas and Westerners relied on temporal cues and on mode for their judgment of emotional expressions, although this pattern was more marked in Western listeners.

By manipulating music, the researchers also found that both Western listeners and African listeners find original music more pleasant than altered versions. That preference is probably explained in part by the increased sensory dissonance of the manipulated tunes.

"In conclusion," the researchers wrote, "both Mafa and Western listeners showed an ability to recognize the three basic emotional expressions tested in this study from Western music above chance level. This indicates that these emotional expressions conveyed by the Western musical excerpts can be universally recognized, similar to the largely universal recognition of human emotional facial expression and emotional prosody." Prosody refers to the rhythm, stress, and intonation of connected speech.

The authors include Thomas Fritz, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; Sebastian Jentschke, UCL Institute of Child Health, London, UK; Nathalie Gosselin, Université de Montreal, Montreal, Canada; Daniela Sammler, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; Isabelle Peretz, Université de Montreal, Montreal, Canada; Robert Turner, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; Angela D. Friederici, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; and Stefan Koelsch, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany, University of Sussex, Falmer, UK.

Maggot therapy similar to standard care for leg ulcers

Larval therapy for leg ulcers (VenUS II): randomized controlled trial, BMJ online

Larval (maggot) therapy has similar health benefits and costs compared with a standard treatment for leg ulcers, find two studies published on bmj.com today.

Leg ulcers are chronic wounds most commonly caused by diseased veins in the legs. Debridement (the removal of dead tissue from the ulcer surface) is a common part of ulcer management and is widely viewed as having a role in promoting wound healing.

Debridement can be undertaken with a hydrogel, but it has been suggested that larval therapy debrides wounds more swiftly, as well as stimulating healing and reducing infection.

A team of UK researchers have carried out the first randomised controlled trial to investigate the clinical and cost-effectiveness of larval therapy on wound healing.

The trial involved 267 participants who had at least one venous or mixed venous/arterial leg ulcer with dead tissue (sloughy and/or necrotic tissue) covering at least a quarter of the wound.

Participants were randomised to receive loose larvae, bagged larvae or hydrogel during the debridement phase, followed by standard treatment. People were monitored for up to 12 months, during which time the date of complete healing of the ulcer was recorded by trained nurses.

Date of debridement was also recorded, as were bacterial levels, adverse events and ulcer-related pain. Participants completed a health-related quality of life questionnaire at the start of the study, and then again at three, six, nine and 12 months.

Larval therapy significantly reduced the time to debridement compared with hydrogel, but there was no evidence of a difference in time to ulcer healing (half of patients allocated to the larvae group were healed by 236 days compared with 245 days for the hydrogel group).

There was no difference between larvae and hydrogel groups in health-related quality of life or in bacterial load (including MRSA). Larval therapy was associated with twice as much pain in the 24 hours prior to removal of the first application compared with hydrogel.

The authors conclude that, although larval therapy is a more effective debriding agent than hydrogel, there is no evidence from this trial that it should be recommended for routine use on sloughy leg ulcers with the aim of speeding healing or reducing bacterial load. They suggest that further research is required to explore the relationship between wound debridement, healing and microbiology, and to better understand the value of debridement from the patient perspective.

In a separate analysis, the researchers calculate that larval therapy is likely to have similar cost-effectiveness to hydrogel. As such, they conclude that healthcare decision makers should generally be indifferent when recommending these two therapies for the debridement of sloughy leg ulcers.

Plant biologists discover gene that switches on 'essence of male'

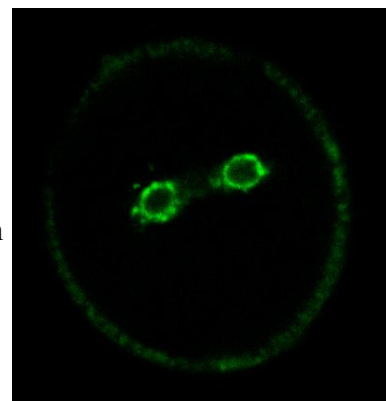
Study identifies role of gene responsible for plant sperm production

Biologists at the University of Leicester have published results of a new study into plant sex – and discovered that a particular gene switches on 'the essence of male'. The study takes to a new level understanding of the genes needed for successful plant reproduction and seed production.

Professor David Twell and colleagues in the Department of Biology at the University of Leicester reported the discovery of a gene that has a critical role in allowing precursor reproductive cells to divide to form twin sperm cells.

Their study is reported in the journal *Public Library of Science Genetics* (PLOS Genetics) and was funded by the Biotechnology and Biological Sciences Research Council (BBSRC).

Pictured is a confocal image of an Arabidopsis pollen grain showing sperm cell-specific expression of the GFP-tagged plasma membrane protein Generative Cell Specific1 that is required for double fertilisation in flowering plants. The GCSI-GFP fusion protein appears in the periphery of the sperm cell pair (spectacles) present in each pollen grain. The authors show that germ cell division and specification, including the expression of GCSI are regulated by the germline-specific transcription factor DUO POLLEN 1. Thus DUO1 has an integrative role linking germ cell division and sperm cell differentiation in flowering plants. Image generated by Lynette Brownfield (University of Leicester)



Professor Twell said: "Flowering plants, unlike animals require not one, but two sperm cells for successful fertilisation. One sperm cell to join with the egg cell to produce the embryo and the other to join with the central cell to produce the nutrient-rich endosperm tissue inside the seed. A mystery in this 'double fertilisation' process was how each single pollen grain could produce the pair of sperm cells needed for fertility and seed production.

"We now report the discovery of a dual role for DUO1, a regulatory gene required for plant sperm cell production. We show that the DUO1 gene is required to promote the division of sperm precursor cells, while at the same time promoting their specialised function as sperm cells. It effectively switches on the essence of male.

"We show that DUO1 is required for the expression of a key protein that controls cell division and for the expression of genes that are critical for gamete differentiation and fertilisation.

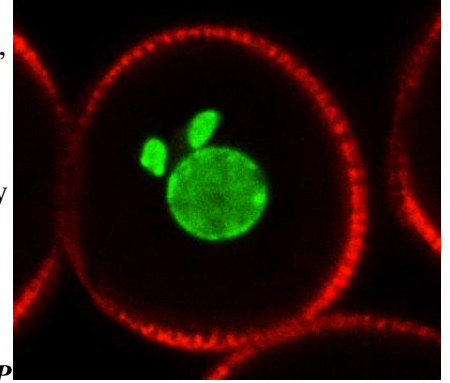
"This work provides the first molecular insight into the mechanisms through which cell cycle progression and gamete differentiation are coordinated in flowering plants.

"This knowledge will be helpful in understanding the mechanisms and evolution of gamete development in flowering plants and may be useful in the control of gene flow and crossing behaviour in crop plants."

The researchers also report on the presence of genes closely related to DUO1 in a wide variety of flowering plants and even in lowly land plants such as moss, which suggests that DUO1 may be part of an ancient sperm cell regulatory network that evolved even before pollen and flowers appeared on the scene.

