Vaccine may double survival in patients with deadly brain tumors

DURHAM, N.C. -- A vaccine aimed at inducing immunity to the most common and deadly type of brain tumor may stave off recurrence and more than double survival in patients, according to a new study led by researchers in Duke's Preston Robert Tisch Brain Tumor Center.

"This vaccine represents a very promising therapy for a cancer that comes out of the blue and robs people of something most of us take for granted -- time," said John Sampson, M.D., Ph.D., a neurosurgeon at Duke and lead investigator on this study. "The possibility of doubling expected survival -- with few if any side effects -- would represent a big step and a lot of hope for this group of patients."

Sampson presented the results of this Phase II study during an oral presentation at the annual American Society of Clinical Oncology meeting in Chicago on June 2, 2008. The study was funded by the National Institutes of Health and Celldex Therapeutics, a subsidiary of Avant Immunotherapeutics, which has licensed the rights to the vaccine and provided vaccine for use in the study.

The vaccine targets a protein expressed on about half of all glioblastoma multiforme (GBM) tumors. The protein, known as epithelial growth factor receptor variant III (EGFRvIII), is not expressed in normal tissues but is prevalent in GBMs, which makes it an attractive target for a vaccine, Sampson said.

The vaccine targets the protein and enhances immune response to it, killing tumor cells that express the protein and preventing the re-growth of brain tumors in patients who have already been diagnosed and treated with standard regimens including surgery, chemotherapy and radiation.

This study included 23 patients, treated at Duke and at M.D. Anderson Cancer Center. Patients had all been diagnosed with GBMs, and had been treated with standard therapy. Patients in the trial received vaccine injections monthly and were given a chemotherapeutic agent called temozolomide in conjunction with the vaccine treatments. The temozolomide is thought to enhance the immune response to the EGFRvIII, Sampson said.

"This reflected something of a surprising conclusion, because it stands to reason that chemotherapy, which suppresses the body's immune system, would make the vaccine less effective," Sampson said. "What we found was that the opposite is true. While the body is recovering from chemotherapy, immune response is actually stronger as the immune system overcompensates in order to right itself. It's the perfect time to introduce a vaccine."

Patients in the study survived without re-growth of their tumors for a median of 16.6 months, which more than doubles the usual 6.4-month expected progression-free survival in these patients.

Study patients lived for an average of 33.1 months; patients who are diagnosed with GBMs and treated with standard therapy typically live an average of 14.3 months.

"We're more than doubling survival time in this group, and we have some patients who are four, five or six years out from diagnosis, which is virtually unheard of in these people," Sampson said.

The vaccine has caused virtually no side effects; swelling at the injection site is often a patient's only complaint. A Phase III trial is now open at more than 20 sites nationwide.

Other researchers involved with this study include Gary Archer, Darell Bigner, Henry Friedman, Duane Mitchell and David Reardon of Duke; Amy Heimberger and Raymond Sawaya of M.D. Anderson Cancer Center; and Tom Davis and Tibor Keler of Celldex Therapeutics.

Waiting room gadget may prove to be a life-saver

Study finds kids who use touch pad device are more likely to share critical info with doctor

(COLUMBUS, Ohio) – Technology may be the key to identifying high-risk behaviors among adolescents. Injury risk, depressive symptoms and drug and alcohol use are the leading causes of adolescent morbidity and mortality; yet pediatricians often lack the time to screen for these behavioral concerns. That paradox of care is the motivation behind a new study, published in the June issue of Pediatrics, which found adolescents who participated in computerized screening with real-time results were more likely to be identified as having a problem by their pediatrician than adolescents whose screening results were delayed.

The study, conducted by researchers at the Center for Innovation in Pediatric Practices in The Research Institute at Nationwide Children's Hospital, compared the results of 878 primary care patients, ages 11 to 20 years, who participated in a unique, computerized behavioral screening system between June 1, 2005 and February 20, 2006 called "Health eTouch." Developed by researchers at Nationwide Children's, Health eTouch is a Web application, presented to patients on secure wireless Web tablets with 10-inch touch screen displays. Questions vary based on the user's age and reported behaviors and are drawn from existing publicly available validated measures.

Study participants took part in Health eTouch screening in the waiting rooms of the urban clinics they attended. These clinics were randomly assigned to have pediatricians either receive screening results just prior

to face-to-face encounters with patients – "Immediate Results" condition – or two to three business days later – "Delayed Results" condition. When provided with the screening results, pediatricians were able to view a summary of patient responses to screening questions, as well as a list of flagged responses thought to be indicative of high-risk behaviors and an overall positive or negative rating for various behavioral concerns tested during the screening process.

After participating in Health eTouch, 59 percent of respondents screened positive for at least one of the following behavioral concerns: injury risk behaviors, significant depressive symptoms or substance use. Of those youths who screened positive and whose results were provided to pediatricians just prior to their consultation, 68 percent were identified as having a problem by their pediatrician, while only 52 percent of youths whose results were delayed were identified as having a problem by their pediatrician.

"Routine behavioral screening, although critical in identifying and addressing high-risk behaviors, often does not occur or is limited due to the time constraints and competing demands facing primary care physicians," said Kelly Kelleher, MD, a principal investigator for the Center for Innovation in Pediatric Practices in The Research Institute at Nationwide Children's and a faculty member at The Ohio State University College of Medicine. "Our research has found that recent advances in information technology, such as the Health eTouch system, and the immediate reporting of computerized screening results may help overcome barriers to behavioral screening."

Direct data entry by youths in waiting rooms and automated scoring and printing programs minimize staff time necessary for screening, scoring, reporting and filing results. Also, past research has shown adults and adolescents are more willing to disclose sensitive information to a computer than to a clinician.

Unravelling the mystery of the kitty litter parasite in marine mammals

Researchers at California Polytechnic State University have discovered what may be a clue to the mystery of why marine mammals around the world are succumbing to a parasite that is typically only associated with cats. The key may just be the lowly anchovy, according to research presented today at the 108th General Meeting of the American Society for Microbiology in Boston.

Toxoplasma gondii is a protozoan parasite which causes toxoplasmosis, considered to be the third leading cause of death attributed to foodborne illness in the United States. While the Centers for Disease Control and Prevention estimates that over 20% of the U.S. population carries the parasite, the only known reservoir of the infectious form of the parasite (the oocyst) are cats.

Over the past decade, toxoplasma infection has appeared in a variety of sea mammals including beluga whales, dolphins, sea lions and seals. It has also become a major cause of death in sea otters living off the coast of California. It is estimated that approximately 17% of sea otter deaths can be attributed to toxoplasma. While many believe fresh water runoff contaminated with cat feces is to blame, there is no definitive science on the source of infection.

"The question that drives our research is how are marine mammals from the Arctic Circle to Australia infected by a parasite that is spread primarily through the consumption of infectious cat feces and infected meat? Based on the global prevalence of T. gondii infections, we hypothesize that migratory filter feeders, specifically northern anchovies, are serving to spread T. gondii throughout the ocean," says Gloeta Massie, a graduate student who conducted the research with Associate Professor Michael Black.

As there is no previously published research on the ability of anchovies to filter oocysts, that was the first step towards proving their hypothesis. Massie and Black exposed northern anchovies to the parasite, and then, using molecular techniques, tested for the presence of the parasite within the fish. They detected T. gondii DNA in 66% of the exposed fish.

Now that they have shown that anchovies can filter oocysts from the water, the next step is to determine the infectivity of exposed anchovies to mammals.

"Do our research findings mean that you should stop eating anchovy pizza? No. T. gondii oocysts are destroyed by high heat. Unfortunately, marine mammals do not have the option of cooking their food before they eat it. As anchovies are considered prey for practically every major predatory marine fish, mammal and bird, if the exposed anchovies harbor infectious oocysts, this could present a possible transmission path of T. gondii in the marine environment," says Massie.

Low vitamin D levels appear common in healthy children

Many healthy infants and toddlers may have low levels of vitamin D, and about one-third of those appear to have some evidence of reduced bone mineral content on X-rays, according to a report in the June issue of Archives of Pediatrics & Adolescent Medicine, one of the JAMA/Archives journals.

Reports of a resurgence of vitamin D deficiency and rickets, the resulting bone-weakening disease, have emerged in several states, according to background information in the article. Vitamin D deficiency also

appears to be high in other countries, including Greece, China, Canada and England.

Catherine M. Gordon, M.D., M.Sc., and colleagues at Children's Hospital Boston, studied 380 healthy children ages 8 months to 24 months who visited a primary care center for a physical examination between 2005 and 2007. Parents filled out a questionnaire regarding their nutritional intake and that of their children, and also reported on the use of vitamin D and other supplements, time spent outdoors, socioeconomic status and education level.

Among the 365 children for whom blood samples were available, 12.1 percent (44) had vitamin D deficiency, defined as 20 nanograms per milliliter of blood or less, and 40 percent (146) had levels below the accepted optimal level of 30 nanograms per milliliter. Breastfed infants who did not receive vitamin D and toddlers who drank less milk were at higher risk of deficiency (for each cup of milk toddlers drank per day, blood vitamin D level increased by 2.9 nanograms per milliliter).

Forty children of the 44 with vitamin D deficiency underwent X-rays of the wrist and knee. Thirteen (32.5 percent) had evidence of bone mineral loss, and three (7.5 percent) exhibited changes to their bones suggestive of rickets.

"Only one child had signs of rickets on physical examination," the authors write. "Thus, these infants and toddlers had a sub-clinical deficiency that could make detection of this issue particularly problematic in routine clinical practice, as a child's vitamin D status is not typically evaluated as part of routine care."

The data suggest that infants should receive vitamin D supplements while breastfeeding and raise the question of whether some children, including those with established risk factors for vitamin D deficiency, should receive regular measurements of blood vitamin D levels. "Given the potential benefits of vitamin D on bone and other tissues, and growing data supporting its immunomodulatory and antiproliferative effects, the current findings support recommendations advocating for vitamin D supplementation for all young children," they conclude.

(Arch Pediatr Adolesc Med. 2008;162[6]:505-512. Available pre-embargo to the media at www.jamamedia.org.)

Editor's Note: This study was supported by grants from the Allen Foundation Inc. and the McCarthy Family Foundation; a grant from the National Center for Research Resources; and a project of the Maternal and Child Health Bureau, U.S. Health Resources and Services Administration. Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.

Editorial: Additional Information Needed About Risks of Low Vitamin D Levels

"The results of this study suggest that a vitamin D level is not a good screening test for rickets in asymptomatic children; 92.5 percent of those with hypovitaminosis [low levels of] D, as defined by Gordon et al, had no evidence of rickets on radiograph [X-ray]," writes James A. Taylor, M.D., of the University of Washington, Seattle, in an accompanying editorial.

"Future research is needed to determine whether infants and toddlers with vitamin D levels of 20 nanograms per milliliter or lower are at significant short- or long-term risk for other bone disease or different conditions," Dr. Taylor writes. "Pending this research, the recommendations by Gordon et al that all young children should receive vitamin D supplementation and that children with risk factors should have periodic vitamin D levels obtained may be premature."

(Arch Pediatr Adolesc Med. 2008;162[6]:583-584. Available pre-embargo to the media at www.jamamedia.org.)

MIT confirms link between inflammation, cancer

Chronic stomach inflammation damages DNA, increasing cancer risk

Chronic inflammation of the intestine or stomach can damage DNA, increasing the risk of cancer, MIT scientists have confirmed. The researchers published evidence of the long-suspected link in the June 2 online issue of the Journal of Clinical Investigation (JCI).

In two studies, the researchers found that chronic inflammation accelerated tumor formation in mice lacking the ability to repair DNA damage.

"It's something that was expected but it was never formally proven," said Lisiane Meira, research scientist in MIT's Center for Environmental Health Sciences (CEHS) and lead author of the paper.

The results of this work suggest that people with decreased ability to repair DNA damage might be more susceptible to developing cancer associated with chronic inflammation such as ulcerative colitis, Meira said.

Inflammation caused by infectious agents such as Helicobacter pylori and Hepatitis C is known to increase the risk of stomach and liver cancers, respectively. Researchers have long known that inflammation produces cytokines (immune response chemicals that encourage cell proliferation and suppress cell death), which can lead to cancer.

In addition, it was suspected that another effect of the inflammation pathway could also induce cancer. During the inflammatory response to infection, immune cells such as macrophages and neutrophils release reactive oxygen and nitrogen species that can damage DNA.

Under normal circumstances, the DNA damage induced during an inflammatory response is repaired by

DNA repair systems. But, if the DNA repair system is not functioning properly, that damage can induce mutations that can lead to cancer, according to the new study.

Every individual has variations in the effectiveness of their DNA repair systems, which could help doctors figure out which patients are most susceptible to inflammation-induced cancers.

"That variation could influence the susceptibility of individuals and how they are going to respond to a chronic inflammation response," said Leona Samson, senior author of the study and director of the CEHS.

In the JCI study, the researchers induced colon inflammation in the mice by treating them with a chemical compound that creates a condition similar to human colitis. "Lo and behold, the DNA repair deficient mice were more susceptible" to cancer, said Meira.

To show that this is a general phenomenon, the team did a second study, in collaboration with another CEHS member, James Fox, director of the Division of Comparative Medicine at MIT, and one of his students, Chung-Wei Lee. They showed that mice infected with H. pylori, who also lacked the proper DNA repair mechanisms, were more susceptible to pre-cancerous lesions in the stomach.

This study is related to another recent paper published by Fox, which found that treating H. pylori infection early with antibiotics can prevent cancer development. The new study suggests that if H. pylori goes untreated, patients with poorly functioning DNA repair mechanisms would have a greater risk of developing cancer.

Other CEHS faculty involved in the JCI report were Peter Dedon and David Schauer. The research was funded by the National Institutes of Health.

Men fighting over women? It's nothing new, suggests research

Men may usually settle it over a drunken brawl in the pub or perhaps a verbal spat – but new evidence has shown for the first time that fighting over women in prehistoric times could have been worse than that.

A mass grave of skeletons investigated by Durham University-led researchers suggests that neighbouring tribes from prehistoric times were prepared to brutally kill their male rivals to secure their women.

The research, described in the academic journal Antiquity, focused on thirty four skeletons found buried in the village of Talheim in the south-west of Germany. Genetic evidence inferred from the skeletons' teeth suggests they were of people killed in an attack between rival tribes around 5000 BC.

The researchers found that, although there were adult females among the immigrant skeletons, within the local group of skeletons there were men and children only. They conclude the absence of local females indicates that they were spared execution and captured instead which may have indeed been the primary motivation for the attack.

Lead author Dr Alex Bentley from Durham University's Anthropology Department said: "It seems this community was specifically targeted, as could happen in a cycle of revenge between rival groups. Although resources and population were undoubtedly factors in central Europe around that time, women appear to be the immediate reason for the attack.

"Our analysis points to the local women being regarded as somehow special and were therefore kept alive."

The Durham University-led team, with researchers from University College London, University of Wisconsin and a German government body, came to their conclusions after analysing the strontium, carbon and oxygen isotopes signatures of the skeletons' teeth. These give vital information about the skeletons' geological origin and diet.

There have been many witness accounts of fighting over women in the last hundred years but most archaeological evidence points to violence erupting over resources, overcrowding and property. The archaeological findings from this study for the first time strongly suggest violence took place over mates as early as prehistoric times, according to the scientists.

The skeletons from the mass grave in Talheim, which were excavated in the 1980s, were all buried in a single pit of three metres long. The deliberateness of the prehistoric attack was first realised when German skeletal experts determined that the majority had been killed by a blow to the left side of the head, suggesting the victims were bound and killed, probably with a stone axe. Others may have been killed from arrow-wounds from behind as if the victims had tried to flee.

The research was funded primarily by the Leverhulme Trust, with support from the National Science Foundation.

Knowing looks: Using gaze aversion to tell when children are learning

People use eye contact in a variety of ways every minute of every day but how often do you find yourself staring into space with concentrating on an issue or problem? Psychologists now know that people who are carrying out a complex task tend to look away from anyone else who is nearby. They refer to it as 'gaze aversion'.

Now they are finding out how to use changes in a child's gaze aversion to understand their educational progress. A group led by Dr Gwyneth Doherty-Sneddon at the University of Stirling, and funded by Economic

and Social Research Council, has looked at gaze aversion in both children and adults.

They found that children aged 4-6 are more likely to avert their gaze when they are carrying out a task that they find difficult, or new to them. They also avert their gaze less if they are being tested by someone they know.

When observing 5-8 year-olds, the researchers found that gaze aversion is related to the complexity of the task being undertaken, rather than to other stimuli. The results were consistent for a variety of settings and for a range of tasks, such as balancing a beam with asymmetrical loads.

Dr Doherty-Sneddon said: "These results are important because they show that children avert their gaze when they are trying to carry out a task which is difficult or with which they are not yet familiar. In our most recent work we have investigated whether gaze aversion is associated with transitional knowledge states. That means that gaze aversion is a useful thing for teachers, carers and parents to know about."

She says that, from the point of view of the teacher, gaze aversion is a positive sign. A child who is doing it is likely to be developing their understanding and is what Dr Doherty-Sneddon terms an "improver". By contrast, children who are not improving their performance, or who are regressing, use gaze aversion less often.

Keeping an eye on gaze aversion is especially valuable for teachers and social workers who are trying to understand the mental state of people with: Autistic spectrum disorders (ASD); Attention Deficit Hyperactivity Disorder (ADHD); or Williams Syndrome, the genetic condition popularly called Cocktail Party Syndrome. "People with Williams Syndrome have been characterised as being hypersociable and using excessive amounts of eye contact, which is an interesting contrast to people with autism. Our gaze aversion work promises to provide new and important insights into the mental and social functioning of such groups" says Dr Doherty-Sneddon.

FOR FURTHER INFORMATION, CONTACT: Dr Gwyneth Doherty-Sneddon, University of Stirling on Tel: 01786 467653; e-mail: Gwyneth.doherty-sneddon@stir.ac.uk NOTES FOR EDITORS:

1.The research project 'Children's Eye Gaze: Associated Cognitive and Physiological States' was funded by the Economic and Social Research Council and carried out by Dr Gwyneth Doherty-Sneddon from the University of Stirling.

2.Methodology: The recently completed work at Stirling University involved working with over 230 children and young people from 5 years of age to early adulthood. A range of methods were used including measures of physiologicial arousal as well as learning and problem solving tasks.

New fingerprint breakthrough by forensic scientists

University of Leicester and Northamptonshire Police research reveals new techniques for identifying prints on metal

Forensic scientists at the University of Leicester, working with Northamptonshire Police, have announced a major breakthrough in crime detection which could lead to hundreds of cold cases being reopened.

The University's Forensic Research Centre has been working with Northamptonshire Police's scientific support unit to develop new ways of taking fingerprints from a crime scene.

Researchers in the University Department of Chemistry and the Police's scientific support unit have developed the method that enables scientists to 'visualise fingerprints' even after the print itself has been removed. They conducted a study into the way fingerprints can corrode metal surfaces. The technique can enhance – after firing– a fingerprint that has been deposited on a small calibre metal cartridge case before it is fired.

Dr John Bond, Honorary Fellow at the University of Leicester and Scientific Support Manager at Northamptonshire Police said: "For the first time we can get prints from people who handled a cartridge before it was fired."

"Wiping it down, washing it in hot soapy water makes no difference - and the heat of the shot helps the process we use. "The procedure works by applying an electric charge to a metal - say a gun or bullet - which has been coated in a fine conducting powder, similar to that used in photocopiers.

"Even if the fingerprint has been washed off, it leaves a slight corrosion on the metal and this attracts the powder when the charge is applied, so showing up a residual fingerprint.

"The technique works on everything from bullet casings to machine guns. Even if heat vaporises normal clues, police will be able to prove who handled a particular gun."

Dr. Bond's initial findings, which prompted the joint study, have been announced in a paper in the American Journal of Forensic Science.

Professor Rob Hillman of the Department of Chemistry added: "It is very satisfying to see excellent fundamental science being applied to a practical problem. We are delighted to have the opportunity to collaborate with Dr. Bond and his colleagues and we look forward to some very exciting chemistry and its application to forensic science."

As a result of the research, cases dating back decades could be reopened because the underlying print never

disappears, say the scientists. The technique also works in cases where prints may be left on other metals.

Dr Bond added: "It's certainly possible hundreds of cold cases could be reopened because with this method the only way to avoid a fingerprint being detected is through abrasive cleaning as that takes a layer off the metal.

Dr Emma Palmer, Director of the Forensic Research Centre said: "This collaboration between the University of Leicester and Northamptonshire Police is an excellent example of applying research to a practical problem in crime detection."

Dr Bond and Professor Rob Hillman of the Chemistry Department at the University now intend to take this research forward via a three-year Ph.D. studentship to commence next academic year. The new project will explore further the corrosion of metal by fingerprint residue and investigate how it might be used to detect more crime with forensic science.

Note to newsdesk: *For more information, please contact Dr John Bond via University of Leicester press office: 0116 252 3335 Please cite University of Leicester and Northamptonshire Police in any report.*

Smallest planet weighs just three Earths

* 19:17 02 June 2008
* NewScientist.com news service
*** Michael Brooks**

Astronomers have discovered a planet about as massive as three Earths, orbiting an object smaller than our Sun.

