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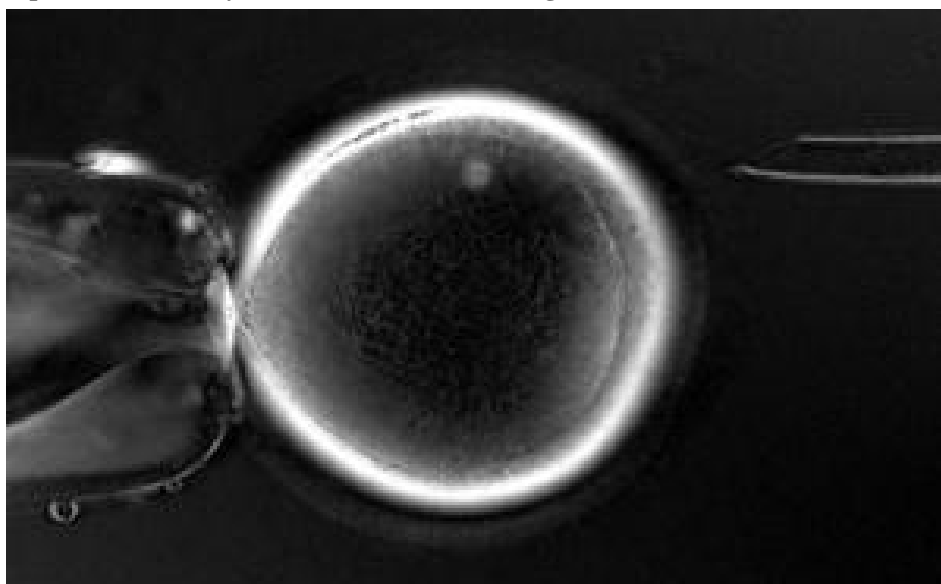
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'Oosight' Microscope Enables Embryonic Stem Cell Breakthrough



Spindle: Visualization of the meiotic spindle in a rhesus monkey oocyte (egg) using the Oosight™ spindle imaging system during enucleation. The spindle is near the 12 o'clock position in the egg. Image: From Byrne, et al. 2007. Nature 450: 497-502 (Supplementary Material). (Credit: From Byrne, et al. 2007. Nature 450: 497-502, courtesy of Marine Biological Laboratory)

ScienceDaily (Dec. 3, 2007) — A noninvasive, polarized light microscope invented at the Marine Biological Laboratory (MBL) played a crucial role in a recent breakthrough in embryonic stem-cell research aimed at developing medical therapies.

A team led by Shoukhrat Mitalipov, Ph.D., of Oregon Health & Science University reported the successful derivation of stem cells from cloned monkey embryos in the November 22 issue of *Nature*. While embryonic stem cells have been made from cloned embryos in a mouse, this is the first time they have been produced in a primate.

In humans, this method for deriving stem cells is a potential way to make "custom" tissues that are genetically identical to a patient, which would avoid rejection by the patient's immune system. Stem cells, in theory, can be induced to become any type of cell, tissue or organ. However, in recent years, some investigators had claimed it wouldn't be technically possible to make embryonic stem cells from monkeys or humans using this method (somatic cell nuclear transfer, or therapeutic cloning).

Mitalipov's stem-cell derivation succeeded, he says, largely due to the Oosight™ microscope system developed by Cambridge Research & Instrumentation Inc. (CRi) of Woburn Mass., using technology invented at the MBL by senior scientist Rudolf Oldenbourg, Ph.D., and research associate Guang Mei, Ph.D. Former MBL research scientists David L. Keefe, M.D., and Lin Liu, Ph.D., both of whom teach in the MBL's Frontiers in Reproduction course, worked with Oldenbourg to adapt the technology for somatic cell nuclear transfer and embryology.

"The use of the Oosight was one of the major modifications we made in our present work," Mitalipov says.

The Oosight allowed Mitalipov's team to clearly see and remove the meiotic spindle from 304 female rhesus monkey eggs. This is the first step in therapeutic cloning, called enucleation. Next, they inserted the genetic material from the skin cells of an adult male rhesus monkey into the eggs and allowed them to grow to the blastocyst stage. From these cloned embryos, the researchers obtained two viable stem cell lines that are genetically identical to the adult male monkey.

"We are thrilled that the Oosight worked for enucleating monkey eggs," says Keefe. "We already had shown at the MBL, in 2000, that the technology developed by Dr. Oldenbourg facilitated noninvasive enucleation of mice eggs." At that time, Keefe operated a research lab at the MBL and directed the Division of Reproductive Medicine and Infertility at Women & Infants Hospital in Providence, R.I. Keefe is presently professor and chair of the Department of Obstetrics and Gynecology at the University of South Florida College of Medicine.

"Before, the problem was always that you could not see the spindle in the egg," Mitalipov says. "The only way to see it was to stain it with dyes. And that, we found, was very detrimental for egg quality." The Oosight uses liquid-crystal polarized light technology to image the spindle noninvasively, with high contrast and quality.

"You can actually look in the Oosight microscope and see the spindle with your eyes, not frozen as a computer screen image," says Mitalipov, which is critical for the next step: taking the spindle out of the egg. "You can't manipulate the egg while looking at a computer screen. You have to look at the egg. The Oosight, plus very skilled micromanipulations of the eggs, gave us a 100% success rate with enucleating."

The Oosight is based on technology that is the result of decades of MBL research pioneered by Distinguished Scientist Shinya Inoué. In the 1950s, Inoué was one of the first cytologists to make extensive use of the polarized light microscope to observe birefringent components of the cell, which led to his landmark discovery in 1951 of the meiotic spindle fibers in living cells. He later showed that dynamic disassembly of the spindle fibers can produce force that moves the chromosomes toward the poles of the cell during mitosis or meiosis.

In 1957, Inoué added a polarization rectifier to his custom-built microscope, which dramatically decreased distortion and improved the contrast of the image. Rudolf Oldenbourg further improved the polarizing microscope in the mid-1990s, adding liquid crystals with electro-optical controls and software. This version, called the LC-PolScope, allows one to simultaneously measure the birefringence in every resolved specimen point across the entire viewing field of the microscope; traditional models could only measure a single point of the specimen at a time. The LC-PolScope continues to be refined and expanded for live cell imaging at the MBL. Its technology is being adapted to different application areas by Cambridge Research & Instrumentation and is sold under trademarks such as Oosight and Abrio.

In the mid-1990s, David Keefe set up a lab at the MBL in order to collaborate with Oldenbourg and Inoué. Keefe was interested in finding out if the noninvasive LC-PolScope could be used in clinical settings to evaluate the quality of human eggs prior to in vitro fertilization procedures, and thus reduce the number of nonviable embryos created; and to improve the efficiency of therapeutic cloning in animals.

"When I was training as an ob-gyn at Yale in the mid 1980s, we were one of the first places to use ultrasound to assess the health of babies in utero," Keefe says. "As a student in the MBL Physiology Course, I learned of Drs. Inoué's and Oldenbourg's work, and realized we could use the polarizing microscope to assess health even earlier during development -- back to the beginning, at the egg stage - - without hurting the egg," Keefe says.

Using the LC-PolScope, Keefe, Oldenbourg and collaborators reported for the first time on layers of birefringence in the egg's zona pellucida in 1997. In 2000, Lin Liu, Keefe, Oldenbourg and collaborators reported that the polarized light microscope also helped enucleate mouse eggs, the critical step during somatic cell nuclear transfer, and proposed that this approach would improve the efficiency and safety of therapeutic cloning (*Nature Biotech.* 18: 223-225).

The LC-PolScope was commercialized first as the SpindleView in 1999, later as the Oosight in 2005, with improvements for fast viewing contributed by Michael Shribak, Ph.D., associate research scientist at the MBL. The Oosight has the same optical components and the algorithms as the LC-PolScope, but

it is simplified for routine operation. While polarized light microscopy is now used throughout the world in infertility clinics, and was proposed as an aid to cloning research, its actual application to cloning research was not appreciated until the recent Nature paper by Mitalipov et al.

"In spirit and in application, the Oosight really expands on what Shinya Inoué started in the 1950s," says Oldenbourg. "And it was David Keefe's vision that the LC-PolScope could be used for in vitro fertilization or for enucleation, since it can be used to visualize the spindle without staining it with dyes."

"It's very significant that the Oosight and its applications were developed at the MBL," says Keefe. "The MBL is such a special and unique place. We had Shinya Inoué, Rudolf Oldenbourg, and our group of mammalian embryologists and clinicians, all working literally 25 feet from each other's labs. That's why this work was accomplished."

Journal citations:

Byrne, J.A., D.A. Pedersen, L.L. Clepper, M. Nelson, W.G. Sanger, S. Gokhale, D.P. Wolf, and S.M. Mitalipov (2007). Producing primate embryonic stem cells by somatic cell nuclear transfer. *Nature* 450: 497-502.

Liu, L., R. Oldenbourg, J.R. Trimarchi, and D.L. Keefe. 2000. A reliable, noninvasive technique for spindle imaging and enucleation of mammalian oocytes. *Nature Biotech.* 18: 223-225.

Adapted from materials provided by Marine Biological Laboratory.

<http://www.sciencedaily.com/releases/2007/11/071129183731.htm>

Stunning Image Of Nearby Spiral Galaxy



In the new Hubble image of the galaxy M74 we can also see a smattering of bright pink regions decorating the spiral arms. These are huge, relatively short-lived, clouds of hydrogen gas which glow due to the strong radiation from hot, young stars embedded within them; glowing pink regions of ionized hydrogen (hydrogen that has lost its electrons). These regions of star formation show an excess of light at ultraviolet wavelengths and astronomers call them HII regions. (Credit: NASA, ESA, and The Hubble Heritage (STScI/AURA)-ESA/Hubble Collaboration)

ScienceDaily (Dec. 2, 2007) — Hubble has sent back an early Christmas card with this new NASA/ESA Hubble Space Telescope image of the nearby spiral galaxy Messier 74. It is an enchanting reminder of the impending season. Resembling glittering baubles on a holiday wreath, bright knots of glowing gas light up the spiral arms, with regions of new star birth shining in pink.

Messier 74, also called NGC 628, is a stunning example of a 'grand-design' spiral galaxy that is viewed by Earth observers nearly face-on. Its perfectly symmetrical spiral arms emanate from the central nucleus and are dotted with clusters of young blue stars.

In the new Hubble image we can also see a smattering of bright pink regions decorating the spiral arms. These are huge, relatively short-lived, clouds of hydrogen gas which glow due to the strong radiation from hot, young stars embedded within them; glowing pink regions of ionized hydrogen (hydrogen that has lost its electrons). These regions of star formation show an excess of light at ultraviolet wavelengths and astronomers call them HII regions.

Tracing along the spiral arms are winding dust lanes that begin very near the galaxy's nucleus and follow along the length of the spiral arms. These spiral arms are not actually static 'arms' like spokes on a wheel. They are in fact density waves and move around the galaxy's disc compressing gas -- just as sound waves compress the air on Earth -- creating a new generation of young blue stars.

Messier 74 is located roughly 32 million light-years away in the direction of the constellation Pisces, the Fish. It is the dominant member of a small group of about half a dozen galaxies, the Messier 74 galaxy group. In its entirety, it is estimated that Messier 74 is home to about 100 billion stars, making it slightly smaller than our Milky Way.

The spiral galaxy was first discovered by the French astronomer, Pierre Méchain, in 1780. Weeks later it was added to Charles Messier's famous catalogue of deep-sky objects. Of all the objects in Messier's catalogue, number 74 has the lowest surface brightness. It is so difficult for amateur astronomers to spot through a telescope that it has been given the nickname 'The Phantom Galaxy'.

This Hubble image of Messier 74 is a composite of Advanced Camera for Surveys' data taken in 2003 and 2005. The filters used to create the colour image isolate light from blue, visible, and infrared portions of the spectrum, as well as emission from ionized hydrogen.

A small segment of this image used data from the Canada France Hawaii Telescope/Gemini Observatory telescope to fill in a region which Hubble did not image.

Adapted from materials provided by ESA/Hubble Telescope.

<http://www.sciencedaily.com/releases/2007/11/071129092042.htm>

Intelligent Software Helps Build Perfect Robotic Hand



The 'cyberglove' used to capture data about how the human hand moves. (Credit: Image courtesy of University Of Portsmouth)

ScienceDaily (Dec. 2, 2007) — Scientists in Portsmouth and Shanghai are working on intelligent software that will take them a step closer to building the perfect robotic hand.

Using artificial intelligence, they are creating software which will learn and copy human hand movements.

They hope to replicate this in a robotic device which will be able to perform the dexterous actions only capable today by the human hand.

Dr Honghai Liu, senior lecturer at the University of Portsmouth's Institute of Industrial Research, and Professor Xiangyang Zhu from the Robotics Institute at Jiao Tong University in Shanghai, were awarded a Royal Society grant to further their research.

The technology has the potential to revolutionise the manufacturing industry and medicine and scientists hope that in the future it could be used to produce the perfect artificial limb.

"A robotic hand which can perform tasks with the dexterity of a human hand is one of the holy grails of science," said Dr Honghai Liu, who lectures artificial intelligence at the University's Institute of Industrial Research. The Institute specialises in artificial intelligence including intelligent robotics, image processing and intelligent data analysis.

He said: "We are talking about having super high level control of a robotic device.



Nothing which exists today even comes close.”

Dr Liu used a cyberglove covered in tiny sensors to capture data about how the human hand moves. It was filmed in a motion capture suite by eight high-resolution CCD cameras with infrared illumination and measurement accuracy up to a few millimetres.

Professor Xiangyang Zhu from The Robotics Institute at the Jiao Tong University in Shanghai, which is recognised as one of the world-class research institutions on robotics, said that the research partnership would strengthen the interface between artificial intelligence techniques and robotics and pave the way for a new chapter in robotics technology.

“Humans move efficiently and effectively in a continuous flowing motion, something we have perfected over generations of evolution and which we all learn to do as babies. Developments in science mean we will teach robots to move in the same way.”

Adapted from materials provided by University Of Portsmouth.

<http://www.sciencedaily.com/releases/2007/11/071130231044.htm>

Breast Cancer Gene Activity Seen From Outside The Body

ScienceDaily (Dec. 3, 2007) — Researchers at Jefferson Medical College and Jefferson's Kimmel Cancer in Philadelphia have used PET imaging to see hyperactive cancer genes inside breast tumors in laboratory animals, marking the first time such gene activity has been observed from outside the body. This technology might someday help physicians to detect and classify cancer, enabling them to find cancerous breast tumors as early as possible, and determine the appropriate treatment.

Reporting in the *Journal of Nuclear Medicine*, scientists led by Eric Wickstrom, Ph.D., and Mathew Thakur, Ph.D., used a DNA "probe" – a modified nuclear medicine agent – to detect the hyperactivity of CCND1, a common breast cancer gene. The gene is copied thousands of times in most breast cancer cells. The high concentration makes CCND1 copies easier to image with the genetic PET probe. The research team found a much higher concentration of the cancer gene activity in estrogen receptor-positive breast tumors in mice than in normal tissue.

"Less than one-fourth of lumps found in mammograms are really cancer," notes Dr. Wickstrom, professor of Biochemistry and Molecular Biology at Jefferson Medical College of Thomas Jefferson University. "Our new technique will let us see what is really going on in a suspicious lump. We will see if a lump is malignant or something safe."

"Patients with benign lumps could avoid invasive procedures if active cancer genes could be identified from outside the body," says Dr. Thakur, professor of Radiology and Radiation Oncology at Jefferson Medical College. "Observing the cancer gene activity of a breast tumor will permit physicians to determine the best way to treat it."

The new technique to visualize sites of cancer gene activity, which the investigators call radiohybridization imaging (RHI), might help physicians find out whether lesions found in mammograms are cancerous or non-cancerous without a biopsy. The genetic imaging agents are intended to find cancer gene activity as quickly as possible and guide the choice of therapy based on which genes are most active.

The American Cancer Society estimates that approximately 40,000 women in this country will die from breast cancer in 2007. Yet, clinical examination and mammography can miss almost half of the breast cancers in women under 40, approximately one-quarter of cancers in women ages 40 to 49 and one-fifth of cancers in women over age 50.

"When suspect lumps are discovered, biopsies are necessary to determine if the lumps are cancerous," Dr. Thakur points out. "However, more than three-fourths of the lumps are found to be benign. Mammography, an invaluable screening technique, sees shapes but not gene activity. Genetic PET scanning is a minimally invasive, sensitive and specific technique that might detect cancers with high efficiency in adult women and young women without breast compression." The researchers expect that RHI will be tested in clinical trials in suspected cases of breast cancer.

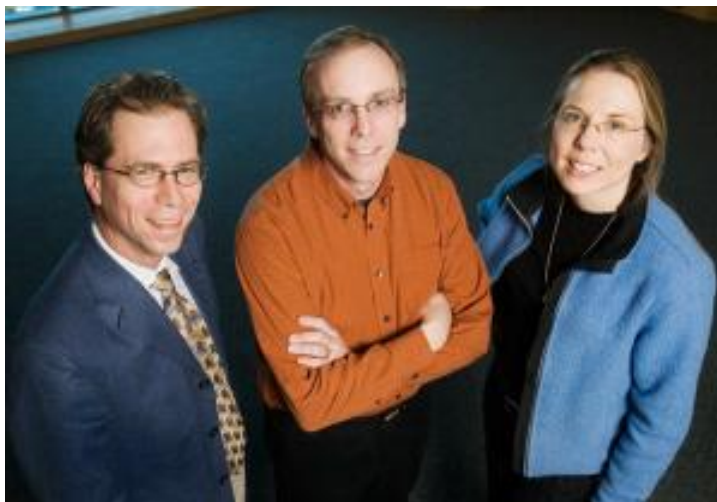
Dr. Wickstrom, Dr. Thakur, and their co-workers have found that RHI works for detecting the activity of other cancer genes in other types of tumors as well. "Early detection saves lives," Dr. Thakur says. "Several other cancers show characteristic activated genes that we might be able to use for early diagnosis, such as pancreatic cancer, prostate cancer, lymphoma, and colon cancer." The investigators are also exploring genetic agents designed for magnetic resonance imaging and fluorescence imaging.

These experiments were supported by grants from the Department of Energy and the National Cancer Institute.

Adapted from materials provided by Thomas Jefferson University.

<http://www.sciencedaily.com/releases/2007/11/071128165905.htm>

Catalyst-free Chemistry Makes Self-healing Materials More Practical



A new catalyst-free, self-healing material system developed by Jeffrey Moore, the Murchison-Mallory Professor of Chemistry at Illinois, is flanked by Scott White, a professor of aerospace engineering, and Nancy Sottos, a professor of materials science and engineering, offers a far less expensive and far more practical way to repair composite materials used in structural applications ranging from airplane fuselages to wind-farm propeller blades. (Credit: L. Brian Stauffer)

ScienceDaily (Dec. 3, 2007) — A new catalyst-free, self-healing material system developed by researchers at the University of Illinois offers a far less expensive and far more practical way to repair composite materials used in structural applications ranging from airplane fuselages to wind-farm propeller blades.

The new self-healing system incorporates chlorobenzene microcapsules, as small as 150 microns in diameter, as an active solvent. The expensive, ruthenium-based Grubbs' catalyst, which was required in the researchers' first approach, is no longer needed.

"By removing the catalyst from our material system, we now have a simpler and more economical alternative for strength recovery after crack damage has occurred," said Jeffrey Moore, the Murchison-Mallory Professor of Chemistry at Illinois. "Self-healing of epoxy materials with encapsulated solvents can prevent further crack propagation, while recovering most of the material's mechanical integrity."

During normal use, epoxy-based materials experience stresses that can cause cracking, which can lead to mechanical failure. Autonomous self-healing -- a process in which the damage itself triggers the repair mechanism -- can retain structural integrity and extend the lifetime of the material.

"Although we demonstrated the self-healing concept with a ruthenium-based catalyst, the cost of the catalyst made our original approach too expensive and impractical," said Moore, who also is affiliated with the university's Frederick Seitz Materials Research Laboratory and with the Beckman Institute. "Our new self-healing system is simple, very economical and potentially robust."

In the researchers' original approach, self-healing materials consisted of a microencapsulated healing agent (dicyclopentadiene) and Grubbs' catalyst embedded in an epoxy matrix. When the material cracked, microcapsules would rupture and release the healing agent, which then reacted with the catalyst to repair the damage.

In their new approach, when a crack forms in the epoxy material, microcapsules containing chlorobenzene break. The solvent disperses into the matrix, where it finds pockets of unreacted epoxy monomers. The solvent then carries the latent epoxy monomers into the crack, where polymerization takes place, restoring structural integrity.



In fracture tests, self-healing composites with catalyst-free chemistry recovered as much as 82 percent of their original fracture toughness.

The new catalyst-free chemistry has taken down the barriers to cost and level of difficulty, Moore said. "From an economics and simplicity standpoint, self-healing materials could become part of everyday life."

The new chemistry is described in a paper accepted for publication in *Macromolecules*, and posted on the journal's Web site.

With Moore, co-authors of the paper are graduate student and lead author Mary Caruso, former postdoctoral research associate David Delafuente (now a chemistry and physics professor at Augusta State University), visiting University of Texas at Austin undergraduate student Victor Ho, materials science and engineering professor Nancy Sottos, and aerospace engineering professor Scott White.

The work was funded by the Air Force Office of Scientific Research and the National Science Foundation.

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

<http://www.sciencedaily.com/releases/2007/11/071127105523.htm>

Toddlers With Persistent Sleep Problems Have More Injuries

ScienceDaily (Dec. 3, 2007) — A new study by psychologists at the University of Alabama at Birmingham (UAB) finds that toddlers who persistently wake up one or more times a night, at least once a week are at a greater risk for accidental injuries severe enough to require medical attention.

Injuries are the leading cause of death among children in the United States, according to the National Center for Injury Prevention and Control.

“The study reinforces the need to aggressively treat sleep difficulty in young children as a means to encourage not just cognitive and social development, but also to maintain physical health,” said UAB psychologist David Schwebel, Ph.D., the study’s principal investigator.

In the study, Schwebel examined a sample of 799 children, which included 408 boys and 391 girls. The children’s parents were surveyed several times a year, beginning just after the children were born until their third birthday.

According to reports by the parents, 34 percent of the children were classified as having very mild to mild sleep problems. This group awakened one or more times a night at least once a week for five minutes or longer.

Two percent of the children were classified as having moderate to severe sleep problems, waking up at least twice a night, three or more times a week and remaining awake for 15 minutes or longer each time.

The study found that the children with very mild to severe sleep problems had nearly twice as many injuries as the 511 children in the study, 64 percent, who did not have sleep problems.

The link between sleep patterns and injury risk was demonstrated even when the researchers controlled for variables such as socioeconomic status, parenting styles and maternal stress and depression, Schwebel said.

More studies are needed to find out whether fatigue or other possibilities such as parent behavior, children’s personality or conditions in the home play a role in creating the link between nighttime awakenings and injuries.

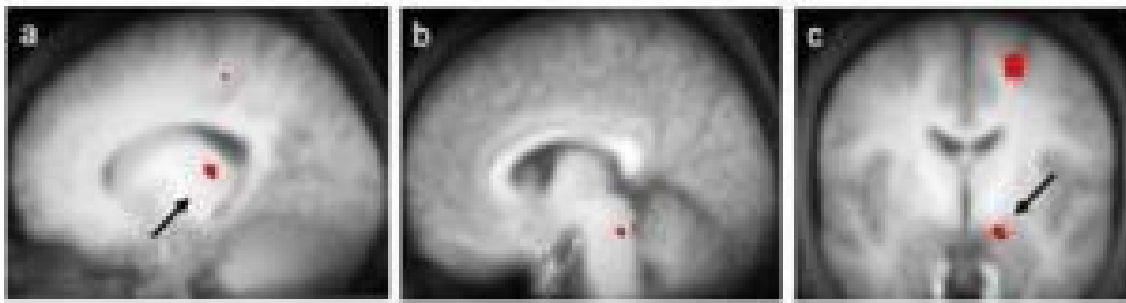
Carl M. Brezaussek, M.S., with the UAB Center for Educational Accountability, was the study’s co-author.

The results of the study are published in the *Journal of Pediatric Psychology*.

Adapted from materials provided by University of Alabama at Birmingham.

<http://www.sciencedaily.com/releases/2007/11/071130165939.htm>

Blue Lighting Up The Human Brain At Work



Modification of the activity of the thalamus (a), brainstem (b), and amygdala (c) induced by a blue light exposure. (Credit: Modified from Vandewalle et al. 2007 PLoS One)

ScienceDaily (Dec. 3, 2007) — The human brain uses light not just to support vision but also to support alertness and cognitive tasks. Which colours of light are most effective and where in the brain these non-visual effects can be seen was previously not known. Now researchers at the Cyclotron Research Centre at the University of Liege and the Surrey Sleep Research Centre at the University of Surrey have ‘shed some novel light’ on these issues by using functional magnetic resonance (fMRI) brain imaging while the participant were engaged on a working memory task. In a recent research paper it is reported that it is not just any light that is most effective but rather light of a particular short wavelength (480 nm, i.e. blue light rather than violet or green). This is in accordance with the hypothesis that such non-visual effects are mediated by a recently discovered ancient photoreceptor which is particularly sensitive to blue light.

More importantly maybe, by using very short exposures to light (< 1 minutes), in combination with brain imaging techniques, the researchers could identify the brain areas that are involved in the initial responses to this light. The brain areas that responded to blue light exposures included areas in the brain stem and the thalamus. These areas are involved in the regulation of very basic aspects of brain function, such as the regulation of alertness and sleepiness. Other areas that responded to light included the hippocampus and amygdala. These areas are well known to be involved in the regulation of higher functions such as memory and emotion. In summary, these data establish a brain basis for the wide ranging effects of light on how we perform and feel. The data have implications for the development of better artificial light environments and a better understanding of the effects of light on the human brain in general.

Dr Gilles Vandewalle, lead author, comments that ‘it was impressive to see how only a minor difference in wavelength could have such a dramatically different effect on our fMRI results’. Dr Pierre Maquet co-senior author, comments that ‘as a neurologist I am impressed by the wide ranging effects of light on brain function and the range of brain areas that are affected. This is an area that certainly warrants further investigation.’ Dr Derk-Jan Dijk, co-senior author remarks, ‘Humans are day-active animals, and maybe it is after all not so surprising to a biologist that blue light has these profound effects on our brain. After all, natural daylight contains quite a bit of blue light. We had simply forgotten about it because we are so preoccupied by the ‘visual’ effects of light, which are not particularly dependent on blue light. We now know that other aspects of brain function are.

Journal reference: G. Vandewalle, C. Schmidt, G. Albouy, V. Sterpenich, A. Darsaud, G. Rauchs, P.-Y. Berken, E. Baletau, C. Degueldre, A. Luxen, P. Maquet, D.J. Dijk. 'Brain Responses to Violet, Blue, and Green Monochromatic Light Exposures in Humans : Prominent Role of Blue Light and the Brainstem', PLoS One, issue 11/28 2007.

Adapted from materials provided by University of Liège.

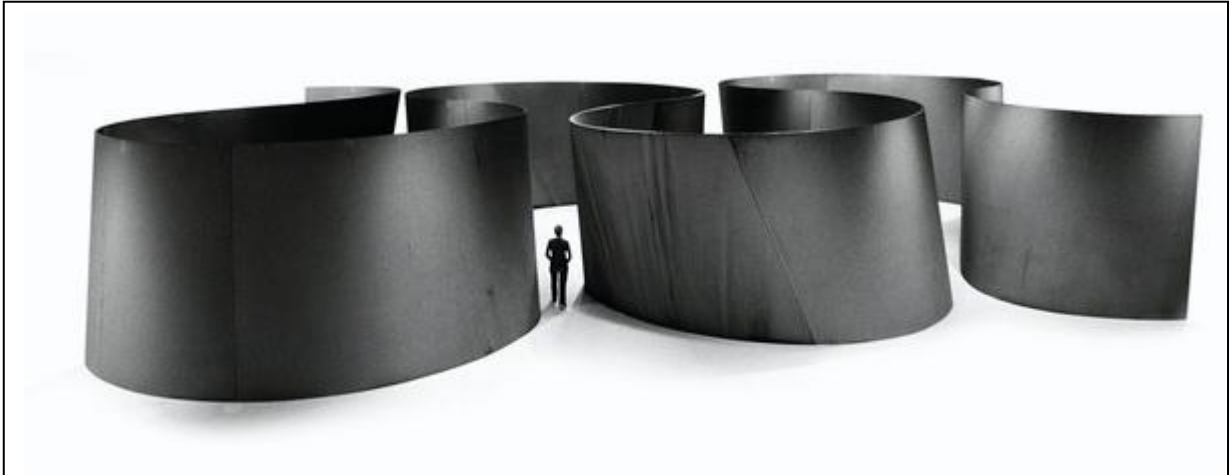
<http://www.sciencedaily.com/releases/2007/11/071130232132.htm>

Once-spurned sculptor feels the love again in N.Y.

By Kyle MacMillan

Denver Post Fine Arts Critic

Article Last Updated: 12/01/2007 04:12:03 PM MST



Richard Serra: "Band" (2006), steel (Los Angeles County Museum of Art. Gift of Eli and Edythe Broad)

For many people outside the art world in the 1980s, Richard Serra's "Titled Arc" embodied much of what was wrong with contemporary art.

The curved 12-foot wall of unadorned steel, which stretched 120 feet and essentially cut New York City's Federal Plaza in half, was castigated as cold, imposing, dehumanizing and just plain ugly.

After years of complaints, intense media coverage and, finally, a heated public hearing, a five-member jury assembled by the General Services Administration voted in March 1989 to have it removed and scrapped.

How much things have changed in the 18 years since!

"Richard Serra: Sculpture: Forty Years," an ambitious retrospective of the 69-year-old sculptor's career earlier this year at New York's Museum of Modern Art, was the kind of popular success more typically associated with Monet or Picasso.

The show drew an amazing 737,074 visitors during its June 3-Sept. 10 run, and these were not just art-world cognoscenti. There were young couples and many families, the towering, labyrinthine installations being big hits with kids.

In short, Richard Serra, previously the arch-villain of art, has gone mainstream. He has been accepted by the general public as a kind of modern old master, and, such treatment is only fitting, because that is exactly what he is.

Emerging in the 1960s, he was part of a generation of artists who sought nothing less than the total redefinition of what sculpture could be. After experimenting with a variety of materials, he settled on thick sheets of steel as his preferred material.

Employing a spare, post-minimalist aesthetic, he explored the very materiality of steel — its weight and seeming rigidity. Suffusing his works with a feeling of precariousness — even danger, Serra balanced steel plates on the wall with a pole ("Prop," 1968) or leaned plates together to create a loose, open cube ("One Ton Prop (House of Cards)," 1969).

"Basic Maintenance" (1987), an example on display on the fourth floor of the Denver Art Museum's Hamilton Building, deals with some of these same issues. The 12-foot-tall piece consists of two square steel plates on edge, one resting at an angle on another against a gallery wall.

Serra has also explored the sometimes confrontational interaction between his sculptures and the spaces where they are exhibited, either indoors or outdoors, as well as the dynamic relationship between his works and the viewer.

If his older works possessed a muscularity and solidity that could be off-putting to some viewers, his sculpture began to grow in complexity and become more supple, sensuous and graceful in the 1990s as his artistic vision evolved and fabricating techniques improved.

This new chapter in Serra's work dramatically culminated at MOMA with the sculptor's awe-inspiring "Sequence" (2006), a maze-like, 65-foot-long work consisting of two inset S-shaped walls nearly 13 feet in height.

Strolling through the serpentine corridors and spaces created by the curving walls offers an unprecedented and ever-changing visual, and, perhaps more important, visceral experiences, as the towering walls constantly bend inward and outward.

Because of the massive weight and scale of the largest pieces on view (MOMA's new building was constructed with reinforced floors specifically designed to handle works by Serra), the exhibition did not tour, and it is unlikely that it will be repeated for a few decades at least.

But art lovers who were not able to make it to New York need not despair. In conjunction with the show, MOMA has published a handsome, impressively comprehensive book (420 pages, \$75), with stunning black-and-white images of the works in the show and dozens of other examples.

It is the ideal Christmas gift for Serra devotees and fans of great sculpture in general.

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http://www.denverpost.com/ci_7611593

Why vandalize art?

Are acts craziness or simply personal statements?

By Diane Heilenman

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The Courier-Journal

Crimes of art? No, crimes of the heart.

So claims the woman who vandalized a Cy Twombly painting in France this summer.



We may never really know why she and a small percentage of art viewers become vandals, but their stories are compelling.

The vandalism of the Twombly occurred in July at the Collection Lambert in Avignon, a museum of contemporary art. Cambodian-born artist Sam Rindy, 30, planted a big, fat, smeary red "kiss" on the deliberately vacant, all-white canvas by the respected abstract painter. Between Rindy's arrest and her trial Nov. 16, some 80 blogs discussing the event sprang up on the Internet, according to Eric Mézil, director of the Collection Lambert, which owns the painting.

The Collection is a respected repository of contemporary art amassed by art dealer Yvon Lambert, who plans to give it to France eventually. Lambert, who had asked for more than \$2.9 million in damages to cover the value of the painting and the \$47,000 restoration cost, was doubtless unhappy with the judgment that directs Rindy to do 100 hours of community service, pay Lambert \$1,465 and pay Twombly a symbolic one euro, or \$1.50.

Twombly, an American born in 1928 in Lexington, Va., who now lives in Rome, requested the symbolic fine. According to Mézil at the museum Web site (www.collectionlambert.net), Twombly is ironically aware that now his name will be known to all but "only as the artist who made a white canvas kissed by a woman."

Rindy's actions are not unique this summer and fall.

