Good long-term prognosis after West Nile virus infection

Largest study on West Nile virus published in Annals of Internal Medicine

PHILADELPHIA, Aug 19, 2008 – The long-term prognosis of patients infected with West Nile virus is good, according to a new study appearing in the August 19, 2008, issue of Annals of Internal Medicine, the American College of Physicians' flagship journal. This is the largest study of the long-term outcomes of West Nile virus infection.

West Nile virus is a potentially serious central nervous system infection spread by mosquitoes. Many people infected by West Nile virus never get sick, so the disease can be difficult to diagnose. However, approximately 20 percent have symptoms that range from mild flu-like illness to neurological problems such as meningoencephalitis, encephalitis, and acute flaccid paralysis. Recent studies report that troublesome symptoms such as fatigue, cognitive dysfunction, and motor abnormalities can persist for months. However, little is known about long-term recovery.

"This is the first study to comprehensively look at a large population of infected persons to study the long-term effects of West Nile virus," said study author Mark Loeb, MD, M.Sc, Professor, Pathology and Molecular Medicine, Michael G. DeGroote School of Medicine, McMaster University, Ontario, Canada. "We found that both physical and mental functions, as well as mood and fatigue, seemed to return to normal in about one year."

Researchers followed 156 patients between 2003 and 2007 to record patterns of physical and mental effects of West Nile virus infection. Researchers anticipated greater severity and a longer course of depression and fatigue in participants with neurological problems. However, they found symptoms and recovery times to be similar to those in participants without neurological consequences of infection. Pre-existing health conditions were an important factor in long-term prognosis. Patients who were healthy at the time of infection returned to normal health more quickly on average than those who had pre-existing conditions.

Researchers say the data might help patients infected with West Nile virus and their health care providers know the expected rate of recovery of physical and mental functioning, fatigue, and depression.

Indigenous children don't need number words to 'count', says new study

Indigenous Australian children who speak languages that have few number words are still able to count, according to a new international study.

The study, by researchers from the University of Melbourne and University College London, is set to be published in the journal Proceedings of the National Academy of Sciences of the USA. (Media embargo applied until 7am Tuesday 19 August Australian Eastern Standard Time)

The study investigated the number skills of children from two Indigenous communities – a group of Warlpiri speakers in the Tanami Desert, north west of Alice Springs, and Anindilyakawa speakers from Groote Eylandt in the Gulf of Carpentaria – and a group of Indigenous preschool children from Melbourne.

It found that even though these children lived in communities which did not have words or gestures for numbers they were able to demonstrate strong numeracy skills based on quantity and spatial concepts.

It also found that their skills were equal to the English-speaking indigenous children.

Study co-author Associate Professor Bob Reeve, from the University of Melbourne's School of Behavioural Science, says the study strongly contradicts previous research which claimed people needed a language with "counting words" to develop number skills.

He says that it has strong implications for the way numeracy is taught, not only to Indigenous children, but to students from all cultures.

And it could also be a key to a better understanding of why some children struggle with basic numeracy skills.

"This study shows that number abilities are not simply based on culture or language," Associate Professor Reeve says. "Our findings are consistent with the idea that we have an innate system for representing quantity ideas and that the lack of number words in a language should not prevent us from completing simple number and computation tasks."

Associate Professor Reeve says the study shows Indigenous Australian children have very strong basic quantity skills which can be the basis for building further mathematical skills.

"We need to investigate ways in which we can add on to these building blocks to develop ways of teaching numeracy that are relevant to Indigenous students culture," he says.

"We also need to redefine the way we think about numeracy across the board – moving away from the view that we need words to describe numbers and basic computations."

Authors of the study Numerical thought with and without words: Evidence from Indigenous Australian children are Brian Butterworth (Institute of Cognitive Neuroscience, University College London, and Professorial Fellow, Department of Psychology, School of Behavioural Science at the University of Melbourne); Robert Reeve and Fiona Reynolds (Department of Psychology, School of Behavioural Science, University of Melbourne) and Delyth Lloyd (Institute of Cognitive Neuroscience, University College London).

Elderly patients less likely to be transported to trauma centers than younger patients

Elderly trauma patients appear to be less likely than younger patients to be transported to a trauma center, possibly because of unconscious age bias among emergency medical services personnel, according to a report in the August issue of Archives of Surgery, one of the JAMA/Archives journals.

An estimated 39 percent of all trauma patients will be age 65 years or older by the year 2050, according to background information in the article. "Evidence-based clinical practice guidelines strongly recommend that elderly trauma patients be treated as aggressively as non-elderly patients," the authors write. "However, some studies have suggested that age bias may still exist in trauma care, even in the prehospital phase of that care."

David C. Chang, Ph.D., M.P.H., M.B.A., of Johns Hopkins School of Medicine and Johns Hopkins Bloomberg School of Public Health, Baltimore, and colleagues analyzed 10 years of data from the statewide Maryland Ambulance Information System. They also surveyed emergency medical services (EMS) and trauma center personnel after presenting them with the registry findings at EMS conferences and grand rounds between 2004 and 2006. The registry identified 26,565 trauma patients, defined as those who met criteria set by the American College of Surgeons (ACS) and were declared level I status (critically ill or injured and requiring immediate attention) by EMS personnel.

More patients older than 65 were undertriaged, or not taken to a state-designated trauma center, than were younger patients (49.9 percent vs. 17.8 percent). After adjusting for other related factors, the researchers found that being 65 years or older was associated with a 52 percent reduction in likelihood of being transported to a trauma center. This decrease in transports was found to start at age 50 years, with another decrease at age 70.

A total of 166 individuals, including 127 EMS personnel and 32 medical personnel (14 attending physicians, four residents, six medical students and eight nurses), responded to the follow-up surveys. When asked about the most likely reasons for not transporting elderly patients to trauma centers, participants cited inadequate training for managing elderly patients (25.3 percent), unfamiliarity with protocol (12 percent) and possible age bias (13.4 percent) as the top three factors.

"The problem of age bias raised in this study may negate efforts to improve clinical care for elderly trauma patients within trauma centers if the system as a whole does not function properly and deliver patients appropriately to needed resources," the authors write.

"However, it may be difficult to change attitudes of age bias and may require a broad societal campaign. Nevertheless, it may be possible to address this problem without directly addressing age bias. A focus on retraining the providers about triage protocols may be sufficient," the authors conclude. "Additionally, it may be helpful to highlight the literature that now suggests that elderly trauma patients do, in fact, return to productive lives after their injury, which can eliminate the perception of futility of care that may be used consciously or subconsciously to justify age bias."

(Arch Surg. 2008;143[8]:776-781. Available pre-embargo to the media at www.jamamedia.org.)

Editor's Note: Dr. Chang was supported by an Individual National Research Service Award from the National Institute of General Medical Sciences for a portion of this study and was awarded the Maryland EMS-Geriatrics Award by the governor of Maryland in 2005. Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.

Chewing gum associated with enhanced bowel recovery after colon surgery

Chewing gum is associated with enhanced recovery of intestinal function following surgery to remove all or part of the colon, according to an analysis of previously published studies in the August issue of Archives of Surgery, one of the JAMA/Archives journals.

"Postoperative ileus [inability of the intestines to pass contents] is regarded as an inevitable response to the trauma of abdominal surgery and is a major contributing factor to postoperative pain and discomfort associated with abdominal distension, nausea, vomiting and cramping pain," the authors write as background information in the article. The problem is estimated to cost approximately $1 billion in U.S. health care expenditures.

Sanjay Purkayastha, B.Sc., M.R.C.S., and colleagues at St. Mary's Hospital, London, analyzed data from five trials published in or before July 2006 and involving 158 patients. In each trial, a group of patients chewed sugarless gum three times per day following surgery for a period of five to 45 minutes and were compared with patients who did not chew gum.

When the trial results were combined, patients who chewed gum took an average of .66 fewer days to pass flatus (gas) and an average of 1.10 fewer days to have a bowel movement, both signs of returning intestinal function. "Postoperative length of hospital stay was assessed in four trials comprising 134 patients," the authors write. "This was also reduced in the chewing gum group by longer than one day; however, this result was not statistically significant."

Gum chewing is thought to act as a kind of "sham feeding," stimulating nerves in the digestive system, triggering the release of gastrointestinal hormones and increasing the production of saliva and secretions from the pancreas, the authors note.

"In conclusion, we feel that the current evidence suggests that gum chewing following abdominal surgery offers significant benefits in reducing the time to resolution of ileus; however, the studies are insufficiently powered to identify a significant benefit in length of stay," they write. "The potential benefits to individual patients, in health economics terms, are such that a well-designed, large-scale, blinded, randomized, controlled trial with a placebo arm is warranted to answer the question of whether gum chewing can significantly reduce the length of stay after abdominal surgery or whether it merely represents a placebo effect."

(Arch Surg. 2008;143[8]:788-793. Available pre-embargo to the media at www.jamamedia.org.)

Limbs saved by menstrual blood stem cells

Cells obtained from menstrual blood, termed 'endometrial regenerative cells' (ERCs) are capable of restoring blood flow in an animal model of advanced peripheral artery disease. A study published today in BioMed Central's open access Journal of Translational Medicine demonstrates that when circulation-blocked mice were treated with ERC injections, circulation and functionality were restored.

Critical limb ischemia, an advanced form of peripheral artery disease, causes approximately 150,000 amputations per year in the US. Currently there are no medical or surgical interventions that are effective in the advanced stages of the disease. ERCs are cells taken from menstrual blood that are capable of forming into at least 9 different tissue types, including heart, liver and lung. Their discovery won the 'Medicine Research Award of the Year' award for BioMed Central's Research Awards in 2007.

Dr. Michael Murphy, a vascular surgeon from Indiana University and lead author of this study has already performed clinical trials with adult stem cells for patients with peripheral artery disease. He stated, "The advantage of ERCs is that they can be used in an 'off the shelf' manner, meaning they can be delivered to the point of care, do not require matching, and are easily injectable without the need for complex equipment."

The experiments were performed as a collaboration between University of Western Ontario, Scripps Research Institute, Indiana University, and several other academic centers. The ERC cell population is currently being developed by the US publicly traded company Medistem Inc, who supported these studies.

"We are proud of assembling such a strong, clinically experienced team to contribute to these studies" said Dr. Thomas Ichim, CEO of Medistem. "Dr. Ewa Carrier and Suman Kambhampati are hematologists who use stem cells on a regular basis, Dr. Angle is a vascular surgeon, who like Dr. Murphy sees CLI on a daily basis, and Dr. Amit Patel has performed numerous cardiac stem cell clinical trials. With such a team that understands not only the science, but also the practical implementation, we feel we are well positioned to translate this discovery into a practical therapy in the near future".

Notes to Editors

1. Allogenic Endometrial Regenerative Cells: An "Off the Shelf Solution" For Critical Limb Ischemia?
Michael P Murphy, Hao Wang, Amit N Patel, Suman Kambhampati, Niren Angle, Kyle W Chan, Annette M Marleau, Andrew Pyszniak, Ewa Carrier, Thomas E Ichim and Neil H Riordan Journal of Translational Medicine (in press)
During embargo, article available here: http://www.translational-medicine.com/imedia/1126625791206242_article.pdf?random=216886
After the embargo, article available at journal website: http://www.translational-medicine.com/

Researchers link cocoa flavanols to improved brain blood flow

New study suggests cocoa compounds could hold promise for debilitating brain conditions

McLEAN, VA (August 18, 2008) – Cocoa flavanols, the unique compounds found naturally in cocoa, may increase blood flow to the brain, according to new research published in the Neuropsychiatric Disease and Treatment journal. The researchers suggest that long-term improvements in brain blood flow could impact cognitive behavior, offering future potential for debilitating brain conditions including dementia and stroke. In a scientific study of healthy, older adults ages 59 to 83, Harvard medical scientists found that study participants who regularly drank a cocoa flavanol-rich beverage made using the Mars, Incorporated Cocoapro® process had an eight percent increase in brain blood flow after one week, and 10 percent increase after two weeks.

In this first-of-its-kind study, the researchers found both short and long-term benefits of cocoa flavanols for brain blood flow, offering future potential for the one in seven older Americans currently living with dementia. When the flow of blood to the brain slows over time, the result may be structural damage and dementia. Scientists speculate that maintaining an increased blood flow to the brain could slow this cognitive decline.

"The totality of the research on cocoa flavanols is impressive. This is just one more study adding to an increasing body of literature connecting regular cocoa flavanol consumption to blood flow and vascular health improvements throughout the body," said Harold Schmitz, Ph.D., chief science officer at Mars, Incorporated, which has supported research on cocoa flavanols for more than 15 years. "Though more research is needed,

these findings raise the possibility that flavanol-rich cocoa products could be developed to help slow brain decline in older age."

The Body of Evidence

Contrary to statements often made in the popular media, the collective research demonstrates that the vascular effects of cocoa flavanols are independent of general "antioxidant" effects that cocoa flavanols exhibit in a test tube, outside of the body. While research aimed at studying the potential role of cocoa flavanols in the context of blood vessel and circulatory function continues, a number of previously published studies already suggest that the consumption of cocoa flavanols can have important beneficial effects on the function of the body's network of blood vessels. The body of research not only suggests that cocoa flavanols may provide a dietary approach to maintaining cardiovascular function and health, but also points at new possibilities for cocoa flavanol-based interventions for vascular complications associated with cognitive performance, skin health and age-related blood vessel dysfunction.

Future Cocoa Flavanol Research Directions

For more than 15 years, Mars, Incorporated has conducted and/or supported a significant portion of the research undertaken in the field of cocoa flavanols and reported new insights in peer-reviewed scientific literature. Working in collaboration with top research institutions around the world, Mars, Incorporated continues to lead the way in exploring the nutritional and medical potential of cocoa flavanols. Mars' commitment to rigorous scientific research of cocoa and flavanols is evidenced by more than 100 peer-reviewed research publications and more than 80 patents held by the company. Mars also developed and patented the breakthrough process called Cocoapro® that helps retain more of the naturally occurring flavanols in cocoa. The high-flavanol cocoa powders made using the Mars Cocoapro® process are thoroughly characterized in terms of nutrient content, as well as standardized with respect to flavanol level and flavanol profile. Through the newly created Mars Botanical division, Mars will continue to develop and apply industry-leading analytical techniques and standards to further investigate the biomedical potential of cocoa flavanols. For more information on the many research studies on cocoa flavanols, visit www.healthycocoa.com.

Source: Sorond FA, Lipsitz LA, Hollenberg NK, Fisher NDL. Cerebral blood flow response to flavanol-rich cocoa in healthy elderly humans. Neuropsychiatric Disease and Treatment. 2008;4:433-440.

About Mars, Incorporated

Mars, Incorporated, headquartered in McLean, Virginia is a family-owned company with a strong commitment to science-based research. With more than 15 years of research into the health effects of cocoa flavanols, and decades of research invested into improving the cocoa plant and farming techniques, Mars, Incorporated has become the global leader in cocoa research. For more information, visit www.cocoapro.com. For more information about the Mars, Incorporated cocoa sustainability program, visit www.cocoasustainability.mars.com.

New method to overcome multiple drug resistant diseases developed by Stanford researchers

Many drugs once considered Charles Atlases of the pharmaceutical realm have been reduced to the therapeutic equivalent of 97-pound weaklings as the diseases they once dispatched with ease have developed resistance to them.