The chilly planet orbits its brown dwarf parent in this artist's conception **(Illustration: Exoplanet Exploration Program/NASA)**

Even smaller exoplanets have been found previously around stellar corpses called neutron stars. But this is the lightest planet ever found orbiting a star in the prime of its life.

In fact, the host star itself is very lightweight, and is thought to be a brown dwarf weighing between 6 and 8% as much as the Sun. Brown dwarfs are more massive than planets but not massive enough to sustain nuclear reactions in their cores, as normal stars do.

"Our discovery indicates that even the lowest-mass stars can host planets," David Bennett of the University of Notre Dame, who led an international team of astronomers to the discovery, said on Monday at the American Astronomical Society meeting in St Louis, Missouri, US.

The planet, dubbed MOA-2007-BLG-192Lb, is around 3000 light years from Earth. Planet formation theory suggests it is made mostly of rock and ice.

It orbits its star at about the same distance that Venus orbits the Sun, although it is likely to be much colder than Pluto because its host star is a brown dwarf.

Small host

The host's small size implies that NASA's James Webb Space Telescope, due to launch in 2013, could explore any such planetary systems that are found relatively close by, bringing the search for alien life much closer to home.

"If someone can find planets like these, we're certainly hoping to be able to find out about them – and the smaller the host star's mass, the better for us," John Mather of NASA's Goddard Space Flight Center, Nobel Laureate and senior project scientist for the JWST, told New Scientist.

A smaller star makes the transit of a planet easier to see, giving a better chance to measure the chemical composition of the atmosphere – a key part of finding the signs of life.

Bent light

Bennett's team made their discovery through a phenomenon called gravitational microlensing. This relies on analysing the way the host star bends light coming from another, more distant star. The presence of a planet can further distort the light.

Performing such observations is notoriously difficult, but made possible in this instance thanks to the sensitivity of the Microlensing Observations in Astrophysics (MOA) II telescope in New Zealand.

It has been independently confirmed by observations at the Very Large Telescope (VLT) in Chile. Bennett is confident that the microlensing technique is just beginning to come into its own, and could be the first method that detects an Earth-sized planet. *Journal reference Astrophysical Journal (in press)*

New, flexible computers use displays with any shape

Computers of the future will change shape, respond to touch and physics, and fold into your pocket, says Queen's prof

(Kingston, ON) – The shape of things to come in the computer world will be anything but flat, predicts Queen's University Computing professor Roel Vertegaal, who is now developing prototypes of these new "non-planar" devices in his Human Media Laboratory.

Not only will they take on flexible forms we've never imagined – like pop cans with browsers displaying RSS feeds and movie trailers – computers of the future will respond to our direct touch and even change their own shape to better accommodate data, for example, folding up like a piece of paper to be tucked into our pockets.

"Organic User Interface" – the concept behind these next-generation computers – is featured in the June issue of the Association of Computer Machinery's (ACM) flagship publication, Communications of ACM. The special edition is co-edited by Drs. Vertegaal and Ivan Poupyrev, of the Sony Interaction Laboratory in Tokyo, Japan (www.organicui.org).

Interactive disposable computer on a Coke can, developed in Queen's University's Human Media Laboratory.

"What we're talking about here is nothing short of a revolution for human-computer interaction," says Dr. Vertegaal. He compares our current use of flat, rectangular computers to the 19th-century satiric novel, Flatland: A Romance of Many Dimensions, about people who live in only two dimensions and are narrow-minded as a result. "I think computers are very much like that today," Dr. Vertegaal suggests. "You are essentially looking at a tiny tunnel into a flat, on-line world, and that causes people to think in a two-dimensional way. 'Flatland' interfaces are incredibly limited compared to natural 3D ones."

Three recent developments in computer technology have allowed inventors to move beyond the rigid, rectangular design of current devices. Advances in touch input technologies now allow for any surface to sense two-handed, multi-finger touch. An example of this is smart fabric, such as the "tank top" user interface being tested in Dr. Vertegaal's laboratory this summer.

The second development, flexible displays, is found in flexible circuit boards with organic LEDs (light emitting diodes) used to make electronic paper. These "E-Ink" (electrophoretic ink) displays are formed from millions of tiny, polarized ink capsules, half black and half white. A computer switch sends out minus or plus voltages and the ink will either attract or repel to form a display. Once the display is "painted" the electricity can be switched off. The flexible base layer allows the display to be rolled up and put inside one's pocket, like regular paper.

Kinetic Organic Interface (KOI), the third development, enables the design of computers that adjust their shape according to some computational outcome, or through interactions with users. This is expected to yield "Claytronic" 3D displays capable of displaying not just pictures, but physical shapes in three dimensions.

"We want to reduce the computer's stranglehold on cognitive processing by imbedding it and making it work more and more like the natural environment," says Dr. Vertegaal. "It is too much of a technological device now, and we haven't had the technology to truly integrate a high-resolution display in artifacts that have organic shapes: curved, flexible and textile, like your coffee mug."

A prototype paper computer developed in Queen's Human Media Laboratory uses leaf turns to navigate documents.

Other OUI projects from Queen's Human Media Lab (see www.humanmedialab.org) include:

* The world's first completely foldable paper computer, which allows users to move up or down in a document by folding or turning the pages – a much more natural experience than using a laptop.
* An interactive Coke can with a cylindrical display that plays videos on its surface and responds to touch. All the electronics can be detached and recycled separately from the aluminum.
* A work bench for gadget design that simulates a real computer on ordinary objects of arbitrary shape, like a sheet of paper or a piece of Styrofoam. When displays are projected onto the surface of the paper or Styrofoam, it instantly becomes a computer.

The third project is useful for the design of new gadgets, but could also allow hardware to be downloaded from an on-line store, avoiding the wasteful purchase of new atoms, Dr. Vertegaal notes in his article. "That would be a final frontier in the design of computer interfaces that turn the natural world into software, and software into the natural world."

Physicists at CCNY determine density limit for randomly packed spherical materials

NEW YORK, June 2, 2008 – The problem of how many identical-sized spheres can be randomly packed into a container has challenged mathematicians for centuries. A team of physicists at The City College of New York

(CCNY) has come up with a solution that could have implications for everything from processing granular materials to shipping fruit.

Writing in the May 29 edition of "Nature," they demonstrate that random packing of hard, i.e. non-crushable, spheres in three dimensions cannot exceed a density limit of 63.4 percent of the volume. This upper limit is a consequence of a completely "jammed" state that occurs when the materials are at their lowest energy levels, i.e. as close to inert as possible.

"Theoretically, the jammed state would be achieved by lowering the temperature of the spheres to approach absolute zero, since this would cause them to contract," explained Dr. Hernán Makse, CCNY Associate Professor of Physics and principal investigator. "In real life, however, it is attained by shaking the materials."

The findings have potential applications for the manufacture of pharmaceuticals and cosmetics, where powders have to be mixed to a homogenous consistency, he said. Currently, manufacturers must rely on empirical data, i.e. trial and error, to establish their formulas. Professor Makse said his goal is to develop a theory of powders that could enable manufacturers to more efficiently develop new products.

Two of Professor Makse's Ph.D. students, Chaoming Song and Ping Wang, collaborated with him on the investigation. Mr. Song completed his degree requirements in 2007.

Expressing feelings after trauma not necessary, research shows

Resources may be wasted when psychological counseling services are ordered following terrorist attacks, school shootings

Irvine, Calif., June 2, 2008 Talking it out has long been considered essential to recovering from a trauma. But new research shows that expressing one's thoughts and feelings after a traumatic event is not necessary for long-term emotional and physical health, a finding that could change the way institutions devote money and resources to mental health services following collective traumas.

The study, led by UC Irvine psychologist Roxane Cohen Silver, looked at the relationship between immediate expression after a traumatic event and mental and physical well-being over time among a nationally representative sample. Study participants were questioned following the terrorist attacks of Sept. 11, 2001.

Silver and colleagues say participants who chose not to express thoughts and emotions about the attacks when given the opportunity to do so through an anonymous, Web-based survey, appeared to cope successfully and reported fewer diagnosed physical and mental disorders. In contrast, individuals who communicated their thoughts and feelings about the attacks reported more physical health problems and emotional distress over time, even after controlling for exposure to and distance from the attacks. The study followed participants over a two-year period. It appears in the June issue of the American Psychological Association's Journal of Consulting and Clinical Psychology.

The results have important implications for understanding the role of expression in the coping process and for early post-trauma intervention, according to Silver.

"Some people don't need to express thoughts and feelings after trauma and do just fine, and it's a myth that you must express your distress in order to recover," Silver said. "Mandatory or required psychological counseling is often unwarranted and universal intervention is likely to be a waste of resources."

A standard and universal approach to trauma counseling can result in misappropriation of resources away from individuals who are truly at risk, she said. It also may interfere with the natural coping processes that take place when individuals seek support and advice from family and close friends.

"This study also shows how dangerous it can be to rely on hunches and common sense when attempting to provide intervention after a trauma experienced by a large group of people, such as the 9/11 attacks, but it can also be applied to situations like school shootings," she said.

Researchers analyzed data from a Web-based survey sent to 36,000 participants who received e-mails with an open-ended prompt asking them to share their thoughts about the events of Sept. 11. Nearly 14,000 people responded, and researchers followed a number of these individuals – as well as some of those who chose not to respond – in the years following the attacks. They collected information about physician-diagnosed physical and mental health ailments over two years.

The researchers caution that the higher rates of illness among those who did respond should not be interpreted to mean that expressing thoughts and feelings is harmful. People who want to talk should still do so, but they say it is important to remember that not everyone copes in the same way, and in the immediate aftermath of a collective trauma it is perfectly healthy not to want to express thoughts and feelings.

Silver conducted the study with Alison Holman of the Program in Nursing Science at UCI; Mark D. Seery of the State University of New York at Buffalo; and Whitney A. Ence and Thai Q. Chu of the University of California, Santa Barbara.

Friends by Chance?

The actor Sir Peter Ustinov once famously said “Contrary to general belief, I do not believe that friends are necessarily the people you like best, they are merely the people who get their first.” Psychologists now believe there is some truth to this argument. Rather than picking our friends based on intentional choice and common values and interests, our friendships may be based on more superficial factors like proximity (think neighbors) or group assignments (your department at work).

Mitja Back, Stefan Schmukle, and Boris Egloff of the University of Leipzig sought to test the notion that random proximity and random group assignment at zero acquaintance would foster friendship in the long run. The researchers investigated 54 college freshmen upon encountering one another for the first time at the beginning of a one-off introductory session and randomly assigned them a seat number in a group of chairs organized in rows.

As reported in a recent issue of Psychological Science, a journal of the Association for Psychological Science, sitting in neighboring seats as a result of randomly assigned seat numbers when meeting for the first time led to higher ratings of friendship intensity one year later. The same was true even if participants were merely in the same row.

The counterintuitive finding suggests that friendships may not be as deliberate we think. “In a nutshell,” write the authors, “people may become friends simply because they drew the right random number.”

Author Contact: Mitja D. Back mback@uni-leipzig.de

Aggression between nursing-home residents more common than widely believed, studies find

By Sheri Hall

When people hear about elder abuse in nursing homes, they usually think of staff members victimizing residents. However, research by Cornell faculty members suggests that a more prevalent and serious problem may be aggression and violence that occurs between residents themselves.

Although such aggression can have serious consequences for both aggressors and victims, the issue has received little attention from researchers, and few proven solutions exist to prevent resident altercations, says Karl Pillemer, director of the Cornell Institute for Translational Research on Aging at the College of Human Ecology. He has co-authored two articles -- in Aggression and Violent Behavior and in the Journal of the American Geriatrics Society -- on "resident-to-resident mistreatment" this spring with Weill Cornell Medical College professor of medicine Mark S. Lachs, M.D., and medical student Tony Rosen. Both studies report that verbal and physical aggression between residents is common and problematic, and that more research is necessary to identify risk factors and preventative measures.

"Anyone who spends much time in a nursing home will observe arguments, threats and shouting matches among residents, as well as behaviors like pushing, shoving and hitting," Pillemer said.

"Given that nursing homes are environments where people live close together, and many residents have lowered inhibitions because of dementia, such incidents are not surprising," he said. "Because of the nature of nursing home life, it is impossible to eliminate these abusive behaviors entirely, but we need better scientific evidence about what works to prevent this problem."

The studies found 35 different types of physical and verbal abuse between residents at a large urban nursing home. Screaming was the most common form of aggression, followed by such physical violence as pushing and punching or fighting.

In related work, the authors found that 2.4 percent of residents reported personally experiencing physical aggression from another resident and 7.3 percent reported experiencing verbal aggression over just a two-week period. Most respondents rated the events as moderately or extremely disruptive to daily activities.

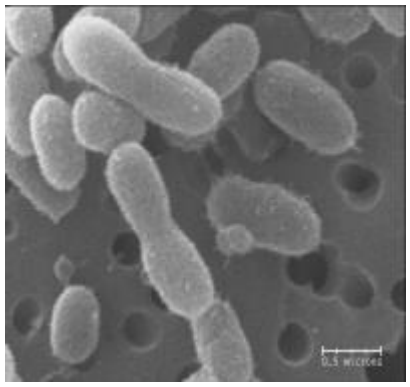
In another study, 12 nurse-observers identified 30 episodes of resident-to-resident aggression on just a single eight-hour shift, 17 of which were physical. Research also indicates that victims are more likely to be male, have behavioral problems like wandering and be cognitively impaired.

While such incidents are difficult to prevent, these types of studies will help nursing-home staff manage aggression among patients, Pillemer said.

"At present, staff have few solutions available to them and typical interventions in the nursing home may have negative consequences for aggressive residents, including the use of psychotropic medications or isolation of the resident," said Lachs, co-chief of geriatrics at Weill Cornell. "We hope our work will help inspire a vigorous search for programs that work to prevent aggression and violence among residents in long-term care."

Sheri Hall is assistant communications director for the College of Human Ecology.

A survivor in Greenland: A novel bacterial species is found trapped in 120,000-year-old ice



A team of Penn State scientists has discovered a new ultra-small species of bacteria that has survived for more than 120,000 years within the ice of a Greenland glacier at a depth of nearly two miles. The microorganism's ability to persist in this low-temperature, high-pressure, reduced-oxygen, and nutrient-poor habitat makes it particularly useful for studying how life, in general, can survive in a variety of extreme environments on Earth and possibly elsewhere in the solar system. The work will be presented by Jennifer Loveland-Curtze, a senior research associate in the laboratory led by Jean Brenchley, Professor of Biochemistry and Molecular Biology at Penn State, at the 108th American Society for Microbiology General Meeting in Boston, Massachusetts on 3 June 2008 at 10:30 a.m. (Extreme Environments-I, poster N-156).

A scanning electron microscope image of the Chryseobacterium greenlandensis bacteria found in a Greenland glacier.
Jennifer Loveland-Curtze, Penn State

This new species is among the ubiquitous, yet mysterious, ultra-small bacteria, which are so tiny that the cells are able to pass through microbiological filters. In fact, some species have been found living in the ultra-purified water used for dialysis. "Ultra-small cells could be unknown contaminants in media and medical solutions that are thought to have been sterilized using filters," said Loveland-Curtze.

The ultra-small size of the new species could be one explanation for why it was able to survive for so long in the Greenland glacier. Called Chryseobacterium greenlandensis, the species is related genetically to certain bacteria found in fish, marine mud, and the roots of some plants. The organism is one of only about 10 scientifically described new species originating from polar ice and glaciers.

To study the bacterium in the laboratory, the research team, which also includes Senior Research Associate Vanya Miteva, filtered the cells from melted ice and incubated them in the cold in low-nutrient, oxygen-free solutions. The scientists then characterized the genetic, physiological, biochemical, and structural features of the species. The team hopes that its studies of this species, as well as others living in the Greenland glacier, will reveal more about how cells survive and how they may alter their biochemistry and physiology over time. "Microbes comprise up to one-third or more of the Earth's biomass, yet fewer than 8,000 microbes have been described out of the approximately 3,000,000 that are presumed to exist," said Loveland-Curtze. "The description of this one species is a significant step in the overall endeavor to discover, cultivate, and use the special features held by these organisms."

This research was supported by the National Science Foundation, the United States Department of Energy, and the National Aeronautics and Space Administration.

Heart failure patients miscalculate life expectancy

DURHAM, N.C. – Many patients with heart failure – especially younger ones and those with more severe disease – significantly overestimate how long they going to live, say Duke University Medical Center researchers.

“It’s a bit of a puzzle,” says Dr. Larry Allen, a cardiologist at Duke and the lead author of the study. “As physicians, we know how important it is to talk with our patients about end of life issues, but this study suggests we may need to take another look at how we might do that better."

The research showed that among 122 patients with heart failure enrolled in the Duke University Heart Failure Disease Management Program, the patients, on average, believed the would live about 40 percent longer than what accepted survival models predicted.

The study appears in the June 4 issue of the Journal of the American Medical Association

While the reasons underlying the phenomenon aren’t clear, scientists say the finding may hold important implications about options such as high-end medical devices, transplantation or palliative care – important decisions that have enormous impact on patients’ quality of life and clinical outcomes.

According to the American Heart Association, about five million people in the United States have heart failure, a condition in which the heart becomes weak and is no longer able to pump as much blood as the body needs. Despite advances in treatment options, the prognosis for patients with symptomatic heart failure is grim: Median life expectancy is less than five years.

Michael Felker, M.D., the senior investigator of the study and a member of the Duke Clinical Research Institute, says the finding is important on many levels.

“With the increasing availability of potentially life-saving but costly therapies, patients need to be fully aware of their prognosis in order to make appropriate decisions about their care. Our data suggest that is not happening, and that many heart failure patients do not have an accurate understanding of their likely survival,”

says Felker.

When researchers asked the patients to address the eventual outcome of their disease, 9 percent said they thought they would be cured, 51 percent said they thought they would have normal life expectancy and 36 percent said they thought heart failure would shorten their lives.

On average, the patients said they thought they would live an additional 13 years. But the widely accepted Seattle Heart Failure Model suggested that the patients would only live an additional 10 years, on average. Patient predictions were highly variable, ranging from 1 to 54 years, and had almost no correlation with individual model predictions.

The data showed that patients appeared to predict their life expectancy without regard to the severity of their illness; those with advanced disease were just as likely to predict a longer than expected life as those with less severe disease. The researchers also found that prior discussions with their clinicians (only about a third of them had talked with a clinician about their prognosis) didn't seem to make any difference in the degree to which they were able to realistically predict outcomes. They also discovered that there was no relationship between a higher estimate of longevity and improved survival.

"Even though we didn't find any difference between patients who had spoken with their caregivers about end of life and those that had not, that doesn't mean that better communication wouldn't help change things," says Allen. "Patients are only able to take in so much information at one time. Maybe we need to revisit end of life issues several times over and check in to make sure important messages are not just stated, but understood, as well. It's a very complex issue, and one that needs more study."

Researchers from Duke who contributed to the study include James Tulsky, Christopher O'Connor, Margaret Bowers and Gwen Dodson. Additional co-authors include Wayne Levy, of the University of Washington, who developed the Seattle Heart Failure Model; Jonathan Yager, from Cardiac Care Associates in Fairfax, Va.; and Michele Jonsson Funk from the University of North Carolina at Chapel Hill.

Antibacterial wipes can still spread bacteria

A new study by a team of researchers at the Welsh School of Pharmacy, Cardiff University, Wales, UK, has found that antimicrobial-containing wipes currently used to decontaminate surfaces in hospitals can spread pathogens after first use. The research highlights concerns as to the suitability of the wipes currently being deployed and the importance of a routine surveillance program in reducing risks of infection to patients.

The research, conducted by Dr. Gareth Williams at the Welsh School of Pharmacy, Cardiff University, Wales, UK, and supported by a grant from the Wales Office of research and Development for Health and Social Care (WORD), is being presented June 3, 2008 at the 108th General Meeting of the American Society for Microbiology (ASM) in Boston.

Antimicrobial-containing wipes are increasingly being used to decontaminate surfaces in hospitals. Many studies have reported on the ability of Staphylococcus aureus to contaminate and persist in the hospital environment. Germicides are commonly used on hard surfaces in hospitals to kill bacteria. The research posed the question – 'Are we confident that these organisms are susceptible to the germicides used in our hospitals"'

The study identified the need for a test which could thoroughly examine the ability of commonly used wipes to disinfect surfaces. As such, a robust 3-step protocol to assess the ability of wipes to remove, kill and prevent the transfer of bacteria between surfaces was subsequently developed. Using the 3-step method the study examined the ability of several commercially available wipes to disinfect surfaces contaminated with Staphylococcus aureus, including Methicillin-resistant Staphylococcus aureus (MRSA).

The results showed that some wipes can remove higher numbers of bacteria from surfaces than others. However, the wipes tested were unable to kill the bacteria that they removed. As a result, they transferred high numbers of bacteria to other surfaces. Our work suggests that if these wipes encounter highly contaminated surfaces in practice, the survival of bacteria on the wipe material could lead to the cross-contamination of other surfaces if used more than once.