Vandals busy in Europe

European news sources have also been following the events of Oct. 5. That's when four people in black masks wielding crowbars and axes quickly cleared out visitors to a small Swedish university museum in Lund, shouting, "We don't support this ----." The exhibit was controversial New York photographer/provocateur Andres Sarrano's "The History of Sex." The series has been around a while. An ArtForum critic called it "a variety show of amateurs and models acting out scripted sexual scenarios" in 1997.

It may be old hat in the art world, but the Swedish vandals had their own agenda. They brought along their own videographer to record their actions -- complete with lettered signs held up like captions saying "This is art?" -- and posted the video on YouTube. It was halted by YouTube owner Google, not for the self-conscious violence but for the alleged pornographic content. The vandals also left leaflets "Against decadence and for a healthier culture," according to reports in The New York Times. The show continues at Lund through December and then continues to travel in Europe.

The vandals have not been found.

In a third vandalism, around midnight on Oct. 7, five apparently drunk teenagers opened a back door and set off an alarm and were captured on video inside Paris' Musée d'Orsay. One young man was taped striking a Monet painting and creating a 4-inch-long horizontal tear. That vandal turned himself in and identified the others. According to BBC News and Agence France-Presse, French police arrested and questioned four men and one woman, all 18 or 19 years old. The incident occurred during *Nuit Blanche* (White Night), an annual all-night arts and concert gala that coincided with France's rugby victory over New Zealand.

France's cultural minister has called for tougher measures against art vandals. The trial is pending.

Vandal motivation

Some experts chalk up such acts to aberrant behavior.

Columbia University art historian David Freedberg speculates in his book *"Iconoclasts and Their Motives"* that such acts attempt to declare supremacy and deprive images of power. Vandalism, he writes, is basically "one of the most striking and dramatic forms of response" to art. Christopher Cordess, who teaches forensic psychiatry in the School of Health and Related Research at the University of Sheffield in England, is trying to amass profiles of art vandals. Few museum directors want to talk about art crimes, worrying that the mere mention may spark action.

However, Stedelijk Museum director Rudi Fuchs spoke up after the 1997 slashing of a \$2 million 1951 Barnett Newman abstract painting in the Amsterdam museum by Gerard Jan van Bladeren. Turned out, this was van Bladeren's *second* successful attack on a Newman work at the *same* museum. He had repeatedly slashed a 1967 Newman painting in 1986. Fuchs told *The New York Times*, "It's like being raped. It changes your life. Now people will forever be looking over their shoulders when they go to museums."

Not all vandalism is simple damage done through craziness. Check out the list accompanying this story for the variety of excuses offered over the years. Another theory was put forth in the 2002 "Vandals" exhibition and panel in San Francisco -- home of the still-unsolved 2001 case in which a slasher mutilated hundreds of books in the public library dealing with women, homosexuality and AIDS.

The exhibit premise was that art vandalism now reflects the attempts of individuals in the 21st century to gain attention in an Internet world dotted by spam and pop-ups, YouTube and MySpace, blogs and Web pages. "Vandals," at the University of San Francisco's Thatcher Gallery, addressed the relationship of vandalism to art, censorship and First Amendment rights. Some vandalism is rationalized as conceptual art. Graffiti is sometimes justified as freedom of expression or speech.

Recently, there has been an effort to describe some acts of vandalism as performance-based "art intervention."

British art historian Richard Murphy tried to make sense of such things in *"Theorizing the Avant-Garde: Modernism, Expressionism, and the Problem of Postmodernity"* (Cambridge University Press: 1999).

He wondered if we are not seeing an implied critique by "artists" that an earlier "tradition" of the avant-garde is dead. (In the case of the Twombly, for instance, a once-shocking all-white canvas needs color and higher shock value.) In this sense, the vandalism is an intervention, Murphy writes, "that is, a form of continuation of the original joke or even an elaboration of the original artistic conception."

Reporter Diane Heilenman can be reached at (502) 582-4682.

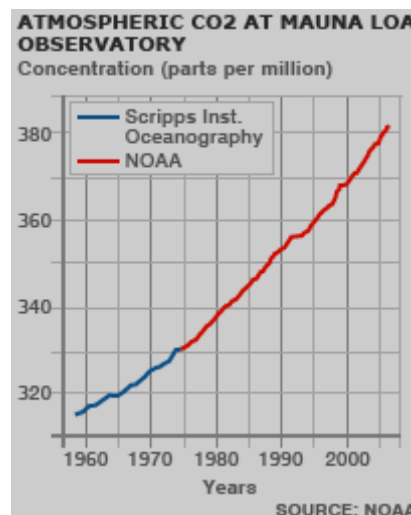
<http://www.courier-journal.com/apps/pbcs.dll/article?AID=/20071202/SCENE05/712020310/>

50 years on: The Keeling Curve legacy

By Helen Briggs

Science reporter, BBC News

It is a scientific icon, which belongs, some claim, alongside $E=mc^2$ and the double helix.



Its name - the Keeling Curve - may be scarcely known outside scientific circles, but the jagged upward slope showing rising carbon dioxide (CO₂) levels in the atmosphere has become one of the most famous graphs in science, and a potent symbol of our times.

It was 50 years ago that a young American scientist, Charles David Keeling, began tracking CO₂ in the Earth's atmosphere at two of the world's last wildernesses - the South Pole and the summit of the Mauna Loa volcano in Hawaii.

His very precise measurements produced a remarkable data set, which first sounded alarm bells over the build-up of the gas in the atmosphere, and eventually led to the tracking of greenhouse gases worldwide.

The curve set the scene for the debate over climate change, and policies, sometimes controversial, that address the human contribution to the greenhouse effect.

Without this curve, and Professor Keeling's tireless work, there is no question that our understanding and acceptance of human-induced global warming would be 10-20 years less advanced than it is today

Dr Andrew Manning, UEA

"It wasn't until Keeling came along and started measuring CO₂ that we got the evidence that CO₂ was increasing from human activities," says Professor Andrew Watkinson, director of the Tyndall Centre for Climate Change Research at the University of East Anglia (UEA), UK.

"The graph is iconic from a climate perspective."

Dr Alistair Manning of the UK Met Office agrees. "It was the first real indication that CO₂ levels were rising," he says. "That therefore started scientists thinking about the impact such a change would have on the climate."

'Tireless work'

Back in the 1950s, when Keeling began his experiments, no-one knew whether the CO₂ released from the burning of fossil fuels (coal, oil/petroleum and natural gas) would end up in the atmosphere or be fully absorbed by oceans and forests.

"The goal behind starting the measurements was to see if it was possible to track what at that time was only a suspicion: that atmospheric CO₂ levels might be increasing owing to the burning of fossil fuels," explains biogeochemist Dr Andrew Manning, also from the UEA, who worked with Professor Keeling in the 1990s.

"To do this, a location was needed very far removed from the contamination and pollution of local emissions from cities; therefore Mauna Loa, high on a volcano in the middle of the Pacific Ocean was chosen.

"Without this curve, and Professor Keeling's tireless work, there is no question that our understanding and acceptance of human-induced global warming would be 10-20 years less advanced than it is today," adds Dr Manning.

Sleepless nights

Professor Keeling discovered that carbon dioxide was rising continuously and that there were annual fluctuations in carbon in the atmosphere (the little squiggles on the line), caused by seasonal variations in plant growth and decay.

When he started his measurements in 1958, CO₂ levels were around 315 ppmv (parts per million by volume - that is 315 molecules of CO₂ for every one million molecules in the air); by the year 2005 they had risen to about 378 ppmv.

Yet despite the importance we place on climate change research today, Professor Keeling, known as Dave to friends and colleagues, struggled to secure funding for his monitoring efforts.

"Dave Keeling suffered many sleepless nights, even as late as in the 1990s, being forced again and again to justify continued funding of his programme," recalls Dr Manning.

"The fact that we are celebrating 50 years now is due purely to his incredible perseverance, courage and optimism."

He says the technical, analytical and logistical challenges of the work are enormous.

"To measure such tiny changes in the composition of the air, high on a remote mountain top in the middle of the Pacific Ocean is extremely challenging even today in the 21st Century," he explains.

"That Dave Keeling was able to successfully begin and continue such highly demanding measurements in the 1950s is a tribute to his brilliance."

Detailed monitoring

Today, carbon dioxide levels are sampled weekly at about 100 sites around the world.

Flasks filled with air are taken to a laboratory, where they are analysed for carbon dioxide, other greenhouse gases and pollutants.

Aircraft collect similar samples at higher altitude, while space-borne sensors detect some gases remotely throughout the atmosphere.

"Without the fifty-year carbon dioxide record, we wouldn't understand the cause of the climate change we are observing today," says James Butler, deputy director of The National Oceanic and Atmospheric Administration (Noaa) Earth System Research Laboratory.

"The carbon dioxide record has allowed us to connect the dots between increasing fossil fuel emissions and a warmer world."

Charles Keeling died in 2005, aged 77. He continued his research into carbon dioxide at the Scripps Institution of Oceanography in San Diego, US, until his final day.

By then he had authored nearly 100 research articles and had received the National Medal of Science - the US's highest award for lifetime achievement in scientific research.

His son, Professor Ralph Keeling, also a geochemist at Scripps, continues his work.

TIMELINE: carbon monitoring

1957 : Charles David Keeling starts work monitoring CO₂ at the South Pole and Mauna Loa Observatory, Hawaii

1958 : Keeling starts first direct continuous atmospheric measurements of CO₂

Early 1970s : Noaa, the US federal agency, starts monitoring CO₂ worldwide

1995-2003 : Noaa's Earth System Research Laboratory (ESRL) at Boulder, Colorado, develops and maintains the world's standard references for CO₂ and other greenhouse gases

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7120770.stm>

Published: 2007/12/02 20:13:58 GMT

'Tropics expand' as world warms

Climate change is causing the tropics to widen, with possible impacts on the global food supply, research suggests.



Scientists examined five different measures of the width of the tropical belt, and found it expanded by between 2 and 4.8 degrees latitude since 1979.

Other researchers meanwhile said climatic change could increase the number of thunderstorms in the US.

The findings emerged as delegates met in Bali for UN climate talks focusing on reducing greenhouse gas emissions.

The capacity of poorer countries - many of them in the tropics - to respond and adapt to impacts of climate change will be another major theme of the talks.

Widening belts

The new analysis of tropical expansion comes from a team of US scientists who reviewed five separate strands of evidence, all gathered from satellite data.

While geographers define "The Tropics" rigidly as the region between 23.5 degrees North and 23.5 degrees South, to atmospheric scientists it is a more variable zone marked by features such as the jet stream and the circulation known as Hadley cells.

On these measures, the tropics have expanded since the era of reliable satellite observation began in 1979.

"The edges of the tropical belt are the outer boundaries of the subtropical dry zones, and their poleward shift could lead to fundamental shifts in ecosystems and in human settlements," the researchers write in the journal *Nature Geoscience*.

"Shifts in precipitation patterns would have obvious implications for agriculture and water resources, and could present serious hardships in marginal areas."

The Intergovernmental Panel on Climate Change (IPCC) warned in its series of reports this year that serious impacts on food and water supplies lie ahead, including:

- 75-250 million people across Africa could face water shortages by 2020
- Crop yields could increase by 20% in East and South East Asia, but decrease by up to 30% in Central and South Asia
- Agriculture fed by rainfall could drop by 50% in some African countries by 2020

The scientists behind the new study note that the tropical zone appears to be expanding much faster than predicted by computer models.

Thunder rolls

While impacts on agriculture could prove important for developing countries, a bigger concern for richer nations such as the US may be the damage wrought by extreme weather.

The IPCC forecasts stronger hurricanes in the future, but possibly fewer of them. Now another US team is suggesting an increase in thunderstorms over the country as well.

In the journal *Proceedings of the National Academy of Sciences (PNAS)*, researchers report a computer modelling study that projects a doubling of the frequency of weather conditions right for the formation of severe thunderstorms.

Already, they write, extreme weather events are costing the US economy more than \$2bn (£970m) each year.

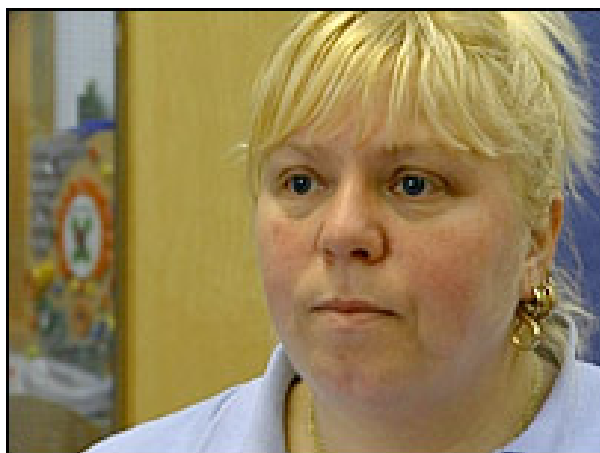
Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7126069.stm>

Published: 2007/12/04 02:40:01 GMT

Maternal deaths linked to obesity

By Branwen Jeffreys
BBC News Health Correspondent



Obesity is the fastest growing cause of women dying in pregnancy or childbirth in the UK, a report shows.

More than half the 295 women who died during or after pregnancy between 2003 and 2005 were overweight or obese.

Experts say the number of deaths - from a total of two million pregnancies - is low but the trend is very worrying.

The Confidential Enquiries into Maternal Deaths (CEMACH) report calls for more support and advice for obese women before and during pregnancy.

Obese pregnant women are probably at four or five times greater risk of suffering maternal death than a woman of normal weight - and the same for their babies dying

Dr Gwyneth Lewis
Maternity tsar

Gwyneth Lewis, CEMACH director and the government's maternity tsar, said the figures showed that childbirth was very safe in the UK.

But she said the growing evidence of a link to obesity was a cause for concern.

The figures suggest that a modest amount of extra weight in pregnancy carries little extra risk, but obesity poses a significant problem.

Fifteen per cent of the mothers who died were morbid or super-morbidly obese.

Dr Lewis said: "Obese pregnant women are probably at four or five times greater risk of suffering maternal death than a woman of normal weight - and the same for their babies dying."

She is concerned many women are not aware of the risk associated with obesity.

Overall, the UK has one of the lowest rates of maternal death in the world.

However, the death rate in the UK has begun to rise. In 2003-05 it stood at almost 13.95 per 100,000 births, up from 13.07 in 2000-02, and just 9.83 in 1985-87.

With obesity levels predicted to soar experts say it is vital that women are fully aware they should try to get to a healthy weight before trying to conceive. The report says excess weight not only puts a woman at risk of medical complications, it can mask symptoms and cause logistical problems.

In one case, there was a delay in spotting that a woman was at risk of seizures, because a blood pressure cuff could not fit around her arm.

New equipment

At the Queen Elizabeth Hospital in Gateshead, consultant obstetricians are already seeing a shift in their clinics and delivery suites. Dr Helene Brandon said around a third of the pregnant mothers they see are obese, and in an average year they care for several women with a body mass index (BMI) of more than 50.

That would place those women in the highest risk category of super-morbidly obese. The maternity unit has had to buy a new operating table that can hold up to 40 stone (254kg) in weight.

It is regularly in use, as around half of obese pregnant women end up having a Caesarean section.

The operation usually requires at least one extra assistant for the surgeon to help manage the bulk of the patient.

Dr Brandon said obese patients face higher risks of certain complications. She said: "The most common ones are dangerously high blood pressure, heart disease such as angina which could cause a heart attack in pregnancy - and obese patients are much more prone to bleeding."

Struggle with weight

Several miles away on an estate in Jarrow one of her patients, Maria Thornton is working hard to reduce the risks to herself and her baby. Maria is six months pregnant and weighs 19-and-a-half stone (124kg).

She has had a lifelong struggle with her weight, and had gastric band surgery several years ago.

In her last pregnancy, Maria developed diabetes because of her weight, which brought home to her the risks to her own health from obesity. Although she is now well informed about the potential health problems Maria is shocked that obesity is emerging as a factor in maternal deaths.

She said: "It is really quite scary. You know there are risks, but you don't think of them in terms of fatality - you kind of think it makes the pregnancy harder or you've got more obstacles to overcome.

"But to hear that it can cost you your life at the end of the day is quite frightening." Now Maria is going several times a week to the sure start scheme in Perth Green to use the gym.

As a result of regular exercise she has only put on three pounds (1.36kg) in this pregnancy, following the medical advice that obese women should aim to maintain their weight.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7121566.stm>

Published: 2007/12/04 07:38:05 GMT

Womb hormones 'lead to anorexia'

Babies who go on to develop anorexia may be programmed in the womb by their mother's hormones, evidence suggests.

Women are usually much more likely than men to have the eating disorder, but a University of Sussex study found men with a female twin were more at risk.

This suggests the hormones released to aid female development may be key.



Commenting on the Archives of General Psychiatry study, a UK expert said other factors in childhood and adolescence remained important.

A plausible explanation for this phenomenon is that in pregnancies bearing a female foetus, a substance is produced, probably hormonal, that increases the risk of having anorexia nervosa in adulthood

Study authors

It is estimated that up to 90,000 people will be receiving treatment for eating disorders in the UK at any one time, with many other cases going undiagnosed.

No-one is sure why women are more prone than men. Some experts suggest that the pressures of modern society are partly to blame while others look at brain changes much earlier in life.

Research into twins is a way to examine the factors involved, as the single most important period for brain development is during the months of pregnancy.

Dr Marco Procopio, from the University of Sussex, worked with Dr Paul Marriott from the University of Waterloo in Canada to look at information drawn from thousands of Swedish twins born between 1935 and 1958.

Overall, as expected, female twins were more likely to develop anorexia than male twins.

The only exception was among mixed-sex twins, where the male was as likely to develop anorexia as the female.

The researchers wrote that the most likely reason was because of sex steroid hormones released into the womb during pregnancy.

"A plausible explanation for this phenomenon is that in pregnancies bearing a female foetus, a substance is produced, probably hormonal, that increases the risk of having anorexia nervosa in adulthood.

"Because the male half of an opposite-sex twin pair would also be exposed to this substance, it could account for the observed elevated risk in males with female twins."

Susan Ringwood, from the Eating Disorders Association, said: "There is a lot of research now into the effects of hormones on brain development.

"This is an interesting study, although it's important that we also look at other factors such as perception of body-image in childhood and adolescence."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/health/7124697.stm>

Published: 2007/12/04 02:03:51 GMT

All pupils 'need sex education'

Children should be taught about sex and relationships throughout their time in school, a group of leading charities and a teaching union has said.

In a letter to the Times newspaper, the Terrence Higgins Trust, the NSPCC and the National Union of Teachers said all pupils were "entitled to" such lessons.

Children needed to know about health risks and where to get advice, it said.

Ministers said schools were teaching about sex and that teenage pregnancy rates were the lowest for 20 years.

The call from the group of charities and other organisations comes after a study found almost half of young people had not been taught about teenage pregnancy.

No school should be able to opt out of delivering good sex and relationships education to their pupils

Letter to the Times

The UK Youth Parliament survey in the summer also found the same number of young people did not know where to find their local sexual health clinic.

The letter to the Times says these figures go "some way to explaining" the disproportionately high rates of teenage pregnancy and sexually transmitted infections in Britain.

Nick Partridge, chief executive of the Terrence Higgins Trust, Dame Mary Marsh, chief executive of the NSPCC, Steve Sinnott, general secretary of the National Union of Teachers, Kevin Barron, chairman of the House of Commons health committee, and TV presenter Davina McCall all signed the letter.

'No opt-out'

It says: "We believe that all children and young people are entitled to receive sex and relationships education (SRE) as part of the statutory provision of personal, social, health and economic education (PSHE Education) in schools.



"No school should be able to opt out of delivering good sex and relationships education to their pupils (including primary schools, faith schools and academies), which should be taught throughout a pupil's time in education."

Young people would be handing over their own proposals on sex and relationship education to Schools Minister Jim Knight this week, the group said.

"We urge the government to listen to what they have to say."

In a statement, Mr Knight said parents did not have the right to withdraw their children from the statutory sex and education part of the curriculum, only the optional PHSE element.

Schools were teaching about the risks of unprotected sex and directing young people to local services where they could access contraceptive and sexual health advice, he added.

"Nevertheless, our teenage pregnancy strategy is working - teenage pregnancy rates are at their lowest for 20 years."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/education/7126142.stm>

Published: 2007/12/04 01:53:32 GMT

Fossils Excavated From Bahamian Blue Hole May Give Clues Of Early Life



Richard Franz (left), a University of Florida herpetologist, and David Steadman, a UF ornithologist, view a crocodile skull and tortoise shell at the Florida Museum of Natural History on the UF campus on Nov. 27, 2007. The first entire fossilized skeletons of a tortoise and a crocodile found anywhere in the West Indies were uncovered in a kind of sinkhole called a blue hole on Great Abaco Island in the Bahamas, along with bones of a lizard, snakes, bats and 25 species of birds, as well as abundant fossils of plants, Steadman says. Radiocarbon analyses date the bones at between 1,000 and 4,200 years old, with the youngest fossil being that of a human tibia, he says. (Credit: University of Florida/Ray Carson)

ScienceDaily (Dec. 4, 2007) — Long before tourists arrived in the Bahamas, ancient visitors took up residence in this archipelago off Florida's coast and left remains offering stark evidence that the arrival of humans can permanently change -- and eliminate -- life on what had been isolated islands, says a University of Florida researcher.

The unusual discovery of well-preserved fossils in a water-filled sinkhole called a blue hole revealed the bones of landlubbing crocodiles and tortoises that did not survive human encroachment, said David Steadman, a UF ornithologist and the lead author of a paper published by the Proceedings of the National Academy of Sciences.

"The climate and environmental conditions back then weren't much different from those of today," said Steadman, who works at the Florida Museum of Natural History on the UF campus. "The big difference is us. When people got to the island, there was probably nothing easier to hunt than tortoises so they cooked and ate them. And they got rid of the crocodiles because it's tough to have kids playing at the edge of the village where there are terrestrial crocodiles running around."

The first entire fossilized skeletons of a tortoise and a crocodile found anywhere in the West Indies were uncovered from Sawmill Sink on Great Abaco Island in the Bahamas, along with bones of a lizard, snakes, bats and 25 species of birds, as well as abundant plant fossils.

Radiocarbon analyses date the bones at between 1,000 and 4,200 years old with the youngest fossil being that of a human tibia, he said. The fossils are the best preserved of any ever found in the Bahamas because of their unusual location in the deep saltwater layer of the sinkhole that contains no oxygen, which normally would feed the bacteria and fungi that cause bones to decay, Steadman said.

Expert diver Brian Kakuk and other skilled scuba divers retrieved the fossils from various places along the floor and walls of the blue hole, which contains salt water covered by a layer of freshwater.

"The fossils from Sawmill Sink open up unparalleled opportunities for doing much more sophisticated work than ever before in reconstructing the ancient plant and animal communities of the Bahamas," Steadman said. "It helps us to understand not only how individual species evolve on islands, but how these communities changed with the arrival of people because we know that changes in the ecosystem are much more dramatic on islands than they are on continents."

There are many blue holes on Abaco and other Bahamian islands, but this is the first to be the site of a sophisticated fossil excavation, Steadman said. Although the Bahamian government has gone to great lengths to protect its coastline, blue holes with their submerged cave passages have received little attention as a marine resource, he said.

The fossil site is especially valuable because of the presence of fossilized plants -- leaves, twigs, flowers, fruits and seeds -- pollen and spores, and vertebrates, giving evidence of both the island's flora and fauna, Steadman said.

"In a typical vertebrate fossil site, you identify the species of vertebrates -- reptiles, birds or mammals - - and based on that identification you speculate what the habitat might have been," he said. "For the first time here in the West Indies, we have here on Abaco plant fossils right in with the vertebrates, so we can reconstruct the habitats in a much more sophisticated way."

For instance, because bracken ferns are one of the first plants to recolonize after a fire, the presence of their spores would indicate regular burning in prehistoric times and indicate that an area was grassland. Evidence for this also comes from the numerous fossils of burrowing owls or meadow larks, which prefer open habitats, he said.

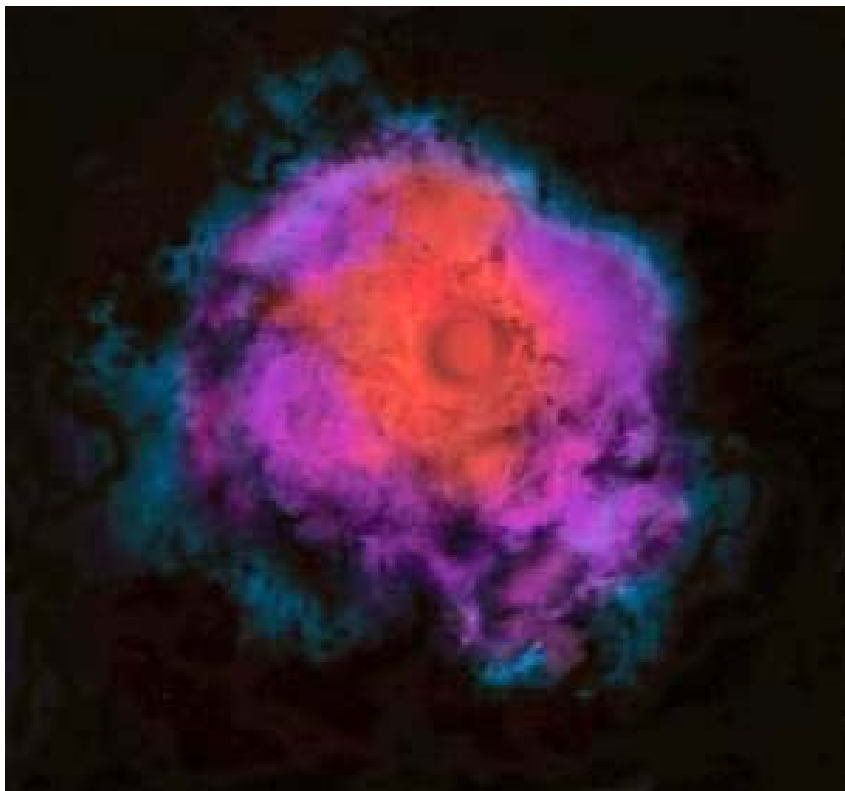
Among the excavation's findings are that the land-roaming Cuban crocodile lived in the Bahamas until humans arrived, Steadman said. "People tend to think of crocodiles as aquatic and certainly most of them are, but in the Bahamas where there is no fresh water, the crocodile became a terrestrial predator," he said.

The collaborative project includes Bahamian scientists Nancy Albury, Keith Tinker and Michael Pateman, as well as paleontologist Gary Morgan of the New Mexico Museum of Natural History.

Adapted from materials provided by University of Florida.

<http://www.sciencedaily.com/releases/2007/12/071203173039.htm>

Dark Matter In Newborn Universe Doused Earliest Stars



This artist's conception shows what an invisible "dark star" might look like when viewed in infrared light that it emits as heat. The core is enveloped by clouds of hydrogen and helium gas. A new University of Utah study suggests the first stars in the universe did not shine, but may have been dark stars. (Credit: University of Utah)

ScienceDaily (Dec. 4, 2007) — Perhaps the first stars in the newborn universe did not shine, but instead were invisible "dark stars" 400 to 200,000 times wider than the sun and powered by the annihilation of mysterious dark matter, a University of Utah study concludes.

The study calculated how the birth of the first stars almost 13 billion years ago might have been influenced by the presence of dark matter -- the unseen, yet-unidentified stuff that scientists believe makes up most matter in the universe.

The findings "drastically alter the current theoretical framework for the formation of the first stars," says study author and astrophysicist Paolo Gondolo, associate professor of physics at the University of Utah.

It is conceivable that gigantic dark stars may exist today, and although they do not emit visible light, they could be detected because they should spew gamma rays, neutrinos and antimatter and be associated with clouds of cold, molecular hydrogen gas that normally wouldn't harbor such energetic particles, he adds.

"Without detailed simulations, we cannot pinpoint the further evolution of dark stars," Gondolo says. "They could last months. They could last 600 million years. Or they could last billions of years and still be around. We have to search for them."

He conducted the study with astrophysicist Katherine Freese of the University of Michigan, Ann Arbor, and graduate student Douglas Spolyar of the University of California, Santa Cruz.

Gondolo says he wanted to call the new, theoretical kind of invisible star a "brown giant" -- similar to the dim but smaller, Jupiter-sized stars known as "brown dwarfs." But he says his co-authors insisted on calling them "dark stars," after the song "Dark Star" first played in 1967 by the revered rock band The Grateful Dead.

"It's catchier," Gondolo acknowledges.

Dark Matter, the Big Bang and the First Stars

Gondolo says some studies have considered the role of dark matter in the evolution of the early universe, but until now, not in the formation of the first stars.

Scientists know dark matter exists because galaxies rotate faster than can be explained by the visible matter within them. Also, observations by satellites, balloons and telescopes have led to the estimate that all the visible matter represents only 4 percent of the universe, which also is made of 23 percent dark matter and 73 percent "dark energy" -- a yet-unknown force helping the universe expand, Gondolo says.

WIMPS -- or weakly interacting massive particles -- are among the main candidates for dark matter. Gondolo says "neutralinos" are a type of WIMP that must exist under particle physics theories that seek to explain the origin of mass in the universe.

Scientists generally believe that the universe came into being 13 billion years ago in a sudden expansion or "inflation" of time and space known as the "big bang."

The afterglow of that explosion -- cosmic microwave background radiation -- developed small fluctuations in temperature that caused some of the earliest matter to begin clumping together, a process accelerated by gravity and that produced the first stars and galaxies. The matter was mostly dark matter but also included normal matter in the form of hydrogen and helium gas.

The conventional theory of how the first stars were born holds that as hydrogen and helium atoms clumped and swirled together in proto-stellar clouds, they began to cool, making the cloud shrink and become denser. The cooling and shrinking of the embryonic star continues until the fusion of hydrogen into helium begins, igniting the fusion engine that burns in our sun and other stars.

How 'Twinkle, Twinkle Little Star' Got Snuffed

For the new study, the astrophysicists calculated how dark matter would have affected the temperature and density of gas that clumped together to form the first stars.

The findings suggest that dark matter neutralinos interacted so they "annihilated" each other, producing subatomic particles called quarks and their antimatter counterparts, antiquarks. That generated heat. As a proto-stellar cloud of hydrogen and helium tried to cool and shrink, the dark matter would keep it hot and large, preventing fusion from igniting the star.

"The heating can counteract the cooling, and so the star stops contracting for a while, forming a dark star," some 80 million to 100 million years after the big bang, says Gondolo. "This is our main result."

Dark stars would contain mostly normal matter -- mostly in the form of hydrogen molecules and helium -- but they would be vastly larger and "fluffier" than the sun and other stars, he adds. They would have glowed infrared, which is heat.

"They are much bigger than the sun," Gondolo says, with diameters ranging from about 4 astronomical units (372 million miles, or four times the average distance between the sun and Earth) to 2,000 astronomical units -- big enough to swallow 15,000 solar systems like our own.

The quarks and antiquarks produced within the dark star would, in turn, generate descendant particles including gamma rays, neutrinos and antimatter such as positrons and antiprotons, Gondolo says.

"With your bare eyes, you can't see a dark star. But the radiation would fry you."

Implications of Dark Stars

Gondolo says dark stars have some important implications for astrophysics:

- They represent a new phase in the evolution of stars.
- Their possible existence could aid the search to find and identify dark matter. Gamma rays, neutrinos and antimatter have characteristic energy signatures if they come from dark matter.
- They could improve understanding of how heavy elements formed. The first stars supposedly were the cradle of elements as heavy or heavier than carbon, producing them via nuclear fusion. But if dark stars existed and did not later evolve into normal stars, they didn't make carbon. "Maybe carbon came from other stars" -- perhaps conventional stars that formed where there was no dark matter nearby, Gondolo says.
- Dark stars may explain why black holes -- collapsed stars so dense that not even light escapes -- formed much faster than expected. Gondolo says black holes existed only a few hundred million years after the big bang, yet current theories say they took longer to form. "These dark stars may help. They could collapse into black holes very early because they are very short-lived and formed when the universe was young, at least in one scenario."

Another possibility is that dark stars lasted quite a while but eventually turned into conventional stars. Gondolo and colleagues, however, argue the gas cooling and dark matter heating within a dark star can remain in balance, allowing dark stars to survive, but that depends on certain assumptions about the mass of neutralinos.

"We don't know how long they last, so we speculate. It depends very sensitively on the parameters of the model."

This research is to be published in December in the journal *Physical Review Letters*. The study was funded by the National Science Foundation, U.S. Department of Energy and the University of Michigan.

Adapted from materials provided by University of Utah.

<http://www.sciencedaily.com/releases/2007/12/071203090139.htm>

Toll Of Climate Change On World Food Supply Could Be Worse Than Thought



Parched ground cracks in a wheat field during the hot European summer of 2006. (Credit: iStockphoto/Susan Stewart)

ScienceDaily (Dec. 4, 2007) — Global agriculture, already predicted to be stressed by climate change in coming decades, could go into steep, unanticipated declines in some regions due to complications that scientists have so far inadequately considered, say three new scientific reports. The authors say that progressive changes predicted to stem from 1- to 5-degree C temperature rises in coming decades fail to account for seasonal extremes of heat, drought or rain, multiplier effects of spreading diseases or weeds, and other ecological upsets. All are believed more likely in the future. Coauthored by leading researchers from Europe, North America and Australia, they appear in a recent issue of the Proceedings of the National Academy of Sciences (PNAS).

"Many people assume that we will never have a problem with food production on a global scale. But there is a strong potential for negative surprises," said Francesco Tubiello, a physicist and agricultural expert at the NASA/Goddard Institute of Space Studies who coauthored all three papers. Goddard is a member of Columbia University's Earth Institute.

In order to keep pace with population growth, current production of grain--from which humans derive two-thirds of their protein--will probably have to double, to 4 billion tons a years before 2100. Studies in the past 10 years suggest that mounting levels of carbon dioxide in the air--believed to be the basis of human-caused climate change--may initially bolster the photosynthetic rate of many plants, and, along with new farming techniques, possibly add to some crop yields.