Interestingly, DUO1 is also related to a super class of Myb regulator proteins also present in animals that have an important role in controlling cell proliferation and that are implicated in certain human cancers such as leukemias. So like animal cell Myb proteins, DUO1 is needed for control of cell proliferation, but DUO1 is distinguished by its specific role in plant reproduction, namely its dual role in sperm cell production and switching on their ability to fertilize.

Professor Twell added that the study could help to unravel the evolutionary origins of plant sperm cells and provide new molecular tools for the manipulation of plant fertility and hybrid seed production – as well as to control gene flow in transgenic crops where the male contribution may need to be eliminated.



Pictured is a confocal image of an Arabidopsis pollen grain showing ectopic GFP expression in the pollen vegetative cell (outlined in red with large single green nucleus) under control of the normally male germ cell-specific histone H3 (MGH3) promoter (pair of green sperm cell nuclei). The MGH3 promoter is induced by the ectopic expression of the germline-specific transcription factor DUO1 in the pollen vegetative cell. The authors show that germ cell mitosis and specification are regulated by DUO1, including the expression of cell cycle and gamete fusion proteins. Thus DUO1 has a key integrative role linking germ cell division and sperm cell differentiation in flowering plants. Image generated by Lynette Brownfield (University of Leicester)

NASA may send fleet of spacecraft to Venus

* 00:00 19 March 2009 by Rachel Courtland

Two high-altitude balloons built to hover in sulphuric acid clouds could be part of a future fleet of spacecraft sent to Venus, a NASA advisory team says.

The multi-billion-dollar mission concept – which is being considered for launch in the next fifteen years – could help reveal more about Venus's runaway greenhouse effect, any oceans it may once have had, and possible ongoing volcanic activity.

It could be the next flagship mission sent to a planet, after a planned mission to Jupiter and its moons set for launch in 2020.

The Venus mission would cost some \$3 billion to 4 billion and would launch between 2020 and 2025, according to NASA, which in 2008 tasked a group of scientists and engineers to formulate goals for the mission.



An aluminium-coated balloon that could be used to explore Venus for weeks is being tested at NASA's Jet Propulsion Laboratory (Image: NASA/JPL)

The team's study, which will be released in April, outlines a plan to study the hazy planet, which has more in common with Earth than any other in terms of distance from the Sun, size and mass, but evolved into an inhospitable world where surface temperatures hover close to 450°C and sulphuric acid rains from the sky.

The team's mission concept includes one orbiter, two balloons and two short-lived landers, all of which would launch into space on two Atlas V rockets.

"Our understanding of Venus is so low, we really need this armada," says planetary scientist Mark Bullock of the Southwest Research Institute in Boulder, Colorado, one of the team leaders.

Signs of water

As an ensemble, the spacecraft could help reveal what happened to Venus's oceans. Researchers believe water was once plentiful enough to have been able to cover the entire planet in a layer 100 metres deep.

But Venus's hothouse climate eventually dried up most of this water, a process that might have also slowed and eventually stopped plate tectonics on the planet.

The landers, which would only last a few hours in the intense heat, could look for evidence of minerals formed by water. Since such hydrated minerals have a limited lifetime, they could help reveal how long Venus's oceans might have lasted, a question that could shed light on whether life might have arisen on the planet.

Long-lived balloons

The mission's two balloons would each carry a gondola full of scientific instruments to sniff the atmosphere at an altitude of 55 kilometres.

The last balloons to study Venus, sent by the Soviet Union, descended into the planet's hazy atmosphere in 1985. Each is thought to have lasted just a few days. But the NASA balloons could be designed to last for a month, enough time for each to circumnavigate the planet seven times.

The mission could also help reveal more about the origin of Venus's current carbon dioxide atmosphere, which produces crushing surface pressures 90 times those on Earth.

Cataclysmic impact

It's unclear whether the planet once lost much of its atmosphere in a cataclysmic impact, like the Earth did in the impact that formed the Moon, later replenishing it with volcanic activity, or whether it has held onto its original atmosphere.

The balloons and descending landers could study this by measuring isotopes of xenon, an unreactive gas that is relatively heavy and therefore should stay put in the atmosphere, barring any violent impacts. If lightweight isotopes of the gas are relatively abundant, that would suggest that the planet has held onto much of its original atmosphere.

The balloons would also be test particles that could be used to track Venus's super-fast winds, which, for reasons that are still not understood, move around the planet 60 times faster than the planet's surface rotates.

Active volcanism

The orbiter could reveal whether geological activity continues on the planet, by looking for bulges on the surface that could signal ongoing volcanic activity.

This activity has been hinted at by the presence of sulphuric acid in the atmosphere, but never seen. Venus boasts the most volcanoes of any planet in the solar system, and nearly 90% of its surface is covered by basaltic lava flows. Finding ongoing volcanic activity in certain spots would help account for the planet's extreme climate.

Although such a mission is at least a decade away, preliminary work may need to begin now. "Because it's such a challenging mission, we are going to recommend NASA begin investing in the required technology right away," Bullock told New Scientist.

Balloon tests

At NASA's Jet Propulsion Laboratory, research is already being done in the hopes of eventually getting funding to launch a smaller balloon-only mission to Venus, called VALOR.

The balloon is made of high-strength polymers and coated with aluminium to deflect most of the Sun's radiation, which could cause the balloon to heat up and burst. A layer of Teflon protects the balloon from sulphuric acid in Venus's atmosphere.

Later this year, the team is planning its first in-air deployment of the balloon. A helicopter will be used to carry the folded-up prototype to an altitude of 2 to 3 kilometres, where it will be released and inflated with helium while dropping to Earth beneath a parachute.

Were all dinosaurs beasts of a feather?

* 19 March 2009 by Jeff Hecht

FEATHERED dinosaurs may have been the rule, not the exception. A stunning new fossil from China reveals primitive filamentary feathers on a dinosaur only distantly related to birds, indicating that all dinosaurs share a feathery ancestry.

All of the feathered dinosaurs found since *Sinosauropteryx* startled the world in 1996 come from a group of two-legged predators called theropods, which gave rise to birds. Now Hai-Lu You of the Institute of Geology in Beijing, China, along with three colleagues, has found feather-like filaments on a fossil named *Tianyulong confuciusi* (*Nature*, vol 458, p 333).



*Reconstruction of *Tianyulong confuciusi*, a feathered heterodontosaurid ornithischian dinosaur* (Illustration: Li-Da Xing)

About 70 centimetres long, the plant-eating *Tianyulong* lived from about 140 to 100 million years ago. The fossil is a member of the ornithischian group of dinosaurs that diverged about 220 million years ago from the other main branch of the dinosaurs, which contained the theropods. The presence of feathers on both branches of the evolutionary tree suggests they were present in the ancestor of all the dinosaurs.

If the ancestral form had such filaments, then they might be present in many or most dinosaurs - although skin impressions left by large dinosaurs lack feathers, suggesting that the trait died out in larger species.

Feathers might even stretch back to the pterosaurs, which split from the ancestors of dinosaurs shortly before the dinosaur groups emerged. A few pterosaur fossils possess hair-like stubble.

