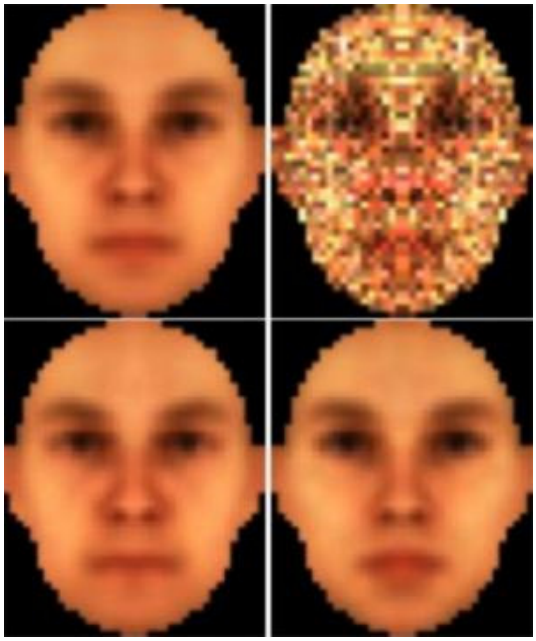
Men Are Red, Women Are Green, Brown Researcher Finds

Michael J. Tarr, professor of cognitive and linguistic sciences at Brown University, has discovered a difference in skin tone associated with gender. His paper, "Gender Recognition of Human Faces Using Color," is to be published online this week in the journal Psychological Science. It may have have wide implications for research and industry.

PROVIDENCE, R.I. [Brown University] - Men are red. Women are green.



Michael J. Tarr, a Brown University scientist, and graduate student Adrian Nestor have discovered this color difference in an analysis of dozens of faces. They determined that men tend to have more reddish skin and greenish skin is more common for women.

The finding has important implications in cognitive science research, such as the study of face perception. But the information also has a number of potential industry or consumer applications in areas such as facial recognition technology, advertising, and studies of how and why women apply makeup.

"Color information is very robust and useful for telling a man from a woman," said Tarr, the Sidney A. and Dorothea Doctors Fox Professor of Ophthalmology and Visual Sciences and professor of cognitive and linguistic sciences at Brown. "It's a demonstration that color can be useful in visual object recognition."

Tarr said the idea that color may help us to identify objects better has been controversial. But, he said, his and related findings show that color can nonetheless provide useful information.

Male or female? Test subjects tended to confirm subtle color differences associated with gender. Even when viewing pixelated or distorted images, subjects identified redder images as male and greener images as female. Top left: gender-ambiguous face; top-right: random noise over the ambiguous face; bottom-left: reconstructed male face; bottom-right: reconstructed female face. **Credit: Michael J. Tarr/Brown University**

Tarr and Nestor's research is reported in the journal Psychological Science. The paper will be published online Dec. 8 and in print a few weeks later.

To conduct the study, Tarr needed plenty of faces. His lab analyzed about 200 images of Caucasian male and female faces (100 of each gender) compiled in a data bank at the Max Planck Institute in Tübingen, Germany, photographed using a 3-D scanner under the same lighting conditions and with no makeup. He then used a MatLab program to analyze the amount of red and green pigment in the faces. Additionally, Tarr and his lab relied on a large number of other faces photographed under similar controlled conditions. (Tarr has made them available on his web site, www.tarrlab.org.)

What he found: Men proved to have more red in their faces and women have more green, contrary to prior assumptions.

"If it is on the more red end of the spectrum (the face) had a higher probability of being male. Conversely, if it is on the green end of the spectrum (the face) had a higher probability of being female," Tarr said.

To test the concept further, Nestor and Tarr used an androgynous image compiled from the average of the 200 initial faces. Trial by trial, they randomly clouded the face with "visual noise" that either included more red or green. The "noise" was not unlike static that can appear on a television screen with no signal.

Subjects were then asked to decide on the gender of the image, using nothing more than the random shape and color patterns over the sexually ambiguous face as a guide. Tarr describes the effect as a "superstitious hallucination," similar to being in the shower and hearing the doorbell or telephone even when neither rings.

Three Brown University students participated in the experiment for pay, and they all had normal or corrected vision with no color blindness. Each observer handled about 20,000 trials spread across 10 one-hour sessions.

Once the study was complete, the images identified by subjects as male or female were divided into two piles according to gender. Each pile of images was then analyzed to determine the average color content across various locations in the images. Across much of both sets of face images, Nestor and Tarr found that the "male" piles were redder and the "female" piles greener.

Such differences are not absolute - some women's faces are much redder and some men's faces are much greener - but overall, across this and related studies, Tarr has determined that observers use the color of a face when trying to identify its gender. That is particularly true when the shape of the given face is ambiguous or hidden.

Another study found, for example, that observers are quite sensitive to the color of faces when the facial images are blurred to the point where the face shape is almost impossible to see.

Ongoing funding from the National Science Foundation and the Temporal Dynamics of Learning Center, which the NSF also funds, supported the study.

Half-dose flu shot appears to produce immune response in young, healthy adults

Individuals younger than 50 who have been previously vaccinated do not appear to have a substantially different immune response to a half-dose of influenza vaccine than to a full dose, according to a report in the December 8/22 issue of Archives of Internal Medicine, one of the JAMA/Archives journals. This suggests that half-dose vaccination in healthy young individuals may be effective in times of vaccine shortage.

"Since 2002, optimum influenza vaccine delivery has been impaired as a result of supply shortages," the authors write as background information in the article. "With the abrupt loss of half the anticipated national influenza vaccine supply in October 2004, the option of using a reduced dose for immunization of healthy, high-priority groups became a critical consideration."

Renata J.M. Engler, M.D., of Walter Reed Army Medical Center, Washington, D.C., and colleagues conducted a randomized clinical trial involving healthy adults age 18 to 64 years. Between November and December 2004, a total of 554 adults received a full dose of trivalent inactivated influenza vaccine and 556 received a half-dose of the vaccine. All had been vaccinated within the past one to three years. Blood samples were taken before and 21 days after vaccination and tested for antibodies against influenza, and participants recorded any symptoms they experienced during this time period.

"Antibody responses to intramuscular half-dose trivalent inactivated influenza vaccine in healthy, previously immunized adults were not substantially inferior to the full-dose vaccine, particularly for ages 18 to 49 years," the authors write. In addition, from November 2004 through March 2005, rates of medical visits for respiratory or cardiovascular reasons were no different between those vaccinated with a full dose or with a half dose. "Given the benefits of immunizing healthy working adults and caregivers, these data support the validity of a dose reduction strategy in the setting of vaccine shortages."

"Reduced dosing could have a significant impact on the response to vaccine shortages, particularly at a local level when faced with considerable delays in vaccine supply delivery," they continue. Because half-doses were associated with fewer side effects, reducing dosage could also make vaccination more acceptable, particularly among groups of people who experience more adverse effects.

Women of all ages had a greater response to both doses of the vaccine than men. In fact, women receiving a half-dose of vaccine had similar antibody responses to men receiving a full dose. "These findings suggest that guidelines for vaccine use during shortages should take sex as well as age into consideration," the authors write. "As recommendations for influenza immunization expand and evidence that elderly persons (men older than 60 years) may require higher doses of vaccine for optimal responses, reduced doses in healthy, younger populations may become a valuable national strategy."

(Arch Intern Med. 2008;168[22]:2405-2414. Available pre-embargo to the media at www.jamamedia.org.)

Editor's Note: This study was supported by the Office of the Army Surgeon General in collaboration with Walter Reed Army Medical Center and Healthcare System; the North Atlantic Regional Medical Command; the U.S. Army Medical Research and Materiel Command; the National Institute of Allergy and Infectious Diseases, National Institutes of Health; and the Influenza Branch of the Centers for Disease Control and Prevention. Please see the article for additional information, including other authors, author contributions and affiliations, financial disclosures, funding and support, etc.

Editorial: Better Methods of Vaccine Production Needed

"The production of adequate supplies of yearly influenza vaccine is challenging for a number of reasons, including the need to anticipate new circulating strains in advance, adaptation of new variants for growth in embryonated hens' eggs and an expanding target population," writes Ann R. Falsey, M.D., of Rochester General Hospital, N.Y., in an accompanying editorial.

"If more antibodies are better, how much is 'good enough' in a time of critical vaccine shortage?" Dr. Falsey continues. "In trying to stretch vaccine supplies to protect the largest number of persons, we must use care to not waste vaccine by using low doses, which will ultimately not be protective. This study clearly shows that half-dose trivalent inactivated vaccine in young healthy women is a rational way to extend vaccine supply in times of critical shortage."

"Although the results of this study are useful and can provide a guide to extending the vaccine supply during periods of shortage, perhaps the real message of this study is that better methods of influenza vaccine production that are less prone to problems are clearly needed," she concludes.

(Arch Intern Med. 2008;168[22]:2402-2403. Available pre-embargo to the media at www.jamamedia.org.)

Mediterranean diet plus nuts may be helpful in managing metabolic syndrome

A traditional Mediterranean diet with an additional daily serving of mixed nuts appears to be useful for managing some metabolic abnormalities in older adults at high risk for heart disease, according to a report in the December 8/22 issue of Archives of Internal Medicine, one of the JAMA/Archives journals.

The metabolic syndrome is a set of metabolic abnormalities that includes abdominal obesity and high cholesterol, high blood pressure and high blood glucose levels, all of which are risk factors for cardiovascular disease, according to background information in the article. "Development of the metabolic syndrome depends on a complex interaction between still largely unknown genetic determinants and environmental factors, including dietary patterns," the authors write. A traditional Mediterranean diet—characterized by a high intake of cereals, vegetables, fruits and olive oil, a moderate intake of fish and alcohol and a low intake of dairy, meats and sweets—has been associated with a lower risk for metabolic abnormalities.

Jordi Salas-Salvadó, M.D., Ph.D., of the University of Rovira i Virgili, Spain, and colleagues assessed 1,224 participants in the PREDIMED (Prevencion con Dieta Mediterranea) study who were age 55 to 80 and at high risk for cardiovascular disease. Participants were randomly assigned to one of three groups: one group received advice on a low-fat diet while two received quarterly education about the Mediterranean diet. One of the Mediterranean diet groups was provided with 1 liter per week of virgin olive oil and the other received 30 grams per day of mixed nuts.

At the beginning of the study, 61.4 percent of the participants met criteria for the metabolic syndrome. After one year, 409 participants in the Mediterranean diet plus olive oil group, 411 in the Mediterranean diet plus nuts group and 404 in the control group of low-fat diet advice were available for evaluation. The prevalence of metabolic syndrome decreased by 13.7 percent among those in the nut group, 6.7 percent in the olive oil group and 2 percent in the control group.

Participants' weight did not change over the one-year period. However, the number of individuals with large waist circumference, high triglycerides or high blood pressure significantly decreased in the Mediterranean diet plus nuts group compared with the control group. This suggests that components of the diet, principally the nuts, may have beneficial effects on pathophysiological characteristics of metabolic syndrome, such as oxygen-related cell damage, resistance to the effects of insulin or chronic inflammation. The Mediterranean diet is high in unsaturated fatty acids; in addition, nuts also contain beneficial nutrients such as fiber, arginine, potassium, calcium and magnesium.

"Traditionally, dietary patterns recommended for health have been low-fat, high-carbohydrate diets, which generally are not palatable," the authors conclude. "The results of the present study show that a non–energy-restricted traditional Mediterranean diet enriched with nuts, which is high in fat, high in unsaturated fat and palatable, is a useful tool in managing the metabolic syndrome." A longer follow-up of the PREDIMED study participants may provide stronger evidence of the cardiovascular benefits that could result, they note.

(Arch Intern Med. 2008;168[22]:2449-2458. Available pre-embargo to the media at www.jamamedia.org.)

Epilepsy drug shows potential for Alzheimer's treatment

A drug commonly used to treat epilepsy could help clear the plaques in the brain associated with Alzheimer's disease, according to researchers at the University of Leeds. The plaques are known to lead to the progressive death of nerve cells in the brain linked to many forms of dementia.

Sodium valproate - which is marketed as the anti-seizure drug Epilim - has been shown by scientists at the University of Leeds to reactivate the body's own defences against a small protein called amyloid beta peptide, which is the main component of the brain plaques characteristic in Alzheimer's. Their work was funded by the Medical Research Council.

"The fact that we've been able to show that a well-established, safe and relatively inexpensive drug could help treat Alzheimer's is an extremely exciting development," says lead researcher Professor Tony Turner from the University's Faculty of Biological Sciences. "We hope colleagues will be able to progress this research with clinical trials in the near future."

Alzheimer's disease is the most common form of dementia and has no cure. In the UK today there a half a million people living with Alzheimer's – and this is likely to double within a generation unless new treatments are found.

Sodium valproate has been used for many years to suppress epileptic seizures and the many sufferers of epilepsy have been taking the drug for decades with few side effects.

The development of Alzheimer's is widely believed to be caused by the gradual accumulation in the brain of amyloid-beta peptide which is toxic to nerve cells. This is thought to be caused by a key enzyme called neprilysin or NEP gradually switching off in later life. One of NEP's roles is to clear the toxic peptide from the brain, and plaques begin to form as it gradually switches off, leading to the death of the brain's nerve cells.

The research team examined changes in chromatin – the 'packaging' that genes are contained within - and surmised that these changes might be involved in switching off NEP. The team found clear differences (acetylation) in key proteins within the chromatin when they compared normal nerve cells against those that failed to produce NEP.

"From there it was relatively simple to stimulate the expression of NEP with sodium valproate, which was seen to prevent the acetylation," says Professor Turner. "We were elated when we saw the results."

Professor Tony Turner, together with former colleague Dr John Kenny, first discovered NEP in the brain. His current research team comprises Dr Nikolai Belyaev, Dr Natalia Nalivaeva and Natalia Makova.

The research is published online in EMBO Reports.

Vitamin B1 could reverse early-stage kidney disease in diabetes patients

Researchers at the University of Warwick have discovered high doses of thiamine – vitamin B1 – can reverse the onset of early diabetic kidney disease.

Kidney disease, or diabetic nephropathy, develops progressively in patients with type 2 diabetes. Early development of kidney disease is assessed by a high excretion rate of the protein albumin from the body in the urine, known as microalbuminuria.

The research is led by Dr Naila Rabbani and Professor Paul J Thornalley at Warwick Medical School, University of Warwick, in collaboration with researchers at the University of Punjab and Sheik Zaid Hospital, Lahore, Pakistan.

The team has discovered taking high oral doses of thiamine can dramatically decrease the excretion of albumin and reverse early stage kidney disease in type 2 diabetes patients.

In a paper published online in the journal Diabetologia, the team show 300 mg of thiamine taken orally each day for three months reduced the rate of albumin excretion in type 2 diabetes patients. The albumin excretion rate was decreased by 41% from the value at the start of the study. The results also showed 35% of patients with microalbuminuria saw a return to normal urinary albumin excretion after being treated with thiamine.

Forty patients with type 2 diabetes aged between 35 and 65 years old took part in the trial. They were randomly assigned a placebo or 3 x 100mg tablets of thiamine a day for three months.

The Warwick research group has already conclusively proven that type 2 diabetes patients have a thiamine deficiency. In an earlier study led by Professor Paul Thornalley at Warwick Medical School, the research team showed that thiamine deficiency could be key to a range of vascular problems for diabetes patients.

Dr Rabbani said: “This study once again highlights the importance of Vitamin B1 and we need to increase awareness. Professor Thornalley and I are planning a foundation at the University of Warwick to further education and research in thiamine deficiency.”

Notes to editors

This study was funded by the Pakistan Higher Education Commission and Dr Rabbani holds a research fellowship with the British Heart Foundation, based at Warwick Medical School.

The paper appears in Diabetologia and is available online at
http://www.springerlink.com/content/51l034044218455j/?p=814d61fe534b49ebbea262b559224387&pi=2

The previous study led by Professor Paul Thornalley appeared in Diabetologia in August 2007. It is available online at
http://www.springerlink.com/content/r472314288273515/?p=de1637f799b94f9eaf1affc684404efb&pi=1

Medical terms worry more people than lay terms, study finds

The label used to identify a disease – whether it is common language or medical terminology – can influence how serious people think the condition is, according to new research from McMaster University, the second part of a larger study on how people understand and interpret disease.

The study, published online in the journal Public Library of Science: ONE, examined many recently medicalized disorders. For example, impotence is now widely known as erectile dysfunction; excessive sweatiness is also known as hyperhidrosis.

Researchers found that when study participants were presented with the medicalized term for these recently medicalized conditions, they were perceived to be more severe, more likely to be a disease and more likely to be rare, compared to the same disorder presented with its synonymous lay label.

"A simple switch in terminology can result in a real bias in perception," says Meredith Young, one of the study's lead authors and a graduate student in the Department of Psychology, Neuroscience & Behaviour at McMaster University. "These findings have implications for many areas, including medical communication with the public, corporate advertising and public policy."

Participants in the study were given a survey that included 16 disorders, eight of which were chosen due to the increased popular use of a medical label within the last 10 years (eg. erectile dysfunction versus impotence). The remaining eight were established medical disorders with both lay and medical terminology in popular use for more than 10 years (eg. hypertension versus high blood pressure).