Between now and mid-century, higher temperatures in northerly latitudes will probably also expand lands available for farming, and bring longer growing seasons. However, these gains likely will be canceled by agricultural declines in the tropics, where even modest 1- to 2-degree rises are expected to evaporate rainfall and push staple crops over their survival thresholds. Existing research estimates that developing countries may lose 135 million hectares (334 million acres) of prime farm land in the next

50 years. After mid-century, continuing temperature rises--5 degrees C or more by then--are expected to start adversely affecting northern crops as well, tipping the whole world into a danger zone.

The authors of the PNAS studies say that much of the previous work is oversimplified, and as a consequence, the potential for bigger, more rapid problems remains largely unexplored. "The projections show a smooth curve, but a smooth curve has never happened in human history," said Tubiello. "Things happen suddenly, and then you can't respond to them." For instance, extreme-weather events of all kinds, including heat waves or sudden big storms, could easily wipe out crops on vast scales if they occur for even a few days during critical germination or flowering times.

Tubiello says this is already happening on smaller scales. During a heat wave in the summer of 2003, temperatures in Italy soared 6 degrees C over their long-term mean, and the corn yield in the rich Po valley dropped a record 36%. Nearly all the world's pastures are rain-fed; in Africa, droughts in the 1980s and 1990s wiped out 20% to 60% of some nations' herds. Such events on larger scales could arise with little or no warning in the near future, the authors suggest.

Higher temperatures may also prompt outbreaks of weeds and pests, and affect plant or animal physiology--factors also left out of most projections. One of the new PNAS studies, "Crop and Pasture Response to Climate Change," says that more recent modeling suggests cattle ticks and bluetongue (a viral disease of sheep and cattle) will move outward from the tropics to areas such as southern Australia. Other new models suggest that higher temperatures will limit the ability of modern dairy-cow breeds to convert feed into milk, and lead to declines in livestock fertility and longevity. As temperatures rise in northerly latitudes, the ability of crop pests to survive winters is expected to improve, enabling them to attack spring crops in regions where they were previously kept at bay during this vulnerable time.

The authors say that farmers may temporarily mitigate some effects of changing climate by moving toward adaptations now. Adaptations already being considered or set up include regional climate-forecasting systems that enable farmers to switch to different crops or change the timing of plantings; introduction of new varieties or species that can withstand anticipated conditions; and improved flood-mitigation and water-storage facilities. One of the PNAS studies, "Adapting Agriculture to Climate Change," says that such adaptations might help tropical farmers cut damages wrought by rises of 1.5 to 3 degrees, and temperate-region farmers, damages from 1- to 2-degree rises. This would buy a few decades of time for nations to agree on ways to slow or reverse the warming itself. "After that, all the bets are off," said Tubiello.

The other authors are based at the Food and Agriculture Organization, in Rome; Austria's International Institute for Applied Systems Analysis; France's National Agronomy Research Institute; Australia's Commonwealth Scientific and Industrial Research Organization; Pennsylvania State University; Arizona State University; and Wageningen University in the Netherlands.

Adapted from materials provided by Earth Institute at Columbia University.

<http://www.sciencedaily.com/releases/2007/12/071203173031.htm>

Climate Change Predicted To Drive Trees Northward



Forested area in West Virginia, US. The most extensive and detailed study to date of 130 North American tree species concludes that expected climate change this century could shift their ranges northward by hundreds of kilometers and shrink the ranges by more than half. (Credit: Michele Hogan)

ScienceDaily (Dec. 3, 2007) — The most extensive and detailed study to date of 130 North American tree species concludes that expected climate change this century could shift their ranges northward by hundreds of kilometers and shrink the ranges by more than half. The study is by Daniel W. McKenney of the Canadian Forest Service and his colleagues. Ranges may decrease sharply if trees cannot disperse in altered conditions.

McKenney's study is based on an extensive data-gathering effort and thus more comprehensive than studies based on published range maps. It includes data from Canada as well as from the United States. Observations of where trees are found are used to define the "climate envelope" of each species.

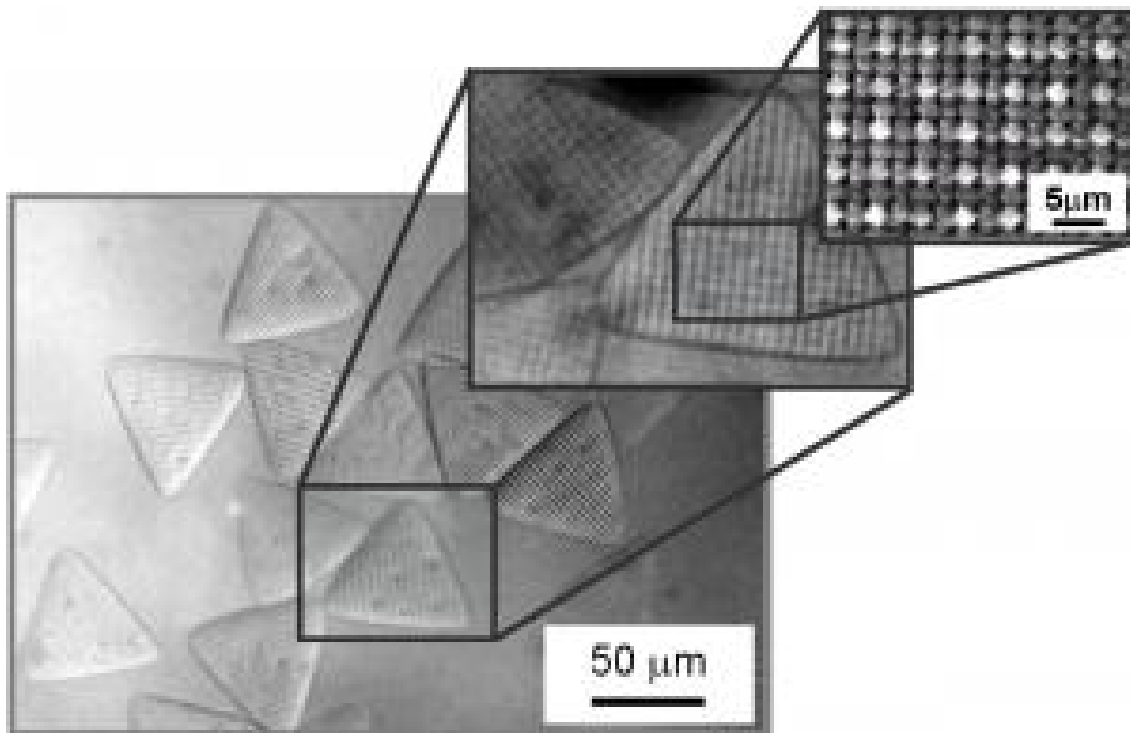
If the trees were assumed to respond to climate change by dispersing their progeny to more favorable locations, McKenney and colleagues found, ranges of the studied species would move northward by some 700 kilometers and decrease in size by an average of 12 percent (with some increasing while others decreased). If the species were assumed unable to disperse, the average expected range shift was 320 kilometers, and "drastic" range reductions of 58 percent were projected. The authors believe that most species will probably fall somewhere between these two extremes of ability to disperse.

The climate measures studied were chosen to represent important gradients for plants: heat and moisture. Two climate change scenarios were modeled. One assumed that carbon dioxide emissions would start to decrease during the coming century, the other that they would continue to increase. Each scenario was investigated with three well-known models of global climate, with broadly similar results. The authors note that their study investigated only a sample of the 700 or so tree species in North America, and that under climate change, new species might colonize the southern part of the continent from tropical regions. A companion article by the same authors provides more detail about their climate envelope method as applied to one species, the sugar maple.

This research is reported in the December issue of BioScience.

<http://www.sciencedaily.com/releases/2007/12/071203090131.htm>

Sculpting 3-D Particles With Light



MIT researchers have reported a technique to create microparticles with a granular texture, shown here at three scales. (Credit: Image courtesy of Massachusetts Institute of Technology)

ScienceDaily (Dec. 4, 2007) — MIT engineers have used ultraviolet light to sculpt three-dimensional microparticles that could have many applications in medical diagnostics and tissue engineering. For example, they could be designed to act as probes to detect certain molecules, such as DNA, or to release drugs or nutrients.

The new technique offers unprecedented control over the size, shape and texture of the particles. It also allows researchers to design particles with specific chemical properties, such as porosity (a measure of the void space in a material that can affect how fast different molecules can diffuse through the particles).

"With this method, you can rationally design particles, and precisely place chemical properties," said Patrick Doyle, associate professor of chemical engineering. Doyle is one of the authors of a paper on the work that will appear in the Dec. 3 issue of the journal *Angewandte Chemie*, published by the German Chemical Society.

The research team started with a method that Doyle and his students reported in a 2006 issue of *Nature Materials* to create two-dimensional particles. Called continuous flow lithography, this approach allows shapes to be imprinted onto flowing streams of liquid polymers. Wherever pulses of ultraviolet light strike the flowing stream of small monomeric building blocks, a reaction is set off that forms a solid polymeric particle. They have now modified that method to add three-dimensionality.

This process can create particles very rapidly: Speeds range from 1,000 to 10,000 particles per second, depending on the size and shape of the particles. The particles range in size from about a millionth of a meter to a millimeter.

The team's new process works by shining ultraviolet light through two transparency masks, which define and focus the light before it reaches the flowing monomers. The first mask, which controls the size and shape of the particles, is part of the technique reported last year by Doyle and his students.



The second mask, which is based on MIT professor Edwin Thomas' work in multibeam lithography, adds three-dimensional texture and other physical traits, such as porosity.

The collaboration sprung from a conversation between Ji-Hyun Jang, a postdoctoral associate in Thomas' lab, and Dhananjay Dendukuri, a recent Ph.D. recipient in Doyle's lab, who are also authors on the paper.

"It's very easy to integrate the (second) phase mask into the microfluidic apparatus," said Thomas, Morris Cohen Professor of Materials Science and Engineering and head of the Department of Materials Science and Engineering. "Professor Doyle was controlling the overall shape, and now what we're doing is controlling these inner labyrinth networks."

Adding inner texture is desirable because it increases the particles' surface-to-volume ratio, which means if the particle is loaded with probes, there are more potential binding sites for target molecules.

In a paper published in Science earlier this year, Doyle and MIT graduate student Daniel Pregibon showed that the particles can be used as probes to identify DNA and other molecules.

Other applications for the particles include tissue engineering. For example, they could form a scaffold that would both provide structural support for growing cells and release growth factors and other nutrients. The particles can be designed so diffusion occurs in a particular direction, allowing researchers to control the direction of nutrient flow.

Alan Hatton, the Ralph Landau Professor of Chemical Engineering Practice, is also an author on the paper.

This research was funded by the U.S. Army Research Office through the MIT Institute for Soldier Nanotechnologies.

Adapted from materials provided by Massachusetts Institute of Technology.

<http://www.sciencedaily.com/releases/2007/12/071203135736.htm>

Life On Earth May Have Originated As The Organic Filling In A Multilayer Sandwich Of Mica Sheets



Mica has thin layers separated by narrow spaces. The mica hypothesis proposes that the narrow confined spaces between the thin layers of mica could have provided exactly the right conditions for the rise of the first biomolecules ---- effectively creating cells without membranes. The separation of the layers would have also provided the isolation needed for Darwinian evolution. (Credit: Michele Hogan)

ScienceDaily (Dec. 4, 2007) — Life may have begun in the protected spaces inside of layers of the mineral mica, in ancient oceans, according to a new hypothesis.

The hypothesis was developed by Helen Hansma, a research scientist with the University of California, Santa Barbara and a program director at the National Science Foundation.

The Hansma mica hypothesis proposes that the narrow confined spaces between the thin layers of mica could have provided exactly the right conditions for the rise of the first biomolecules ---- effectively creating cells without membranes. The separation of the layers would have also provided the isolation needed for Darwinian evolution.

"Some think that the first biomolecules were simple proteins, some think they were RNA, or ribonucleic acid," said Hansma. "Both proteins and RNA could have formed in between the mica sheets."

RNA plays an important part in translating the genetic code, and is composed of nitrogenous bases, sugar, and phosphates. RNA and many proteins and lipids in our cells have negative charges like mica. RNA's phosphate groups are spaced one half nanometer apart, just like the negative charges on mica.

Mica layers are held together by potassium. The concentration of potassium inside the mica is very similar to the concentration of potassium in our cells. And the seawater that bathed the mica is rich in sodium, just like our blood.

The heating and cooling of the day to night cycle would have caused the mica sheets to move up and down, and waves would have provided a mechanical energy source as well, according to the new model. Both forms of movement would have caused the forming and breaking of chemical bonds necessary for the earliest biochemistry.

Thus the mica layers could have provided the support, shelter, and an energy source for the development of precellular life, while leaving artifacts in the structure of living things today.

Besides providing a more plausible hypothesis than the prebiotic oceanic "soup" model, Hansma said her new hypothesis also explains more than the so-called "pizza" hypothesis. That model proposes that biomolecules originated on the surfaces of minerals from the Earth's crust. The "pizza" hypothesis cannot explain how the earliest biomolecules obtained the right amount of water to form stable biopolymers.

A biophysicist, Hansma has worked with mica for decades beginning with her work in biological Atomic Force Microscopy (AFM) in the late 1980s. "We put our samples on mica, because it is so atomically flat, so flat that we can see even bare DNA molecules as little ridges on the mica surface," said Hansma. "The layered mineral is made of sheets so thin (one nanometer) that there are a million of them in a millimeter-thick sheet of mica."

Hansma came upon her idea one day last spring when she was splitting some mica under her dissecting microscope. She had collected the specimens in a mica mine in Connecticut. The mica was covered with organic material. "As I was looking at the organic crud on the mica, it occurred to me that this would be a good place for life to originate ---- between these sheets that can move up and down in response to water currents which would have provided the mechanical energy for making and breaking bonds," said Hansma.

She summed up her hypothesis of the origin of life by saying, "I picture all the molecules of early life evolving and rearranging among mica sheets in a communal fashion for eons before budding off with cell membranes and spreading out to populate the world."

Hansma presented her findings on Dec. 4, at the annual meeting of the American Society for Cell Biology in Washington, D.C.

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

<http://www.sciencedaily.com/releases/2007/12/071204102500.htm>

Early Lead Exposure Impedes Recovery From Brain Injury

ScienceDaily (Dec. 4, 2007) — Exposure to lead can hinder the brain's ability to recover from injury, a recent study in laboratory animals shows. The results have implications for the effects of environmental lead exposure on brain injuries such as stroke, say researchers at Jefferson Medical College, who led the work. Lead exposure early in life is known to increase the risk for cancer, renal disease, hypertension and cardiovascular disease later in life, and as a result, also increases the risk for stroke and brain damage. Jay Schneider, Ph.D., professor of Pathology, Anatomy and Cell Biology and Neurology at Jefferson Medical College of Thomas Jefferson University in Philadelphia and postdoctoral fellow Emmanuel Decamp, Ph.D., wanted to know if it was possible that lead might alter the potential for plasticity, the ability of the brain to compensate for an injury.

They studied young rats that were fed a diet supplemented with lead and compared them to others on a diet without lead. In earlier work in the lab, they found that even brief exposures to lead affected neurotrophic factors in the brain important for growth and maintenance of neurons and their connections. They ran each group through some simple behavioral tests before causing a small stroke in a specific part of the brain that affected a hind limb. Reporting in the journal *NeuroToxicology*, Dr. Schneider, who is director of the Parkinson's Disease Research Unit at Thomas Jefferson University, and his group saw significant recovery after a brief period of time in the control group, "as compensatory processes take over," though the limb function was not completely back to normal.

"In contrast, those animals that were exposed to lead earlier in life had worse outcomes in the same period after the stroke," he says. "There was significant difference in the brain's ability to compensate for that injury." Because the study was brief, he says, they don't know if in a longer period of time the lead-exposed animals would catch up in their recovery to the controls. There was some recovery in the lead group, but then it leveled off. The control group continued to get better.

"That's one of the questions we would like to pursue in further studies -- whether lead exposure slows or attenuates the recovery process after a brain injury," Dr. Schneider notes. "Have they recovered as much as they will recover or given more time, would they recover to the same extent" Is lead exposure affecting the rate of recovery or the recovery potential"" According to Dr. Schneider, it is well known that lead exposure had detrimental effects on learning and memory, other forms of brain plasticity. "Brain plasticity generally refers to the brain's ability to be molded by experience as well as its ability to reorganize anatomically and functionally and recover from injury," Dr. Schneider says. "It's why people who have relatively small strokes can recover function. The brain has an innate ability to reorganize and repair itself. Our data suggest that lead exposure may compromise or alter this capacity for remodeling that may impair recovery of function following brain injury."

Next, the group would also like to see if such a trend translates to recovery from other types of injury, such as traumatic brain injury. They would also like to explore the notion that childhood lead exposure increases the risk of a child having a poorer outcome from an acquired brain injury.

Dr. Schneider explains that one important aspect of lead poisoning is impairment of plasticity. "The data we have begin to support that," he says. "We want to look at the effects of different levels of lead exposure on the outcome from acquired brain injury and see how different types and extents of exposures correspond with the expression of injury and recovery of function. Then, we want to try to nail down the biological processes responsible."

Adapted from materials provided by Thomas Jefferson University.

<http://www.sciencedaily.com/releases/2007/12/071203172959.htm>

Exercise May Play Role In Reducing Inflammation In Damaged Skin Tissue



Former U. of I. doctoral student K. Todd Keylock, now a professor of kinesiology at Bowling Green State University, prepares wounds for analysis in a laminar flow hood. (Credit: Photo by Susan Herrelr)

ScienceDaily (Dec. 4, 2007) — In recent years, researchers at the University of Illinois have uncovered a host of reasons for people to remain physically active as they age, ranging from better brain function to improved immune responses.

Now a new U. of I. study points to yet another benefit: a link between moderate exercise and decreased inflammation of damaged skin tissue.

“The key point of the study is that moderate exercise sped up how fast wounds heal in old mice,” said researcher K. Todd Keylock, who noted that the improved healing response “may be the result of an exercise-induced anti-inflammatory response in the wound.”

Keylock, now a professor of kinesiology at Bowling Green State University, conducted the research as a doctoral student while working with Jeffrey A. Woods, a U. of I. professor of kinesiology and integrative immunology and behavior.

While previous research conducted at Ohio State University demonstrated a correlation between wound healing response time and moderate exercise, that research did not reveal a physiological cause for the reaction.

“That’s the key part that our study adds – that the acceleration and healing were associated with decreased levels of inflammation,” Keylock said.

Jeffrey Woods, a professor of kinesiology and integrative immunology and behavior at Illinois, said the new study points to another benefit to moderate exercise: decreased inflammation of damaged skin tissue.

“One of the proposed mechanisms whereby aging adds to delayed healing is that the aged have hyper-inflammatory response to wounding,” Woods said. “The thought is that the exaggerated inflammatory response slows the healing process. So, in essence, what happened here is that the exercise reduced the exaggerated inflammatory response.”

Keylock explained that exercise may be contributing to that reduction in any number of ways.

“Increasing blood flow during the time of exercise is one (possibility),” he said. “We’ve shown in the past that has an effect on how certain immune cells – such as macrophages, function. “And if exercise can help decrease the amount of inflammatory cytokines put out by macrophages, maybe that would help decrease the inflammation, and therefore, speed healing.”

Cytokines are molecules that signal and direct immune cells, such as macrophages, to the site of an infection, Woods said. Macrophages play two critical roles in the wound-healing process, according to Keylock.

“First, they help fight any infection that may have gotten into the wound, and they also help the wound repair itself and get back to its original strength,” Keylock said.

Woods noted that if an exaggerated inflammatory response occurs when an older person incurs a wound, “the proinflammatory cytokines that the macrophages produce slow the rate of healing. And interestingly,” he said, “macrophages are drawn to damaged tissue and hypoxic tissue, that is, tissue that has low oxygen content. Wounds, because of the damage to the blood vessels, typically are hypoxic, and macrophages are attracted to that.

“So one potential thing that exercise might be doing, although we would need to test this, is reducing hypoxia within the wounds. And it’s known that hyperbaric oxygen therapy – which has been used with burn patients – speeds wound healing in some people.”

The next step required to better understand the mechanisms at work with respect to the exercise-healing relationship will be to test the researchers’ theories in people. Woods said he expects to begin such trials in the near future.

In the meantime, Keylock hopes to initiate similar tests as those done at the U. of I., but with diabetic mice, which also have delayed wound-healing responses and high levels of inflammation.

“The public-health message of this applies not just to older people, but also to diabetics, those who are obese and many different populations at risk of having high levels of inflammation,” he said. Those other populations include people with congestive heart failure and coronary heart disease.

“If exercise can help decrease inflammation, all of those populations would benefit.”

Woods speculates additional research may even eventually prove the health benefits of exercise among a much broader sector of individuals.

“This is going a bit beyond our results, but there are certain characteristics ... a set of events that are followed when any tissue is damaged – not just skin, like in this study, but arterial walls or other internal organs,” he said. “First, there’s hemostasis, which is limiting blood leakage. Then there’s an inflammatory process, then a regenerative process. So, using this model, we may be able to get at whether exercise could have farther-reaching implications for tissue damage in general.

“There are probably some things unique to the skin, as opposed to these other tissues, so we can’t make leaps of faith,” he cautioned. “But if we study the inflammatory process, the regenerative process in one tissue might have implications for other tissues.”

Meanwhile, the benefits of regular, moderate exercise – essentially a brisk walk most days of the week – for older adults, are many.

“There’s obviously the financial cost, which is important,” Keylock said, noting that “the clinical impact of delayed wound healing in the aged population is priced at more than \$9 billion per year in the United States.”

“But the personal cost to people with poorly healing wounds is tremendous,” he said, “because it means not only pain and suffering, but also means they’re immobile or their mobility is limited for a period of time. So, faster healing wounds would mean getting them up on their feet again. For people with poorly healing wounds, like diabetics, that’s a critical factor.”

Woods added: “The bottom line is that if you are wounded or have a problem healing, exercise is safe and potentially beneficial.”

The results appear in the *American Journal of Physiology: Regulatory, Integrative and Comparative Physiology*. In addition to Keylock and Woods, co-authors are Victoria Vieira, a predoctoral fellow in kinesiology and community health and in nutritional sciences; Matthew Wallig, a professor of veterinary pathobiology; Luisa A. DiPietro, a professor of periodontics and director of the Center for Wound Healing and Tissue Regeneration at the U. of I. at Chicago, and Megan Schrementi, a postdoctoral student in periodontics, U. of I. at Chicago.

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

<http://www.sciencedaily.com/releases/2007/11/071128151747.htm>

Honey A Better Option For Childhood Cough Than Over The Counter Medications

ScienceDaily (Dec. 4, 2007) — A new study by a Penn State College of Medicine research team found that honey may offer parents an effective and safe alternative than over the counter children's cough medicines.

The study found that a small dose of buckwheat honey given before bedtime provided better relief of nighttime cough and sleep difficulty in children than no treatment or dextromethorphan (DM), a cough suppressant found in many over-the-counter cold medications.

Honey did a better job reducing the severity, frequency and bothersome nature of nighttime cough from upper respiratory infection than DM or no treatment. Honey also showed a positive effect on the sleep quality of both the coughing child and the child's parents. DM was not significantly better at alleviating symptoms than no treatment.

These findings are especially notable since an FDA advisory board recently recommended that over-the-counter cough and cold medicines not be given to children less than 6 years old because of their lack of effectiveness and potential for side effects.

In a previous study published in 2004, Ian Paul of Penn State College of Medicine and colleagues showed that neither DM nor diphenhydramine, another common component of cold medications, performed better than a placebo at reducing nighttime cough or improving sleep quality. However, honey has been used for centuries in some cultures to treat upper respiratory infection symptoms like cough, and is considered to be safe for children over 12 months old. Honey has well-established antioxidant and antimicrobial effects, which could explain its contributions to wound healing. Honey also soothes on contact, which may help explain its effect on cough as suggested by the World Health Organization.

In the latest study, the researchers enrolled 105 children between the ages of 2 and 18 at a single university-affiliated physician practice site. On the first night of the study, children received no treatment. Parents answered five questions about their child's cough and sleep quality as well as about their own sleep quality. On the second night, children received either honey, artificial honey-flavored DM or no treatment about a half hour prior to going to bed. Parents answered the same five questions the following morning.

The randomized study was partially double-blinded: Medical staff did not know what treatment each participating family received when distributing their sealed syringe-containing envelope. Parents of children who received honey or artificial honey-flavored DM in a measured syringe were blinded to their treatment group. Parents of children in the no treatment group received an empty syringe, and therefore were aware of their child's treatment group.

Across the board, parents rated honey as significantly better than DM or no treatment for symptomatic relief of their child's nighttime cough and sleep difficulty. In a few cases, parents did report mild side effects with the honey treatment, such as hyperactivity.

"Our study adds to the growing literature questioning the use of DM in children, but it also offers a legitimate and safe alternative for physicians and parents," said Paul, a pediatrician, researcher and associate professor of pediatrics at Penn State College of Medicine and Penn State Children's Hospital. "Additional studies should certainly be considered, but we hope that medical professionals will consider the positive potential of honey as a treatment given the lack of proven efficacy, expense, and potential for adverse effects associated with the use of DM."

Potentially dangerous effects of DM in young children include dystonic reactions, severe involuntary muscle contractions and spasms. Further, DM is a commonly used as a drug of abuse by adolescents.



Cough is the reason for nearly three percent of all outpatient visits in the United States, more than any other symptom. It is particularly bothersome at night because it disrupts sleep. Consumers spend billions of dollars each year on OTC cough and cold medications despite little evidence that these drugs provide significant relief.

Journal reference: Arch Pediatr Adolesc Med. 2007;161(12):1140-1146.

This work was supported by an unrestricted research grant from the National Honey Board, an industry-funded agency of the U.S. Department of Agriculture.

Adapted from materials provided by Penn State University.

<http://www.sciencedaily.com/releases/2007/12/071203164750.htm>



Canada to launch biofuels initiative

OTTAWA, Dec. 4 (UPI) -- Canada has announced a \$1.5 billion biofuels initiative that will require gasoline to contain an average of 5 percent renewable content by 2010.

In addition to gasoline, the program will require diesel fuel and heating oil to have an average of 2 percent renewable content by 2012. To meet those requirements, it's estimated Canada will need 792 million gallons of renewable fuel a year. Canadian production is currently about 211 million gallons per year.

Producers of ethanol and other renewable biofuels will be eligible for incentives of up to 10 cents per liter of production; biodiesel producers can receive incentives of up to 20 cents per liter for the first three years.

"We owe it to future generations to take action on climate change," said Gary Lunn, Canada's minister of natural resources. "The ecoENERGY for Biofuels initiative shows our commitment to taking real action towards a healthier environment and a stronger economy for all Canadians."

The biofuel production incentive program runs from April 1, 2008, to March 31, 2017, and will be administered by Natural Resources Canada.

<http://www.newsdaily.com/Science/UPI-1-20071204-11303300-bc-canada-biofuels.xml>

Mark Wallinger wins Turner Prize

Mark Wallinger was first nominated for the Turner Prize 12 years ago

Mark Wallinger has been named the winner of the Turner Prize for his replica of the one-man anti-war protest in Parliament Square, State Britain.



Actor and director Dennis Hopper presented the £25,000 award at a ceremony at the Tate Liverpool gallery.

"I am indebted to all those people who contributed to the making of State Britain," said Wallinger.

For the exhibition he chose to display a film of him roaming the National Gallery in Berlin in a bear suit.

'Tireless campaign'

It was the first time since the award was founded 23 years ago that the event took place outside London.

Around 45,000 people have seen the exhibition of the nominees' work, which has been on display since October.

Wallinger first made the shortlist in 1995, but lost out to Damien Hirst.

He was favourite to win the prize for his £90,000 installation, which recreates everything from Brian Haw's protest in Parliament Square in 2001.

Every detail was copied from his tarpaulin shelter and tea-making area to the messages of support and hand-painted placards.

It is said he employed 15 people for six months to make State Britain.

'Historic importance'

"Brian Haw is a remarkable man who has waged a tireless campaign against the folly and hubris of our government's foreign policy," Wallinger said.

"For six-and-a-half years he has remained steadfast in Parliament Square, the last dissenting voice in Britain. Bring home the troops, give us back our rights, trust the people," he added.

The jury commended Wallinger, 48, for its "immediacy, visceral intensity and historic importance".

They said: "The work combines a bold political statement with art's ability to articulate fundamental human truths."

The other artists on the shortlist, Zarina Bhimji, Mike Nelson and Nathan Coley, each received £5,000 for their "outstanding presentations" at the show.

Nelson was shortlisted for Amnesiac Shrine, which features a maze of mirrors, while Bhimji's photographs of Uganda included a picture of automatic guns lined up against a wall.

Coley's work is a scaffold with the phrase "there will be no miracles here" spelt out in lightbulbs.

The Turner Prize, established in 1984, is awarded to a British artist under 50 for an outstanding exhibition or other presentation of his or her work in the 12 months before May this year.

Last year German-born artist Tomma Abts became the first woman painter to win the prize.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/entertainment/7124575.stm>

Published: 2007/12/03 21:06:41 GMT

Computer servers 'as bad' for climate as SUVs

- 14:29 03 December 2007
- NewScientist.com news service
- **Catherine Brahic**

Computer servers are at least as great a threat to the climate as SUVs or the global aviation industry, warns a new report.

Global Action Plan, a UK-based environmental organisation, publishes a report today drawing attention to the carbon footprint of the IT industry in the UK.

"Computers are seen as quite benign things sitting on your desk," says Trewin Restorick, director of the group. "But, for instance, in our charity we have one server. That server has same carbon footprint as your average SUV doing 15 miles to the gallon. Yet, whereas the SUV is seen as a villain from the environmental perspective, the server is not."

The report, *An Inefficient Truth* states that with more than 1 billion computers on the planet, the global IT sector is responsible for about 2% of human carbon dioxide emissions each year – a similar figure to the global airline industry.

The energy consumption is driven largely by vast amounts of customer and user data that are stored on the computer servers in most businesses. The rate at which data storage is growing surpasses the growth in the airline industry: in 2006, 48% more data storage capacity was sold in the UK than in 2005, while the number of plane passengers grew by 3%.

Unknown cost

The group ran a survey of some of the largest businesses in the UK in an attempt to find out how aware the industry is of its carbon footprint.

The survey revealed that more than half of the IT professionals surveyed believed their environmental impact was "significant", however:

- 86% of them do not know the carbon footprint of their activities
- two thirds of the departments they work for are not responsible for paying their own energy bills
- more than half do not even see those bills

The bottom line is that IT departments "are buying lots and lots of kit that they have to run and cool without knowing what the energy cost of that kit is", says Restorick.

The survey also revealed that considerable amounts of electricity could be saved by more efficient data storage: 60% of the departments said they were using less than half their storage capacity and 37% said they are storing data indefinitely.

Restorick told **New Scientist** that simply increasing the efficiency of energy use and data storage could easily cut 30% of power use in businesses. "In theory, this could happen overnight," he says.

ID cards



Respondents to the survey said they are given few if any incentives to "go green". Global Action Plan is calling on the UK government to review its policies on long-term data storage to take into account the environmental implications and to encourage businesses to only keep the data they need to save.

Restorick points out that policies being pursued by the government have considerable carbon costs. "This government is very keen on individual ID cards," says Restorick. "We would say you should be doing a carbon analysis of putting ID cards into our country – such cards would require data being kept on every single person in the country for an infinite amount of time."

The report is published as a major UN conference about climate change opens in Bali, Indonesia.

From 3 to 14 December, thousands of representatives from governments around the world, NGOs, climate policy makers, researchers, environmental activists, and lobbyists meet in Bali to negotiate a successor to the Kyoto protocol and discuss its progress.

http://environment.newscientist.com/channel/earth/dn12992-computer-servers-as-bad-for-climate-as-suvs.html?feedId=online-news_rss20

Whiz Chimps Outsmart College Students

Jennifer Viegas, Discovery News

Dec. 3, 2007 -- Three five-year-old chimpanzees have soundly defeated nine university students while playing a computer game that tests numerical memory skills, according to a paper published today in *Current Biology*.



The scores weren't even close. One young chimp named Ayumu who, in his off time, buys his own vending machine snacks, scored 76 percent correct in one game. The adult human average for the same game was 36 percent correct.

The study is one of the first to demonstrate that, at least under certain circumstances, chimp memory may be superior to that of humans.

"No human adults reached Ayumu's level," co-author Tetsuro Matsuzawa told Discovery News.

"The young chimpanzees are better than human adults in a memory task," agreed Matsuzawa, who collaborated with Sana Inoue on the paper and is the director of Kyoto University's Primate Research Institute. "Young chimpanzees quickly grasp many numerals at a glance, with no decline in performance as the hold duration is varied."

Matsuzawa was referring to the game, which functioned like the popular card match memory games on many home computers.

In this case, however, the three young chimp players (and their mothers), along with the human students, were each shown a series of numbers from 1 to 9 on the screen. The numbers were then replaced by blank squares, which the players had to touch based on their knowledge of numerical sequences. For example, if the numbers 2,3,5,8 and 9 appeared on the screen, the player had to touch the corresponding blank squares in that order.

What confused the human players was the length of time that the numbers first appeared on the screen. The shorter the duration, the worse they scored.

"Ayumu's performance was kept constant regardless of the duration of looking at the numerals," said Matsuzawa, who even failed to stump the chimp when he flashed five numbers for just 210 milliseconds.

The mother chimps and the adult humans all played worse than the young chimpanzees, likely because of a phenomenon called "eidetic imagery."

He explained that this is "a special memory capability to retain an accurate, detailed image of a complex scene or pattern." Many normal human children have the skill, which declines with age.