Microsurgery on the brain of the fruit fly leads to new insights into irreparable nerve injuries

Leuven, Belgium – Every year, one million Europeans are confronted with potentially irreparable brain or spinal cord injuries resulting from traffic accidents. Because the nerves in a damaged spinal cord cannot, or cannot fully, be repaired, the patient remains (partially) paralyzed. Now, VIB scientists connected to the K.U. Leuven have become the first to successfully develop a simple model that enables the study of injured brain tissue. The researchers have perfected a technique for keeping the cultured brain of a fruit fly alive and healthy for a longer period of time. With the aid of microsurgery, this new technique enables scientists to inflict injury on certain nerve bundles for research purposes. By means of this new fruit fly model, the researchers have already succeeded in showing that the activation of a particular signaling pathway (JNK) induces the regeneration of

axons. This research offers positive perspectives for patients with nerve injuries that have been irreversible up to now.

Drosophila as model organism

The Drosophila melanogaster fruit fly is an important, low-cost model organism with a 60% genetic similarity to humans. The fruit fly is playing a significant role in the elucidation of various neurological processes (such as the functioning of our memory and our sense of smell) as well as in the study of certain neurodegenerative diseases (such as Alzheimer's disease). Until recently, scientists could only use model organisms belonging to the vertebrates (e.g., the mouse) to study injuries to the nervous system and the possibility of regenerating damaged axons. However, the fruit fly model is more user-friendly and allows faster, large-scale genetic analyses.

The fruit fly brain in culture

Although the fruit fly model is used for numerous diseases, until now it has not been possible to study the repair of damaged axons with fruit flies. Indeed, the fruit fly's brain is difficult to access due to the fly's external skeleton, which prevents reproducible, physical manipulations of the living brain. Under the direction of VIB researcher Bassem Hassan, and in collaboration with international experts, Derya Ayaz, Maarten Leyssen and their colleagues have now developed a new technique in which the fruit fly's entire brain is cultured, enabling long-term experimentation (i.e., manipulation and observation) on the living fruit fly brain.

Fruit fly brain as model for studying damaged nerve bundles

The researchers have used this new technique explicitly to develop a fruit fly model for the regeneration of axons after injury. With the aid of micro-dissection, the researchers inflicted injuries on the nerve fibers and then studied them for several days. As is the case for humans, the regeneration of damaged nerve bundles in fruit fly brains is as good as non-existent.

In a next step, the researchers are using this new model to study which molecular processes might be able to promote this regeneration. They have already demonstrated that activation of the JNK signaling pathway positively influences the repair of nerve bundles. JNK activation not only stimulates the growth of the severed nerves but the nerves also grow correctly in the direction of their original target region in the brain.

Perspectives for the future

In the future, this new model can be used to identify new molecules that are involved in the repair of damaged nerve bundles. These molecules will then be candidate molecules for further research with humans, and they can possibly form the basis of new treatments for patients with a nerve injury that has been irreparable up to now.

Honeybee dance breaks down cultural barrier

CANBERRA, AUSTRALIA – Asian and European honeybees can learn to understand one another's dance languages despite having evolved different forms of communication, an international research team has shown for the first time. The findings are published this week in the journal PLoS ONE.

The nine species of honeybees found worldwide separated about 30 to 50 million years ago, and subsequently developed different dance 'languages'. The content of the messages is the same, but the precise encoding of these languages differs between species.

Now researchers from Australia, China and Germany have discovered that the two most geographically distant bee species – the European honeybee Apis mellifera and the Asian honeybee Apis cerana – can share information and cooperate to exploit new food sources.

'We know that the members of a honeybee colony routinely exchange information via dance about the location of newly discovered locations, like feeding places, water or new nesting sites," explains Dr Shaowu Zhang from the Research School of Biological Sciences at The Australian National University.

"The scouts perform the so-called bee dances inside the nest. The coordinates of distant locations are encoded in the waggle phase of this ballet, with the direction and distance to the food source indicated by the orientation and duration of the dance. This duration differs across honeybee species, even if they fly the same distance in the same environment. It's these differences which we can think of as distinct languages."

The research team is the first to successfully study the behaviour of a colony containing a mixture of two different species of bees. One of the first findings of this novel approach was that Asian and European honeybees, after some time of adjustment in the mixed colony, could share information and work together to gather food. Asian honeybees followed the dances of European forager bees, and deciphered the encoded information correctly.

"The dance language of honeybees is among the best studied communication systems in the animal kingdom. Nevertheless, surprises are still possible, as we have shown," Dr Zhang said. "This work has potentially major implications for our understanding of animal communication. Next we plan to study exactly to what extent

variation is a factor between different bee dance languages."

The research was carried out by an international collaborative team. In addition to the work done at ANU, the research team included Dr Shenglu Chen and Songkun Su from Zhejiang University in China and Dr Jürgen Tautz from Würzburg University in Germany.

Parasitoid turns its host into a bodyguard

There are many examples of parasites that induce spectacular changes in the behaviour of their host. Flukes, for example, are thought to induce ants, their intermediate host, to move up onto blades of grass during the night and early morning. There, they firmly attach themselves to the substrate with their mandibles, and are thus consumed by grazing sheep, the fluke's final host. In contrast, uninfected ants return to their nests during the night and the cooler parts of the day. As another example, terrestrial insects parasitized by hairworms commit suicide by jumping into water, where the adult worms reproduce.

Behavioural changes like these are thought to be induced by the parasite so as to increase its transmission to the final host, but there are alternative explanations. It is possible, for example, that the hosts already behaved differently before becoming infected. Hence, infection is a consequence of different behaviour, not its cause. Increased transmission can also be called into question: the behavioural changes of the host may result in increased attacks by other non-host animals, and this would seriously decrease the probability of transmission. Increased transmission should therefore always be tested under natural conditions.

In a recent publication in the online, open-access journal PLoS ONE, a research team from University of Amsterdam, the Netherlands, and the Federal University of Viçosa, Brazil, led by Arne Janssen, now offer evidence that behavioural changes of a host are indeed beneficial to the parasite in the field. In research supported by WOTRO, carried out in Brazil, they studied a moth, the caterpillars of which feed on leaves of the native guava tree and on an exotic eucalyptus. Small caterpillars are attacked by an insect parasitoid wasp, which then quickly inserts up to 80 eggs into it.

Inside the caterpillar host, a cruel drama takes place: the eggs of the parasitoid hatch and the larvae feed on the body fluids of the host. The caterpillar continues feeding, moving and growing like its unparasitized brothers and sisters. When the parasitoid larvae are full-grown, they emerge together through the host's skin, and start pupating nearby. Unlike many other combinations of host and parasitoid, the host remains alive but displays spectacular changes in its behaviour: it stops feeding and remains close to the parasitoid pupae (see photo). Moreover, it defends the parasitoid pupae against approaching predators with violent head-swings (see movies of predatory bug attack in the article at PLoS ONE).

A caterpillar of the geometrid moth Thyrinteina leucocerae with pupae of the Braconid parasitoid wasp Glyptapanteles sp. Full-grown larvae of the parasitoid egress from the caterpillar and spin cocoons close by their host. The host remains alive, stops feeding and moving, spins silk over the pupae, and responds to disturbance with violent head-swings (supporting information). The caterpillar dies soon after the adult parasitoids emerge from the pupae.
Photograph by Prof. José Lino-Neto.

The caterpillar dies soon after the adult parasitoids emerge from their pupae, so there can be no benefit whatsoever for the caterpillars. In contrast, unparasitized caterpillars do not show any of these behavioural changes, but continue feeding and developing into adults. The research team found that, in the field, parasitoid pupae which were guarded by caterpillars suffered half as much predation as those which had no bodyguard. Hence, the behavioural changes of the host result in increased survival of the parasitoids due to the host that acts as a bodyguard of the parasitoid pupae.

Whereas it is still unclear how the parasitoid changes the behaviour of its host, it is tempting to speculate. The research team found that one or two parasitoid larvae remained behind in the host. Perhaps these larvae affect the behaviour of the caterpillar, and sacrifice themselves for the good of their brothers and sisters.

Grosman AH, Janssen A, de Brito EF, Cordeiro EG, Colares F, et al. (2008) Parasitoid Increases Survival of Its Pupae by Inducing Hosts to Fight Predators. PLoS ONE 3(6): e2276. doi:10.1371/journal.pone.0002276
The correct URL is http://www.plosone.org/doi/pone.0002276 [This appears in the section: (URL live from June 4): http://www.plosone.org/doi/pone.0002276]

Movie S1. A parasitized caterpillar, bent over the parasitoid pupae that have egressed from it, defends itself and the parasitoid

pupae against a predator with violent head-swings, resulting in the predator being knocked off the twig. (2.59 MB WMV) **Movie S2.** A non-parasitized caterpillar hardly responds to a predator (1.43 MB WMV)

Agent in red wine found to keep hearts young

MADISON - How, scientists wonder, do the French get away with a clean bill of heart health despite a diet loaded with saturated fats?

The answer to the so-called "French paradox" may be found in red wine. More specifically, it may reside in small doses of resveratrol, a natural constituent of grapes, pomegranates, red wine and other foods, according to a new study by an international team of researchers.

Writing this week (June 3) in the online, open-access journal Public Library of Science One, the researchers report that low doses of resveratrol in the diet of middle-aged mice has a widespread influence on the genetic levers of aging and may confer special protection on the heart.

Specifically, the researchers found that low doses of resveratrol mimic the effects of what is known as caloric restriction - diets with 20-30 percent fewer calories than a typical diet - that in numerous studies has been shown to extend lifespan and blunt the effects of aging.

"This brings down the dose of resveratrol toward the consumption reality mode," says senior author Richard Weindruch, a University of Wisconsin-Madison professor of medicine and a researcher at the William S. Middleton Memorial Veterans Hospital. "At the same time, it plugs into the biology of caloric restriction."

Previous research has shown that resveratrol in high doses extends lifespan in invertebrates and prevents early mortality in mice given a high-fat diet. The new study, conducted by researchers from academia and industry, extends those findings, showing that resveratrol in low doses and beginning in middle age can elicit many of the same benefits as a reduced-calorie diet.

"Resveratrol is active in much lower doses than previously thought and mimics a significant fraction of the profile of caloric restriction at the gene expression level," says Tomas Prolla, a UW-Madison professor of genetics and a senior author of the new report.

The group explored the influence of the agent on heart, muscle and brain by looking for changes in gene expression in those tissues. As animals age, gene expression in the different tissues of the body changes as genes are switched on and off.

In the new study - which compared the genetic crosstalk of animals on a restricted diet with those fed small doses of resveratrol - the similarities were remarkable, explains lead author Jamie Barger of Madison-based LifeGen Technologies. In the heart, for example, there are at least 1,029 genes whose functions change with age, and the organ's function is known to diminish with age. In animals on a restricted diet, 90 percent of those heart genes experienced altered gene expression profiles, while low doses of resveratrol thwarted age-related change in 92 percent. The new findings, say the study's authors, were associated with prevention of the decline in heart function associated with aging.

In short, a glass of wine or food or supplements that contain even small doses of resveratrol are likely to represent "a robust intervention in the retardation of cardiac aging," the authors note.

That finding may also explain the remarkable heart health of people who live in some regions of France where diets are soaked in saturated fats but the incidence of heart disease, a major cause of mortality in the United States, is low. In France, meals are traditionally complemented with a glass of red wine.

The new resveratrol study is also important because it suggests that caloric restriction, which has been widely studied in animals from spiders to humans, and resveratrol may govern the same master genetic pathways related to aging.

"There must be a few master biochemical pathways activated in response to caloric restriction, which in turn activate many other pathways," explains Prolla. "And resveratrol seems to activate some of these master pathways as well."

The new findings, according to Weindruch and Prolla, provide strong evidence that resveratrol can improve quality of life through its influence on the different parameters of aging such as cardiac function. However, whether the agent can extend lifespan in ways similar to caloric restriction will require further study, according to the new report's authors.

The work of the Wisconsin team was funded by grants from the National Institutes of Health and DSM Nutritional Products of Basel, Switzerland.

Instant messaging proves useful in reducing workplace interruption

COLUMBUS, Ohio -- Employers seeking to decrease interruptions may want to have their workers use instant messaging software, a new study suggests.

A recent study by researchers at Ohio State University and University of California, Irvine found that workers who used instant messaging on the job reported less interruption than colleagues who did not.

The study challenges the widespread belief that instant messaging leads to an increase in disruption. Some researchers have speculated that workers would use instant messaging in addition to the phone and e-mail, leading to increased interruption and reduced productivity.

Instead, research showed that instant messaging was often used as a substitute for other, more disruptive forms of communication such as the telephone, e-mail, and face-to-face conversations. Using instant messaging led to more conversations on the computer, but the conversations were briefer, said R. Kelly Garrett, co-author of the study and assistant professor of communication at Ohio State.

"The key take away is that instant messaging has some benefits where many people had feared that it might be harmful," Garrett said.

"We found that the effect of instant messaging is actually positive. People who used instant messaging reported that they felt they were being interrupted less frequently."

The study involved 912 people who worked at least 30 hours per week in an office and used a computer for at least five hours in a workday. Randomly selected participants from 12 metropolitan areas took a telephone survey between May and September 2006. The results were published recently in the Journal of Computer Mediated Communication.

The key to unlocking the effects of instant messaging lies in how people are using the technology, Garrett said.

Instead of dropping in unexpectedly, many are using the technology to check in with coworkers to see when they are available. Many also use the technology to get quick answers to general questions or to inquire about current work tasks instead of engaging in longer face-to-face conversations.

"We find that employees are quite strategic in their use of instant messaging. They are using it to check in with their colleagues to find out if they're busy before interrupting them in a more intrusive way," Garrett said.

Because of its unique setup, instant messaging allows users to control how and when they communicate with coworkers. The technology gives people the ability to flag their availability or postpone responses to a more convenient time, and because it is socially acceptable to ignore or dismiss a message, many use the technology to put off more disruptive conversations, he said.

"People see a new technology and they are innovative in how they use it. They will tailor their use of the technology to their needs and their expectations. And with IM, people had enough time to learn about the technology at home and to find ways to use it productively," Garrett said.

"It is not the case that people are engaging in extensive conversations or trying to resolve complex problems over this very limited medium. Instead, people are using the technology to solicit answers to quick questions from colleagues and coordinate their conversations at more convenient times," he said.

Ease of use and similarities to e-mail could foster greater acceptance of instant messaging in the workplace. And while the study provides clear evidence that instant messaging can be used successfully in the workplace, Garrett said the technology will not likely be as widely used as e-mail.

Garrett conducted the study with James N. Danziger, a professor of political science at the University of California, Irvine. The study was funded by the National Science Foundation and the Center for Research on Information Technology and Organizations at University of California, Irvine.

Firearm suicide and homicide rates associated with level of background check

States that perform local-level background checks for firearms purchases are more effective in reducing firearm suicide and homicide rates than states that rely only on a federal-level background check, according to a new study by researchers at the Medical College of Wisconsin in Milwaukee.

The study, led by Steven A. Sumner, B.S., a third-year medical student, and Peter Layde, M.D., professor of population health and co-director of the Injury Research Center at the Medical College, is published electronically in the May 2008 issue of the American Journal of Preventive Medicine, ahead of print.

Local-level background checks were found to be associated with a 27 percent-lower firearm suicide rate and a 22 percent-lower homicide rate in adults aged 21 years or older.

The retrospective study observed the association between the Department of Justice classification of agencies conducting firearm background checks for each state from 2002 to 2004, and firearm suicide and homicide rates for the same years from the National Center for Injury Prevention and Control.

Federal minimums for gun-control laws were established in 1993 with the passage of the Brady Handgun Violence Prevention Act. The Brady Act disqualifies any persons from purchasing firearms who are under indictment or convicted of a crime punishable by more than one year in prison. Other disqualifiers include persons who are a fugitive from the law; are unlawfully a user of a controlled substance; have been adjudicated as mentally defective or committed to a mental institution; have been dishonorably discharged from the armed services; have renounced United States citizenship; are subject to a restraining order; or have been convicted of domestic violence.

There are three entities that perform background checks for firearm purchases. The FBI, a single state agency or a local law enforcement department such as a municipal police or sheriff's office are the bodies contacted to perform background checks.

All states consult the National Instant Criminal Background Check System (NICS), which scans federal databases. This is the minimum background check that must be performed. States that use state and local checks have access to the same information available to the FBI, as well as information that is available only to state agencies.

"Depending on which agency is conducting the background check, additional records may be accessed, resulting in a more detailed and effective check," says Dr. Layde.

Federal-level background checks are used as the only level of background checks in 21 states. Seventeen states use state-level background checks in addition to the federal checks. Only 12 states rely on local-level background checks, which consult local law enforcement offices, such as a sheriff's department, in addition to the federal system. States that performed only federal-level checks saw a firearm suicide rate of 11.64 people per every 100,000 in the population. States that performed state-level or local-level checks were found to have substantially lower rates of firearm suicides, at 8.45 and 5.74 per 100,000, respectively.

A similar trend was observed with firearm homicide rates, with 4.28 per 100,000 for federal checks; 4.02 per 100,000 for state checks; and 2.81 per 100,000 for local checks.

"As with suicides, the reduction in firearm homicide rates associated with local-level background checks, if confirmed, would also have an important impact on public health and economic outcomes," says Dr. Layde. "Assaults involving a firearm are more lethal and more costly for patients and hospital systems than non-gun assaults."

"This is the first study to analyze the effects of differences among states doing background checks for firearm purchase," explains Dr. Layde. "We hope that future research will evaluate the impact of changes in the background checking process that may emerge in the next few years."

The study was funded in part by a grant from the Centers for Disease Control and Prevention.

Co-author of the study was Clare Guse, M.S., biostatistician in the Injury Research Center and the department of family and community medicine at the Medical College.

Increased Incidence of Melanoma Found in Rheumatoid Arthritis Patients Treated with Methotrexate

A chronic, inflammatory disease of unknown origin, rheumatoid arthritis (RA) affects about 1 percent of adults worldwide. Marked by joint destruction, RA often leads to disability and diminished quality of life. It can also lead to an early death from cancer. Various studies have linked RA to an increased risk of Hodgkin's and non-Hodgkin's lymphoma, leukemia, myeloma, and lung cancer. A link between methotrexate (MTX), a disease-modifying antirheumatic drug (DMARD) commonly prescribed to RA patients, and cancer has also been suggested. Numerous case reports of RA patients treated with MTX developing lymphoma and, even more strikingly, tumors disappearing when the drug was discontinued, have prompted concern that MTX itself may be carcinogenic. So far, however, studies addressing this concern have been inconclusive.

To shed further light on the cancer risk for RA patients treated with MTX, researchers in Australia, where RA affects over 2 percent of adults, studied the cancer incidence in RA patients treated with MTX by local doctors. Their findings, featured in the June 2008 issue of Arthritis Care & Research (www.interscience.wiley.com/journal/arthritis), suggest an increased risk of melanoma, as well as other malignancies, for RA patients receiving MTX.

The study focused on 459 RA patients, 309 women and 150 men, regularly seen by 1 of 6 rheumatologists based in Melbourne. All had started treatment with MTX prior to June 1986. The majority had no previous history of immunosuppressant therapy. 61 percent were rheumatoid factor positive. Researchers set out to determine the cancer incidence in these patients compared with the general population and compared with the results of published studies on the incidence of malignancy in MTX-treated RA populations in other countries. For all patients, followup started on the date they first started MTX therapy and ended on the date of their last confirmed doctor visit or death. Over the total of 4,273 person-years of followup, an average of 9.3 years per patient, 87 malignancies were identified.

Researchers then compared the cancer incidence observed among these RA patients with that of their healthy peers in Victoria, Australia. Standard incidence ratios (SRIs) for all malignancies and for selected cancers were calculated using state population cancer rates, stratified by sex, age (in 5 age groups: under 40, 40-49, 50-59, 60-69, and 70 and over), and calendars years, from 1983-1999. Cox regression analysis was also performed, including positive rheumatoid factor and ever use of two immunosuppressive agents, azathioprine and cyclophosphamide.

RA patients exposed to MTX were found to have an estimated 50 percent excess risk of developing cancer in any form. The risk of non-Hodgkin's lymphoma was more than 5 times higher in RA patients than in the general population. RA patients also had a 3-fold increased risk of melanoma and almost a 3-fold increased risk of lung cancer.

While the increased risk levels for non-Hodgkin's lymphoma and lung cancer were in line with the findings of related studies in Europe and the United States, the high risk for melanoma stood out as novel. "This study is, to our knowledge, the first to report an increased risk of melanoma in patients with RA treated with MTX compared with the general population," notes its lead author, Dr. Rachelle Buchbinder.

Interestingly, the researchers observed a 2.5-fold increased cancer risk for MTX-treated RA patients exposed to cyclophosphamide, but contrary to expectation, no increased risk with exposure to azathioprine.

Despite its limitations—lack of a RA control group who was not exposed to MTX, for one—this study has important implications, particularly in regard to the risk of melanoma for RA patients. "Further investigation is needed to determine whether this risk is unique to Australia and what role MTX, immunosuppression per se, and/or environmental factors such as exposure to UV radiation play in its development," Dr. Buchbinder stresses. "Our findings, taken together with other studies investigating the risk of skin cancer in patients with RA, may support a role for regular skin cancer screening for all patients with RA, particularly those receiving immunosuppressive therapy."