While modern flight feathers are elaborately branched, the new fossil's feathers are hollow single filaments - "the most primitive basic feather structure", says ornithologist Alan Brush at the University of Connecticut at Storrs. Similar feathers still exist on the tail of the 12-wired bird of paradise and in the "beards" of wild turkeys.

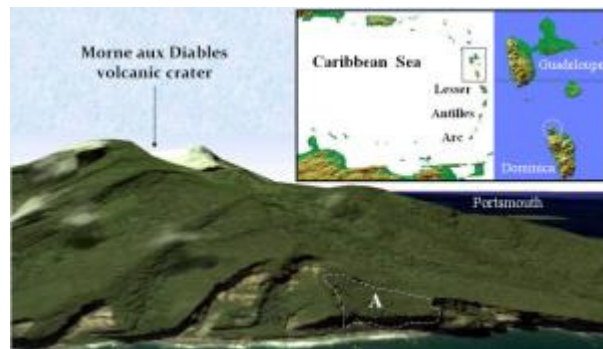
Tsunami 'trigger' spotted on Google Earth

* 11:02 19 March 2009 by Nora Schultz

Spotting risky rock formations that are about to collapse and trigger tsunamis could be done with the help of Google Earth, new research suggests. The software could prove a useful tool where other types of survey prove too difficult or expensive.

One such spot has just been found in the Caribbean by Richard Teeuw from the Geohazard Research Centre at the University of Portsmouth, UK.

See satellite imagery of the volcano for yourself [online](#) or [in Google Earth](#). (You can [download Google Earth for free here](#)).



Google Earth view of the feature (marked) that could collapse triggering a devastating wave on the shores of Guadeloupe - see maps (inset) (Image: Google Earth/NASA/AGU)

"We were doing fieldwork on the volcanic island of Dominica in the Lesser Antilles and initially just used Google Earth to identify good study areas," he says. "But with its 3D flyover tool, we quickly got excellent direct glimpses of a slab or rock that may soon cause a tsunami."

The flyover tool allowed Teeuw and his colleagues to examine the million-tonne rock in 3D, and from several angles. They found plenty of evidence that this block of coastline is a landslide waiting to happen. "The flank is undercut by erosion from the sea and we saw scars from recent landslides and tension cracks above the block," he says. "Earthquakes are common in the area and we are pretty sure it's going to go soon."

Cheap tool

The researchers have calculated that when the rock tumbles into the sea, it could trigger a tsunami of up to 3 metres high. Though that is smaller than the waves of the 2004 Boxing Day Tsunami, the coast of the island Guadeloupe is only 40 kilometres away and has vulnerable flat beaches.

"If even a small tsunami hit during the tourist season, and people were unprepared, the impact could be quite bad," says Teeuw. What's more, if other blocks above the problem slab were destabilised by a larger earthquake or movement of the slab itself, a much larger tsunami could result.

Teeuw says that the Google Earth images give enough reason to examine the area more closely with high-resolution survey techniques, such as laser altimetry, which would more accurately appraise the risks of a potential collapse.

Surveys of this kind are too expensive to use for routine scans over large areas, especially in poor countries. "If we can do a systematic study using Google Earth to identify the areas most at risk, the detailed analysis can be focused only on the spots that really need it," he says. *Journal reference: EOS (volume 90, number 10, page 81)*

Report warns of jury service 'trauma'

First study of its kind highlights whether people called for jury service should be screened

A new report by psychologists at the University of Leicester warns of the dangers of jurors facing trauma because of their exposure to harrowing and gruesome evidence.

In the first study of its kind, the research highlights how women jurors are more vulnerable, particularly if the trial covers material that resonates with their personal histories.

The research confirms that jury service, particularly for crimes against people, can cause significant anxiety, and for a vulnerable minority it can lead to severe clinical levels of stress or the symptoms of post traumatic stress disorder.

The study led by clinical psychologist Dr Noelle Robertson has been published in *The Howard Journal*. It warns of the perils of undergoing jury service- and the fact that people cannot talk about their experiences for fear of being held in contempt of court.

Dr Robertson, with University of Leicester colleagues Professor Emeritus Graham Davies and graduate student Alice Nettleingham, is the first UK exploratory study to look at the possible traumatising of jurors.

The report claims jury service can be a significant stressor for a vulnerable minority and goes on to debate whether screening might be employed to eliminate jurors from potentially traumatising trials.

Dr Robertson said: "Recent research on post-traumatic stress disorder has revealed that it is not only victims of violence or crime that suffer trauma, but that those who interact with them may also be affected.

"If called to jury service, citizens of Britain, as well as the US and most Commonwealth countries, are obliged to serve and may be exposed to gruesome exhibits and harrowing stories, which, the study shows, can lead to traumatising for some of them."

An average of 390,000 British citizens serve on juries each year and, after no other preparation than a film outlining their duties, may be exposed to the distress of witnesses or required to handle repellant exhibits and examine graphic and shocking photographs.

When they retire to reach their verdict they have to discuss and weigh up the evidence and may be under pressure to change their own views or to try and change the views of others.

All this can lead to short-term or long-term distress.

The times during trials when jurors were required to make decisions were cited as the most stressful, but having to deal with evidence that might be horrific was also a source of concern, particularly for women, who were also more adversely affected by dissension and questioning in the jury room.

While Dr Robertson urges caution in the interpretation of what was a small-scale Leicester study, it does bear out research from North America, and confirms that jury service can be a source of stress, which for some people can be overwhelming.

The report recommends more support for jurors, including more comprehensive preparation, briefing and clear directions, as well as guidelines for the decision process in the jury room. It also recommends that Crown Courts could provide a supporter for jurors, who might lessen the sense of isolation jurors can feel, since they are unable to discuss the court case outside the jury room.

Currently, people called for jury service are allocated by lot to juries, and the report also calls for use of a questionnaire highlighting past experiences which would save jurors from the trauma of cases that might resonate with their own past experiences.

Dr Robertson commented: "Jury service is a civic duty, yet we know little about its consequences for the individual. At present, anyone who talks openly about their experiences runs the risk of being charged with contempt of court."

Acetaldehyde in alcohol - no longer just the chemical that causes a hangover ***New evidence points to an overlooked risk factor for cancer***

New evidence by researchers at the Centre for Addiction and Mental Health (CAMH) and researchers in Germany shows that drinking alcohol is the greatest risk factor for acetaldehyde-related cancer. Heavy drinkers may be at increased risk due to exposure from multiple sources.

Acetaldehyde is ubiquitous in daily life in Ontario. Widely present in the environment, it is inhaled from the air and tobacco smoke, ingested from alcohol and foods, and produced in the human body during the metabolism of alcoholic beverages. Research indicates that this organic chemical plays a significant role in the development of certain types of cancers (especially of the upper digestive tract), and it is currently classified as possibly carcinogenic by the International Agency for Research on Cancer of the World Health Organization. New research from CAMH in Toronto and the Chemical and Veterinary Investigation Laboratory Karlsruhe (CVUA) in Germany recently provided the necessary methodology for calculating the risk for the ingestion of alcoholic beverages.