While chimps in the wild obviously aren't playing computer games, they use the same skills to assess numbers of fruits ripening on trees, hierarchical positions within their troops, and to evaluate locations and numbers of enemies "in the bush at a glance."

Matsuzawa theorizes there is a mental trade-off between memory and symbolization -- especially as it relates to language -- in humans. This may cause the apparent memory lapses later.

James Anderson, a member of the Scottish Primate Research Group at the University of Stirling, told Discovery News that the new research "is impressive on several levels."

"Of course there is the striking finding that immature chimpanzees outperform both adult chimpanzees and adult humans in the numerical sequence task," Anderson said. "This naturally leads us to speculate on the development of the cognitive abilities involved in this task, in terms not only of individual development but also species-typical abilities."

Anderson added that the study is also an "excellent example of how good laboratory-based experiments can reveal abilities that would be extremely difficult, if not impossible, to uncover through purely observational studies."

<http://dsc.discovery.com/news/2007/12/03/chimp-number-game.html?dcitc=w19-502-ak-0000>

Aggression protein found in mice

Aggression pheromones have been identified in mice that encourage fights between rival males.



Scientists from Scripps Research Institute in California found that mice excrete at least two chemicals in their urine which make them brawl.

Nerves in the noses of male mice are able to detect these proteins in the urine of rivals.

This is enough to stimulate aggressive behaviour in these highly territorial rodents, the journal *Nature* reports.

Scientists already knew that something in the urine of male mice promoted aggression in other males.

Previous experiments had shown that castrated males did not produce the aggression pheromone and did not elicit belligerent behaviour from rivals.

But when scientists swabbed urine from uncastrated males on the backs of castrated mice, other males displayed hostile behaviour towards them once again.

Lisa Stowers from Scripps and her colleagues have now analysed the responses of sensory neurons in the rodents' noses to various protein components in mouse urine, and assessed the behaviour of the males.

They eventually identified two molecules that were sufficient to promote male-on-male aggression. The authors then characterised the cells and circuits that these molecules acted on.

Male mice display innate territorial aggression, but the logic underlying this behaviour has been difficult to unravel.

Dr Stowers and colleagues hypothesised that pheromones may transmit information about the characteristics of other mice such as gender, age, or status, but this remains unproven.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7129176.stm>

How elephants keep tabs on family

By Helen Briggs

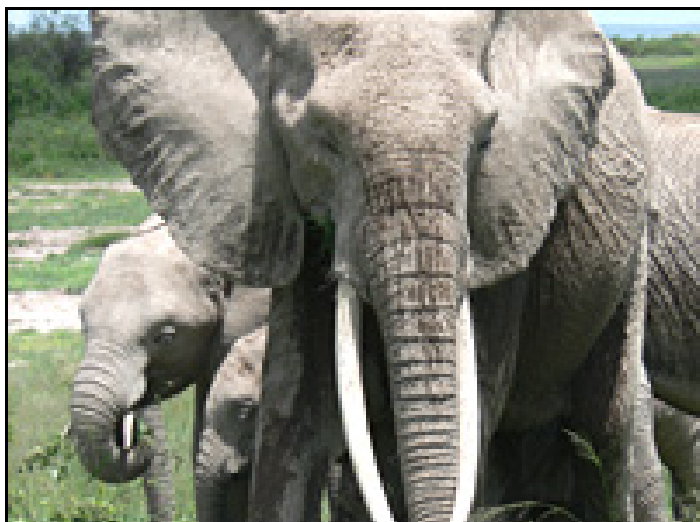
Science reporter, BBC News

Elephants keep track on up to 30 absent relatives by sniffing out their scent and building up a mental map of where they are, research suggests.

Herd members use their good memory and keen sense of smell to stay in touch as they travel in large groups, according to a study of wild elephants in Kenya.

The University of St Andrews studied 36 family groups of elephants living in Amboseli National Park.

The research is published in the Royal Society journal, *Biology Letters*.



Memory update

Wild elephants form matriarchal family groups which travel, hunt for food, and socialise together. Individuals need to keep track of each other, as family members split up into smaller groups or overtake companions as they wander the home range.

It may be that where elephants really excel in memory is not remembering things for very long periods but in everyday working memory

Dr Richard Byrne, St Andrews University

Psychologists from the University of St Andrews collected samples of female elephant urine from the ground and presented it to relatives to trick them into believing that the elephant had recently passed by.

Elephants showed surprise when they encountered the scent of an individual who was actually walking behind them so could not possibly have been there.

"We reckoned that only if each elephant was continually updating its memory of where everyone was, and was able to identify specific individuals from their urine, would they show any different reaction to this case," said co-researcher Dr Lucy Bates.

The elephants also reacted when the urine was from a family member who was far away, and not supposed to be in the area.

Human parallels

Dr Byrne said it is hard enough for humans to keep tabs on each other, let alone elephants, which have poor day vision.



"If you think of a comparable human situation - perhaps a mum in the supermarket with three kids and a husband who'd rather be looking in the DIY section - keeping track of four or five people is really quite a strain," he told BBC News.

"But our elephants are doing it in parties of 20 to 30 family members."

But Dr Byrne said that elephants have two advantages over humans - their excellent sense of smell and, if their popular reputation is anything to go by, a good memory.

"It may be that where elephants really excel in memory is not remembering things for very long periods but in everyday working memory - where it is important to update and delete things rather than remember things forever," he added.

The research was carried out with members of the Amboseli Trust for Elephants.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7127276.stm>

Government 'failing on e-crime'

By Rory Cellan-Jones
Technology correspondent, BBC News

IT chiefs at some of the UK's biggest companies have accused the government of failing to take e-crime seriously.



Members of the Corporate IT Forum have demanded that the Home Office keeps a promise to establish a police unit to deal with high-tech criminal gangs.

They say the abolition of the National High Tech Crime Unit in 2006 left a vacuum in the investigation of e-crime.

The Home Office said it takes the issue "seriously" and has allocated funding to make reporting cyber-crime easier.

But members of the Corporate IT Forum, a professional body for industry computer experts, claim that crimes have to be reported to local police who do not have the training to understand complex cases.

"It's a practical nonsense," said David Roberts, Chief Executive of the Corporate IT Forum.

"You can imagine the response an IT officer would get reporting a complex attack at their local police station - how is your local PC going to cope? It's a damning indictment of how little the Home Office understands 21st Century high-tech crime".

Global concern

Companies in the UK say they are dealing with a rising tide of electronic crime.

The threat includes denial of service attacks, where corporate websites are taken out of action and money is demanded by hackers, and "phishing", where fake websites are used to try to obtain banking details.

One member of the Corporate IT Forum claimed that after reporting a phishing attack their only contact was with a "very confused policeman".

They said that the police "urgently need support so that they understand that phishing doesn't involve rods and nets".

The responsibility for investigating e-crime is now split between local police forces, the Serious Organised Crime Agency, and MI5.

Last month MI5 warned that British companies faced the threat of cyber-attacks from China. But companies fear that competing claims on the agencies' time - such as the battle against international terrorism - mean the investigation of high-tech crime does not get the resources it deserves.

Security measures

Senior figures in the IT world have now signed a petition on the Downing Street website calling on the Prime Minister "to give the formation of a police central e-crime unit urgent priority."

They say the loss of the child benefit records of 25m people by HM Revenue and Customs makes the creation of a unit which could address crimes such as identity theft from data centres all the more urgent.

The Home Office said that government takes "seriously all forms of crime" and that legislation has been passed to help prosecute cyber criminals, particularly those that "steal data and attack IT systems, or who create the technical mechanisms to support such attacks".

"The Government has allocated £28m over three years to implement the recommendations of the Fraud Review, which will include setting up the National Fraud Reporting Centre," the Home Office said in a statement.

"This will provide a one-stop shop for reporting fraud, including electronic fraud. The Home Office is also considering ACPO [Association of Chief Police Officers] proposals on tackling computer crime at the national level."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/technology/7128491.stm>

Published: 2007/12/05 10:25:43 GMT

Cell transplant for heart attack

Transplanting genetically engineered cells into the heart may reduce the risk of a fatal condition which occurs after heart attack, research suggests.



Ventricular tachycardia - an unusually fast heart rhythm - is the main cause of sudden death after heart attack.

In mice, transplants of skeletal muscle cells engineered to produce a specific protein prevented the condition.

Experts said the study in Nature should help to direct research on using stem cells to treat heart attacks in humans.

The German researchers tested a variety of cells in mice who had been induced to have heart attacks.

The nice thing about skeletal muscle is it has adult stem cells so you can take a biopsy of the thigh muscle and grow millions and millions of cells in culture

Dr Bernd Fleischmann

They found that heart cells taken from 15-day-old embryos reduced the risk of ventricular tachycardia but other implanted cells, such as skeletal muscle cells, did not.

It was found that a protein present in embryonic heart cells but not the other cells - connexin 43 - was the key.

By engineering skeletal muscle cells, which are more readily available than embryonic cells, to produce connexin 43, the researchers found the cells were equally effective in preventing heart arrhythmia.

Tests on the ability of the implanted cells to conduct an electrical current - an important function of heart cells - found the signal was passed between implanted and existing heart tissue.

Clear drop

Study leader Dr Bernd Fleischmann, from the University of Bonn, said more research would have to be done before the technique could be used in humans but the study was important.

"The incidence of ventricular tachycardia dropped by 60%.

"We clearly showed these cells improved electrical stability.

"The nice thing about skeletal muscle is it has adult stem cells so you can take a biopsy of the thigh muscle and grow millions and millions of cells in culture."

He said there were ongoing clinical trials using skeletal muscle and bone marrow cells to try and restore pump function of the heart but this was the first study to look at arrhythmias.

Current treatment for patients who develop ventricular tachycardia after a heart attack is for a defibrillator to be implanted under the skin.

The expensive device gives a painful electric shock if it detects a fast heart beat.

Dr Tim Chico, an expert in vascular development at the University of Sheffield, said the study was preliminary.

But he added: "If it can be repeated in humans it would be a breakthrough in the treatment of patients with heart disease and could save thousands of lives."

British Heart Foundation medical director, Peter Weissberg, said: "This is a vital insight, only possible from animal studies, which should help direct current research using stem cells to prevent the dangerous consequences of heart attacks in people.

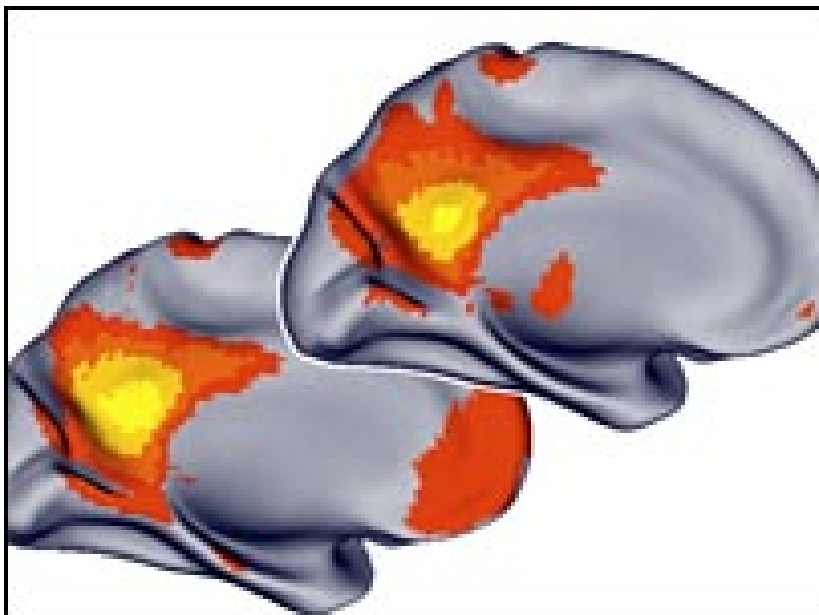
"However, application of this technique to people with heart disease is still a long way off."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7129376.stm>

Normal ageing 'can addle brain'

Scientists may have discovered why we tend to slow down mentally as we age.



Harvard University used medical imaging techniques to compare the brains of 93 healthy people aged 18 to 93.

The scans showed the brain gradually loses the material it needs for one major region to communicate effectively with another.

The study, published in *Neuron*, suggests this slowly undermines sophisticated "higher" cognitive functions such as memory and learning.

Understanding why we lose cognitive function as we age may help us to prolong our mental abilities later in life

Professor Randy Buckner

Howard Hughes Medical Institute

This may help to explain why advanced age is often accompanied by a loss of mental agility, even in an otherwise healthy individual.

Lead researcher Jessica Andrews-Hanna said: "This research helps us to understand how and why our minds change as we get older, and why some individuals remain sharp into their 90s, while others' mental abilities decline as they age.

"One of the reasons for loss of mental ability may be that these systems in the brain are no longer in sync with one another."

Previous studies have focused on the effect of ageing on specific structures in the brain.

The latest work, using functional magnetic resonance imaging, was different because it examined the effect on communication between different regions.

White matter

The researchers tracked the nerve cell-packed white matter, which effectively serves as the brain's wiring, allowing different areas to communicate and share information.

The scans showed white matter degraded over time. In particular, they revealed a reduction in connections between the front and back regions of the brain.

As a result, while the younger brains were in sync, this was not always the case for older brains.

Older people whose brains remained in sync were more likely to perform better in a battery of tests of mental capacity than peers whose scans showed more evidence of disruption.

However, the pattern of disruption varied between individuals - as did their performance on individual tests.

The researchers found the system governing our internal thoughts, which tends to kick in when we are not focusing on processing information from the outside world, was particularly vulnerable to disruption.

The researchers said the study promises a better physiological understanding of cognitive decline, and may help research into the impact of risk factors such as heart disease.

Professor Randy Buckner, who worked on the study, said: "Understanding why we lose cognitive function as we age may help us to prolong our mental abilities later in life."

Vascular element

Professor Clive Ballard, of the Alzheimer's Society, said more work was needed to confirm and clarify the findings.

He said: "Understanding how the brain changes as people age is an important part of the fight to protect against cognitive diseases such as dementia.

"People displaying the signs of Alzheimer's disease were ruled out of the study, but those with subtle vascular changes in the brain may have been included.

"Further work is needed to establish if the pattern of change is related to age only, or to vascular changes in the brain."

Rebecca Wood, of the Alzheimer's Research Trust, said the research highlighted the complexity of the brain.

She said: "If we can better understand the normal effects of ageing on a brain then we can differentiate it from Alzheimer's and improve diagnosis."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7127463.stm>

Published: 2007/12/06 01:35:20 GMT

Mice Lacking Enzyme Renin Stay Lean On High-fat Diet, With Little Exercise



New research shows that mice lacking the enzyme known as renin are lean and resistant to gaining weight on a high-fat diet, even though they continue to eat just as much and don't exercise more. (Credit: iStockphoto/Emilia Stasiak)

ScienceDaily (Dec. 6, 2007) — A new study elucidates the connection between an enzyme involved in blood pressure control and symptoms of the metabolic syndrome. The researchers report in the December issue of *Cell Metabolism*, a publication of Cell Press, that mice lacking the enzyme known as renin are lean and resistant to gaining weight on a high-fat diet, even though they continue to eat just as much and don't exercise more.

The findings suggest that renin-blocking drugs designed for treating high blood pressure might also improve obesity and insulin resistance, according to the researchers. Renin plays an important rate-limiting role in the production of a hormone called angiotensin II (Ang II) that increases blood pressure by constricting blood vessels.

"An overactive renin-angiotensin system has also been associated with obesity and the metabolic syndrome," said Nobuyuki Takahashi of The University of North Carolina at Chapel Hill. "Now we've gained new insight into the mechanism responsible."

The metabolic syndrome is characterized by central obesity, hypertension, abnormally high blood lipid levels, and impaired glucose tolerance, the researchers explained. It also increases the risk of heart disease and type 2 diabetes. While most theories to explain the condition have focused on primary defects of insulin action, the renin-angiotensin system has also been implicated.

Clinical trials have shown that drugs that block other parts of the renin-angiotensin system improve insulin sensitivity and decrease the incidence of type 2 diabetes. Studies have also revealed that mice lacking angiotensinogen, the substrate that renin acts on, are lean and resistant to diet-induced obesity.

In the current study, the researchers generated mice with a predisposition for obesity that were also deficient for renin. They found that the renin-less mice were lean, resistant to diet-induced obesity, and more insulin sensitive than normal mice.

"This metabolically favorable state results partly from an increased metabolic rate and partly from gastrointestinal loss of dietary fat, but not from increased physical activity or decreased food intake," they said. The metabolic effects were explained almost entirely by a lack of Ang II in the absence of renin. Renin's other effects on metabolism were minimal.

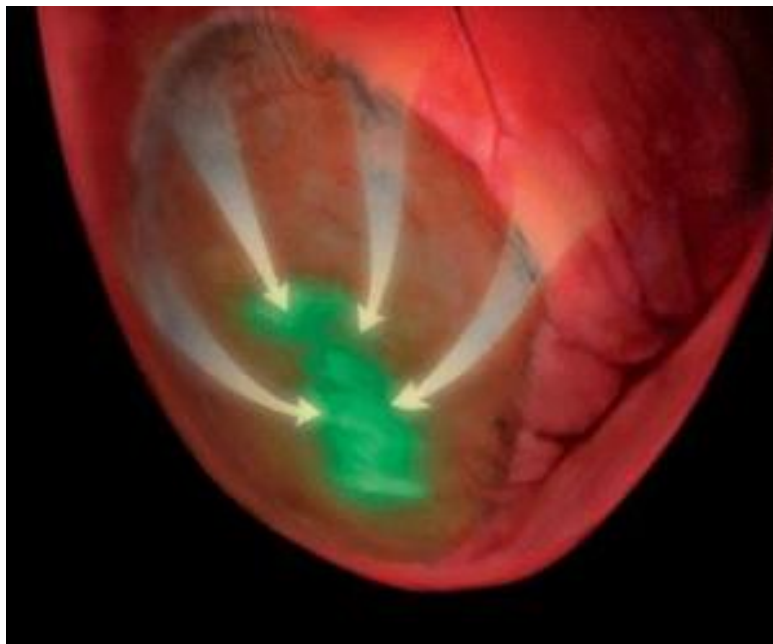
"Our findings are particularly relevant since they suggest that renin inhibitors recently approved or under development for the treatment of hypertension are likely to have favorable effects on obesity, insulin sensitivity, and their associated metabolic and cardiovascular consequences," the researchers said.

The researchers include Nobuyuki Takahashi, Feng Li, Kunjie Hua, Jianbei Deng, Chih-Hong Wang, Hyung-Suk Kim, and Joyce B. Harp, of The University of North Carolina at Chapel Hill, in Chapel Hill, NC, USA; Robert R. Bowers, and Timothy J. Bartness, of the Center for Behavioral Neuroscience, Georgia State University, Atlanta, GA, USA.

Adapted from materials provided by Cell Press.

<http://www.sciencedaily.com/releases/2007/12/071204122015.htm>

Implanting Embryonic Cardiac Cells Prevents Arrhythmias, The Most Dangerous Consequence Of Heart Attacks



Cells implanted within damaged heart tissue (darker area) express a green fluorescent molecular sensor. Implantation of these cells, which express the protein connexin43, reduces the risk of the damaged heart developing fatal arrhythmias by enhancing electrical conduction (arrows). The fluorescent molecular sensor is activated when the cells contract, demonstrating conduction of electrical waves into the damaged area. (Credit: Michael Simmons)

ScienceDaily (Dec. 6, 2007) — When researchers at Cornell, the University of Bonn and the University of Pittsburgh transplanted living embryonic heart cells into cardiac tissue of mice that had suffered heart attacks, the mice became resistant to cardiac arrhythmias, thereby avoiding one of the most dangerous and fatal consequences of heart attacks.

The discovery, reported in *Nature*, has profound implications for using cell-transplant therapies to restore damaged heart tissue.

The researchers, including Michael Kotlikoff, the Austin O. Hooey Dean of Cornell's College of Veterinary Medicine, one of the paper's senior authors, discovered that a protein called connexin43, expressed by the transplanted embryonic heart cells, improved electrical connections to other heart cells. The researchers showed that the improved connections helped activate the transplanted cells deep within the damaged section of the heart tissue. The technique reversed the risk of developing ventricular arrhythmias after a heart attack, the number one cause of sudden death in the Western world.

In the past, scientists have transplanted a variety of cell types into failing hearts with modest improvement of function, although transplanting skeletal muscle cells made things worse and led to more arrhythmias. Surprisingly, when co-author Bernd Fleischmann at the University of Bonn and colleagues transplanted embryonic cardiac cells, the hearts' electrical stability and function returned to normal.

Scientists recognize the untapped potential of using cell-based therapies to counter many debilitating diseases, but they have not had tools to assess the function of the cells once transferred. In Kotlikoff's laboratory, the researchers determined that the transplanted embryonic cells were making electrical connections with normal heart cells. Using genetically modified heart cells that express a fluorescent sensor, they established that transplanted heart cells were activated during normal heart contractions.



"For the first time we were able to see how cells used in therapy are working with other cells in a complex organ within a living animal, establishing the mechanism of the therapeutic effect," Kotlikoff said.

Professor Guy Salama at the University of Pittsburgh School of Medicine was also able to map voltage signals across the surface of the hearts, establishing that the implanted cells improve conduction of electrical signals within the damaged heart tissue.

While doctors could never use cells from a human embryonic heart for transplantation, researchers at the University of Bonn engineered skeletal muscle to express connexin43 and achieved the same restorative results as they did with the embryonic heart cells.

"These results have important implications for therapy, although they must be verified in the context of naturally occurring heart damage," Kotlikoff said. "One can envision using a patient's own cells by deriving heart cells from stem cells to improve heart function and decrease arrhythmia risk."

The study was supported by the National Institutes of Health, the Deutsche Forschungsgemeinschaft, the Federal Ministry of Education and Research, Germany, and the European Commission, Bonn Forschung.

Adapted from materials provided by Cornell University.

<http://www.sciencedaily.com/releases/2007/12/071205140112.htm>

A Really Inconvenient Truth: Divorce Is Not Green



A novel study that links divorce with the environment shows a global trend of soaring divorce rates has created more households with fewer people, has taken up more space and has gobbled up more energy and water. (Credit: iStockphoto/Nicholas Monu)

ScienceDaily (Dec. 5, 2007) — The data are in. Divorce is bad for the environment. A novel study that links divorce with the environment shows a global trend of soaring divorce rates has created more households with fewer people, has taken up more space and has gobbled up more energy and water. A statistical remedy: Fall back in love. Cohabitation means less urban sprawl and softens the environmental hit.

The findings of Jianguo "Jack" Liu and Eunice Yu at Michigan State University are published in the Proceedings of the National Academy of Sciences.

"Not only the United States, but also other countries, including developing countries such as China and places with strict religious policies regarding divorce, are having more divorced households," Liu said. "The consequent increases in consumption of water and energy and using more space are being seen everywhere."

Liu and his research assistant Yu started with the obvious -- that divorce rates across the globe are on the rise. Housing units, even if they now have few people in them, require resources to construct them and take up space. They require fuel to heat and cool. A refrigerator uses roughly the same amount of energy whether it belongs to a family of four or a family of two.

When they calculated the cost in terms of increased utilities and unused housing space per capita, they discovered that divorce tosses out economy of scale. Among the findings:

- In the United States alone in 2005, divorced households used 73 billion kilowatt-hours of electricity and 627 billion gallons of water that could have been saved had household size remained the same as that of married households. Thirty-eight million extra rooms were needed with associated costs for heating and lighting.
- In the United States and 11 other countries such as Brazil, Costa Rica, Ecuador, Greece, Mexico and South Africa between 1998 and 2002, if divorced households had combined to have the same average household size as married households, there could have been 7.4 million fewer households in these countries.
- The numbers of divorced households in these countries ranged from 40,000 in Costa Rica to almost 16 million in the United States around 2000.
- The number of rooms per person in divorced households was 33 percent to 95 percent greater than in married households.

To track what happens when divorced people returned to married life, the study compared married households with households that had weathered marriage, divorce and remarriage. The results: The environmental footprint shrunk back to that of consistently married households.

Liu, a University Distinguished Professor of fisheries and wildlife and Rachel Carson Chair in Ecological Sustainability at MSU's Center for Systems Integration and Sustainability, has spent more than two decades integrating ecology with social sciences to understand the complex interrelationships between nature and humans and how those interactions affect the environment and biodiversity. Liu and Yu began to discuss this research project when Yu was a high school student.

This new work also acknowledges that divorce is not the only lifestyle trend changing family living structures -- the demise of multigenerational households, people remaining single longer are examples.

"People's first reaction to this research is surprise, and then it seems simple," Liu said. "But a lot of things become simple after research is done. Our challenges were to connect the dots and quantify their relationships. People have been talking about how to protect the environment and combat climate change, but divorce is an overlooked factor that needs to be considered."

The research, Liu said, shows that environmental policy is more complex than one single solution. Governments across the world may need to start factoring in divorce when examining environmental policy, Liu said.

"Solutions are beyond a single idea," Liu said. "Consider the production of biofuel. Biofuel is made from plants, which also require water and space. We're showing divorce has significant competition for that water and space. On the other hand, more divorce demands more energy. This creates a challenging dilemma and requires more creative solutions."

The research was funded by the National Science Foundation, the National Institutes of Health and the Michigan Agricultural Experiment Station.

Adapted from materials provided by Michigan State University.

<http://www.sciencedaily.com/releases/2007/12/071203190625.htm>

Could Hydrogen Sulfide Hold The Key To A Long Life?



C. elegans. Hydrogen sulfide, or H_2S , the chemical that gives rotten eggs their sulfurous stench has now been shown to significantly increase life span and heat tolerance in the nematode worm, or *C. elegans*. (Credit: Washington University in St. Louis)

ScienceDaily (Dec. 5, 2007) — Hydrogen sulfide, or H_2S , the chemical that gives rotten eggs their sulfurous stench -- and the same compound that researchers at Fred Hutchinson Cancer Research Center successfully have used to put mice into a state of reversible metabolic hibernation -- has now been shown to significantly increase life span and heat tolerance in the nematode worm, or *C. elegans*.

In an effort to understand the mechanisms by which hydrogen sulfide induces hibernation in mice, the researchers turned to the tiny nematode, a workhorse of laboratory science because its biology is similar in many respects that of humans. For example, like humans, nematodes have a central nervous system and the ability to reproduce. The worms also are ideally suited for studying life span, because they normally live for only two to three weeks.

This research was performed by Mark Roth, Ph.D., a member of the Center's Basic Sciences Division, and Dana Miller, Ph.D., a postdoctoral research fellow in Roth's lab.

The researchers found, to their surprise, that nematodes that were raised in a carefully controlled atmosphere with low concentrations of H_2S (50 parts per million in room air) did not hibernate. Instead, their metabolism and reproductive activity remained normal, their life span increased and they became more tolerant to heat than untreated worms.

The H_2S -exposed worms lived eight times longer than untreated worms when moved from normal room air (22 C or 70 F) to a high-temperature environment (35 degrees Celsius, or 95 F). Roth and colleagues replicated these results in 15 independent experiments.

"Although the maximum extension of survival time varied between experiments, the effect was quite robust. On average, 77 percent of the worms exposed to H_2S outlived the untreated worms," Roth said. The mean life span of worms grown in an atmosphere laced with hydrogen sulfide was 9.6 days greater than that of the untreated population, a longevity increase of 70 percent.

Most genes that influence life span in *C. elegans* act on one of three genetic pathways: those that control insulin/IGF (insulin growth factor) signaling, those that control mitochondrial function and those that modulate the effects of dietary restriction.

Roth and colleagues ruled out hydrogen sulfide's influence on each of these pathways. Instead, they suspect it acts through a different mechanism. One theory is that exposure to H₂S naturally regulates the activity of a gene called SIR-2.1, which has been shown to influence life span in many organisms, including the nematode. Previous studies have found that over-expression of this gene increases the longevity of *C. elegans* by 18 percent to 20 percent.

"Further research into the genetic mechanisms that influence H₂S-induced changes in nematodes may reveal similar mechanisms in higher organisms, including humans, with potentially wide-ranging implications in both basic research and clinical practice," Roth said. For example, understanding how H₂S affects physiology in animals may lead to the development of drugs that could delay the onset of age-related diseases in humans such as cancer, Alzheimer's and heart disease.

Roth's hibernation research made headlines worldwide in April 2005 when he was the first to show that exposing mice to minute amounts of hydrogen sulfide could induce a state of reversible "hibernation on demand," dramatically reducing their core body temperature, respiration and need for oxygen. Roth envisions a future in which similar techniques could be used to "buy time" for critically ill patients who otherwise would face injury and death from insufficient blood and oxygen supply to organs and tissues.

Roth hypothesizes that H₂S, a chemical normally produced in humans and animals, may help regulate body temperature and metabolic activity. Hydrogen sulfide is similar to oxygen at the molecular level because it binds at many of the same proteins. As a result, H₂S competes for and interferes with the body's ability to use oxygen for energy production -- a process within the cell's power-generating machinery called oxidative phosphorylation.

The inhibition of this function, in turn, is what Roth and colleagues believe causes organisms such as mice to shut down metabolically and enter a hibernation-like state pending re-exposure to normal room air, after which they quickly regain normal function and metabolic activity with no long-term negative effects.

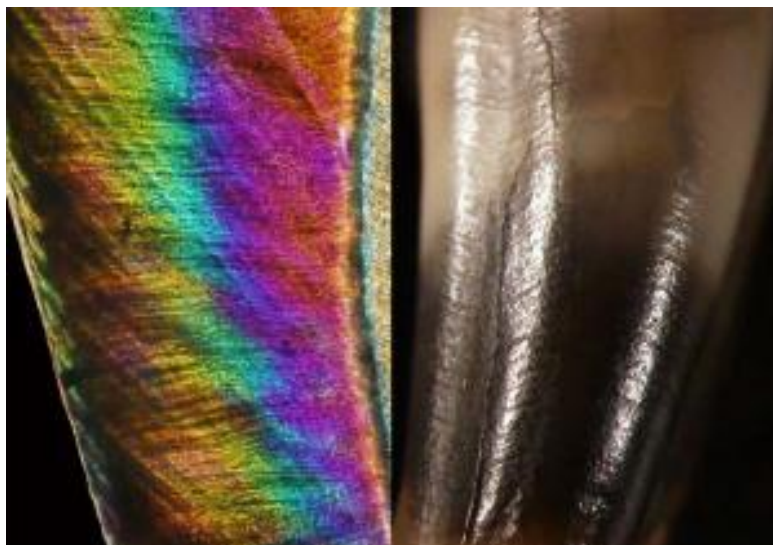
This research appear in the PNAS Online Early Edition, a publication of the Proceedings of the National Academy of Sciences of the United States of America.

The National Institutes of Health, the NIH Center for Research Resources, the Caenorhabditis Genetics Center and a National Research Service Award Fellowship supported this work.

Adapted from materials provided by Fred Hutchinson Cancer Research Center.

<http://www.sciencedaily.com/releases/2007/12/071203190614.htm>

Neanderthal Children Grew Up Fast



Growth lines inside a Neanderthal tooth (left - diagonally running lines) and on the outside (right- horizontal curved lines). Counts and measurements of these lines helped to determine that the child was approximately 8 years old when it died. (Credit: Tanya Smith, MPI for Evolutionary Anthropology)

ScienceDaily (Dec. 5, 2007) — An international European research collaboration led by scientists at the Max Planck Institute for Evolutionary Anthropology reports evidence for a rapid developmental pattern in a 100,000 year old Belgian Neanderthal (*Homo neanderthalensis*).

A new report details how the team used growth lines both inside and on the surfaces of the child's teeth to reconstruct tooth formation time and its' age at death.

Scientists found differences in the duration of tooth growth in the Neanderthal when compared to modern humans, with the former showing shorter times in most cases. This faster growth resulted in a more advanced pattern of dental development than in fossil and living members of our own species (*Homo sapiens*).

The Scladina juvenile, which appears to be developmentally similar to a 10-12 year old human, was estimated to be in fact about 8 years old at death. This pattern of development appears to be intermediate between early members of our genus (e.g., *Homo erectus*) and living people, suggesting that the characteristically slow development and long childhood is a recent condition unique to our own species.

Neanderthal life history, or the timing of developmental and reproductive events, has been under great debate during the past few decades. Across primates, tooth development, specifically the age of molar eruption, is related to other developmental landmarks such as weaning and first reproduction.

Scientists have previously found evidence to both support and refute the idea that Neanderthals grew up differently than our own species. In this new study, researchers used information from the inside of a molar tooth, coupled with data from micro-computed tomography (micro-CT), as well as evidence of developmental stress on the outsides of tooth crowns and roots.

This yields the first chronology, or time sequence, for Neanderthal tooth growth, which differs from living humans. The Scladina Neanderthal grew teeth over a shorter period of time, and has more teeth erupted (present in the mouth), than similarly-aged fossil or living humans (*Homo sapiens*).



This suggests that other aspects of physical development were likely more rapidly achieved as well, implying significant differences in the behaviour or social organization of these ancient humans.

Journal reference: Tanya M. Smith, Michel Toussaint, Donald J. Reid, Anthony J. Olejniczak, Jean-Jacques Hublin, Rapid Dental Development in a Middle Paleolithic Belgian Neanderthal, Proceedings of the National Academy of Sciences USA December 2007

Adapted from materials provided by Max-Planck-Gesellschaft.

<http://www.sciencedaily.com/releases/2007/12/071204100409.htm>

Respiratory Infections Linked To Increased Heart Attacks And Strokes

ScienceDaily (Dec. 6, 2007) — A new study, which appears today in the online edition of the European Heart Journal, has found strong evidence that recent respiratory infections increase the risk of heart attacks and strokes, both of which are more common in the winter.

It has for some years been recognised, using information from death certificates, that there is an excess of deaths from coronary heart disease (CHD) and stroke during the winter months, over and above those directly attributable to deaths from respiratory disease. More direct evidence has been necessary.