The problem is well documented for antibiotics, although not confined to them. Chemotherapy drugs that were once highly effective when first used against a particular cancer now are often rendered near powerless when a patient's cancer resurges. Even more devastating, when an organism develops resistance to one drug, it often becomes resistant to other drugs (known as multi-drug resistance), rendering not just one medication but a whole class of therapeutics useless against it.

But researchers at Stanford University have developed a method to get around one of the most common forms of resistance, thereby opening up some if not many resistant diseases to the reinvigorated fury of the medications that once laid them low. To do it, they took a tip from nature.

"Nature has developed all of this firepower for getting things into cells, and one of the ways is to create entities that are arginine-rich," said Paul Wender, the Bergstrom Professor of Chemistry at Stanford University. Arginine is an amino acid, the building block of proteins, and as such is found in virtually every cell in the human body, as well as other mammalian bodies.

Using such a common transporter to ferry a potent medication inside a resistant cell is a bit like recruiting your grandmother to cart a load of switchblade knives through customs. Indeed, Wender said, "Arginine-rich sequences appear to figure in the mechanisms by which many pathogens invade cells." Wender's team used a necklace of eight arginine molecules to surround the medication they worked with.

Wender and his colleagues figured out that a particular molecular subunit within arginine, called a guanidinium group, was what nature actually exploits to get foreign substances through cell membranes. Working with

Taxol(r), a widely used chemotherapeutic agent, they attached a series of arginines with their associated guanidinium groups and tried it out against Taxol-resistant ovarian cancer cells implanted in mice. It worked.

"It's an exciting result to be able to take a drug known to work against cancer, but stymied by resistant cells, and restore it to effectiveness using an arginine transporter," Wender said. "This bodes well for use with other drugs that succumb to resistance."

A paper describing the work is scheduled to be published next week in the online Early Edition of the Proceedings of the National Academy of Sciences. Wender's group collaborated with that of Chris Contag, a professor of pediatrics and of microbiology and immunology at Stanford's School of Medicine, who is a co-author on the paper.

"Overcoming Taxol resistance is big. It's huge," said Nelson Teng, professor of obstetrics and gynecology at the Medical School. "In essence, the technology can be used to overcome one of the most challenging types of problems of drug resistance."

The type of drug resistance that Wender's work has overcome develops when pumps located in the membrane that encloses a cell become sensitized to a medication. It is one of the most common ways in which resistance manifests. The pumps, which normally capture and eject foreign material from a cell, are produced at higher levels in certain resistant cells and, because of their increased number, become more effective at tossing the drug molecules out.

"It is kind of like a bouncer," Wender said. "If you're not recognized as being part of the club, then you're kicked out." Resistant cells also create a lot more of the pumps than a normal cell would have.

Some researchers have tried dealing with this situation by adding another molecule to the mix to inhibit the pump, keeping it busy so the medication can slip in while the pumps are occupied with the decoy molecule. But if any of the molecules make their way into healthy cells, they can gum up the proper functioning of the pumps in those cells, too, adding to the litany of undesirable side effects that generally accompany chemotherapy.

Wender's group decided to see if they could take drugs to which diseases had become resistant and, by combining them with what they call "molecular transporters," get them in around the pump.

"If we think of the pump as being a bouncer for the cellular club, then effectively what we're doing is disguising one of these therapeutic agents to get it in through the back door or the side door," Wender said. "We're not even going to deal with the bouncer."

Therein lies what may be the greatest value of the work. The basic approach of bonding a medication to an arginine-rich transporter to slip it past the cellular sentries could, in theory, be used to get any of a host of medications into any cell that has developed the type of resistance involving increased numbers of export pumps. "This could potentially be used with any drug which is effective but has a delivery problem," Teng said. "Not just Taxol."

That could include medications for diseases caused by antibiotic resistant bacteria, such as multi-drug resistant tuberculosis, or by drug resistant parasites such as malaria, as well as other types of cancer.

The arginine transporter manages to avoid ejection by slipping through the membrane of the cell in between the pumps. The key is the ability of arginine to form weak, temporary bonds with some of the molecules that reside in the membrane.

"As the transporter, with all these arginine guanidinium groups, approaches the cell, it basically does a handshake using hydrogen bonds with cell surface constituents that are in the membrane," Wender said. "In essence, it changes its physical properties by shaking hands with all these cell membrane components."

That change in physical properties effectively cloaks the arginine-Taxol complex, allowing it to slip past the sentries and into the cell. As it passes into the cell, the weak bonds it formed with the membrane components break and the transporter, with its therapeutic load, is free to roam inside the cell.

But after getting into the cell, the arginine-Taxol complex still has to break apart for the Taxol to do its job against the cancer cell. Wender's group achieved this by taking advantage of the presence of a molecule called glutathione, which is generally abundant inside cells and which in cancer cells tends to be present in higher levels than usual.

Glutathione is predisposed to attacking sulphur-sulphur bonds, so that is the bond the researchers used to hold the arginine and Taxol together. Once the arginine-Taxol complex is inside the cell, the glutathione can get to work hacking away at the sulphur bonds, and in the process, unwittingly release the compound that will spell its doom.

Because glutathione is relatively scarce outside of cells, the arginine transporter is effectively inert in that environment, so there are no side effects from having the arginine-Taxol complex moving through the patient's body. This is in stark contrast to the present situation, as many patients are extremely sensitive to the molecular vehicle that is currently used to administer ferried Taxol to the cancer cells.

The researchers achieved another breakthrough by tinkering with the form of the arginine used in their transporter. By altering certain aspects of the arginine, the researchers were able to control the rate at which glutathione slices and dices the arginine-Taxol complex.

This gives them an unprecedented ability to regulate the amount of medication that is active inside the patient at any point in time. To date, doctors have had to be content with injecting as high a dose of medication as patients can tolerate and then waiting as the effective amount in the patients slowly dwindled until they could safely inject more. This approach results in a repeated pattern of rapid spikes in the amount of medication in the system, followed by slow declines until the next spike. Ideally, doctors would like the patient to be continually experiencing the maximum tolerable dosage to keep the pressure on the cancer cells, killing them off as quickly and as thoroughly as possible. The arginine transporter makes this possible.

Ovarian cancer was chosen as the subject cancer for this study in part because it commonly develops resistance to Taxol, but also because of a low long-term success rate in treating it. The American Cancer Society estimates that in the United States alone there will be 21,650 diagnoses of ovarian cancer this year and 15,500 deaths from it.

"Ovarian cancer has a drug [Taxol] that works pretty well in the beginning. Seventy or eighty percent of the patients have a response," Teng said. "But it fails at the end because drug resistance develops."

Further studies need to be done to demonstrate the safety of arginine transporters before they can be used in this application in humans, Wender and Teng said. But the researchers already have positive safety data from tests of arginine-transporter technology in another application, one that does not involve drug resistance, so they are optimistic. The discovery of effective arginine transporters could be the key to treating ovarian cancer, as well as other diseases that develop drug resistance, more effectively.

Other co-authors of the paper in PNAS are Elena Dubikovskaya, a graduate student at the time this work was done and now a postdoctoral fellow at University of California-Berkeley; Steve Thorne, a postdoctoral fellow at the time this work was done and now on a faculty member at the University of Pittsburgh; and Thomas Pillow, a graduate student in chemistry.

Teng is working with Wender on other projects stemming from the work with Taxol but was not involved in the research described in this paper.

UNC study: 'chilling' hardship rates among families raising disabled children

CHAPEL HILL – Families with disabled children are struggling to keep food on the table, a roof over their heads, and to pay for needed health and dental care. But according to a new study from the University of North Carolina at Chapel Hill, these challenges are now falling on middle-income households and not just on poor families as previous research has found.

These latest findings show that long-held federal standards for identifying the nation's poor are not capturing everyone in need and should be re-evaluated, especially for the financial effects on disabled children, said Susan L. Parish, Ph.D., the study's lead investigator and an assistant professor in the UNC School of Social Work.

"The bottom line is that U.S. families raising children with disabilities are reporting severe hardships at rates that are chilling, including families that are solidly middle-class," she said. "We were shocked to find such high rates of hardship among upper-income families."

The study, which is based on 2002 data from the National Survey of American Families, is being published in this month's journal Exceptional Children. The survey analyzed 28,141 households.

The UNC study found that overall, families across all income levels who are raising disabled children are significantly more challenged by food, housing and health issues compared to families without disabled children. Many also struggled to pay their phone bills.

Most surprising, Parish said, was data indicating that a significant percentage of those struggling are higher-income households. Yet based on federal poverty guidelines – which have remained unchanged since the 1960s and are used to determine eligibility for many income, food, health and disability-related programs – those same households would not be classified as "poor," she said. They also would not qualify for assistance, despite the higher costs of raising children with disabilities, Parish noted. In 2002, the federal poverty level for a family of four was $18,100.

According to the study, 40 percent of the surveyed families with disabled children who earned between two to three times the federal poverty level (between $36,200 and $54,300 for a family of four, for example) experienced at least one food hardship, including worrying that food would run out or skipping meals because of a lack of money. Fifteen percent of families with incomes at three or more times the federal poverty level ($54,300 and up for a family of four) experienced housing instability, meaning they were unable to pay their rent or had to move in with others.

"These results suggest that state and federal policies that are in place to help families with disabled children are not going nearly far enough," Parish said. "They are not eliminating deprivation. And these findings are particularly troubling now when the nation's economy is struggling. Families raising children with disabilities are likely to be hardest hit during this economic downturn."

Though the study found that children with disabilities were more likely to have health insurance and a usual source of care, they were 61 percent more likely than non-disabled children to have postponed necessary medical care and 83 percent more likely to have postponed needed dental care. The study didn't examine the causes for those results, but Parish said they likely are related to the expenses of obtaining care – even with health insurance – and other issues, such as limited transportation.

The research results offer a compelling reason to expand eligibility standards for federal programs designed to assist families with disabled children, Parish said. Though more study is needed to determine how best to assist these families, UNC researchers suggest that increasing the income limits for food stamps, housing assistance and federal Supplemental Security Income, which assists low-income people with disabilities, would probably be a good start. Raising the asset limit for Supplemental Security Income and Medicaid, the federal insurance program for the poor and disabled, so that families are not penalized for saving money in case of a hardship would also help, Parish said.

"These families struggle to provide adequate care for their disabled children," Parish said, "and stronger supports are vital."

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UNC trial: oral contraceptives may ease suffering of women with severe PMS

CHAPEL HILL – A new clinical trial at the University of North Carolina at Chapel Hill using a popular low-dose contraceptive could uncover a more effective treatment for the 5 to 10 percent of women who suffer from premenstrual dysphoric disorder (PMDD).

PMDD is much more severe than premenstrual syndrome, or PMS. The disorder interferes with a woman's ability to function effectively several days out of each month, every month. Physical symptoms include bloating, low energy, heart palpitations and joint or muscle pain. Far more disruptive emotional symptoms include irritability, anxiety, depression, mood swings, difficulty focusing and trouble sleeping. For many women with PMDD, five or more of these symptoms occur the week before menstruation starts and disappear a few days after the period begins.

The National Institute of Mental Health awarded UNC a $3 million grant for a five-year clinical trial using a low-dose contraceptive called YAZ (ethinyl estradiol/drospirenone). The trial is based on previous research by David Rubinow, M.D., the Asad Meymandi Distinguished Professor and chair of psychiatry in the UNC School of Medicine.

Rubinow discovered it is the change in – not the level of – reproductive hormones that triggers depression in women who are susceptible to PMDD. In other words, women with the disorder don't have abnormal levels of reproductive hormones, but are more sensitive to the shifts in them that occur prior to menstruation. That sensitivity triggers mood symptoms.

"This study will potentially demonstrate that it is the regimen of administration of birth control pills rather than their specific formulation that results in successful treatment of PMDD," Rubinow said. His colleague and fellow co-principal investigator of the trial, Susan Girdler, Ph.D., professor of psychiatry, added: "If we can eliminate the hormone cycling, we should eliminate the PMDD symptoms."

There are no other studies of continuous administration of birth control pills, so the ability of the study to identify the role of neurosteroids like allopregnanolone (a metabolite of progesterone) in PMDD is unique.

During the trial, researchers will test three groups of 27 women for a three-month period. One group will take a full 28-day dose of oral contraceptives continuously, while another takes the standard 21-7 regimen each month. A third group will be given a placebo.

After the three months, researchers will measure hormone cycling, as well as metabolites of progesterone, which are involved in activating brain centers. "They're regulators of mood and emotion, so if you can eliminate the metabolites that have been implicated in PMDD you may create a huge benefit for women with PMDD," Girdler said.

"We believe this trial will help us understand the underlying physiology, which will allow for the development of a range of possible new treatments," Rubinow added.

That's good news for women like Jamie Dilweg of Chapel Hill, N.C.

Dilweg has managed the disease for 22 years. "Initially, I focused on physical symptoms," she said. "I'd gain weight. My face would be puffy. I had horrible cramps. And that would get me mentally down. The symptoms

changed as I matured and had children. It gradually became more emotional. Now it also affects my mental acuity and I can still get down sometimes."

Dilweg's symptoms are fairly manageable, but other women can suffer major disruptions. "The impairment and reduction in quality of life for women with PMDD during their premenstrual phase is equivalent to people with major depression, anxiety disorder and even post-traumatic stress disorder," said Girdler.

While some women try antidepressants like SSRIs (selective serotonin reuptake inhibitors) to ease the symptoms, a full 40 percent don't respond well to this treatment. "We need other treatment options," Girdler said. "If we can show that continuous low-dose contraceptives are effective, that opens up another option that may have a better risk-benefit profile than SSRIs."

Women with severe premenstrual symptoms who are medically healthy and not currently taking psychotropic medicines for PMDD are invited to enroll in the trial. "Many women in our previous studies felt better knowing they were contributing to furthering our knowledge about this disorder and informing subsequent treatment options," Girdler said.

And even those who are not accepted will derive benefit from participating. "We can give them a gold-standard diagnosis if they do have PMDD; and if they have something else we can help them find treatment for it," Girdler added.

That knowledge can provide comfort to women struggling with the disorder. "Now that I've got the diagnosis," Dilweg said, "I know what to do and where to go. I have all the information and I know help is there. There's such a peace of mind from that."

There is also hope. "The more we understand, the better we can treat it, and the better for everyone," Dilweg said. "There is so much lost productivity in women with PMDD. Just think how much more a woman could accomplish if she didn't have to lose so much of herself and her energy every month."

The trial is currently enrolling subjects. Interested women can call (919) 966-2547 or visit www.womensmooddisorders.org. NOTE: To see a video related to the trial and Rubinow and Girdler's research, go to: http://www.unchealthcare.org/site/newsroom/pmdd_relief0814.

New reasons to avoid grapefruit and other juices when taking certain drugs

Mark T. Sampson

PHILADELPHIA, Aug. 19, 2008 — Scientists and consumers have known for years that grapefruit juice can increase the absorption of certain drugs — with the potential for turning normal doses into toxic overdoses. Now, the researcher who first identified this interaction is reporting new evidence that grapefruit and other common fruit juices, including orange and apple, can do the opposite effect by substantially decreasing the absorption of other drugs, potentially wiping out their beneficial effects.

The study provides a new reason to avoid drinking grapefruit juice and these other juices when taking certain drugs, including some that are prescribed for fighting life-threatening conditions such as heart disease, cancer, organ-transplant rejection, and infection, the researcher says. These findings — representing the first controlled human studies of this type of drug-lowering interaction — were described today at the 236th National Meeting of the American Chemical Society.