The team found that risk from ingesting acetaldehyde via alcoholic beverages alone may exceed usual safety limits for heavy drinkers. Their risk assessment study found that the average exposure to acetaldehyde from alcoholic beverages resulted in a life-time cancer risk of 7.6/10,000, with higher risk scenarios (e.g. contaminations in unrecorded alcohol) in the range of 1 in 1,000. As such, the life-time cancer risks for acetaldehyde from ingestion of alcoholic beverages greatly exceed the usual limits for cancer risks from the environment.

The research team noted, however, that this risk is compounded by the addition of acetaldehyde exposure from different sources. "The problem with acetaldehyde has been that although it has been recognized as toxic by Health Canada some years ago, most risk assessments to date were based on one source of exposure only" explained Dr. Jürgen Rehm, the lead scientist of the Toronto group and head of the Public Health and Regulatory Policies section at CAMH. "This has led to a negligence of the overall risk."

For example, in Toronto, even though there are limits for air exposure of acetaldehyde set by the responsible Public Health agency, these limits have been surpassed in the past. Alone, the risks associated with surpassing limits of acetaldehyde from the air may not yet be alarming, but for heavy drinkers and smokers, it adds to the acetaldehyde levels already received from these sources. This overall risk then surpasses established safety limits.

"Their risk assessment of acetaldehyde present as a congener in alcoholic beverages touches the tip of the iceberg," according to a Commentary on the CAMH/CVUA study in the journal *Addiction*.

Based on their study the scientists of CAMH recommend:

* That the classification of acetaldehyde with respect to cancer be re-examined, incorporating new evidence which points to an additional cancer risk to humans.

- * That a further risk assessment should take into consideration all sources of exposure from this substance.
- * That the risk for cancer stemming from acetaldehyde from alcoholic beverages is recognized, and necessary preventive steps are taken to reduce the acetaldehyde content in alcoholic beverages.
- * That the overall level of acetaldehyde exposure be minimized to the lowest level technically possible.

To arrange interviews please contact Michael Torres, Media Relations, CAMH at (416) 595-6015.

For a full text copy of the article please contact Molly Jarvis, Editorial Manager: Marketing & Liaison, Addiction. Email molly@addictionjournal.org, telephone +44 (0)20 7848 0014

Source: Lachenmeier, D.W., Kanteres, F., Rehm, J. Carcinogenicity of acetaldehyde in alcoholic beverages: risk assessment outside ethanol metabolism. *Addiction* 2009; 104: 533 - 550

Optimum running speed is stride toward understanding human body form

MADISON — Runners, listen up: If your body is telling you that your pace feels a little too fast or a little too slow, it may be right.

A new study, published online March 18 in the *Journal of Human Evolution*, shows that the efficiency of human running varies with speed and that each individual has an optimal pace at which he or she can cover the greatest distance with the least effort.

The result debunks the long-standing view that running has the same metabolic cost per unit of time no matter the speed - in other words, that the energy needed to run a given distance is the same whether sprinting or jogging. Though sprinting feels more demanding in the short term, the longer time and continued exertion required to cover a set distance at a slower pace were thought to balance out the difference in metabolic cost, says Karen Steudel, a zoology professor at the University of Wisconsin-Madison.

However, Steudel and Cara Wall-Scheffler of Seattle Pacific University have now shown that the energetic demands of running change at different speeds. "What that means is that there is an optimal speed that will get you there the cheapest," metabolically speaking, Steudel says. Peak efficiency was determined by measuring runners' metabolic rates at a range of speeds enforced by a motorized treadmill. Metabolic energy costs increased at both fast and slow speeds and revealed an intermediate pace of maximal efficiency.

The most efficient running speed determined in the study varied between individuals but averaged about 8.3 miles per hour for males and 6.5 miles per hour for females in a group of nine experienced amateur runners. Much of the gender difference may be due to variations in body size and leg length, which have been shown to affect running mechanics, Steudel says. In general, the larger and taller runners had faster optimum speeds.

Interestingly, the slowest speeds - around 4.5 miles per hour, or about a 13-minute mile - were the least metabolically efficient, which Steudel attributes to the gait transition between walking and running. For example, she points out, both a very fast walk and a very slow run can feel physically awkward.

While holding great interest for athletes and trainers, the mechanics of running may also hold clues to the evolution of the modern human body form: tall and long-limbed with broad chests and defined waists.

Modern humans are very efficient walkers and fairly good runners, Steudel says, and efficient locomotion probably provided our ancestors with an advantage for hunting and gathering food. Distant ancestral forms, the australopithecines, had shorter, boxier frames with stubbier legs.

"They wouldn't have had noticeable waists - their torso looked more like the torso of an ape, except they were walking on two legs," Steudel says. "With the genus *Homo*, you start getting taller individuals, larger individuals, and they started developing a more linear body form" with distinct waists that pivot easily, allowing longer and more efficient strides.

Human walking is also known to have an optimally efficient speed, so the new findings may help researchers determine the relative importance of the different gaits in driving human evolution, Steudel says. "This is a piece in the question of whether walking or running was more important in the evolution of the body form of the genus *Homo*."

Living Jumper Cables: Lab-Grown Nerves Promote Nerve Regeneration After Injury, Penn Study Finds

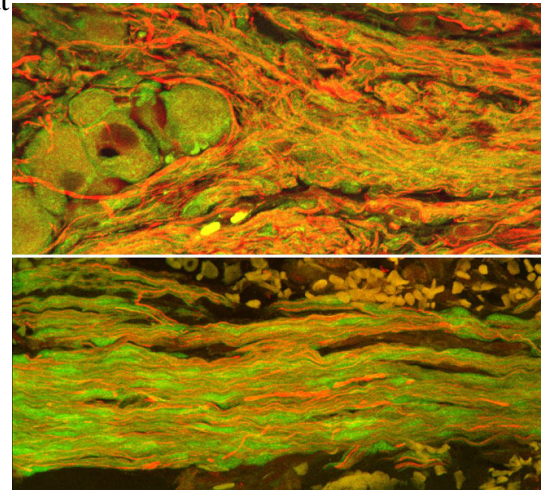
PHILADELPHIA – Researchers at the University of Pennsylvania School of Medicine have engineered transplantable living nerve tissue that encourages and guides regeneration in an animal model. Results were published this month in *Tissue Engineering*.

About 300,000 Americans suffer peripheral nerve injuries every year, in many cases resulting in permanent loss of motor function, sensory function, or both. These injuries are a common consequence of trauma or surgery, but there are insufficient means for repair, according to neurosurgeons. In particular, surgeons need improved methods to coax nerve fibers known as axons to regrow across major nerve injuries to reconnect healthy targets, for instance muscle or skin.

“We have created a three-dimensional neural network, a living conduit in culture, which can be transplanted en masse to an injury site,” explains senior author Douglas H. Smith, MD, Professor, Department of Neurosurgery and Director of the Center for Brain Injury and Repair at Penn. Smith and colleagues have successfully grown, transplanted, and integrated axon bundles that act as ‘jumper cables’ to the host tissue in order to bridge a damaged section of nerve.