The authors of this study applied to the British Heart Foundation for funding to enable them to undertake further research to confirm or refute the findings of previous studies based on information from general practice which showed that respiratory infections were a strong risk factor for stroke.

The group, led by Tim Clayton and Tom Meade of the London School of Hygiene & Tropical Medicine's Medical Statistics Unit, carried out a clinical case-control study in a general practice database, the IMS Disease Analyzer Mediplus database (IMS), which is used widely in epidemiological research. It contains details of some two million patients registered with approximately 500 GPs.

They found a doubling of risk of both heart attack and stroke in the week following respiratory infection, which reduced over time so that there was little excess risk beyond one month. Risk did not depend on age or gender and for heart attack was seen at every level of preceding risk, whether this had been low or high. There was also some evidence of an association between recent urinary tract infection and subsequent heart attack or stroke.

The researchers say that the benefit of reducing respiratory infection, either through ensuring high immunisation rates or by treating and preventing infection, may be substantial.

Tim Clayton comments: 'These data add to the growing body of evidence linking respiratory infection with subsequent risk of cardiovascular events. However the absolute risk of such an event to an individual with respiratory infection remains low'.

Dr. Mike Knapton, Director of Prevention and Care at the British Heart Foundation, which funded the study, says: 'We recommend that anyone with heart disease has the flu jab. Influenza is a serious infection, particularly in patients with heart disease such as heart failure, and it could even trigger a heart attack.'

'Flu is a potential killer and heart patients are offered the flu jab for free, no matter what their age. We strongly recommend they take up the offer to give themselves protection against the flu'.

Adapted from materials provided by London School of Hygiene & Tropical Medicine.

<http://www.sciencedaily.com/releases/2007/12/071205190859.htm>

Scientists Issue Bali Climate Change Warning



Dried lake bed. Scientists warn that if immediate action is not taken, many millions of people will be at risk from extreme events such as heat waves, drought, floods and storms, with coasts and cities threatened by rising sea levels, and many ecosystems, plants and animal species in serious danger of extinction. (Credit: iStockphoto/Selahattin Bayram)

ScienceDaily (Dec. 6, 2007) — More than 200 leading climate scientists have warned the United Nations Climate Conference of the need to act immediately to cut greenhouse gas emissions, with a window of only 10-15 years for global emissions to peak and decline, and a goal of at least a 50 per cent reduction by 2050.

The roll-call of top climate researchers includes five University of East Anglia scientists: Prof Corinne Le Quéré (also of the British Antarctic Survey), Prof Andrew Watson, Dr Dorothee Bakker, Dr Erik Buitenhuis and Dr Nathan Gillett.

The signatories warn that if immediate action is not taken, many millions of people will be at risk from extreme events such as heat waves, drought, floods and storms, with coasts and cities threatened by rising sea levels, and many ecosystems, plants and animal species in serious danger of extinction.

The researchers, who include many of the world's most acclaimed climate scientists, have issued the 'Bali Climate Declaration by Scientists' in which they call on government negotiators from the 180 nations represented at the meeting to recognize the urgency of taking action now. They say the world may have as little as 10 years to start reversing the global rise in emissions.

Prof Le Quéré said: "Climate change is unfolding very fast. There is only one option to limit the damages: stabilise the concentration of CO₂ and other greenhouse gases in the atmosphere.

"There is no time to waste. I urge the negotiators in Bali to stand up to the challenge and set strong binding targets for the benefit of the world population."

The Bali Declaration emphasises the current scientific consensus that long-term greenhouse gas concentrations need to be stabilised at a level well below 450ppm CO₂e (450 parts per million measured in carbon dioxide equivalent).

Building on the urgency of the recent Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC) released on 17 November in Valencia, Spain, the declaration calls on governments to reduce emissions "by at least 50 per cent below their 1990 levels by the year 2050".

The Bali Declaration endorses the latest scientific consensus that every effort must be made to keep increases in the globally averaged surface temperature to below 2 degrees C. The scientists say that "to stay below 2 degrees C, global emissions must peak and decline in the next 10 to 15 years".

The critical reductions in global emissions of greenhouse gases and the atmospheric stabilisation target highlighted in the Bali Declaration places a tremendous responsibility on the Bali United Nations Framework Convention on Climate Change.

Negotiations at Bali must start the process of reaching a new global agreement that sets strong and binding targets and includes the vast majority of the nations of the world. The Bali Declaration concludes:

"As scientists, we urge the negotiators to reach an agreement that takes these targets as a minimum requirement for a fair and effective global climate agreement."

Adapted from materials provided by University of East Anglia.

<http://www.sciencedaily.com/releases/2007/12/071206105136.htm>

Generosity May Be Genetically Programmed



The scientists conducted the experiment with 203 online "players". Each player could choose to keep the equivalent of \$12 he was allocated, or to give all or part of it to an anonymous other player. (Credit: iStockphoto)

ScienceDaily (Dec. 6, 2007) — Are those inclined towards generosity genetically programmed to behave that way? A team of researchers, including Dr. Ariel Knafo of the Psychology Department at the Hebrew University of Jerusalem, believes that this could very well be the case.

Through an online task involving making a choice whether or not to give away money, the researchers found that those who chose to give away some or all of their money differed genetically from those involved in the exercise who chose not to give their money away.

The scientists conducted the experiment with 203 online "players". Each player could choose to keep the equivalent of \$12 he was allocated, or to give all or part of it to an anonymous other player.

Those involved also provided DNA samples which were analyzed and compared to their reactions. It was found that those who had certain variants of a gene called AVPR1a gave on average nearly 50 percent more money than those not displaying that variant.

"The experiment provided the first evidence, to my knowledge, for a relationship between DNA variability and real human altruism," said Knafo, who conducted the research along with other researchers, including Prof. R. P. Ebstein, Prof. Gary Bornstein, and Salomon Israel of the Psychology Department at the Hebrew University of Jerusalem. The gene AVPR1a codes for the production of a receptor that enables a hormone, arginine vasopressin, to act on brain cells. Vasopressin, in turn, has been implicated in social bonding. The researchers found greater altruism in players in which a key section of the AVPR1a gene, called its promoter, was longer. The promoter is the region of a gene that allows cellular machinery to bind to it and determine how much gene product is made. In the case of this gene, a longer promoter can result in greater activity.

The findings could help biologists sort out altruism's evolutionary history, according to the scientists. They noted that a version of AVPR1a also exists in rodents called voles, where it also promotes social bonding. This suggests that altruism has a long rooted genetic history, which may have taken on a new role during human evolution. The results of the study were published online recently in the research journal *Genes, Brain and Behavior*.

Adapted from materials provided by Hebrew University of Jerusalem.

<http://www.sciencedaily.com/releases/2007/12/071206100557.htm>

Climate Change Will Significantly Increase Impending Bird Extinctions



By 2100, climate change could cause up to 30 percent of land-bird species to go extinct worldwide. In Costa Rica, toucans normally confined to lower elevations are colonizing mountain forests, where they compete with resident species for food and nesting holes, and prey on the eggs and nestlings of other bird species. (Credit: iStockphoto/Steffen Foerster)

ScienceDaily (Dec. 6, 2007) — Where do you go when you've reached the top of a mountain and you can't go back down?

It's a question increasingly relevant to plants and animals, as their habitats slowly shift to higher elevations, driven by rising temperatures worldwide. The answer, unfortunately, is you can't go anywhere. Habitats shrink to the vanishing point, and species go extinct.

That scenario is likely to be played out repeatedly and at an accelerating rate as the world continues to warm, Stanford researchers say.

By 2100, climate change could cause up to 30 percent of land-bird species to go extinct worldwide, if the worst-case scenario comes to pass. Land birds constitute the vast majority of all bird species.

"Of the land-bird species predicted to go extinct, 79 percent of them are not currently considered threatened with extinction, but many will be if we cannot stop climate change," said Cagan Sekercioglu, a senior research scientist at Stanford and the lead author of a paper detailing the research.

The study is one of the first analyses of extinction rates to incorporate the most recent climate change scenarios set forth earlier this year in the reports of the Intergovernmental Panel on Climate Change (IPCC), which shared the Nobel Peace Prize with Al Gore.

The researchers modeled changes to the elevational limits of the ranges of more than 8,400 species of land birds using 60 scenarios. The scenarios consisted of various combinations of surface warming projections from the 2007 IPCC report, habitat loss estimates from the 2005 Millennium Ecosystem Assessment (an evaluation of the planet's ecosystems by 1,360 experts around the world), and several possibilities of shifts in elevational range limits.

The worst-case scenario of 6.4 degrees Celsius surface warming combined with extensive habitat loss produced the estimate of 30 percent of land bird species going extinct by 2100. Increasing habitat loss exacerbates the effects of climate change because organisms seeking more suitable conditions will be less likely to find intact habitats. Even with an intermediate 2.8 C warming, 400 to 550 land-bird extinctions are expected.

"Vegetational shift is the key issue here," Sekercioglu said. "Birds will follow the shift in habitat."

All plants have certain temperature and precipitation requirements they need to flourish. As lowlands become too warm for some species, higher slopes that were formerly too cool become better suited to their needs, and the distributions of plants slowly move upward. That shifting of populations renders bird species vulnerable to a host of complications.

Topography itself is a major issue. Each bird species is only found between specific elevations, limits based mainly on the temperatures at which it can survive and the presence of the plants, insects and other animals on which it feeds. Temperature decreases as one goes up a mountain, so as the lowlands become warmer, plant and animal communities need to move higher in order to remain in their required microclimates. Most bird species live in the tropics, mostly in lowland environments. In many of these areas, there may be no significantly higher slopes to which they can retreat. But even the presence of hills or mountains does not guarantee the survival of a species.

As one moves upslope, the extent of the area encompassed by a given elevational range almost always decreases. It's a matter of simple geometry. The circumference of a mountain is typically smaller near the summit than at its base, so a range of, say, a hundred vertical meters occupies a far smaller band of area near the top than it does down at the base.

And once the summit of a mountain becomes too hot for a species or its preferred vegetation type, the habitable area is reduced to nothing.

"It's like an escalator to extinction. As a species is forced upwards and its elevational range narrows, the species moves closer to extinction," Sekercioglu said.

In some instances, species can expand their ranges, which the authors also considered in their models. If warming is limited and a species adapts, only the upper limit of a species' elevational range might rise. As warming continues, however, the lower bound is likely to rise, as well.

Additional threats include interactions between the rising temperatures and other environmental factors. For example, as Hawaiian mountains get warmer, mosquitoes carrying avian malaria, to which most native bird species have no immunity, are moving upslope, invading the last refuges of birds already on the brink of extinction. In Costa Rica, toucans normally confined to lower elevations are colonizing mountain forests, where they compete with resident species for food and nesting holes, and prey on the eggs and nestlings of other bird species.

In addition, plant species that currently share a habitat may not all react the same way to temperature and moisture changes. Some species may be forced upslope while others are able to linger behind, tearing apart plant and animal communities even if all the species survive. Differences in soil composition can further disrupt plant communities. If soils at higher elevations are inhospitable to some plant species, those species will be wedged between a fixed upper bound and a rising lower bound until they are squeezed out of existence.

Until now, highland species have been less threatened by habitat loss and hunting, simply because most people live in flat lowlands instead of the steeper highlands. Compared to lowland birds, however, highland species are not only more sensitive to temperature changes, but their populations also are more isolated from each other, as mountains effectively constitute habitat islands surrounded by a sea of hotter lowlands.

The study also has shown that sedentary birds, which comprise over 80 percent of all bird species, are much more likely to go extinct from climate change than are migratory birds. That suggests that many sedentary mountain species currently thought to be safe are actually jeopardized by global warming. All in all, climate change is likely to be especially hard on the hundreds of bird species endemic to tropical mountains.

But in part because of the remoteness of the mountains and in part due to a lack funding for ornithological studies in most tropical countries, there are few data on these birds' responses to climate change. Crucial remote sensing data are also becoming less available, as government satellites like Landsat age and as image distribution moves increasingly to the relatively expensive private sector.

"To effectively monitor the rate of change as warming progresses, especially in the species-rich tropics, we need a lot more data on birds' distributions and on the speed and extent of birds' elevational shifts in response to climate change," Sekercioglu said.

Perhaps the most worrisome finding is that each additional degree of warming will have increasingly devastating effects. The authors estimate that an increase of 1 C from present temperatures will trigger roughly 100 bird extinctions. But if the global average temperature were to rise 5 C, from that point on an additional degree of warming, to 6 C, would be expected to cause 300 to 500 more bird extinctions.

"This emphasizes the importance of any measure that reduces surface warming, even if we cannot stop it altogether," Sekercioglu said. "Even a reduction of 1 degree can make a huge difference."

"Giving up the fight against global warming would be the true disaster," he added.

The research paper is scheduled to be published online in the first week in December in *Conservation Biology*.

Stephen Schneider, the Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies, a senior fellow at Stanford's Woods Institute and a major contributor to the IPCC reports, also was a co-author, along with John Fay and Scott Loarie of Duke University.

The research was funded by the Christensen Fund, the Koret Foundation, the Edward S. Moore Family Foundation and the Winslow Foundation.

Adapted from materials provided by Stanford University.

<http://www.sciencedaily.com/releases/2007/12/071206094116.htm>

Art Basel Miami Beach: Fashion begins its move into the art world

By Guy Trebay

Thursday, December 6, 2007

Fashion is a stepchild, in photography no less than in other areas of the culture. The reach of the imagery it produces influences everything from trash television to presidential campaigns. Yet the slick work cranked out by the fashion machine is rarely taken seriously.

Museums relegate fashion picture shows to their basements. Art galleries disdain fashion photographs as work for hire. Auction houses have historically tended to accord fashion images second-class status, sneaking a few first-rate fashion pictures into sales of photography's certified masters. It's not hard to fathom why friction exists between practitioners of fine art and fashion photography. For every self-styled Cindy Sherman hoping to hit it big in the gallery world, there are scores of competent but doubtless overpaid journeymen (fees of \$100,000 a day are not rare for top fashion photographers) toiling in advertising's lucrative fields.

"For a long time in the quote unquote fine arts world, fashion was a dirty word," said Joshua Holdeman, international director of the photography department at Christie's. "We're far enough away from the work now," he added, referring to the early examples from the canon, "to realize it is a valuable cultural product that belongs in the pantheon of art history."



Signs of this seem to be everywhere. Last January, a show of pictures by five important contemporary fashion photographers was mounted at the National Portrait Gallery in London. Designating 2009 as the Year of Fashion, the International Center of Photography in New York recently announced an ambitious roster of shows celebrating the fashion image, beginning with a survey of contemporary work, moving through a retrospective of fashion images by Edward Steichen and Richard Avedon, and closing with the third ICP Triennial, whose theme will be the cultural ubiquitousness of fashion imagery.

And this week, fashion photography makes its debut at Art Basel Miami Beach, the annual trade fair that is to the art world what the Coachella festival in Southern California is to indie rock. In Fashion '07, an assembly of 20 contemporary photographers brought together by Marion de Beaupre, a curator and author, opened Dec. 2 at the Surfcomber Hotel. Part survey and part marketing trial balloon, the show also tests the premise that the traditional borders between fine and commercial art are now permeable.



"As the market becomes so broad and there are so many people who have the means to collect," fashion pictures have been upgraded both critically and in the marketplace, Holdeman said. "The imagery is easy to approach and accessible in price," he added, although accessible in this case may be a relative term. Prices for images by photographers like Serge Lutens, Max Vadukul and Willy Vanderperre are modest by Art Basel Miami Beach standards (generally under \$10,000). But the Irving Penn platinum print a farseeing collector might have picked up at auction 10 years ago for under \$8,000 would now command \$350,000, Holdeman said.

A paradoxical dimension of the current lively interest in the field is that the innovative spirit and visual daring of the late '90s — when many photographers were mining

their personal lives as well as the weirder byways of pop culture, including pornography, and were also eschewing technological wizardry in favor of raw emotional response — appears to have gone into retreat.

Some in the industry point to the economy and the conservative tenor of most mainstream fashion magazines to explain this development. Some claim that a backlash against images condemned (by Bill Clinton, among others) for glorifying "heroin chic" in the mid-90s resulted in self-chastening throughout the industry.

Many note that the marquee names of the moment were already the establishment a decade ago. Where is the generation that ought by now to have supplanted stars like Jean-Baptiste Mondino, Ellen von Unwerth, Mario Testino or Nick McKnight? Who knows?

"It's obviously a complicated issue," said Dennis Freedman, the creative director of W magazine, perhaps the most visually daring of mainstream American fashion publications. "There are many photographers working today who have a lot to say, who have points of view, who have a voice that's intelligent and considered," he added. "Unfortunately within the fashion world there aren't enough opportunities to create that meaningful work."

True, there was a period within the last decade, said Vince Aletti, a photography critic for The New Yorker and adjunct curator at the International Center of Photography, "when every time I went to look at a fashion magazine, I was psyched." At the moment, he added, "there is not much to jump out of your seat about."

There is little around quite as startling as the "Fight Club" pictorial that Steven Klein photographed for W, in which Brad Pitt posed covered with sweat and grime and so little else that the magazine's caption writers were taxed. There is little that seems so controversial as Klein's pictures of Justin Timberlake, which appeared just after 9/11, images whose borders were singed and whose pretty boy subject was shown with his nose caked in blood.

Even Klein's pictures of a compulsive exhibitionist like Madonna, posed atop a table with her foot behind her head and her crotch thrust toward the viewer, seems to belong to another, more provocative time.

"The entirety of that Madonna sitting was very dark," Aletti said. "And it couldn't have been further from the classicism and clean lines of Beaton and Horst."

Like the 20 photographers whose work is on view in Miami Beach, Klein sometimes gives the impression that he consults fashion history only rarely and cares little or nothing about clothes. This is

illusion, of course, but one that de Beaupre, the curator of In Fashion '07, said helped set terms for a new kind of photographic engagement with the business of selling garments.

With the notable exception of Steven Meisel, whose work mines an obsession with fashion's back pages, most fashion photographers of recent years have made it clear that their concerns lie mainly in "material that has nothing to do with the history of fashion," as Aletti said.

Enmeshed in both fashion's past and the cultural present, Meisel exploits an unabashed affection for fashion's surface obsession while simultaneously devising a sly form of cultural critique. "I don't know whether a term like avant-garde works in this case," Aletti said. "But, like a lot of people over the past few years, Meisel is really trying to do something creative and risky. He's really pushing photography."

Whether or not by intention, he is helping propel fashion photographs in the direction of art and in the process creating an alluring hybrid, one that sometimes supports an aesthetics of glamour and just as often parodies it. "Fashion photography now is not about fashion alone," de Beaupre said. "The material is of interest now because there is this strong creative and personal language," de Beaupre said, "that belongs very much to our times."

<http://www.iht.com/articles/2007/12/06/style/06photo.php>

Unhappy? Self-Critical? Maybe You're Just a Perfectionist

By BENEDICT CAREY

Just about any sports movie, airport paperback or motivational tape delivers a few boilerplate rules for success. Believe in yourself. Don't take no for an answer. Never quit. Don't accept second best.

Above all, be true to yourself.

It's hard to argue with those maxims. They seem self-evident — if not written into the Constitution, then at least part of the cultural water supply that irrigates everything from halftime speeches to corporate lectures to SAT coaching classes.

Yet several recent studies stand as a warning against taking the platitudes of achievement too seriously. The new research focuses on a familiar type, perfectionists, who panic or blow a fuse when things don't turn out just so. The findings not only confirm that such purists are often at risk for mental distress — as Freud, Alfred Adler and countless exasperated parents have long predicted — but also suggest that perfectionism is a valuable lens through which to understand a variety of seemingly unrelated mental difficulties, from depression to compulsive behavior to addiction.

Some researchers divide perfectionists into three types, based on answers to standardized questionnaires: Self-oriented strivers who struggle to live up to their high standards and appear to be at risk of self-critical depression; outwardly focused zealots who expect perfection from others, often ruining relationships; and those desperate to live up to an ideal they're convinced others expect of them, a risk factor for suicidal thinking and eating disorders.

"It's natural for people to want to be perfect in a few things, say in their job — being a good editor or surgeon depends on not making mistakes," said Gordon L. Flett, a psychology professor at York University and an author of many of the studies. "It's when it generalizes to other areas of life, home life, appearance, hobbies, that you begin to see real problems."

Unlike people given psychiatric labels, however, perfectionists neither battle stigma nor consider themselves to be somehow dysfunctional. On the contrary, said Alice Provost, an employee assistance counselor at the University of California, Davis, who recently ran group therapy for staff members struggling with perfectionist impulses. "They're very proud of it," she said. "And the culture highly values and reinforces their attitudes."

Consider a recent study by psychologists at Curtin University of Technology in Australia, who found that the level of "all or nothing" thinking predicted how well perfectionists navigated their lives. The researchers had 252 participants fill out questionnaires rating their level of agreement with 16 statements like "I think of myself as either in control or out of control" and "I either get on very well with people or not at all."

The more strongly participants in the study thought in this either-or fashion, the more likely they were to display the kind of extreme perfectionism that can lead to mental health problems.

In short, these are people who not only swallow many of the maxims for success but take them as absolutes. At some level they know that it's possible to succeed after falling short (build on your mistakes: another boilerplate rule). The trouble is that falling short still reeks of mediocrity; for them, to say otherwise is to spin the result.

Never accept second best. Always be true to yourself.

The burden of perfectionist expectations is all too familiar to anyone who has struggled to kick a bad habit. Break down just once — have one smoke, one single drink — and at best it's a "slip." At worst it's

a relapse, and more often it's a fall off the wagon: failure. And if you've already fallen, well, may as well pour yourself two or three more.

This is why experts have long debated the wisdom of insisting on abstinence as necessary in treating substance abuse. Most rehab clinics are based on this principle: Either you're clean or you're not; there's no safe level of use. This approach has unquestionably worked for millions of addicts, but if the studies of perfectionists are any guide it has undermined the efforts of many others.

Ms. Provost said those in her program at U.C. Davis often displayed symptoms of obsessive-compulsive disorder — another risk for perfectionists. They couldn't bear a messy desk. They found it nearly impossible to leave a job half-done, to do the next day. Some put in ludicrously long hours redoing tasks, chasing an ideal only they could see.

As an experiment, Ms. Provost had members of the group slack off on purpose, against their every instinct. "This was mostly in the context of work," she said, "and they seem like small things, because what some of them considered failure was what most people would consider no big deal."

Leave work on time. Don't arrive early. Take all the breaks allowed. Leave the desk a mess. Allow yourself a set number of tries to finish a job; then turn in what you have.

"And then ask: Did you get punished? Did the university continue to function? Are you happier?" Ms. Provost said. "They were surprised that yes, everything continued to function, and the things they were so worried about weren't that crucial."

The British have a saying that encourages people to show their skills while mocking the universal fear of failure: Do your worst.

If you can't tolerate your worst, at least once in a while, how true to yourself can you be?

<http://www.nytimes.com/2007/12/04/health/04mind.html?em&ex=1197003600&en=7bfaff2e98a5ddda&ei=5087%0A>

Tate's extension gets £50m grant

The Tate Modern's proposals to build a £215m extension have received a £50m boost from the government.



The investment from the Department of Culture, Media and Sport will help fund the 11-floor building, to be built on the south side of the London gallery.

Tate director Nicholas Serota called the grant "an important endorsement by government of the contribution that the arts make to society as a whole".

It is hoped the extension will open in time for the 2012 Olympics in London.

The scheme has already received £7m from the London Development Authority and a £5m donation from banker John Studzinski.

Capital commitment

The development, designed by Swiss architects Herzog and de Meuron, will provide more space for the Tate's collection and help reduce overcrowding.

The 23,000 square metres of space will include areas for contemporary art, several galleries and two performance zones.

The glass construction will be built on the site of the former power station's oil tanks and will require the relocation of an electricity sub-station.

The £50m investment represents the government's largest capital commitment to a cultural project since the British Library, which opened in 1998.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/entertainment/7128551.stm>

Published: 2007/12/05 10:46:02 GMT

Liberty through creativity

Matthew Westwood | December 07, 2007

THE proverb about turning swords into ploughshares aptly describes the work of J. William Fulbright. The US senator, who died in 1995, gave his name to the Fulbright Program of educational exchange.



US Philanthropist Harriet Fulbright in Canberra. Picture: Kym Smith

Since it started in the years after World War II, about 300,000 people from 140 countries have advanced their learning through overseas tertiary study.

The program is funded today through government grants and corporate support. Interesting detail: the funds originally came from the sale of surplus US military stock. The senator's wife, Harriet Mayor Fulbright, visiting Australia this week, says there was a utopianism about Fulbright's vision.

"The reason my husband started the program was a direct result of the hearings that he held in the Senate about the atomic bombs dropped in Hiroshima and Nagasaki," Fulbright says. "He invited a wide range of people: environmentalists, biologists, even psychologists. He was so horrified by what this bomb did, and could do in the future, that he was looking for a way to help prevent world war III."

Fulbright is president of the J. William and Harriet Fulbright Centre, and today she will address the US Studies Centre at the University of Sydney about the role of the arts and humanities in building international understanding. Speaking yesterday by phone from Canberra, where the Australian-American Fulbright Commission is based, she is a persuasive advocate for the civilising influence of the arts in society.

She maintains a strictly nonpartisan stance when discussing the centre's work - although her husband was a prominent Democrat, and she reveals occasional flashes of political colour - and indeed the Fulbright mission is about not seeing the world in terms of dichotomies.

On the subject of public v private sector support for the arts, for example, Fulbright takes an elevated view.

In the 1980s, during the Reagan years, she was executive director of the President's Committee on the Arts and the Humanities, a body charged with encouraging partnerships between the public and private sectors to support the arts. The Australia Business Arts Foundation has a similar remit.

"I was told that one of the reasons (Ronald) Reagan started it was that he wanted to prove that the private sector should take over, that government had no business in (the arts)," she says.

"In no time it was clear to the committee members that the public and private sector really need to work together and that government has a very important role in the arts and humanities.

"And that was under Reagan."

In Australia, arts organisations have been moved to seek private funds in the manner of their counterparts in the US.

The difficulty, it's frequently said, is that Australia does not the same level of private wealth and custom of philanthropy. Fulbright says the issue is not about public v private funds but the advantages to government from investing in creativity.

"One of the things that governments really benefit from is a better understanding and appreciation of their country as a whole, so that when we get together we can talk in civil terms," Fulbright says.

"Populations are often smarter than governments think they are. It's not just that if they don't listen to their constituents they're going to get thrown out of office, which was completely evident here in Australia. People do have a certain amount of wisdom."

Fulbright's studies combined the creative and the political. She studied political theory and comparative government at Radcliffe College, then fine arts at George Washington University, where she specialised in ceramics.

She has been a frequent visitor to Australia and has travelled widely on Fulbright Centre business. There is a family link to Queensland: her grandfather Alpheus Hyatt Mayor was a marine biologist who did important work at the Great Barrier Reef.

The Fulbright Centre is best known for its fellowships for postgraduate and advanced studies. Fulbright is also concerned about the quality and scope of education for people from a young age.

"It's a big subject, but one that is extremely important in today's world," she says.

"We are trying very hard to improve education. And unless we understand exactly what education is, we're not going to do verywell. It's not learning a bunch of facts where you can answer yes or no, or multiple-choice questions."

In her Sydney address, Fulbright will explain that the established educational measures of numeracy and literacy are too limited and that there are other intelligences that we may associate with creativity: visual, kinesthetic, musical and social.

Understanding between people of different cultures, she says, is aided when the tools of communication are not limited to language.

She gives an example from 40 years ago. Living in Moscow, she saw a performance by the visiting New York City Ballet at the Bolshoi Theatre: the Bolshoi Ballet, in turn, was touring the US. The abstract, American style of choreography astonished the Russians, who had not seen such freedom of movement. She says it became a much more powerful way to describe the benefits of individual expression than any lecture.



Fulbright says the arts and humanities should coexist in centres of learning along with the sciences and vocational subjects. But, in the US as elsewhere, courses with economic benefit have been favoured at the expense of the liberal arts.

"When there are budget cuts, the first thing that goes (are) the arts and humanities," she says, adding that enlightened parents are pushing for a rounded education in schools.

"Education is learning how to learn, how to analyse, how to synthesise and understand, how to take what you see in front of you and use it sensibly."

<http://www.theaustralian.news.com.au/story/0,,22882004-16947,00.html>

Publishers find big market for Spanish-language books

By Monica Hatcher

McClatchy Newspapers

Tucson, Arizona | Published: 12.06.2007

A little over a decade ago, Spanish-language books occupied the smallest slice of shelf space at bookstores around the country. They were dusty, overlooked and undervalued, and there were few titles beyond the classics — a little poetry and reference materials, most pertaining to the Spanish language itself.

But the 2000 census and its revelations about the fast-growing Hispanic population sparked renewed interest among U.S. publishing houses in meeting the reading desires of Spanish-speakers. Many who had tried — unsuccessfully — to market books in Spanish in the 1990s supercharged their plans.

Then came Dan Brown's "The Da Vinci Code."

This thriller wrapped in an enigmatic riddle that shakes the foundations of Catholicism not only shot up the international charts but quickly became one of the best-selling translations into Spanish of all time.

While successful Spanish-language titles in the United States typically sell between 15,000 and 20,000 books, more than 300,000 copies of "El Código Da Vinci" were scooped off bookstore shelves across the land, ushering in what some described as a new era for Spanish-language books in America.

"Distributors saw the potential," said Lucia Laratelli, president of Urano Publishing in Miami. The firm's Barcelona, Spain-based parent company, Ediciones Urano, hit the jackpot with its purchase of the book's Spanish publishing rights.

"If we can sell 300,000 copies, the readers are out there," Laratelli said.

Booksellers and publishers agree that the potential of the Spanish-reading market and the market for Spanish-language translations is only now becoming evident.

Even industry veterans are surprised by its scope. The recent explosive success of "El Secreto," the Spanish translation of "The Secret" by Rhonda Byrne, opened eyes. After its June release, the self-help book almost immediately hit the top spot on the charts of *Criticas* magazine — the equivalent of *Publishers Weekly* for Spanish books.

Simon & Schuster's Atria Books has printed more than 245,000 copies in anticipation of a megahit by Spanish-language standards.

Aida Bardales, editor of *Criticas*, said the phenomenon around "The Da Vinci Code" made publishers realize that Hispanic readers in the United States don't live in a publicity vacuum.

"'The Da Vinci Code' confirmed that Spanish-language readers were paying attention to what was going on in the English-language market," Bardales said. Now, publishers are starting to time the release of English and Spanish versions so they coincide. Best-selling translations have helped the book market overall by alerting readers to the broadening selection of Spanish titles available at their local bookstores, Bardales said.

While the major industry groups, including the Association of American Publishers and the American Booksellers Association, don't track the sales of Spanish-language books, evidence of real growth in the Spanish market began about six years ago.

That's when several major U.S. publishers began establishing divisions to cultivate new Hispanic talent and focus on the sale of both Spanish-language books and English books geared for the Hispanic market. Notable were the efforts of HarperCollins, which announced the expansion of its Spanish imprint, Rayo, in 2004, and Atria Books, which established a Spanish publishing program the following year.

About that time, large chain booksellers began hiring Spanish-book buyers to study market demographics and expand their Libros en Español sections.

Foreign-based publishing houses such as Santillana USA, Planeta Publishing and Urano Publishing have begun partnering with smaller Spanish publishers to beef up their portfolios of Spanish-language titles as well.

Publishers from Spain were for many years the only players serving the Hispanic market. But now they are competing with U.S. houses for new authors and translation rights.

"When we started publishing, it was really difficult to get people to take us seriously outside of the independent bookstores," said Marla Norman, U.S. sales director of Planeta Publishing, whose Spanish parent, Grupo Planeta, is that country's largest trade book publisher. "To go mainstream was almost unthinkable."

While foreign-based publishers now must go head-to-head with their heavyweight U.S. counterparts, Norman said their participation has led to bigger market growth overall and is welcome. Last year,



Planeta partnered with HarperCollins to co-publish a list of Spanish titles — including two novels by best-selling Spanish author Carlos Ruiz Zafon, "La Sombra del Viento" and "El Principe de la Niebla" — for publication in the United States.

Profits also are now coming more easily — even for lesser-known titles, Norman said.

"We can start to sell 1,000 copies of a single book and there's some profit, finally," Norman said. "It's gone beyond being a hobby into being a much more interesting business. You can actually create some momentum within the marketing area when you have more people involved and more dollars being invested from a number of different entities."

<http://www.azstarnet.com/sn/accent/214744.php>

'Faster decisions' on green power

Decisions on new renewable energy developments should be made quicker, Energy Minister Jim Mather has said.



Mr Mather said the Scottish Government plans to set a target of nine months for wind and wave power applications to be decided.

He told industry chiefs however that this target would only apply to schemes which would not be put to a public inquiry.

Mr Mather was speaking at the Green Energy Awards in Edinburgh.

He said the government currently dealt with applications without "unnecessary delay", but called for improvements in consent procedures.

'Clear signal'

Mr Mather said: "Our commitment to renewable energy and sustainable economic growth is beyond question.

"We substantially increased Scotland's renewable electricity target to provide 50% of Scottish energy demand from renewables by 2020, with an interim milestone of 31% by 2011.

"These targets send a clear signal about the scale of our renewables ambitions."

Mr Mather said he wanted to see decisions made quicker by improving the quality of applications and ensuring more robust procedures were implemented.

He added: "The message is we need more renewables but not at any price - the best applications are those that take care to resolve environmental and planning concerns in advance.

"I believe we can work to an objective of having applications being determined within nine months where there is no public inquiry."

Mr Mather will be discussing the issue with the Forum for Renewable Energy next week.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/scotland/7131882.stm>

All nations 'need emission goals'

By Richard Black

Environment correspondent, BBC News website

Developing countries will need targets for greenhouse gas emissions, Britain's Trade and Development Minister Gareth Thomas has said.



Rich nations had to lead emissions cuts, he said, but developing countries such as China should have targets too.