"Recently, we discovered that grapefruit and these other fruit juices substantially decrease the oral absorption of certain drugs undergoing intestinal uptake transport," says study leader David G. Bailey, Ph.D., a professor of clinical pharmacology with the University of Western Ontario in London, Ontario. "The concern is loss of benefit of medications essential for the treatment of serious medical conditions."

Bailey and colleagues announced almost 20 years ago the unexpected finding that grapefruit juice can dramatically boost the body's levels of the high-blood-pressure drug felodipine, causing potentially dangerous effects from excessive drug concentrations in the blood. Since then, other researchers have identified nearly 50 medications that carry the risk of grapefruit-induced drug-overdose interactions. As a result of the so-called "Grapefruit Juice Effect," some prescription drugs now carry warning labels against taking grapefruit juice or fresh grapefruit during drug consumption.

In the most recent research, Bailey's group had healthy volunteers take fexofenadine, an antihistamine used to fight allergies. The volunteers consumed the drug with either a single glass of grapefruit juice, water containing only naringin (substance in grapefruit juice that gives the juice its bitter taste), or water. When fexofenadine was taken with grapefruit juice, only half of the drug was absorbed compared to taking the drug with water alone, Bailey says. Loosing half of the amount of drugs taken into the body can be critical for the performance certain drugs, he points out.

They also showed that the active ingredient of grapefruit juice, naringin, appears to block a key drug uptake transporter, called OATP1A2, involved in shuttling drugs from the small intestine to the bloodstream. Blocking this transporter reduces drug absorption and neutralizes their potential benefits, the researchers say. By contrast,

drugs whose levels are boosted in the presence of grapefruit juice appear to block an important drug metabolizing enzyme, called CYP3A4, that normally breaks down drugs.

"This is just the tip of the iceberg," Bailey says. "I'm sure we'll find more and more drugs that are affected this way."

To date, grapefruit, orange and apple juices have been shown to lower the absorption of etoposide, an anticancer agent; certain beta blockers (atenolol, celiprolol, talinolol) used to treat high blood pressure and prevent heart attacks; cyclosporine, a drug taken to prevent rejection of transplanted organs; and certain antibiotics (ciprofloxacin, levofloxacin, itraconazole). But additional drugs are likely to be added to the list as physicians become more aware of this drug-lowering interaction, Bailey says.

Orange and apple juices also appear to contain naringin-like substances that inhibit OATP1A2, Bailey says. The chemical in oranges appears to be hesperidin, but the chemical in apples has not yet been identified, the researchers notes.

Bailey advises patients to consult with their doctor or pharmacist before taking any medications with grapefruit juice or other fruits and juices. Unless it is known to be a problem, he recommends taking most medications only with water. This research was funded by grants from the Canadian Institutes of Health Research and the United States Public Health Service.

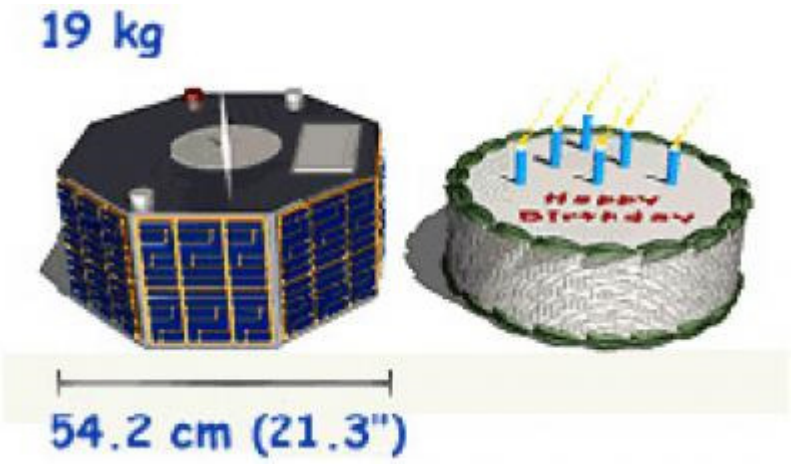
The American Chemical Society — the world's largest scientific society — is a nonprofit organization chartered by the U.S. Congress and a global leader in providing access to chemistry-related research through its multiple databases, peer-reviewed journals and scientific conferences. Its main offices are in Washington, D.C., and Columbus, Ohio.

Key advance toward 'micro-spacecraft'

– Adam Dylewski

PHILADELPHIA, Aug. 19, 2008 — Fleets of inexpensive, pint-sized spacecraft are one giant leap closer to lift off. Researchers here at the 236th National Meeting of the American Chemical Society describe a new, razor thin temperature-regulating film that brings this sci-fi vision of "micro-spacecraft" weighing barely 50 pounds and 10-pound "nano-spacecraft" closer to reality.

"We don't have the processes in space to remove excess heat or keep the spacecraft warm in excess cold," says Prasanna Chandrasekhar, Ph.D. "It may sound very trivial, but controlling the temperature of a spacecraft is absolutely crucial. Currently, there is no way to do it for very small spacecraft."



Comparison of a typical micro-spacecraft to the size of a birthday cake. **Prasanna Chandrasekhar**

With the cost of orbiting one pound of payload hovering around $5,000, micro-spacecraft are expected to be the thrust of future aerospace development. With these miniature craft, NASA, military and private firms will be able to launch more probes and satellites at lower cost, opening the doors to profound new applications for communications and defense. But before the first micro-spacecraft can blast off, scientists need to shrink the titanic thermal regulation systems used to help prevent today's ships from frying in the harsh sunlight of space – or freezing in the pitch black absence of it.

Space is an unforgiving environment. Outside of the cozy confines of Earth's atmosphere, every shuttle and satellite needs to contend with extreme heat and cold, blasts of charged particles from constant solar wind and periodic solar flares, corrosive atomic oxygen and punishing UV rays. Finally, there are micrometeoroids, bits of space debris traveling at over 20,000 miles per hour – approximately ten times faster than any bullet on earth.

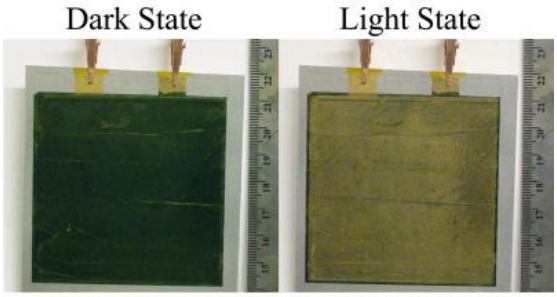
Chandrasekhar and his team had to construct a thermo-regulating technology that could contend with all of these hazards – and still be light enough for use on micro-spacecraft.

In large spacecraft, mechanical "louvers" – Chandrasekhar calls them "glorified window blinds" – and loops of refrigeration pipes handle thermal control. Besides having weight and cost disadvantages, these technologies are difficult or impossible to adapt to micro- and nano-spacecraft.

Chandrasekhar began tackling the problem in 2003 as an offshoot of a military technology. His solution was to design a so-called "thin-film variable emittance electrochromic device," a slender, flexible "sandwich" that feels like plastic and can change color when given an electrical charge. The thin-film could be applied to micro-spacecraft like a skin, switching color from light to dark based on its exposure to harsh sunlight or extreme darkness. Chandrasekhar added that the "color change" is in the infrared as well as in the visible color spectrum.

The film moves from a high "emittance" state — or one that emits lots of heat — in hot temperatures and a low emittance, or insulating, state in freezing temperatures. The thermo-film also has a protective layer consisting of germanium silicon oxides to protect it from atomic oxygen, which can corrode ships and shorten their lifespan – a serious problem for space stations and vital communications satellites.

The silicon oxide topcoat also imparts a lower "solar absorptance" to the skin. Even in its light-color state, the skin is still highly absorptive of solar radiation and can get very hot as a result. The topcoat ensures that the solar absorptance stays below a value that prevents heating of the skin under direct solar radiation.



(Device mounted on 0.4 mm aluminum backplate.)

The thin film is able to change color from light to dark based on its exposure to harsh sunlight or extreme darkness. **Prasanna Chandrasekhar.**

Although the film is under one hundredth of an inch thick, it is tough enough to withstand the micrometeoroids hurtling through space. "The test for micrometeoroids was very simple — we just fired a gun loaded with small particles and tiny, harpoon-like needles at it," says Chandrasekhar, a researcher with the Ashwin-Ushas Corporation who carried out the research with NASA.

Other extreme experiments confirmed the film's resilience. To simulate the succession of intense heat and cold of space, the device was placed in a vacuum and exposed to temperatures that cycled continuously between -58 and 212 degrees F over several months. The film successfully endured these and other durability tests – Chandrasekhar says their device has yielded "very good results" all around.

"This work represents a radical improvement over prior work presented by this firm in incorporating a protective layer that drastically lowers the solar absorptance to an acceptable value," says Chandrasekhar. "The variable emittance electrochromic technology is an entirely new technology pioneered by this firm. To the best of our knowledge, no other group has done any work in this area."

NASA aims to get the first micro-spacecraft prototypes operational by 2013, so Chandrasekhar says his team is working to get their thermo-film tested in space as soon as possible.

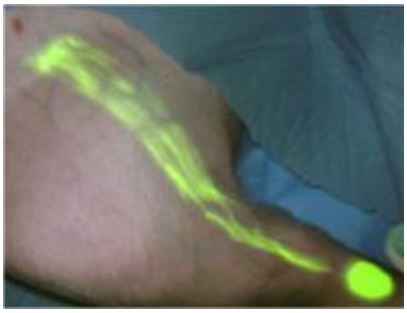
Once deployed, micro-spacecraft would fly in constellation, making them nearly impossible to detect or blast out of the sky. With cheaper launch costs and a larger number of tiny satellites in orbit, micro-spacecraft could broaden the scope of satellite communications by opening it up to industries now unable to afford them. Improved hurricane detection as well as faster, more reliable and universally accessible telecommunications would be just the beginning.

Earthbound uses also exist for the thermo-film. Chandrasekhar says that countries with hot or cold climates could build homes with this color- and emittance-changing film to better control temperature cheaply. He has already received inquiries from overseas to create cinderblocks skinned with the temperature regulating film.

Chandrasekhar says that interest is building for the thermo-film. "A lot of spacecraft engineers have come to us saying 'If we had this technology, it would give us much greater design freedom for future micro-spacecraft.'"

'Cutting by color': New imaging technique for more precise cancer surgery

PHILADELPHIA, Aug. 19, 2008 — Cancer surgeons today operate "blind" with no clear way of determining in real-time whether they have removed all of the diseased tissue, which is the key to successful surgery. Researchers in Massachusetts now report development and early clinical trials of a new imaging system that highlights cancerous tissue in the body so that surgeons can more easily see and remove diseased tissue with less damage to normal tissue near the tumor.



The technique shows particular promise for improving surgery for breast, prostate, and lung cancer, whose tumor boundaries can be difficult to track at advanced stages, they say. Described today at the 236th National Meeting of the American Chemical Society (ACS), the technique can also help cancer surgeons avoid cutting critical structures such as blood vessels and nerves.

A futuristic imaging technique could improve cancer surgery by revealing hidden anatomical details. Photo of a pig's hind leg viewed after injection with near-infrared contrast agents and imaging with near-infrared light to highlight lymph flow. **John V. Frangioni, M.D., Ph.D. Beth Israel Deaconess Medical Center, Boston.**

"This technique is really the first time that cancer surgeons can see structures that are otherwise invisible, providing true image-guided surgery," says project director John Frangioni, M.D., Ph.D., of Beth Israel

Deaconess Medical Center (BIDMC) in Boston and co-director of its Center for Imaging Technology and Molecular Diagnostics. "If we're able to see cancer, we have a chance of curing it."

The system is called FLARE, or Fluorescence-Assisted Resection and Exploration. Under development for the past decade, the portable system consists of a near-infrared (NIR) imaging system, a video monitor, and a computer. "The system has no moving parts, uses LEDs instead of lasers for excitation, makes no contact with the patient, and is sterile," Frangioni says.

The unique system uses special chemical dyes, called NIR fluorophores, that are designed to target specific structures such as cancer cells when the dyes are injected into patients. When exposed to NIR light, which is invisible to the human eye, the dyes or contrast agents light up the cancer cells and are shown on a video monitor. Images of these "glowing" cancer cells are then superimposed over images of the normal surgical field, allowing surgeons to easily see the cancer cells even in a background crowded by blood and other anatomical structures, the researcher says.

Frangioni compares the system to the old color-by-number paint sets. Instead of coloring by numbers, it will provide surgeons with a means of "cutting by color," he says. The computerized technique also gives physicians the power to control multiple viewing angles and different magnification levels through the use of a footswitch.

In preliminary studies, Frangioni and colleagues used the FLARE to successfully visualize organs and body fluids of mice and map the lymph nodes of pigs, all in real-time. The first human clinical trials, expected to begin this summer, involve mapping the lymph nodes of a small group of patients with breast cancer. Broader clinical use of the device could occur within five years, the researchers estimate.

In the future, fluorophores could be developed to highlight nerves and blood vessels in one color while visualizing cancer cells in a different color, allowing multiple structures to be viewed easily and even simultaneously, he says.

"The future of the technology now is really in the chemistry," Frangioni says. "We have to develop agents for specific tumors, nerves or blood vessels we're trying to visualize."

The study is funded primarily through a Bioengineering Research Partnership from the National Cancer Institute of the National Institutes of Health.

Silver-coated endotracheal tubes appear to reduce risk of pneumonia associated with ventilator use

Among intensive care unit patients who require mechanical ventilation, use of a silver-coated endotracheal tube resulted in reduced incidence of pneumonia associated with ventilators, according to a report in the August 20 issue of JAMA.

Ventilator-associated pneumonia is associated with longer hospital stays, increased health care costs and infection with antibiotic-resistant pathogens, according to background information in the article. It is likely to develop when pathogenic bacteria colonize the aerodigestive tract or when patients breathe out contaminated secretions. "Prevention strategies often focus on modifiable risk factors for colonization and aspiration and can successfully reduce ventilator-associated pneumonia rates, but no single strategy completely eliminates ventilator-associated pneumonia," the authors write. "Adherence to prevention guidelines is variable due to costs and lack of education, resources and leadership."

Silver has displayed antimicrobial activity in the laboratory and has blocked the formation of harmful pathogens on ventilator tubes in animal models. Marin H. Kollef, M.D., of the Washington University School of Medicine, and colleagues in the NASCENT Investigation Group report on a randomized controlled trial involving patients at 54 centers expected to require mechanical ventilation for 24 hours or longer. Between 2002 and 2006, 2,003 patients were randomly assigned to undergo intubation with either a silver-coated tube or a similar tube that was not coated.

Of 1,509 patients who were intubated for 24 hours or longer, 4.8 percent of those with silver-coated tubes developed ventilator-associated pneumonia, compared with 7.5 percent of those with uncoated tubes—a 35.9 percent relative reduction in risk. Among 1,932 patients who were on ventilators for any length of time, the silver coating was associated with a 34.2 percent relative reduction in risk of developing pneumonia (3.8 percent of those with silver-coated tubes vs. 5.8 percent with uncoated tubes).

In addition, the silver-coated tubes were associated with a delayed occurrence of ventilator-associated pneumonia. No differences were seen between the two groups in median (midpoint) duration of intubation, length of stay in the intensive care unit (ICU) or in the hospital, death rates or frequency and severity of adverse events.