Previously, Smith and colleagues have “stretch-grown” axons by placing neurons from rat dorsal root ganglia (clusters of nerves just outside the spinal cord) on nutrient-filled plastic plates. Axons sprouted from the neurons on each plate and connected with neurons on the other plate. The plates were then slowly pulled apart over a series of days, aided by a precise computer-controlled motor system.

These nerves were elongated to over 1 cm over seven days, after which they were embedded in a protein matrix (with growth factors), rolled into a tube, and then implanted to bridge a section of nerve that was removed in a rat.



A surviving cluster of transplanted neurons at the graft extremity (top) with axons in the center (bottom). In both images, transplanted nerve cells are labeled green and axons are stained red. These axons are a mix of the transplanted axons and host axons, which intertwined as regeneration occurred directly across the transplanted tissue.

Doug Smith, MD, University of Pennsylvania School of Medicine

“That creates what we call a ‘nervous-tissue construct’,” says Smith. “We have designed a cylinder that looks similar to the longitudinal arrangement of the nerve axon bundles before it was damaged. The long bundles of axons span two populations of neurons, and these neurons can have axons growing in two directions - toward each other and into the host tissue at each side.”

The constructs were transplanted to bridge an excised segment of the sciatic nerve in rats. Up to 16 weeks post-transplantation, the constructs still had their pre-transplant shape, with surviving transplanted neurons at the extremities of the constructs spanned by tracts of axons.

Remarkably, the host axons appeared to use the transplanted axons as a living scaffold to regenerate across the injury. The authors found host and graft axons intertwined throughout the transplant region, suggesting a new form of axon-mediated axonal regeneration. “Regenerating axons grew across the transplant bridge and became totally intertwined with the transplanted axons,” says Smith

Axons throughout the transplant region showed extensive myelination, the fatty layer surrounding axons. What’s more, graft neurons had extended axons beyond the margins of the transplanted region, penetrating deep into the host nerve. Remarkably, the constructs survived and integrated without the use of immunosuppressive drugs, challenging the conventional wisdom regarding immune tolerance in the peripheral nervous system.

The researchers suspect that the living nerve-tissue construct encourages the survival of the supporting cells left in the nerve sheath away from the injury site. These are cells that further guide regeneration and provide the overall structure of the nerve.

“This may be a new way to promote nerve regeneration where it may not have been possible before,” says co-first author D. Kacy Cullen, PhD, a post doctoral fellow in the Smith lab. “It’s a race against time - if nerve regeneration happens too slowly, as may be the case for major injuries, the support cells in the extremities can degenerate, blunting complete repair. Because our living axonal constructs actually grow into the host nerve sheath, they may ‘babysit’ these support cells to give the host more time to regenerate.”

The other co-first author is Jason Huang, MD, Assistant Professor of Neurosurgery at Rochester University, who participated in the study during his Neurosurgical residency at Penn.

This work was funded by the National Institutes of Neurological Disorders and Stroke and the Sharpe Trust.

Jigsaw complete for ancient predator

* 18:00 19 March 2009 by Ewen Callaway

For an animal nicknamed the "T. rex of the Cambrian" – the apex predator of its food chain – the ancient arthropod *Hurdia victoria* has had a tough time getting properly recognised.

The species was initially described as a crustacean by American palaeontologist Charles Walcott in 1912. But its bizarre appearance and the discovery of numerous partial fossils led to it being misclassified variously as a species of jellyfish, sea cucumber and its close relative *Anomalocaris*.

Now a new analysis of numerous *Hurdia* fossils – including the animal's whale-like carapace – suggests that all these specimens belong to a single species.

"The animal is very strange looking," says Allison Daley, a palaeontologist at Uppsala University in Sweden, who led the new classification.

She says the early arthropod may have grown to be half a metre long and sat near the top of its marine food chain, some 500 million years ago.

Hurdia is among the most abundant predators in a western Canadian rock formation called the Burgess shale. Study co-author Jean-Bernard Caron, an invertebrate palaeontologist at the Royal Ontario Museum in Toronto, says that Hurdia probably skulked around the bottom of the ocean in large numbers.



An artist's reconstruction of Hurdia based on numerous fossils. The large head carapace helped researchers distinguish it from a related Cambrian super-predator, Anomalocaris (Image: Science/AAAS)

Journal reference: Science (DOI: 10.1126/science.1169514)

UK researcher identifies just 8 patterns as the cause of all humor

Evolutionary theorist Alastair Clarke has today published details of eight patterns he claims to be the basis of all the humour that has ever been imagined or expressed, regardless of civilization, culture or personal taste.

Clarke has stated before that humour is based on the surprise recognition of patterns but this is the first time he has identified the precise nature of the patterns involved, addressing the deceptively simple unit and context relationships at their foundation. His research goes on to demonstrate the universality of the theory by showing how these few basic patterns are recognized in more than a hundred different types of humour.

Clarke explains: "One of the most beautiful things about the theory is that, while denying all previous theories, it also unites them for the first time. For decades researchers have concentrated on limited areas of humour and have each argued for causality based on their specific interest. Now that we have pattern recognition theory, all previous explanations are accommodated by a single over-arching concept present in all of them.

"The eight patterns divide into two main categories. The first four are patterns of fidelity, by which we recognize the repetition of units within the same context, and the second four are patterns of magnitude, by which we recognize the same unit repeated in multiple contexts.

"What this all means is that the basic faculty of pattern recognition equips us to compare multiple units for their appropriateness within a certain context, effectively selecting the best tool for the job, and then to apply our chosen unit to as wide a range of contexts as possible, effectively discovering the largest number of jobs that tool is good for.

"Basically humour is all about information processing, accelerating faculties that enable us to analyse and then manipulate incoming data."

Clarke lists the patterns that are active in humour as positive repetition, division, completion, translation, applicative and qualitative recontextualization, opposition and scale.

"Some are more intuitive than others," he admits. "The most basic, positive repetition, simply means that the unit is repeated in a similar form with the same purpose. As with all patterns, the repeated unit can be composed of any information available to the human brain, whether an entity, action or property. Then there's opposition, in which we take the unit and turn it against itself, such as can be seen in a mirror image or if we turn an arrow back to point in the other direction, producing a pattern of symmetry. However, while all the patterns are relatively simple in structure the activity of some forms of translation and recontextualization can seem counter-intuitive at first sight.

"In instances of humour these patterns may be recognized individually or in any possible combination of the eight. Most instances are founded on one or two, although theoretically there is no limit to the number of patterns a person has recognized when they find something funny. Pattern recognition remains a subjective matter, just like any other perception."

Details of the patterns and how they relate to more than a hundred forms of humour are published today in 'The Eight Patterns Of Humour', which is also available as a free eBook from the publisher's website at www.pyrrhichouse.co.uk/eightpatterns for a period of 30 days.

"The patterns reflect vitally important cognitive frameworks. Those of fidelity provide us with a basic arithmetical toolkit, while those of magnitude provide everything required to develop syntactical systems. Pattern recognition is in many ways pattern cognition, since the promotion of patterns through the reward systems associated with humour has massively accelerated humankind's ability to order and manipulate multiple units for multiple uses. Put like that, there are few better ways to express human ingenuity and adaptability."