"A lot of people have become critical of what is sometimes called 'disease-mongering' - or defining more and more conditions as diseases when they were previously just in the range of normal health, and a change in language certainly seems to accompany this," says Karin Humphreys, one of the study's authors and assistant professor in the Department of Psychology, Neuroscience & Behaviour. "We don't mean to dismiss any of the recently medicalized conditions we tested as trivial. Rather, because public understanding of these conditions is still in flux, they are an excellent place to examine how different terminology impacts this understanding."

The pattern of results has implications for the patient, researchers found. If a patient is informed that she has gastro esophageal reflux disease, for example, rather than chronic heartburn, she might think she is more ill. An important implication is that patient's understanding of the condition heavily influences how she goes about taking care of her own health.

For established medical conditions, researchers found that it did not make a difference in perception if a lay term was used or if subjects were presented with the medicalized language.

"We can see that there are a number of conditions where the medicalese term has, over the past ten years or so, been really rising in how often it is used, compared to the lay term for the same thing," says Humphreys. "This is particularly important when you have lots of conditions that have recently become medicalized, some of them possibly through the influence of pharmaceutical companies, who want to make you think that you have a disease that will need to be treated with a drug."

The study was funded by the National Science and Engineering Research Council (NSERC).

U of Minnesota researcher finds link between aggression, status and sex

Have you ever wondered why it seems like the littlest things make people angry? Why a glance at the wrong person or a spilled glass of water can lead to a fist fight or worse? University of Minnesota researcher Vladas Griskevicius has three words to explain why people may be evolutionarily inclined to make a mountain out of molehill: aggression, status and sex.

Although hostility or belligerent acts might not immediately appear to be linked to reproduction, new research forthcoming in the Journal of Personality and Social Psychology shows that mating goals may underlie behaviors such as aggression. Griskevicius, a marketing professor at the U of M's Carlson School of Management, and his co-authors, have found conclusive evidence that merely activating a desire for status can trigger aggression. Aggressive displays, which may result in enhanced status, indirectly boost an individual's ability to attract a mate and, thereby, reproduce.

"It all boils down to the fact that status for men typically equals sex. Across different cultures and time, the higher status men have, the more sex or better-quality partners they may have," said Griskevicius. "At the gene-level, nobody wants to go down in an evolutionary blaze of glory--no one wants their genes to become extinct. Additionally, unlike low-status women, low-status men are in serious danger of not reproducing, since they make especially undesirable mates."

To listen to Griskevicius describe his research, go to http://mediamill.cla.umn.edu/mediamill/embed/22978

"Think of it this way," said Griskevicius, "For men, fighting for status is akin to fighting for the survival of their genes. Not caring about status, which can be implied by backing away from a fight, can be evolutionary suicide. Aggression can lead to status. A higher status leads to sex, and that leads to more or higher-quality offspring."

The evolved pull of aggression was shown in a series of three studies. Results showed that if men have status or sex on their minds (e.g., they are thinking about a promotion at work or an attractive opposite-sex individual), they will more quickly respond aggressively to a trivial insult. The slight seems much more substantial when a man has sex or status on his mind. Men are especially likely to respond aggressively when there are other men around to watch the situation, suggesting that much of aggression is about display, rather than self-defense.

Statistics reinforce this idea; police reports show that "trivial altercations" is the leading reason for homicide. But Griskevicius warns that his work should not suggest that people are attracted to aggression. Rather, "it is all about status--the one who wins the game--he's the one that gets the girl. And at the end of the day, if those genes are passed on, the aggressor is the ultimate winner."

Griskevicius's paper "Aggress to Impress: Hostility as an Evolved Context-Dependent Strategy" was written with Joshua Tybur and Steven Gangestad, University of New Mexico; Elaine Perea and Douglas Kenrick, Arizona State University; and Jenessa Shapiro, University of California, Los Angeles. More information on Griskevicius (pronounced greash-caviches) and a copy of the article can be found at www.carlsonschool.umn.edu/marketinginstitute/vgriskevicius.

Study examines motives behind Santa myth

Université de Montréal and University of Ottawa professors investigate Christmas rite

Having kids believe there's a jolly man in a red suit who visits on Christmas Eve isn't detrimental, although some parents can feel they're outright lying to their children, according to a new analysis by Serge Larivée.

"When they learn the truth, children accept the rules of the game and even go along with their parents in having younger children believe in Santa," says Larivée, a psycho-education professor at the Université de Montréal. "It becomes a rite of passage in that they know they are no longer babies."

Larivée, along with colleague Carole Sénéchal from the Univerity of Ottawa, examined a study from 1896 involving 1,500 children aged 7 to 13, which was repeated in 1979. More than 46 percent of children in 1896 and 44 percent in 1979 gradually found out on their own that Santa didn't exist.

The studies also analyzed the reaction of the children once they discovered the jolly old elf wasn't real. More than 22 percent in the 1896 study admitted to being disappointed compared with 39 percent in the 1979 study. But only 2 percent and 6 percent, respectively, felt betrayed.

"The constant outcome of the two studies was that children generally discovered through their own observations and experiences that Santa doesn't exist," Larivée noted. "And their parents confirmed their discovery. "Children ask their parents, for example, how Santa gets in the house if there's no chimney," he says. "And even if the parents say they leave the door unlocked, the child will figure out that Santa can't be everywhere at the same time and that reindeer can't be that fast."

Close to 25 percent of children in the 1896 study learned the truth about Santa from their parents, compared with 40 per cent in 1979. Those who didn't find out from their parents learned the truth from other children.

Larivée says belief in Santa diminishes as children approach the age of reason. "But cognitive maturity and level of thought that would allow a 7-year-old to differentiate between the imaginary and reality are insufficient to let go of the myth," he adds, pointing out that half of children of that age in a 1980 study still believed.

In 1896, 54 percent of parents said they perpetuated the myth of Santa since it made their children happy; compared with 73 percent in 1979 and 80 percent in 2000.

Larivée and Sénéchal now want to explore a deeper question: If children attribute the same supernatural powers to Santa as they do to God, why do they stop believing in Santa, but continue their belief in God?

Contraceptive methods shape women's sexual pleasure and satisfaction.

New data from The Kinsey Institute at Indiana University demonstrate that many women think condoms undermine sexual pleasure, but those who use both hormonal contraception and condoms report higher overall sexual satisfaction. The study authors suggest that this inconsistency reflects how women think about their contraceptive method when asked questions about two different aspects of sexuality -- sexual enjoyment and overall sexual satisfaction.

When considering overall sexual satisfaction, which goes beyond the immediate sexual moment and includes factors such as sexual self-esteem and relationship satisfaction, women who used both condoms and hormonal methods reported the highest levels of sexual satisfaction. On the other hand, when asked directly about the effect of contraceptive methods on sexual enjoyment, women who used condoms, either alone or with hormonal methods, were far more likely to report decreased pleasure, suggesting women feel condoms make sex less pleasurable. Those who used only hormonal methods, such as the birth control pill, were unlikely to associate their method with decreased sexual pleasure.

The study, published in November's issue of Sexual Health, begins to answer questions about contraceptive methods and women's sexuality -- an area largely ignored by researchers. "The public health community has paid little attention to women's sexual experiences with contraceptive methods, especially condoms," said Stephanie Sanders, associate director of The Kinsey Institute and a co-author of the study. "If women think condoms detract from sexual pleasure, they may be less inclined to use them consistently."

Findings include:

* Only 4 percent of women who relied on hormonal methods of contraception reported decreased pleasure, but hormonal users reported the lowest overall sexual satisfaction scores.

* While 23 percent of women who used both condoms and hormonal methods reported decreased pleasure, they had the highest sexual satisfaction scores.

* Women who used condoms alone or along with a hormonal method were six to seven times more likely to report decreased sexual enjoyment compared to those who used hormonal methods only.

* Women with no history of a sexually transmitted infection were more than twice as likely to report that their method decreased sexual pleasure.

Authors of the study include lead author Jenny Higgins, Princeton University; Susie Hoffman, Columbia University; and Cynthia Graham, University of Oxford.

For more information, please contact Jennifer Bass at The Kinsey Institute, 812-855-7986 and jbass@indiana.edu, or study author Jenny Higgins, jennyh@princeton.edu.

For a copy of the study, please visit http://www.indiana.edu/~iunews/Higgins.pdf. Top

Late Neandertals and modern human contact in southeastern Iberia

It is widely accepted that Upper Paleolithic early modern humans spread westward across Europe about 42,000 years ago, variably displacing and absorbing Neandertal populations in the process. However, Middle Paleolithic assemblages persisted for another 8,000 years in Iberia, presumably made by Neandertals. It has been unclear whether these late Middle Paleolithic Iberian assemblages were made by Neandertals, and what the nature of those humans might have been.

New research, published Dec. 8 in the Proceedings of the National Academy of Sciences, is now shedding some light on what were probably the last Neandertals.

The research is based on a study of human fossils found during the past decade at the Sima de la Palomas, Murcia, Spain by Michael Walker, professor at Universidad de Murcia, and colleagues, and published by Michael Walker, Erik Trinkaus, professor of Anthropology at Washington University in St. Louis, and colleagues.

The human fossils from the upper levels of the Sima de las Palomas are anatomically clearly Neandertals, and they are now securely dated to 40,000 years ago. They therefore establish the late persistence of Neandertals in this southwestern cul-de-sac of Europe. This reinforces the conclusion that the Neandertals were not merely swept away by advancing modern humans. The behavioral differences between these human groups must have been more subtle than the Middle-to-Upper Paleolithic technological contrasts might imply.

In addition, the Palomas Neandertals variably exhibit a series of modern human features rare or absent in earlier Neandertals. Either they were evolving on their own towards the modern human pattern, or more likely, they had contact with early modern humans around the Pyrenees. If the latter, it implies that the persistence of the Middle Paleolithic in Iberia was a matter of choice, and not cultural retardation.

From the Sima de las Palomas, other late Neandertal sites, and recent discoveries of the earliest modern humans across Europe, a complex picture is emerging of shifting contact between behaviorally similar, if culturally and biologically different, human populations. Researchers are coming to see them all more as people, flexibly making a living through the changing human and natural landscapes of the Late Pleistocene.

Are men hardwired to overspend?

Listen to the podcast

ANN ARBOR, Mich.—Bling, foreclosures, rising credit card debt, bank and auto bailouts, upside down mortgages and perhaps a mid-life crisis new Corvette—all symptoms of compulsive overspending.

University of Michigan researcher Daniel Kruger looks to evolution and mating for an explanation. He theorizes that men overspend to attract mates. It all boils down, as it has for hundreds of thousands of years, to making babies.

Kruger, an assistant research scientist in the School of Public Health, tested his hypothesis in a community sample of adults aged 18-45 and found that the degree of financial consumption was directly related to future mating intentions and past mating success for men but not for women.

Financial consumption was the only factor that predicted how many partners men wanted in the next five years and also predicted the number of partners they had in the previous five years, Kruger said. Being married made a difference in the frequency of one-time sexual partners in the last year, but not in the number of partners in the past or desired in the future.

The 25 percent of men with the most conservative financial strategies had an average of three partners in the past five years and desired an average of just one in the next five years. The 2 percent of men with the riskiest financial strategies had double those numbers.

"Men in the ancestral environment were valued if they were good providers. Now we have this new consumer culture, so basically we show our potential through the consumer goods that we purchase, rather than being a good hunter or providing protection," Kruger said.

"It gives an ultimate explanation for why we feel we have to keep up with the Joneses. Especially for guys, our position in the social hierarchy is based on our resources. Economic success has traditionally been good for men's reproductive success, so men have an incentive to show that they are doing well economically."

So where does the current economic downturn come into play?

"It is partially a result of our economic system and recent financial policies, but I really do think that our evolved mating strategies have an influence. Our competition for economic displays drives our consumer economy and culture of affluence," he said. "In terms of the current mortgage crisis, the findings suggest that one of the reasons why we overextend ourselves is that we're basically in a status race. We have expectations that spiral upward as people make more money and everyone wants to show that they are better than average."

Related Links: *Higher Mating Intentions and Mating Success*

Jealous dogs don't play ball

* 12:39 08 December 2008 **by Nora Schultz**

A dog might be a man's best friend, but only if it is being treated fairly. When a dog thinks it's getting a raw deal in comparison to other dogs, it doesn't shy away from expressing its envy.

Until now, such overt dislike of unfairness had only been demonstrated in primates, but some scientists have suspected that other species that live cooperatively could also be sensitive to fair play - or a lack of one.

To test this theory, Friederike Range and her colleagues at the University of Vienna, Austria, asked 43 trained dogs to extend their paw to a human in various situations.

A sulky dog might just feel unfairly treated (Image: stock.xchng)

The animals performed the trick almost at every request, regardless of whether they were given a reward or not; as well as when working alone or alongside another dog. The dogs' enthusiasm quickly waned, though, when they saw the other dog being rewarded but received nothing themselves.

'Baby envy'

The dogs that were ignored extended their paws significantly less often than in all other circumstances, doing so in only 13 out of 30 trials. They also showed significantly more symptoms of stress, such as licking or scratching themselves. "They are clearly unhappy with the unfair situation", says Range. She also suspects that this sensitivity might stretch beyond food to things like praise and attention. "It might explain why some dogs react with 'new baby envy' when their owners have a child", she says.

To Marc Bekoff at the University of Colorado, Boulder, the study confirms an impression he has been forming in years of field studies on social carnivores (see Virtuous Nature). "The fate of a wolf or coyote pack can really hang on whether an individual pulls its weight," says Bekoff. "These animals learn not to tolerate unfairness."

Range agrees that the dogs' sense of fairness probably evolved long before domestication. "We are now testing for envy in wolves, and I would be surprised if we didn't find it", she says.

Journal reference: PNAS (DOI: 10.1073_pnas.0810957105)

Time with dad is time well spent

* 14:56 08 December 2008 **by Ewen Callaway**

When picking out that perfect Father's Day gift next year, sons and daughters might want to look to their own accomplishments before deciding between a gaudy polyester tie or splurging on a new set of golf clubs.

The more effort a father invests in his children, the smarter they are as kids and more successful as adults, new research shows. And highly educated fathers make even more of a difference than less educated dads, all things being equal. "It's not [just] about having dad around, it's about what kind of dad he is," says Daniel Nettle, a psychologist at the University of Newcastle, UK, who led the new analysis, based on surveys of more than 10,000 children over half a century.

Nettle used the National Child Development Study, which traces the lives of every Briton born between 3 and 9 March, 1958. Surveys taken in the 1960s and 70s asked mothers to rate the father's involvement in his child, from "inapplicable" to "equal to the mother". These and later surveys through 2005 tracked intelligence, income, and education of the participants.

Nettle has previously used the same data set to show that wealthy men father more children than paupers. With paternal investment, however, time seemed to be the most important currency. At age 11, children of highly involved fathers boasted markedly higher IQs than children with less present dads. "This is not half a point, this is a few points of IQ, on average," he says.

Sons over daughters

Nettle also found that highly educated and successful fathers get more bang for their buck, compared with uneducated and working class men. All things being equal, fathers of high socioeconomic status gave children a small extra boost with their attention than less affluent fathers.

However, this effect did not last through middle age. At 42, the children of super-dads were no more socially mobile than other children - regardless of the father's education level or profession. Sons enjoyed more of a boost than daughters, possibly because men face more hurdles in climbing the social ladder than women, Nettle speculates. This could be one reason why fathers tended to invest more time in sons, than daughters.

Robert Quinlan, a biocultural anthropologist at Washington State University in Pullman, says the study breaks new ground in showing the benefits of having a father around - especially an affluent one.

Quinlan wonders, though, whether discrepancies in a father's socioeconomic status make a real-world difference, rather than a statistical one, detectable only in large-scale surveys. "How much would you pay to get a half a point of IQ," he asks.

Journal reference: Evolution and Human Behavior(DOI: 10.1016/j.evolhumbehav.2008.06.002)

Genetic change extends mouse life, points to possible treatment for ALS

MADISON - There are many ways to die, but amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease must be one of the worst. By the time a patient notices muscle weakness, the neurons that control the muscles have already begun dying, in an untreatable process that brings death within two to five years.

In a series of experiments reported today in the Journal of Neuroscience, a University of Wisconsin-Madison pharmacy researcher was able to prolong life and slow nerve deterioration in a mouse with a genetic form of ALS, or amyotrophic lateral sclerosis. Marcelo Vargas, a postdoctoral fellow in the laboratory of Jeff Johnson, professor in the School of Pharmacy, tested mice that carried an extra gene that pushed support cells for the neurons into overdrive, causing them to pump out extra quantities of the anti- oxidant glutathione. The gene in question, called Nrf2, has long been a research focus for Johnson, who is also a Waisman Center investigator.

Although oxidation is a major cause of cell death in Parkinson's disease and Alzheimer's disease as well as ALS, antioxidant treatments have failed to slow these diseases.

But the mice with extra copies of Nrf2 produced glutathione right alongside the vulnerable neurons, and that made all the difference, says Johnson. These special mice were engineered in collaboration with Albee Messing, a professor in the UW-Madison School of Veterinary Medicine and also an investigator at the Waisman Center. "It's extremely difficult to increase glutathione in the central nervous system," Johnson says. "You can't just shoot it into people or animals. But we found a 25 percent increase in the molecule in the spinal cords."