"In conclusion, the results of this large, randomized, multicenter study demonstrated that the silver-coated endotracheal tube significantly reduced the incidence of microbiologically confirmed ventilator-associated

pneumonia and had its greatest benefit during the peak time of ventilator-associated pneumonia occurrence, without any notable adverse events," the authors conclude. "The silver-coated endotracheal tube appears to offer a unique approach because it is the first intervention that becomes user-dependent after intubation, requiring no further action by the clinician."

(JAMA. 2008;300[7]:805-813. Available pre-embargo to the media at www.jamamedia.org.)

***Editor's Note**: This study, including design, data collection, statistical analysis and manuscript preparation, was supported by a research grant from C. R. Bard Inc. Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.*

***Editorial**: Silver-Coated Endotracheal Tubes Not Definitive Solution But Could Benefit High-Risk Patients*

"Based on the results of this trial, should clinicians reconsider guidelines for ventilator-associated pneumonia prevention and use a silver-coated endotracheal tube in all patients requiring intubation and mechanical ventilation in the ICU?" writes Jean Chastre, M.D., of the Groupe Hospitalier Pitie-Salpetriere, Paris, in an accompanying editorial.

"The answer is probably yes for the subset of patients at very high risk of developing early-onset ventilator-associated pneumonia, such as neurologically impaired patients or trauma patients, because the greatest effect of the intervention appeared to occur during the first 10 days of mechanical ventilation and was clinically relevant, with minimal effect on clinician workload," Dr. Chastre writes.

"Important uncertainties exist regarding the exact benefit of silver-coated endotracheal tubes," Dr. Chastre concludes. "Consequently, silver-coated tubes should not be viewed as the definitive answer for ventilator-associated pneumonia prevention, and, until additional data confirm the clinical effectiveness and cost benefit of these devices, their issue should be restricted to high-risk patients treated in ICUs with benchmark value-based infection rates that remain above institutional goals despite implementation of a comprehensive strategy of usual preventive measures to prevent ventilator-associated pneumonia."

(JAMA. 2008;300[7]:842-844. Available pre-embargo to the media at www.jamamedia.org.)

***Editor's Note**: Dr. Chastre reported receiving consulting and lecture fees from Pfizer, Brahms, Wyeth, Johnson & Johnson, Bayer-Nektar and Arpida. Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.*

Study finds foul owls use feces to show they are in fine feather

Some years ago, within the Department of Conservation Biology of the Estación Biológica de Doñana (EBD-Consejo Superior de Investigaciones Científicas; Seville, Spain), a recently established group (colloquially named the Night Ecology Group) started to explore the possibility of visual communication in crepuscular and nocturnal birds.

New research on this topic challenged the common belief that social communication in this group of species is limited to vocal signaling. By using the largest European owl (the eagle owl) as their biological model, members of this EBD group (Drs Vincenzo Penteriani and María del Mar Delgado) discovered that these crepuscular and nocturnal species use visual signaling in intraspecific communication, both in territorial and in parent-offspring contexts.

As a direct consequence of their receptiveness to visual communication, the researchers surmised that owls could potentially employ various visual signals in other situations involving intraspecific interaction.

In a paper published in the online, open-access journal PLoS ONE, August 20, Penteriani and Delgado now provide descriptive and experimental evidence that suggests that owl faeces and prey remains could act as previously unrecognized visual signals for this nocturnal, avian predator.

"I believe that this novel signaling behavior could indicate the owls' current reproductive status to potential intruders, such as other territorial owls or non-breeding floaters," Delgado said. "Such marking behavior may have been overlooked in birds, and I hope that our story will represent the beginning of new and stimulating explorations on other questions and mechanisms in territoriality and social communication."

"Moreover," Penteriani added, "faeces may represent an ideal substance for marking, because it has a minimal energetic cost to the signaler, and can continue to indicate possession of a territory when the owner is occupied in activities other than territorial defense."

Image shows a frequent marking pattern that uses the darkest section of the substrate.

In an unpredictable natural world in which some birds are capable of masticating vegetables to paint a saliva-plant mixture on their shelters, or arrange the brightest feathers to decorate their nests, the scientists present preliminary evidence suggesting that owls may use faeces and prey feathers to signal their breeding status to conspecifics.

But Penteriani also stressed that the information presented in the PLoS ONE paper mainly serves to provide a baseline for further testing of this hypothesis. "To obtain stronger evidence on the intriguing idea that eagle owls use faeces and prey feathers to signal current reproduction," he said, "we will need to perform further experimental studies and behavioral observations that examine whether faeces and feathers provoke specific behavioral reactions and what functional significance these behavioral reactions have."

Their study on visual signaling with faeces had some funny episodes. During the research, they removed eagle owl faeces from a large number of posts as additional evidence that faeces in the areas surrounding nests were used for signaling. In the morning, the researchers covered the faeces by spray-painting the marks with a paint color similar to the background color.

"In most cases," said Penteriani and Delgado, "owls responded so rapidly to the removal of their faecal marks that during the night after the spraying that they came back to defecate not only on the same posts but precisely on the painted stretches!"

Citation: Penteriani V, Delgado dMM (2008) Owls May Use Faeces and Prey Feathers to Signal Current Reproduction. PLoS ONE 3(8): e3014. doi:10.1371/journal.pone.0003014 http://dx.plos.org/10.1371/journal.pone.0003014

Merck catches more flak over dangerous drug

* 10:15 19 August 2008
* NewScientist.com news service
*** Jim Giles**

It looks like a regular report of a clinical trial - it contains the usual mix of data, statistics and analysis. But a group of doctors is alleging that a paper published in Annals of Internal Medicine in 2003 has been heavily influenced by the marketing division of the pharmaceutical giant, Merck.

The Annals study reported positive results for Vioxx, a painkiller that was manufactured by Merck. In patients with osteoarthritis, said the paper's authors, the drug caused fewer side effects than naproxen, another commonly prescribed painkiller

But a year after the trial was published, Merck withdrew Vioxx owing to safety concerns. In the court cases that followed, where Merck eventually agreed to pay out $4.85 billion in settlements, internal company documents were released. These reveal the true nature of the study, say Kevin Hill of McLean Hospital in Belmont, Massachusetts, and colleagues.

The documents include memos in which Merck staff describe the trial as being designed to introduce Vioxx to primary-care physicians, who the company knew issued most painkiller prescriptions for arthritis patients.

The papers quotes a memo saying that Merck's marketing department had responsibilities to "set objectives" and "design the protocol and oversee execution" of the trial. The company collected data on the prescription habits of the doctors involved and noted that more were prescribing Vioxx by the end of the trial.

The use of such "seeding studies" is considered unethical, in part because patients are exposed to risk without being properly informed of the purpose of the trial. Merck staff appeared wary of this being revealed. In an internal email, a marketing division staff member says, "It may be a seeding study, but let's not call it that in our internal documents".

Physicians were aware that such studies existed, but this is the first time that an individual trial has been definitively identified as such, notes Joel Lexchin, a public health expert at the University of Toronto. "Up until now there had only been circumstantial evidence," says Lexchin. "This is the one that says 'gotcha'."

Jonathan Edelman, of Merck's Global Center for Scientific Affairs, says that the trial was run by researchers, not marketing officials. He says that the two groups work within the same division but are independent of each other, and adds that colleagues who referred to it as a seeding trial were misinformed.

Journal reference: Annals of Internal Medicine (vol 149, p251)

Polygamy is the key to a long life

* 17:26 19 August 2008
* NewScientist.com news service
*** Ewen Callaway**

Want to live a little longer? Get a second wife. New research suggests that men from polygamous cultures outlive those from monogamous ones.

After accounting for socioeconomic differences, men aged over 60 from 140 countries that practice polygamy to varying degrees lived on average 12% longer than men from 49 mostly monogamous nations, says Virpi Lummaa, an ecologist at the University of Sheffield, UK. Lummaa presented her findings last week at the International Society for Behavioral Ecology's annual meeting in Ithaca, New York.

Rather than a call to polygamy, the research might solve a long-standing puzzle in human biology: Why do men live so long?

This question only makes sense after asking the same for women, who - unlike nearly all other animals - live long past the menopause.

Enforced monogamy

One answer seems to be a phenomenon called the grandmother effect. For every 10 years a woman survives past the menopause, she gains two additional grandchildren, Lummaa says. It seems that doting on and spoiling grandchildren aids their survival, as well as furthering some of their grandmother's genes.

Men, by contrast, can reproduce well into their 60s and even 70s and 80s, and most researchers assumed this explained their longevity. But Lummaa and colleague Andy Russell wondered whether other factors explained the long lifespan of men, such as a grandfather effect.

To test this possibility, the team analysed church-gathered records for 25,000 Finns from the 18th and 19th centuries. People tended to move little, no one practiced contraception and the Lutheran Church enforced monogamy. Only widowed men could remarry, and if they had children with their new wife, they fathered more kids, on average, than men who married once.

But ultimately remarried men "don't end up with any more grandchildren," Lummaa says. "If anything the presence of a grandfather was associated with decreased survival of grandchildren."

Perhaps, Lummaa adds, the children of the first mother lose out on food and resources that go to the second mother's kids. "It's kind of the Cinderella effect."

Even fathers with only one wife provided no benefit to their grandchildren, a finding supported by previous research.

Biological selection

With the grandfather effect ruled out, Lummaa and Russell next wondered whether the constraints of human physiology explain male longevity. In the same way that men have nipples that evolved for women to nourish their young, male longevity might be a consequence of biological selection for long-lived women.

To answer this question, the researchers compared the lifespan of men from polygamous countries with those from monogamous nations.

Using data from the World Health Organization, Lummaa and Russell scored 189 countries on a monogamy scale of one to four - totally monogamous to mostly polygamous. They also took into account a country's gross domestic product and average income to minimise the effect of better nutrition and healthcare in monogamous Western nations.

Lummaa stressed that their monogamy score is a crude first stab, and they are working to find multiple ways to assess marriage patterns. The conclusions could evaporate under further analysis, she adds.

If female survival is the main explanation for male longevity, then monogamous and polygamous men would live for about the same length of time. Instead, it seems that fathering more kids with more wives leads to increased male longevity. Men, then, live long because they're fertile well into their grey years.

The explanation could be both social and genetic. Men who continue fathering kids into their 60s and 70s could take better care for their bodies because they have mouths to feed. But evolutionary forces acting over thousands of years could also select for longer-lived men in polygamous cultures.

"It's a valid hypothesis and good prediction," says Chris Wilson, an evolutionary anthropologist at Cornell University in Ithaca, New York, who attended the talk. But the care and attention of several wives who depend on the social status of their ageing husband could explain everything. "It doesn't surprise me that men in those societies live longer than men in monogamous societies, where they become widowed and have nobody to care for them."

First red blood cells grown in the lab

* 19:30 19 August 2008
* NewScientist.com news service
* **Andy Coghlan**

Blood donations may one day be a thing of the past thanks to the creation of the first functional red blood cells grown in the lab. The cells were grown from human embryonic stem cells (ESCs).

"You wouldn't have to worry about shortages because you could create as many as you want," says Robert Lanza, chief scientist at Advanced Cell Technology, the company that grew the red blood cells in Worcester, Massachusetts.

The breakthrough raises the prospect of mass-producing supplies of the "universal donor" blood type O-negative, which is prized because it can be safely transfused into any patient, whatever their blood group. This type of blood is in short supply – around 8% of Caucasians have it, and just 0.3% of Asians.

Making blood from a few ESC lines instead of obtaining it from countless donors may also help to stop the spread of disease, as it is easier to ensure such artificial blood is free of pathogens such as HIV and the viruses that cause hepatitis.

To create the red blood cells, Lanza and his collaborators at the Mayo Clinic in Rochester, Minnesota, and at the University of Illinois in Chicago exposed cultures of human ESCs to a sequence of nutrients and growth factors. This turned them first into haemangioblasts, which are precursors to blood cells, and then into mature red blood cells.

Empty cells

The team's crucial achievement was getting the cells to expel their nuclei, just as they would in the body. "Experts said it was impossible, and we were pretty surprised ourselves when it worked," said Lanza.

Researchers had previously grown blood cells from ESCs, but never achieved this "enucleation" step, which is important because it means the cells can't divide and become cancerous. The key seems to be to grow the blood cells on connective "stromal" cells from the bone marrow, where blood cells are made in the body. Tests on the red blood cells suggest that they deliver oxygen just as efficiently as donated red blood cells. The team was also able to produce the red blood cells in bulk, creating populations of as many as 100 billion cells.

However, the team has not yet been able to make O-negative red blood cells. This is because blood type is determined by the genes of the ESCs, and none of the ESC lines approved for use in the US are O-negative.

Universal blood

Lanza says it should still be possible to make this prized blood using skin cells from O-negative donors. Previous research has shown that adult cells can be "reprogrammed" to return to an embryonic state by using viruses to insert genes that erase a cell's developmental history.

Like ESCs, such "induced pluripotent stem cells" (iPSCs) can be coaxed to turn into other cell types. Since they have the advantage of not requiring an embryo, iPSCs could potentially be used to make blood of all types without the moral dilemmas associated with using embryos.

A spokeswoman from the American Red Cross says the breakthrough is "an important step towards the possibility of growing transfusible red blood cells in the laboratory". The next step is to test that the cells are safe and functional in animals, says Lanza. *Journal reference: Blood, DOI: 10.1182/Blood-2008-05-157198*

Really?

The Claim: Morning Sickness Means a Girl Is More Likely

By ANAHAD O'CONNOR

Leif Parsons

THE FACTS Old wives' tales about predicting a baby's sex — relying on clues like the way the woman carries and the fetal heart rate — are usually more fantasy than fact.

But the notion that morning sickness can sometimes indicate that a girl is on the way may be an exception. A number of large studies in various countries have examined the claim, and almost all have found it to be true, with caveats. Specifically, studies have found that it applies to women with morning sickness in the first trimester, and with symptoms so severe that it leads to hospitalization a condition known as hyperemesis gravidarum.

One of the most recent studies was conducted by epidemiologists at the University of Washington. The scientists compared 2,110 pregnant women who were hospitalized with morning sickness in their first trimester and a control group of 9,783 women who did not get severely ill. They found that the women in the first group were more likely to deliver a girl, and that those who were the sickest — hospitalized for three days or more — had the greatest odds: an increase of 80 percent compared with the control women.

Other studies in The Lancet and the journal Epidemiology, among others, have repeated the findings. It is thought that certain hormones produced by female fetuses may be the culprit.

THE BOTTOM LINE Severe morning sickness may indicate a higher likelihood that the baby will be a girl.

Vital Signs

Behavior: Nothing Says 'Focus' Like Memory of Love

By ERIC NAGOURNEY

Does love stay the wandering eye?

In a new study, people shown images of attractive men and women paid less attention to them if they had just been reminded about the person they loved.

The results, say the researchers, led by Jon K. Maner of Florida State University, suggest that humans may have developed mechanisms to safeguard long relationships. The study appears in Evolution and Human Behavior.

For the study, the researchers looked at more than 100 college students who said they were in committed relationships. One group was asked to write short essays about "a time in which they experienced strong feelings of love for their current partner." The other volunteers were asked to write about a time when they were extremely happy.

The students were then placed in front of computers and asked to identify a series of shapes as quickly as they could. Before the shapes were shown, however, images of faces of varying attractiveness appeared on the screen.

When attractive faces of the opposite sex appeared, the students were slower to identify the shapes. But those who had written about their loved ones were less distracted.

Long-term relationships, the researchers said, offer benefits for reproduction, in part because both parents can play a role in rearing the children.