Article: *"Incidence of Melanoma and Other Malignancies Among Rheumatoid Arthritis Patients Treated With Methotrexate," Rachelle Buchbinder, Melissa Barber, Louise Heuzenroeder, Anita E. Wluka, Graham Giles, Stephen Hall, Andrew Harkness, Daniel Lewis, Geoff Littlejohn, Marian H. Miller, Peter F.J. Ryan, and Damien Jolley, Arthritis & Rheumatism (Arthritis Care & Research), June 15, 2008; 59:6, pp. 794-799.*

Rat stowaways date human arrival in New Zealand

* 11:46 03 June 2008
* NewScientist.com news service
*** Rachel Nowak**

Humans arrived in New Zealand in the 13th century and no earlier. That's the conclusion of a study that re-examines the remains of Pacific rats (Rattus exulans) collected on both main islands, as well as the seeds they ate. Genetic studies suggest that early human settlers in New Zealand as well as the Pacific rat migrated from East Polynesia.

As rats could easily stow away on boats, and were also a source of food for Polynesians prior to European settlement, the date of the earliest rat remains is presumed to be the date humans first arrived in New Zealand.

The finding could help settle a decades-long argument about when New Zealand was first settled by humans.

"It adds to the overwhelming weight of evidence that suggests that humans arrived in the 13th century," says anthropologist Ian Smith of Otago University in Dunedin, New Zealand.

Debated dates

Pollen and charcoal from fires that may have been lit by humans have been used as evidence that humans arrived as far back as 2000 years ago.

However, evidence from human remains, Maori oral history, fossil records of animal extinctions, as well as pollen evidence of deforestation, has all suggested that the first humans arrived in the late 13th century.

But a 1996 study of rat bones by Richard Holdaway of the University of Canterbury, in Christchurch, suggested a date as early as 200 BC. The finding fuelled a fierce controversy, with Holdaway arguing that humans reached New Zealand over two thousand years ago, and then moved on, leaving some rats behind.

Careful preparation

Now a team led by Janet Wilmshurst at Landcare Research in Lincoln, New Zealand, has collected rat bones from the same sites as the bones analysed by Holdaway – places where the now-extinct laughing owls roosted and left regurgitated remains of prey.

But the Wilmshurst team used an improved technique for removing contamination from the bones before radiocarbon dating. This led to a far later date for the earliest rat populations – around 1280 AD.

"Bone is problematic because it exchanges material with the environment very readily," says Smith, who was not involved in the study. "This controversy has raised the whole issue of how we need to prepare bone very carefully before carbon dating."

Crucially, the team also supports its findings by radiocarbon dating seeds from seven sites on both the south and north islands of New Zealand. The nuts were dated to between 100 and 3000 years old, but only nuts that were less than 780 years old showed tell-tale signs of rat teeth marks.

Rapid changes

"The carbon dates for the seeds from both the north and the south island were in strong agreement with the

archaeological evidence – roughly 1280 AD," says Wilmshurst.

The New Zealand environment was transformed by the arrival of humans – a quarter of the bird species became extinct and large-scale deforestation occurred during pre-European settlement.

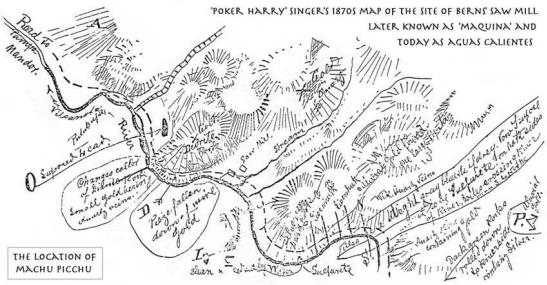
"If everything we see happened since the 13th century, it's incredibly rapid," says Smith.

The findings also have implications for the broader debate about the exact timing and speed of the last major human migration from West Polynesia, which includes islands like Tonga, to East Polynesia, which includes Hawaii and New Zealand.

Journal references: Proceedings of the National Academy of Sciences (DOI: 10.1073/pnas.0801507105); Arrival of rats in New Zealand 1996, Richard Holdaway, Nature: (10.1038/384225b0)

Incan lost city looted by German businessman

* 17:15 03 June 2008
* NewScientist.com news service
*** Michael Marshall**



The "lost city of the Incas", Machu Picchu, was actually discovered forty years earlier than thought, and ransacked. Machu Picchu was famously discovered by Hiram Bingham in 1912

New evidence shows that it was first visited in 1867 by an obscure German entrepreneur named Augusto Berns, who apparently looted the tombs with the Peruvian government's blessing.

This sketch, rediscovered by Paolo Greer in 1978, was made by 'Poker Harry' Singer, Augusto Berns' partner. It shows alleged mineral deposits, close to Aguas Calientes, Berns' original sawmill camp **(Image: Alex Chepstow-Lusty)**

When Bingham arrived, he found a hut called "La Maquina". This was actually part of a sawmill which Berns ran in the area, after purchasing 25 kilometres of land along the Vilcanota River in 1867. He then realised the immense potential value of Machu Picchu's artefacts.

Berns' activities were uncovered by Paolo Greer, who in 1978 discovered an old map of the area and subsequently traced Berns' activities through documents in the National Library of Peru.

New Scientist has been given access to some of the documents Greer uncovered, which you can see on the right. Greer uncovered a sketch map of the area by Berns' partner, a lost geology book with material based on Berns' work, a booklet describing Berns' plans to loot Machu Picchu, and his handmade map of the area.

Greer's research will be published in South American Explorer Magazine.

Extra vitamins can counteract faulty genes

* 17:29 03 June 2008
* NewScientist.com news service
*** Peter Aldhous**

Nutrigenomics has got itself a bad name – companies offering nutritional supplements supposedly tailored to people's genetic makeup have been criticised for misleading consumers.

But a team in California is putting the field on a sounder scientific footing. Researchers led by Jasper Rine and Nick Marini of the University of California, Berkeley, have already shown that mutations causing subtle defects in an enzyme involved in DNA synthesis can be fixed by providing the vitamin folate.

Now they are studying genes for enzymes that require vitamin B6 to function properly, to see whether similar defects can be corrected by providing more of that vitamin.

Rine and Marini inserted variants of the human gene for an enzyme called MTHFR into yeast cells, where they were able to measure the enzyme's activity. They found five mutations that impaired the enzyme's function – but for four of them, the problem could be fixed by providing extra folate.

"Nutrigenomics has suffered from unsubstantiated claims," says Rine, who hopes that his results will encourage companies to run trials in human volunteers.

His work is supported in part by the US Defense Advanced Research Projects Agency, which hopes that genetically-tailored nutritional supplements will help improve the performance of military personnel.

Journal reference: (Proceedings of the National Academy of Sciences, DOI: 10.1073/pnas.0802813105)

Well

Experts Revive Debate Over Cellphones and Cancer

By TARA PARKER-POPE

What do brain surgeons know about cellphone safety that the rest of us don't?

Last week, three prominent neurosurgeons told the CNN interviewer Larry King that they did not hold cellphones next to their ears. "I think the safe practice," said Dr. Keith Black, a surgeon at Cedars-Sinai Medical Center in Los Angeles, "is to use an earpiece so you keep the microwave antenna away from your brain."

Dr. Vini Khurana, an associate professor of neurosurgery at the Australian National University who is an outspoken critic of cellphones, said: “I use it on the speaker-phone mode. I do not hold it to my ear.” And CNN’s chief medical correspondent, Dr. Sanjay Gupta, a neurosurgeon at Emory University Hospital, said that like Dr. Black he used an earpiece.

Along with Senator Edward M. Kennedy’s recent diagnosis of a glioma, a type of tumor that critics have long associated with cellphone use, the doctors’ remarks have helped reignite a long-simmering debate about cellphones and cancer.

That supposed link has been largely dismissed by many experts, including the American Cancer Society. The theory that cellphones cause brain tumors “defies credulity,” said Dr. Eugene Flamm, chairman of neurosurgery at Montefiore Medical Center.

Stuart Bradford

According to the Food and Drug Administration, three large epidemiology studies since 2000 have shown no harmful effects. CTIA — the Wireless Association, the leading industry trade group, said in a statement, “The overwhelming majority of studies that have been published in scientific journals around the globe show that wireless phones do not pose a health risk.”

The F.D.A. notes, however, that the average period of phone use in the studies it cites was about three years, so the research doesn’t answer questions about long-term exposures. Critics say many studies are flawed for that reason, and also because they do not distinguish between casual and heavy use.

Cellphones emit non-ionizing radiation, waves of energy that are too weak to break chemical bonds or to set off the DNA damage known to cause cancer. There is no known biological mechanism to explain how non-ionizing radiation might lead to cancer.

But researchers who have raised concerns say that just because science can’t explain the mechanism doesn’t mean one doesn’t exist. Concerns have focused on the heat generated by cellphones and the fact that the radio frequencies are absorbed mostly by the head and neck. In recent studies that suggest a risk, the tumors tend to occur on the same side of the head where the patient typically holds the phone.

Like most research on the subject, the studies are observational, showing only an association between cellphone use and cancer, not a causal relationship. The most important of these studies is called Interphone, a vast research effort in 13 countries, including Canada, Israel and several in Europe.

Some of the research suggests a link between cellphone use and three types of tumors: glioma; cancer of the parotid, a salivary gland near the ear; and acoustic neuroma, a tumor that essentially occurs where the ear meets the brain. All these cancers are rare, so even if cellphone use does increase risk, the risk is still very low.

Last year, The American Journal of Epidemiology published data from Israel finding a 58 percent higher risk of parotid gland tumors among heavy cellphone users. Also last year, a Swedish analysis of 16 studies in the journal Occupational and Environmental Medicine showed a doubling of risk for acoustic neuroma and glioma after 10 years of heavy cellphone use.

“What we’re seeing is suggestions in epidemiological studies that have looked at people using phones for 10 or more years,” says Louis Slesin, editor of Microwave News, an industry publication that tracks the research. “There are some very disconcerting findings that suggest a problem, although it’s much too early to reach a conclusive view.”

Some doctors say the real concern is not older cellphone users, who began using phones as adults, but children who are beginning to use phones today and face a lifetime of exposure.

“More and more kids are using cellphones,” said Dr. Paul J. Rosch, clinical professor of medicine and psychiatry at New York Medical College. “They may be much more affected. Their brains are growing rapidly, and their skulls are thinner.”

For people who are concerned about any possible risk, a simple solution is to use a headset. Of course, that option isn’t always convenient, and some critics have raised worries about wireless devices like the Bluetooth that essentially place a transmitter in the ear.

The fear is that even if the individual risk of using a cellphone is low, with three billion users worldwide, even a minuscule risk would translate into a major public health concern.

“We cannot say with any certainty that cellphones are either safe or not safe,” Dr. Black said on CNN. “My concern is that with the widespread use of cellphones, the worst scenario would be that we get the definitive study 10 years from now, and we find out there is a correlation.”

Vital Signs

Nostrums: After Taser Jolt, a Regular Heartbeat Again

By ERIC NAGOURNEY

The Taser is known mainly as the shock-giving device that helps police officers incapacitate suspects and, thanks to YouTube, made "Don't Tase me, bro" a national catchphrase. But could there be a medical application in its future?

Probably not, but researchers say they have found one case in which a suspect's irregular heartbeat returned to a normal pattern when he was hit with a Taser.

Writing online in Annals of Emergency Medicine, researchers described the case of a 28-year-old man who hid in a cold lake in Connecticut for 40 minutes to try to escape from the authorities.

When the police found the suspect, he was suffering from hypothermia and his heartbeat was rapid and irregular.

As a cardiologist finished his examination, the study said, the patient grew agitated and "became threatening to the hospital staff and to the police officer who accompanied him."

The officer then gave him a single jolt from the Taser, and when doctors checked his pulse right afterward, they found it fast but in a normal rhythm.

There have been cases in which Tasers were believed to have shocked hearts out of their normal rhythm. And medical workers often use defibrillators to help patients whose hearts are not beating properly.

But the authors of the study, led by Dr. Kyle A. Richards of Hartford Hospital, said this was the first report of a Taser's possibly correcting a problem.

Essay

Repairing the Damage, Before Roe

By WALDO L. FIELDING, M.D.

With the Supreme Court becoming more conservative, many people who support women's right to choose an abortion fear that Roe v. Wade, the 1973 decision that gave them that right, is in danger of being swept aside.

When such fears arise, we often hear about the pre-Roe "bad old days." Yet there are few physicians today who can relate to them from personal experience. I can.

Tony Cenicola/The New York Times

I am a retired gynecologist, in my mid-80s. My early formal training in my specialty was spent in New York City, from 1948 to 1953, in two of the city's large municipal hospitals.

There I saw and treated almost every complication of illegal abortion that one could conjure, done either by the patient herself or by an abortionist — often unknowing, unskilled and probably uncaring. Yet the patient never told us who did the work, or where and under what conditions it was performed. She was in dire need of our help to complete the process or, as frequently was the case, to correct what damage might have been done.

The patient also did not explain why she had attempted the abortion, and we did not ask. This was a decision she made for herself, and the reasons were hers alone. Yet this much was clear: The woman had put herself at total risk, and literally did not know whether she would live or die.

This, too, was clear: Her desperate need to terminate a pregnancy was the driving force behind the selection of any method available.

The familiar symbol of illegal abortion is the infamous "coat hanger" — which may be the symbol, but is in no way a myth. In my years in New York, several women arrived with a hanger still in place. Whoever put it in — perhaps the patient herself — found it trapped in the cervix and could not remove it.

We did not have ultrasound, CT scans or any of the now accepted radiology techniques. The woman was placed under anesthesia, and as we removed the metal piece we held our breath, because we could not tell whether the hanger had gone through the uterus into the abdominal cavity. Fortunately, in the cases I saw, it had not.

However, not simply coat hangers were used.

Almost any implement you can imagine had been and was used to start an abortion — darning needles, crochet hooks, cut-glass salt shakers, soda bottles, sometimes intact, sometimes with the top broken off.

Another method that I did not encounter, but heard about from colleagues in other hospitals, was a soap solution forced through the cervical canal with a syringe. This could cause almost immediate death if a bubble in the solution entered a blood vessel and was transported to the heart.

The worst case I saw, and one I hope no one else will ever have to face, was that of a nurse who was admitted with what looked like a partly delivered umbilical cord. Yet as soon as we examined her, we realized

that what we thought was the cord was in fact part of her intestine, which had been hooked and torn by whatever implement had been used in the abortion. It took six hours of surgery to remove the infected uterus and ovaries and repair the part of the bowel that was still functional.

It is important to remember that Roe v. Wade did not mean that abortions could be performed. They have always been done, dating from ancient Greek days.

What Roe said was that ending a pregnancy could be carried out by medical personnel, in a medically accepted setting, thus conferring on women, finally, the full rights of first-class citizens — and freeing their doctors to treat them as such.

Waldo L. Fielding was an obstetrician and gynecologist in Boston for 38 years. He is the author of "Pregnancy: The Best State of the Union" (Thomas Y. Crowell, 1971).

With a Tiny Bit of Cancer, Debate on How to Proceed

By LAURA BEIL

In a cancer patient, lymph nodes are the closest thing to a crystal ball. Gaze into them after removing a tumor. The presence of malignant cells may be a sign that the cancer will recur, leading to more tests and intensive treatment.

As biopsies of the lymph nodes grow more sophisticated and sensitive, oncologists and patients face the unsettling question of what to do with a little bit of cancer. It has become a familiar debate, especially for breast cancer, with no clear answer in sight.

"We can pick up things that we could never pick up before," said Dr. Minetta Liu, an oncologist at the Georgetown University Medical Center. "But do we need to pick them up?"

Without more data to guide them, doctors worry that some women may be given test results that are actually too good, leading to more medical attention than necessary.

Pathologists have long examined lymph nodes — small grapelike bunches that are part of the immune system — to gain the best sense of whether a tumor, once gone, will reassert itself. If renegade cells become caught in the nodes, the tumor could also be setting up outposts in distant parts of the body.

As recently as the 1990s, doctors took 24 or so nodes to the laboratory for testing, slicing each one and looking for glimpses of cancer. But the more nodes a patient loses, the greater the likelihood of long-term side effects.

In recent years, doctors have tended to focus far more narrowly, on so-called sentinel nodes, the one or two most connected to the internal plumbing of the tumor.

Sentinel node biopsy is growing more and more popular among breast cancer surgeons. The procedure was used in more than 50 percent of patients by 2005, up from about 10 percent in 1998.

Along the way, the field has grown more refined. In one new approach, part of the node is dropped into a high-tech blender, and its genetic material is sifted by computer for signs of cancer.

Now that pathologists have fewer nodes to consider, they have more time to section the tissue. It is as if, after years of skimming a book, doctors could peruse entire chapters. The problem is that the more carefully you read, the less you may know.

"When someone has a very small amount of tumor, what is their actual risk?" asked Dr. Hiram S. Cody III of the Memorial Sloan-Kettering Cancer Center in New York. A tiny bit of cancer could mean that a tumor is going to reignite. Or it could mean very little.

The presence of these so-called micrometastases, and other wisps of tumor too small to count as full-fledged metastases, has been documented in lymph nodes for decades. But only with the popularity of sentinel node testing has the question of micrometastasis entered everyday medical practice.

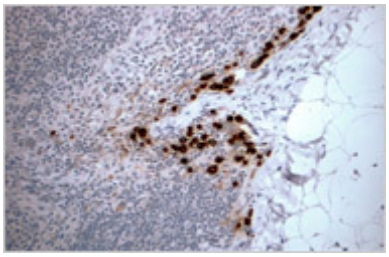
"Because they are looking at fewer nodes, they can look more carefully," said Brenda K. Edwards, associate director for surveillance research at the National Cancer Institute.

Dr. Edwards and her colleagues recently found that diagnoses of breast cancer with micrometastatic lymph-node involvement began to increase markedly after 1997 and that it shows no signs of leveling off.

Nowhere are discussions of micrometastases more animated than with breast cancer, where 86 percent of sentinel node biopsies are performed. Scientists are trying to determine whether micrometastases have any effects on survival.

Research is divided, and all the studies have had built-in shortcomings. In The Journal of Clinical Oncology in April, Dr. Cody described a study that looked back at 368 patients from the 1970s. The researchers retrieved stored lymph nodes from the women, examined them for micrometastases and checked to see how the patients had fared.

He and his colleagues found that women with micrometastases did have a slightly worse survival rate than women without any cancer in the nodes. But there are important caveats. Through earlier detection, doctors are diagnosing smaller tumors that are presumably less advanced and less likely to be deadly. Also, none of the subjects received chemotherapy, which has become far more effective in the last 30 years. And the study looked at all nodes, not just the one or two in the sentinel position.



Newer data come from researchers at the John Wayne Cancer Institute in Santa Monica, Calif., home to some of the earliest studies on sentinel node biopsy. Unlike the women in Dr. Cody's study, these 790 patients underwent chemotherapy and would have received diagnoses on a scale more aligned with modern mammography.

NEW INSIGHT A more sensitive analysis of a lymph node shows cancer cells, even a single cell toward the left, that would not be seen using the standard staining process. **Mary K. Sidawy/Georgetown University Hospital**

At the annual San Antonio Breast Cancer Symposium in December, researchers reported that women with just micrometastatic cancer in their lymph nodes survived as long, on average, as those with clear nodes.

The problem with that study is that those women and their doctors knew whether micrometastases had been found in their lymph nodes, and that probably influenced the course of treatment.

"We don't have good answers at this point," said Dr. Nora Hansen of the Feinberg School of Medicine at Northwestern University, who reported the results.

Other researchers from the John Wayne Institute recently examined breast cancer statistics from 1992 to 2003. They compared how the extent of cancer found in lymph nodes predicted survival.

Writing in December in The Annals of Surgical Oncology, the researchers reported that women with micrometastatic cancer in a sentinel node had a survival rate slightly poorer than women without cancer in the nodes, but better than women with greater node involvement.

Doctors predict that the best insight will come from two national studies involving thousands of participants in which neither the women nor their doctors know about the presence of micrometastases. But those studies are not expected to produce results for years.

So until the issue is settled, oncologists will have to navigate patients through complicated choices. One is whether a node that is positive for micrometastases warrants removing more nodes.

This is no small matter. Women who have been treated for breast cancer often report years of swelling and tightness in the arms just from lymph node removal.

The second dilemma is whether a little cancer is worth a lot of anxiety. Even knowing that its significance is unclear, cancer in a lymph node, no matter how minuscule, can be alarming.

"It's a hard point for medical oncologists to walk away from," said Dr. Thomas B. Julian of the Allegheny Cancer Center in Pittsburgh, a leader of one of the two trials that may provide better guidance. "In most centers across the United States, they will treat you for that positive node."

Dr. Julian and others say that without better answers, micrometastases will continue to affect each doctor and patient differently. Some women, especially younger ones, may want more aggressive treatment, no matter what. Others may decide that the increased risk posed by a micrometastasis is too small and too uncertain to worry about.

And all of them will await the day when medical science does a better job of predicting the future.

Neurologically impaired mice improve after receiving human stem cells

Scientists report a dramatic success in what may be the first documented rescue of a congenital brain disorder by transplantation of human neural stem cells. The research, published by Cell Press in the June issue of the journal Cell Stem Cell, may lead the way to new strategies for treating certain hereditary and perinatal neurological disorders.