Although the mice did eventually die of ALS, they lived longer, and the disease appeared 17 days later than in mice that lacked the extra Nrf2 gene, Johnson says. "This was a very aggressive model of ALS, so a life extension of 21 days is thought to be pretty significant, roughly equivalent to five to 10 years in human patients."

The inserted Nrf2 gene was only active in support cells called astrocytes, which promote health among the neurons that actually carry nerve signals, Johnson explains. "We have taken this normal function of producing antioxidants and added to it. It's like putting the astrocytes on steroids."

Experiments performed on mouse astrocytes and nerve cells in a dish confirmed the source of the protection, Johnson adds. "We can completely reverse the toxicity of the sick astrocytes. The mutated protein that causes ALS is still there, but Nrf2 makes glutathione that completely blocks it."

Although the mice that Johnson tested carried the inherited form of ALS, most patients do not have an inherited disease. However, Johnson says the mice are still a good testbed for ALS treatments. "The endpoints that we are blocking, including death of neurons and separation of neurons from the muscle, are seen in all forms of ALS; that's what makes this so exciting. We are not targeting the mutant protein that causes the disease; we are targeting the astrocytes' mechanism that preserves the neurons. The mutant protein is still in all cells of the spinal cord; we are just over-expressing the Nrf2 gene - causing it to make more glutathione - and that provides the protection."

Nrf2 activates a system, or pathway, that is also attracting interest from researchers working on Parkinson's disease, Alzheimer's disease, Huntington's disease and stroke, says Johnson. "It's been exciting. This hypothesis came to me when I was in graduate school in 1990, and this year it seems to be coming to fruition" as a possible treatment for several neurodegenerative diseases.

The results may be promising, but inserting genes, or gene therapy, has had few successes to date. Yet by positively identifying the chemical pathway that keeps neurons healthy in ALS, Johnson is in a position to search for a drug that can enter the brain and activate the Nrf2 system. That quest is already under way at an automated screening facility at UW-Madison, where more than 50,000 molecules are being tested for their ability to activate Nrf2.

Years of research will be needed before today's results can be translated into a treatment for patients, however. "If everything worked perfectly, we probably could have something in two to three years, but the odds of that happening are pretty low," says Johnson. "But in five to eight years, I hope to have something can get through all the regulatory hoops."

Finding that one mechanism is involved in several neurodegenerative diseases is significant, Johnson says, because it attracts a broader group of scientists and funders to the work. "Something seems to be going wrong with the neurons because the astrocyte does not function right. Now, it looks like we have the potential to fix the astrocyte, so it can preserve the neurons for a longer period."

Delinda Johnson and Daniel Sirkis were also members of the UW-Madison research team. The study was funded by the Robert Packard Center for ALS Research at Johns Hopkins, the ALS Association and National Institutes of Health grants.

Asthma: Commonly used medication shows no clear benefits in children

Research news from the journal Evidence-Based Child Health

There are no clear benefits to using long-acting beta2-agonists (LABAs) for treatment of asthma in children, a new study concludes. In an overview of recent Cochrane reviews, Child Health Field researchers report that there is currently insufficient evidence to suggest the drugs, which are recommended to relieve the symptoms of asthma, offer any additional benefit to conventional preventative medications.

LABAs such as salmeterol and formoterol can reduce the symptoms of asthma for periods of up to 12 hours and are often given to relax the airways overnight or after exercise. Currently, LABAs are recommended as add-on therapies to inhaled corticosteroids (ICS), which are taken on a daily basis to help control symptoms over a longer term. Since LABAs have previously been shown to increase the risk of life-threatening adverse effects in adults when used as the only drug (monotherapy), they are not recommended as the main treatment agent in asthma in any age groups.

Now researchers say that although giving LABAs to children can improve lung function, their use does not generally provide any further benefit over regular ICS therapy. "We found no evidence to suggest that LABA should be used alone or in combination with ICS in the majority of young asthma sufferers. ICS should remain the therapy of choice," says Amy Plint, who led the study at the University of Ottawa in Canada.

The overview included four previous reviews of trials in children above the age of four. Together, the trials showed that ICS in combination with LABAs significantly improved lung function compared to ICS combined with placebos. LABAs did not, however, reduce severity of asthma symptoms as measured by hospital admissions or the need for steroid medication.

The researchers say more long-term trials are needed to establish the effectiveness of LABAs in children. However, they think that the drugs may improve lung function in the most severe cases. "We should not rule out combination therapy as a treatment option in children with poorly controlled asthma despite compliance with moderate dose ICS agents," says Plint.

Fear of nuts creating hysteria of epidemic proportions

Observations column: This allergies hysteria is just nuts, BMJ Online

Measures imposed to reduce exposure to nuts are often based on irrational fears of nut allergies and are becoming increasingly sensationalist, according to a doctor on bmj.com today. A peanut on the floor of a school bus leading to evacuation and decontamination for fear that it might be eaten by the 10 year old passengers, and schools declaring themselves "nut free" by banning nuts, peanut butter, homebaked goods and any foods without ingredient labels, are just some examples cited in this article.

According to Professor Nicolas Christakis from Harvard Medical School, there is no evidence that any of these extreme restrictions work better than more circumscribed policies or that they are worth the money and disruptions they create.

In the US, 150 people die each year from food allergies. This is compared to the 50 who die from bee stings, the 100 who die from lightening strikes, the 45,000 who die in motor vehicle accidents, and the 10,000 who are hospitalised for traumatic brain injury from playing sport. But these issues do not incur such extreme reactions, such as calling for an end to sport.

Christakis says that the "gross over-reaction to the magnitude of the threat" is very similar to mass psychogenic illness (MPI), previously known as epidemic hysteria.

Often seen occurring in small towns, schools and factories, these outbreaks of MPI involve healthy people in a flow of anxiety, most often triggered by a fear of contamination. Being around individuals who are anxious heightens others' anxiety. These extreme measures to reduce exposure to nuts are fuelling anxiety in parents, leading to more sensitisation, and creating the very epidemic they are designed to stop. A recent study has suggested that early exposure to peanuts actually reduces, rather than increases the risk of allergy.

Christakis concludes by calling for a level-headed strategy to deal with this phenomenon before it spirals out of control.

Drug combination improves or stabilizes disease for relapsed multiple myeloma patients

ROCHESTER, Minn.- Mayo Clinic researchers have found that a new combination of medications designed to maximize immune functions improved or stabilized multiple myeloma for 76 percent of patients who had relapsed after previous treatment.

Interim results of an ongoing clinical trial evaluating pomalidomide, a new immunomodulatory agent, combined with dexamethasone (pom/dex), were presented today at the 50th Annual Meeting of the American

Society of Hematology in San Francisco. Pomalidomide, also referred to as CC-4047, is the latest in the class of immunomodulatory agents that also includes thalidomide and lenalidomide.

Multiple myeloma (http://www.mayoclinic.org/multiple-myeloma/) is a cancer of the plasma cells, a type of white blood cells in the bone marrow, that affects approximately 3 in 100,000 people each year. There is no cure. While the condition can be managed, often with good results, the disease can lead to erosion of the bones, causing bone pain and fractures.

Immunomodulatory drugs work by interfering with cancer cell growth and by stimulating the immune system to attack the cancer cells. The Food and Drug Administration (FDA) has approved the use of thalidomide and lenalidomide to be given with dexamethasone for previously treated cases of multiple myeloma.

The study opened in November 2007 and has accrued 60 patients. To date, 58 percent of patients have responded to therapy with at least a 50 percent drop in the detectable tumor burden as measured by blood protein levels, a marker for myeloma. This included one patient who achieved a complete remission -- no signs of the cancer -- and 14 patients (23 percent) who achieved at least a 90 percent drop in blood proteins. Eleven other patients (18 percent) remained stable.

"These are high remission rates, and they happened quickly," says Martha Lacy, M.D. (http://www.mayoclinic.org/bio/11115891.html), Mayo Clinic hematologist and lead researcher on the study. Also encouraging, says Dr. Lacy, is that treatment did not cause significant side effects in most patients. Side effects included anemia and declines in blood counts, most often mild in both.

In the study, patients took pomalidomide (2 milligrams [mg]) orally daily for a 28-day cycle. Dexamethasone (40 mg) was taken orally on days 1, 8, 15 and 22 of each cycle. Patients also took 325 mg of aspirin daily to prevent blood clots, a concern associated with immunomodulatory agents. Blood clots can occur with use of any IMiD, but the risk increases as the dose of dexamethasone increases.

The dosage of dexamethasone in the current trial is one-third of the dose that was used in the registration trial that led to FDA approval for lenalidomide in previously treated myeloma patients. "We're getting good results with less toxicity compared to what we've seen in the past," says Dr. Lacy. "And, so far, no patients have had blood clots."

Another key finding was that pom/dex was helpful for 29 percent of patients who previously did not respond to treatment with lenalidomide. "We are excited about the potential of this drug combination to significantly help patients with myeloma," says Dr. Lacy. "Based on these encouraging results, we are expanding the study to include other patient populations that may benefit from this therapy."

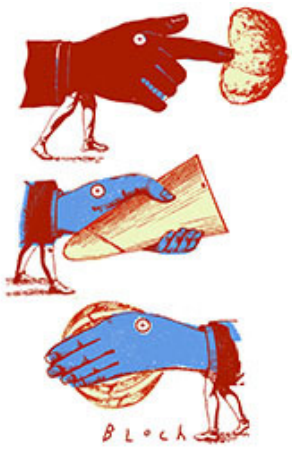
This sponsored research study was funded by Celgene. Other Mayo researchers involved in this study include: Suzanne Hayman, M.D.; Morie Gertz, M.D.; Angela Dispenzieri, M.D.; Steven Zeldenrust, M.D., Ph.D.; Shaji Kumar, M.D.; Philip Greipp, M.D.; John Lust, M.D., Ph.D.; Stephen Russell, M.D., Ph.D.; Francis Buadi, M.D.; Robert Kyle, M.D.; Rafael Fonseca, M.D.; P. Leif Bergsagel, M.D.; Vivek Roy, M.D.; Joseph Mikhael, M.D.; Keith Stewart, M.B.Ch.B.; Jacob Allred; Kristina Laumann; Melanie Thompson; Sumithra Mandrekar, Ph.D.; and S. Vincent Rajkumar, M.D.

To find out more about treatment of multiple myeloma at Mayo Clinic, visit http://www.mayoclinic.org/multiple-myeloma/. Information regarding Mayo Clinic Cancer Center's related research is available online at http://cancercenter.mayo.edu/mayo/research/cancercenter/.

Basics

Primal, Acute and Easily Duped: Our Sense of Touch

By NATALIE ANGIER



Serge Bloch

Imagine you're in a dark room, running your fingers over a smooth surface in search of a single dot the size of this period. How high do you think the dot must be for your finger pads to feel it? A hundredth of an inch above background? A thousandth?

Well, take a tip from the economy and keep downsizing. Scientists have determined that the human finger is so sensitive it can detect a surface bump just one micron high. All our punctuation point need do, then, is poke above its glassy backdrop by 1/25,000th of an inch - the diameter of a bacterial cell - and our fastidious fingers can find it. The human eye, by contrast, can't resolve anything much smaller than 100 microns. No wonder we rely on touch rather than vision when confronted by a new roll of toilet paper and its Abominable Invisible Seam.

Biologically, chronologically, allegorically and delusionally, touch is the mother of all sensory systems. It is an ancient sense in evolution: even the simplest single-celled organisms can feel when something brushes up against them and will respond by nudging closer or pulling away. It is the first sense aroused during a baby's

gestation and the last sense to fade at life's culmination. Patients in a deep vegetative coma who seem otherwise lost to the world will show skin responsiveness when touched by a nurse.

Like a mother, touch is always hovering somewhere in the perceptual background, often ignored, but indispensable to our sense of safety and sanity. "Touch is so central to what we are, to the feeling of being ourselves, that we almost cannot imagine ourselves without it," said Chris Dijkerman, a neuropsychologist at the Helmholtz Institute of Utrecht University in the Netherlands. "It's not like vision, where you close your eyes and you don't see anything. You can't do that with touch. It's always there."

Long neglected in favor of the sensory heavyweights of vision and hearing, the study of touch lately has been gaining new cachet among neuroscientists, who sometimes refer to it by the amiably jargony term of haptics, Greek for touch. They're exploring the implications of recently reported tactile illusions, of people being made to feel as though they had three arms, for example, or were levitating out of their bodies, with the hope of gaining insight into how the mind works.

Others are turning to haptics for more practical purposes, to build better touch screen devices and robot hands, a more well-rounded virtual life. "There's a fair amount of research into new ways of offloading information onto our tactile sense," said Lynette Jones of the Massachusetts Institute of Technology. "To have your cellphone buzzing as opposed to ringing turned out to have a lot of advantages in some situations, and the question is, where else can vibrotactile cues be applied?"

For all its antiquity and constancy, touch is not passive or primitive or stuck in its ways. It is our most active sense, our means of seizing the world and experiencing it, quite literally, first hand. Susan J. Lederman, a professor of psychology at Queen's University in Canada, pointed out that while we can perceive something visually or acoustically from a distance and without really trying, if we want to learn about something tactilely, we must make a move. We must rub the fabric, pet the cat, squeeze the Charmin. And with every touchy foray, Heisenberg's Uncertainty Principle looms large. "Contact is a two-way street, and that's not true for vision or audition," Dr. Lederman said. "If you have a soft object and you squeeze it, you change its shape. The physical world reacts back."

Another trait that distinguishes touch is its widespread distribution. Whereas the sensory receptors for sight, vision, smell and taste are clustered together in the head, conveniently close to the brain that interprets the fruits of their vigils, touch receptors are scattered throughout the skin and muscle tissue and must convey their signals by way of the spinal cord. There are also many distinct classes of touch-related receptors: mechanoreceptors that respond to pressure and vibrations, thermal receptors primed to sense warmth or cold, kinesthetic receptors that keep track of where our limbs are, and the dread nociceptors, or pain receptors - nerve bundles with bare endings that fire when surrounding tissue is damaged.

The signals from the various touch receptors converge on the brain and sketch out a so-called somatosensory homunculus, a highly plastic internal representation of the body. Like any map, the homunculus exaggerates some features and downplays others. Looming largest are cortical sketches of those body parts that are especially blessed with touch receptors, which means our hidden homunculus has a clownishly large face and mouth and a pair of Paul Bunyan hands. "Our hands and fingers are the tactile equivalent of the fovea in vision," said Dr. Dijkerman, referring to the part of the retina where cone cell density is greatest and visual acuity highest. "If you want to explore the tactile world, your hands are the tool to use."

Our hands are brilliant and can do many tasks automatically - button a shirt, fit a key in a lock, touch type for some of us, play piano for others. Dr. Lederman and her colleagues have shown that blindfolded subjects can easily recognize a wide range of common objects placed in their hands. But on some tactile tasks, touch is all thumbs. When people are given a raised line drawing of a common object, a bas-relief outline of, say, a screwdriver, they're stumped. "If all we've got is contour information," Dr. Lederman said, "no weight, no texture, no thermal information, well, we're very, very bad with that."

Touch also turns out to be easy to fool. Among the sensory tricks now being investigated is something called the Pinocchio illusion. Researchers have found that if they vibrate the tendon of the biceps, many people report feeling that their forearm is getting longer, their hand drifting ever further from their elbow. And if they are told to touch the forefinger of the vibrated arm to the tip of their nose, they feel as though their nose was lengthening, too.

Some tactile illusions require the collusion of other senses. People who watch a rubber hand being stroked while the same treatment is applied to one of their own hands kept out of view quickly come to believe that the rubber prosthesis is the real thing, and will wince with pain at the sight of a hammer slamming into it. Other researchers have reported what they call the parchment-skin illusion. Subjects who rubbed their hands together while listening to high-frequency sounds described their palms as feeling exceptionally dry and papery, as

though their hands must be responsible for the rasping noise they heard. Look up, little Pinocchio! Somebody's pulling your strings.

This article has been revised to reflect the following correction:

Correction: December 10, 2008*The Basics column on Tuesday, about the sense of touch, misstated the thickness of a micron. It is one-25,000th of an inch, not one-400,000th.*

18 and Under

What to Do When the Patient Says, 'Please Don't Tell Mom'

By PERRI KLASS, M.D

Melinda Beck

Some years ago, in the candor of the exam room, a seventh-grade boy told me that he didn't really have friends at school, and that he sometimes found himself being picked on. I gave him the pediatric line on bullying: it shouldn't be tolerated, and there are things schools can do about it. Let's talk to your parents, let's have your parents talk to the school; adult interventions can change the equation.

And he was horrified. He shook his head vehemently and asked me please not to interfere, and above all not to say a word to his mother, who was out in the waiting room because I had asked her to give us some privacy.

He wouldn't have told me this at all, he said, except he thought our conversation was private. The situation at school wasn't all that bad; he could handle it. He wasn't in any danger, wasn't getting hurt, he was just a little lonely. His parents, he said, thought that he was fine, that he had lots of friends, and he wanted to keep it that way.