Wrinkle Removers, Backed by Science

By NICHOLAS BAKALAR

Correction Appended

Nostrums that promise to smooth wrinkled skin are a staple of snake-oil salesmen everywhere, but now there is strong evidence that certain kinds of treatment are effective. Over the past decade, researchers have been learning which treatments work, and why.

The key is a growing understanding of the skin's connective tissue, called the dermal collagen, and a recognition that damage to the mechanical properties of the collagen outside the skin cells, and not necessarily genetic damage to the cells themselves, causes wrinkled skin.

A recent review in The Archives of Dermatology concludes that three anti-aging treatments are proven clinically effective: the topical application of retinol; carbon dioxide laser resurfacing; and injection of hyaluronic acid, a moisture-retaining acid that occurs naturally in the skin. Each depends on the same mechanism, the interaction of skin cells called fibroblasts with the collagen they produce.

"This is an area where there's a lot of hype and not much substance," said David J. Leffell, a professor of dermatology and surgery at Yale who was not involved in the review. But, he said, this study is "good science."

Theory and experiment back these treatments, the authors write. Fibroblasts — connective tissue cells — secrete a complex group of polysaccharides and proteins that creates collagen, which gives the skin shape and elasticity and supports the blood vessels that permeate it. The network of collagen tissue is maintained by its mechanical tension with these skin cells.

Skin deteriorates as it ages, but its exposure to sunlight inhibits the ability of fibroblasts to produce collagen. The hands, face, neck and upper chest all suffer more than unexposed skin, and light-pigmented people wrinkle more readily than others. This damage, the authors write, is essentially an accelerated version of chronological aging. Ultraviolet radiation induces production of the same enzymes that degrade collagen with age.

Collagen fibers last as long as 30 years. But with age and ultraviolet exposure, they deteriorate and fragment, and fragmented collagen impairs the collagen-producing function of the fibroblasts that created it. As the fragmented collagen accumulates, new collagen production declines, the connections between the fibroblasts and the collagen weaken, and the skin, now lacking support, begins to wrinkle.

But there are treatments that counter this process. Topical application of retinol, a form of vitamin A, was the first to be proved useful. Although the molecular pathways are not well understood, retinol causes new collagen to form in chronologically aged skin and in skin damaged by ultraviolet light.

Skin creams with retinol are available over the counter, but many do not indicate the concentration of the active ingredient. "Many products just refer to retinol or vitamin A as a buzzword," said Gary J. Fisher, the lead author of the review and a professor of dermatology at the University of Michigan.

Concentrations of 0.2 to 0.6 percent are enough, Dr. Fisher said, but preparations strong enough to have an effect can also have a side effect, a rash called retinoid dermatitis. Dr. Fisher's advice is to stop using it if a rash occurs. The rash can sometimes be avoided if the concentration is increased gradually.

Retinol also makes the skin more sensitive to damage from ultraviolet light, so protection from the sun while using it is essential. "O.T.C. products tend to try to walk the line between effects and side effects," Dr. Fisher said. "But many intentionally keep the concentration too low to have any benefit."

Dr. Robyn S. Gmyrek, an assistant professor of dermatology at Columbia University, is also skeptical of over-the-counter wrinkle creams. "If something shows true biological activity, it's regulated as a drug," she said. "A cream bought over the counter is certainly not going to do what prescription-strength retinol will do." Dr. Gmyrek was not involved in the study.

Carbon dioxide laser resurfacing is another well-tested treatment for wrinkles. The laser removes thin layers of skin without damaging surrounding tissue. As the wound heals, new collagen is produced. The treatment

works first by inducing high levels of matrix metalloproteinase, or MMP, an enzyme that destroys fragmented collagen. Then it reduces MMP and increases the production of new and undamaged replacement material. The procedure is also used for removing scars, warts and birthmarks.

Healing takes two to three weeks, and the wound has to be cleaned with saline or diluted vinegar and treated with ointments to prevent scarring. In most cases, the procedure is done only once, Dr. Fisher said, and lasts many years.

There are now some less invasive laser procedures, the authors write, but their effectiveness is doubtful.

The third effective treatment is injecting a form of hyaluronic acid, similar to a substance the skin normally produces, into the dermis that underlies the wrinkles. This was originally designed as a space filler, with no intended physiological effect. But as the injection stretches the dermis, the fibroblasts respond by producing more collagen and less MMP. The authors cite studies that have demonstrated that increased collagen production is visible within a month after the injection. The benefit lasts about six months, Dr. Fisher said.

This type of hyaluronic acid, he said, should not be confused with hyaluronic acid in some topical cosmetic products. Rubbing such products on the skin will not stimulate collagen production.

Do the benefits of these treatments outweigh the risks?

"It's a matter of the kind of problem a person perceives and how he wants to deal with it," Dr. Fisher said. "For these treatments, which have sound research behind them, and for people who want to improve their appearance, the benefits far outweigh any problems."

The authors have no ties to companies that make skin care products, but the University of Michigan, where they teach, has patents on the use of matrix metalloproteinase inhibitors in the treatment and prevention of aging skin.

This article has been revised to reflect the following correction:

Correction: August 21, 2008

Because of an editing error, an article on Tuesday about three treatments proved to be effective against wrinkles described incorrectly part of the process of one of those treatments, carbon dioxide laser resurfacing. After the laser removes thin layers of skin, the healing wound produces more collagen, not less.

Brain Surgery Is Getting Easier On Patients

Loyola Neurosurgeon uses smaller openings to reach the brain; Removing tumors through the nose

MAYWOOD, Ill. -- Dr. Edward Duckworth is part of a new generation of neurosurgeons who are making brain surgery a lot easier on patients.

At Loyola University Hospital, Duckworth is using less-invasive techniques to remove tumors, to repair life-threatening aneurysms and to dramatically reduce seizures in epilepsy patients.

Rather than removing large sections of the skull or face, Duckworth is reaching the brain through much smaller openings. And in certain cases, he goes through the nose to get to the brain.

"It's not necessary to expose a large surface of the brain in order to access a small abnormality," said Duckworth, an assistant professor, neurological surgery, at Loyola University Chicago Stritch School of Medicine.

Less-invasive brain surgery can result in decreased pain and shorter hospital stays. It also makes patients less apprehensive, Duckworth said.

Duckworth recently performed a less-invasive aneurysm repair on David Shoblaske of Riverside, Ill. An aneurysm is a bulge in a blood vessel. Shoblaske's aneurysm was in the right side of his brain. It was spotted on a CT done in an attempt to find the source of Shoblaske's nonstop headaches. If the aneurysm had burst, Shoblaske likely would have suffered a serious stroke. To prevent that from happening, Duckworth closed off the aneurysm with a small titanium clip.

In a traditional aneurysm repair, the surgeon cuts out a piece of skull roughly 3 inches high and 3 inches wide. After repairing the aneurysm, the surgeon uses small plates and screws to reattach the skull piece. By contrast, the opening Duckworth created in Shoblaske was only about one inch across.

It's difficult to work with such a small opening. "You have to be much more meticulous," Duckworth said.

But the effort paid off for Shoblaske, a 64-year-old retired business executive with a history of heart disease that also has been treated successfully at Loyola. Despite the complexity of the procedure and the additional risks Shoblaske faced as a heart patient, he experienced no surgical complications or changes in his cognitive abilities. And, his headaches went away. "It was a complete success," he said.

Duckworth has performed more than 50 similar aneurysm repairs at Loyola; at the University of South Florida, where he trained and at Northwestern Memorial Hospital, where he did a fellowship. Duckworth gave a presentation on the procedure at a recent meeting of the American Association of Neurological Surgeons.

Duckworth also performs less-invasive brain surgeries on epilepsy patients. In this procedure, Duckworth removes a small part of the brain that is triggering seizures. In a recent issue of the journal Neurosurgery, Duckworth and a colleague reported results on 201 of their patients at the University of South Florida. After being followed a minimum of two years, 78 percent were free of the most disabling type of seizures. And only 1.5 percent experienced complications. Patients stayed in the hospital an average of 2.6 days. By comparison, an earlier study found that patients who underwent surgery with a larger opening stayed seven days.

In certain cases, Duckworth can reach the brain by passing instruments through the nose and cutting a 1-centimeter-wide hole in the skull. A surgical instrument goes through one nostril and an endoscope through the other. An endoscope is a tube with a light and a lens. It enables the surgeon to see tissue. Using this technique, Duckworth can remove certain tumors located in the pituitary gland or at the base of the skull.

Duckworth predicts less-invasive brain surgery will become increasingly common because it offers big advantages. "Because the openings are smaller, less brain tissue is exposed," he said. "There's less blood loss. Surgery times are shorter, and patients spend less time in the hospital. It's better cosmetically, too. Smaller incisions leave smaller scars."

Yew cuttings help cancer research

An operation is under way to prune the famous yew hedges at Chirk Castle, and help the fight against cancer at the same time.

David Lock and his team hope to be finished in October

The annual task takes up to eight weeks to finish, and results in about three tonnes of clippings. They are then bought by a company which transports them to be processed into chemotherapy drugs.

The castle's head gardener, David Lock, said it was "brilliant" to think they were helping develop anti-cancer drugs.

The drugs docetaxel and paclitaxel are developed from yew trees.

Both drugs can also be made synthetically, but yew needles are still collected and used across Britain.

At Chirk, they are bought and collected by Doncaster-based Friendship Estates, which claims they are used as the raw material for anti-cancer drugs, particularly breast and ovarian cancers.

The company's website said clippings should be one year's growth, because the required chemical is concentrated in greener areas of the plant.

Chirk gardener Mr. Lock, who started trimming on Monday, said: "We start in the third week of August and finish some time in October. "The hedges are the most important thing at this time of year - we have to try and fit everything else in between."

The gardening team have people on the ground, as well as staff in a cherry picker to reach the top of the hedges.

Although they hope to be finished by October, rain could delay them.

Mr Lock said: "We use electric trimmers because they're lighter, less noisy and you're not constantly breathing in fumes. "But it does mean that we need dry weather.

"It's brilliant to think the clippings are collected from here and then used for research into anti-cancer drugs."

The statuesque hedges, which line the main gardens and are dotted throughout 11 acres of grounds, were planted in 1872.

The castle, built by Edward I, is more than 700 years old and is surrounded by 500 acres of parkland.

Debbie Coats, clinical information manager at Cancer Research UK said: "There are two common chemotherapy drugs developed from Yew trees.

"One of them, docetaxel (Taxotere), first made from the needles of the European yew. The other, paclitaxel (Taxol) and was made from the bark of the Pacific yew.

"These are used to treat some breast, prostate and ovarian cancers. Both drugs are manufactured in the lab but the needles are collected and sold to the drug industry for this purpose."

Friendship Estates has been asked to comment.

Superdoctors - one small step

By Diana Hill Director and series producer of Superdoctors

You could call him the Indiana Jones of surgery. Steve Mannion, an orthopaedic surgeon, has devoted his life to working in far-flung and under-resourced corners of the world.

"Part of my reason for going into medicine was to work overseas. I was a bit of an adventurer. As a student, I did an elective on the Afghan-Pakistan border."

His sense of adventure led him into working as a trauma and war surgeon for the Red Cross and medical aid agency Medecins Sans Frontiers.

Nowadays, Mr Mannion spends two weeks of every month at his job in Blackpool; and the other two weeks working for charities in countries like Papua New Guinea and Sierra Leone.

He features in the last film in a three-part series called SuperDoctors, which looks at the progress being made in medicine.

Medicine

The first two programmes focus on high-tech medicine in the form of surgical robots and costly stem cell therapy.

In contrast, presenter Robert Winston follows the surgeon to Malawi, one of the poorest countries on earth where the life expectancy is around 40 years.

The surgeon believes you can push the boundaries of medicine in poor countries

Mr. Mannion's human ingenuity in treating people in places that have no technology or money has seen him cross over a medical frontier.

"It may not immediately be apparent that working in war zones or developing countries is somewhere you can push back medical frontiers or be very innovative, but I feel it's even more important in these situations," he said. He maintains his mantra that "necessity is the mother of invention."

Around Malawi, the surgeon has several clinics for children and adults with clubfeet.

Like Britain, somewhere between one to two children per 1,000 are born with this deformity.

Until recently the treatment in Britain has been extensive surgery, and when the treated child grows up they are often still in pain and scarred from the procedure.

In Malawi, however, Mr. Mannion was one of only two surgeons for seven million people in the northern area of the country.

Demand

To keep up with demand, he had to come up with a new and non-surgical solution which he could train staff in the country to perform as well.

The surgeon found a little known and scarcely used physiotherapy treatment, called the Ponseti treatment, which proved to be successful. It involves gentle manipulation of the bones and stretching of the skin through casting, followed by the child wearing a particular type of boots.

Quickly Mr. Mannion spread the practice through clinics all over the country and soon evidence based on hundreds of cases showed that the treatment was excellent.

Not only that - it was better than the British treatment of surgery. He had stumbled across something big.

The programme follows the Ponseti treatment - both in Africa and Britain - and tells the story of Steve's struggle to overcome deep-set traditions and practices to eventually cross a new medical frontier.

Yet, for the cost of one advanced surgical robot - around £12 million - a quarter of a million children can be treated and given the ability to walk again.

Unlike expensive high-tech surgery, Mr. Mannion found a simple solution within the reach of more than a small percentage of the world's population.

UQ research touches a nerve

University of Queensland researchers have traced the origins of one of the most important steps in animal evolution – the development of nerves.

Professor Bernie Degnan, from UQ's School of Integrative Biology, together with PhD student Gemma Richards and colleagues from France, have traced the evolution of the nerve cell by looking for pre-cursors in, of all places, the marine sponge.

"Sponges have one of the most ancient lineages and don't have nerve cells," Professor Degnan said.

"So we are pretty confident it was after the sponges split from trunk of the tree of life and sponges went one way and animals developed from the other, that nerves started to form.

"What we found in sponges though were the building blocks for nerves, something we never expected to find."

Professor Degnan said the science involved came from the relatively new area of paleogenomics, which is the study of ancestral genomes to paint a more accurate picture of animal evolution.

"What we have done is try to find the molecular building blocks of nerves, or what may be called the nerve's ancestor the proto-neuron," he said.

"We found sets of these genes in sponges, when we really didn't expect it.

"But what was really cool is we took some of these genes and expressed them in frog and flies and the sponge gene became functional – the sponge gene directed the formation of nerves in these more complex animals.

LSUHSC research reports new method to protect brain cells from diseases like Alzheimer's

New research led by Chu Chen, PhD, Associate Professor of Neuroscience at LSU Health Sciences Center New Orleans, provides evidence that one of the only naturally occurring fatty acids in the brain that has the ability to interact with the receptors originally identified as the targets of THC (the psychoactive component of marijuana) can help to protect brain cells from neurodegenerative diseases like Alzheimer's and Parkinson's. Published in the August 15, 2008 issue of the Journal of Biological Chemistry, the research focuses on the cellular and molecular mechanisms of inflammation, specifically the role these relatively recently discovered endogenous cannabinoids can play in the control of COX-2 and other cyclooxygenases. COX-2 is a key player in neuroinflammation and has been implicated in the development of neurodegenerative diseases and worsening of damage from such insults as traumatic brain injury and stroke.

Chen and research associate Jian Zhang show that endocannabinoid 2-arachidonoylglycerol (2-AG) functions as an endogenous COX-2 inhibitor, turning off the production of COX-2 which normally goes into overdrive in response to pro-inflammatory and certain types of toxic stimuli, resulting in the injury or death of brain cells. The researchers also revealed the specific signaling pathways that regulate the 2-AG suppression of COX-2. The paper, Endocannabinoid 2-Arachidonoylglycerol Protects Neurons by Limiting COX-2 Elevation, is available online at http://www.jbc.org.