This publication is one of several within a series regarding Clarke's Pattern Recognition Theory Of Humour, which posits the fundamental role humour has played in the development of the intellectual and perceptual capacities of the species.

The theory is based on extensive observation and analysis. "While countless thousands of instances were informally considered over the years, ten thousand specific instances were analysed in a single document known as 'The Humour Ten Thousand'."

This document is currently being prepared for publication and is to be made publicly available on the internet during 2009. Due to its substantial length (around 1500 pages) the document will be published in sections of 1000 instances throughout the year. For more information about Clarke's research visit www.pyrrhichouse.co.uk/research.

Is life bubbling up in Mars mud?

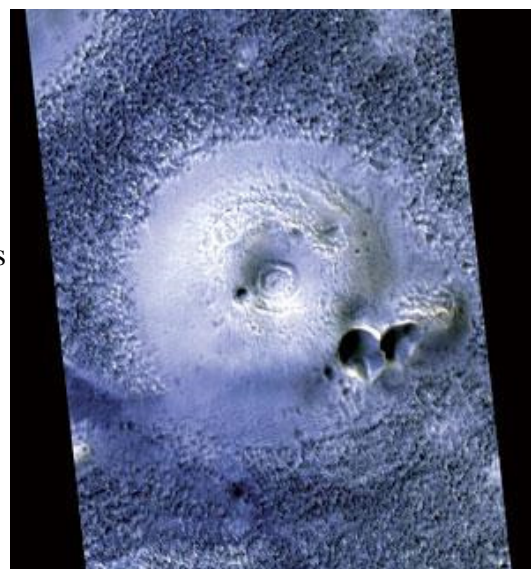
* 20 March 2009 by **David Shiga**

IS LIFE bubbling onto the Martian surface in muddy squirts? The discovery of what could be mud volcanoes on the planet suggest it is possible, providing a new focus in the hunt for alien microbes.

Three plumes have recently been identified as sources of methane in Mars's atmosphere (New Scientist, 24 January, p 19). This has led to suggestions that the gas could have been produced by microbes living a few kilometres beneath the surface, where it could be warm enough for liquid water to persist.

This would be difficult to confirm as drilling that deep for samples on another planet is beyond current technology. Now it seems that nature may have done the hard work for us, bringing mud from deep within the planet to the surface via mud volcanoes.

Using images from the Mars Odyssey spacecraft, Dorothy Oehler and Carlton Allen of NASA's Johnson Space Center in Houston, Texas, identified dozens of mounds at a site in the northern plains of Mars that bear a striking resemblance to mud volcanoes on Earth. These form a [distinctive large hill](#) of sediment with a central crater (see photo).



Mounds at a site in the northern plains of Mars bear a striking resemblance to mud volcanoes on Earth (Image: University of Arizona/JPL/NASA)

Further evidence comes from infrared images of the Martian mounds, which show that they cool down more quickly at night than rock should, suggesting they are made of a fine-grained sediment such as mud.

Together with David Baker of Brown University in Providence, Rhode Island, Allen and Oehler also took a fresh look at some possible mud volcanoes identified previously by other researchers, about 1000 kilometres further north. Using light spectra of the mounds recorded by the Mars Reconnaissance Orbiter, they found hints of iron oxides, which form in the presence of liquid water. Both studies will be presented at the Lunar and Planetary Science Conference in The Woodlands, Texas, this month.

Jack Farmer of Arizona State University in Tempe agrees that the mounds could be mud volcanoes, but cautions that other processes, like the retreat of glaciers, can leave behind similar heaps of sediment. Nonetheless, studying the clay from mud volcanoes would be of great interest, he says. "Clays have the ability to sequester organic molecules, like ammonia and proteins," he says. "They might retain a memory of any organisms that were there."

2-day results predict ultimate response to therapy in chronic hepatitis C

A new study suggests that previously noted low rates of successful hepatitis C virus (HCV) therapy in African Americans are in large part due to very early differences in the antiviral activity induced by interferon. The study is published in the April 15 issue of the Journal of Infectious Diseases, now available online.

More than 3 million Americans are infected with HCV, and in some countries more than 10 percent of the population is infected. Chronic HCV infection is the leading cause of liver failure worldwide. Response to standard therapy with peginterferon and ribavirin varies widely. Those infected with one strain of the virus—genotype 1—are the least likely to have a successful response to therapy, known as a sustained virological response (SVR). About one-half of patients infected with genotype 1 do not achieve SVR.

Studies have shown that African Americans have consistently lower rates of SVR to interferon-based therapy, compared to Caucasian Americans. A recent study of those with chronic genotype 1 HCV infection found that only 28 percent of African American patients attained SVR, compared with 52 percent in Caucasian Americans. This new study shows that the variation in therapy responsiveness between African Americans and

Caucasian Americans can be partly explained by differences in viral response noted as early as one to two days after the first dose of peginterferon.

The study, conducted by a collaborative group of eight medical centers throughout the United States, monitored 341 patients with chronic HCV, genotype 1, who underwent therapy with peginterferon and ribavirin for at least 24 weeks. It focused on response rates to interferon therapy within the first 28 days of therapy, noting viral factors such as HCV RNA levels and host factors such as race, gender, and weight.

Results showed that HCV RNA levels decreased in almost all patients, and that the degree and pattern of decrease, as expected, was different between African and Caucasian Americans. Most important was the new finding that these differences were statistically significant by day 2 of treatment, and that this early viral kinetic measurement was a reliable predictor of ultimate SVR rates. After 28 days of treatment, 22 percent of Caucasian Americans, but only 12 percent of African Americans, were HCV RNA negative.

These findings are particularly important because they point toward the presence of some block or defect in the immediate antiviral response of those who do not respond to therapy. As the authors summarize, "The underlying cause of virological non-response and the reasons why it is more common among African Americans than Caucasian Americans are not clear. [But] the current analyses demonstrated that these differences are fundamentally biologic and become apparent within 24 to 48 hours of starting therapy." As a next step, future research should focus on these host biologic factors that are induced by interferon in an attempt to improve therapy response rates.

In an accompanying editorial, Andrew W. Tai, MD, PhD, and Raymond T. Chung, MD, of Massachusetts General Hospital agree that the findings will prove vital for future research into HCV, remarking, "[this study] demonstrates that the low rates of SVR in African American patients in response to IFN-based therapy appear to result, in large part, from impaired early viral kinetics. Further studies are necessary to uncover the relevant mechanisms that underlie this defect in IFN signaling... with the hope that such mechanisms can be manipulated to restore interferon responsiveness in the otherwise nonresponsive host."

New study finds daily drinking is biggest risk factor in serious liver disease

Long-term daily drinking, rather than weekly binge drinking, is by far the biggest risk factor in serious liver disease, according to a new report from the University of Southampton, published in Addiction

Long-term daily drinking, rather than weekly binge drinking, is by far the biggest risk factor in serious liver disease, according to a new report from the University of Southampton. The study, published in *Addiction* journal this week, concludes that increases in UK liver deaths are a result of daily or near daily heavy drinking, not episodic or binge drinking, and this regular drinking pattern is often discernable at an early age. It also recommends that several alcohol-free days a week is a healthier drinking pattern.