When treating older adolescents, pediatricians routinely offer confidentiality on many issues, starting with sex and substances. But middle-schoolers are on the border - old enough to be asked some of the same questions, but young enough that it can be less clear what should stay confidential.

At my own eighth-grade son's pediatric checkup last year, I of course left the room, because I didn't want to embarrass him or inhibit him, and because I wanted his pediatrician to have the opportunity to hear anything he wanted to say. (I am reporting this with my son's explicit permission.) But as I waited, I thought of that seventh grader, and of the other middle-schoolers who have told me things that left me agonizing about the ethics and the wisdom of confidentiality in this age group.

I'm not talking about the child who tells you something that makes it clear he's in danger. Those are the "easy" ones (though in another sense they can be tremendously difficult), and I've had my share: The 13-year-old girl who is frightened of a much older guy who sometimes seems to follow her home. The 14-year-old boy who has been thinking about dying a lot ever since his grandmother died. The seventh grader who is being beaten up on the playground. No matter the age, when I feel the child is actually in danger, I explain that I have to let the parents know.

But as I talked to my colleagues - including my son's pediatrician, Dr. Herbert Lazarus - we all kept coming up with ambiguous cases. Because you do value the child's trust, and you don't want to lose it.

I'm not talking about the child who tells you he shared a beer with his friends one day after school. Most sensible parents, I think, know that once they're out of the exam room we're going to review sex, drugs and rock 'n' roll with their children, and most sensible parents, I think, are grateful. And many middle-school children seem grateful for the opportunity to mention that yes, they have been in situations where people are drinking.

"They'll preface it with 'My mom's not going to know about this, right?' " said Dr. Lazarus, who is also a clinical associate professor of pediatrics at New York University. "I'm going to talk as much as I can about why this is not good, and all we know about alcohol and marijuana. There are enough studies out there that show how bad this is for brain development."

But what about if it's more than a beer? One of my colleagues had a story: a 13-year-old girl who was drinking and stealing from her parents' liquor cabinet. "She did admit that to me," the pediatrician said. "She was doing it by herself, not a good sign, not social drinking."

The child did not want her mother to know, and the pediatrician, who had known her since infancy, negotiated a compromise: the doctor would advise the mother that the girl needed counseling, and as long as she went to counseling, and discussed the drinking and her underlying issues with the counselor, the pediatrician would not tell her mother about the liquor.

But even though it worked out, even though she continued seeing the patient regularly, the pediatrician still felt less than completely comfortable. "I did personally feel bad," she said, "because if I were the mother, I

would want to know, and I actually did tell the mother just to keep a closer eye on her without going into the details." So what about the child who trusts you with the information that he's being picked on, or that all is not well at home? You want to keep that child's trust - all the more so if the child isn't talking to the parents, because you want to be available for more confidences if things grow worse.

"The balance changes in part based on what the level of the health risks are, how mature that young person is, how much parental oversight they're receiving," said Dr. S. Jean Emans, chief of adolescent medicine at Children's Hospital Boston.

Experts say the middle-school years are particularly challenging. "It's a fine balance because it's developmentally appropriate for kids to want to develop some autonomy and it's the time when they should be developing at least in part a private and confidential relationship with a physician," said Dr. Carol A. Ford, director of the adolescent medicine program at the University of North Carolina, Chapel Hill.

"Middle school is really when you see a lot of variation in pubertal development and cognitive development and social development," Dr. Ford went on. "A 12-year-old who looks like an 18-year-old - you can't assume they think like an 18-year-old. You can't assume their skills of negotiating the world are related to their physical maturity."

Or as Dr. Emans put it: "You do have to make tough choices. There isn't a little book where you look up, 'O.K., this can stay confidential and this can't.' "

So what did I do with the seventh grader who had told me he didn't have friends at school? Well, I asked him a bunch of questions, and I decided that he wasn't feeling suicidal (or homicidal) and that the situation in his school didn't threaten his physical safety. I urged him to talk to his parents, especially if things grew worse - and I scheduled an appointment for him to come back and check in with me.

But with his mother, I limited myself to one of those "generic" comments: this is an age when he really needs you to be involved in his life, to talk about how things are going at school.

"Your role as a physician is different than your role as a mother," Dr. Ford said. "If you lose the trust of the kid, you've lost a lot; they won't tell you what's going on in the future, and that's not in the best interests of the kid or the parent."

If I had been his mother, I would have wanted to know. But I was his doctor, and he wanted it kept confidential.

Perri Klass is a professor of journalism and pediatrics at New York University. Her most recent book is the novel "The Mercy Rule."

Hidden Travels of the Atomic Bomb

By WILLIAM J. BROAD

In 1945, after the atomic destruction of two Japanese cities, J. Robert Oppenheimer expressed foreboding about the spread of nuclear arms. "They are not too hard to make," he told his colleagues on the Manhattan Project at Los Alamos, N.M. "They will be universal if people wish to make them universal."

That sensibility, born where the atomic bomb itself was born, grew into a theory of technological inevitability. Because the laws of physics are universal, the theory went, it was just a matter of time before other bright minds and determined states joined the club. A corollary was that trying to stop proliferation was quite difficult if not futile.

But nothing, it seems, could be further from the truth. In the six decades since Oppenheimer's warning, the nuclear club has grown to only nine members. What accounts for the slow spread? Can anything be done to reduce it further? Is there a chance for an atomic future that is brighter than the one Oppenheimer foresaw?

Two new books by three atomic insiders hold out hope. The authors shatter myths, throw light on the hidden dynamics of nuclear proliferation and suggest new ways to reduce the threat.

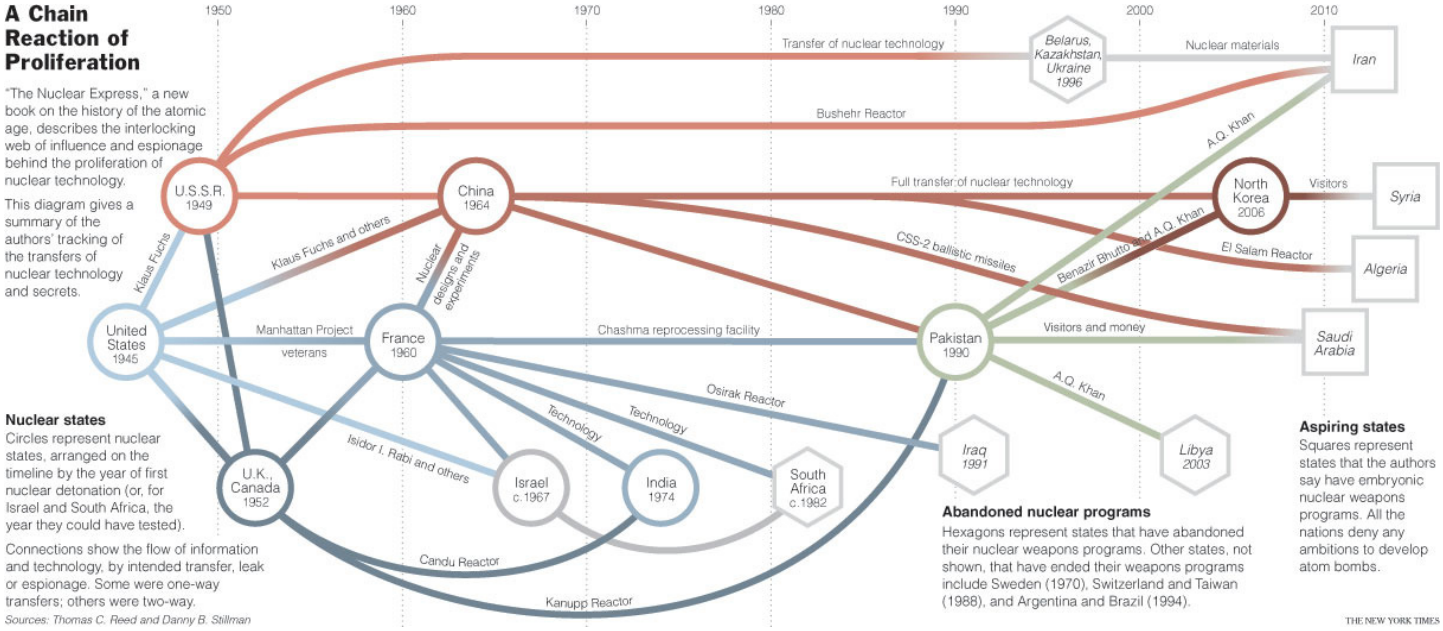
Neither book endorses Oppenheimer's view that bombs are relatively easy to make. Both document national paths to acquiring nuclear weapons that have been rocky and dependent on the willingness of spies and politicians to divulge state secrets.

Thomas C. Reed, a veteran of the Livermore weapons laboratory in California and a former secretary of the Air Force, and Danny B. Stillman, former director of intelligence at Los Alamos, have teamed up in "The Nuclear Express: A Political History of the Bomb and its Proliferation" to show the importance of moles, scientists with divided loyalties and - most important - the subtle and not so subtle interests of nuclear states. "Since the birth of the nuclear age," they write, "no nation has developed a nuclear weapon on its own, although many claim otherwise."

Among other things, the book details how secretive aid from France and China helped spawn five more nuclear states. It also names many conflicted scientists, including luminaries like Isidor I. Rabi. The Nobel

laureate worked on the Manhattan Project in World War II and later sat on the board of governors of the Weizmann Institute of Science, a birthplace of Israel's nuclear arms.

Secret cooperation extended to the secluded sites where nations tested their handiwork in thundering blasts. The book says, for instance, that China opened its sprawling desert test site to Pakistan, letting its client test a first bomb there on May 26, 1990. That alone rewrites atomic history. It casts new light on the reign of Benazir Bhutto as prime minister of Pakistan and helps explain how the country was able to respond so quickly in May 1998 when India conducted five nuclear tests. "It took only two weeks and three days for the Pakistanis to field and fire a nuclear device of their own," the book notes.



In another disclosure, the book says China "secretly extended the hospitality of the Lop Nur nuclear test site to the French." The authors build their narrative on deep knowledge of the arms and intelligence worlds, including those abroad. Mr. Stillman has toured heavily guarded nuclear sites in China and Russia, and both men have developed close ties with foreign peers.

In their acknowledgments, they thank American cold warriors like Edward Teller as well as two former C.I.A. directors, saying the intelligence experts "guided our searches."

Robert S. Norris, an atomic historian and author of "Racing for the Bomb," an account of the Manhattan Project, praised the book for "remarkable disclosures of how nuclear knowledge was shared overtly and covertly with friends and foes."

The book is technical in places, as when detailing the exotica of nuclear arms. But it reads like a labor of love built on two lifetimes of scientific adventure. It is due out in January from Zenith Press.

Its wide perspective reveals how states quietly shared complex machinery and secrets with one another.

All paths stem from the United States, directly or indirectly. One began with Russian spies that deeply penetrated the Manhattan Project. Stalin was so enamored of the intelligence haul, Mr. Reed and Mr. Stillman note, that his first atom bomb was an exact replica of the weapon the United States had dropped on Nagasaki.

Moscow freely shared its atomic thefts with Mao Zedong, China's leader. The book says that Klaus Fuchs, a Soviet spy in the Manhattan Project who was eventually caught and, in 1959, released from jail, did likewise. Upon gaining his freedom, the authors say, Fuchs gave the mastermind of Mao's weapons program a detailed tutorial on the Nagasaki bomb. A half-decade later, China surprised the world with its first blast.

The book, in a main disclosure, discusses how China in 1982 made a policy decision to flood the developing world with atomic know-how. Its identified clients include Algeria, Pakistan and North Korea.

Alarmingly, the authors say one of China's bombs was created as an "export design" that nearly "anybody could build." The blueprint for the simple plan has traveled from Pakistan to Libya and, the authors say, Iran. That path is widely assumed among intelligence officials, but Tehran has repeatedly denied the charge.

The book sees a quiet repercussion of China's proliferation policy in the Algerian desert. Built in secrecy, the reactor there now makes enough plutonium each year to fuel one atom bomb and is ringed by antiaircraft missiles, the book says.

China's deck also held a wild card: its aid to Pakistan helped A.Q. Khan, a rogue Pakistani metallurgist who sold nuclear gear on the global black market. The authors compare Dr. Khan to "a used-car dealer" happy to sell his complex machinery to suckers who had no idea how hard it was to make fuel for a bomb.

Why did Beijing spread its atomic knowledge so freely? The authors speculate that it either wanted to strengthen the enemies of China's enemies (for instance, Pakistan as a counterweight to India) or, more chillingly, to encourage nuclear wars or terror in foreign lands from which Beijing would emerge as the "last man standing."

A lesser pathway involves France. The book says it drew on Manhattan Project veterans and shared intimate details of its bomb program with Israel, with whom it had substantial commercial ties. By 1959, the book says, dozens of Israeli scientists "were observing and participating in" the French program of weapons design.

The book adds that in early 1960, when France detonated its first bomb, doing so in the Algerian desert, "two nations went nuclear." And it describes how the United States turned a blind eye to Israel's own atomic developments. It adds that, in the autumn of 1966, Israel conducted a special, non-nuclear test "2,600 feet under the Negev desert." The next year it built its first bomb.

Israel, in turn, shared its atomic secrets with South Africa. The book discloses that the two states exchanged some key ingredients for the making of atom bombs: tritium to South Africa, uranium to Israel. And the authors agree with military experts who hold that Israel and South Africa in 1979 jointly detonated a nuclear device in the South Atlantic near Prince Edward Island, more than one thousand miles south of Cape Town. Israel needed the test, it says, to develop a neutron bomb.

The authors charge that South Africa at one point targeted Luanda, the capital of neighboring Angola, "for a nuclear strike if peace talks failed."

South Africa dismantled six nuclear arms in 1990 but retains much expertise. Today, the authors write, "South African technical mercenaries may be more dangerous than the underemployed scientists of the former Soviet Union" because they have no real home in Africa.

"The Bomb: A New History," due out in January from Ecco Books, an imprint of HarperCollins, plows similar ground less deeply, but looks more widely at proliferation curbs and diplomacy. It is by Stephen M. Younger, the former head of nuclear arms at Los Alamos and former director of the Defense Threat Reduction Agency at the Pentagon.

Dr. Younger disparages what he calls myths suggesting that "all the secrets of nuclear weapons design are available on the Internet." He writes that France, despite secretive aid, struggled initially to make crude bombs - a point he saw with his own eyes during a tour of a secretive French atomic museum that is closed to the public. That trouble, he says, "suggests we should doubt assertions that the information required to make a nuclear weapon is freely available."

The two books draw on atomic history to suggest a mix of old and new ways to defuse the proliferation threat. Both see past restraints as fraying and the task as increasingly urgent. Mr. Reed and Mr. Stillman see politics - not spies or military ambitions - as the primary force in the development and spread of nuclear arms. States repeatedly stole and leaked secrets because they saw such action as in their geopolitical interest.

Beijing continues to be a major threat, they argue. While urging global responses like better intelligence, better inspections and better safeguarding of nuclear materials, they also see generational change in China as a great hope in plugging the atomic leaks. "We must continue to support human rights within Chinese society, not just as an American export, but because it is the dream of the Tiananmen Square generation," they write. "In time those youngsters could well prevail, and the world will be a less contentious place."

Dr. Younger notes how political restraints and global treaties worked for decades to curb atomic proliferation, as did American assurances to its allies. "It is a tribute to American diplomacy," he writes, "that so many countries that might otherwise have gone nuclear were convinced to remain under the nuclear umbrella of the United States."

And he, too, emphasizes the importance of political sticks and carrots to halting and perhaps reversing the spread of nuclear arms. Iran, he says, is not fated to go nuclear. "Sweden, Switzerland, Argentina and Brazil all flirted with nuclear programs, and all decided to abandon them," he notes. "Nuclear proliferation is not unidirectional - given the right conditions and incentives, it is possible for a nation to give up its nuclear aspirations."

The take-home message of both books is quite the reverse of Oppenheimer's grim forecast. But both caution that the situation has reached a delicate stage - with a second age of nuclear proliferation close at hand - and that missteps now could hurt terribly in the future.

Mr. Reed and Mr. Stillman take their title, "The Nuclear Express," from a 1940 radio dispatch by Edward R. Murrow , who spoke from London as the clouds of war gathered over Europe. He told of people feeling like the express train of civilization was going out of control.

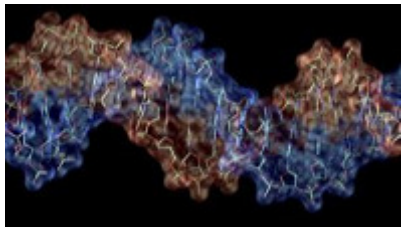
The authors warn of a similar danger today and suggest that only close attention to the atomic past, as well as determined global action, can avoid "the greatest train wreck" in history.

Neanderthal genome already giving up its secrets

* Updated 10:21 10 December 2008 **by Ewen Callaway**

Half the Neanderthal genome has been decoded and the rest should be sequenced by year's end, a scientist involved in the project told a human evolution conference last week. Researchers will roll out a rough draft of the Neanderthal nuclear genome after their sequencers have read every letter in the genome on average once - "1x coverage" in genomics speak.