"Our findings provide a basis for opening up new therapeutic approaches to protect neurons from inflammation and toxicity-induced neurodegeneration," notes Chen. "Selective COX-2 inhibitors were thought to be a promising medicine in treating neurodegenerative diseases, stroke, cancers and inflammation-related diseases like arthritis; however, the occurrence of a series of cardiovascular complications in patients receiving COX-2 inhibitors has led to their recent withdrawal from the market and limits on their usages. Our research has shown that the use of endogenous cannabinoid 2-AG may avoid such side effects. Therefore, elevation of endogenous 2-AG levels by facilitating its production, inhibiting its decomposition, or directly supplying 2-AG may result in treatment advances to prevent the devastation of disorders like stroke, Alzheimer's and traumatic brain injury."

The research was supported by grants from the National Institutes of Health and the Alzheimer's Association.

News Release - heic0817: Hubble sees magnetic monster in erupting galaxy

The Hubble Space Telescope has found the answer to a long-standing puzzle by resolving giant but delicate filaments shaped by a strong magnetic field around the active galaxy NGC 1275. It is the most striking example of the influence of these immense tentacles of extragalactic magnetic fields, say researchers.
NGC 1275 is one of the closest giant elliptical galaxies and lies at the centre of the Perseus Cluster of galaxies. It is an active galaxy, hosting a supermassive black hole at its core, which blows bubbles of radio-wave emitting material into the surrounding cluster gas. Its most spectacular feature is the lacy filigree of gaseous filaments reaching out beyond the galaxy into the multi-million degree X-ray emitting gas that fills the cluster.

These filaments are the only visible-light manifestation of the intricate relationship between the central black hole and the surrounding cluster gas. They provide important clues about how giant black holes affect their surrounding environment.

A team of astronomers using the NASA/ESA Hubble Space Telescope Advanced Camera for Surveys have for the first time resolved individual threads of gas which make up the filaments. The amount of gas contained in a typical thread is around one million times the mass of our own Sun. They are only 200 light-years wide, are often surprisingly straight, and extend for up to 20 000 light-years. The filaments are formed when cold gas from the galaxy's core is dragged out in the wake of rising bubbles blown by the black hole.

It has been a challenge for astronomers to understand how the delicate structures withstood the hostile high-energy environment of the galaxy cluster for more than 100 million years. They should have heated up, dispersed, and evaporated over a very short period of time, or collapsed under their own gravity to form stars. Even more puzzling is the fact that they haven't been ripped apart by the strong tidal pull of gravity in the cluster's core.

A new study led by Andy Fabian from the University of Cambridge, UK, published in Nature on 21 August 2008 proposes that the magnetic fields hold the charged gas in place and resist forces that would distort the filaments. This skeletal structure has been able to contain and suspend these

peculiarly long threads for over 100 million years. “We can see that the magnetic fields are crucial for these complex filaments - both for their survival and for their integrity”, said Fabian.

The new Hubble data also allowed the strength of the magnetic fields in the filaments to be determined from their size. Thinner filaments are more fragile, requiring stronger magnetic fields for support. However, the finer the filaments, the more difficult they are to observe.

The filamentary system in NGC 1275 provides the most striking example of the workings of extragalactic magnetic fields so far and is a spectacular by-product of the complex interaction between the cluster gas and the supermassive black hole at the galaxy’s heart. Similar networks of filaments are found around many other, even more remote, central cluster galaxies. They cannot be observed in anything like the detail of NGC 1275, so the team will apply the understanding gained here to interpret observations of these more distant galaxies.

Notes for editors:

The Hubble Space Telescope is a project of international cooperation between ESA and NASA.

The authors of the science paper are: A.C. Fabian, R.M. Johnstone, J.S. Sanders (University of Cambridge, UK), C.J. Conselice (University of Nottingham, UK), C.S. Crawford (University of Cambridge, UK), J.S. Gallagher III (University of Wisconsin, USA) and E. Zweibel (University of Wisconsin, USA)

Biochemists manipulate fruit flavor enzymes

Would you like a lemony watermelon? How about a strawberry-flavored banana? Biochemists at The University of Texas Medical School at Houston say the day may be coming when scientists will be able to fine tune enzymes responsible for flavors in fruits and vegetables. In addition, it could lead to environmentally-friendly pest control.

In the advance online publication of Nature on Aug. 20, UT Medical School Assistant Professor C.S. Raman, Ph.D., and his colleagues report that they were able to manipulate flavor enzymes found in a popular plant model, Arabidopsis thaliana, by genetic means. The enzymes—allene oxide synthase (AOS) and hydroperoxide lyase (HPL)—produce jasmonate (responsible for the unique scent of jasmine flowers) and green leaf volatiles (GLV) respectively. GLVs confer characteristic aromas to fruits and vegetables.

Green leaf volatiles and jasmonates emitted by plants also serve to ward off predators. "Mind you plants can't run away from bugs and other pests. They need to deal with them. One of the things they do is to release volatile substances into the air so as to attract predators of the bugs," Raman said.

"Genetic engineering/modification (GM) of green leaf volatile production holds significant potential towards formulating environmentally friendly pest-control strategies. It also has important implications for manipulating food flavor," said Raman, the senior author. "For example, the aroma of virgin olive oil stems from the volatiles synthesized by olives. By modifying the activity of enzymes that generate these substances, it may be possible to alter the flavor of the resulting oils."

According to Raman, "Our work shows how you can convert one enzyme to another and, more importantly, provides the needed information for modifying the GLV production in plants." The scientists made 3-D images of the enzymes, which allowed them to make a small, but specific, genetic change in AOS, leading to the generation of HPL.

AOS and HPL are part of a super family of enzymes called cytochrome P450. P450 family enzymes are found in most bacteria and all known plants and animals. Although AOS or HPL are not found in humans, there are related P450 family members that help metabolize nearly half of the pharmaceuticals currently in use. In plants, AOS and HPL break down naturally-occurring, organic peroxides into GLV and jasmonate molecules. "Each flavor has a different chemical profile," Raman said.

"A notable strength of this manuscript is the combined use of structural and evolutionary biology to draw new insights regarding enzyme function. These insights led to the striking demonstration that a single amino acid substitution converts one enzyme into another, thereby showing how a single point mutation can contribute to the evolution of different biosynthetic pathways. This begins to answer the long-standing question as to how the same starting molecule can be converted into different products by enzymes that look strikingly similar," said Rodney E. Kellems, Ph.D., professor and chairman of the Department of Biochemistry & Molecular Biology at the UT Medical School at Houston.

The study dispels the earlier view that these flavor-producing enzymes are only found in plants, Raman said. "We have discovered that they are also present in marine animals, such as sea anemone and corals. However, we do not know what they do in these organisms."

The study is titled "Structural insights into the evolutionary paths of oxylipin biosynthetic enzymes." The lead authors were Dong-Sun Lee, Ph.D., an assistant professor in the Department of Biochemistry & Molecular Biology at the UT Medical School at Houston, and Pierre Nioche, Ph.D., an assistant professor at the Université Paris Descartes. Mats Hamberg, M.D., Ph.D., professor of medical chemistry in the Division of Physiological Chemistry, Karolinska Institutet, Stockholm, Sweden, collaborated on the research.

The research is supported by Pew Charitable Trusts through a Pew Scholar Award, The Robert A. Welch Foundation, The National Institutes of Health, a Beginning Grant in Aid from the American Heart Association, and an INSERM Avenir Grant sponsored by La Fondation pour la Recherche Medicale.

Aggression written in the shape of a man's face

* 00:01 20 August 2008
* NewScientist.com news service
*** Gursharan Randhawa**

Facial width-to-height predicted aggression in men in the lab and during ice hockey games. Ryan Del Monte from Brock University Badgers is shown. (Credit: Brock University)

No matter how hard men try, they may not be able to hide their aggression. A study in male ice-hockey players suggests that to gauge a man's aggression levels, you just have to look at the proportions of his face.

Cheryl McCormick and Justin Carre from Brock University in Ontario, Canada, found that the larger the width-to-height ratio of a player's face, the more aggressive they were.

They measured aggression by the number of penalty points each player accrued for potentially harmful behaviour, such as elbowing and fighting.

In general, men's faces tend to have a larger width-to-height ratio than women's. This physical characteristic has been linked to higher levels of testosterone, which in turn is linked to aggressive behaviour.

Most people would not want to pick a fight with a big, brawny man, but because facial ratio is not linked to body size, it may have been favoured by evolution to warn others of an aggressive personality they would not want to tangle with.

Real world results

Although the team first found the result in a study of students playing computer games, McCormick says they were "astounded to see that the measure could predict aggressive behaviour in a 'real world' setting".

Previous studies on facial metrics have suggested that women can tell whether a man wants children just by looking at their photograph. Now McCormick's study raises the question of whether people can spot these subtle facial differences and use it to guide everyday behaviour.

"If someone was given the choice of one of two opponents to compete against who differed on the basis of the facial metric, would the facial metric predict the less aggressive opponent?" asks McCormick.

She believes that people's faces may be influencing who we chose to socialise with on a daily basis.

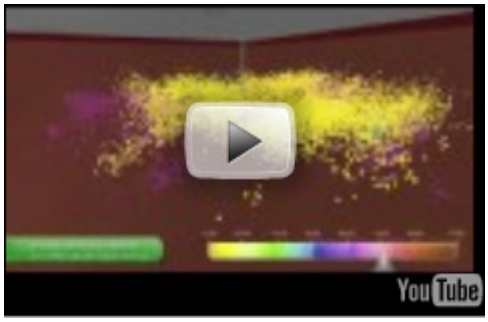
Journal reference: Proceedings of the Royal Society B (DOI:10.1098/rspb.2008.0873)

Google buries $10m in underground power

* 12:56 20 August 2008
* NewScientist.com news service
*** New Scientist staff and Reuters**

Search and advertising giant Google is investing $10 million in a relatively new approach to producing electricity from underground heat which could make geothermal power possible in many more areas of the world.

Google's philanthropic arm, Google.org, has recently declared an interest in sustainable technology. It has already pumped tens of millions of dollars into solar thermal and high-altitude wind energy.



Dan Reicher, Google's head of climate and energy initiatives, said that new technology could make extracting heat from beneath the ground a massive contributor to US electricity supplies.

"It's 24-7, it's potentially developable all over the country, all over the world, and for all that we really do think it could be the 'killer app' of the energy world," says Reicher. "Killer app" is a term used in the tech industry to describe an application that revolutionises a field and creates new opportunities.

A 3D model of an enhanced geothermal power generation system in Australia. Google has invested $10m in the technology, which can make use of heat from underground rocks in areas not suited to established approaches to geothermal electricity generation Watch the full-size video

Hot water

That new "app", called enhanced geothermal systems (EGS), improves upon the century-old technology of tapping geothermal energy from geysers or hot springs to generate electricity. With EGS, engineers drill shafts down to hot rocks and pump in water to create steam to power a turbine.

The bulk of Google's first geothermal investment, $6.25 million, will help finance EGS company AltaRock Energy of Sausalito, California. The firm has also attracted money from some of the best known Silicon Valley

venture capitalists. A further $4 million of Google's money will go to Potter Drilling in Redwood City, California, which has a hard rock drilling technology.

AltaRock hopes to develop technology that can generate electricity in a wider range of geographies than conventional geothermal ones. "If you drill deep enough anywhere you can get to hot rock," says Reicher.

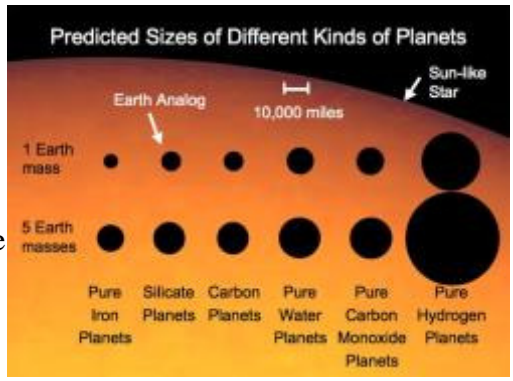
Finding places where hot rocks lie close to the surface can reduce the cost of such projects. Nevada is one such place, Reicher said, while some eastern US states including West Virginia and Pennsylvania also have good geothermal prospects.

Google also awarded nearly $0.5 million to Southern Methodist University's Geothermal Lab in Dallas, Texas, to update geothermal mapping of North America.

Planets without metal cores may be bad for life

* 15:07 20 August 2008
* NewScientist.com news service

*** Ker Than**



Some planets beyond our solar system might be rocky like Earth, but lack its gooey metallic middle, a new study suggests. Such 'coreless' terrestrial planets would not have magnetic fields, which would make them inhospitable to life as we know it.

Rocky planets were once thought to consist of three main layers: a thin solid crust, a viscous, rocky mantle and a solid or molten iron core.

This layering, or differentiation, is thought to have occurred early in the solar system's history, when collisions between rocky bodies and the decay of radioactive isotopes melted the interiors of large objects, allowing dense material to settle towards their centres.

But exoplanet discoveries have revealed a menagerie of diverse worlds. Now, Linda Elkins-Tanton and Sara Seager of MIT describe how another planetary oddity might form: coreless rocky planets.

Such planets might differentiate into layers of different density but not form a core – essentially making them giant silicate mantles.

One way this could happen is if the planet was born in a very water-rich environment, such as the icy regions at large orbital distances from Sun-like stars.

The iron could interact with water, forming iron oxide, faster than it would fall to the centre of the planet. "If the iron reacts with water, then it will be locked away with other minerals and won't reach the core as metallic iron," Seager told New Scientist.

Alien life

Currently, astronomers have no clear way of determining whether a distant rocky exoplanet has a core, Seager said. That's because telescopes are not yet good enough to image such small planets, much less study their chemical composition.

But studying the planet's parent star may provide hints about the existence of its core, suggests Diana Valencia of Harvard University, who was not involved in the study. "If we look at the star, we will know the iron-silicate ratio and some of the chemistry that was present while these planets were forming," she told New Scientist.

One thing that is certain is that coreless planets will not have magnetic fields.

Earth's magnetic field is generated by molten iron circulating in its core. It shields life on Earth from harmful charged particles from space called cosmic rays. "If we got nailed by cosmic rays, it would cause us a lot of [genetic] mutations," Seager says.

But Seager says a magnetic field may not be crucial for alien life. "I always like to think that life is a lot smarter than we are and that it can exist in many different places in many different ways," Seager says.

Journal reference: Astrophysical Journal (forthcoming)

Virginia Tech researcher converts biodiesel byproduct into omega-3 fatty acids

Blacksburg, Va. – The typical American diet often lacks omega-3 fatty acids despite clinical research that shows their potential human health benefits. Zhiyou Wen, assistant professor of biological systems engineering in Virginia Tech's College of Agriculture and Life Sciences, found a way to grow these compounds using a byproduct of the emerging biodiesel industry. He presented his findings at the 236th national meeting of the American Chemical Society (ACS) in Philadelphia, Pa., on August 21.

"High energy prices have led to an increase in biodiesel production, which in turn has led to an increase in the amount of crude glycerol in the market," said Wen, who explained that biodiesel plants leave behind approximately 10 percent crude glycerol during the production process.