Nerve cell projections are ensheathed by a fatty substance called myelin that is produced by oligodendrocytes, a type non-nerve cell in the brain and spinal cord. Myelin enhances the speed and coordination of the electrical signals by which nerve cells communicate with one another. When myelin is missing or damaged, electrical signals are not properly transmitted. Previous studies have explored the potential utility of cell transplantation for restoring absent or lost myelination to diseased nerve fibers. Much of this research has made use of the 'shiverer mouse' animal model which lacks normal myelin and typically dies within months of birth. Yet to date, no transplantation of human neural stem cells or of their derivatives, called glial progenitor cells, have ever altered the condition or fate of recipient animals.

Dr. Steve Goldman and colleagues from the Departments of Neurology and Neurosurgery at the University of Rochester Medical Center, along with collaborators at Cornell, UCLA and Baylor, built on this earlier work

by devising a more robust method for the acquisition and purification of human fetal glial progenitor cells. In addition, they developed a new cell delivery strategy, based on multiple injection sites, to encourage widespread and dense donor cell engraftment throughout the central nervous system of recipient mice. The researchers transplanted human glial stem cells into neonatal shiverer mice that also had a genetically deficient immune system. Immunodeficient mice were used to minimize the rejection of the transplanted cells.

The researchers found that the new transplant procedure resulted in infiltration of human glial progenitor cells throughout the brain and spinal cord. The engrafted mice exhibited robust, efficient and functional myelination. Most notably, many of the mice displayed progressive, neurological improvement and a fraction of the mice were actually rescued by the procedure. “The neurological recovery and survival of the mice receiving transplants was in sharp contrast to the fate of their untreated controls, which uniformly died by five months,” explains Dr. Goldman. Upon histological examination well over a year after the procedure, the white matter of the surviving mice had been essentially re-myelinated by human cells.

“To our knowledge, these data represent the first outright rescue of a congenital hypomyelinating disorder by means of stem or progenitor cell transplantation,” offers Dr. Goldman. “Although much work needs to be done to maximize the number of individuals that respond to transplantation, I think that these findings hold great promise for the potential of stem cell-based treatment in a wide range of hereditary and ischemic myelin disorders in both children and adults.”

The reseachers include Martha S. Windrem, University of Rochester Medical Center, Rochester, NY; Steven J. Schanz, University of Rochester Medical Center, Rochester, NY; Min Guo, University of Rochester Medical Center, Rochester, NY; Guo-Feng Tian, University of Rochester Medical Center, Rochester, NY; Vaughn Washco, University of Rochester Medical Center, Rochester, NY; Nancy Stanwood, University of Rochester Medical Center, Rochester, NY; Matthew Rasband, Baylor University College of Medicine, Houston, TX; Neeta S. Roy, Weill Medical College of Cornell University, New York, NY; Maiken Nedergaard, University of Rochester Medical Center, Rochester, NY; Leif A. Havton, UCLA Medical Center, Los Angeles, CA; Su Wang, University of Rochester Medical Center, Rochester, NY; and Steven A. Goldman, University of Rochester Medical Center, Rochester, NY.

Kylie's breast cancer triggered a surge of over 30 percent in breast imaging of low-risk women

Use of mammography and breast ultrasound procedures soared by over 30 percent among women aged 25-44 in the 6 months following Kylie Minogue's breast cancer diagnosis, says a new study from the University of Melbourne

Kylie's breast cancer triggered a surge of over 30 per cent in breast imaging of low risk women, says new University of Melbourne study.

Use of mammography and breast ultrasound procedures soared by over 30 per cent among women aged 25-44 in the six months following Kylie Minogue's breast cancer diagnosis, says a new study from the University of Melbourne.

There was also a sharp rise in the number of women aged 25-34 years who underwent breast biopsies – but this surge in screening activity did not lead to the detection of more cases of breast cancer.

The study, published this week in the International Journal of Epidemiology, is the first to use Medicare data to examine the impact of the intense publicity that surrounded this announcement on breast imaging, biopsies and operations to remove breast tumors.

Study leader Dr Margaret Kelaher, from the University of Melbourne's Melbourne School of Population Health, and colleagues found that in the six months following Minogue's diagnosis in April 2005:

* Breast imaging in 25-34 year old women rose by 33 per cent;
* Breast biopsies in women 25-34 increased by 46 per cent;
* Breast imaging in women aged 35-44 rose by 25 per cent;
* Biopsies in women aged 35-44 increased by 37 per cent.

However, the rates of operations to remove breast cancers did not change significantly, suggesting that the flurry of screening activity led to many "false positives".

"Raising women's awareness of the need to get screened is a generally good thing," Dr Kelaher said.

"But these findings suggest that thousands of additional imaging procedures and biopsies did not improve breast cancer detection among young women.

"It appears there has been a situation where publicity has led to many low risk women using – and probably overusing – screening services.

"We need to improve the targeting of health messages and the confidence of women and their doctors in early breast cancer detection recommendations."

Dr Kelaher said the publicity could have raised doctors' perception about breast cancer risk and increased concerns, both medical and legal, about missed diagnoses in younger women.

The researchers also suggest that the influx of low-risk women into the screening system may have

damaging effects by reducing the system's capacity to deal with higher risk women.

Dr Kelaher said Kylie Minogue had been a great ambassador for breast cancer awareness, but the publicity surrounding her case highlighted the need for better efforts at "managing the message."

"The visibility of a celebrity's illness provides an opportunity to address a huge health problem like breast cancer," she said.

"But when that celebrity is from a low risk group, it also has the potential to undercut the appropriateness and cost effectiveness of health service delivery.

"Consultation between a celebrity's PR team and public health agencies on how to shape and disseminate the information could help create a message with the best chances of furthering the quality of care and sound public health practice."

Dr Julie Miller, consultant surgeon at the Royal Melbourne Hospital and senior lecturer in the Department of Surgery at the University of Melbourne, is a co-author of the study.

"It's important that women are breast-aware, and consult their doctor if they are concerned about any changes in their breasts," Dr Miller said.

"However there is no role for routine screening of women under 40 who do not have symptoms or a strong family history.

"This study shows that all the extra worry and expense was unwarranted and that the current recommendations for breast cancer screening are appropriate."

Dr Margaret Kelaher, University of Melbourne School of Population Health and Dr Julie Miller, Consultant Surgeon Royal Melbourne Hospital and Senior Lecturer Department of Surgery, University of Melbourne, will be available for interviews at 10.30am today.

Cartilage regeneration '20,000 Leagues Under the Sea'

Engineers use high pressure to stimulate growth of new cartilage

HOUSTON, June 4, 2008 -- Bioengineers at Rice University have discovered that intense pressure -- similar to what someone would experience more than a half-mile beneath the ocean's surface -- stimulates cartilage cells to grow new tissue with nearly all of the properties of natural cartilage. The new method, which requires no stem cells, may eventually provide relief for thousands of arthritis sufferers.

"This tissue-engineering method holds promise not only for cartilage but also for tissues to repair bladders, blood vessels, kidneys, heart valves, bones and more," said lead researcher Kyriacos Athanasiou, Rice's Karl F. Hasselmann Professor of Bioengineering.

The findings appear this week in the journal PLoS ONE. They are the latest from the emerging field of tissue engineering, a new discipline that aims to capitalize on the body's innate healing abilities to develop new ways of growing tissues that can be used to surgically repair wounds without risk of rejection.

Cartilage, a tissue in the human body that cannot heal itself, has long been a target of tissue engineers. Cartilage is the skeleton's shock absorber, and its stiffness, strength and other mechanical properties derive not from living cartilage cells but from the densely woven matrix of collagen and proteoglycan that surrounds them. This extracellular matrix, or ECM, is produced during cartilage development in children, but cannot be repaired following injury in adulthood.

Injured cartilage often serves as the focal point for arthritis formation, so tissue engineers have long sought a means of growing new cartilage that can be transplanted into adults to repair damaged joints before arthritis can develop. Unfortunately, cartilage is difficult to engineer, in part because there are no natural healing processes to mimic.

Athanasiou's Musculoskeletal Bioengineering Laboratory has focused on cartilage for more than 10 years, and he said the new process is the first he has studied that produces cartilage that's almost identical to the body's own tissue.

"The combination of hydrostatic pressure and growth factors used in this process result in an engineered cartilage ECM with properties nearly identical to that of native cartilage," he said. "This research appears very promising for treating arthritis, as cartilage can now be produced in our lab that is almost identical in composition to native tissue."

So far, the process has been tried only with cells from cows and has yet to be tested in live animals. Athanasiou cautions that it will be several years before the process will be ready for clinical testing in humans.

The new findings are based on three years of data collected by graduate student Benjamin Elder, who is simultaneously earning a doctorate in bioengineering at Rice and a medical degree at Baylor College of Medicine under Rice and Baylor's Medical Scientist Training Program.

In the study, Elder took small samples of cartilage from calves' knees, dissolved the ECM and isolated the living cartilage cells, or chondrocytes. The calf chondrocytes were used to create tissue-engineered cartilage.

The engineered cartilage was placed into a chemical bath of growth factors and sealed inside soft plastic containers that were placed inside a chamber connected to a hydraulic press. For one hour per day, the bags were squeezed at intense pressures.

"Our knees are filled with fluid, and when we walk or run the hydrostatic pressure on the cartilage cells in the knee approaches the pressures we used in our experiments," Elder said. "But in daily activities, these pressures are fleeting, just a second or so at a time."

Most of the prevailing strategies in tissue engineering attempt to reproduce the conditions that cells experience in the body. Athanasiou said the unconventional approach of using unnaturally high-pressure stemmed from insights gained during years of previous experiments.

Elder said, "By combining high pressure and growth factors, we were able to more than triple the biomechanical properties of the cartilage. We're not sure why they reinforce one another, but we do not get the same results when we apply them independently."

Elder, who earned both a bachelor's and master's degree from Yale in four years, has a 4.2 grade point average at Rice and is on track to earn his bioengineering doctorate in just three years. He's already finished two years of medical school and will resume his medical studies in the fall.

"Ben's an exceptional student and he embodies the future of this field," Athanasiou said. "He plans to pursue a career in neurosurgery, where he will be able to conduct future work in tissue engineering and translate it from the laboratory bench to the patient's bedside."

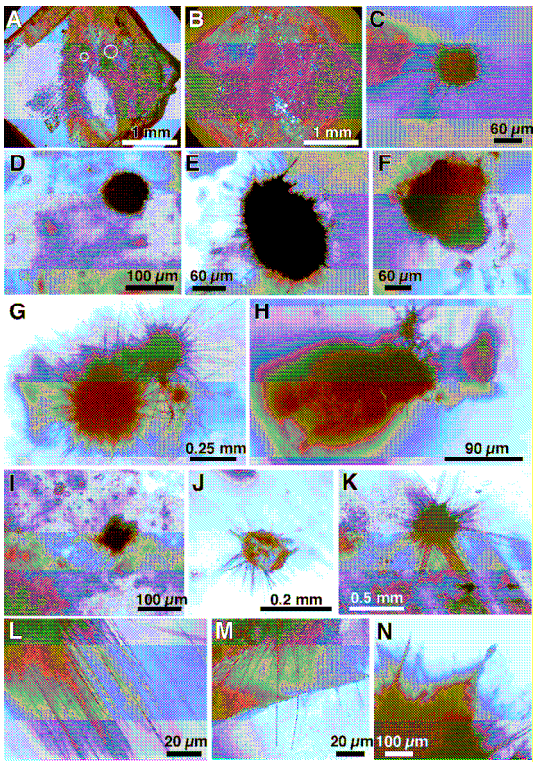
Hairy blobs found in acidic hell

IN CLOSE-UP, they look like something out of a 1950s B-movie. Colonies of fossilised creatures, dubbed "hairy blobs", have been discovered in one of the harshest environments on Earth. The find may turn out to be crucial for spotting signs of extraterrestrial life in rocks on other planets.

Kathleen Benison, a geologist at Central Michigan University, Mount Pleasant, led a team that studied the sediments formed by acidic and very salty lakes in modern day Western Australia, and those deposited around 250 million years ago in North Dakota. It is very difficult to survive in such a tough environments and few signs of life have ever been found in these sorts of lakes.

Inside the halite and gypsum "evaporate" minerals, which form as the lake waters dry up, Benison and colleagues found previously unknown fossilised blobs at both the modern and ancient sites, ranging in size from 0.05 to 1.5 millimetres. They were made up of a mix of inorganic crystals and "hairs" stuck together in a mass (pictured). They named them hairy blobs.

The team argues that each hair was in fact a separate microorganism because the hair fossils are made of disordered graphite which, unlike inorganic graphite, has irregular layers that suggest it was once a live organism.



Photomicrographs of hairy blobs in halite chevron crystals from the mid-Permian Opeche Shale. All samples are from halite beds between 7411_ and 7412_ in the Gulf-Romanysyn 2-33-4B core, Billings County, North Dakota. All views are in transmitted plane light unless noted otherwise. (A) and (B) Halite crystal with primary fluid inclusion growth bands in plane-transmitted light (A) and with crossed polars (B). Circles in (A) and (B) show localities of some hairy blobs. Bright spots in B are solid inclusions of accessory sulfate minerals (mostly anhydrite). (C) Single hairy blob with long hairs. (D) Single hairy blob with short hairs in close association with primary fluid inclusions. (E) Oblong hairy blob surrounded by a "halo" of birefringent anhydrite crystals (crossed-polar light). (F) Clump of several hairy blobs. (G) Clump of several hairy blobs with long hairs. (H) Close association of hairy blobs and anhydrite crystals. Large dark spot in central to lower right is hairy blob material surrounding an anhydrite crystal. (I) Hairy blob trapped in and extending from primary fluid inclusion. (J) Sparse hairs extending from crystal and fluid inclusion. (K) Large hairy blob with subparallel bundles of hairs oriented along halite cleavage panes. (L) Subparallel hairs with kinks. (M) Hairs truncated by healed fracture. (N) Anhydrite bead at end of hair

Many of the hairs are coated with crystals of gypsum, a calcium sulphate mineral. This link with gypsum suggests that the microorganisms were fuelled by chemical interactions with sulphur in the acidic water - which helped the gypsum to form.

The team also found previously undescribed microorganisms in the lake water, which they say may be the cells that end up as fossilised hairs (Astrobiology, DOI: 10.1089/ast.2006.0034).

Conditions in acidic saline lakes such as those studied by the team are thought to be similar to those on ancient Mars. The many probes currently exploring the Red Planet have discovered that Martian seas and lakes, such as those once found at Meridiani Planum, were strikingly similar in terms of acidity, salinity and the minerals and sediments present.

Benison says the hairy blobs from the Permian halite seem well preserved. "This argues for long-term preservation of microfossils in halite elsewhere, perhaps even on Mars." Had the organisms lived on Mars, she says, the inorganic minerals surrounding them would have acted as protection from the ultraviolet radiation there.

André Brack, an astrobiologist at CNRS, the French National Centre for Scientific Research, says the work "shows life can be preserved for long periods of time from an acidic medium, just like the Martian oceans".

However, he adds that to be certain that the blobs are indeed evidence of life, further tests are needed, such as those to examine whether the carbon isotope ratio in the graphite matches the signature for life.

Regular tipple may curb risk of rheumatoid arthritis

Alcohol cuts the risk of developing rheumatoid arthritis by up to 50%, reveals research published ahead of print in the Annals of the Rheumatic Diseases.

The Scandinavian researchers base their findings on more than 2750 people taking part in two separate studies, which assessed environmental and genetic risk factors for rheumatoid arthritis.

Over half the participants (1650) had the disease and had been matched for age, sex, and residential locality with randomly selected members of the general public.

All participants were quizzed about their lifestyle, including how much they smoked and drank. And blood samples were taken to check for genetic risk factors.

The results showed that drinking alcohol was associated with a significantly lower risk of developing rheumatoid arthritis. And the more alcohol was consumed, the lower the risk of rheumatoid arthritis.

Among those who drank regularly, the quarter with the highest consumption were up to 50% less likely to develop the disease compared with the half who drank the least.

The effect was the same for both men and women.

Among those with antibodies to a specific group of proteins involved in the development of the disease, alcohol cut the risk most in smokers with genetic risk factors for rheumatoid arthritis.

Smoking is known to be a major environmental risk factor for developing rheumatoid arthritis, and this risk is further increased in those who carry these genetic variants.

The authors conclude that their research reinforces the importance of lifestyle factors in the development of the disease, and that giving up smoking remains the single most important preventive measure.

They point to recent experimental research by other authors, which showed that alcohol protected against the development and severity of rheumatoid arthritis, although it is not clear exactly how it does this.

And they draw parallels with the links between moderate alcohol consumption and a reduced risk of other inflammatory processes, such as cardiovascular disease.

Does everyone really want to be a macho man?

MU researcher finds varying attitudes toward masculinity in Mexican-American men

COLUMBIA, Mo. – Traditional attitudes of masculinity, such as physical toughness and personal sacrifice, are valued in Mexican culture. A University of Missouri researcher found that Mexican-American men, as a group, are more likely to endorse traditional 'macho man' attitudes than European-American or black men. Certain factors influenced this attitude, including socioeconomic status (SES). The higher the SES, the greater the likelihood that Mexican-American men held tightly to traditional masculine roles, even at the expense of emotional pressure.

According to the study, Mexican-American men who embraced traditional 'macho man' beliefs were more engaged with traditional Mexican culture and often were the primary breadwinners for the family. There were no significant findings that age affected these attitudes.

Those men often believed that:

* They deserved respect from their immediate family
* Self-assurance in men is admirable
* It is essential for men to gain the respect of others

"Being raised in a culture with traditional male values, Mexican-American men learn to uphold these values," said Glenn Good, professor of educational, school and counseling psychology in the MU College of Education. "Men learn that they must be tough, suck it up and not complain."

In Mexican culture, men often feel honor and pride when they are the protectors of their families. These traditional attitudes are influenced by the Catholic faith and the importance of family in the Mexican culture.

Yet, embracing these traditional attitudes may lead to a greater risk for problems such as depression, substance abuse, violence and reluctance to seek psychological assistance.

"If Mexican-American men feel pressure to meet these traditional ideals of masculinity, it can hinder their ability to cope with emotions," said Lizette Ojeda, MU doctoral candidate in counseling psychology. "They may feel the need to be tough and will not ask for help when they need it."

Ojeda stresses the importance of providing a safe space for Mexican-American men to be themselves. When men do get the help they need, they can be receptive, she said.

Sudden growth spurt pushed the Andes up like a Popsicle

* 11:42 06 June 2008
* NewScientist.com news service
*** Catherine Brahic**

We tend to think of mountains as features that grow very, very slowly. Think again, says one group of scientists. They claim the Andes jumped by as much as 2.5 kilometres in just 4 million years – a geological blink of an eye.

Carmala Garzione of the University of Rochester in New York State, US, and colleagues say the sudden rise was caused by a huge layer of dense rock dropping off the underside of the crust that forms the mountain chain.

Previously, the rock had been dragging the relatively light crust down. Liberated of its ball and chain, the mountain chain underwent a growth spurt.

The theory is controversial, but Garzione reckons she can back it up. She and her colleagues have looked at the chemistry of the sedimentary rocks in the Andes and say it reveals what the mineral levels were when the mountains formed.

Rain proof

Sediment formation depends on reactions that are modulated by temperature and humidity – two factors that vary with altitude. In particular, heavy isotope molecules tend to precipitate out of the atmosphere at low altitudes.

This means that as moisture moves up the sides of mountains, it sheds the heavy isotopes it contains in rain and snow – the higher the altitude, the greater the proportion of light isotopes.

Garzione and her colleagues looked at isotope ratios of certain atoms inside Andean rocks to see what altitude they were at when the rocks were formed.

The data showed that the Andes rose slowly for tens of millions of years, but then, between 10 and 6 million years ago, suddenly shot up by between 1.5 and 2.5 kilometres.

To the researchers, this is proof for a controversial geological theory called "delamination".

Floating cork

Mountains are believed to form slowly when two tectonic plates push against each other. Along the western coast of Latin America, the ocean shelf pushes against the less dense continental shelf, and slowly gets squeezed under it. As this happens, the continental crust buckles and gets thicker.

Traditional tectonics suggests that, as the continental crust thickens, the denser rock at the base is slowly eroded away by heat into the semi-molten mantle below.

Delamination theory, however, holds that this denser rock can detach from the underside of the crust like thick blobs of molasses, allowing the lighter crust above to pop up like a cork. If this is true, then mountains could indeed be born in sudden bursts.

Garzione and colleagues believe their isotopic data proves mountains are formed by delamination. They say the uplift seen in the Andes would have taken tens of millions of years to arise from the gradual melting of the lower crust – the rapid removal a large section of this crust best explains such a growth spurt.

Others, though, would like to see more work done before declaring themselves convinced. Todd Ehlers of the University of Michigan in the US points out that as the Andes rose, they will have changed the local climate and rain cycle. This could affect the way the isotopic data should be interpreted.