However, the fragmentary state of the DNA sample - from bones recovered in Croatia - means that the first draft will offer only a tantalizing glimpse of the genome to researchers who hope to better understand Neanderthal biology and human evolution. Some 38,000 years of decay has left the DNA in tatters and strewn with contamination from bacteria and human handlers.



"It's not like sequencing any other genome," says Adrian Briggs, a researcher at Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, who is involved in the project, along with colleagues Edward Green and Svante Pääbo.

A rough draft of the Neanderthal genome should be available by the end of 2008 **(Image: Wikimedia Commons)**

Kissing cousins?

When the same team sequenced the far shorter mitochondrial genome, they decoded each letter an average of 35 times from different samples - enough to ferret out contamination and changes that happen as DNA strands crumble over the years.

It will take another year or two for the complete Neanderthal nuclear genome sequence to reach a comparable level of quality, Briggs says. In the meantime, he and his colleagues will make thrifty use of the rough draft to understand Neanderthal biology, evolution and their relationship to humans - and the big question: did they interbreed or not?

On that question, the answer seems to be probably not. Although the two species seemed to have lived together, if the first European humans regularly interbred with Neanderthals, researchers would expect the genome of modern Europeans to share more similarities with Neanderthals than those of modern Africans.

This is not the case, Briggs says. Europeans and Africans appear to have equal numbers of genetic differences with Neanderthals, suggesting that the first anatomically modern humans to arrive in Europe replaced their close relatives Homo neanderthalensis.

Brain mutations

The rough draft is also expected to say some things about Neanderthal biology. "We're starting to be able to answer individual questions about concrete genes," says Briggs.

Preliminary results suggest that Neanderthals were lactose intolerant, hardly surprising since the ability to digest dairy products in adulthood only became common in humans after the domestication of cows, 10,000 years ago. Neanderthals also seem to lack a mutation associated with increased fertility, identified in Icelanders. A 2005 paper suggested that this mutation had entered humans through inbreeding with Neanderthals.

Nor do Neanderthals boast mutations in a gene called microcephalin, linked to bulging brains in humans. This might shoot down another controversial hypothesis contending that this version of microcephalin also evolved in Neanderthals then spread to humans through inbreeding.

With a draft sequence, Briggs and his team will be able to home in on more genes known to have changed since humans split with chimpanzees, six million years ago, and determine where Neanderthals stand in relation. This will shed light on the evolution of modern humans after their ancestors split from Neanderthals, more than 600,000 years ago.

Ancient sex habits

Brigg's team is also developing methods to buff up their coverage of specific areas of the genome to answer pointed questions about Neanderthal genetics with more certainty than a 1x genome can provide.

But deeper insights - the kind that now flow routinely from animal and individual human genomes - will have to wait for more data. With a more meticulous sequence, researchers will be able to compare the genomes of humans and Neanderthals in search of slight changes to DNA that do not make proteins, but instead determine how much is produced.

Another analysis might determine whether Neanderthals practiced polygyny, with fewer males reproducing with more females, Briggs says. Deeper coverage will also help scientists understand genetic diversity within Neanderthals. Although, the researchers are working with DNA from just one individual, his two genome copies will differ in some places.

And although most other Neanderthal skeletons have yielded far too little DNA to provide a complete genome, technological advances and new samples could make another Neanderthal genome soon possible. "There is hope for more material to arrive," Briggs says.

Statin warning for pregnant women

Pregnant women or those hoping to start or extend a family should avoid using the cholesterol-lowering drugs statins, say scientists.

Current clinical guidelines already recommend that women who are pregnant should stop taking statins but the advice is based on the knowledge that cholesterol is essential for normal fetal development. Indeed, a 2007 study examining the risk of congenital anomalies in children of pregnant women using statins suggested that the detrimental effects of the drugs may be restricted to fat-soluble or 'lipophilic' statins only. But new research from The University of Manchester has shown that even water-soluble or 'hydrophilic' statins, such as pravastatin, can affect placental development leading to worse pregnancy outcomes.

"The rapid rise in obesity and type-2 diabetes is a major health issue and affected individuals are often treated with statins to lower circulating cholesterol levels and reduce the risk of heart disease," said Dr Melissa Westwood, a Senior Lecturer in Endocrinology based at the Maternal and Fetal Health Research Centre at St Mary's Hospital, Manchester.

"Given the evolving demographic profile of these conditions, such drugs are increasingly prescribed to women of reproductive age but the actions of statins are not limited to the regulation of cholesterol levels, as they can affect the production of other chemicals in the body too. "Our study examined the effects that both lipophilic and hydrophilic statins had on a key biological system that is crucial for maintaining the normal function of the placenta, which acts as the nutrient-waste exchange barrier between mother and fetus."

The research, funded by the Biotechnology and Biological Sciences Research Council (BBSRC), used a placental-tissue model that could be maintained in a viable state outside the body for several days and tested the effects of two different statins – one water-soluble and one that dissolves in fat. As expected, the fat-soluble statin, cerivastatin, affected the placenta resulting in reduced growth but the researchers also found that pravastatin – the water-soluble statin thought to be potentially compatible for use in pregnancy – had the same detrimental effect.

"These results clearly show that the effect of statins on the placenta is not dependent on their lipophilicity as had previously been suggested," said Dr Westwood, whose findings are published in the Journal of Cellular and Molecular Medicine. "While hydrophilic statins have not been reported to increase the incidence of fetal malformations, our research suggests that they will have a detrimental effect on placental growth, which is likely to result in poor pregnancy outcome.

"Healthcare professionals should continue to advise women to avoid the use of any type of statin once they plan to start a family or when a pregnancy is suspected or confirmed."

Notes for editors:A copy of the paper: 'Statins are detrimental to human placental development and function; use of statins during early pregnancy is inadvisable,' is available on request.

Cholinesterase inhibitors reduce aggression, wandering and paranoia in Alzheimer's disease

INDIANAPOLIS - Cholinesterase inhibitors, used to treat cognitive symptoms of Alzheimer's disease, are also a safe and effective alternative therapy for the behavioral and psychological symptoms of dementia, according to a study that appears in the December 2008 edition of Clinical Interventions in Aging.

Investigators from the Indiana University School of Medicine, the Regenstrief Institute and Wishard Health Services reviewed nine randomized, double-blind, placebo-controlled clinical trials evaluating the effectiveness of three popular cholinesterase inhibitors in managing behavioral and psychological symptoms displayed by patients with Alzheimer's disease.

The researchers report that the trial results indicate cholinesterase inhibitors led to a statistically significant reduction in behavioral and psychological symptoms such as aggression, wandering or paranoia when using the same dosage as administered for improving cognitive impairment.

Nine out of 10 Alzheimer's disease patients display behavioral and psychological symptoms of their disease. The review of the clinical trials revealed that cholinesterase inhibitors are safe, producing no major side effects.

"There is a need for safe alternatives to the anti-psychotic drugs currently used to manage the behavioral and psychological symptoms of Alzheimer's disease. The results of the studies we analyzed are encouraging and suggestive that cholinesterase inhibitors are safe and effective alternatives. However, they are underutilized and typically prescribed for less than three months and for less than 10 percent of patients with Alzheimer's disease. Our findings might provide clinicians with useful data to justify the appropriate use of these medications," said Malaz Boustani, M.D., corresponding author of the Clinical Interventions in Aging paper. Dr. Boustani is

assistant professor of medicine at the IU School of Medicine, a Regenstrief Institute research scientist, a research investigator with the IU Center for Aging Research, and chief research officer of the Indianapolis Discovery Network for Dementia.

In Alzheimer's disease there is a decrease in acetylcholine, a chemical in the brain that assists memory, thought and judgment. Cholinesterase inhibitors raise acetylcholine levels. Increased concentrations of acetylcholine in the brain leads to increased communication between nerve cells and may improve or stabilize the symptoms of Alzheimer's disease in the early and moderate stages of progression.

Noll Campbell, PharmD, a clinical pharmacy specialist in geriatric psychiatry with Wishard Health Services and corresponding author of the paper, said that, "This class of medications has already been approved by the Food and Drug Administration to manage symptoms of Alzheimer's-type dementia, although their potential benefits on behavioral symptoms are not frequently identified by many prescribers. Clinical trials of cholinesterase inhibitors have shown benefits in several domains of cognitive function as well as behavioral symptoms associated with dementia, and may improve the management of behavioral problems while reducing the use of more harmful medications that are needed to control behaviors."

Dr. Boustani noted that the vast majority of busy primary care physicians, the doctors who see the majority of patients with Alzheimer's disease, are unaware of the details of the studies analyzed in the Clinical Interventions in Aging paper and he hopes that this new paper, which reviewed the studies, will encourage them to prescribe cholinesterase inhibitors, with its benefits for both cognition and behavior symptoms to their Alzheimer's disease patients.

Other co-authors of the study are Amir Ayub, M.D., IU Center for Aging Research; Martin Farlow, M.D., professor of neurology at the IU School of Medicine; Chris Fox, MPsyMed and Ian Maidment, MRPharmS, MCMH of the University of Kent; and Robert Howard, M.R.C.Psych. of King's College, London.

Genetic test for spinal muscular atrophy should be offered to all couples, says the ACMG

American College of Medical Genetics makes new recommendations on population carrier screening for SMA

Carrier screening for spinal muscular atrophy (SMA) - a serious genetic disease affecting approximately 1 in 10,000 infants that causes progressive muscle weakness and death - should be made available to all families, according to a new practice guideline issued by the American College of Medical Genetics (ACMG). The statement appears in the November 2008 issue of Genetics in Medicine, the official peer-reviewed journal of the American College of Medical Genetics. In the past, tests to identify carriers of the gene responsible for SMA have generally been offered only to people with a family history of the disease. According to new recommendations from the ACMG's Professional Practice and Guidelines Committee of the ACMG, "Because SMA is a common genetic disorder in all populations, carrier testing should be offered to all couples regardless of race or ethnicity." Thomas W. Prior, Ph.D., professor at The Ohio State University, is the author of the new statement.

Spinal muscular atrophy is a severe neuromuscular disease caused by mutations in the SMN1 gene. The mutations cause degeneration of a specific type of nerve cell (motor neurons) in the spinal cord, leading to progressive muscle weakness and paralysis. Children with the most common and severe type of SMA (type I, also called Werdnig-Hoffman syndrome) have severe, generalized muscle weakness, usually leading to death from respiratory failure before age 2. Other types of SMA are less severe, but are still serious and disabling.

Spinal muscular atrophy is a recessive genetic disease, meaning that both parents of an affected child are usually carriers of an abnormal SMN1 gene. It is the second most common recessive disease, after cystic fibrosis. It is estimated that between 1 in 40 to 1 in 60 individuals carry an abnormal SMN1 gene, and about 1 in 10,000 infants are born with SMA.

An accurate genetic test is available for detecting the SMN1 gene mutation that causes SMA. In the past, these tests have been primarily offered to families with a child affected by SMA -whereas individuals without a history of the disorder were not tested. There is no way to identify couples at high risk of carrying the abnormal SMN1 genes, other than DNA testing. Furthermore in contrast to some other genetic diseases for which carrier testing has been extremely important - for example, Tay-Sachs disease, which occurs at high rates among people of Ashkenazi Jewish ancestry - SMA seems to affect all populations.

According to the new ACMG guidelines, SMA meets established criteria for population-based genetics screening. It is a severe disease, there is a relatively high frequency of gene carriers in the population, and an accurate genetic test is available, along with prenatal diagnosis and genetic counseling.

"The goal of population based SMA carrier screening is to identify couples at risk of having a child with SMA," said Prior, the Guideline's author. Ideally, testing should be performed early in pregnancy or before

conception: "Preconception carrier screening allows carrier couples to consider the fullest range of reproductive options."

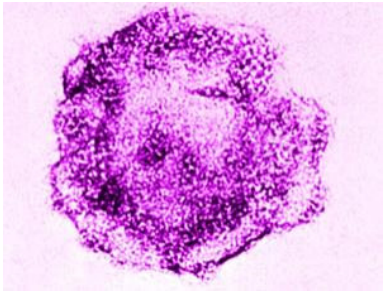
A key stipulation is that formal genetic counseling must be made available to anyone requesting SMA testing. "It is important that all individuals undergoing testing understand that a carrier is a healthy individual who is not at risk of developing the disease, but has a risk of passing the gene mutation to his/her offspring," according to the statement. Couples with positive tests need to be provided with information on the risks of any current or future pregnancies, as well as all available reproductive options.

Counseling must also include information on the limitations of carrier screening. Because of the complexity of the genetic abnormalities causing SMA, about ten percent of carriers of abnormal SMN1 genes are not detected by the current test. Couples must also understand that the test cannot predict how severe the disease will be - although the type 1 SMA occurs in about 70 percent of cases, and milder types of SMA account for 30 percent.

As for any type of gene carrier screening, testing is voluntary. The statement also addresses the need for informed consent, as well as issues of confidentiality, social and psychological, and cost issues common to all genetic tests. "The new recommendation to extend SMA carrier screening to the general population is a good example of the way in which technical capabilities and knowledge in the field of genetics are advancing to the point that entire populations stand to benefit," comments Dr. James P. Evans, Editor-in-Chief of Genetics in Medicine.

Cold sore virus might cause Alzheimer's

* 17:46 09 December 2008 **by Andy Coghlan**



Tests on brain samples from dead people have strengthened claims that Alzheimer's disease may be caused by the same virus that causes cold sores. "We think the virus is a very strong risk factor for the disease," says Ruth Itzhaki of the University of Manchester, UK - head of the team leading the investigation.

If confirmed by further research, the finding opens up the possibility of treating Alzheimer's with acyclovir, a cheap antiviral drug used to treat cold sores, or even vaccinating against it.

Herpes simplex type-1 virus is responsible for those irritating cold sores, and maybe Alzheimer's too **(Image: CDC/Phanie/Rex Features)**

One of the hallmarks of the incurable disease is the presence of sticky plaques, which seem to clog up the working of the brain and result in dementia.

Brain maps

The virus that causes cold sores - Herpes simplex type 1 - was found in 90% of plaque samples from six patients who had died of Alzheimer's disease. The virus was also found in 80% of the plaques in brain tissue from five "control" patients who didn't die of Alzheimer's, although they had far fewer plaques overall than the patients.

However, the most convincing evidence that the virus is linked with the disease came from scans mapping the whereabouts of the virus across the whole brain. These showed that, in the Alzheimer's patients, 72% of the virus found was in the plaques, compared with just 24% in the non-Alzheimer's brains. "It's very specifically located in the plaques, so it strongly supports the likelihood that the virus is a major cause of plaque formation," says Itzhaki.

In earlier studies, Itzhaki's team demonstrated that when healthy brain cells are grown in culture and infected with HSV-1, they accumulate the same amyloid beta protein that is found in plaque. Itzhaki's team followed that up by showing that amyloid beta plaques formed in the brains of mice deliberately infected with the virus.

Now the new results provide direct evidence that the same happens in the brains of people with Alzheimer's.

Antiviral attack

Itzhaki found that all six patients had inherited at least one copy of APOE-ε4 - a gene variant previously linked with higher risk of Alzheimer's.

She speculates that the variant somehow impairs clearance of the amyloid protein from brain cells infected by the virus, or perhaps leads to excessive production of the protein in those cells. "It either enhances the damage, or makes the cells less efficient at repairing it," she says. "We suggest the virus enters the brain in the elderly as their immune systems decline, and establishes a latent infection from which it is repeatedly reactivated by events such as stress, immunosuppression and brain inflammation," says Itzhaki.

In normal brains, the infection is kept under control, but in patients with the APOE-ε4 gene variant, the virus gets the upper hand, leading to Alzheimer's.

Already, Itzhaki has followed up her findings to see if antiviral drugs like acyclovir reduce symptoms. "We've used the antivirals in infected human cells and found it reduced the burden of beta amyloid," she says. "It was obvious by eye that there were great reductions." The next step, says Itzhaki, is to raise funds for a clinical trial. "All the evidence we have suggests it would work," she says.

Not everyone is convinced, however. "Although the new research provides some additional evidence supporting a link between the herpes virus and Alzheimer's disease, there is considerable uncertainty around whether this is a promising avenue of research," says Clive Ballard, director of research at the UK Alzheimer's Society. *Journal reference: Journal of Pathology (DOI: 10.1002/path.2449)*

If MRI shows signs of MS, will the disease develop?

ST. PAUL, Minn. – With more and more people having brain MRIs for various reasons, doctors are finding people whose scans show signs of multiple sclerosis (MS) even though they have no symptoms of the disease. A new study published in the December 10, 2008, online issue of Neurology®, the medical journal of the American Academy of Neurology, found that a third of these people developed MS within an average of about five years.

The study involved 44 people who had brain scans for various reasons, such as migraine headaches or head trauma, that showed abnormalities similar to those that occur in MS. The researchers confirmed that the abnormalities were the same as in MS and ruled out other possible causes. Then the researchers monitored the participants to determine whether they developed the disease.