This has led the price of glycerol, a chemical compound widely used in the pharmaceutical and cosmetic industries, to drop in recent years. The rise in biodiesel production over the last decade means that the market can no longer absorb all the extra glycerol. Biodiesel producers must find alternative means for disposing of crude glycerol, which is prohibitively expensive to purify for industry use. Wen and his colleagues have developed a novel fermentation process using microalgae to produce omega-3 fatty acids from crude glycerol

"We have shown that it is possible to use the crude glycerol byproduct from the biodiesel industry as a carbon source for microalgae that produce omega-3 fatty acids," said Wen, who added that the impurities in crude glycerol may actually be beneficial to algal growth. "After thorough chemical analysis, we have also shown that the algae biomass composition has the same quality as the commercial algae product."

After growing the algae in the crude glycerol, researchers can use it as an animal feed. This mimics a process in nature in which fish, the most common source of omega-3 fatty acid for humans, eat the algae and then retain the healthful compounds in their bodies. Humans who consume the fish in turn consume the omega 3s. Fish-derived products such as fish oil are an inexpensive alternative, but the taste has deterred widespread use.

Wen has partnered with Steven Craig, senior research scientist at Virginia Cobia Farms, to use crude glycerol-derived algae as a fish feed. "The results so far have been promising," Wen said. "The fish fed the algae had significant amounts of omega-3 fatty acids."

He and Audrey McElroy, associate professor of animal and poultry sciences, are now trying to determine whether the algae would work as a chicken feed. Kumar Mallikarjunan, associate professor of biological systems engineering, is also working with Wen to determine the fate of omega 3s after they enter the food supply. Researchers do not yet know whether oxidation would have a major impact on omega-3 fatty acids stored in cheese, for example.

Funding for this research has come from the Virginia Agricultural Council, U.S. Poultry and Egg Association, Fats and Proteins Research Foundation, Virginia Sea Grant, and Virginia Commercial Fisheries and Shellfish Technologies.

Wen presented his paper, "Production of omega-3 polyunsaturated fatty acid from biodiesel-waste glycerol by microalgal fermentation (AGFD 272)," as a part of a session sponsored by the ACS Division of Agricultural and Food Chemistry.

Nationally ranked among the top research institutions of its kind, Virginia Tech's College of Agriculture and Life Sciences (www.cals.vt.edu/) focuses on the science and business of living systems through learning, discovery, and engagement. The college's comprehensive curriculum gives more than 2,400 students in a dozen academic departments a balanced education that ranges from food and fiber production to economics to human health. Students learn from the world's leading agricultural scientists, who bring the latest science and technology into the classroom.

Hormone replacement therapy improves sleep, sexuality and joint pain in older women

Results of new quality of life study revealed

One of the world's longest and largest trials of hormone replacement therapy (HRT) has found that post-menopausal women on HRT gain significant improvements in quality of life.

The results of the latest study by the WISDOM research team (Women's International Study of long Duration Oestrogen after Menopause) are published today on the British Medical Journal website www.bmj.com.

The study involved 2130 post-menopausal women in the UK, Australia and New Zealand, and assessed the impact of combined oestrogen and progestogen hormone therapy on the women's quality of life. The average age of women in this study was 13 years after menopause and most participants did not have menopausal symptoms.

"Our results show that hot flushes, night sweats, sleeplessness and joint pains were less common in women on HRT in this age group. Sexuality was also improved," says Professor Alastair MacLennan, leader of the Australian arm of WISDOM and head of Obstetrics & Gynaecology at the University of Adelaide, Australia.

"Overall, quality of life measures improved. Even when women did not have hot flushes and were well past menopause, there was a small but measurable improvement in quality of life and a noted improvement in sleep, sexuality and joint pains. HRT users also had more breast tenderness and discharge compared to those on a placebo," he says.

Dr Beverley Lawton, Head of WISDOM New Zealand, says: "These new data should be added to the risk/benefit equation for HRT. The quality of life benefits of HRT may be greater in women with more severe symptoms near menopause. New research suggests that HRT taken from near menopause avoids the cardiovascular risks seen when HRT is initiated many years after menopause."

Professor MacLennan says studies such as those conducted by WISDOM "enable the risks of HRT to be reduced and its benefits maximized when the treatment is individualized to each woman".

"Early start-up side effects can usually be alleviated by adjusting the treatment," he says. "For most women with significant menopause symptoms the benefits of HRT outweigh the risks. The latest analyses of the main long-term randomized control trial of HRT (The Women's Health Initiative) show that breast cancer is not increased by oestrogen-only HRT and is only increased in women using combined oestrogen and progestogen HRT after seven years of use. This increased risk is less than 0.1% per year of use.

"If a woman feels that HRT is needed for quality of life, then doctors can find the safest regimen for her. She can try going off HRT every 4-5 years, and can then make an informed choice about whether she takes and continues HRT."

The WISDOM research is independent of the pharmaceutical industry and has been funded by UK, Australian and New Zealand government research bodies.

Air-purifying church windows early nanotechnology

Stained glass windows that are painted with gold purify the air when they are lit up by sunlight, a team of Queensland University of Technology experts have discovered.

Associate Professor Zhu Huai Yong, from QUT's School of Physical and Chemical Sciences said that glaziers in medieval forges were the first nanotechnologists who produced colours with gold nanoparticles of different sizes. Professor Zhu said numerous church windows across Europe were decorated with glass coloured in gold nanoparticles.

"For centuries people appreciated only the beautiful works of art, and long life of the colours, but little did they realise that these works of art are also, in modern language, photocatalytic air purifier with nanostructured gold catalyst," Professor Zhu said.

He said tiny particles of gold, energised by the sun, were able to destroy air-borne pollutants like volatile organic chemical (VOCs), which may often come from new furniture, carpets and paint in good condition.

"These VOCs create that 'new' smell as they are slowly released from walls and furniture, but they, along with methanol and carbon monoxide, are not good for your health, even in small amounts," he said.

"Gold, when in very small particles, becomes very active under sunlight. "The electromagnetic field of the sunlight can couple with the oscillations of the electrons in the gold particles and creates a resonance.

"The magnetic field on the surface of the gold nanoparticles can be enhanced by up to hundred times, which breaks apart the pollutant molecules in the air." Professor Zhu said the by-product was carbon dioxide, which was comparatively safe, particularly in the small amounts that would be created through this process.

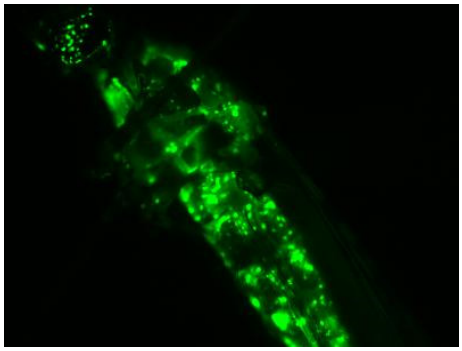
He said the use of gold nanoparticles to drive chemical reactions opened up exciting possibilities for scientific research.

"This technology is solar-powered, and is very energy efficient, because only the particles of gold heat up," he said. "In conventional chemical reactions, you heat up everything, which is a waste of energy.

"Once this technology can be applied to produce specialty chemicals at ambient temperature, it heralds significant changes in the economy and environmental impact of the chemical production."

Malaria researchers identify new mosquito virus

Researchers at the Johns Hopkins Bloomberg School of Public Health's Malaria Research Institute have identified a previously unknown virus that is infectious to Anopheles gambiae—the mosquito primarily responsible for transmitting malaria. According to the researchers, the discovered virus could one day be used to pass on new genetic information to An. gambiae mosquitoes as part of a strategy to control malaria, which kills over one million people worldwide each year. The study was published August 22 online in the peer-reviewed open access journal PLoS Pathogens.



***Anopheles gambiae mosquito infected with GFP-expressing AgDNV*. Johns Hopkins Bloomberg School of Public Health**

The virus, AgDNV, is a densonucleosis virus or "densovirus," which are common to mosquitoes and other insects, but do not infect vertebrate animals such as humans. Although the virus does not appear to harm the mosquitoes, the researchers determined it is highly infectious to mosquito larvae and is easily passed on to the adults.

According to Jason Rasgon, PhD, senior author of the study, the discovery came about serendipitously while the research team was conducting experiments to determine whether Wolbachia bacteria could be used to infect An. gambiae mosquito cells. During the analysis, Xiaoxia Ren, a postdoctoral fellow with Johns Hopkins Malaria Research Institute, noticed an "artifact," that appeared as a prominent band in the gel used to detect the bacteria.

"Finding artifacts such as this one during experiments is not uncommon, but we decided to investigate this one further since we kept observing it over and over. When we sequenced it we were surprised to learn that we

had found a new virus," explained Rasgon, an assistant professor with the Bloomberg School's W. Harry Feinstone Department of Molecular Microbiology and Immunology.
According to Rasgon, the virus could be potentially altered to kill the mosquito or make An. gambiae incapable of transmitting malaria. To test the concept, the research team successfully used altered AgDNV to express harmless green fluorescent protein in the adult mosquitoes which could be easily spotted under the microscope.

"In theory, we could use this virus to produce a lethal toxin in the mosquito or instruct the mosquito to die after 10 days, which is before it can transmit the malaria parasite to humans. However, these concepts are many years away," said Rasgon.

Iran plans to launch humans into space

*** 15:37 21 August 2008**
*** NewScientist.com news service**
*** New Scientist Space and Reuters**

Iran plans to send a crewed rocket into space in the next 10 years, state television said on Thursday, just days after the Islamic Republic announced it had put a dummy satellite into orbit.

"One of the aims of Iran's 10-year space programme is to send a manned rocket into space," state television quoted Reza Taghipour, the head of Iran's aerospace organisation, as saying. "Within the next six months to one year, the exact date of this mission will be determined."

Taghipour said Iran would cooperate with Islamic countries in building a satellite that the television report said would be called "Besharat", meaning "good news". He also said Iran was working with Russia and other Asian states to launch another satellite.

Only three other nations have launched humans into space - Russia, the US and China.

Embroiled in a standoff with the West over its nuclear ambitions, Iran said on Sunday it had put a dummy satellite into orbit on a home-grown rocket for the first time.

US security officials said the launcher failed shortly after lift-off and did not reach its intended position. But Charles Vick, a senior analyst for the GlobalSecurity.org research group, said Iran appeared to have succeeded in igniting the second stage of its booster rocket and gained data that will help it perfect its launch system.

The long-range ballistic technology used to put satellites into space can also be used for launching weapons. Iran says it has no such intention.

The West accuses Iran of seeking to build a nuclear warhead, a charge Tehran denies, insisting its nuclear ambitions are aimed at generating electricity so it that it can export more of its massive oil and gas reserves.

Machine 'sniffs out skin cancer'

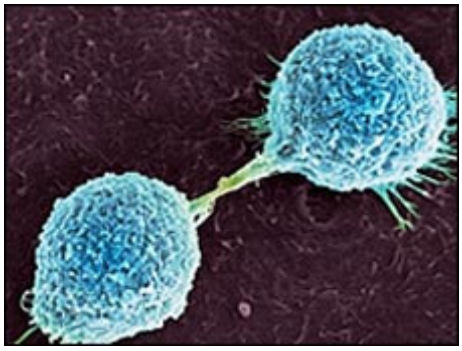
A common form of skin cancer could be diagnosed by the distinctive chemical "scent" it gives off, say US experts.

Philadelphia's Monell Center sampled the air directly above basal cell carcinomas and found it was different to similar samples from healthy skin. They told a conference it offered the chance of cheap and painless testing.

Other scientists are trying to spot the "smell" of cancer, with a UK team using dogs to sniff out bladder tumours from urine samples.

All human skin releases chemicals called "volatile organic compounds", many of which do have a scent.

The researchers from the Monell Center used a technology called gas chromatography-mass spectrometry to identify their precise chemical composition.



Skin cancer cells dividing Skin cancer can be fatal

A total of 22 patients, 11 with and 11 without basal cell carcinomas, were tested. All the air samples contained the same ingredients, but the equipment revealed that the patients with cancer had markedly different concentrations of certain chemicals.

Dr Michelle Gallagher, presenting the results of the project at the American Chemical Society's annual conference, said that a "profile" of the cancer could be built up.

"Our findings may someday allow doctors to screen for and diagnose skin cancers at very early stages," she said.

She now plans to try to construct profiles of other types of skin cancer, including the much more dangerous malignant melanoma.

Dog detector

Dr Carolyn Willis, a dermatology researcher from Amersham Hospital in Buckinghamshire, is trying to develop a cancer test using the same principles - but substituting a living sensor.

Her team has trained dogs to detect subtle changes in the odour of urine which could indicate bladder cancer, and is hoping to detect prostate and skin cancers the same way.

The dog's nose, she said, was one of the most sensitive instruments available, and had the advantage of being attached to a brain already programmed to identify different patterns in the scents it received.

She said: "This has great potential as a screening tool. The detection of these volatile organic compounds could make a major contribution to diagnosis.

"It's a non-invasive and simple way of detecting disease."

Other projects worldwide have included checking the composition of exhaled breath for distinctive chemicals given out by lung tumours.

Two more face transplant triumphs

* 00:01 22 August 2008
* NewScientist.com news service
*** Andy Coghlan**

The bear-attack patient after the successful transplant **(Credit: The Lancet)**

Full details of the world's second and third face transplants are unveiled today.

One operation was on a Chinese man whose face was slashed by a bear. The other was on a Frenchman whose face was disfigured for many years by a massive tumour.

Although neither is a full facial transplant, both procedures break new ground compared with the world's first face transplant in November 2005 on Isobelle Dinoire, a French woman savaged by a dog.

The Chinese team, led by Shuzhong Guo of the Fourth Military Medical University in Xi'an, is the first to include facial bone in a face transplant, carried out on 13 April 2006. "Without the facial bone framework, reconstruction of the nose and upper lip would not be possible," the team state in their report.

Like the triangular face flap grafted onto the face of Dinoire, the Chinese graft included muscles, nerves, blood vessels, cartilage and skin. Another first was that it included an intact salivary gland.

Two years on from the procedure, the man can eat, drink and speak, thanks to the gradual fusing of transplanted nerves and muscles with what remained of the patient's own.

Complete paralysis

The French team, meanwhile, came closest to transplanting an entire face. On 21 January 2007, they transferred a graft that was three times the surface area of the one given to Dinoire.

Their most difficult task was to remove a huge tumour that had completely infiltrated and disfigured their patient's face, leading to complete paralysis on one side and partial paralysis on the other. The tumour was caused by an inherited condition called neurofibromatosis type 1, and gave the man the appearance of the "Elephant Man", John Merrick.

"It's more a malformation than a tumour, so there was no clear-cut division between healthy and abnormal tissue," says Laurent Lantieri, head of the team which performed the surgery at the Henri Mondor Hospital in Créteil, France. "We removed all the lower part of the face, including muscle and nerves, and replaced it all with the transplant."

For two to three months, the man couldn't move his face, but then began to recover mobility and sensation. "Now, he can close his mouth completely, speak and eat," says Lantieri. "But he still has some problems smiling because the way we set the muscles wasn't perfect."

He has also recovered an ability to blink, lost for 10 years, and says that as little as a month after the surgery, his self-image in dreams had reverted from his old to his new appearance, reinforcing his acceptance of the graft. "The psychological results are very good," says Lantieri, adding that the man has since returned to work as an accountant.

New material

Just like Dinoire, both patients suffered bouts of acute rejection of the new tissue, but both were stabilised with strong immunosuppressive drugs.

Since the procedure, the French patient has drastically cut down on immunosuppressive drugs. Lantieri believes that the chimeric tissue formed between the native and transplanted tissue has gradually helped his body accept the new material as "self".