Mr Thomas also told BBC News that too little money was available to help poor countries prepare for climate impacts.

Britain will next week launch a major international study to identify the best ways to fund climate adaptation.

I frankly think every developing country has to have clear targets

Gareth Thomas

The minister was speaking to the BBC as representatives of more than 180 countries met in Bali for this year's round of UN climate negotiations.

Britain and its European allies hope the Bali meeting will begin a process that will lead to a further international set of binding targets for emissions cuts to take effect when the current Kyoto Protocol targets expire in 2012.

Developing difficulty

A major sticking point in the UN process has been whether big developing countries such as China, India and Brazil should take on firm commitments.

The US in particular argues that with China's emissions set to overtake and eventually exceed its own, there is little point in making a deal that includes only developed nations.

Others argue that the per-capita emissions of developing countries are still much lower than in the west, and they should not yet take on any commitment that could impair their economic development.

"I frankly think every developing country has to have clear targets," said Mr Thomas.

"Some developing countries who are at a very low stage of development are going to have to be allowed to increase their emissions, while the bigger developing countries draw back on theirs, and developed countries draw back even faster on their carbon emissions."

However, he said developed nations could not escape their primary responsibility for climate change.

"Quite understandably, (developing countries) are looking to developed nations such as ourselves and the US and the rest of the EU to take more of the burden of responsibility, and we in the UK have accepted that we have that role to play."

Adapt and survive

The Bali meeting is also looking at adaptation - assisting developing countries to protect their societies and economies against climate impacts such as hotter growing seasons, drought, floods and disease.

The British and Dutch governments will be announcing a two-year project in six developing countries to research the best ways of funding adaptation.

The research will focus on analysing the resources already available, how much extra donor assistance is needed, ways of drawing in the private sector, and on assessing how much money is needed each year.

"Frankly we don't know the scale of the financial challenge," said Mr Thomas.

"Various estimates have been put forward - anything from \$11bn to \$86bn (£5.5bn to £42bn) has been touted as being necessary."

The idea was endorsed by Oxfam, one of the charities heavily involved in climate adaptation.

"This would be an absolutely vital piece of research that has to be done," a spokesman commented.

"We've previously called for a global audit for adaptation - Oxfam believes the sum needed will be around \$50bn (£25bn) a year.

"But the fact that they're taking adaptation seriously and doing research doesn't mean we should take a breather and wait for the results - people need to start funding adaptation immediately."

Earlier this week, Oxfam, together with other charities and the UN Development Programme, poured scorn on the scale of the global commitment to adaptation funding - "less than Americans spend on suntan lotion each month" and "roughly what Britain spends on flood defences each week" were two of the unflattering comparisons.

Gareth Thomas agreed that the sums available fall well short of what was needed.

"I can understand the frustration," he said.

"[But] I do think we need to get our information right, it will help to shape how we approach the private sector, how we look for innovative financial solutions that involve the private sector in helping to address deforestation, etc."

They key to generating adaptation funds, the government believes, is a global and effective carbon market.



But many economists believe such a market cannot function properly without a global system of emission caps.

The British and Dutch governments will formally launch their research fund during the Bali meeting.

Richard.Black-INTERNET@bbc.co.uk

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/sci/tech/7131530.stm>

Published: 2007/12/06 23:00:38 GMT

Light to shrink computer clusters**Supercomputers may one day be the size of a laptop thanks to research by IBM.**

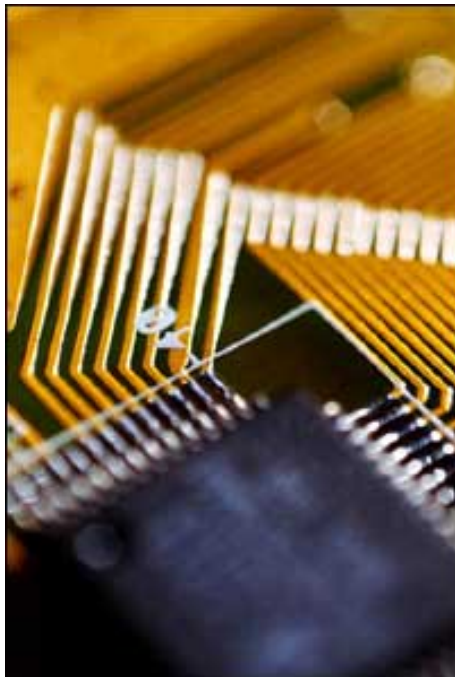
Scientists at IBM have completed work that may make it possible to do away with the copper wires used to couple processing cores to each other.

The connector created by the team uses light to pass data between the computational cores that is faster and uses less power than copper wires.

The device is smaller than previously demonstrated connectors promising to shrink future computational clusters.

The IBM development, reported in the journal *Optics Express*, could replace the copper wires that connect cores with a device that converts electrical signals to pulses of light.

The device, called a silicon Mach-Zehnder electro-optic modulator, is many times smaller than previously produced convertors.



"What we have done is a significant step toward building a vastly smaller and more power-efficient way to connect those cores, in a way nobody has done before," said Dr Tze-chiang Chen, a spokesman for IBM's science and technology research division.

It could also boost the power of coupled computational cores because by using light, the speed at which data travels between the cores would be accelerated.

With light the researchers, led by Dr Will Green, can cut the amount of power needed to move data between processors and slash the amount of heat a large computational cluster produces.

The technology, which can transfer data up to a distance of a few centimetres, is about 100 times faster than wires and consumes one-tenth as much power, said Dr Green.

The lower power requirement should reduce operational costs for supercomputers.

Doing away with some of the cooling systems for computational clusters could shrink the systems further.

So far the team has only demonstrated the technology in a lab and it could be years before it makes its way into commercial chips.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/technology/7130416.stm>

Published: 2007/12/06 11:16:08 GMT

Microsoft trials XP on XO laptop

Microsoft is to begin field tests of Windows XP working on the so-called \$100 laptop, or XO, early in 2008.

It has not committed to offering XP on the XO laptop but hopes to release the operating system in the first half of 2008 if the trials succeed.

The work, undertaken as part of the firm's plans to widen access to technology, forms part of a project to run Windows on flash-based machines.

The XO does not have a hard drive, and uses a lightweight flash drive instead.

Microsoft's James Utzschneider, writing on his blog, said: "We are hard at work on the project here.



"Between Microsoft employees and third party contractors that we have brought into the effort, we have over 40 engineers working full-time on the port."

The XO is the work of the One Laptop Per Child project to boost access to technology in the developing world by building a low-cost laptop designed for educational uses.

It has been pioneered by a not-for-profit group led by Nicholas Negroponte, the founder of the Massachusetts Institute of Technology's Media Lab.

The group has taken its first orders, with 100,000 bought by Uruguay and 40,000 by Peru, with an option for a further 210,000.

The availability of Windows on the XO could boost take-up of the machine. There have been reports that some countries have been cautious about signing-up to the project because it does not run Windows, the world's most popular operating system.

The XO laptop runs Linux, an open source operating system which costs nothing for schools around the world to use.

If schools and governments wanted to use XP on an XO machine, they would have to buy a license.

For Microsoft the challenge in porting XP to the XO machine has been in re-writing many drivers for the operating system that control functions like the laptop's webcam and wireless connections.

The engineers have also had to work to fit the operating system into a much smaller amount of storage.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/technology/7130637.stm>

Published: 2007/12/06 12:05:31 GMT

Laureate attacks poetry teaching

Children's Laureate Michael Rosen has said government literacy policy is having a "disastrous" effect on poetry.



He spoke out after an Ofsted report said poetry was taught well in two-thirds of schools but there was room for improvement.

Inspectors in England found most pupils liked poetry but had only a limited knowledge of classic poems.

Schools often concentrated on preparing children for exams at the expense of teaching poetry, the report said.

The report found poetry teaching in primary and secondary schools was at least satisfactory in all 86 primary and secondary schools visited.

However, the quality of poetry teaching varied greatly and remained "under-developed" in many schools.

This was reflected in the limited range of poems studied and pupils' limited experience of classic poems and poems from other cultures and traditions.

"Although these poems were mostly worth studying, many of them were relatively lightweight and pupils had only limited experience of classic poems and poems from other cultures and traditions," said inspectors.

The effect of Sats and indeed the whole literacy strategy, have to my mind, been disastrous for poetry

Michael Rosen, Children's Laureate

Provision was slightly better in primary schools than in secondary schools.

But many primary teachers did not know enough about poetry and focused on a narrow range of relatively easy works by modern writers, the report found.

Children's experience of poetry suffered, inspectors said, through the "emphasis over recent years on raising standards of basic literacy" and national tests.

"Poetry featured less in the English curriculum in Years 6 and 9 in the schools visited because too many teachers focused on preparing pupils for the tests," said inspectors.

The Children's Laureate has condemned the effect of the government's emphasis on exam results.

Mr Rosen told the BBC News website: "The effect of Sats and indeed the whole literacy strategy, have to my mind, been disastrous for poetry."

"Poetry is either sidelined or subjected to pointless questioning on the supposed 'facts' of a poem and children spend their time counting metaphors and proving what that this or that makes a poem effective.

"Effective for who? The children aren't asked. I welcome the fact that this report goes some of the way to exposing what's going on."

The laureate - who wrote the best-selling children's book "We're going on a bear hunt" - is not alone in criticising government policy.

The National Association for the Teaching of English (Nate) says teachers are under too much pressure to get children through exams.

A 'luxury'

Nate director Ian McNeilly said: "For a teacher under pressure to deliver results there may be precious little time or inclination to study areas which are not for assessment.

"It's depressing that some schools might not be encouraging things like the study of poetry, reading for pleasure and engaging with texts just for fun.

"All education and learning stems from pleasure and the assessment system is choking the fun out of the creative aspects of the teaching of English."

In secondary school, poetry education did not provide a "coherent" preparation for studying English at A-level, the report claimed.

I want to see a generation of young people who know their poetry from Auden to Zephaniah and their sonnets from sestinas
Andrew Adonis, Schools Minister

Teachers also failed to give teenagers the chance to write their own poetry during the GCSE years.

The report said: "Once pupils have embarked on their GCSE course, most teachers feel that there is too little time in a crowded examination timetable for what they perceive as a luxury."

The government has admitted it wants to do more to encourage children to enjoy poetry.

Schools Minister Andrew Adonis said: "Poetry is an essential part of the teaching of English literature and it is embedded in the national curriculum at all key stages.

"It's vital it is taught in an engaging way. Understanding the mechanics of language and being able to express yourself creatively and concisely are really important skills.

"As we made clear when we reviewed the secondary curriculum this year, teachers should embrace but not be confined to the classics.

"There is a myth that poetry is obscure - which teachers can explode by introducing pupils to a broad range of poets, from different eras, styles and cultures.

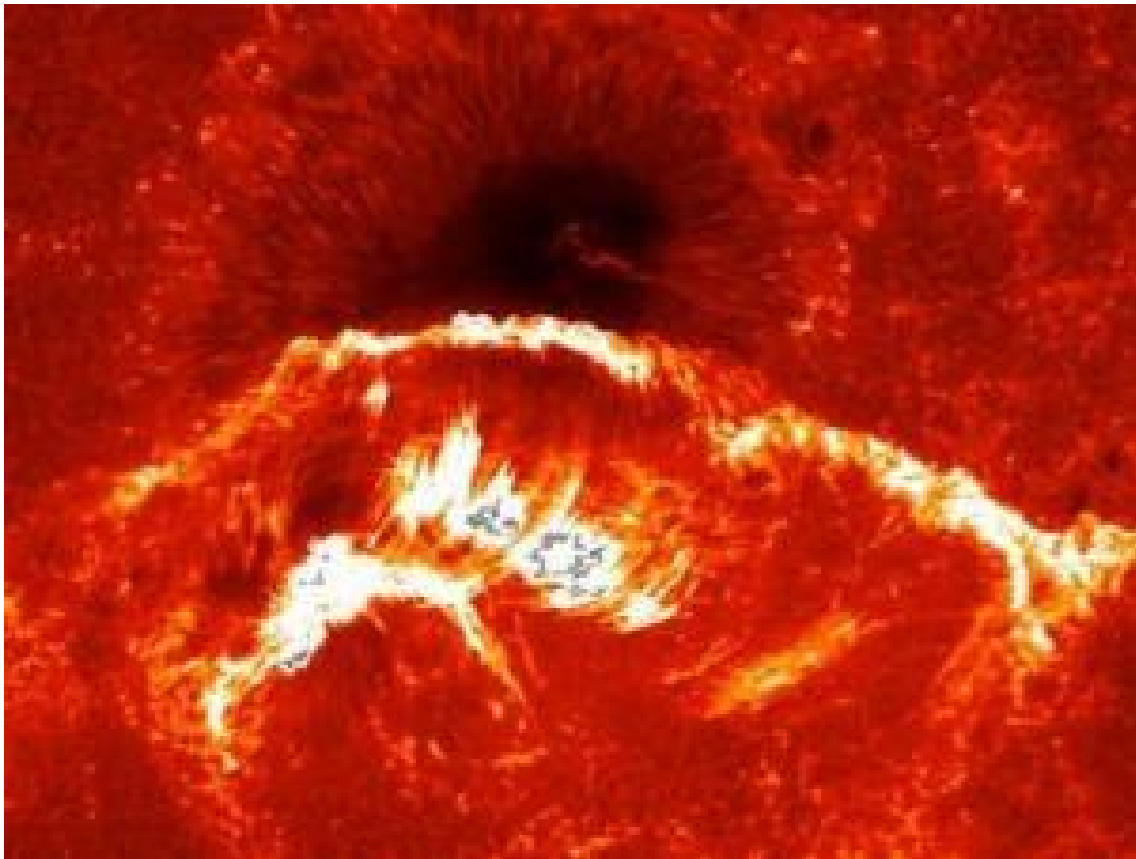
"I want to see a generation of young people who know their poetry from Auden to Zephaniah and their sonnets from sestinas."

Ofsted said the 10 most commonly taught poems in primary schools were:



The Highwayman - Alfred Noyes
On the Ning, Nang, Nong - Spike Milligan
Jabberwocky - Lewis Carroll
The Owl and the Pussycat - Edward Lear
From a Railway Carriage - RL Stevenson
The Listeners - Walter de la Mare
The Magic Box - Kit Wright
The Sound Collector - Roger McGough
Revolting Rhymes - Roald Dahl
Dog in the Playground - Allan Ahlberg
Story from BBC NEWS:
<http://news.bbc.co.uk/go/pr/fr/-/1/hi/education/7131133.stm>

Hinode Reveals New Insights About The Origin Of Solar Wind



Hinode's Solar Optical Telescope (SOT) provides crystal-clear images of features on the sun's surface. This video shows a whirl of a new developing sunspot colliding with an existing spot that explodes into a major solar flare. The solar flare shown in this movie was captured on December 13, 2006. The flare produced high-energy protons that reached the Earth at the time of STS-116 Space Shuttle flight. The flare is shown in 3 different wavelengths. (Credit: Hinode JAXA/NASA)

ScienceDaily (Dec. 7, 2007) — Images from telescopes aboard a Japanese satellite have shed new light about the sun's magnetic field and the origins of solar wind, which disrupts power grids, satellites and communications on Earth.

Many of Hinode's key goals involve understanding the basic physics that operate on the Sun, providing Earth with the heat and energy to sustain life.

The discoveries may also have a practical edge, since eruptions of magnetic energy from the Sun are responsible for "space weather" events that can threaten telecommunications, navigation systems and electric power grids on Earth. A better understanding of these eruptions and of the solar wind, the huge volume of ionized material that the Sun spews into interplanetary space, may help people predict or plan for space weather events.

Data from the Hinode satellite shows that magnetic waves play a critical role in driving the solar wind into space. The solar wind is a stream of electrically charged gas that is propelled away from the sun in all directions at speeds of almost 1 million miles per hour. Better understanding of the solar wind may lead to more accurate prediction of damaging radiation waves before they reach satellites.

How the solar wind is formed and powered has been the subject of debate for decades. Powerful magnetic Alfvén waves in the electrically charged gas near the sun have always been a leading candidate as a force in the formation of solar wind since Alfvén waves in principle can transfer energy from the sun's surface up through its atmosphere, or corona, into the solar wind.

In the solar atmosphere, Alfvén waves are created when convective motions and sound waves push magnetic fields around, or when dynamic processes create electrical currents that allow the magnetic fields to change shape or reconnect.

"Until now, Alfvén waves have been impossible to observe because of limited resolution of available instruments," said Alexei Pevtsov, Hinode program scientist, NASA Headquarters, Washington. "With the help of Hinode, we are now able to see direct evidence of Alfvén waves, which will help us unravel the mystery of how the solar wind is powered."

Using Hinode's high resolution X-ray telescope, a team led by Jonathan Cirtain, a solar physicist at NASA's Marshall Space Flight Center, Huntsville, Ala., was able to peer low into the corona at the sun's poles and observe record numbers of X-ray jets. The jets are fountains of rapidly moving hot plasma. Previous research detected only a few jets daily.

With Hinode's higher sensitivity, Cirtain's team observed an average of 240 jets per day. They conclude that magnetic reconnection, a process where two oppositely charged magnetic fields collide and release energy, is frequently occurring in the low solar corona. This interaction forms both Alfvén waves and the burst of energized plasma in X-ray jets.

"These observations show a clear relationship between magnetic reconnection and Alfvén wave formation in the X-ray jets," said Cirtain. "The large number of jets, coupled with the high speeds of the outflowing plasma, lends further credence to the idea that X-ray jets are a driving force in the creation of the fast solar wind."

Another research team led by Bart De Pontieu, a solar physicist at Lockheed Martin's Solar and Astrophysics Laboratory, Palo Alto, Calif., focused on the sun's chromosphere, the region sandwiched between the solar surface and its corona. Using extremely high-resolution images from Hinode's Solar Optical Telescope, De Pontieu's team found that the chromosphere is riddled with Alfvén waves. When the waves leak into the corona, they are strong enough to power the solar wind.

"We find that most of these Alfvén waves have periods of several minutes, much longer than many theoretical models have assumed in the past," says De Pontieu. Comparisons with advanced computer simulations from the University of Oslo, Norway, indicate that reconnection is not the only source of the Alfvén waves. "The simulations imply that many of the waves occur when the sun's magnetic field is jostled around by convective motions and sound waves in the low atmosphere," continued De Pontieu.

Findings appear in the Dec. 7 issue of the journal *Science*.

Hinode was launched in September 2006 to study the sun's magnetic field and how its explosive energy propagates through the different layers of the solar atmosphere. It is a collaborative mission with NASA and the space agencies of Japan, the United Kingdom, Norway and Europe and Japan's National Astronomical Observatory. Marshall manages science operations and managed the development of the scientific instrumentation provided for the mission by NASA, industry and other federal agencies. The Lockheed Martin Advanced Technology Center, Palo Alto, Calif., is the lead U.S. investigator for the Solar Optical Telescope. The Smithsonian Astrophysical Observatory, Cambridge, Mass. is the lead U.S. investigator for the X-Ray Telescope.

Adapted from materials provided by NASA/Marshall Space Flight Center.

<http://www.sciencedaily.com/releases/2007/12/071206145256.htm>

Adult Cells, Reprogrammed To Embryonic Stem Cell Like State, Treat Sickle-cell Anemia In Mice

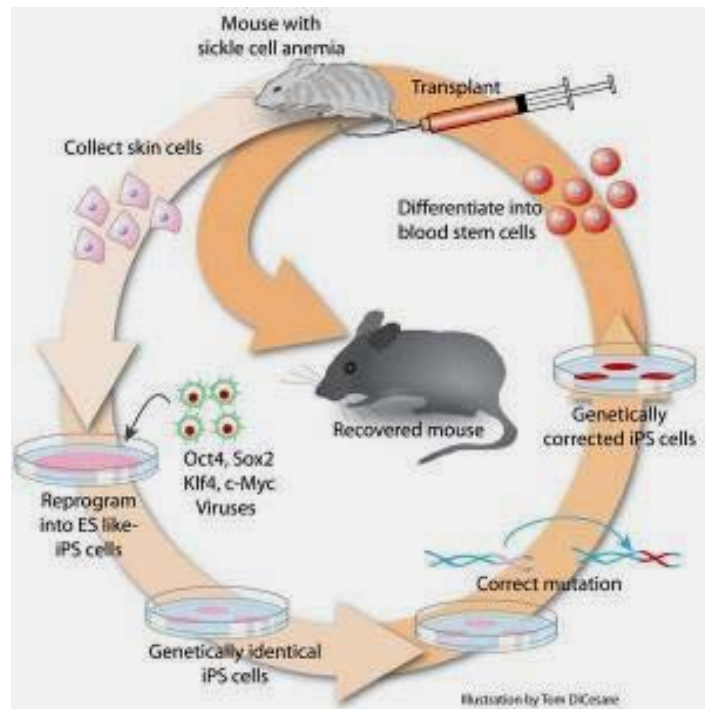


Illustration of research. Mice received reprogrammed cells by tail injections. (Credit: Tom DiCesare)

ScienceDaily (Dec. 7, 2007) — Mice with a human sickle-cell anemia disease trait have been treated successfully in a process that begins by directly reprogramming their own cells to an embryonic-stem-cell-like state, without the use of eggs. This is the first proof-of-principle of therapeutic application in mice of directly reprogrammed "induced pluripotent stem" (IPS) cells, which recently have been derived in mice as well as humans.

The research was carried out in the laboratory of Whitehead Member Rudolf Jaenisch. The IPS cells were derived using modifications of the approach originally discovered in 2006 by the Shinya Yamanaka laboratory at Kyoto University.

Scientists studied a therapeutic application of IPS cells with the sickle-cell anemia mouse developed by the laboratory of Tim Townes of the University of Alabama at Birmingham. Sickle-cell anemia is a disease of the blood marrow caused by a defect in a single gene. The mouse model had been designed to include relevant human genes involved in blood production, including the defective version of that gene.

To create the IPS cells, the scientists started with cells from the skin of the diseased mice, explains lead author* Jacob Hanna, a postdoctoral researcher in the Jaenisch lab. These cells were modified by a standard lab technique employing retroviruses customized to insert genes into the cell's DNA. The inserted genes were Oct4, Sox2, Lif4 and c-Myc, known to act together as master regulators to keep cells in an embryonic-stem-cell-like state. IPS cells were selected based on their morphology and then verified to express gene markers specific to embryonic stem cells. To decrease or eliminate possible cancer in the treated mice, the c-Myc gene was removed by genetic manipulation from the IPS cells.

Next, the researchers followed a well-established protocol for differentiating embryonic stem cells into precursors of bone marrow adult stem cells, which can be transplanted into mice to generate normal blood cells. The scientists created such precursor cells from the IPS cells, replaced the defective blood-production gene in the precursor cells with a normal gene, and injected the resulting cells back into the diseased mice.

The blood of treated mice was tested with standard analyses employed for human patients. The analyses showed that the disease was corrected, with measurements of blood and kidney functions similar to those of normal mice.

"This demonstrates that IPS cells have the same potential for therapy as embryonic stem cells, without the ethical and practical issues raised in creating embryonic stem cells," says Jaenisch.

While IPS cells offer tremendous promise for regenerative medicine, scientists caution that major challenges must be overcome before medical applications can be considered. First among these is to find a better delivery system, since retroviruses bring other changes to the genome that are far too random to let loose in humans. "We need a delivery system that doesn't integrate itself into the genome," says Hanna. "Retroviruses can disrupt genes that should not be disrupted or activate genes that should not be activated."

Potential alternatives include other forms of viruses, synthesized versions of the proteins created by the four master regulator genes that are modified to enter the cell nucleus, and small molecules, Hanna says.

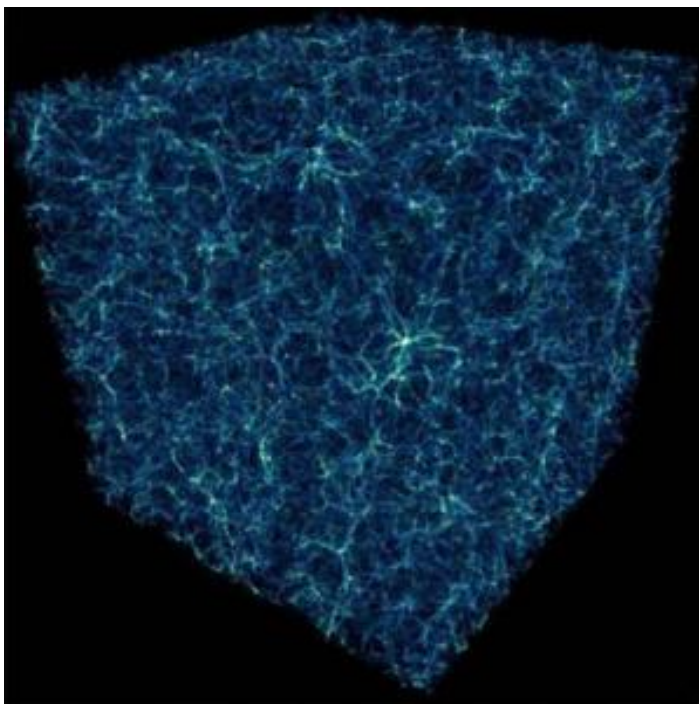
Despite the rapid progress being made with IPS cells, Jaenisch emphasizes that this field is very young, and that it's critical to continue full research on embryonic stem cells as well. "We wouldn't have known anything about IPS cells if we hadn't worked with embryonic stem cells," says Jaenisch. "For the foreseeable future, there will remain a continued need for embryonic stem cells as the crucial assessment tool for measuring the therapeutic potential of IPS cells."

*The research article "Treatment of Sickle-Cell Anemia Mouse Model with iPS Cells Generated from Autologous Skin" was published online in Science Express on December 6, 2007.

Adapted from materials provided by Whitehead Institute for Biomedical Research.

<http://www.sciencedaily.com/releases/2007/12/071206145301.htm>

Supercomputer Simulation Of Universe May Help In Search For Missing Matter



Pictured is a portion of a supercomputer simulation of the universe showing a region roughly 1.5 billion light-years on a side. The bright object in the center is a galaxy cluster about 1 million-billion times the mass of the sun. In between the filaments, which store most of the universe's mass, are giant, spherical voids nearly empty of matter. (Credit: University of Colorado at Boulder)

ScienceDaily (Dec. 7, 2007) — Much of the gaseous mass of the universe is bound up in a tangled web of cosmic filaments that stretch for hundreds of millions of light-years, according to a new supercomputer study by a team led by the University of Colorado at Boulder.

The study indicated a significant portion of the gas is in the filaments -- which connect galaxy clusters -- hidden from direct observation in enormous gas clouds in intergalactic space known as the Warm-Hot Intergalactic Medium, or WHIM, said CU-Boulder Professor Jack Burns of the astrophysical and planetary sciences department. The team performed one of the largest cosmological supercomputer simulations ever, cramming 2.5 percent of the visible universe inside a computer to model a region more than 1.5 billion light-years across. One light-year is equal to about six trillion miles.

It took the researchers nearly a decade to produce the extraordinarily complex computer code that drove the simulation, which incorporated virtually all of the known physical conditions of the universe reaching back in time almost to the Big Bang, said Burns. The simulation -- which uses advanced numerical techniques to zoom-in on interesting structures in the universe -- modeled the motion of matter as it collapsed due to gravity and became dense enough to form cosmic filaments and galaxy structures.

"We see this as a real breakthrough in terms of technology and in scientific advancement," said Burns. "We believe this effort brings us a significant step closer to understanding the fundamental constituents of the universe."

According to the standard cosmological model, the universe consists of about 25 percent dark matter and 70 percent dark energy around 5 percent normal matter, said Burns. Normal matter consists primarily of baryons - hydrogen, helium and heavier elements -- and observations show that about 40

percent of the baryons are currently unaccounted for. Many astrophysicists believe the missing baryons are in the WHIM, Burns said.

"In the coming years, I believe these filaments may be detectable in the WHIM using new state-of-the-art telescopes," said Burns, who along with Hallman is a fellow at CU-Boulder's Center for Astrophysics and Space Astronomy. "We think that as we begin to see these filaments and understand their nature, we will learn more about the missing baryons in the universe."

Two of the key telescopes that astrophysicists will use in their search for the WHIM are the 10-meter South Pole Telescope in Antarctica and the 25-meter Cornell-Caltech Atacama Telescope, or CCAT, being built in Chile's Atacama Desert, Burns said. CU-Boulder scientists are partners in both observatories.

The CCAT telescope will gather radiation from sub-millimeter wavelengths, which are longer than infrared waves but shorter than radio waves. It will enable astronomers to peer back in time to when galaxies first appeared -- just a billion years or so after the Big Bang -- allowing them to probe the infancy of the objects and the process by which they formed, said Burns.

The South Pole Telescope looks at millimeter, sub-millimeter and microwave wavelengths of the spectrum and is used to search for, among other things, cosmic microwave background radiation - the cooled remnants of the Big Bang, said Burns. Researchers hope to use the telescopes to estimate heating of the cosmic background radiation as it travels through the WHIM, using the radiation temperature changes as a tracer of sorts for the massive filaments.

The CU-Boulder-led team ran the computer code for a total of about 500,000 processor hours at two supercomputing centers --the San Diego Supercomputer Center and the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign. The team generated about 60 terabytes of data during the calculations, equivalent to three-to-four times the digital text in all the volumes in the U.S. Library of Congress, said Burns.

Burns said the sophisticated computer code used for the universe simulation is similar in some respects to a code used for complex supercomputer simulations of Earth's atmosphere and climate change, since both investigations focus heavily on fluid dynamics.

A paper on the subject will be published in the Dec. 10 issue of the *Astrophysical Journal*. In addition to Burns, the paper was authored by CU-Boulder Research Associate Eric Hallman of APS, Brian O'Shea of Los Alamos National Laboratory, Michael Norman and Rick Wagner of the University of California, San Diego and Robert Harkness of the San Diego Supercomputing Center.

The *Astrophysical Journal* study was funded by NASA, the National Science Foundation and the U.S. Department of Energy through the Los Alamos National Laboratory.

Adapted from materials provided by University of Colorado at Boulder.

<http://www.sciencedaily.com/releases/2007/12/071206113223.htm>

Chemoprevention, Naturally: Findings On Plant-derived Cancer Medicines



Black raspberries. The next cancer-fighting therapeutic could be growing in your garden. For example, a black raspberry-based gel might offer a means of stopping oral lesions from turning into a particularly dangerous and disfiguring form of cancer. (Credit: iStockphoto/Cathleen Abers-Kimball)

ScienceDaily (Dec. 7, 2007) — The next cancer-fighting therapeutic could be growing in your garden. For example, a black raspberry-based gel might offer a means of stopping oral lesions from turning into a particularly dangerous and disfiguring form of cancer. And new studies show that cancer prevention might come in drinkable form: green tea extract, a powerful antioxidant, shows efficacy against colorectal cancer; and a new berry-rich beverage, made from a combination of known plant-based antioxidants, could prevent or slow the growth of prostate cancer.

That is, according to research presented December 6, at the American Association for Cancer Research's Sixth Annual International Conference on Frontiers in Cancer Prevention Research, being held in Philadelphia, Pennsylvania.

Topically applied black raspberry gel applied on oral premalignant tumors

Oral squamous cell carcinoma is a deadly cancer that, even when treated successfully, often leaves patients permanently disfigured. Other than radical surgery, there are few known treatments. Researchers at Ohio State University, however, report a Phase I/II trial demonstrating that a gel made from black raspberries shows promise in preventing or slowing the malignant transformation of precancerous oral lesions.

"Black raspberries are full of anthocyanins, potent antioxidants that give the berries their rich, dark color, and our findings show these compounds have a role in silencing cancerous cells," said Susan Mallery, D.D.S., Ph.D., professor in the Department of Oral Maxillofacial Surgery and Pathology at Ohio State University's College of Dentistry. "This gel appears to be a valid means of delivering

anthocyanins and other cancer-preventing compounds directly to precancerous cells, since it slowed or reduced lesion progression in about two-thirds of study participants."

According to American Cancer Society statistics, oral cancer is one of the deadliest of all cancers, with about 35,000 new cases each year in the United States and 7,500 deaths annually. These cancers generally begin as small, often unnoticed, lesions inside the mouth. "More than a third of untreated precancerous oral lesions will undergo malignant transformation into squamous cell cancer, but we do not have the capability to predict which lesions will progress," Mallery said.

The National Cancer Institute-funded trial included 30 participants, 20 of whom had identifiable precancerous lesions, and 10 normal controls. Each of the participants was instructed to gently dry the lesion sites (or a pre-selected control site for the normal participants) and rub the gel into the area four times a day, once after each meal and at bedtime.

After six weeks, about 35 percent of the trial participants' lesions showed an improvement in their microscopic diagnosis, while another 45 percent showed that their lesions had stabilized. About 20 percent showed an increase in their lesional microscopic diagnoses. Importantly, none of the participants experienced any side effects from the gel.

"The trial was designed to test the safety of the gel and detect any possible toxicity, but the next obvious step is a multicenter, double-blind, placebo-controlled Phase II study," Mallery said. "Such a study would enable us to determine that the black raspberries are the active factor and not just the gel base or the act of drying and rubbing the lesions."

The researchers also collected cell samples from the lesion sites of each participant before and after treatment in order to study the genetics and biology of the lesions. The majority of patients with precancerous lesions at the start of the trial showed elevated levels of COX-2 and iNOS, two proteins closely correlated with inflammation and malignant progression. Following treatment, Mallery says, levels of those proteins in the treated lesional epithelial cells decreased dramatically.

Mallery and her colleagues also examined samples for three tumor suppressor genes in order to determine what researchers call "loss of heterozygosity," whether or not a cancer cell has lost one of its two copies of the gene. Such loss greatly increases a cell's chances of losing the benefit of the tumor suppressor genes due to a second mutation or gene silencing event. Following the trial, the researchers noted that many lesions returned to normal, retaining both copies of each tumor suppressor gene. "We speculate that the chemopreventive compounds in black raspberries assist in modulating cell growth by promoting programmed cell death or terminal differentiation, two mechanisms that help "reeducate" precancerous cells," Mallery said.