Within an average of 5.4 years, 30 percent of the participants had developed MS symptoms. The brain scans of an additional 29 percent of the people showed further abnormalities, but they continued to have no symptoms of the disease. "More research is needed to fully understand the risk of developing MS for people with these brain abnormalities, but it appears that this condition may be a precursor to MS," said study author Darin T. Okuda, MD, of the University of California, San Francisco, the UCSF Multiple Sclerosis Center and a member of the American Academy of Neurology.

Okuda and his colleagues are calling the condition the radiologically isolated syndrome (RIS).

Okuda said further research is also needed before any recommendations can be made regarding treatment. Editorial author Dennis Bourdette, MD, of Oregon Health & Science University in Portland and a Fellow of the American Academy of Neurology, took a stronger stand, noting that seven of the study participants had received MS treatment before they were referred to the UCSF MS center.

"Diagnosing a patient with MS has serious psychosocial and treatment implications, and physicians have an obligation to follow appropriate criteria in making the diagnosis," Bourdette said. "Patients must have symptoms to receive a diagnosis. This study sets the stage for establishing a process for evaluating these patients and following them to help determine the risk of developing MS. Until then, we should not tell them that they have MS or treat them with disease-modifying therapies. For now, it's best to remember the wise advice that we 'treat the patient, not the MRI scan.'"

Bug genes are the key to human digestion

WITHOUT the "good" bacteria in our guts, we could not digest food. You might expect that we would all have the same set of bacteria to provide the chemical machinery that does the job. But this turns out to be only half true.

Knowing that gut bacteria are key to digestion and metabolism, Jeffrey Gordon of Washington University School of Medicine in St Louis, Missouri, and his colleagues went in search of a core group of bacterial species that aid digestion. They expected to find these species living in the guts of most healthy people. When the researchers analysed faeces from 154 people this turned out not to be so. The subjects did, however, all possess the same core group of bacterial genes needed for digestion, albeit from different species (Nature, DOI: 10.1038/nature07540).

It is this combination of genes, rather than any particular species, that is necessary for a healthy gut, says Gordon. "We've learned that you can have different collections of species, yet the gene functions represented in these collections are broadly shared."

The analysis also flagged up differences between the bacterial genes of obese and lean people. Obese individuals had a greater proportion of genes for digesting fat, protein and carbohydrates, which might make them better at extracting and storing energy from food. Gordon hopes that a better knowledge of these genes might suggest new ways of combating obesity.

Interestingly, participants who were related shared similar gut bacteria species as well as genes.

High phosphorus linked to coronary calcification in chronic kidney disease

For patients with moderate chronic kidney disease (CKD), higher levels of phosphorus in the blood are associated with increased calcification of the major arteries and heart valves—which may contribute to the increased risk of cardiovascular disease in patients with CKD, reports a study in the Journal of the American Society of Nephrology (JASN).

"Previous studies have found that a very high level of phosphorus in the blood can lead to cardiovascular disease and vascular calcification in dialysis patients," comments Bryan Kestenbaum, MD, of the University of Washington in Seattle, Washington, one of the authors of the new study. "We are now recognizing that even a mild increase in the serum phosphorus level is associated with cardiovascular events in people with CKD who are not on dialysis."

The researchers looked at the relationship between blood phosphorus levels and vascular (blood vessel) calcification in a group of 439 patients with moderate CKD. Patients with CKD have loss of kidney function that, in many cases, progresses to end-stage renal disease. Detected by a special computed tomography (CT) scan, vascular calcification is an indicator of overall atherosclerosis ("hardening of the arteries"). Coronary artery calcification is also linked to an increased risk of cardiovascular events, such as myocardial infarction (heart attack).

The CT scans showed calcifications of the coronary arteries in two-thirds of the CKD patients. Ninety-five percent of the patients had phosphorus levels within the normal range—between 2.5 and 4.5 milligrams per deciliter (mg/dL). Even within this normal range, patients with higher phosphorus levels were more likely to have vascular calcification. For each 1 mg/dL increase in phosphorus level, the risk of coronary artery calcification increased by 21 percent, after adjustment for level of kidney function and other characteristics.

The relationship between phosphorus and vascular calcification was unaffected by traditional risk factors, including lower kidney function, dietary factors, or levels of parathyroid hormone or vitamin D—which, like phosphorus, have important effects on bone.

"Higher serum phosphorous levels within the normal range have been associated with cardiovascular events and premature death in people with CKD," according to Dr. Kestenbaum. "Experimental work suggests that phosphorous causes toxicity by promoting calcification of blood vessels. We were able to demonstrate that people with higher serum phosphorus levels tended to have more calcification."

Another study in the same issue of JASN shows that high-normal phosphorus levels are also linked to increased coronary artery calcium in healthy adults without kidney disease. Both studies raise the possibility that phosphate-lowering drugs—generally used only in patients with end-stage renal disease, who have higher-than-normal phosphorus levels—might help to reduce cardiovascular risk in CKD patients and even in healthy adults with high-normal phosphate levels.

The study has some important limitations. Serum phosphorus levels were measured at the same time as the calcification scores—it is not clear whether current serum phosphorus levels represent those which were present when calcification was developing. Further, it is possible that calcified lesions give rise to the higher serum phosphorous levels that were observed. Also, people who have higher serum phosphorous levels may have other characteristics that explain their greater tendency toward calcification.

The principal investigator has received consulting fees from Genzyme, Abbott, and Shire Inc, and has received grant support from Amgen Inc. The study will appear online at http://jasn.asnjournals.org/ on December 10, 2008, and in the February 2009 print issue of JASN.

Long-term use of diabetes drugs by women significantly increases risk of fractures

A group of drugs commonly used to treat diabetes can double the risk of bone fractures in women, according to a new study by the University of East Anglia (UEA) and Wake Forest University. Published today in the Canadian Medical Association Journal (CMAJ), the findings show that use of thiazolidinediones for more than one year by women with type 2 diabetes significantly reduces bone density, resulting in the risk of fractures being doubled. The researchers found no increased risk of fractures among men, however.

Thiazolidinediones are a group of drugs used to treat type 2 diabetes. Included in this group are the drugs rosiglitazone and pioglitazone. Latest figures show there are around 4 million users of these drugs in the US, while in the UK there were around 2 million prescriptions for rosiglitazone and pioglitazone last year.

"Women with type 2 diabetes are already at an increased risk of fractures - with a near doubling in the risk of hip fractures - so any additional risk from thiazolidinedione therapy could have a considerable impact on public health," said lead author Dr Yoon Loke, of the University of East Anglia.

"The underlying causes of this gender-specific effect of thiazolidinediones require further investigation. In the meantime, regulatory authorities and clinicians should reconsider recommending these drugs to women with type 2 diabetes. "This is a problem that arises with long-term use, and patients should not stop or change their

treatment suddenly without consulting their doctors. Women who have taken these drugs for more than a year should speak to their doctors about other treatment options."

Recent research into thiazolidinediones has focussed on the drugs' adverse cardiovascular effects. This new meta-analysis involved a systematic review of 10 clinical trials involving a total of 13,715 participants. The trials lasted from one to four years and all were double-blinded.

There is no clear evidence that other drugs used to treat type 2 diabetes, such as metformin and sulfonylurea, cause an increased risk of fractures.

'Long-term use of thiazolidinediones and fractures in type 2 diabetes: systematic review and meta-analysis' by Yoon Loke (University of East Anglia, UK), Sonal Singh and Curt Furberg (both Wake Forest University, US) is published in CMAJ on December 10.

Drug-resistant tuberculosis rife in China

Levels of drug-resistant tuberculosis (TB) in China are nearly twice the global average. Nationwide research published in the open access journal BMC Infectious Diseases has shown that almost 10% of Chinese TB cases are resistant to the most effective first-line drugs.

Susan van den Hof, from the KNCV Tuberculosis Foundation in The Netherlands is one of the authors on a Chinese study into the prevalence of multi-drug resistant tuberculosis (MDR-TB). She said, "In order to obtain insight into the prevalence and distribution of resistance, China has joined the global project on anti-tuberculosis drug resistance surveillance, and investigated drug resistance in ten provinces between 1996 and 2004."

China has the second largest number of TB cases in the world, and is one of the countries with high levels of drug-resistant TB. According to the authors, "The prevalence of drug resistance varied greatly between the provinces, but on average was worryingly high, with a weighted mean for MDR-TB of 9.3% among all cases; 5.4% among new cases and 25.6% among previously treated cases. The global MDR-TB estimates are 4.8% for all cases, 3.1% for new cases and 19.3% for previously treated cases."

Treatment of MDR-TB requires use of costly, toxic and less effective second-line drugs and infected patients are less likely to survive treatment. In a well-functioning TB control program with low levels of defaulting from treatment, high resistance levels are expected among previously treated cases. This is consistent with the authors' observations in China. If a good TB control program is in place, the proportion of previously treated patients among all TB patients should also be low. In China the proportion of previously treated patients varied between the provinces but on average was about 20%, compared to a global average of 11%.

The authors said, "Many possible explanations for the development of drug resistance in China exist, and different explanations may prevail in different areas of this vast country. These include the inadequate use of anti-TB drugs in public hospitals, lack of supervision of treatment, poor drug-management and absence of infection control measures in hospitals. Also, availability of anti-TB drugs without a prescription in some areas of China in the past may have contributed to the development of drug resistance."

At this moment, programmatic treatment of MDR-TB cases with second-line drugs is being piloted in some areas of China. MDR-TB treatment will then be expanded within China to prevent further spread of MDR-TB and help to bring MDR-TB rates down.

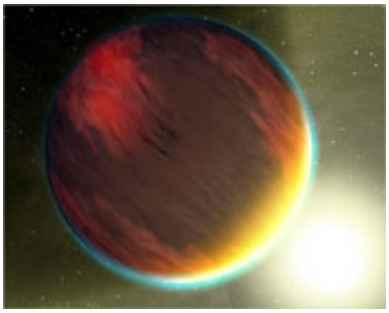
Notes to Editors

1. Prevalence of tuberculosis drug resistance in 10 provinces of China Guang Xue He, Yan Lin Zhao, Guang Lu Jiang, Yu Hong Liu, Hui Xia, Sheng Fen Wang, Li Xia Wang, Martien W Borgdorff, Marieke J van der Werf and Susan van den Hof BMC Infectious Diseases (in press)

During embargo, article available at: www.biomedcentral.com/imedia/1330770062143561_article.pdf?random=136307 After the embargo, article available at the journal website: www.biomedcentral.com/bmcinfectdis/

Carbon Dioxide (No S.U.V.'s) Detected on Distant Planet

By KENNETH CHANG



Astronomers testing techniques to search for extraterrestrial life have detected carbon dioxide in the atmosphere of a planet 63 light-years away. This carbon dioxide, though, is certainly not coming from plants or automobiles. The planet, HD 189733b, is far too large (about the mass of the Jupiter) and too hot (1,700 degrees Fahrenheit) for any possibility of life.

"It's really a proof of concept of using CO2 as a biomarker," said Mark R. Swain, a research scientist at NASA's Jet Propulsion Laboratory in Pasadena, Calif., who led the team that made the discovery. The findings will appear in Astrophysical Journal Letters.

This artist's concept shows a cloudy Jupiter-like planet that orbits very close to its fiery hot star. **NASA/JPL-Caltech/T. Pyle**

This year, astronomers including Dr. Swain's group reported finding water vapor and methane swirling around HD x189733b. And in Thursday's issue of the journal Nature, a different group of astronomers, led by Carl J. Grillmair of the California Institute of Technology, now report that they, too, have detected water around the same planet, using a technique more precise than that used in earlier research.

As seen from Earth, HD 189733b passes directly in front of and behind its parent star as it orbits. Taking advantage of those eclipses, Dr. Swain's group used the Hubble Space Telescope to compare the near-infrared light from the star alone (when the planet was hidden behind it) with the combined light from both.

The difference between the two spectrums revealed the light emitted from the planet, and the mix of colors in the planet's light contained the telltale signs of carbon dioxide at concentrations of between one part per million and one part per 10 million, compared with Earth at about 385 parts per million.

Even that much carbon dioxide was a bit of a surprise, because the simplest chemistry equations predicted that carbon would prefer to form carbon monoxide or methane molecules. One possibility is that the intense ultraviolet radiation from the star, just three million miles away, is spurring chemical reactions to produce the observed carbon dioxide.

"The theorists will have no problem explaining it," said L. Drake Deming, a planetary scientist at NASA's Goddard Space Flight Center in Greenbelt, Md., and a member of Dr. Swain's team.

Meanwhile, the detection of water by Dr. Grillmair's team, using a similar technique but with longer-wavelength infrared emissions detected by the Spitzer Space Telescope, confirms what had been expected: hydrogen and oxygen are two of the most common elements in the universe, and they readily combine into water. "This result basically confirms what the theoreticians have been saying for a number of years," Dr. Grillmair said. "There should be a huge amount of water in these atmospheres, and it looks like there is."

Living in multigenerational households triples women's heart disease risk

Living arrangement and coronary heart disease: The JPHC study online first, Heart 2008

Living in a household with several generations of relatives triples a woman's risk of serious heart disease, suggests research published ahead of print in the journal Heart.

The researchers assessed the long term impact on health of domestic living arrangements among almost 91,000 Japanese men and women aged between 40 and 69. None of the study participants had been diagnosed with any serious illness, such as cancer, heart disease, or stroke at the start of the study in 1990-4.

They were quizzed about their personal and family medical histories, perceived stress, occupation, personality, and lifestyle factors, such as diet and exercise.

They were also asked about their domestic living arrangements and the family structure of their households.

During the monitoring period, which ended in 2004, 671 people were newly diagnosed with coronary artery disease, 339 died of coronary heart disease, and 6255 died from other causes.

After taking account of factors likely to influence the results, women who lived with a partner, children, and their parents, or their spouse's parents, were two to three times more likely to be diagnosed with coronary heart disease than women who just lived with a partner. But they were no more likely to die of their disease than their peers who lived with just a partner, suggesting that while living arrangements may boost the risk of diagnosis, it does not affect prognosis, say the authors.

But it wasn't just women living with parents and children who were at increased risk of serious heart problems.

Women who lived with a partner and children were also twice as likely to be diagnosed with coronary heart disease as those who lived in households without children.

The presence of other close relatives, especially parents, seems to deter women from unhealthy behaviours, such as heavy drinking and smoking, which could boost their susceptibility to heart disease, the authors point out. But the stress of fulfilling multiple roles as daughter/daughter in law, mother and partner probably has a deleterious effect on heart health, they suggest.

Over the long term, this is likely to boost levels of stress hormones and inflammatory proteins, which in turn may strengthen the effects of other risk factors, such as high blood pressure, or diabetes, they conclude.

EURASIA INSIGHT

Turkey: Ancient Pagan Temple Site Yields New Archeological Clues On Origins Of Farming

Nicholas Birch 12/09/08

It's the last day of the excavating year at Gobekli Tepe, the hill-top neolithic site whose circles of huge decorated T-shaped stones are at least 5,000 years older than any other monumental structure ever found. Workmen have already buried the bases of the stones in rubble to protect them from the winter rain.

Now they are laying raised walkways into the centre of a site that was previously off-limits to visitors.

In between shouted instructions, the German archaeologist who has been excavating the site since 1994 sums up four more months of digging. "This is not like an ordinary excavation, uncovering a wall here and the corner of a house there," Klaus Schmidt says, standing at the highest point of a 15-metre high artificial mound that covers nine hectares. "In 14 years, we have uncovered barely five percent of what is here. There are decades of work ahead."

Apart from a new transverse cut to the left of the main dig, and the excavation of a small, late circle that probably dates from about 8,500 B.C., little appears to have changed since March. [For background see the Eurasia Insight archive].

But there have been striking discoveries: a U-shaped stone sculpted with leopards and a boar that Schmidt compares to the Lion Gate at Mycenae; two almost life-size sculptures of a boar and wild cat found embedded within the rubble walls surrounding one early enclosure.

Schmidt and his team have also uncovered a hollowed-out stone, roughly four-foot square, lying cracked in the middle of one of the circles. "We found similar stones in other enclosures, and we assumed they are some sort of door", Schmidt says. "The position of this one makes us wonder whether the circles weren't vaulted," like the trulli of southern Italy, or the famous bee-hive houses at Harran, just south of Gobekli Tepe.

Potentially much more significant, although almost invisible to the untrained eye, archaeologists have also uncovered evidence that the builders of at least one of the oldest circles had dug roughly five meters down through the mound before erecting the standing stones on the bedrock. "For the time being this is just hypothesis, but this leaves us wondering whether the site dates back to before [c. 9500 b.c.], when the earliest circles were built," Schmidt says. "Piling up a five-meter mound is not the work of one night."

Whatever the carbon-dating eventually shows, Gobekli Tepe stands at the cusp of what is arguably the biggest social revolution in human history - the transformation of semi-nomadic hunters into settled farmers.

Archaeologists now know a great deal about the whens and wheres of the birth of agriculture.

DNA tests on wild wheat growing on Karacadag, a mountain just east of Gobeklitepe, suggest it may have been the source of early cultivated strains. At Nevali Cori, a neolithic village 40 miles northwest of Schmidt's site, archaeologists found seeds of domesticated einkorn wheat dating from 9000 b.c.