With the success of all three operations, the stage could now be set for a full face transplant. "I think it might be possible, but we have to find a patient, and there's a technical problem transplanting eyelids," says Jean-Michel Dubernard of the Edouard Herriot Hospital in Lyon, and co-leader of the team that did the first face transplant.

Lantieri agrees that the eyelid is the main technical challenge, because the nerves and muscles that operate it reside both outside the eye socket and within it. But he and his colleagues are researching ways to overcome the problem. "We're still working on the possibility of transferring the whole face," he said.

Dubernard said that Dinoire is still doing very well, and has now recovered an estimated 95% of normal facial function, none of which could have been restored by conventional surgery. "She can speak, drink without spilling liquid and eat normally," he says. "She can smile, grimace, kiss and do almost everything," says Dubernard.

The other gratifying thing in all three cases is that none has suffered the feared psychological consequences of receiving parts of other people's faces.

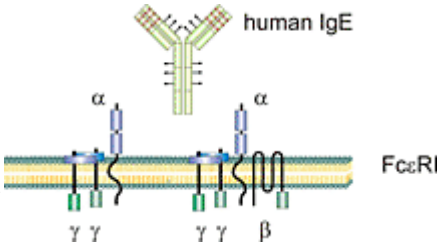
"The psychological results are very good," says Lantieri. Dubernard, meanwhile, repeated a statement from Dinoire three months ago that the transplant "gave me back an identity, because without a face, I am nothing". "We're very encouraged by these results," says Maria Siemionow of the Cleveland Clinic in Ohio, and the only holder in the US of approval to do a face transplant, granted in 2004. "But as we can see, there's still incidence of acute rejection, so we need to work on immunosuppressive procedures that are less harmful," she says.

Siemionow says that her team is still preparing for the possibility of doing face transplants, but that everything needs to be in place beforehand. "It's taking time to get agreement on this, not just in the institutions involved, but in society generally," she says. *Journal reference:The Lancet (vol 372, p 361, p 639)*

Munich researchers discover key allergy gene

Together with colleagues from the Department of Dermatology and Allergy and the Center for Allergy and Environment (ZAUM) of the Technische Universität München, scientists at the Helmholtz Zentrum München have pinpointed a major gene for allergic diseases. The gene was localized using cutting edge technologies for examining the whole human genome at the Helmholtz Zentrum München.

The newly discovered FCER1A gene encodes the alpha chain of high affinity IgE receptor, which plays a major role in controlling allergic responses. The team of scientists led by Dr. Stephan Weidinger from the Technische Universität München and Dr. Thomas Illig from the Helmholtz Zentrum München found that certain variations of the FCER1A gene decisively influence the production of immunoglobulin E (IgE) antibodies. IgE antibodies are a particular type of antibody that is normally used to protect against parasites. In Western lifestyle countries with less contact, however, elevated IgE levels are associated with allergic disorders.



Schematic representation of the high affinity receptor for IgE. Variants within the gene encoding the alpha chain are associated with increased levels of IgE antibodies

In genetically susceptible individuals the immune system becomes biased and produces IgE antibodies against harmless agents such as pollen, dust mites or animal hair. These IgE antibodies then work in conjunction with certain cells to get rid of the allergens, a process that gives rise to the symptoms of allergy such as allergic rhinitis (hay fever), atopic dermatitis or asthma.

"Most people with allergies are atopic - meaning they have a genetic tendency to develop allergies. To detect the genetic factors we examined the genomes of more than 10,000 adults and children from the whole of Germany" explained Stephan Weidinger.

Most of the persons examined for the study come from the population studies of the KORA (co-operative health research in the Augsburg region) research platform, which is led by Prof. Dr. H.-Erich Wichmann, the Director of the Institute of Epidemiology at the Helmholtz Zentrum München. The allergological examinations were carried by the Department for Dermatology and Allergy of the Technische Universität München headed by Prof. Dr. Dr. Johannes Ring.

Although in its early stages, the new knowledge on the regulation of IgE production does have the potential to guide the development of new drugs.

Publication:

Weidinger S, Gieger C, Rodriguez E, Baurecht H, Mempel M, et al. (2008) Genome-Wide Scan on Total Serum IgE Levels Identifies FCER1A as Novel Susceptibility Locus. PLoS Genet 4(8): e1000166. doi: 10.1371/journal.pgen.1000166
http://www.plosgenetics.org/doi/pgen.1000166

Some solar flares may be caused by dark matter

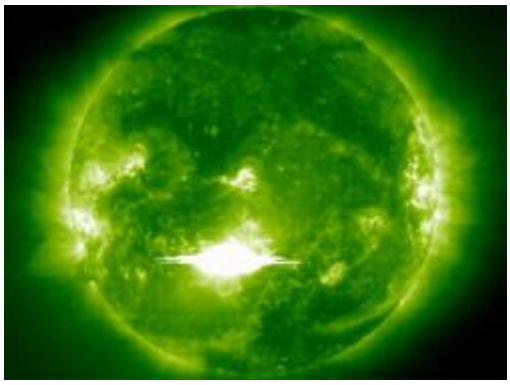
*** 15:36 22 August 2008**
*** NewScientist.com news service**
*** Anil Ananthaswamy**

Some solar flares may be caused by dark matter particles called axions spewing out from the centre of the Sun, new calculations suggest.

Solar flares are sudden changes in the Sun's brightness thought to be caused when twisted magnetic fields on the Sun snap and reconnect explosively.

But they could also be caused by dark matter, the mysterious entity that makes up most of the universe's mass – if it is made up of theoretical particles called axions.

Axions were proposed in the 1970s to help explain the mystery of why our universe is made mostly of matter and not antimatter. They should be produced deep inside the Sun and should interact with some of the Sun's magnetic fields as they stream outwards, producing flares that are bright at X-ray wavelengths.



A powerful X-ray flare (lower centre) erupted from the Sun on 28 October 2003 **(Image: NASA/ESA)**

Physicists had predicted that these axion-generated flares would have certain traits – the flares' X-ray photons were expected to travel radially outwards from the Sun, for example. But observations showed they came out at all angles.

Now, researchers led by Konstantin Zioutas of the University of Patras in Greece, say they have solved such discrepancies.

In their scenario, the first X-rays produced by axions would ionise surrounding matter. The electrons freed in the process would then cause subsequent X-rays to scatter, explaining why the photons show no preferred direction when leaving the Sun.

Zioutas says analysing flares in detail would indicate the depths at which they formed in the Sun. That in turn could shed light on how massive axions are, since their mass is related to the density of the solar plasma at which they would be able to produce X-ray photons.

With the axion's mass, cosmologists could use estimates of how many were produced in the early universe to figure out what fraction of dark matter is made of axions and what is made of other candidates, such as particles known as WIMPs.

The new study is more qualitative than quantitative, says Konrad Dennerl of the Max Planck Institute for Extraterrestrial Physics at Garching, Germany. But he says that even though solar flares can mostly be explained by conventional physics, they are still somewhat of a mystery.

"What we see may well be a superposition of different effects," he says. "There is room for speculation, and this is one specific speculation of how it could be."

When charities ask for time, people give more money

According to new research in the Journal of Consumer Research, simply asking people a question about whether they're willing to volunteer their time leads to increases in donations of both time and money.

"Because time consumption is associated with emotional experiences, thinking about donating time reminds people of the happiness achieved through helping others," write authors Wendy Liu (UCLA) and Jennifer Aaker (Stanford). They explain that the effect cannot be explained by guilt about not donating time, since people first asked to donate time agree to donate more money and more time than other groups.

The researchers conducted three separate studies, which yielded similar results. In the first study, participants completed an online survey and then read a statement about lung cancer and the American Lung Cancer Foundation's mission. Half of the participants were asked how much time they would like to donate to the foundation and half were not asked. Then all were asked how much money they would donate to the foundation. The participants who were asked to donate time eventually pledged more than those who weren't asked: $36.44 versus $24.46.

In the next study, researchers introduced undergraduates to the work of HopeLab, a nonprofit organization that serves children with chronic illnesses. The average donation level was nearly five times higher for participants who were first asked about donating their time to the organization. Additionally, the numbers of people who volunteered their time and the number of people who actually followed up and did volunteer work were both higher in that group. A third study replicated the findings from the first two studies and also explored the feelings that arose when people thought about donating time.

"We argue that thinking about time activates goals of well-being and beliefs involving personal happiness. In contrast, thinking about money suppresses such emotional goals and instead activates goals of economic utility and beliefs about attainment of such goals," the authors explain.

Organizations wishing to increase involvement should take note. "This paper has important practical implications for both profit and non-profit social organizations interested in cultivating ways to more effectively raise funds," the authors conclude.

Wendy Liu and Jennifer Aaker. "The Happiness of Giving: The Time-Ask Effect" Journal of Consumer Research: October 2008.

Healthy people and enhancement drugs

Healthy people are more willing to take drugs to enhance traits that are not fundamental to their identity.

According to a new study in the Journal of Consumer Research, people's willingness to take a pill or drug depends on whether the trait the drug promises to enhance is one they consider fundamental.

Authors Jason Riis (NYU, Harvard Business School), Joseph P. Simmons (Yale University), and Geoffrey P. Goodwin (Princeton University) examine the moral dilemmas that arise as technologies develop that not only cure disease but also enhance already-healthy people. As many young people without diagnosed disorders or deficits take Ritalin or Adderall to improve concentration or anti-depressants to lift their moods, this study examines what makes healthy people willing to take pills.

The researchers determined that people do not feel comfortable using a pill to enhance a trait they believe to be fundamental to their identity. But less-fundamental traits, including concentration, are more acceptable targets. "We suggest that people's willingness to take psychological enhancements will largely depend on beliefs about whether those enhancements will alter characteristics considered fundamental to self-identity," the authors write.

During a series of studies, the researchers found that young people were less likely to agree to take a drug to increase their social comfort than one that increased their ability to concentrate. The most common reason participants said they wouldn't want to take a pill was because it would "fundamentally change who I am."

Not surprisingly, the marketing message affected participants' responses. When the researchers tested different advertising taglines, they found that participants responded more positively to a drug promising to help them become "more than who you are," than one that would allow them to become "who you are."

"Together, this research converges to highlight the importance of identity expression and preservation in governing the choices and lives of consumers," write the authors.

Jason Riis, Joseph P. Simmons, and Geoffrey P. Goodwin. "Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits" Journal of Consumer Research: October 2008.

Health Journalists Face Translation Challenge, MU Researchers Find

Majority of health journalists lack specialized training, nearly half not familiar with health literacy

Story Contact: **Emily Smith**, (573) 882-3346, SmithEA@missouri.edu

COLUMBIA, Mo. – The media constantly inform the public of new health information, but many Americans have difficulty recognizing what they should, or should not do to improve their health. University of Missouri researchers conducted a national survey and found that the majority of health journalists have not had specialized training in health reporting and face challenges in communicating new medical science developments.

Amanda Hinnant and María Len-Ríos, assistant professors in the Missouri School of Journalism, surveyed 396 newspaper and magazine journalists and completed 35 in-depth interviews to offer insight into the role of journalists in reducing the negative effects of limited health literacy. Health literacy, as defined by the American Medical Association, is 'the ability to obtain, process and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment.'

"Almost half of the journalists reported they were not familiar with the concept of health literacy, but said that their readers' ability to understand health information was very important to consider when writing health stories," Hinnant said. "Increasing knowledge of health literacy could help journalists clarify medical information to readers."

Of the journalists surveyed, only 18 percent had specialized training in health reporting and only 6.4 percent reported that a majority of their readers change health behaviors based on the information they provide. The journalists had an average of 18 years of journalism experience and seven years experience as health journalists.

"Health journalists play an important role in helping people effectively manage their health," Len-Ríos said. "However, we found that many journalists find it difficult to explain health information to their readers, while maintaining the information's scientific credibility. They have to resist 'bogging down' the story with too much technical science data and 'dumbing down' the story with overly simplistic recommendations."

Journalists reported quoting medical experts, avoiding technical terms, and providing data and statistics, as the three most important elements to making health information understandable. However, understanding numbers is a challenge for many people, Hinnant said. According to the U.S. Department of Education 2007 report, mathematics literacy is a serious problem in the United States. Only 39 percent of U.S. students are at or above the "proficient" level in grade eight and only 23 percent, are at that level by grade 12. Mathematical knowledge is important to understand health information, Hinnant said.

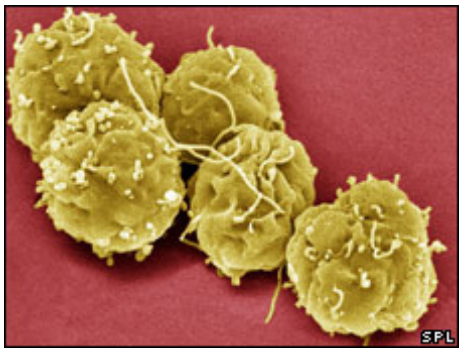
"A large percentage of Americans are not health literate, which is related to significant health problems including medication errors, failing to seek treatment and an inability to understand directions about proper health behavior," Hinnant said. "The role of a health journalist includes translating medical information and acting as a liaison responsible for providing quality information. We need to actively find ways to improve health coverage and recognize the importance of the media's role in improving the public's quality of life."

According to the survey, journalists have complex views of what their readers can understand. A majority of journalists reported believing that their readers understand information from medical professionals, but are not proficient with scientific information and more prone to believe health myths. More than half of the respondents thought a majority of their readers used information simply to gain a better understanding of health issues or used it to communicate better with health professionals. The results suggest that newspaper journalists view their roles as information providers, while magazine journalists perceive themselves more as advocates for behavioral change.

Results from the study, "Tacit Understandings of Health Literacy: Interview and Survey Research with Health Journalists," were presented at the 2008 Association for Education in Journalism and Mass Communication Convention in Chicago. The paper received the Top Faculty Paper Award from the Science Communication Interest Group. The research was funded by the Missouri Foundation for Health, Missouri Health Literacy Enhancement Priority Area Grant

Stem cells 'created from teeth'

Japanese scientists say they have created human stem cells from tissue taken from the discarded wisdom teeth of a 10-year-old girl.



Many religious groups object to using embryos for medical research

The researchers say their work suggests that wisdom teeth could be a suitable alternative to human embryos as a source for therapeutic stem cells.

Research involving stem cells is seen as having the potential to treat many life-threatening diseases.

But some people believe using human embryos is ethically controversial.

The researchers, based at the National Institute of Advanced Industrial Science and Technology (AIST), say it will be at least five years before their findings result in practical medical applications.

Dual benefit

Stem cells have the ability to develop into other kinds of human cells, and experts believe they may eventually lead to treatments for some of the most intractable conditions, such as cancer and diabetes.

The AIST researchers said they had identified a form of stem cell in the wisdom teeth which had the capability to develop and be grown successfully into other forms of cell outside the body.

The cells they harvested continued to grow in the laboratory for just over a month, they added.

The leader of the team, Hajime Ogushi, said the research was significant in two ways.

"One is that we can avoid the ethical issues of stem cells because wisdom teeth are destined to be thrown away anyway," he told the AFP news agency.

"Also, we used teeth that had been extracted three years ago and had been preserved in a freezer. That means that it's easy for us to stock this source of stem cells."

In the US, dentists are starting to offer to store stem cells taken from wisdom teeth and from baby teeth, another potential source, for therapeutic purposes in the future.

Last year, a team of US and Japanese scientists announced they had managed to produce stem cells from skin.