Journal reference: Science (vol 320, p 1304)

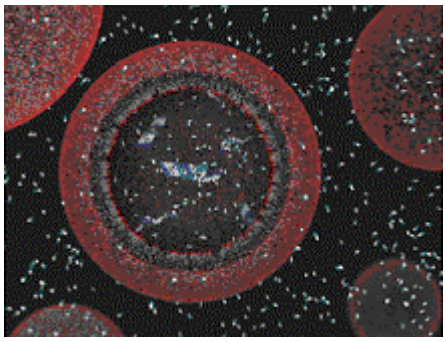
A New Way to Think About Earth's First Cells

Study provides insight into how Earth's earliest cells may have interacted with their environment

A team of researchers at Harvard University have modeled in the laboratory a primitive cell, or protocell, that is capable of building, copying and containing DNA.

Since there are no physical records of what the first primitive cells on Earth looked like, or how they grew and divided, the research team's protocell project offers a useful way to learn about how Earth's earliest cells may have interacted with their environment approximately 3.5 billion years ago.

The protocell's fatty acid membrane allows chemical compounds, including the building blocks of DNA, to enter into the cell without the assistance of the protein channels and pumps required by today's highly developed cell membranes. Also unlike modern cells, the protocell does not use enzymes for copying its DNA. Supported with funding from the National Science Foundation and led by Jack W. Szostak of the Harvard Medical School, the research team published its findings in the June 4, 2008, edition of the journal Nature's advance online publication.



"Szostak's group took a creative approach to this research challenge and made a significant contribution to our understanding of small molecule transport through membranes," said Luis Echegoyen, director of the NSF Division of Chemistry. "This is a great outcome of NSF's support of basic research."

Above is a three-dimensional view of a model protocell approximately 100 nanometers in diameter. The protocell's fatty acid membrane allows nutrients and DNA building blocks to enter the cell and participate in non-enzymatic copying of the cell's DNA. The newly formed strands of DNA remain in the protocell. **Janet Iwasa, Szostak Laboratory, Harvard Medical School and Massachusetts General Hospital**

Some scientists have proposed that ancient hydrothermal vents may have been sites where prebiotic molecules--molecules made before the origin of life, such as fatty acids and amino acids--were formed. An animation (accessible at upper right) created by Janet Iwasa of the Szostak Laboratory shows a theoretical scenario in which fatty acids are formed on the surface of minerals deep underground, and then brought to the surface by the eruption of a geyser.

When fatty acids are in an aqueous environment, they spontaneously arrange so that their hydrophilic, or water-loving, "heads" interact with the surrounding water molecules and their hydrophobic, or water-fearing, "tails" are shielded from the water, resulting in the formation of tiny spheres of fatty acids called micelles.

Depending upon chemical concentrations and the pH of their environment, micelles can convert into layered membrane sheets or enclosed vesicles. Researchers commonly use vesicles to model the cellular membranes of protocells. A second animation created by Iwasa (accessible at lower right) shows how vesicles may have been formed.

When the team started its work, the researchers were not sure that the building blocks required for copying the protocell's genetic material would be able to enter the cell.

"By showing that this can happen, and indeed happen quite efficiently, we have come a little closer to our goal of making a functional protocell that, in the right environment, is able to grow and divide on its own," said Szostak.

Co-authors of the Nature paper include Sheref S. Mansy, Jason P. Schrum, Mathangi Krishnamurthy, Sylvia Tobe and Douglas A. Treco of the Szostak Laboratory.

The research was supported by NSF Division of Chemistry award number 0434507. Jack W. Szostak was also supported by National Aeronautics and Space Administration Exobiology Program award number EXB02-0031-0018. Sheref S. Mansy was supported by National Institutes of Health award number F32 GM07450601.
Funding for Exploring Life's Origins Web site project was provided by NSF award number 0610117. **-NSF-**

Duke chemist has new way to tell right from left

DURHAM, N.C. – A Duke University chemist has apparently solved a long-standing frustration in creating certain synthetic molecules that make up drugs, which could lead to better drugs with fewer side effects.

Like human hands, many molecules that make up drugs come in two shapes, right and left. But usually only one of the two versions has the desired effect; the other is at best useless and sometimes even harmful. For example, side effects from the morning sickness drug Thalidomide resulted in profound birth defects because one shape of the molecule was therapeutic and the other was dangerous.

Don Coltart, an assistant professor of chemistry at Duke, appears to have found a way to make synthetic ketone molecules in just one version or the other using a process that is faster, cheaper and less wasteful than the best techniques now available.

And unlike previous attempts to make just one shape of these molecules, a process called asymmetric synthesis, the new method should be able to scaling up to industrial manufacturing quantities.

"Asymmetric synthesis of ketones is not new, but we can do it more practically and easily," said Coltart, who developed the new technique with graduate student Daniel Lim."

Though well-known to the pharmaceutical industry, this problem of molecular handedness in ketones has been difficult to solve. Academic labs have succeeded at asymmetric synthesis over the last two decades, but only by using extreme conditions (e.g. temperatures of -100 degrees Celsius), and costly and time-consuming

steps.

Conducted at zero C to -40 C, the new process uses a small molecule called a "chiral auxiliary" to attach pieces to a molecule being built, which causes the new pieces to have the correct handedness. The process is up to 98 percent accurate, Coltart said, and the auxiliary molecules can be easily released and recycled after they've done their work.

"He did something very different," said Samuel Danishefsky of Columbia University and the Memorial Sloan-Kettering Cancer Center, who is Coltart's former post-doctoral mentor. "You could have had a hundred people look at this problem and not see it the way he did. It's a very nice idea."

Coltart said there is a huge need for drug companies to be more selective to make better drugs with fewer side effects, which this new process might help achieve. Pharmaceutical companies might also use the new technique to turn existing formulations of drugs sold as mixtures into a pure form having only the active form of the drug, giving them another seven years of patent protection.

The work, which was funded internally by Duke, appears online in the international edition of the European journal Angewandte Chemie. (http://dx.doi.org/10.1002/anie.200800848)

Coltart and Duke recently applied for a patent on the process.

Plastic Brain Outsmarts Experts

Training can increase fluid intelligence, once thought to be fixed at birth

Can human beings rev up their intelligence quotients, or are they stuck with IQs set by their genes at birth? Until recently, nature seemed to be the clear winner over nurture.

But new research, led by Swiss postdoctoral fellows Susanne M. Jaeggi and Martin Buschkuehl, working at the University of Michigan in Ann Arbor, suggests that at least one aspect of a person's IQ can be improved by training a certain type of memory.

Most IQ tests attempt to measure two types of intelligence--crystallized and fluid intelligence. Crystallized intelligence draws on existing skills, knowledge and experiences to solve problems by accessing information from long-term memory.

Fluid intelligence, on the other hand, draws on the ability to understand relationships between various concepts, independent of any previous knowledge or skills, to solve new problems. The research shows that this part of intelligence can be improved through memory training.

"When it comes to improving intelligence, many researchers have thought it was not possible," says Jaeggi. "Our findings clearly show this is not the case. Our brain is more plastic than we might think."

Jaeggi, Buschkuehl and Walter Perrig from Bern University, Switzerland, along with Jon Jonides, their National Science Foundation-supported colleague from the University of Michigan, reasoned that just as crystallized intelligence relies on long-term memory, fluid intelligence relies on short-term memory, or "working memory," as it is more accurately called. This is the same type of memory people use to remember a phone number or an e-mail address for a short time, but beyond that, working memory refers to the ability to both manipulate and use information briefly stored in the mind in the face of distraction.

Researchers gathered four groups of volunteers and trained their working memories using a complex training task called "dual n-back training," which presented both auditory and visual cues that participants had to temporarily store and recall.

Participants received the training during a half hour session held once a day for either eight, 12, 17 or 19 days. For each of these training periods, researchers tested participants' gains in fluid intelligence. They compared the results against those of control groups to be sure the volunteers actually improved their fluid intelligence, not merely their test-taking skills.

The results were surprising. While the control groups made gains, presumably because they had practice with the fluid intelligence tests, the trained groups improved considerably more than the control groups. Further, the longer the participants trained, the larger were their intelligence gains.

"Our findings clearly show that training on certain memory tasks transfer to fluid intelligence," says Jaeggi. "We also find that individuals with lower fluid intelligence scores at pre-test could profit from the training."

The results are significant because improved fluid intelligence scores could translate into improved general intelligence as measured by IQ tests. General intelligence is a key to determining life outcomes such as academic success, job performance and occupational advancement.

Researchers also surmise that this same type of memory training may help children with developmental problems and older adults who face memory decline. But, that remains to be seen, because the test results are based on assessments of young, healthy adult participants.

"Even though it currently appears very hard to improve these conditions, there might be some memory training related to intelligence that actually helps," says Jaeggi. "The saying 'use it or lose it' is probably

appropriate here."

Since it is not known whether the improvements in fluid intelligence last after the training stops, researchers currently are measuring long-term fluid intelligence gains with both laboratory testing and long-term field work. Researchers say it will be some time before a complete data set is available to draw any conclusions.

University of Bern professor Walter J. Perrig also co-authors this study along with University of Michigan professor John Jonides. The Swiss National Science Foundation funds Jaeggi and Buschkuehl's visiting scholar status. **-NSF-**

Hay fever vaccine needs just four shots

* 05 June 2008
* From New Scientist Print Edition. Subscribe and get 4 free issues.
*** Andy Coghlan**

STREAMING eyes, runny nose and endless sneezing? Help might be on the way in the form of a hay-fever vaccine that works faster and involves far fewer injections than existing treatment regimens.

Hay fever and some other allergies are caused by an overactive immune response to pollen. Conventional treatments consist of a series of pollen injections that gradually increase in strength, eventually training the immune system to ignore pollen. It is a long, drawn-out process, requiring at least 100 shots spread over up to five years. Meanwhile two vaccines against ragweed allergy developed by Dynavax Technologies of Berkeley, California, and Curalogic of Copenhagen in Denmark, require fewer injections but were recently abandoned because they worked no better than placebos.

Now, a low-hassle hay fever vaccine, requiring just four injections over four weeks, has been shown to have some effect. Although it is not dramatic, Tom Holdich of Allergy Therapeutics in Worthing, UK, which developed the vaccine, points out that it is the only one of its kind that works. Neil Kao, an allergy physician based in Greenville, South Carolina, agrees: "The size of symptom relief is small, but the convenience is very high."

The company gave 1028 volunteers in Europe and North America either its vaccine - Pollinex Quattro - or a placebo just before the start of the 2007 pollen season. During the four "peak" weeks, symptoms were on average 13 per cent less severe in vaccine recipients. One-third of volunteers recorded their symptoms between May and September, and for them the effect appeared to be doubled. The company will present the results on 8 June at the European Academy of Allergology and Clinical Immunology meeting in Barcelona, Spain.

As well as pollen, Pollinex contains monophosphoryl lipid A (MPL), which "retunes" the immune system by damping down the usual "Th2" reaction to pollen and encouraging the milder Th1 response. The vaccine works in a short time because its pollen protein has been modified both to sneak past the body's antibodies, allowing large doses to be given from the start, and to lodge in tissue rather than going directly into the bloodstream, prolonging its effect on the immune system.

Allergy Therapeutics hopes to apply for approval in Europe next year. In the US, the Food and Drug Administration must first review the safety of MPL, which is also present in a cervical cancer vaccine made by GlaxoSmithKline.

Male circumcision is a weapon in the sperm wars

* 18:00 05 June 2008
* NewScientist.com news service
*** Kurt Kleiner**

Circumcision and other forms of male genital mutilation have always been a puzzle. The ritual mutilations can leave the man vulnerable to infection and even death. So why do some societies insist on such a risky ritual for their men?

There may be an evolutionary explanation, according to Christopher Wilson, of Cornell University in New York, US. It could function to reduce a young man's potential to father a child with an older man's wife, he says.

Sperm competition theory predicts that males will evolve ways to ensure that their sperm, and not another male's, fertilises a female's eggs. Genital mutilation, in this view, is just another way to win the sperm war.

In some forms of mutilation, the handicap to sperm competition is obvious. There is subincision, for example, where cuts are made to the base of the penis. This causes sperm to be ejaculated from the base rather than the end, and is performed in several Aboriginal Australian societies, says Wilson.

In some African and Micronesian cultures, young men have one of their testicles crushed.

Male genital mutilation makes it less likely that a male will manage to father a child with another man's wife, Wilson says.

Home advantage

Circumcision is one of the less painful forms of mutilation, but it is also less effective at reducing sperm

competition. Wilson suggests, however, that the lack of a foreskin could make insertion or ejaculation slower, meaning brief, illicit sex is less likely to come to fruition and lead to a pregnancy.

Younger men, he says, willingly submit to having their reproductive ability reduced because they benefit socially from the older men, by forming alliances, and by gaining access to weapons or tribal lore.

The older men have also gone through the ritual, and seen their own reproductive effectiveness reduced. But if a man with, say, four wives wants to ensure that any children his wives produce are his, there is pressure to make sure other men can't successfully impregnate them.

The husband's own reproductive ability is impaired, but continuous and repeated access to his wives makes up for it, while any genital mutilation is a greater handicap to an interloper trying to sneak brief occasional sex with his wives.

Price of alliance

"An older married man must form alliances, or associate with younger or unmarried men at some point, and it would be better to associate with and invest preferentially in those who are least likely to threaten his paternity, especially in societies where cuckoldry is rife," says Wilson.

"Men who demand genital mutilations as part of the price for alliance and investment would be less vulnerable to exploitation of such relationships and loss of paternity to peers."

Wilson has now tested the idea. If the sperm competition theory is correct, he reasoned, then male genital mutilation should be more common in societies where men tend to have multiple wives, especially those in which the wives live apart from the husband.

The mutilation would also probably be carried out in a public setting, witnessed mostly by other men, and performed by a non-relative. Men who refused would face social sanctions.

Who's the daddy?

Wilson searched anthropological databases and found that his predictions were borne out: 48% of highly polygynous societies practice some form of male genital mutilation, and in societies in which wives live in separate households that increases to 63%.

Only 14% of the monogamous societies in the database practice male genital mutilation.

It might also be the case that selection works at a group level, so that societies that enforce mutilation are more stable because of less conflict over paternity, Wilson says.

David Barash, an evolutionary biologist at the University of Washington in Seattle, US, says that the paper makes a convincing case.

"Wilson has tackled a perplexing question and come up with a persuasive preliminary answer to an evolutionary enigma: why do men submit to procedures that seem to reduce their fitness?" he says.

Journal reference: Evolution and Human Behavior (vol 29 p 149)

First Shoes Worn 40,000 Years Ago

By Maggie Koerth-Baker, Special to LiveScience

Humans started wearing shoes about 40,000 years ago, much earlier than previously thought, new anthropological research suggests.

As any good clothes horse knows, the right outfit speaks volumes about the person wearing it. Now, anthropologists are tapping into that knowledge base, looking for the physical changes caused by wearing shoes to figure out when footwear first became fashionable.

Turns out, clothes really do make the man (and the woman), at least when it comes to feet. That's because wearing shoes changes the way humans walk and how their bodies distribute weight. If you wear shoes regularly, as most modern humans do, those changes end up reflected in your bones and ligaments.

Susan Cachel, an anthropologist at Rutgers University in New Jersey, said science has known about the way wearing shoes affects feet since the early 20th century. Researchers have found several differences between feet that regularly wear shoes and those that don't.

For instance, wearing tight shoes can lead to bunions, which are painful enlargements of the bone or tissue in the big toe, she said. People who don't wear shoes have wider feet and bigger gaps between their big toe and the other four. And women who spend a lot of time in high heels wind up with smaller calf muscles.

Erik Trinkaus, an anthropologist at Washington University in St. Louis, was the first person to apply this understanding of how fashion alters physical bodies to anthropology. He found a point in human history where the size of toe bones began to shrink. Combining that data with knowledge of how shoes change the way people walk, Trinkaus reasoned that smaller toe bones meant people had started wearing shoes.

While the oldest surviving shoes are only about 10,000 years old, Trinkaus' discovery pushed the adoption of footwear back to almost 30,000 years ago. He published that research in 2005. Now, thanks to analysis set to be published in the July 2008 issue of the Journal of Archaeological Science, Trinkaus has found that humans were

probably wearing shoes even earlier, about 40,000 years ago.

Through thick and thin

Trinkaus' theory is based on a simple fact: Bone size isn't set in stone.

"Bone, at least to a certain extent, responds during a person's lifetime to the mechanical stresses placed on it," said Tim Weaver, a University of California, Davis, anthropologist. "If you work out at the gym, not only will your muscles get bigger, your bones will become thicker."

For most of their history, humans had big, thick toe bones. Trinkaus said this was because they were doing more walking, climbing and carrying than we do today. In fact, he said, all their leg bones were bigger as well, for the same reasons. This is true for both Neanderthals and the earliest modern humans.

But, around 40,000 years ago, that began to change. Trinkaus noticed that skeletons from this time period still had strong, thick leg bones, but their toes had suddenly gotten smaller. "They had wimpy toes," he said. "I tried to figure out what would take away stresses on the toes, but not the legs, and the answer was shoes."

First shoes, first tailors

While Weaver agrees with Trinkaus' theory, Cachel doesn't buy it. She pointed out that, not long after the time period Trinkaus looked at, humans apparently stopped being so active and all their limb bones, not just the toes, started to shrink.

"If the footbones are smaller, this probably reflects less walking and physical activity, rather than the invention of supportive footware," Cachel said.

Both Weaver and Cachel think that it would make sense for shoes to hit it big around the time Trinkaus thinks they did. Around 40,000 and 30,000 years ago, human culture went through a growth spurt.

"The archaeological record shows may changes, including the types of tools people were making and the first definite artwork, and the oldest needles for making clothing appear shortly afterward," Weaver said.

And Cachel said this was probably the time period where a population boom allowed for the first divisions of labor, meaning that, for the first time, somebody could dedicate all their time to making better, more decorated clothing.

"It seems reasonable that there were changes in footwear around this time too," Weaver said, "But before Erik Trinkaus' study we didn't have any direct evidence."

Militant jihadists are inspired by night dreams, suggests research

The inspirational night dream, or ruya, is a fundamental, inspirational and even strategic part of the militant jihadist movement in the Middle East and elsewhere. This is the conclusion of a study of the reported dreams of many of the best-known al-Qaeda and Taliban leaders carried out by Dr Iain Edgar a social anthropologist at Durham University.

Edgar identified four key themes from his research:

* Militant jihadists are inspired by night dreams
* Militant jihadists legitimize their actions partly on the basis of night dreams
* The inspirational night dream can be more 'real' than reality, connecting the individual to a mythical past
* Militant Jihadism can be directly authorized by dream content

Speaking at the Cheltenham Science Festival today (Friday 6 June) on the cultural significance of sleeping and dreaming Edgar said: "Islam is probably the largest night dream culture in the world today. The night dream is thought to offer a way to metaphysical and divinatory knowledge, to be a practical alternative and accessible source of inspiration and guidance, to offer clarity concerning action in this world."

Edgar interviewed individuals in the UK, Pakistan, Northern Cyprus and Turkey to identify the key features of the inspirational night dream. He also reviewed transcripts including that of Osama Bin Laden, who has spoken of the night dream in the context of his concern that "the secret [of the 9/11 attacks] would be revealed if everyone starts seeing it in their dreams."

"It has been suggested that dream narratives are cynically adopted for propaganda purposes", says Edgar. "This could of course be the case for some individuals but the range and number of reported narratives I have researched strongly argue against this. Even if reported jihadist dream narratives are fabricated, the fact that Muslims often believe them and are mobilized to jihad partly on their account is of significance".

On the significance of the research Edgar said. "Overall, how Moslems, and people in general, understand their night dreams is a powerful tool in assessing their worldview and implicit key motivations. The understanding of night dreams offers an entrée into the deepest recesses of the self, and the emerging self. There is little doubt that one's lived world-view and unconscious, mythic world-view are predictive of one's sympathies and potential actions."

Weight gain may be healthy when it comes to type 1 diabetes

SAN FRANCISCO, June 6 – Gaining body fat may be a good thing, at least for people with type 1 diabetes, say researchers at the University of Pittsburgh Graduate School of Public Health. Their study, being presented at the 68th Scientific Sessions of the American Diabetes Association in San Francisco, followed 655 patients with type 1 diabetes for 20 years and found that patients who gained weight over time were less likely to die.

The findings are based on participants in the Pittsburgh Epidemiology of Diabetes Complications Study, a long-term prospective study of childhood onset type 1 diabetes, which began in 1986. Participants in the study, an average age of 28 when entering the study and 44 at its completion, were diagnosed with type 1 diabetes between 1950 and 1980. Researchers measured patients' body mass index (BMI) and waist circumference and assessed BMI every two years during the study period. Over the course of the study, 147 deaths occurred.

Results showed that patients whose BMI increased the most during the study (2 to 11 points or about 10 to 55 pounds) were one-third less likely to die than those who had smaller increases in BMI, indicating that weight gain may protect people with type 1 diabetes from premature death.

"Although weight gain in adulthood is typically associated with increased mortality, this may not be the case for those with type 1 diabetes," said Trevor Orchard, M.D., professor of epidemiology at the University of Pittsburgh Graduate School of Public Health. "Gaining a reasonable amount of weight may be a sign patients are getting enough insulin and appropriately controlling their disease, which may partly explain why those who gained weight over time had lower mortality rates," said Dr. Orchard, who also is professor of medicine and pediatrics at the University of Pittsburgh School of Medicine.