But debate still rages - and probably always will - about what it was that led neolithic groups to transfer almost all their energies into farming. For many experts, climate change was behind the transformation. Global temperatures had been warming gradually since the last Ice Age. Between 10,800 and 9,500 b.c., they suddenly plummeted again.

The Greenland ice cap cooled by roughly 15 degrees. Rain stopped falling on the Fertile Crescent. "The region where grasses could be cultivated shrank to the very upper edges of the Middle East, northern Syria and southeastern Turkey," says Ofer Bar-Yosef, MacCurdy Professor of Prehistoric Archaeology at Harvard and a doyen of paleolithic studies. "Even there, resources were limited - people wanted to keep them for themselves."

But the location, age and sheer size of Gobekli Tepe have led some to posit a radically different explanation for the change. "The intense cultivation of wild wheat may have first occurred to supply sufficient food to the hunter-gatherers who quarried 7-ton blocks of limestone with flint flakes," writes Stephen Mithen, Professor of Archaeology at the University of Reading, in the United Kingdom. The move to farming may "have been driven as much by ideology as by the need to cope with environmental stress."

Klaus Schmidt appears in two minds about the theory. In a book he wrote in German about Gobekli Tepe, he suggests that "temples came first, and cities followed." Sipping sugary tea outside a portakabin at the entrance to the site, he is more circumspect. "There is no doubt this was a place of huge feasts, and hunter-gatherers would have had difficulty gathering together enough food to feed large groups," he says. "Some American colleagues say such feasts may have been the origin of domestication."

His caution stems from growing evidence uncovered over the last five years or so that domestication was a much longer process than previously believed.

Experts now think farmers probably sowed grain for at least a thousand years before domesticated strains appeared. In 2004, French archaeologists showed how neolithic settlers had corralled wild cattle in southern Turkey before transporting them to Cyprus.

Professor Bar-Yosef has had his doubts about the theory of ideological farmers since the start. "First you need to get your economy working," he says. "Then you build the monuments that justify the complex social organization that requires."

Complex, he adds, can sometimes mean unjust. "You can't build places like Gobekli with kibbutzim," he says. "I wouldn't be surprised if somebody somewhere in the Fertile Crescent finds evidence of slave labour in the near future." *Editor's Note: Nicolas Birch specializes in Turkey, Iran and the Middle East.*

A new class of anti-inflammatory drugs

Fewer side effects than aspirin

In the treatment of pain, inflammation and fever, non-steroid anti-rheumatic drugs (NSAR) such as acetylsalicylic acid - more commonly known as Aspirin - or Ibuprofen have always been popular choices. However, had they been tested using today's stringent criteria, many of these drugs would not have passed the clinical trial stage, due to the potential risks and side effects they entail. This suggests the need for more innovative thinking in this area of drug therapy. One such new approach has been developed in Manfred Schubert-Zsilavecz's laboratory at the Goethe University, using chemical substances belonging to the dual mPGES-1/5-LO-Inhibitors.

Oliver Werz's group at Tübingen has characterized the substances at the molecular/pharmacological level. Their research results now form the basis of a joint patent application, and a publication in the renowned "Journal of Medicinal Chemistry" (Koeberle et al, J Med Chem (2008), Nov 19. [Epub ahead of print]).

Aspirin and the related NSAR drugs act on the arachidonic acid biosynthesis cascade, which plays a central role in the onset of pain and inflammation. They thus prevent the synthesis of specific prostaglandins, which are essential for vital bodily functions. When the drugs are taken over a long period of time, the unselective inhibition of this essential pathway may result in unwanted side effects on the gastrointestinal tract and the cardiovascular system. As Schubert-Zsilavecz explains: "By comparison, our class of drugs/substances acts on a later stage in the arachidonate cascade, and is more selective. We therefore can expect it to have considerably fewer side effects."

A further advantage of this new class of drugs is that they not only specifically target the biosynthesis of prostaglandin, but also of leukotrienes, which are metabolites in the second important branch of the arachidonate cascade and play a central role in allergic and inflammatory reactions. This double attack promises more effective results for these new substances.

Gerd Geisslinger, Speaker of the LiFF-Initiative and President of the Center for Drug Research, Development and Safety (ZAFES) explains: "This is a most important success for our newly established Lipid Signalling Research Centre, which was established only a short time ago under the LOEWE initiative, funding research in the German state Hesse."

The dark chocolate version of Father Christmas is most filling

New research at the Faculty of Life Sciences (LIFE), University of Copenhagen shows that dark chocolate is far more filling than milk chocolate, lessening our craving for sweet, salty and fatty foods. In other words, eating dark chocolate may be an efficient way to keep your weight down over Christmas.

Mørk chokolade mætter mestWe have known for a long time that it is healthier to eat dark chocolate, but now scientists at the Department of Human Nutrition at LIFE, University of Copenhagen, have found that dark chocolate also gives more of a feeling of satiety than milk chocolate.

Chocolate experiment

To compare the effects of dark and milk chocolate on both appetite and subsequent calorie intake, 16 young and healthy men of normal weight who all liked both dark and milk chocolate took part in a so-called crossover experiment. This meant that they reported for two separate sessions, the first time testing the dark chocolate, and the second time the milk chocolate.

They had all fasted for 12 hours beforehand and were offered 100g of chocolate, which they consumed in the course of 15 minutes. The calorific content was virtually the same for the milk and dark chocolate.

During the following 5 hours, participants were asked to register their appetite every half hour, i.e. their hunger, satiety, craving for special foods and how they liked the chocolate.

Results

Two and a half hours after eating the chocolate, participants were offered pizza ad lib.

They were instructed to eat until they felt comfortably satiated. After the meal, the individuals' calorie intake was registered.

The results were significant. The calorie intake at the subsequent meal where they could eat as much pizza as they liked was 15 per cent lower when they had eaten dark chocolate beforehand.

The participants also stated that the plain chocolate made them feel less like eating sweet, salty or fatty foods.

So apart from providing us with the healthier fatty acids and many antioxidants, dark chocolate can now also help us steer clear of all the sweet, salty and fattening Christmas foods.

Hot drinks help fight cold and flu

Research reveals how hot drinks could tackle cold symptoms

A hot drink may help reduce the symptoms of common colds and flu, according to new research by Cardiff University's Common Cold Centre.

New research at the Centre has found that a simple hot drink of fruit cordial can provide immediate and sustained relief from symptoms of runny nose, cough, sneezing, sore throat, chilliness and tiredness.

Published in the December 2008 edition of the clinical journal Rhinology, the research compared the effects of a commercially produced cordial apple and blackcurrant drink either 'hot' or at room temperature in 30 volunteers with common cold symptoms.

The Centre's Director, Professor Ron Eccles, is urging people suffering from colds or flu to have a hot drink to help reduce their symptoms. Professor Eccles said: "It is surprising that this is the first scientific research on the benefit of a hot drink for treating cold and flu symptoms.

"With temperatures falling and Christmas just round the corner, cold viruses love this time of year. Having a bottle of fruit cordial in the cupboard and making a hot drink could help fight off the symptoms of festive cold and flu. The big advantage of this type of treatment is that it is cheap as well as safe and effective."

Women Who Are Perceived As Confident in Job Interviews Also Seen as Lacking Social Skills

Piscataway, N.J. – A new study in Psychology of Women Quarterly finds that women who present themselves as confident and ambitious in job interviews are viewed as highly competent but also lacking social skills. Women who present themselves as modest and cooperative, while well liked, are perceived as low on competence. By contrast, confident and ambitious male candidates are viewed as both competent and likable and therefore are more likely to be hired as a manager than either confident or modest women.

Julie E. Phelan, Corinne A. Moss-Racusin, and Laurie A. Rudman of Rutgers University taped both male and female applicants interviewing to be a computer lab manager. All applicants presented themselves as competent, but also as either confident and ambitious or modest and cooperative. Participants then evaluated the applicants' competence, social skills, and hirability.

Results show how disparate hiring criteria further discriminates against ambitious, competent women. When judging the ambitious women's hirability, a perceived lack of social skills formed the basis of the hiring decision, and the womens' high competence was relatively neglected. For ambitious men, however, perceived competence and interpersonal skills were weighed equally in the hiring decision. Women were doubly disadvantaged because even when female applicants adhered to stereotypic expectations by presenting themselves as modest, they were unlikely to be hired because evaluators emphasized their relatively low competence and discounted their (high) social skills.

According to this research, women who seek managerial roles face a double bind. In order to be viewed as sufficiently qualified for leadership, they must present themselves as confident and ambitious. But if they do so, they risk prejudice for acting "unfeminine," which can result in hiring discrimination. Thus, in performance settings where confidence and ambition are required to get ahead, men have a clear advantage.

This study is published in the December 2008 issue of Psychology of Women Quarterly. Media wishing to receive a PDF of this article may contact journalnews@bos.blackwellpublishing.net.

Transplanted fat cells restore function after spinal cord injury

Fat cells treat spinal cord injury

Tampa, Fla. – A study published in the current issue of CELL TRANSPLANTATION (Vol.17, No. 8) suggests that mature adipocytes - fat cells - could become a source for cell replacement therapy to treat central nervous system disorders.

According to the study's lead researcher, Dr. Yuki Ohta of the Institute of Medical Science, St. Mariana University School of Medicine, Kawasaki, Japan, adipose-derived stem/stromal cells have in the past been shown to differentiate into neuronal cells in an in vitro setting. In their study, for the first time fat cells have been shown to successfully differentiate into neuronal cells in in vivo tests. The fat cells are grown under culture conditions that result in them becoming de-differentiated fat (DFAT) cells.

"These cells, called DFAT cells, are plentiful and can be easily obtained from adipose tissue without discomfort and represent autologous (same patient) tissue," said Ohta. "DFAT cells, with none of the features of adipocytes, do have the potential to differentiate into endothelial, neuronal or glial lineages."

The research team reported that DFAT cells expressed neurotrophic factors, such as BDNF and GDNF, prior to and after transplantation and which likely contributed to the promotion of functional recovery.

According to Ohta and colleagues, tests in animal models confirmed that the injected cells survived without the aid of immunosuppression drugs and that the DFAT-grafted animals showed significantly better motor function than controls.

"We concluded that DFAT-derived neurotrophic factors contributed to promotion of functional recovery after spinal cord injury (SCI)," said Ohta. "Transplanting DFAT cells into SCI rats significantly promoted the recovery of their hind limb function."

"These studies demonstrate the ability to obtain stem cells from a patient's own fat that can help repair injury to the spinal cord," said Paul R. Sanberg, PhD, DSc, at the University of South Florida Health, and Coeditor-in-chief of Cell Transplantation.

'Fly guy' makes memory breakthrough

Finding a treatment for intellectual disabilities may take off thanks to the fruit fly

Dr. Francois Bolduc keeps more than 300,000 fruit flies in a basement laboratory, where he manipulates their genes and then tests their mental abilities. He's called the "fly guy," and he may sound like a comic book villain, but Bolduc is no mad scientist.

A new recruit to the University of Alberta's Faculty of Medicine & Dentistry, Bolduc has shown that genetically disrupting a specific gene called FMR1 in a fruit fly's brain will wipe out its long-term memory. Bolduc has also found a class of drugs that helps fruit flies with this disrupted gene to regain their memories. The news is significant for humans, because FMR1 may malfunction in people with intellectual disabilities like Fragile X syndrome, and there are currently no clinically available treatments.

Fragile X syndrome is the most common cause of genetically defined developmental delays in humans, affecting 1 in 4,000 males and 1 in 8,000 females. Children with Fragile X syndrome may have learning and memory problems, epilepsy and autism.

"We know that 87 per cent of the genes found in human mental retardation have homologs in fruit flies, so we're confident that we're on to something here," said Bolduc, whose research was recently published in Nature Neuroscience.

Bolduc's test of long-term memory in fruit flies began by exposing them to two smells in succession that were different but "equally repulsive" to the flies. One of the smells was paired to a foot shock, and the other was benign. From this, the flies learn to avoid the odor that leads to a shock, even in the absence of a future shock. This memory lasts for about a week—one-fifth of a lifetime to an average fruit fly.

In his long-term memory experiment, Bolduc found just 10 per cent of the fruit flies without the FMR1 gene avoided the smell that led to a shock, while 50 per cent of the normal flies knew enough to steer clear of it.

"The evidence clearly showed that the flies without the FMR1 gene really weren't operating at the same capacity as the control group," said Bolduc, who arrived at the University of Alberta this year from the Cold Spring Harbor Laboratory in New York.

A well-functioning FMR1 gene is thought to help "quiet" new protein synthesis in the brain, enabling normal mental performance. After four years of research, Bolduc was not only able to demonstrate the cognitive deficiencies of fruit flies without a FMR1 gene, he was also able to show that adding more of the Fragile X protein than is normal in a fruit fly's brain also debilitated its mental capacity. He also identified the pathways that interfered with the function of the protein, and he determined where in the flies' brains the protein functioned. Perhaps most significantly, he enhanced memory performance in Fragile X flies by pharmaceutically decreasing protein synthesis. Fragile X flies that were fed drugs that reduced the production of protein in the brain remembered to avoid the smell associated with a shock almost as much as the normal flies.

The next step, he said, is to translate the findings into the creation of drugs to treat the condition in human patients.

"Right now there is no medical treatment—absolutely nothing that we can use routinely in the clinic—so we have a long way to go. We're probably about 10 years away, but I think we're on the right track," said Bolduc, an assistant professor in the Department of Pediatrics.

Bolduc also believes the new knowledge of the FMR1 gene will likely apply to a number of other syndromes involving reduced cognitive function.

"This type of brain research is vital in the future," he said. "The FMR1 gene is complicated, and a lot of things can go wrong with it. We've answered a few basic questions, but there is still a lot to be discovered."

A special type of collagen may help protect the brain against Alzheimer's disease

San Francisco, Ca – Scientists from the Gladstone Institute of Neurological Disease (GIND), UCSF, and Stanford have discovered that a certain type of collagen, collagen VI, protects brain cells against amyloid-beta (Aβ) proteins, which are widely thought to cause Alzheimer's disease (AD). While the functions of collagens in cartilage and muscle are well established, before this study it was unknown that collagen VI is made by neurons in the brain and that it can fulfill important neuroprotective functions.

The team of investigators led by GIND director Lennart Mucke, MD, reported in a recent edition of the journal Nature Neuroscience, that collagen VI is increased in brain tissues of Alzheimer's patients.

"We first noticed the increase in collagen VI in the brain of AD mouse models, which inspired us to look for it in the human condition and to define its role in the disease," said Dr. Mucke.

The Gladstone team had profiled changes in gene expression using DNA microarrays, which provides an unbiased method for identifying key biological pathways. By comparing all of the genes that are active in disease and normal tissue, one can get valuable information on new pathways and potential therapeutic targets.

The researchers looked at the dentate gyrus, a specific area of the brain that is critical to memory and particularly vulnerable in AD, and compared the genes that were turned on and off in normal mice and a mouse model of AD. This analysis revealed the striking increase in collagen VI in the brains of mice that model AD.

Building on this initial finding, the team examined brain tissue from AD patients and normal non-demented humans and found that collagen VI expression was also higher in the AD patients. They further discovered that the cellular source of the collagen VI in the brain was neurons, the very cells that the disease attacks and that we all need to think and remember.

"These findings were really surprising and exciting to us because nobody knew anything about collagen VI in the brain," said Jason Cheng, MD, co-lead author of the study. "We were particularly curious whether collagen VI contributed to neuronal damage in AD or was produced as a defense mechanism against it," added Dena Dubal, MD, PhD, co-lead author of the study.

To answer this and other questions, the scientists carried out a series of informative cell culture experiments. These experiments revealed found that Aβ added to neurons grown in culture increased the expression of collagen VI and that this process involved the immune regulatory cytokine TGFβ. What is more, the team discovered that increasing the amount of collagen VI in the cultures effectively protected the neurons against Aβ toxicity. "This striking protective effect suggests that increased neuronal production of collagen VI is an important component of the brain's defense against Aβ," said Dr. Mucke. "It made us really curious about the underlying mechanisms."

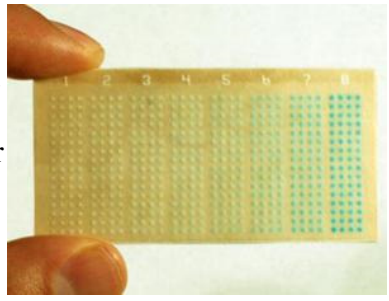
To clinch these mechanisms, Dr. Mucke's team examined the direct interactions of collagen VI with Aβ. They looked at how Aβ attacks individual neurons in cell culture. Small poisonous Aβ assemblies, called oligomers, bind strongly to vulnerable neurons in the brain, but in the presence of collagen VI, this binding was blocked. Using immunohistochemistry and atomic force microscopy, they showed that collagen VI and Aβ form large aggregates with each other that may sequester the smaller, more toxic Aβ complexes away from neurons.

"We are eager to explore how this kind of process might be enhanced therapeutically and how we can best leverage it for the development of more effective treatments for this devastating condition," said Dr. Dubal.

Other members of the research team were Gladstone's Irene Cheng, Daniel Kim, and Gui-Qiu Yu. Ina Tesseur and Tony Wyss-Coray of Stanford University and Paolo Bonaldo of the University of Padova, Italy also contributed to this study. The research was supported by the National Institutes of Health, the Howard Hughes Medical Institute, and the Larry L. Hillblom Foundation.