"Oral cancer is a debilitating disease and there is a desperate need for early detection and management of precancerous lesions," Mallery said. "While screening can help detect the disease early -- and survival rates are definitely improved the earlier the disease is caught -- many of these precancerous lesions recur despite complete surgical removal. There are currently no effective chemopreventive treatments which could conceivably serve as either adjunctive or alternative approaches to surgery."

According to Mallery, the development of black raspberries as potential cancer-fighters is the result of decades of research into identification of naturally derived chemopreventive compounds by Ohio State researcher Gary D. Stoner, Ph.D., an emeritus professor at Ohio State University's College of Medicine and Public Health. Clinical studies stemming from his research are currently underway for oral, esophageal and colorectal cancer.

The gel looks deceptively like black raspberry jam, but it certainly does not taste like something you would want to spread on toast, Mallery says. The bioadhesive gel, which contains 10 percent freeze dried black raspberries, is devoid of many of the tasty sugars found in native berries.

The black raspberry gel was manufactured by the University of Kentucky's Good Manufacturing Production (GMP) facility. NanoMed Pharmaceuticals is partnering with OSU investigators Mallery, Stoner and Peter E. Larsen D.D.S. and Russell J. Mumper, Ph.D., of the University of North Carolina, in product development.

Suppressive effects of a phytochemical cocktail on prostate cancer growth in vitro and in vivo

A commercially available nutrition drink reduces the growth of tumors in a mouse model of human prostate cancer by 25 percent in two weeks, according to researchers from the University of Sydney. The drink, Blueberry Punch, is a mixture of plant-based chemicals -- phytochemicals -- known to have anti-cancer properties.

In particular, Blueberry Punch consists of a combination of fruit concentrates (blueberry, red grape, raspberry and elderberry), grape seed and skin extract, citrus skin extracts, green tea extract (EGCG), olive leaf and olive pulp extracts, tarragon, turmeric and ginger.

"We have undertaken efficacy studies on individual components of Blueberry Punch, such as curcumin, resveratrol and EGCG, in the same laboratory setting and found these effective in suppressing cell growth in culture," said Jas Singh, Ph.D., research fellow at the University of Sydney.

"While individual phytochemicals are successful in killing cancer cells, we reasoned that synergistic or additive effects are likely to be achieved when they are combined."

Singh and her colleagues studied the effect of the beverage on both cancer cell cultures and in mouse models that mimic human prostate cancer. After 72 hours of exposure to increasing concentrations of Blueberry Punch, prostate cancer cells showed a dose-dependent reduction in size and viability when compared with untreated cells, Singh says. After feeding mice a 10 percent solution of the punch for two weeks, the tumors in the test mice were 25 percent smaller than those found in mice that drank only tap water.

Because Blueberry Punch is a combination of several ingredients, it could have multiple mechanisms of action, Singh says. "Based on our initial findings, the mechanisms include, at least, the inhibition of the inflammation-related pathways, which is similar to the action of non-steroidal anti-inflammatory drugs; and inhibition of cyclin D1, which is similar to green tea action."

Based on these results, the researchers believe Blueberry Punch is now ready for human prostate cancer trials. Because Blueberry Punch is a food product rather than a drug, it is unlikely to have adverse reactions or side effects assuming that the individual is tolerant to all ingredients, Singh says. "The evidence we have provided suggests that this product could be therapeutic, although it requires clinical validation," Singh said.

The study was partially funded by the makers of Blueberry Punch, Dr. Red Nutraceuticals, a firm located near Brisbane, Australia, but the experiments were designed and conducted independently in the University of Sydney.

Inhibition of colorectal tumorigenesis in azoxymethane (AOM)-treated rats by green tea polyphenols

Elucidating a decade's worth of conflicting studies of the cancer-fighting benefits of green tea, researchers at Rutgers University have conclusively demonstrated that a standardized green tea polyphenol preparation can prevent the growth of colorectal tumors in a rat model of human colorectal cancer.

Results from previous studies using different tea constituents in this particular rat cancer model, which is thought to closely mimic human cancer, had been inconsistent. The researchers believe their findings will pave the way for clinical trials with green tea polyphenols in humans.

"Our findings show that rats fed a diet containing Polyphenon E, a standardized green tea polyphenol preparation, are less than half as likely to develop colon cancer," said Hang Xiao, Ph.D., research associate at the Department of Chemical Biology in Ernest Mario School of Pharmacy of Rutgers University.

According to Xiao, these results are consistent with previously published results by the project's primary investigator, C.S. Yang, Ph.D., professor and chair of the Department of Chemical Biology at Rutgers, which showed that green tea consumption was associated with lower colon cancer rates in Shanghai, China.

Xiao and his colleagues treated two groups of mice with azoxymethane (AOM), a widely used agent that has been shown to generate in rats colorectal tumors that share many characteristics with colorectal cancer in humans, Xiao says. They then split the rats into two groups that were each fed a high fat diet, which the researchers believe closely resembles a Western diet; half received a 0.24 percent solution of Polyphenon E. According to Xiao, the green tea extract contains four major polyphenols, the majority of which (about 65 percent) is EGCG, thought to be the main active ingredient.

"When you account for caloric consumption, 0.24 percent Polyphenon E in diet gave the experimental rats the equivalent of about four to six cups of tea a day," Xiao said. "While I can't make any recommendations for how much green tea people should drink each day, it isn't uncommon for some to drink that much tea."

After 34 weeks, rats that received Polyphenon E developed 55 percent fewer tumors compared to the control rats that did not receive Polyphenon E. Moreover, the tumors were 45 percent smaller in rats treated with green tea extract. Histopathological analysis by his colleague, Xinpei Hao, Ph.D., also showed that the treatment group had significantly lower incidence and number of malignant colon tumors. The researchers could also detect green tea polyphenols in the blood plasma as well as the colorectal mucosa of the rats who received the extract.

Meanwhile, the test rats weighed about five percent less than their control group counterparts, a result Xiao attributes to the ability of the green tea polyphenols to block lipid absorption in the body, which the researchers had previously demonstrated in a mouse model of obesity.

Adapted from materials provided by American Association for Cancer Research.

<http://www.sciencedaily.com/releases/2007/12/071206124856.htm>

Humans Appear Hardwired To Learn By 'Over-Imitation'



Adult retrieves turtle from puzzle box as part of experiment that determined children "over-imitate" adult behavior. (Credit: Yale Department of Psychology)

ScienceDaily (Dec. 6, 2007) — Children learn by imitating adults--so much so that they will rethink how an object works if they observe an adult taking unnecessary steps when using that object, according to a new Yale study.

"Even when you add time pressure, or warn the children not to do the unnecessary actions, they seem unable to avoid reproducing the adult's irrelevant actions," said Derek Lyons, doctoral candidate, developmental psychology, and first author of the study. "They have already incorporated the actions into their idea of how the object works."

Learning by imitation occurs from the simplest preverbal communication to the most complex adult expertise. It is the basis for much of our success as a species, but the benefits are less clear in instances of "over-imitation," where children copy behavior that is not needed, Lyons said.

It has been theorized that children over-imitate just to fit in, or out of habit. The Yale team found in this study that children follow the adults' steps faithfully to the point where they actually change their mind about how an object functions.

The study included three-to-five-year-old children who engaged in a series of exercises. In one exercise, the children could see a dinosaur toy through a clear plastic box. The researcher used a sequence of irrelevant and relevant actions to retrieve the toy, such as tapping the lid of the jar with a feather before unscrewing the lid.

The children then were asked which actions were silly and which were not. They were praised when they pinpointed the actions that had no value in retrieving the toy. The idea was to teach the children that the adult was unreliable and that they should ignore his unnecessary actions.

Later the children watched adults retrieve a toy turtle from a box using needless steps. When asked to do the task themselves, the children over-imitated, despite their prior training to ignore irrelevant actions by the adults.

"What of all of this means," Lyons said, "is that children's ability to imitate can actually lead to confusion when they see an adult doing something in a disorganized or inefficient way. Watching an adult doing something wrong can make it much harder for kids to do it right."

Journal reference: Proceedings of the National Academy of Sciences: online publication week of December 3, 2007 (doi/10.1073/pnas.0704452104)

Co-authors include Andrew Young of the University of Wisconsin-Madison and Frank Keil of Yale, who was the senior author.

Adapted from materials provided by Yale University.

<http://www.sciencedaily.com/releases/2007/12/071205102433.htm>

Fighting Diseases Of Aging By Wasting Energy, Rather Than Dieting -- Works For Mice



By making the skeletal muscles of mice use energy less efficiently, researchers report that they have delayed the animals' deaths and their development of age-related diseases, including vascular disease, obesity, and one form of cancer. Those health benefits, driven by an increased metabolic rate, appear to come without any direct influence on the aging process itself, according to the researchers. (Credit: iStockphoto/Andrei Tchernov)

ScienceDaily (Dec. 6, 2007) — By making the skeletal muscles of mice use energy less efficiently, researchers report that they have delayed the animals' deaths and their development of age-related diseases, including vascular disease, obesity, and one form of cancer. Those health benefits, driven by an increased metabolic rate, appear to come without any direct influence on the aging process itself, according to the researchers.

Metabolism researchers at Washington University School of Medicine in St. Louis have found that although it does not extend maximum lifespan in mice, activating a protein in muscle tissue increases average lifespan and prevents some age-related diseases. The researchers believe a similar approach may someday help people avoid age-related problems such as atherosclerosis, diabetes, hypertension and even some cancers.

"When you make the mitochondria inefficient, the muscles burn more calories," a metabolic increase that could be at least a partial substitute for exercise, said Clay Semenkovich of Washington University School of Medicine in St. Louis. "There are a couple of ways to treat obesity and related diseases," he continued. "You can eat less, but that's unpopular, or you could eat what you want as these animals did and introduce an altered physiology. It's a fundamentally different way of addressing the problem."

Atherosclerosis, diabetes, hypertension, and cancer occur more frequently with increasing age, the researchers explained. These age-related diseases are distinct from the process of aging, a physiological decline that includes decreases in muscle strength, cardiopulmonary function, vision, and hearing as well as wrinkled skin and graying hair. Thus, the researchers added, aging and age-related disease are associated but may not share the same mechanisms.

Given the difficulty of validating strategies to increase life span in humans and the possible dissociation between aging and age-related diseases, the researchers said, identifying a simple intervention affecting several age-related diseases is an attractive approach to decreasing the morbidity of growing old. They suspected that treatments designed to alter the efficiency of mitochondrial respiration might be one way to accomplish this.

In a series of experiments, the research team bred large numbers of mice, fed them a normal chow diet and followed each mouse until its natural death. Half were genetically engineered to make more of a protein in their muscle tissue called uncoupling protein-1. Their littermates did not make excess uncoupling protein. In muscle tissue, uncoupling protein-1 converts the energy from food into heat and mimics the effects of exercise.

Past research conducted in the laboratory of Clay F. Semenkovich, M.D., the Herbert S. Gasser Professor and chief of the Division of Endocrinology, Metabolism and Lipid Research, had found that mice with extra uncoupling protein-1 in muscle tissue are protected from diabetes and obesity.

Because the experiments took so long for this study and involved the breeding and following of so many mice, Semenkovich was joined on the paper by three first authors: Alison C. Gates, Ph.D., a former postdoctoral fellow in the lab now studying at Southern Illinois University Edwardsville; Carlos Bernal-Mazrachi, M.D., assistant professor of medicine and of cell biology and physiology; and Sharon L. Chinault, Ph.D., former postdoctoral fellow and now assistant professor of biology at MacMurray College in Illinois. The findings are published in the December issue of the journal *Cell Metabolism*.

"Uncoupling basically means generating inefficient metabolism," says Semenkovich. "We knew years ago that when mice manufactured uncoupling protein in muscle, they didn't become obese. The next challenge was to see whether the protein would be relevant to some of the major problems that affect humans, namely aging and age-related disease."

The longest-lived animals in each group lived for 39 months and died within two weeks of one another. What was different was the median lifespan for the mice. Median survival in the uncoupled mice was 30 months, compared to 27 months for their wild-type littermates.

"We were a little bit disappointed because we had hoped uncoupling in muscle would slow aging, but maximum lifespan didn't increase," Semenkovich says. "However, the odds of reaching that maximum lifespan did improve in the uncoupled mice."

Semenkovich says the mice with the genetic alteration were more likely to live longer, presumably because they were able to avoid age-related diseases. One result appeared in all of the experiments: Decreasing body fat and inflammation in the animals by accelerating muscle metabolism with uncoupling protein delayed death and diseases, including atherosclerosis, diabetes, hypertension and even cancer.

The researchers examined the mice after each animal died. They were surprised to find that female mice with the uncoupling protein mutation were less likely to develop a type of cancer called lymphoma. None of the genetically engineered females did. No differences in lymphoma rates were found in male mice. Increased uncoupling protein-1 in muscle also reduced markers of chronic inflammation.

In a second set of experiments, the researchers found that the uncoupled mice were less likely to have vascular disease. That was the opposite of what Semenkovich and his colleagues previously had found in mice engineered to overproduce uncoupling protein-1 in the wall of the aorta, the body's primary artery. Rather than being protected from damage, those mice were prone to develop high blood pressure and atherosclerosis.

"Where the uncoupling occurs has a big impact," he says. "If this principle someday becomes a therapy, it will be very important to target the proper tissues to produce the desired effects."

The team also generated a line of mice that made extra uncoupling protein only after the animals received drug therapy. They genetically modified a line of mice that already were prone to become obese. When the researchers gave these animals an antibiotic drug called doxycycline, they

manufactured more uncoupling protein in muscle tissue and reversed their problems with glucose metabolism and hypertension related to their obesity.

Prior to these experiments, the researchers hypothesized that uncoupled mice might experience the type of increased survival seen in animals on calorie restriction. "Here at Washington University, we have Dr. John Holloszy, one of the world's leaders in aging research," Semenkovich says. "Calorie restriction prolongs lifespan in animals, and Dr. Holloszy has elegantly begun to translate caloric restriction studies to humans."

In landmark studies in the 1980s, Holloszy's team also had shown that rodents getting a great deal of exercise tended to live longer, but unlike calorie-restricted rodents, their maximum lifespan did not change. Uncoupled mice, Semenkovich says, resemble the animals that exercised.

"Uncoupling in muscle may be a substitute for exercise," he says. "If that's true in humans, and if uncoupling can be done safely, this could be an important therapy because it's sometimes very difficult to get people to exercise."

Gates AC, Bernal-Mizrachi C, Chinault SL, Feng C, Schneider JG, Coleman T, Malone JP, Townsend RR, Chakravarthy MV, Semenkovich CF. Respiratory uncoupling in skeletal muscle delays death and diminishes age-related disease. *Cell Metabolism*, vol. 6:6, Dec. 5, 2007.
DOI:10.1016/j.cmet.2007.10.010

This research was supported by grants from the National Institutes of Health and the Clinical Nutrition Research Unit, Diabetes Research and Training Center, and Digestive Diseases Research Core Center at Washington University and by a mentor-based postdoctoral fellowship from the American Diabetes Association.

Adapted from materials provided by Washington University School of Medicine.

<http://www.sciencedaily.com/releases/2007/12/071204122007.htm>

Eating More Red And Processed Meats Linked To Greater Risk For Bowel And Lung Cancer, Findings Suggest



In a new study, people whose red meat intake was in the top fifth of the range of intakes recorded in the study had an increased risk of developing colorectal, liver, lung and esophageal cancer when compared to people in the lowest fifth of consumption. (Credit: iStockphoto/Heiko Martin)

ScienceDaily (Dec. 11, 2007) — New findings provide evidence that people who eat a lot of red and processed meats have greater risk of developing bowel and lung cancer than people who eat small quantities. The research by Amanda Cross and colleagues at the US National Cancer Institute is published in the latest issue of PLoS Medicine.

The researchers used data from a large US diet and health study, which began in 1995 and involves nearly half a million men and women aged 50-71. Participants--none of whom had had cancer previously--completed a questionnaire about their dietary habits over the previous year. People whose red meat intake was in the top fifth of the range of intakes recorded in the study had an increased risk of developing colorectal, liver, lung and esophageal cancer when compared to people in the lowest fifth of consumption. People in the highest fifth of processed meat intake had an increased risk of developing colorectal and lung cancer. The incidences of other cancers were largely unaffected by meat intake.

These results provide evidence that people who eat a lot of red and processed meats have greater risk of developing colorectal and lung cancer than people who eat small quantities. They also indicate that a high red meat intake is associated with an increased risk of esophageal and liver cancer and that 1 in 10 colorectal and 1 in 10 lung cancers could be avoided if people reduced their red and processed meat intake to the lowest quintile.

The researchers allowed for factors such as smoking that might have affected cancer incidence, but it remains possible that other life-style factors may have had an influence. The study's definitions of red meat and processed meat overlapped; bacon and ham, for example, were included in both categories. Thus, exactly which type of meat causes which type of cancer remains unclear. Most of the study participants were non-Hispanic white, so these findings may not apply to people with different genetic backgrounds. Nevertheless, they add to the evidence that suggests that decreased consumption of red and processed meats could reduce the incidence of several types of cancer.

In another article in the same issue of PLoS Medicine Anita Koushik and Jeanine Genkinger review the key research on the association between meat intake and cancer risk, including this new study.



Citation: Cross AJ, Leitzmann MF, Gail MH, Hollenbeck AR, Schatzkin A, et al. (2007) A prospective study of red and processed meat intake in relation to cancer risk. PLoS Med 4(12): e325. doi:10.1371/journal.pmed.0040325 (<http://dx.doi.org/10.1371/journal.pmed.0040325>)

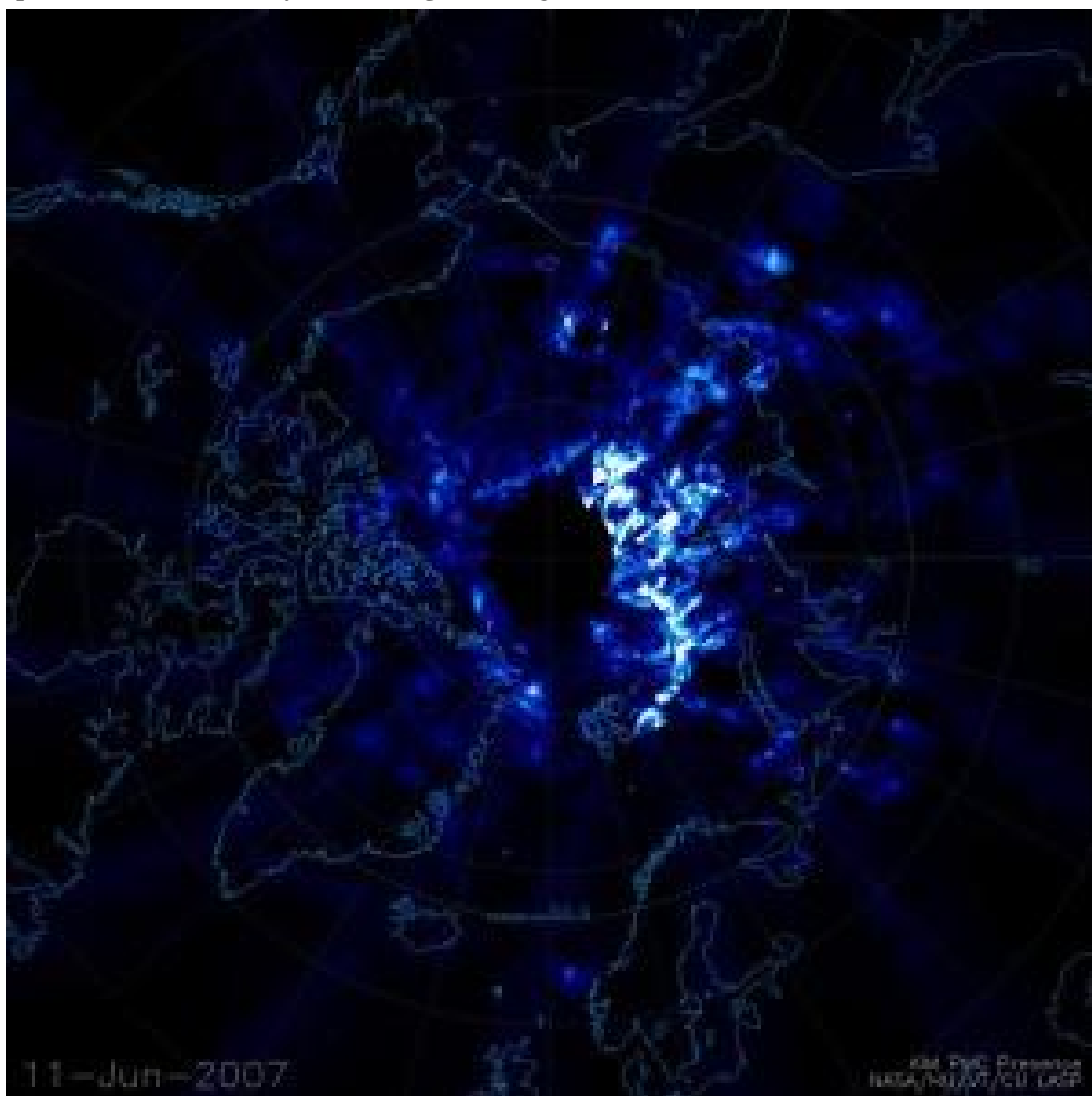
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Citation: Genkinger JM, Koushik A (2007) Meat consumption and cancer risk. PLoS Med 4(12): e345. doi:10.1371/journal.pmed.0040345 (<http://dx.doi.org/10.1371/journal.pmed.0040345>)

Adapted from materials provided by Public Library of Science.

<http://www.sciencedaily.com/releases/2007/12/071210213133.htm>

Unprecedented View Of Mysterious 'Night-shining' Clouds



On June 11, 2007 the cameras on the AIM satellite returned some of the first data documenting noctilucent clouds over the Arctic regions of Europe and North America. This new data reveals the global extent and structure of these mysterious clouds, to a degree that was previously unattainable. White and light blue represent noctilucent cloud structures. Black indicates areas where no data is available. (Credit: Cloud Imaging and Particle Size Experiment data processing team at the University of Colorado Laboratory for Atmospheric and Space Physics)

ScienceDaily (Dec. 11, 2007) — NASA's AIM satellite has provided the first global-scale, full-season view of iridescent polar clouds that form 50 miles above Earth's surface.

The Aeronomy of Ice in the Mesosphere (AIM) mission is the first satellite dedicated to the study of these noctilucent or "night-shining" clouds. They are called "night shining" clouds by observers on the ground because their high altitude allows them to continue reflecting sunlight after the sun has set below the horizon. AIM has provided the first global-scale view of the clouds over the entire 2007 Northern Hemisphere season with an unprecedented horizontal resolution of 3 miles by 3 miles.

Very little is known about these 'clouds at the edge of space', also called Polar Mesospheric Clouds. How do they form over the summer poles, why are they being seen at lower latitudes than ever before, and why have they been growing brighter and more frequent? During its mission lifetime, AIM will

observe a total of two complete polar mesospheric cloud seasons in each polar region, documenting for the first time the entire complex life cycle of Polar Mesospheric Clouds.

"The AIM mission has changed our view of Polar Mesospheric Clouds and their surroundings after only one season of observations," stated AIM Principal Investigator James Russell III of Hampton University, Hampton, Va. "The measurements show the brightest clouds ever observed with more variability and structure than expected, signifying extreme sensitivity to the environment in which the clouds form. They also show that the clouds exist over a broader range in height than was believed to be the case before AIM was launched. The unprecedented sensitivity has revealed for the first time the presence of very small ice particles believed to be responsible for the mysterious radar phenomenon known as "Polar Mesospheric Summertime Echoes".

The bright "night-shining" clouds were seen by the spacecraft's instruments regularly, first appearing on May 25 and lasting until August 25.

The AIM satellite reported daily observations of the clouds at all longitudes and over a broad latitude range extending from 60 degrees North to 85 degrees North. The AIM satellite is currently making the first global observations of the Southern Hemisphere cloud season. The clouds consist of ice crystals formed when water vapor condenses onto dust particles in these coldest regions of our planet, at temperatures that may dip to minus 210 to minus 235 degrees Fahrenheit.

New results from AIM's first Northern Hemisphere season observations show:

1. The most detailed picture of the clouds ever collected showing that they appear every day, they are widespread, and they are highly variable on hourly to daily time scales.
2. That Polar Mesospheric Cloud brightness varies over horizontal scales of about two miles; and over small regions, clouds measured by AIM are ten-fold brighter than measured by previous space-based instruments.
3. The unexpected result that mesospheric ice occurs in one continuous layer extending from below the main peak at 51 miles up to around 55 miles.
4. Observations of a previously suspected, but never before seen, population of very small ice particles believed to be responsible for strong radar echoes from the summertime mesosphere. This was made possible because of the unprecedented sensitivity of the AIM measurements.
5. Polar Mesospheric Cloud structures resolved for the first time that exhibit complex features present in normal tropospheric clouds. This startling similarity suggests that the mesosphere may share some of the same dynamical processes responsible for weather near the surface. If this similarity holds up in further analysis, this opens up an entirely different view of potential mechanisms that can explain why the clouds form and how they vary.

The new results were produced by David Rusch and the Cloud Imaging and Particle Size experiment team, University of Colorado, Laboratory for Atmospheric and Space physics (result 1, 2 and 5); and Larry Gordley and Mark Hervig and the Solar Occultation for Ice Experiment team, Gats, Inc., Newport News, Va. (results 3 and 4).

AIM is a NASA-funded Small Explorers mission managed by the Explorers Program Office at Goddard Space Flight Center, Greenbelt, Md.

Adapted from materials provided by NASA/Goddard Space Flight Center.

<http://www.sciencedaily.com/releases/2007/12/071210112002.htm>

Abdominal Fat Distribution Predicts Heart Disease, Study Shows



Abdominal obesity is a strong independent risk factor for heart disease, and using the waist-hip ratio rather than waist measurement alone is a better predictor of heart disease risk among men and women, researchers report. (Credit: iStockphoto/Jennifer Sheets)

ScienceDaily (Dec. 11, 2007) — Abdominal obesity is a strong independent risk factor for heart disease, and using the waist-hip ratio rather than waist measurement alone is a better predictor of heart disease risk among men and women, researchers reported in a study published in *Circulation: Journal of the American Heart Association*.

In the study, researchers also looked at whether the association between fat distribution and heart disease risk was independent of body mass index (BMI), which assesses body weight relative to height, as well as other heart disease risk factors, such as high blood pressure and high cholesterol.

"The size of the hips seems to predict a protective effect," said Dexter Canoy, M.Phil., M.D., Ph.D., lead author of the study and a research fellow in epidemiology and public health at the University of Manchester in the United Kingdom. "In other words, a big waist with comparably big hips does not appear to be as worrisome as a big waist with small hips."

The research was based on 24,508 men and women ages 45 to 79 in the United Kingdom who participated in the European Prospective Investigation into Cancer cohort study (EPIC-Norfolk) which is based at the University of Cambridge in the UK. Researchers measured participants' weight, height, waist circumference, hip circumference and other heart disease risk factors from 1993 to 1997. They then followed up with participants for an average 9.1 years.

During the follow-up, 1,708 men and 892 women developed coronary heart disease. When they divided the men and women into five groups, according to waist-hip ratio, researchers found that those with the highest waist-to-hip ratio had the highest heart disease risk. Among the findings:

- Men in the top one-fifth of the distribution (those with the biggest waists in relation to their hips) had a 55 percent higher risk of developing coronary heart disease compared to men in the bottom one-fifth of the distribution (those with the smallest waists in relation to their hips).
- Women in the top one-fifth, or the highest waist-to-hip ratio group, were 91 percent more likely to develop heart disease than women with the smallest waists in relation to their hips.
- Waist-only measurements underestimated heart disease risk by 10 percent to 18 percent when compared to risk estimates for waist measurements when hip is considered (waist-to-hip ratio).

- When waist-only, body mass index and coronary heart disease risk factors are considered, for every 6.4 centimeter (cm) increase in hip circumference in men and for every 9.2 cm hip circumference increase in women, there is a 20 percent lower risk for developing heart disease.

The study's results are definitive for predicting risk in relatively healthy men and women in the general population, Canoy said. More research is needed on whether abdominal fat distribution is an independent risk factor for heart disease among people who have chronic and other diseases at baseline.

"People whose abdominal fat puts them at higher risk for heart disease do not always appear overweight or obese," Canoy said. "However, the overriding message from this and other studies about heart disease risk is that, despite the different measures and risk estimates, the bottom line is that many of us need to lose excess weight. Doctors should start looking beyond weight, height, simple waist circumference and BMI to assess heart disease. A simple waist-hip ratio measurement is a strong predictor of heart disease."

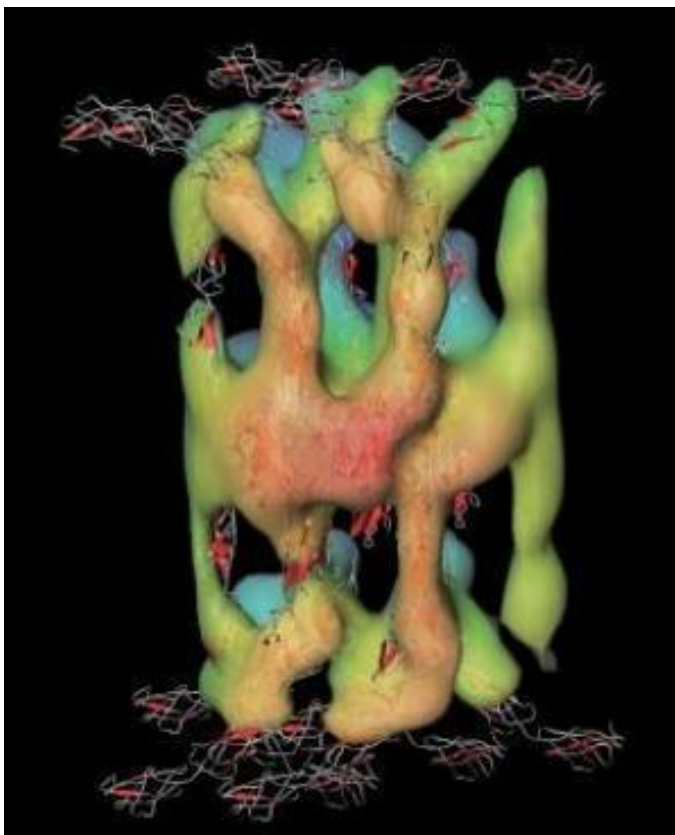
The EPIC-Norfolk study is funded by the Cancer Research UK, Medical Research Council, Stroke Association, British Heart Foundation, Department of Health, Europe against Cancer Programme Commission of the European Union, Food Standards Agency and Wellcome Trust. Canoy was funded by Cambridge Commonwealth Trust/Cambridge Overseas Trust and Christ's College.

Canoy worked with collaborators from Cambridge University. Co-authors are: S. Matthijs Boekholdt, M.D., Ph.D.; Nicholas Wareham, M.B.B.S., FRCP; Robert Luben, B.Sc.; Ailsa Welch, Ph.D.; Sheila Bingham, Ph.D.; Iain Buchan, M.D., F.F.P.H.; Nicholas Day, Ph.D., F.R.S.; and Kay-Tee Khaw, M.B.B.Chir., FRCP.

Adapted from materials provided by American Heart Association.

<http://www.sciencedaily.com/releases/2007/12/071210163211.htm>

Closest Look Ever At Native Human Tissue



3-D visualization of interacting cadherin molecules in their native arrangement. Known molecular structures of cadherins (grey and red ribbons) are fit into the electron tomogram (multicolour) of the complex. (Credit: Achilleas Frangakis, EMBL)

ScienceDaily (Dec. 10, 2007) — Seeing proteins in their natural environment and interactions inside cells has been a long-standing goal. Using an advanced microscopy technique called cryo-electron tomography, researchers from the European Molecular Biology Laboratory [EMBL] have visualised proteins responsible for cell-cell contacts for the first time. In this week's issue of *Nature* they publish the first 3D image of human skin at molecular resolution and reveal the molecular Velcro-like organisation that interlinks cells.

"This is a real breakthrough in two respects," says Achilleas Frangakis, group leader at EMBL. "Never before has it been possible to look in three dimensions at a tissue so close to its native state at such a high resolution. We can now see details at the scale of a few millionths of a millimetre. In this way we have gained a new view on the interactions of molecules that underlie cell adhesion in tissues -- a mechanism that has been disputed over decades."

So far, the only information available about a protein's position and interactions in a cell was based on either light microscopy images at poor resolution or techniques that remove proteins from their natural context. Frangakis and his group have been developing a technique called cryo-electron tomography, with which a cell or tissue is instantly frozen in its natural state and then examined with an electron micro-scope.

Electron microscopy normally requires tissue to be treated with chemicals or coated in metal, a procedure that disturbs the natural state of a sample. With cryo-electron tomography, images are taken of the untreated sample from different directions and assembled into an accurate 3D image by a computer.

The researchers applied this technique to observe proteins that are crucial for the integrity of tissues and organs like the skin and the heart, but also play an important role in cell proliferation. These proteins, called cadherins, are anchored in cell membranes and interact with each other to bring cells close together and interlink them tightly.