In the study of drinking patterns, dependency and lifetime drinking history in 234 subjects with liver disease, 106 had ALD (Alcohol-related Liver Disease) – 80 of whom had evidence of cirrhosis or progressive fibrosis – the team found that 71 per cent of ALD patients drank on a daily basis. In contrast to the patients with alcohol-related cirrhosis or fibrosis, patients with other forms of liver disease tended to drink sparingly with only 10 subjects (8 per cent) drinking moderately on four or more days each week.

The study also explored lifetime drinking histories of 105 subjects and found that ALD patients started drinking at a significantly younger age (on average at 15 years old) than other subjects and had significantly more drinking days and units than non-ALD patients from the age of 20 onwards.

Lead author of the study Dr Nick Sheron, consultant hepatologist and senior lecturer at the University of Southampton, comments: "If we are to turn the tide of liver deaths, then along with an overall reduction in alcohol consumption – which means tackling cheap booze and unregulated marketing – we need to find a way to identify those people who are most likely to develop alcohol-related illnesses at a much earlier stage, and perhaps we need to pay as much attention to the frequency of drinking occasions as we do to binge drinking.

"The transition from a late teenage and early 20's binge drinking pattern to a more frequent pattern of increased intake may prove to be a useful point of intervention in the future, and the importance of three alcohol-free days each week should receive more prominence."

Fears over 'designer' babies leave children suffering

* 21 March 2009 by Michael Le Page

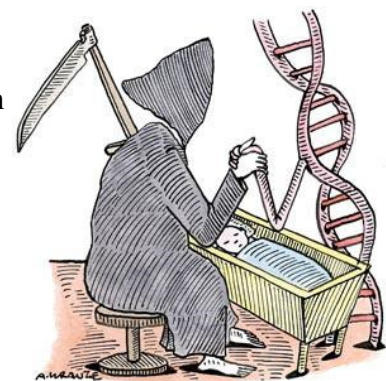
MADLINE Kara Neumann, age 11, died of diabetes because her parents prayed rather than taking her to doctors. Caleb Moorhead, age 6 months, died after his deeply religious vegan parents refused a simple vitamin injection to cure his malnutrition. The list of children killed by their parents' superstition or wilful ignorance is a long one.

Most people are rightly appalled by such cases. How can parents stand by and let their children die instead of doing all in their power to get the best medical care available?

Yet this is precisely what society is doing. We now have the ability to ensure that children are born free of any one of hundreds of serious genetic disorders, from cystic fibrosis to early-onset cancers. But children continue to be born with these diseases.

All would-be parents should be offered screening to alert them to any genetic disorders they risk passing on to their children. Those at risk should then be offered IVF with pre-implantation genetic diagnosis (IVF-PGD) to ensure any children are healthy.

Why isn't it happening? Because most people still regard attempts to influence which genes our children inherit as taboo. When a fertility clinic in Los Angeles recently offered would-be parents the chance to choose their child's eye colour, for instance, it provoked a storm of criticism that forced the clinic to reconsider.



When a California fertility clinic withdrew its offer of 'designer' babies it revealed a deeper societal problem

Such fears are misplaced: IVF-PGD is little use for creating designer babies. You cannot select for traits the parents don't have, and the scope for choosing specific traits is very limited. What IVF-PGD is good for is ensuring children do not end up with disastrous genetic disorders.

Nearly 150 years after Darwin unveiled his theory of evolution, we have yet to grasp one of its most unsettling implications: having diseased children is as natural as having healthy ones. Every new life is a gamble, an experiment with novel gene combinations that could be a brilliant success or a tragic failure.

Thanks to technology, we are no longer entirely at the mercy of this callous process. Rather than regarding this ability with suspicion, we should be celebrating it and encouraging its use. Instead, we continue to allow children be born with terrible diseases because of our collective ignorance and superstition. That makes us little better than the parents of Madeline and Caleb. *Michael Le Page is biology features editor at New Scientist*

Hopkins scientists ID 10 genes associated with a risk factor for sudden cardiac death

One minute, he's a strapping 40-year-old with an enviable cholesterol level, working out on his treadmill. The next, he's dead.

That an abnormality in his heart's electrical system had managed to stay on the Q.T. — until it proved lethal — is characteristic of sudden cardiac death, which annually claims more than a quarter million Americans. A dearth of discernable symptoms and lack of detectable molecules circulating in the blood makes the prediction of sudden cardiac death largely dependent on genetic risk factors.

Having identified 10 common variants of genes that modify the timing of the contraction of the heart, known as the QT interval, scientists in the Johns Hopkins University School of Medicine, in collaboration with an international contingent of researchers, now provide new insight about the underpinnings of the QT interval which, when prolonged or shortened, predisposes to sudden cardiac death.

QT interval, which is determined from a standard electrocardiogram (ECG), reflects the time it takes for the heart (ventricles) to contract and then reset for the next heartbeat.

Publishing March 22 in *Nature Genetics*, the international team including researchers from the Technical University in Munich, Johns Hopkins and others, used DNA samples previously collected for epidemiological studies to analyze the genomes of 15,842 individuals whose QT intervals had been measured by electrocardiogram. With DNA microarray chips, each able to assess hundreds of thousands of markers in each sample, followed by bioinformatic techniques to increase the number of markers, the researchers screened approximately 2.5 million markers to detect subtle alterations in the sequences of these genomes that modify the QT interval.

By focusing on 2.5 million sites in a genome of 3 billion sites, the scientists surveyed one-one-thousandth of nearly 16,000 genomes. This relatively small but "still extremely powerful" screen correlates genomic architecture with QT intervals, according to Aravinda Chakravarti, Ph.D., a professor in the McKusick-Nathans Institute of Genetic Medicine.

These common variants at 10 locations across the genome represent perhaps dozens of yet-to-be-identified genes that affect this trait, Chakravarti adds. Of the 10, one that had been previously identified - *Nos1ap* - was confirmed. Several others were suspected culprits, the effects of which hadn't been demonstrated in preliminary screens.

"However, almost half were surprising new genes that no one would have guessed as being involved in cardiac biology," says Dan Arking, Ph.D., an assistant professor in the McKusick-Nathans Institute of Genetic Medicine. "So it really does open up a new world of investigation because these are genes that would have never come up if we had only focused on a list of known candidate genes."

A separate study, led by Christopher Newton-Cheh, M.D., M.P.H., of the Massachusetts General Hospital Center for Human Genetic Research and Cardiovascular Research Center, found similar results from more than 13,000 individuals. "We were very reassured to see such strong replication in two independent studies," says Newton-Cheh.

While any single genetic variation in any one individual does not necessarily imply a significant alteration to QT interval, much less increased risk of sudden cardiac death, there is meaning that resides in the collective.

The power of this genetic analysis is a result of screening many thousands of samples, says Chakravarti: "We're not very good at predicting what happens to any one, single sample. It's sort of like, I could examine in great detail how important my vote was in the last election, but it's trivial compared to the collective vote. An individual's genome is important as part of the study's whole, but individually, it's of little consequence."