Dr. Orchard and colleagues also looked at BMI ranges and mortality and found no difference in mortality between those with a BMI in the overweight range (BMI 25 to 30) and the normal range (BMI 20 to 25). Conversely, they found that having a BMI in the underweight (BMI less than 20) or obese range (BMI 30 and greater) was a strong predictor of mortality. When researchers controlled for waist circumference, a commonly cited reason for general fat mortality, patients with a BMI in the underweight range were at greatest risk for death, while those with a BMI in the overweight or obese ranges had a decreased risk of mortality compared to patients with a normal BMI.

"These results are not a firm recommendation to people with type 1 diabetes to put on weight, but it does raise the possibility that weight recommendations in type 1 diabetes may be somewhat different than those for the general population, and emphasizes the complex relationship between body fat and mortality in diabetes," added Baqiyyah Conway, M.P.H., lead author of the abstract.

Previously known as juvenile diabetes, type 1 diabetes is usually diagnosed in children and young adults. In type 1 diabetes, the pancreas produces little or no insulin to properly control blood sugar levels. It is typically treated with insulin replacement therapy. As many as 3 million Americans have type 1 diabetes.

In addition to Dr. Orchard and Ms. Conway, other authors include Rachel G. Miller, M.S.; Tina Costacou, Ph.D.; Linda Fried, M.D.; Robert Evans, Ph.D.; and Sheryl Kelsey, Ph.D., all of the University of Pittsburgh. The study was funded by the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health.

Should medical researchers share their results with the volunteers in their studies?

New analysis looks at ethical, privacy and financial issues

ANN ARBOR, Mich. — Every year, hundreds of thousands of Americans volunteer to take part in medical research studies, from simple health surveys to detailed analyses of their DNA or tests of experimental medicines.

But what happens after their participation is over? In many cases, volunteers won't ever hear from the researchers about what the study revealed. But other studies make a special effort to keep volunteers informed, via newsletters or Web sites.

A new review of the issue, published recently in the journal Public Library of Science Medicine, suggests that participants' desire to know the results of studies outweighs concerns by some bioethicists about the potential negative psychological consequences of sharing some results. Even when it's bad news, most study volunteers want to know.

So, should all medical researchers make an effort to communicate about their results with the volunteers who are so vital to their research? If they try to do so, what hurdles — ethical, privacy-related, financial or logistical — might complicate their efforts? Could sharing clinical research results with some volunteers actually upset them?

Such questions are addressed in the new paper, which was written by University of Michigan medical student David Shalowitz and Franklin Miller, Ph.D., of the Department of Bioethics at the National Institutes of Health. The research was funded by a grant from the U-M President's Initiative for Ethics in Public Life.

The paper reviews the landscape of knowledge on this issue, including commentaries on the potential positive and negative impacts of sharing results, and data from studies that evaluated the desires and reactions

of research volunteers in specific clinical trials.

All in all, the article says, better data are needed on the ins and outs of sharing study results with research volunteers.

"It's a mixed bag," says lead author Shalowitz. "We found overwhelmingly that participants do want access to aggregate study results, and that to a lesser extent they want to know their individual results if they have relevance to their lives."

For instance, volunteers in a study looking for genes related to a particular disease might appreciate the opportunity to find out what their individual genetic test revealed. And they may be interested in learning what the entire study found.

But other people in the same study might not want to know their individual results, for fear of finding out that they have a higher risk of developing a particular disease.

One of the biggest hurdles that the authors found in both commentaries and studies of this issue, Shalowitz says, was the cost of contacting research volunteers and presenting trial results to them.

Presenting aggregate results in layman's language is not as difficult, he notes, as preparing individual reports for each volunteer, which can be very labor-intensive in a large study with hundreds or thousands of participants.

Then there's the ethical issue of whether and how to offer participants a way to communicate with the researchers about what they've been told – for instance, by phone or e-mail if they're concerned about their individual test results.

And, for those who simply don't want to know their individual results or even the aggregate results, a system for opting out is needed.

These considerations might be addressed if researchers consider participant communications during the earliest planning of their study, including the funding request, Shalowitz says.

If the NIH and local Institutional Review Boards were to demand a plan for such communications as part of each study proposal, and perhaps provide staff who could facilitate such efforts, it would help researchers greatly, he adds.

In the end, the authors say, more research on the best approaches for contacting research volunteers, and the actual responses of volunteers to this issue, is needed.

"There's a need to develop a standard way of measuring these domains, so that systematic evaluations can be done," says Shalowitz. "We also need better evaluations of the best ways to communicate data to research participants. We need to change the current situation in which claims are being made about the benefits and risks of sharing results without data to back them up."

For more information on participating in clinical research trials at the University of Michigan, visit the U-M Engage web site, www.umengage.org.

***Reference**: PLoS Medicine, May 13, 2008 medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371%2Fjournal.pmed.0050091*

Mystery of infamous 'New England Dark Day' solved by 3 rings

Black day of 1780 caused by distant wildfires, MU experts say

COLUMBIA, Mo. – At noon, it was black as night. It was May 19, 1780 and some people in New England thought judgment day was at hand. Accounts of that day, which became known as 'New England's Dark Day,' include mentions of midday meals by candlelight, night birds coming out to sing, flowers folding their petals, and strange behavior from animals. The mystery of this day has been solved by researchers at the University of Missouri who say evidence from tree rings reveals massive wildfires as the likely cause, one of several theories proposed after the event, but dismissed as 'simple and absurd.'

"The patterns in tree rings tell a story," said Erin McMurry, research assistant in the MU College of Agriculture, Food and Natural Resources Tree Ring Laboratory. "We think of tree rings as ecological artifacts. We know how to date the rings and create a chronology, so we can tell when there has been a fire or a drought occurred and unlock the history the tree has been holding for years."

Limited ability for long-distance communication prevented colonists from knowing the cause of the darkness. It was dark in Maine and along the southern coast of New England with the greatest intensity occurring in northeast Massachusetts, southern New Hampshire and southwest Maine. In the midst of the Revolutionary War, Gen. George Washington noted the dark day in his diary while he was in New Jersey.

Nearly 230 years later, MU researchers combined written accounts and fire scar evidence to determine that the dark day was caused by massive wildfires burning in Canada.

"A fire comes along and heat goes through the bark, killing the living tissue. A couple of years later, the bark falls off revealing the wood and an injury to the tree. When looking at the rings, you see charcoal formation on

the outside and a resin formation on the top that creates a dark spot," said Richard Guyette, director of the Tree Ring Lab and research associate professor of forestry in the MU School of Natural Resources.

The researchers studied tree rings from the Algonquin Highlands of southern Ontario and many other locations. They found that a major fire had burned in 1780 affecting atmospheric conditions hundred of miles away. Large smoke columns were created and carried into the upper atmosphere.

"This study was a unique opportunity to take historical accounts and combine them with modern technology and the physical historical evidence from the tree rings and solve a mystery with science," McMurry said.

The study – "Fire Scars Reveal Source of New England's 1780 Dark Day" – was published in the International Journal of Wildland Fire.

Circadian Math: One Plus One Doesn't Always Equal Two

Troy, N.Y. – Like a wristwatch that needs to be wound daily for accurate time-telling, the human circadian system — the biological cycles that repeat approximately every 24 hours — requires daily light exposure to the eye's retina to remain synchronized with the solar day. In a new study published in the June issue of Neuroscience Letters, researchers have demonstrated that when it comes to the circadian system, not all light exposure is created equal.

The findings have profound implications for exploring how lighting can be used to adjust our bodies' clocks, and they could redefine the way lighting is manufactured, according to Mariana Figueiro, lead author of the paper and assistant professor in the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute.

Short-wavelength light, including natural light from the blue sky, is highly effective at stimulating the circadian system. Exposure to other wavelengths — and thus colors — of light may necessitate longer exposure times or require higher exposure levels to be as effective at "winding the watch."

In some instances, exposure to multiple wavelengths (colors) of light simultaneously can result in less total stimulation to the circadian system than would result if either color were viewed separately, a phenomenon known as "spectral opponency." The LRC scientists have shown that the circadian system shares neurons in the retina — which exhibit spectral opponency and form the foundation for our perception of color — with the visual system. Thus, in principle, the circadian system may be able to distinguish between lights of different colors.

More than meets the eye

To demonstrate that the circadian system exhibited spectral opponency formed in the retina, the researchers exposed 10 subjects to three experimental conditions: one unit of blue light to the left eye plus one unit of green light to the right eye; one unit of blue light to the right eye plus one unit of green light to the left eye; and half a unit of blue light plus half a unit of green light to both eyes and then measured each individual's melatonin levels, a natural indicator of the circadian clock.

"The first two conditions — exposure to a single color in each eye — did not result in a significant difference in melatonin suppression, while the third condition — exposure to both colors in both eyes — resulted in significantly less melatonin suppression," said Figueiro. "Even though the amount of light at the eye was the same in all three conditions, when the two colors of light were combined in the same eye, the response of the system was reduced due to spectral opponent mechanisms formed in the retina."

This indicates that spectral opponency is a fundamental characteristic of how the human retina converts light into neural signals in the human circadian system, according to Figueiro.

The findings also verify the accuracy of a new quantification system LRC researchers developed in 2006 to calculate the "circadian efficacy" of different light sources. Called the model of human circadian phototransduction, the tool correctly predicted the circadian system response demonstrated under each of the three experimental conditions.

The model appears to correctly predict the circadian response to any light source, and can be used as the foundation for a new system of circadian photometry, much like the current system of photometry based on human vision.

Quantification of light as a stimulus for the circadian system provide new scientific insights into how the human body processes light for the circadian system, according to Figueiro.

Nocturnal melatonin, a hormone produced at night and under conditions of darkness, is used as a marker for the circadian clock. Scientific evidence suggests that disruption of the circadian system — and thus the melatonin cycle — may result in increased malignant tumor growth, as well as poor sleep quality, lack of alertness, seasonal depression, and immune deficiencies.

Now that the model can predict circadian efficacy for any light source, Figueiro and her research partners have begun studying the way time of night affects the potency of light exposure. Once complete, the

comprehensive model will allow manufacturers to develop light sources that most effectively stimulate and, importantly, do not stimulate the circadian system.

Figueiro's research was supported by a $200,000 grant from the New York State Office of Science, Technology, and Academic Research (NYSTAR), which awarded her the James D. Watson Investigator award in 2007.

The Watson awards are designed to recognize and support outstanding scientists and engineers who show potential for leadership and scientific discovery early in their careers in the fields of biotechnology, according to Michael J. Relyea, executive director of NYSTAR.

Figueiro conducted her research with LRC Director Mark Rea, and Senior Research Scientist Andrew Bierman, who are coauthors on the paper.

About the Lighting Research Center *The Lighting Research Center (LRC) is part of Rensselaer Polytechnic Institute of Troy, N.Y., and is the leading university-based research center devoted to lighting. The LRC offers the world's premier graduate education in lighting, including one- and two-year master's programs and a Ph.D. program. Since 1988 the LRC has built an international reputation as a reliable source for objective information about lighting technologies, applications, and products. The LRC also provides training programs for government agencies, utilities, contractors, lighting designers, and other lighting professionals. Visit www.lrc.rpi.edu.*

Hints of 'time before Big Bang'

By Chris Lintott Co-presenter, BBC Sky At Night, St Louis, US

A team of physicists has claimed that our view of the early Universe may contain the signature of a time before the Big Bang.

The discovery comes from studying the cosmic microwave background (CMB), light emitted when the Universe was just 400,000 years old.

Their model may help explain why we experience time moving in a straight line from yesterday into tomorrow.

Details of the work have been submitted to the journal Physical Review Letters.

The CMB is relic radiation that fills the entire Universe and is regarded as the most conclusive evidence for the Big Bang.

Although this microwave background is mostly smooth, the Cobe satellite in 1992 discovered small fluctuations that were believed to be the seeds from which the galaxy clusters we see in today's Universe grew.

Dr Adrienne Erickcek, and colleagues from the California Institute for Technology (Caltech), now believes these fluctuations contain hints that our Universe "bubbled off" from a previous one.

Their data comes from Nasa's Wilkinson Microwave Anisotropy Probe (WMAP), which has been studying the CMB since its launch in 2001.

Their model suggests that new universes could be created spontaneously from apparently empty space. From inside the parent universe, the event would be surprisingly unspectacular.

Arrow of time

Describing the team's work at a meeting of the American Astronomical Society (AAS) in St Louis, Missouri, co-author Professor Sean Carroll explained that "a universe could form inside this room and we'd never know".

The inspiration for their theory isn't just an explanation for the Big Bang our Universe experienced 13.7 billion years ago, but lies in an attempt to explain one of the largest mysteries in physics - why time seems to move in one direction.

The laws that govern physics on a microscopic scale are completely reversible, and yet, as Professor Carroll commented, "no one gets confused about which is yesterday and which is tomorrow".

Physicists have long blamed this one-way movement, known as the "arrow of time" on a physical rule known as the second law of thermodynamics, which insists that systems move over time from order to disorder.

This rule is so fundamental to physics that pioneering astronomer Arthur Eddington insisted that "if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation".

The second law cannot be escaped, but Professor Carroll pointed out that it depends on a major assumption - that the Universe began its life in an ordered state.

This makes understanding the roots of this most fundamental of laws a job for cosmologists.

"Every time you break an egg or spill a glass of water you're learning about the Big Bang," Professor Carroll explained.

Before the bang

In his presentation, the Caltech astronomer explained that by creating a Big Bang from the cold space of a previous universe, the new universe begins its life in just such an ordered state.

The apparent direction of time - and the fact that it's hard to put a broken egg back together - is the

consequence.

Much work remains to be done on the theory: the researchers' first priority will be to calculate the odds of a new universe appearing from a previous one.

In the meantime, the team have turned to the results from WMAP.

Detailed measurements made by the satellite have shown that the fluctuations in the microwave background are about 10% stronger on one side of the sky than those on the other.

Sean Carroll conceded that this might just be a coincidence, but pointed out that a natural explanation for this discrepancy would be if it represented a structure inherited from our universe's parent.

Meanwhile, Professor Carroll urged cosmologists to broaden their horizons: "We're trained to say there was no time before the Big Bang, when we should say that we don't know whether there was anything - or if there was, what it was."

If the Caltech team's work is correct, we may already have the first information about what came before our own Universe.

Story from BBC NEWS: http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7440217.stm

Having heart surgery? Watch your blood sugar, especially if you're overweight or older

People with no history of diabetes may have sustained high glucose levels even after surgery, and need treatment

ANN ARBOR, Mich. — Nearly half of all heart surgery patients may experience blood sugar levels high enough to require temporary insulin treatment after their operation, even though they've never had diabetes, according to a new study from the University of Michigan Health System.

And a significant minority of those patients might need to take medicines for days or even weeks after they leave the hospital, to help their blood sugar levels reach normal again, the researchers show. Obese patients, older patients, and those whose blood sugar levels were still high two days after their operation are most likely to need this kind of treatment, they find.

Although the study didn't look at whether such patients later developed true diabetes or pre-diabetes, the results are striking enough to warrant a new U-M research project. It will recruit patients before their operations, and will include longer follow-up and more rigorous testing of pre-surgery and post-hospitalization blood sugar levels.

On Sunday at the American Diabetes Association's Scientific Sessions in San Francisco, a U-M team presented their findings in a poster that included retrospective data from 1,362 patients who had certain heart and vascular operations at U-M in 2006 and 2007.

Of them, 662 developed "stress induced hyperglycemia", or high blood sugar after surgery, and 87 needed blood sugar medicines when they left the hospital.

The study was possible because UMHS has a dedicated team of physicians, physician assistants and nurse practitioners called the Hospital Intensive Insulin Program who look for and treat elevated blood sugar in all heart and vascular surgery patients. Led by U-M endocrinologist Roma Gianchandani, M.D., the team gives insulin and oral medicines during these patients' hospital stays, and prescribes medicines for the patients to take at home. They also recommend that such patients receive further blood-sugar testing from their primary care doctors.

But high blood sugar in non-diabetic patients after surgery hasn't been fully studied, says Sima Saberi, M.D., the U-M endocrinology fellow who presented at the ADA meeting.

Stress-induced hyperglycemia occurs when the body reacts to the double insults of having an operation on the heart or major blood vessels, and of being cooled down by the heart-bypass machine to protect the heart muscle during surgery.

Heart and vascular surgeons already know that high blood sugar during surgery itself is associated with worse recovery and a higher risk of infection and death. So, most heart and blood vessel surgery patients currently have their blood sugars monitored while they're in the operating room, and many patients receive doses of insulin while the operation is going on.

The new study looked at what happened after surgery, and what factors predicted a need for blood sugar treatment. By far, the most telling sign that a person was likely to need such treatment -- both in the hospital and as they went home -- was their average blood sugar two days after surgery.

Those patients whose glucose levels were still high at this point were more than two and a half times more likely to need post-hospital medicines, even after other factors were considered.

Patients who had a body mass index (BMI) over 35, which is consistent with a diagnosis of obesity, were also somewhat more likely to develop SIH, as were older patients. But these factors were not nearly as strongly predictive of SIH as was the glucose level on the second day after surgery.

Still, Saberi says, overweight patients who carry their excess weight mainly around their waists, in the form of belly fat, are more likely to have metabolic syndrome, which involves both increased cardiovascular risk and increased risk of diabetes.

The patients in the study had either a coronary artery bypass operation, a heart valve operation, or an operation on the upper part of their aorta, the major blood vessel that leads out of the heart to the rest of the body.

The new project, to be led by Gianchandani and Rodica Pop-Busui MD PhD, a co-author of this study, is being proposed to start later this year at U-M.

This study will recruit hundreds of patients who are planning to have these operations and who agree to take oral glucose tolerance tests three months after their operation to measure how well their bodies recover from a blood sugar "challenge." The volunteers will also allow the researchers to monitor their blood sugars during and after surgery, and record other data about them.

The new study's authors are Roma Gianchandani MD, Rodica Pop-Busui, M.D.PhD, Sima Saberi MD, and Mary Fisher. Both Gianchandani and Pop-Busui are assistant professors in the Division of Metabolism, Endocrinology & Diabetes, part of the Department of Internal Medicine at the U-M Medical School.

More information on the UMHS Hospital Intensive Insulin Program is available at: www.med.umich.edu/intmed/endocrinology/staff/HIIP.htm

Acrobat's last tumble

A 4,300-year-old building in Syria reveals an unusual human sacrifice

By Bruce Bower June 6th, 2008

Sometimes it's just good fortune to find a headless acrobat's skeleton sprawled on the floor near the remains of two other people, several mules and an array of valuable metal objects. That, at least, is the opinion of archaeologists who have identified just such a scene, apparently the result of a ritual sacrifice, at an ancient city in northeastern Syria.

This discovery offers a unique view of the social world nearly 4,300 years ago at Nagar, a city that belonged to Mesopotamia's Akkadian Empire, say Joan Oates of the University of Cambridge in England and her colleagues. Nagar's remnants lie within layers of mud-brick construction known collectively as Tell Brak (SN: 2/9/08, p. 90). The earliest layers date to more than 6,000 years ago.

Evidence suggests that this Nagar sacrifice immediately followed a brief abandonment of the site because of some sort of natural disaster. Residents appeased their gods by surrendering valued individuals, animals and objects in a building formerly used for breeding and trading mules that pulled kings' chariots and war wagons. Following the sacrifice, the structure was closed to further activity.

ANCIENT FALL One of the ancient acrobat's lower leg bones displays a bony spur, or protrusion, caused by a fall-related injury. **A. Soltysiak**

Acrobats apparently ranked high enough in Nagar's social sphere to serve as sacrificial offerings, the researchers report in the June Antiquity. Cuneiform texts from Ebla, a nearby site from the same time period, refer to individuals from Nagar known as húb. Scholars have variously defined húb as a term for acrobats, jugglers or horsemen.

An analysis of the most complete human skeleton found in the Nagar structure supports a translation of húb as acrobats, Oates says. The specimen's leg, foot and toe bones display signs of enlarged muscles and energetic activity associated with acrobatics, her team finds.

In further support of that hypothesis, cylinder seals found earlier at Nagar depict processions of spiky-haired acrobats bending over backwards. Ebla documents contain separate terms for dancers and singers, whom Oates regards as unlikely sources of the Nagar skeleton.

"The húb at Nagar were well-known, maybe even famous entertainers, so perhaps their fame was a reason for choosing one of them to sacrifice," Oates says.

Their fame undoubtedly sprung from athletic prowess. The skeleton of undetermined sex studied by Oates' group displays strongly developed attachment areas for ligaments and muscles.

Both forearms feature bony anchors for powerful muscles. Comparably large muscle attachments have been observed on either the right or left forearm of ancient spear throwers. The Nagar individual's knees show wear caused by repeated rotation of the joint. An upper leg bone contains impressions made by a large hamstring muscle, which works like a spring when a person jumps with flexed knees.

Vigorous activity also produced a bony spur where the Achilles tendon attached to the right heel. Ligament imprints on the toes suggest that these digits were frequently flexed against a hard surface, forming pits on the bottoms of some toes.

A hard fall left evidence of a dislocated right leg joint and right ankle inflammation that eventually cleared

up.