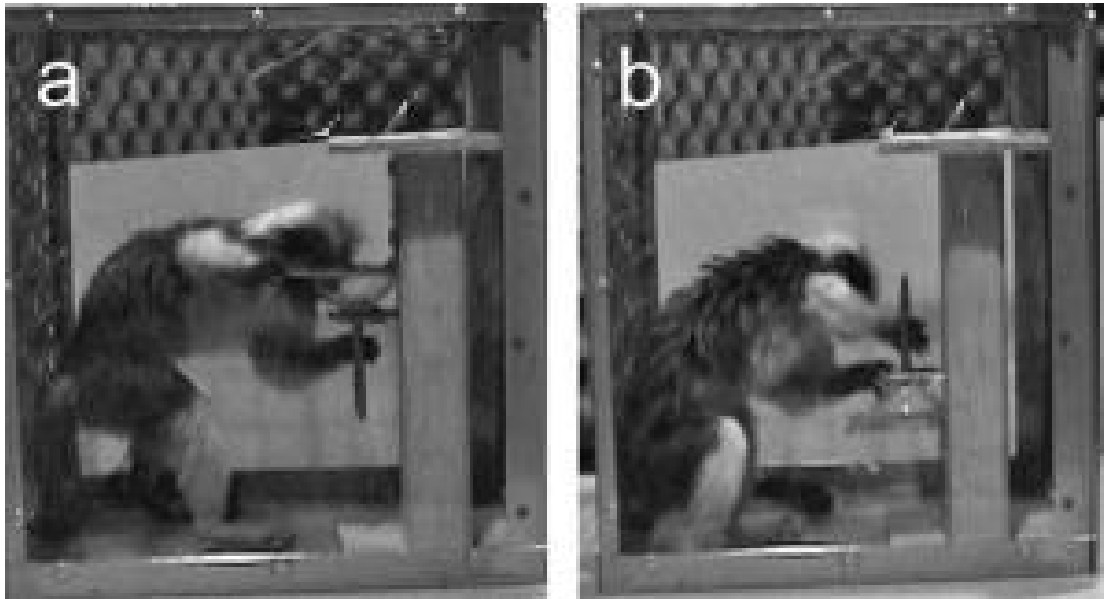
"We could see the interaction between two cadherins directly, and this revealed where the strength of human skin comes from," says Ashraf Al-Amoudi, who carried out the work in Frangakis' lab. "The trick is that each cadherin binds twice: once to a molecule from the juxtaposed cell, and once to its next-door neighbour. The system works a bit like specialised Velcro and establishes very tight contacts between cells."

The new insights into the cadherin system broadens the understanding of structural aspects of cell adhesion and shed light on other crucial processes such as cell proliferation. The technical advances achieved in cryo-electron tomography of frozen sections open up new possibilities to study more systems at native conditions with molecular resolution.

Adapted from materials provided by European Molecular Biology Laboratory.

<http://www.sciencedaily.com/releases/2007/12/071205122549.htm>

Like Humans, Monkey See, Monkey Plan, Monkey Do



A tamarin grasping the stem of a plastic champagne glass to pull the glass from the apparatus in order to extract a marshmallow stuck inside the glass. In (a), the monkey exhibits the thumb-up grasp orientation, and in (b), the monkey exhibits the thumb-down grasp orientation. (Credit: Dan Weiss, Pennsylvania State University)

ScienceDaily (Dec. 10, 2007) — How many times a day do you grab objects such as a pencil or a cup? We perform these tasks without thinking, however the motor planning necessary to grasp an object is quite complex. The way human adults grasp objects is typically influenced more by their knowledge of what they intend to do with the objects than the objects' immediate appearance. Psychologists call this the “end-state comfort effect,” when we adopt initially unusual, and perhaps uncomfortable, postures to make it easier to actually use an object.

For example, waiters will pick up an inverted glass with their thumb pointing down if they plan to pour water into the glass. While grabbing thumb-down may feel awkward at first, it allows the waiter to be more comfortable when the glass is turned over and water poured inside.

Does this occur because motor planning abilities were crucial in facilitating the evolution of complex tool use in humans? If so, then we might predict that only humans would show this ability. Or perhaps this ability would be evidenced in humans and other tool-using species. The way to test this hypothesis, then, is to test whether this is something that other animals, non-tool users, would do.

Pennsylvania State University psychologists, Dan Weiss, Jason Wark, and David Rosenbaum decided to see if cotton-top tamarins (non-tool users) would show the end-state comfort effect. In the first experiment, Weiss and colleagues presented the monkeys with a small cup containing a marshmallow. The cup was either suspended upright or upside down. Would these monkeys, a non-tool using species, adopt an unusual grasping pattern while removing the cup from the apparatus to retrieve the marshmallow?

The results, which appear in the December issue of *Psychological Science*, a journal of the Association for Psychological Science, are fascinating. The monkeys grabbed the inverted cup with their thumb pointing down, thereby behaving much like human adults. In the second experiment, the monkeys were confronted with a new handle shape and still displayed grasps that were consistent with end-state comfort.



This research is the first to provide evidence for more sophisticated motor planning than has previously been attributed to a nonhuman species. The authors suggest that formulating relatively long-term motor plans is a necessary but not sufficient condition for tool use. “Our results may be taken to suggest that the reason tamarins don’t use tools in the wild is not that they lack the ability to plan ahead, but rather that the scope of their planning is limited,” say the researchers.

Adapted from materials provided by Association for Psychological Science.

<http://www.sciencedaily.com/releases/2007/12/071206102256.htm>

Brazil deforestation slows again

By Gary Duffy
BBC News, Sao Paulo

Deforestation in the Amazon rainforest fell by 20% between August 2006 and July 2007, according to interim figures released by the Brazilian government.



It is the third year in a row that there has been a fall.

Brazil's President Luiz Inacio Lula da Silva said the new figures were good, but felt Brazil could have done more.

Environmental groups said the government is celebrating a past achievement when it knows the rate of deforestation is on the increase again.

Enormous challenge

While the Brazilian government views the fall in deforestation as encouraging news, there is a general recognition that protecting the Amazon is an enormous challenge.

Initial figures show that between August 2006 and July 2007, just over 11,000 sq km (4,250 sq m) of forest was destroyed, equivalent to the size of the island of Jamaica.

The estimate was based on 90% of the satellite images available for that period and the final result will be available early next year.

Deforestation has now fallen for the last three years, but this is a reduction from the near record levels reached in 2004.

Earlier this week, a report from the environmental group the Worldwide Fund for Nature warned that a combination of climate change and deforestation could destroy or severely damage 55% of the Amazon rainforest by 2030.



And another environmental organisation - Greenpeace - says the government is celebrating an achievement from the past and that more recent satellite images suggest deforestation is starting to rise again.

Some analysts had already warned that recent falls in deforestation could be explained by a drop in market prices for products such as soya and meat and that once these rose again, land clearance would start to increase.

The government says measures it has taken, such as creating conservation areas and increasing land inspections, have also made a difference.

There seems little doubt that the next year will be a major test of whether the right strategy is in place to protect the Amazon rainforest.

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/1/hi/world/americas/7133957.stm>

Published: 2007/12/08 02:42:33 GMT

Ancient polar bear jawbone found

By Jonathan Amos

Science reporter, BBC News, San Francisco



What may be the oldest known remains of a polar bear have been uncovered on the Svalbard archipelago in the Arctic.

The jawbone was pulled from sediments that suggest the specimen is perhaps 110,000 or 130,000 years old.

Professor Olafur Ingolfsson from the University of Iceland says tests show it was an adult, possibly a female.

The find is a surprise because polar bears are a relatively new species, with one study claiming they evolved less than 100,000 years ago.

If the Svalbard jawbone's status is confirmed, and further discoveries can show the iconic Arctic beasts have a deeper evolutionary heritage, then the outlook for the animals may be more positive than some believe.

Age 'confidence'

"We have this specimen that confirms the polar bear was a morphologically distinct species at least 100,000 years ago, and this basically means that the polar bear has already survived one interglacial period," explained Professor Ingolfsson.

POLAR BEAR (URSUS MARITIMUS)

Largest of five living bear species of *Ursus* genus

Brown bear (*U. arctos*) is nearest evolutionary cousin

Two species able to produce fertile hybrid offspring

Highly specialised predator of seals - but will take other prey

Global population of polar bears may number 20-25,000

Most recent IUCN Red List status: Vulnerable

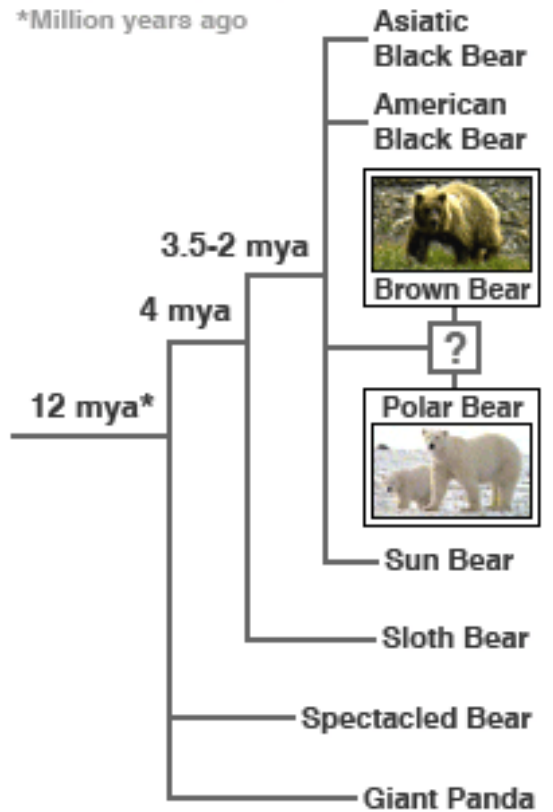
Previous oldest recovered remains are about 70,000 years old

"And what's interesting about that is that the Eemian - the last interglacial - was much warmer than the Holocene (the present).

"This is telling us that despite the ongoing warming in the Arctic today, maybe we don't have to be quite so worried about the polar bear. That would be very encouraging."

POLAR BEAR ORIGINS

*Million years ago



SOURCE: Modified from Waits et al. 1999

The jawbone's discovery is being presented here in San Francisco at the American Geophysical Union (AGU) Fall Meeting.

The specimen was found at Poolepynten on Prins Karls Forland, a narrow strip of land on the far west of the archipelago.

The sediments there are well-described, and record at least two glaciations sandwiched with marine sequences. In other words, they record periods when Poolepynten was alternately covered by ice and water.

These periods are understood in good detail by Professor Ingolfsson's team, so although direct dating at the dig site gives an age range for the bone of 80-140,000 years ago, the group is confident the specimen can be placed at the upper end of this scale.

London detour

The 23cm-long bone itself retains some critical details that have helped identify it.

"It is very well-preserved," Professor Ingolfsson told BBC News.

"We can measure various parameters, such as the cheek-teeth row-length, and the size of the hole made by the third molar - which is very characteristic of polar bears. We've compared all this, both to fossil and recent materials, and there's no question it's a polar bear." They speculate it was a female bear.

Researchers have studied the DNA of modern polar bears to try to gauge when the Arctic animals separated from brown bears, their nearest evolutionary cousins.

Different models have variously put the radiation as near as 70,000 years ago and as distant as 1-1.5 million years ago. One of the problems has been in finding the ancient specimens to put alongside, and constrain, these genetic estimates.

Until recently, one of the oldest polar bear specimens was thought to be British - a 70,000-year-old animal found at Kew Bridge in London.

The presumption was that the creature lived at a lower latitude during a period when ice sheets were more extensive.

But scientists are now confident the Kew animal was in fact a brown bear.

"It's a huge bear; it's a runner - a hunting bear," said Andy Curren, a palaeontologist from London's Natural History Museum. "It's got some of the features of a polar bear, but it's undoubtedly a brown bear.

"With something like polar bears, to make an identification you've got to have a skull or a lower jaw - they've got very reduced teeth, rather surprisingly, and you've got to see that. So I was interested to learn that [Ingolfsson's group] has that."

Hidden Arctic

Building up a more detailed picture of the ancient history of polar bears will be challenging, though. The animals spend much of their lives out on the ice, and when they die their remains are likely to be scavenged by other creatures or fall to the bottom of the Arctic Ocean. Finds will continue to be extremely rare.

Concern over the bears' future status centres on the observations of shrinking ice in what is a rapidly warming Arctic. The ice provides a platform from which to hunt ringed, and other, seals. If the ice is diminished and the bears cannot adapt quickly, many of them may be squeezed out of their ecological niche.



Professor Ingolfsson is hopeful the bears will cope - and believes the palaeo-record will offer some reassurance.

"The polar bear is basically a brown bear that decided some time ago that it would be easier to feed on seals on the ice. So long as there are seals, there are going to be polar bears. I think the threat to the polar bears is much more to do with pollution, the build up of heavy metals in the Arctic.

"This is just how I interpret it. But this is science - when you have little data, you have lots of freedom."

The team, which includes Professor Oystein Wiig from the University of Oslo, Norway, will develop its research on the Svalbard specimen by trying to extract DNA.

Jonathan.Amos-INTERNET@bbc.co.uk

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7132220.stm>

Published: 2007/12/10 17:19:21 GMT

Antibiotics 'could help slow MS'

Adding antibiotics to standard drug therapy may slow down the progress of multiple sclerosis, research suggests.



Patients showed fewer symptoms, and fewer signs of tissue damage when they took the antibiotic doxycycline alongside the MS drug beta interferon.

Louisiana State University researchers believe the antibiotic may block the action of enzyme that destroy certain cells in the nervous system.

Archives of Neurology reports the study involving 15 patients on its website.

However, UK experts warned the study was small, and no comparison was made with patients who did not take doxycycline.

Antibiotics are cheap and easily available, which would make them an attractive treatment for MS if they were shown to be beneficial

Dr Laura Bell
MS Society

The 15 patients who took part in the study all had relapsing-remitting MS - the most common form of the disease.

Typically, this causes attacks of symptoms such as muscle weakness and spasms, followed by periods of remission.

The attacks result from damage inflicted on the body by its own immune system, which turns in on itself, attacking the nervous tissue.

It is thought that these attacks may be triggered by an inappropriate response to viral or bacterial infections, or another potentially disease-causing agent.

They are certainly very unpredictable, and symptoms come and go, often seemingly randomly.

Many patients with relapsing-remitting MS take the drug interferon, which helps to suppress the immune system, and keep it working more normally.

However, they are still prone to attacks which cause damage to the tissue of the brain.

Brain scans

The study focused on patients who had been taking interferon for at least six months, and who were still experiencing symptoms, and developing new tissue damage in the brain.

For four months the patients took 100mg a day of doxycycline alongside their regular dose of interferon.

At the end of this period brain scans revealed that brain tissue damage was reduced by at least 25% in nine of the patients.

There were also signs that disability levels had improved.

The researchers believe that doxycycline, a member of the tetracycline family of antibiotics, may block an enzyme which destroys nerve cells, thus protecting the brain and increasing the effectiveness of the immune system.

Dr Laura Bell, of the MS Society, said: "Antibiotics are cheap and easily available, which would make them an attractive treatment for MS if they were shown to be beneficial.

"However this study is very early stage in only 15 people with MS and no firm conclusions can be drawn at this stage."

Chris Jones, chief executive of the MS Trust, agreed that the study was small, and had only covered a short period of time.

"A longer trial with more people will be needed before we can properly gauge the value of this combination for people with MS."

Helen Yates, of the MS Resource Centre, said the condition was complex and difficult.

She said other work was examining the possibility that MS was linked to an infection of the bacterium *Chlamydia pneumoniae* - more commonly associated with respiratory disease - in the brain.

"The growing interest in combination therapies is producing some good results, in particular for those people for whom single therapies have not worked."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7136088.stm>

Published: 2007/12/11 00:08:43 GMT

Warning on anti-drinking adverts

Some anti-drinking advertising campaigns may backfire by inadvertently glamorising the habit, say researchers.



The study, led by the University of Bath, said focusing on idiotic behaviour carried out when drunk may be "catastrophically misconceived".

The researchers warned that young people might see such behaviour as a way to assert their social identity.

Drinking stories also deepened bonds of friendship and cemented membership of a peer group, they said.

Tales of alcohol-related mishaps and escapades were key markers of young peoples' social identity

Professor Christine Griffin
University of Bath

The Bath team found adverts which show drunken incidents - such as being thrown out of a nightclub, or passing out in a doorway - are often seen by young people as being typical of a "fun" night out, rather than as a cautionary tale.

Whilst these adverts - such as drinks manufacturer Diageo's "The Choice Is Yours" campaign - imply that being very drunk with friends carries a penalty of social disapproval, for many young people the opposite is often the case.

Lead researcher Professor Christine Griffin said: "Extreme inebriation is often seen as a source of personal esteem and social affirmation amongst young people.

"Our detailed research interviews revealed that tales of alcohol-related mishaps and escapades were key markers of young peoples' social identity."

Rethink required

Professor Griffin added that being the subject of an extreme drinking story could raise esteem among a peer group.

Professor Chris Hackley, from Royal Holloway, University of London, also worked on the study.

He said: "Inebriation within the friendship group is often part of a social bonding ritual that is viewed positively and linked with fun, friendship and good times, although some young people can be the target of humiliating or risky activities.

"This suggests that anti-drinking advertising campaigns that target this kind of behaviour may be catastrophically misconceived."

The research, funded by the Economic & Social Research Council, involved in-depth interviews with 94 young people in three UK regions over a period of three years.

Professor Hackley said: "The study suggests a radical rethinking of national alcohol policy is required which takes into account the social character of alcohol consumption and the identity implications for young people."

Professor Isabelle Szmigin, from the University of Birmingham, who also worked on the study, said many young people were aware that drinking too much could damage their health.

However, few saw this as more than a short-term problem.

Frank Soodeen, of the charity Alcohol Concern, said: "Binge drinking is often treated as nothing more than a source of amusing anecdotes.

"Research into the area suggests that for young people, messages have to be very hard-hitting to have a chance of working, with more reference to physical safety than lost social prestige."

Diageo said it had carried out extensive research to ensure its campaign would resonate strongly with young people, and was confident they would have a positive effect.

"Our research showed that young adults were much more likely to consider drinking responsibly if they believed that by drinking excessively they would be in danger of losing their social credibility and standing - precisely the message our campaigns convey."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7132749.stm>

Published: 2007/12/10 00:04:15 GMT

Brain 'irrelevance filter' found

Scientists believe they have located a new brain area essential for good memory - the "irrelevance filter".



People who are good at remembering things, even with distractions, have more activity in the basal ganglia on brain scans, the Swedish team found.

The work in Nature Neuroscience could help explain why some people are better at remembering things than others.

Clinically, it could also aid the understanding of attention deficit hyperactivity disorder (ADHD).

The ability to hold information in the mind so that it is immediately accessible is known as working memory.

We use working memory all of the time - for example, when doing a simple maths calculation in our head or recalling a telephone number.

There will be many brain regions that filter irrelevant information, so it is too early to tell if these findings will have a bearing on conditions such as ADHD

John Duncan

Medical Research Council scientist

Working memory is important because it gives a mental workspace in which we can hold information whilst mentally engaged in other relevant tasks, which is crucial for learning.

Its capacity is limited and seems to vary from person to person.

These variations are not just due to having a larger or smaller memory store, but also due to differences in how effectively irrelevant items are kept out of memory, the Karolinska Institute researchers believe.

Distracters

Dr Torkel Klingberg and colleague Fiona McNab used a special brain scan called functional magnetic resonance imaging (fMRI) to track what was happening in the brains of 25 healthy volunteers.

The volunteers were asked to perform a computer-based task that required them to respond to target visual images, with or without distractions.

A noise informed subjects when an upcoming visual display would contain irrelevant distracters along with the targets.

When this cue occurred, neural activity increased in the basal ganglia and the prefrontal cortex before the visual display appeared, suggesting the brain was preparing to "filter out" the upcoming distracters.

Also, greater activity in a specific part of the basal ganglia - the globus pallidus - correlated with less unnecessary storage in another part of the brain, the posterior parietal cortex, which is sensitive to the amount of information held in memory.

The team is currently investigating methods of improving attention and working memory in children with ADHD and monitoring any changes with fMRI.

Medical Research Council scientist John Duncan said: "This is very interesting work and gives a window on important parts of the brain.

"The basal ganglia are very strong candidates for involvement in brain disorders where people have difficulty with attentional control.

"But there will be many brain regions that filter irrelevant information, so it is too early to tell if these findings will have a bearing on conditions such as ADHD."

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/health/7132829.stm>

Published: 2007/12/10 00:04:05 GMT

<http://news.bbc.co.uk/2/hi/health/7132829.stm>

Catch cuts 'bring bigger profits'

By Richard Black

Environment correspondent, BBC News website

Fishermen would make even more money than previously thought if they let depleted stocks rebuild, according to research from Australia and the US.

When fish are more plentiful it becomes easier and cheaper to catch them.

Now researchers have shown how bigger stocks would bring bigger profits for those in the industry.

Writing in the journal *Science*, they report that Australia is to start managing some of its fisheries this way from the beginning of next year.

The publication comes a couple of weeks before European fisheries ministers meet to decide 2008 quotas for many species, including the severely depleted cod.

We're saying 'if you reduce the harvest now, you'll actually be better off'

Quentin Grafton

"This is what some people may have suspected before, but we're the first to actually show the result," said research leader Quentin Grafton from the Australian National University (ANU) in Canberra.

"As soon as you start saying 'we're going to reduce the harvest', fishermen say 'you're going to make us worse off'; but we're saying 'if you reduce the harvest now, you'll actually be better off'."

Less is more

Traditional fisheries management centres around a concept known as Maximum Sustainable Yield (MSY) - the highest catches that can be taken year after year without running stocks down.

Many fisheries authorities that claim to aim for MSY are failing to achieve their target. The UN calculates that 75% of commercial fisheries globally are exploited either up to or beyond their sustainable limits.

While MSY management might yield the biggest catches, Professor Grafton's team calculated that fishermen would earn more if they kept stocks at a higher level, which they have named Maximum Economic Yield (MEY).

Story from BBC NEWS:

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/7127761.stm>

Published: 2007/12/07 11:58:08 GMT

Audain endows National Gallery post to bring first-nations art to forefront

MARSHA LEDERMAN

From Wednesday's Globe and Mail

December 12, 2007 at 4:46 AM EST

VANCOUVER — A \$2-million donation by Vancouver philanthropist Michael Audain to endow an Indigenous Art Curatorial Chair at the National Gallery of Canada was motivated by his desire to see indigenous artists' work in mainstream settings - and not just in galleries specializing in aboriginal art. "I think it acknowledges that they're amongst the most illustrious artists in the country and they deserve to be judged and to be enjoyed in those environments," he said.

The donation, announced yesterday, establishes the Audain Curator of Indigenous Art - a role filled by Greg Hill, an artist himself, who was appointed curator and head of the department of indigenous art in August. "This is an endowment so that sense of permanence I think really transmits to the idea of indigenous art at the gallery," Hill said.

The endowment will enable the Ottawa gallery to collect more contemporary works of indigenous art - a key objective of Audain's.

Emerging from a meeting yesterday in which the National Gallery acquired five drawings by Norval Morrisseau, who died last week (the acquisition was unrelated to Morrisseau's death), Hill said the gallery has been "really active and really committed" to expanding its indigenous art collection, which currently stands at nearly 1,600 works (the vast majority of which are works of Inuit art).

In the past two years, the department has spent close to \$1-million on the acquisition of nearly 100 works for the collection. Just last week, Hill finalized two major acquisitions: Robert Davidson's *Supernatural Eye* (2007) and Kent Monkman's *Triumph of Mischief* (2007). Both works were purchased from the artists.

Audain, who grew up on the West Coast, says his own exposure to aboriginal art early in his life helped to foster a love of visual arts and an appreciation for the natural environment. He is now a key figure in visual arts philanthropy - since the Audain Foundation was established 10 years ago, it has handed out grants to 35 organizations for projects related to the visual arts.

This is Audain's second \$2-million donation to the National Gallery; last year, the gallery created the Audain Endowment for Contemporary Canadian Art. Audain also serves on the National Gallery's board of trustees. The donation was scheduled to be announced last week, but was delayed by Morrisseau's passing. It's a sad coincidence, which also carries meaning, Hill said. "Norval Morrisseau has cleared a path that I'm walking on now in terms of bringing his art and Anishnabe art out to the viewing public, out to the gallery world, being one of those very first artists to do that and really blazing a trail in that way."

<http://www.theglobeandmail.com/servlet/story/RTGAM.20071212.wdonation12/BNStory/Entertainment/home>

Anonymous painting attributed to Caravaggio

Artwork contains signs of Baroque master's trademarks, experts agree



ROME - A casual glance at an auction catalog set a British art historian on the path to discovering the brushstrokes of Caravaggio on a painting previously attributed to an anonymous follower of the Baroque master.

Experts in Italy believe a copy of Caravaggio's "The Cardsharps" which surfaced at a London auction last year is an earlier version of the 1594 painting now displayed at the Kimbell Art Museum in Fort Worth, Texas.

The previously anonymous work was bought at a Sotheby's auction in December 2006 by art historian and collector Denis Mahon and will be first displayed to the public in the Sicilian city of Trapani at a Caravaggio exhibit starting Saturday, organizers said.

Mahon was at a restaurant when he spotted a painting attributed to a Caravaggio follower in a catalog and quickly linked it to the already known "Cardsharps," said Mina Gregori, an Italian art historian who worked with the British expert to verify his initial hunch.

"It was intuition or a stroke of genius," Gregori told The Associated Press in a telephone interview.

Mahon was struck by the fact that the work belonged to a private collection that had previously sold an original Caravaggio, she said.

Maurizio Marini, another Caravaggio expert who has studied the newly found painting, said the work is true to Caravaggio's style, and X-rays have confirmed it is an original by revealing the lead-laced sketch that was drawn to outline the painting.

An analysis of the paint has also come up with traces of very fine sand, another trademark of the artist, he said.

‘Ultimate proof’

“The Cardsharps” is an early work by Caravaggio and shows a young, fresh-faced page being tricked at a card game by two cheaters. The scene is typical of Caravaggio’s revolutionary style of depicting realistic characters and images found in everyday life.

Gregori said she was convinced that the London painting was a Caravaggio when she noticed that the face of one of the cheats, though partly covered by the page’s hat, had still been sketched out in detail by the artist before being painted over.

“That’s the ultimate proof,” she said. “A copycat doesn’t do that.”

Officials at the Kimbell Museum welcomed the discovery.

“We are fascinated to hear of this development and look forward to the scholarly debate that will surely ensue,” acting director Malcolm Warner said in an e-mail.

While the two works were painted only a few months apart, there are important differences highlighting the rapid evolution of Caravaggio’s style, Marini and Gregori said.

The earlier version is brighter and leaves more empty space around the characters, while the Fort Worth painting changes the perspective and focuses on the figures, achieving a dramatic effect through Caravaggio’s signature “chiaroscuro” technique, which uses the interplay of light and shadow.

The surfacing of the earlier version also resolves a long-standing debate in the art world over whether Caravaggio, like other masters of his time, sometimes painted the same thing twice, Marini said.

The Fort Worth painting — commissioned by Caravaggio’s patron, Cardinal Francesco Del Monte — is rendered with expensive colors and bears the coat of arms of the prelate’s family on the collar of the young page. By contrast, the earlier version, painted when Caravaggio had just reached Rome at the start of his career, is made with cheaper materials and was probably intended to be sold to the general public.

“This confirms that when necessary, he would replicate his own works,” Marini said. “Artists, too, need to eat three times a day.”

Gregori said Mahon bought the painting in London for \$100,000 and plans to donate it to the Ashmolean Museum in Oxford. She said the work would have fetched a much higher price had it been known it was by Caravaggio, but she declined to give a figure.

Michelangelo Merisi da Caravaggio (1571-1610) was the prototype of the fast-living, outlaw artist, frequently involved in brawls and in trouble with the law. His starkly realist approach to biblical subjects and bold shafts of illumination remain influential.

Forced to flee Rome in 1606 after killing a man in a duel, Caravaggio spent the last years of his life between Naples, Malta and Sicily. The exhibit in Trapani, which runs through March 14, will commemorate the 400th anniversary of the artist’s stay on the island.

<http://www.msnbc.msn.com/id/22205901/>

A painless way to make kids buzz off?

MARY RODHAM

The idea is superficially attractive. Devices that emit a high-pitched and annoying sound, which can be heard only by people under the age of 20, are being used to disperse groups of youths deemed to be "anti-social". Adults, untroubled by the noise, are subsequently soon untroubled by young people either, it is claimed.

However, the use of such devices is almost completely unregulated and children's rights campaigners object to them on the grounds that they are indiscriminate - affecting well-behaved and misbehaving young people alike, not to mention infants and babies who may be unable even to object.

Since its release in October 2006, the device - called a Mosquito ultrasonic youth deterrent, by the company that sells it - has proven to be extremely popular south of the border. Almost 3300 security systems were bought within 18 months of their launch. Around 70% of those were installed in the UK, mostly in England and spread around almost every region in the country.

They work because a condition known as "presbycusis" or "age-related hearing loss" means that following their teenage years, most people's ability to hear sounds at frequencies of 18 to 20 kilohertz begins to deteriorate then disappear, according to the system's manufacturer, Compound Security Systems.

The firm says the Mosquito can be activated to make groups of young people who are judged to be a threatening presence on street corners or outside shops, move on of their own accord. It was invented by entrepreneur Howard Stapleton, who claimed to have been inspired when his daughter was bullied by a group of youths outside shops near their home in Merthyr Tydfil.

Now Scotland's commissioner for children and young people, Kathleen Marshall, wants to find out how widely the device's use has spread in Scotland and warns against "zapping" children indiscriminately.

"These devices are discriminatory because they target only young people," she said. "The Mosquito mentality is about zapping young people, moving them on and not addressing what the issues are."

She also argues that it helps reinforce an unhelpful and inaccurate perception of young people in some sections of the community: "I think there are much better ways of engaging young people rather than having this attitude of getting them out of the way. Young people don't want to be identified as trouble merely because of the fact of their existence."

Marshall highlights the fact that the effects of these devices are not limited to teenagers but will also be heard by babies, very young children and young people with disabilities. "What about autistic children, who will react particularly badly, or children with visual impairments who rely on their hearing?" she said.

When Marshall learned that Grampian Police were planning to install a Mosquito device in Banff, she wrote to the Chief Constable of the force, Colin McKerracher, expressing her concerns.

McKerracher wrote back, saying that Grampian had decided against deploying the units in the town, describing their use as "disproportionate".

It is difficult to know how many of the devices are already in use here however - as enquiries by The Herald Society have demonstrated.

They are known to have been used or to be in use in other parts of Aberdeenshire, Glasgow, Renfrewshire and Fife and one is even being under consideration in Orkney. And while popular with some police forces, they can be installed by individuals, shopping centres and other businesses. Unlike dispersal orders, Asbos and other deterrents to anti-social behaviour, the police do not have ultimate control over when and where the Mosquito is used.

Local authorities are often unclear about the extent of their use. Phil Walker, managing director of Glasgow Community Safety and Services, confirmed that the devices have been installed in the city, but would not be specific about their locations.

He said: "Mosquito devices have been used in Glasgow, to disrupt and disperse anti-social behaviour in specific and appropriate areas only, for example, where young people congregate and commit acts of anti-social behaviour.

"GCSS themselves have not deployed them but have given advice on deployment to some of our partners."

A spokesperson for Strathclyde Police also confirmed that a device was being used at a chemist shop in Crawfoot in the city.

Two primary schools in Aberdeenshire - Lochpots School in Fraserburgh and Newburgh Mathers School - got the devices in the hope they would stop pupils and other children from climbing on school roofs. A spokesman for Aberdeenshire Council said: "It was agreed that the Mosquito deterrent would provide a safe and cost-effective tool to discourage pupils and youths from climbing on school roofs to ensure their personal safety and to reduce the damage to the buildings that such intrusions caused." However, both devices are believed to have been deactivated.

Renfrewshire Council also tested the device but decided against its use as a permanent fixture. A spokesman said: "It was installed for three weeks at Paisley Town Hall to see if it would have any effect on youths hanging about outside. There were occasions when staff switched on the system, that youths appeared to move away a short time later. Having said that, it was the middle of winter so perhaps they were just moving on anyway.

"We'd keep an open mind about using the system again but have no plans to do so at present."

In her bid to find out how many devices have already been installed, Marshall has been in touch with local councils, police authorities and supermarkets. She has had a mixed response from major supermarket chains. Both Sainsbury's and the Co-op have told her they have no plans to use them, but Somerfield, which already has devices in some English stores, is considering one for Glasgow.

Human Rights campaigners Liberty have also been vocal in their opposition to the use of Mosquitoes. The organisation's director, Shami Chakrabarti, described them as "at worst, a low-level sonic weapon and, at best, a dog-whistle for kids". Chakrabarti added: "Either way, it has no place in a civilised society that values its children and young people and seeks to imbue them with values of dignity and respect. Degrading young people instead of providing opportunities for them is a tragic option whose long-term effect is frightening to imagine."

Paula Evans, policy and parliamentary officer at Children in Scotland, said: "This type of dispersal mechanism affects children of all ages, from infants to young people. It contravenes their right to assemble and to socialise under article 15 of the United Nations Convention on the Rights of the Child. It also fails to address the underlying problem of a shortage, within communities across Scotland, of suitable places for children and young people to meet socially and a shortage of recreational facilities for children and young people to use.

"The same money would be more wisely spent if it were invested in the community to better meet the needs and rights of children and young people instead of simply moving the problem on'."



But a spokesman for Compound Security Systems denied that there are legal or human rights concerns about the use of the devices. "We have thoroughly tested the Mosquito and have gone to extraordinary lengths to ensure that there are no such valid concerns," Si Morris said.

He added: "We have consulted with the National Autism Society and they are quite happy with the product."

Although some autistic people can react badly to sudden loud noises it is a small number and the noise made by a Mosquito is neither loud nor sudden, Morris argued: "There are significantly more autistic people who react badly when confronted with groups of people they do not know."

Morris also said the device was not designed to be left on continuously so should only be used when a property owner perceived a problem with loitering.

12:04am Tuesday 11th December 2007

http://www.theherald.co.uk/features/features/display.var.1894856.0.a_painless_way_to_make_kids_buzz_off.php