Likewise, if scientists analyze the effect on QT interval by any one of the genetic variants, the alteration amounts to just a couple milliseconds, which is not a huge amount, says Arking: "But if you put all 10 genetic variants together, that bumps up the QT interval by about 20 milliseconds, which is significant."

This latest study builds on research published in 2006, when a screen of 100,000 sites in individuals of European ancestry first showed that the *Nos1ap* gene is associated with the QT interval; and subsequent research showing that sequence changes in *Nos1ap* are also a risk factor for sudden cardiac death. A third paper, published in January 2009 in *PLoS one*, widened the original screen to include multiethnic populations; that study confirmed that *Nos1ap* genetic variants alter QT interval in all populations and, in fact, have a stronger effect in women than men.

"The reason people die from this cardiovascular disorder is because we know nothing about the antecedents," Chakravarti says. "It's like a truck barreling down a slope: there's no way to stop it. The only way out is to understand the science of this in a deep, meaningful way. If we know, we can begin to intervene."

The research was supported in part by National Heart, Lung and Blood Institute, National Human Genome Research Institute, National Institute on Aging, National Institutes of Health, Donald W. Reynolds Cardiovascular Clinical Research Center at Johns Hopkins University, German Federal Ministry of Education and Research, Fondation Leducq, State of Bavaria, Ministry of Health of the Autonomous Province of Bolzano, South Tyrolean Sparkasse Foundation, and the Heinz Nixdorf Foundation. Authors of the paper, in addition to Chakravarti and Arking, are Georg B. Ehret, Anna Ko"ttgen, W.H. Linda Kao, Josef Coresh and Man Li, Johns Hopkins University; Arne Pfeufer and Christine Happel, Technical University Munich, Germany; Serena Sanna, Gianluca Usala, Mariano Dei, Silvia Naitza and Marco Orru', Istituto di Neurogenetica e Neurofarmacologia, Cagliari, Italy; Martina Mu"ller and H.-Erich Wichmann, Helmholtz Center Munich; Gerhard Steinbeck and Stefan Ka"a"b, Klinikum Grosshadern, Munich; Gonc,alo R. Abecasis and Vesela Gateva, University of Michigan; Christian Fuchsberger, Peter P. Pramstaller and Andrew A. Hicks, EURAC European Academy, Italy; Siegfried Perz, Helmholtz Center Munich; Maja Barbalic and Eric Boerwinkle, University of Texas Health Science Center; Benno Pu"tz and Bertram Mu"ller-Myhsok, Max Planck Institute of Psychiatry, Munich; Angelo Scuteri, Istituto Ricovero e Cura per Anziani, Rome; Ronald J. Prineas, Wake Forest University School of Medicine; Samer S. Najjar and Edward Lakatta, National Institute on Aging; Thomas W. Mu"hleisen, University of Bonn; Stefan Mo"hlenkamp and Karl-Heinz Jo"ckel, University Hospital of Essen, University Duisburg-Essen; and David Schlessinger, National Institute on Aging.

On the Web: <http://www.hopkinsmedicine.org/geneticmedicine/> <http://www.nature.com/ng/index.html>

Editor Note: Video clips of Chakravarti and Arking are available at: http://www.hopkinsmedicine.org/Press_releases/2009/03_22_09.html

TV crime drama compound highlights immune cells' misdeeds

St. Louis, March 20, 2009 - Detectives on television shows often spray crime scenes with a compound called luminol to make blood glow. Researchers at Washington University School of Medicine in St. Louis have applied the same compound to much smaller crime scenes: sites where the immune system attacks the body's own tissues.

The authors report in *Nature Medicine* that injected luminol glows blue at sites of active immune inflammation in living mice, and that they can detect this glow from outside the mice with scientific cameras.

Immune inflammation is thought to be a critical component of arthritis and other autoimmune diseases, atherosclerosis, some forms of cancer and neurodegenerative disease. Imaging such inflammation non-invasively should help scientists better understand and control it, according to the researchers.

"It's quite striking how specific and sensitive this approach is," says senior author David Piwnica-Worms, M.D., Ph.D. "For example, we have evidence that this technique can highlight inflamed tissue that is on the way to becoming cancerous but not yet discernible via visual or tactile inspection."

Piwnica-Worms, professor of radiology and of developmental biology, notes that cardiologists now believe immune inflammation is a key component that makes an arterial plaque dangerous. Such inflammation causes platelets to bind to plaques, leading the plaques to rupture or break away and putting the patient at risk of heart attack, stroke or lung clots.

For now, blood vessels of the chest and torso are too deep within the body to image with this approach. But vessels of the leg and neck are close enough to the skin that the technique may be "directly translatable" to use in human patients, according to Piwnica-Worms.

Lead author Shimon Gross, Ph.D., a postdoctoral fellow, proposed that luminol might be used to image inflammation when he found earlier studies linking luminol bioluminescence with myeloperoxidase (MPO), a protein some types of immune cells use to make bleach during the inflammatory process. When activated, cells known as phagocytes use MPO to make the bleach in pockets. They seek out and swallow invaders, and then push the invaders into these bleach-filled pockets to kill them.

In television dramas like CSI, detectives spray a mixture of hydrogen peroxide and luminol onto crime scenes. The mixture reacts with iron from blood, which in that context acts a catalyst, causing the luminol to glow. In the living body, though, iron isn't as accessible. The iron in hemoglobin, for example, is still inside red blood cells and is often bound to oxygen, blocking the reaction with luminol.

Gross and Piwnica-Worms realized this only after their initial experiments. They injected luminol into mice anticipating that they would need a way to distinguish immune inflammation from other processes that might also cause the luminol to luminesce. Instead, they found the compound only glowed at sites of immune inflammation involving MPO.

"Everything's kept compartmentalized when it's still in the body," says Piwnica-Worms. "When it comes to making luminol glow, the only places where all the necessary ingredients come together in concentrated form in the living body are in active phagocytes containing MPO."

When scientists dabbed an irritant onto the ears of normal mice and injected luminol, immune cells that migrated to the irritation site glowed. But in mice lacking the MPO gene supplied by Jay Heinecke, M.D., Ph.D., of the University of Seattle, no glow could be detected.

To further test the new technique, Lee Ratner, M.D., Ph.D., of Washington University School of Medicine, provided a line of mice that models a type of tumor known to be rife with active immune cells. Injected luminol not only lit up established tumors, it also highlighted areas of inflammation that weeks later would become tumors.

Scientists also used the technique to show inflammation in a mouse model of acute arthritis. Piwnica-Worms speculates that applying luminol in this context could improve arthritis patient management and enable rapid assessment of the effectiveness of new treatments.

Piwnica-Worms and his colleagues are currently working to modify luminol chemically to improve its clinical potential.

Gross S, Gammon ST, Moss BL, Rauch D, Harding J, Heinecke JW, Ratner L, Piwnica-Worms D. Bioluminescence imaging of myeloperoxidase activity in vivo. Nature Medicine, online March 22.