“These are the bones of someone who was physically active, using jumping and turning movements in a very disciplined way with feet pointed downwards during leaps,” Oates says.

Two other partial human skeletons found on the floor of the Nagar building also lack heads. One body may be that of a wagon driver, based on its placement near mule remains and its association with wagon-related artifacts. No clues have emerged to the background of the other person.

Finding these bodies with the bones of prized mules — probably bred from onagers and donkeys — along with bronze and silver items, supports a sacrificial scenario, Oates says. Artifacts placed in an adjacent temple courtyard were burned during a ceremony that marked the building’s closure following the ritual sacrifice, she speculates.

Northern Mesopotamian rulers may have emulated the grandiose sacrificial practices of southern Mesopotamian kings that began around 4,800 years ago, remarks archaeologist Guillermo Algaze of the University of California, San Diego. In one southern Mesopotamian city, a queen’s burial chamber includes the bodies of 54 royal retainers, six spear-wielding soldiers and drivers for two wagons, each accompanied by three oxen.

“The acrobat angle that Oates and her colleagues tease out of the Nagar data is entirely new, to my knowledge,” Algaze says.

Origins of the brain

Complex synapses drove brain evolution

One of the great scientific challenges is to understand the design principles and origins of the human brain. New research has shed light on the evolutionary origins of the brain and how it evolved into the remarkably complex structure found in humans.

The research suggests that it is not size alone that gives more brain power, but that, during evolution, increasingly sophisticated molecular processing of nerve impulses allowed development of animals with more complex behaviours.

The study shows that two waves of increased sophistication in the structure of nerve junctions could have been the force that allowed complex brains - including our own - to evolve. The big building blocks evolved before big brains.

Current thinking suggests that the protein components of nerve connections - called synapses - are similar in most animals from humble worms to humans and that it is increase in the number of synapses in larger animals that allows more sophisticated thought.

"Our simple view that 'more nerves' is sufficient to explain 'more brain power' is simply not supported by our study," explained Professor Seth Grant, Head of the Genes to Cognition Programme at the Wellcome Trust Sanger Institute and leader of the project. "Although many studies have looked at the number of neurons, none has looked at the molecular composition of neuron connections. We found dramatic differences in the numbers of proteins in the neuron connections between different species".

"We studied around 600 proteins that are found in mammalian synapses and were surprised to find that only 50 percent of these are also found in invertebrate synapses, and about 25 percent are in single-cell animals, which obviously don't have a brain."

Synapses are the junctions between nerves where electrical signals from one cell are transferred through a series of biochemical switches to the next. However, synapses are not simply soldered joints, but mini-processors that give the nervous systems the property of learning and memory.

Remarkably, the study shows that some of the proteins involved in synapse signalling and learning and memory are found in yeast, where they act to respond to signals from their environment, such as stress due to limited food or temperature change.

"The set of proteins found in single-cell animals represents the ancient or 'protosynapse' involved with simple behaviours," continues Professor Grant. "This set of proteins was embellished by addition of new proteins with the evolution of invertebrates and vertebrates and this has contributed to the more complex behaviours of these animals.

"The number and complexity of proteins in the synapse first exploded when muticellular animals emerged, some billion years ago. A second wave occurred with the appearance of vertebrates, perhaps 500 million years ago"

One of the team's major achievements was to isolate, for the first time, the synapse proteins from brains of flies, which confirmed that invertebrates have a simpler set of proteins than vertebrates.

Most important for understanding of human thought, they found the expansion in proteins that occurred in

vertebrates provided a pool of proteins that were used for making different parts of the brain into the specialised regions such as cortex, cerebellum and spinal cord.

Since the evolution of molecularly complex, 'big' synapses occurred before the emergence of large brains, it may be that these molecular evolutionary events were necessary to allow evolution of big brains found in humans, primates and other vertebrates.

Behavioural studies in animals in which mutations have disrupted synapse genes support the conclusion that the synapse proteins that evolved in vertebrates give rise to a wider range of behaviours including those involved with the highest mental functions. For example, one of the 'vertebrate innovation' genes called SAP102 is necessary for a mouse to use the correct learning strategy when solving mazes, and when this gene is defective in human it results in a form of mental disability.

"The molecular evolution of the synapse is like the evolution of computer chips - the increasing complexity has given them more power and those animals with the most powerful chips can do the most," continues Professor Grant.

Simple invertebrate species have a set of simple forms of learning powered by molecularly simple synapses, and the complex mammalian species show a wider range of types of learning powered by molecularly very complex synapses.

"It is amazing how a process of Darwinian evolution by tinkering and improvement has generated, from a collection of sensory proteins in yeast, the complex synapse of mammals associated with learning and cognition," said Dr Richard Emes, Lecturer in Bioinformatics at Keele University, and joint first author on the paper.

The new findings will be important in understanding normal functioning of the human brain and will be directly relevant to disease studies. Professor Grant's team have identified recently evolved genes involved in impaired human cognition and modelled those deficits in the mouse.

"This work leads to a new and simple model for understanding the origins and diversity of brains and behaviour in all species" says Professor Grant, adding that "we are one step closer to understanding the logic behind the complexity of human brains"

This research was a collaboration between scientists in the Wellcome Trust Sanger Institute, Edinburgh University and Keele University.

Notes to Editors *Publication details*

Emes RD, Pocklington AJ, Anderson CNG, Bayes A, Collins MO, Vickers CA, Croning MDR, Malik BR, Choudhary JS, Armstrong JD and Grant SGN (2008)

Evolutionary expansion and anatomical specialization of synapse proteome complexity. Nature Neuroscience published online Sunday 8 June 2008

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Teenagers and young adults with cancer can face long delays before finally being diagnosed

Patients and doctors need education and simpler referral systems

London, UK: Three studies to be presented at Teenage Cancer Trust's Fifth International Conference on Teenage and Young Adult Cancer Medicine today (Monday) have thrown light on the extent of delays that teenagers and young adults (TYAs) can face before being diagnosed with cancer, and on some of the reasons why this happens.

Tim Eden, Teenage Cancer Trust Professor of TYA Cancer at the University of Manchester, UK, will tell the conference that in a study of 115 patients with bone tumours, the time between the first symptom and a diagnosis (the symptom interval) ranged from four to 184 weeks with the average time being 15.2 weeks. A second study looked at 95 patients with a variety of tumours and found that the symptom interval ranged from two to 192 weeks with the average length being 9.5 weeks. The symptom interval is made up of the time it takes a young person to seek help and the delay by health professionals in recognising symptoms that require referral and prompt diagnosis.

A third study to be reported to the conference by Ms Sam Smith, a TYA Nurse Consultant in the Teenage Cancer Trust Unit at the Christie Hospital (Manchester, UK), shows that out of 207 young people with cancer who took part in an interactive survey, four out five sought medical help very quickly and only seven per cent delayed for a matter of months. Approximately half of the patients with Hodgkin lymphoma, brain and bone cancers had to visit their general practitioner (GP) four or more times before they were referred to a specialist.

Prof Eden said: "It would appear that when we compare these data with studies of children with cancer, teenagers and young adults do face greater delays in diagnosis, particularly for bone and brain tumours and

Hodgkin lymphoma. In our studies the professional interval has always been longer than patient symptom interval. There appears to be delay at primary, secondary and tertiary care levels. Interventions are being explored, both to educate the public, and young people in particular, to seek help for worrying symptoms and to empower them to push for referral to specialists. However, it would seem to be more important to raise awareness amongst professionals to recognise worrying signs and to trigger them to be more rapid in their response; in addition, they need to ensure simple and rapid referral pathways for investigation and subsequent treatment. Whether this will improve survival remains unclear but it will reduce anxiety, anger and distrust of doctors."

He added that from most of the research in this field it was difficult to conclude whether delays in diagnosis did definitely result in worse outcome for TYAs. "There has been an improvement in survival for teenagers and young adults who develop cancer but it has not been so dramatic as seen in children. It is important to realise that there are other potential reasons for delays in diagnosis, including the particular mix of tumour types seen in this age group, with more resistant forms of cancer, and treatments not yet fully adapted to the tumour biology."

In the study of bone tumour patients, Prof Eden said: "The delay was longer if the patient was over 12 years at presentation and if they went to their GP first, rather than going to a hospital accident and emergency department. X-rays were more likely to be taken in A&E at once." Delays also varied depending on the type and site of the tumour.

In the second study looking at all tumour types, the symptom interval varied depending on tumour type, with the shortest wait being seen in those with leukaemia (an average of 4.5 weeks) and the longest for bone tumours (an average of 23 weeks).

Ms Smith will report an analysis of responses from 207 young people with cancer who attended the annual Teenage Cancer Trust "Find your sense of tumour" conference in 2007. Eighty per cent reported that they had gone to their GP within four weeks of noticing pain, a lump or swelling, weight loss or tiredness. Almost all of them had two or three of these symptoms. Of the one in five who delayed seeking help, most (63%) said that either they or their parents had felt that the symptoms weren't serious; a small number had been too embarrassed or scared to seek help.

"If young people are reporting to their GP with what are recognised as being pretty classic cancer symptoms, cancer should be considered the first possibility and not the last resort," said Ms Smith. "However, following the first onset of symptoms many young people reported numerous visits to their GP before being referred to a specialist and many waited several months for this referral to take place. Our findings do show that age is a factor in the number of GP visits, with the older age group reporting more visits before being referred.

"The minority of patients who did delay seeking help sometimes waited for several months. Of that small group, about 60% had Hodgkin lymphoma, which normally presents slowly with increasing swelling most commonly in the neck, but it can be elsewhere in the body."

Leukaemia was the quickest of the cancers to be referred to a specialist, probably because it usually presents with a number of acute signs and symptoms. "However, it is of great concern that some of the commonest cancers at this age – Hodgkin lymphoma, brain and bone cancers – were the slowest to be referred to a specialist. For example, 54% of patients with Hodgkin lymphoma, 59% with brain tumours and 46% with bone tumours visited their GP four or more times with symptoms before referral," said Ms Smith.

Prof Eden said: "A small number of patients may delay in seeking help and we can improve education about health and the meaning of symptoms for the public, but the biggest challenge seems to be to overcome delays by professionals. We need to assist professionals in: recognising signs and symptoms as being potentially serious; referring patients in a timely fashion to appropriate experts; but above all, considering the possibility of cancer in this age range. Cancer is, after all, the most common disease causing death in the 15-24 age range, accounting for 11% of all deaths."

Prof Eden and Ms Smith say that a group of colleagues working together are planning educational programmes about health and cancer symptoms for young people through Teenage Cancer Trust. They are also investigating why rare but serious symptoms and signs do not trigger a rapid response by professionals within the health service.

Note: please see the press release on Sam Smith's case study of a 20-year-old who waited ten months before being diagnosed and starting treatment.

Pre-dinosaur era burrow discovered in Antarctica

* 01:15 08 June 2008
* NewScientist.com news service
*** Jeff Hecht**

Long before the age of the dinosaurs, something was constructing tunnels in Antarctica.

A burrow has been discovered in the ancient flood plain of a broad Antarctic river only a few million years after a mass extinction ended the Permian period.

The tunnel was preserved when a flood washed sand into it, forming a cast 35 centimetres deep and 16 cm wide – and even preserving claw marks scratched into the walls during excavation.

Thrinaxodon from the Early Triassic of South Africa

Palaeontologist Christian Sidor of the University of Washington thinks the den belonged to Thrinaxodon, a small badger-like reptile closely related to mammals.

Procolophon pricei from the Early Triassic of South Africa

A second candidate is a lizard-like reptile called Procolophon. Bones of both animals have been found in Antarctica and in South Africa.

Winter slumber

Fossils show that insects and plants prospered all over late-Permian Antarctica, but the oldest known fossils of four-legged animals come from sites in the Transantarctic Mountains where Sidor found the burrow.

Four-legged animals had spread over other continents tens of millions of years earlier, but were late to arrive in Antarctica, which was part of the vast supercontinent of Pangea, and like today was near the south pole.

The 245-million-year-old structure is the oldest known evidence of quadrupeds in Antarctica, and shows that, like some contemporary animals, they liked to settle down for a long winter's nap.

Extreme environment

In the late Permian, Antarctica had a more moderate climate than that encountered today, but it was still a pretty extreme environment.

"Temperatures within a burrow remain much more constant than outside," says study co-author Molly Miller of Vanderbilt University in Nashville, Tennessee, US. So the dark of polar midwinter would have been a perfect time to snuggle deep in the burrow for a long nap.

While the find is exciting, even older fossils may be hidden under the ice that now covers most of the continent, Sidor says.

Journal reference: Journal of Vertebrate Paleontology (vol 28, p277)

Blocking chemical lets cells feast on brain plaques

DEBRIS-gobbling immune cells have been lured into the brains of mice to gorge on the plaques that cause Alzheimer's disease.

Richard Flavell at Yale University and colleagues created transgenic mice predisposed to develop brain plaques, and doubly transgenic mice that also had a gene that blocks TGF-beta, a chemical used by the immune system.

The researchers expected the second set to fare worse than the first. But to their surprise, the doubly transgenic mice performed better on various mazes when they were 18 months old and had up to 90 per cent fewer plaques in their brains (Nature Medicine, DOI: 10.1038/nm1781). It's not clear why, but it seems that blocking TGF-beta allowed macrophages - immune cells that digest unwanted materials - to get across the blood-brain barrier into the brain, where they feasted on the plaques. "It was like a vacuum cleaner," says Flavell.

It's not known what effect a TGF-beta blocker would have on humans with Alzheimer's. "To reverse the decline would be an improvement," adds Flavell.

Study finds Chinese food good for your heart

Chinese red yeast rice reduces repeat heart attacks/mortality rates

(PHILADELPHIA) – A clinical study on patients who have suffered a heart attack found that a partially purified extract of Chinese red yeast rice, Xuezhikang (XZK), reduced the risk of repeat heart attacks by 45%, revascularization (bypass surgery/angioplasty), cardiovascular mortality and total mortality by one-third and cancer mortality by two-thirds. The multicenter, randomized, double-blind study, was conducted on almost 5,000 patients, ranging in age from 18-70 over a five-year period at over 60 hospitals in the People's Republic

of China. Corresponding author David M. Capuzzi, M.D., Ph.D, director of the Cardiovascular Disease Prevention Program at Jefferson's Myrna Brind Center of Integrative Medicine and Zonliang Lu, M.D., Ph.D, from the Fuwai Hospital at the Chinese Academy of Medical Science report their findings in the June 15th edition of the American Journal of Cardiology.

"It's very exciting because this is a natural product and had very few adverse side effects including no abnormal blood changes," said Capuzzi. "People in the Far East have been taking Chinese red yeast rice as food for thousands of years, but no one has ever studied it clinically in a double-blind manner with a purified product against a placebo group until now and we are pleased with the results. However, people in the United States should know that the commercially available over-the-counter supplement found in your average health food store is not what was studied here. Those over-the-counter supplements are not regulated, so exact amounts of active ingredient are unknown and their efficacy has not been studied yet."

The study looked at patients who had suffered a heart attack in the previous year. Study participants were given two-300-milligram XZK capsules or a placebo and tracked over a five-year period. The XZK capsules contained a combination of lovastatin, lovastatin hydroxyl acid, ergosterol and other components.

"I think it is surprising that a natural product like XZK would have this great an effect," said Capuzzi. "If further testing and study prove true, my hope is that XZK becomes an important therapeutic agent to treat cardiovascular disorders and in the prevention of disease whether someone has had a heart attack or not. But it is important to recognize the fact we do not know exactly how Chinese red yeast rice works. The exact ingredients from the XZK capsules have not been isolated and studied yet. Still the results were so profound, even out performing statins prescribed in numerous western populations, that further study should certainly be investigated."

The study was sponsored by Beijing Peking University WBL Biotech Co. Ltd (WPU), in Beijing, People's Republic of China. Dr. Capuzzi has no financial interest in this company

Military Supercomputer Sets Record

By JOHN MARKOFF

SAN FRANCISCO — An American military supercomputer, assembled from components originally designed for video game machines, has reached a long-sought-after computing milestone by processing more than 1.026 quadrillion calculations per second.

The new machine is more than twice as fast as the previous fastest supercomputer, the I.B.M. BlueGene/L, which is based at Lawrence Livermore National Laboratory in California.

The new $133 million supercomputer, called Roadrunner in a reference to the state bird of New Mexico, was devised and built by engineers and scientists at I.B.M. and Los Alamos National Laboratory, based in Los Alamos, N.M. It will be used principally to solve classified military problems to ensure that the nation's stockpile of nuclear weapons will continue to work correctly as they age. The Roadrunner will simulate the behavior of the weapons in the first fraction of a second during an explosion.

Before it is placed in a classified environment, it will also be used to explore scientific problems like climate change. The greater speed of the Roadrunner will make it possible for scientists to test global climate models with higher accuracy.

To put the performance of the machine in perspective, Thomas P. D'Agostino, the administrator of the National Nuclear Security Administration, said that if all six billion people on earth used hand calculators and performed calculations 24 hours a day and seven days a week, it would take them 46 years to do what the Roadrunner can in one day.

The machine is an unusual blend of chips used in consumer products and advanced parallel computing technologies. The lessons that computer scientists learn by making it calculate even faster are seen as essential to the future of both personal and mobile consumer computing.

The high-performance computing goal, known as a petaflop — one thousand trillion calculations per second — has long been viewed as a crucial milestone by military, technical and scientific organizations in the United States, as well as a growing group including Japan, China and the European Union. All view supercomputing technology as a symbol of national economic competitiveness.

By running programs that find a solution in hours or even less time — compared with as long as three months on older generations of computers — petaflop machines like Roadrunner have the potential to fundamentally alter science and engineering, supercomputer experts say. Researchers can ask questions and receive answers virtually interactively and can perform experiments that would previously have been

impractical.

“This is equivalent to the four-minute mile of supercomputing,” said Jack Dongarra, a computer scientist at the University of Tennessee who for several decades has tracked the performance of the fastest computers.

Each new supercomputing generation has brought scientists a step closer to faithfully simulating physical reality. It has also produced software and hardware technologies that have rapidly spilled out into the rest of the computer industry for consumer and business products.

Technology is flowing in the opposite direction as well. Consumer-oriented computing began dominating research and development spending on technology shortly after the cold war ended in the late 1980s, and that trend is evident in the design of the world’s fastest computers.

The Roadrunner is based on a radical design that includes 12,960 chips that are an improved version of an I.B.M. Cell microprocessor, a parallel processing chip originally created for Sony’s PlayStation 3 video-game machine. The Sony chips are used as accelerators, or turbochargers, for portions of calculations.

The Roadrunner also includes a smaller number of more conventional Opteron processors, made by Advanced Micro Devices, which are already widely used in corporate servers.

“Roadrunner tells us about what will happen in the next decade,” said Horst Simon, associate laboratory director for computer science at the Lawrence Berkeley National Laboratory. “Technology is coming from the consumer electronics market and the innovation is happening first in terms of cellphones and embedded electronics.”

The innovations flowing from this generation of high-speed computers will most likely result from the way computer scientists manage the complexity of the system’s hardware.

Roadrunner, which consumes roughly three megawatts of power, or about the power required by a large suburban shopping center, requires three separate programming tools because it has three types of processors. Programmers have to figure out how to keep all of the 116,640 processor cores in the machine occupied simultaneously in order for it to run effectively.

“We’ve proved some skeptics wrong,” said Michael R. Anastasio, a physicist who is director of the Los Alamos National Laboratory. “This gives us a window into a whole new way of computing. We can look at phenomena we have never seen before.”

Solving that programming problem is important because in just a few years personal computers will have microprocessor chips with dozens or even hundreds of processor cores. The industry is now hunting for new techniques for making use of the new computing power. Some experts, however, are skeptical that the most powerful supercomputers will provide useful examples.

“If Chevy wins the Daytona 500, they try to convince you the Chevy Malibu you’re driving will benefit from this,” said Steve Wallach, a supercomputer designer who is chief scientist of Convey Computer, a start-up firm based in Richardson, Tex.

Those who work with weapons might not have much to offer the video gamers of the world, he suggested.

Many executives and scientists see Roadrunner as an example of the resurgence of the United States in supercomputing.

Although American companies had dominated the field since its inception in the 1960s, in 2002 the Japanese Earth Simulator briefly claimed the title of the world’s fastest by executing more than 35 trillion mathematical calculations per second. Two years later, a supercomputer created by I.B.M. reclaimed the speed record for the United States. The Japanese challenge, however, led Congress and the Bush administration to reinvest in high-performance computing.

“It’s a sign that we are maintaining our position,“ said Peter J. Ungaro, chief executive of Cray, a maker of supercomputers. He noted, however, that “the real competitiveness is based on the discoveries that are based on the machines.”

Having surpassed the petaflop barrier, I.B.M. is already looking toward the next generation of supercomputing. “You do these record-setting things because you know that in the end we will push on to the next generation and the one who is there first will be the leader,” said Nicholas M. Donofrio, an I.B.M. executive vice president.

By breaking the petaflop barrier sooner than had been generally expected, the United States’ supercomputer industry has been able to sustain a pace of continuous performance increases, improving a thousandfold in processing power in 11 years. The next thousandfold goal is the exaflop, which is a quintillion calculations per second, followed by the zettaflop, the yottaflop and the xeraflop.