Life-saving lab made from paper and sticky tape

Origami artists can turn paper into all manner of ingenious objects. It's unlikely, though, that anyone has tried to make a functioning medical lab that way - until now. With the help of some bits of carpet tape, a portable testing kit made of paper could transform medical care in poor countries.



Much diagnosis depends on tests of body fluids, such as for sugar in urine or viral proteins in mucus. Some such tests are now automated in "labs on a chip" that pipe biological samples through tiny channels into cavities containing reagents that change colour to reveal the result. The trouble is that these microfluidic devices are expensive and fragile.

The chip relies on the paper wicking the fluids along carved channels to reagents that change colour to reveal the result **(Image: G Whitesides/PNAS)**

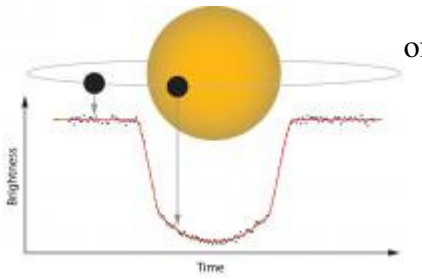
George M. Whitesides and his Harvard University colleagues cut precise patterns of tiny channels in sheets of paper and interleaved them with double-sided carpet tape laser-drilled with corresponding patterns of holes.

The paper wicks water along the channels, making pumps unnecessary, and the holes connect paper layers to form a three-dimensional maze. Samples applied to one side of the device end up in chambers pre-packed with reagents for different substances. The team's prototype measured sugar in urine, but in principle the device could do many tests at once (Proceedings of the National Academy of Sciences, DOI: 10.1073/pnas.0810903105).

A photo of the coloured dots that reveal the results could be sent by cellphone to a specialist centre for diagnosis, and the devices are light, cheap and rugged - good news for healthcare in poor countries.

Astronomers use ultra-sensitive camera to measure size of planet orbiting star

A team of astronomers led by John Johnson of the University of Hawaii's Institute for Astronomy has used a new technique to measure the precise size of a planet around a distant star. They used a camera so sensitive that it could detect the passage of a moth in front of a lit window from a distance of 1,000 miles.



The camera, mounted on the UH 2.2-meter telescope on Mauna Kea, measures the small decrease in brightness that occurs when a planet passes in front of its star along the line-of-sight from Earth. These "planet transits" allow researchers to measure the diameters of worlds outside our solar system.

IMAGE: When the planet WASP-10b crosses the disk of its star, WASP-10, the brightness of the star decreases, allowing scientists to measure the precise size of the planet.

"While we know of more than 330 planets orbiting other stars in our Milky Way galaxy, we can measure the physical sizes of only the few that line up just right to transit," explains Johnson. The team studied a planet called WASP-10b, which was thought to have an unusually large diameter. They were able to measure its diameter with much higher precision than before, leading to the finding that it is one of the densest planets known, rather than one of the most bloated. The planet orbits the star WASP-10, which is about 300 light-years from Earth.

IfA astronomer John Tonry designed the camera, known as OPTIC (Orthogonal Parallel Transfer Imaging Camera), and it was built at the IfA. It uses a new type of detector, an orthogonal transfer array, the same type used in the Pan-STARRS 1.4 Gigapixel Camera, the largest digital camera in the world. These detectors are similar to the CCDs (charge-coupled devices) commonly used in scientific and consumer digital cameras, but they are more stable and can collect more light, which leads to higher precision.

"This new detector design is really going to change the way we study planets. It's the killer app for planet transits," said team member Joshua Winn of MIT. The precision of the camera is high enough to detect transits of much smaller planets than previously possible. It measures light to a precision of one part in 2,000. For the first time, scientists are approaching the precision needed to measure transits of Earth-size planets.

Bigger planets block more of the star's surface and cause a deeper brightness dip. The diameter of WASP-10b is only 6 percent larger than that of Jupiter, even though WASP-10b is three times more massive. Correspondingly, its density is about three times higher than Jupiter's. Because their interiors become partially degenerate, Jovian planets have a nearly constant radius across a wide range of masses.

The photometric precision is three to four times higher than that of typical CCDs and two to three times higher than the best CCDs, and comparable to the most recent results from the Hubble Space Telescope for stars of the same brightness.

Johnson is a National Science Foundation astronomy and astrophysics postdoctoral fellow working at the IfA. Working with Johnson and Winn are MIT graduate student Joshua Carter and Nicole Cabrera, a student at the Georgia Institute of Technology who spent the summer working with Johnson as a participant in the Research Experiences for Undergraduates program at the IfA.

The scientific paper presenting this discovery will be published in the Astrophysical Journal Letters. A preprint is available on the Web at http://arxiv.org/abs/0812.0029.

Man's genes 'key to baby's sex'

A man's genetic make-up may play a role in whether he has sons or daughters, a study of hundreds of years of family trees suggests.

Newcastle University researchers found men were more likely to have sons if they had more brothers and vice versa if they had more sisters.

They looked at 927 family trees, with details on 556,387 people from North America and Europe, going back to 1600. The same link between sibling sex and offspring sex was not found for women.

The precise way that genes can influence baby sex remains unproven.

But the Evolutionary Biology study could clear up a long-standing mystery - a flood of boy babies after World War I.

While a woman will always pass a female "X" chromosome via her egg to her child, the father effectively "decides" the sex of the child by passing on either another "X" in his sperm, making a girl, or a "Y" chromosome, making a boy.

While the birthrate is almost 50/50, suggesting that overall men will deliver equal amounts of "X" sperm and "Y" sperm, scientists have suspected that in some individual couples the balance is shifted in favour of either boys or girls.

Various explanations have been put forward for this, ranging from differences in the time in the woman's monthly cycle that sex happens, to the amount of time that sperm spend waiting in the testicles.

The Newcastle study, by Dr Corry Gellatly, is strong evidence that there is a genetic component.

He found that within families, boys with lots of brothers were more likely to have a higher number of sons themselves and those with lots of sisters were more likely to have lots of daughters.

War babies

Dr Gellatly said it was likely that a genetic difference affected the relative numbers of "X" and "Y" sperm within those produced by the man. This gene, while only active in the man, could be carried by men and women. "The family tree study showed that whether you're likely to have a boy or a girl is inherited."

He said that the effect was to actually balance out the proportion of men and women in the population.

"If there are too many males in the population, for example, females will more easily find a mate, so men who have more daughters will pass on more of their genes, causing more females to be born in later generations."

In the years after World War I, there was an upsurge in boy births, and Dr Gellatly said that a genetic shift could explain this. The odds, he said, would favour fathers with more sons - each carrying the "boy" gene - having a son return from war alive, compared with fathers who had more daughters, who might see their only son killed in action. However, this would mean that more boys would be fathered in the following generation, he said.

The hottest white dwarf in its class

Based on the article:

***"Discovery of photospheric CaX emission lines in the far-UV spectrum of the hottest known white dwarf (KPD 0005+5106)"*, by K. Werner, T. Rauch, and J.W. Kruk**

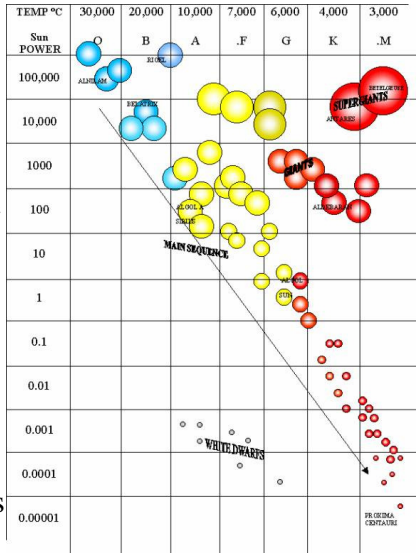
Original A&A article Published in Astronomy & Astrophysics Letters, 2008, vol. 492-3, pp. L43

A team of German and American astronomers present far-ultraviolet observations of white dwarf KPD 0005+5106 and reveal that it is among the hottest stars ever known with a temperature of 200 000 K at its surface. Astronomy & Astrophysics is publishing this discovery, which was made through spectroscopic observations with NASA's space-based Far-Ultraviolet Spectroscopic Explorer (FUSE).

Astronomy & Astrophysics is publishing spectroscopic observations with NASA's space-based Far-Ultraviolet Spectroscopic Explorer (FUSE) of the white dwarf KPD 0005+5106. The team of German and American astronomers who present these observations show that this white dwarf is among the hottest stars known so far, with a temperature of 200 000 K at its surface. It is so hot that its photosphere exhibits emission lines in the ultraviolet spectrum, a phenomenon that has never been seen before. These emission features stem from extremely ionized calcium (nine-fold ionized, i.e., CaX), which is the highest ionization stage of a chemical element ever discovered in a photospheric stellar spectrum.

***Fig. 1 - White dwarfs in the globular cluster M4. In this picture, only the faintest stars are white dwarfs.* © NASA and H. Richer (University of British Columbia)**

Stars of intermediate mass (1-8 solar masses) terminate their life as an Earth-sized white dwarf after the exhaustion of their nuclear fuel. During the transition from a nuclear-burning star to the white dwarf stage, the star becomes very hot. Many such objects with surface temperatures around 100 000 Kelvin are known. Theories of stellar evolution predict that the stars can be much hotter. However, the probability of catching them in such an extremely hot state is low, because this phase is rather short-lived.



Since its discovery as a faint blue star in 1985, KPD 0005+5106 attracted much attention because optical spectra taken with ground-based telescopes suggested that this white dwarf is very hot. In addition, it belongs to a particular class of rare white dwarfs whose atmospheres are dominated by helium. A detailed analysis of these spectra, combined with ultraviolet observations performed with the Hubble Space Telescope (HST), had led to the conclusion that KPD 0005+5106 has a temperature of 120 000 Kelvin, which made it the hottest member of its class. It was, however, rivaled by other similarly hot white dwarfs, discovered a few years ago in the Sloan Digital Sky Survey.

The FUSE observatory performed spectroscopy in the far-ultraviolet wavelength range, which is inaccessible to HST. During its lifetime (1999-2007), FUSE frequently observed KPD 0005+5106 because it was used as a calibration target to track the telescope's performance. The team of astronomers including K. Werner, T. Rauch, and J.W. Kruk, made use of all accumulated data and obtained a dataset of outstanding quality. Close inspection revealed the presence of two emission lines from calcium, and detailed stellar atmosphere modeling confirmed their photospheric origin. The analysis proves that the temperature must be 200 000 Kelvin, for the presence of these emission lines to be possible.

Although theory predicted the existence of such hot white dwarfs, the star nevertheless represents a challenge to our concepts of stellar evolution because of its composition. The measured calcium abundance (1-10 times the solar value) in combination with the helium-rich nature of its atmosphere represents a chemical surface composition that is not predicted by stellar evolution models.

'Mind-reading' software could record your dreams

* 18:05 12 December 2008 **by Celeste Biever**

Pictures you are observing can now be recreated with software that uses nothing but scans of your brain. It is the first "mind reading" technology to create such images from scratch, rather than picking them out from a pool of possible images.

Earlier this year Jack Gallant and colleagues at the University of California, Berkeley, showed that they could tell which of a set of images someone was looking at from a brain scan.

To do this, they created software that compared the subject's brain activity while looking at an image with that captured while they were looking at "training" photographs. The program then picked the most likely match from a set of previously unseen pictures.

Now Yukiyasu Kamitani at ATR Computational Neuroscience Laboratories in Kyoto, Japan has gone a step further: his team has used an image of brain activity taken in a functional MRI scanner to recreate a black-and-white image from scratch.

"By analysing the brain signals when someone is seeing an image, we can reconstruct that image," says Kamitani.

This means that the mind reading isn't limited to a selection of existing images, but could potentially be used to "read off" anything that someone was thinking of, without prior knowledge of what that might be.

"It's absolutely amazing, it really is a very significant step forward," says John-Dylan Haynes of the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig, Germany.

Brain scanning can now extract information directly from the brain: the subject read the word "neuron" at the top, and software working with the brain scan images reconstructed the word (below) **(Image: Neuron/Cell Press)**

Dream catcher

Kamitani starts by getting someone to look at a selection of images made up of black and white squares on a 10 by 10 square grid, while having their brain scanned. Software then finds patterns in brain activity that correspond to certain pixels being blacked out. It uses this to record a signature pattern of brain activity for each pixel.

The person then sits in the scanner and is shown fresh patterns. Another piece of software then matches these against the list to reconstruct the pixels on a 10 by 10 grid.

The quality of images that were recreated is quite crude. However, the word "neuron" and several numbers and shapes that people were indeed being shown (see image, top right) could be observed in the reconstructed images. It is an important proof of principle, says Haynes.

As fMRI technology improves, Kamitani adds that an image could potentially be split into many more pixels, producing much higher quality images, and even colour images.

The next step is to find out if it is possible to image things that people are thinking of - as well as what they are looking at - Haynes says it may be possible to "make a videotape of a dream".

Ethical concerns

Haynes also raises the prospect of "neural marketing", where advertisers might one day be able to read the thoughts of passers by and use the results to target adverts. "This [new research] specifically doesn't lead to this - but the whole spirit in which this is done is in line with brain reading and the applications that come with that," he says.

"If you have a technique that allows you to read out what people are thinking we need clearer ethical guidelines about when and how you are able to do this," he says. "A lot of people want their minds to be read - take for example a paralysed person. They want us to read their thoughts," he says. "But it shouldn't be possible to do this for commercial purposes."

Kamitani is well aware of the negative potential of the technology. "If the image quality improves, it could have a very serious impact on our privacy and other issues. We will have to discuss with many people - not just scientists - how to apply this technology," he says. *Journal reference: Neuron (DOI: 10.1016/j.neuron.2008.11.004)*

Observatory

Corals Indicate Another Sumatra Quake Is Likely

By HENRY FOUNTAIN

With coral reefs as their tea leaves, scientists are forecasting that in the next several decades there will be another major earthquake along the Sunda fault off Sumatra like the one that spawned the catastrophic tsunami of Dec. 26, 2004.

Kerry Sieh, formerly of the California Institute of Technology and now at Nanyang Technological University in Singapore, and colleagues write in the journal Science that a 2007 quake along a more southerly stretch of the fault represented only a first, partial rupture of that 400-mile section, which had been quiet for nearly two centuries. The researchers say this part of the fault, called the Mentawai section, is likely to be the site of at least one more major rupture.

As evidence, they point to the growth patterns of coral reefs in the region over the past 700 years. When a quake occurs the seafloor rises up, effectively lowering the sea level so that shallow coral reefs are now above the surface. The reefs can't grow upward, but their still submerged portions grow outward.

The researchers found signs of this growth pattern roughly every 200 years going back to the 14th century, suggesting cycles of earthquake activity. But each cycle consisted of several major events over three or more decades. So the 2007 quake, they say, is just the first of a new cycle.

Earthquake Supercycles Inferred from Sea-Level Changes Recorded in the Corals of West Sumatra (Science)

Tools with handles even more ancient

New finds move back the origins of Stone Age tools that were attached to handles with adhesive material

By Bruce Bower

Friday, December 12th, 2008

In a gripping instance of Stone Age survival, Neandertals used a tarlike substance to fasten sharpened stones to handles as early as 70,000 years ago, a new study suggests.

Stone points and sharpened flakes unearthed in Syria since 2000 contain the residue of bitumen - a natural, adhesive substance - on spots where the implements would have been secured to handles of some type, according to a team led by archaeologist Eric Boëda of University of Paris X, Nanterre. The process of attaching a tool to a handle is known as hafting. The Neandertals likely found the bitumen in nearby tar sands, the team reports.

Stone tools of the type found at the Syrian site are typically attributed to Neandertals. These evolutionary cousins of modern humans frequently used bitumen and other tars as an adhesive for hafting and perhaps sometimes as a sleeve to protect a tool user's hand, the researchers propose in the December Antiquity.

The new age of 70,000 years ago places the practice earlier than a previous finding in 1996 by Boëda's team of 40,000-year-old stone artifacts unearthed at the same location, Umm el Tlel. Those artifacts also contained remnants of bitumen (SN: 4/13/96, p. 235).

“The surprising thing, to me, is that we do not find more such evidence for hafting by Neandertals,” remarks archaeologist John Shea of Stony Brook University in New York. Hafting may have been too time-consuming for Neandertals in some resource-poor locales, Shea hypothesizes, because their large bodies dictated that they forage constantly for food. Neandertals living at Umm el Tlel 70,000 years ago apparently had time for hafting, using bitumen to construct hunting spears, in his view.

Neandertals and modern humans inherited the intellectual abilities needed for hafting from a common ancestor that lived more than 200,000 years ago, Shea speculates.

Following an analysis of microscopic wear on 90,000-year-old stone artifacts from an early Homo sapiens site in Israel, Shea reported in 2007 that some stone points had probably been attached to hand-cast spears with an unidentified adhesive. Also in 2007, archaeologist Marlize Lombard of Natal Museum in Pietermaritzburg, South Africa, reported that modern humans living in southern Africa around 60,000 years ago hafted stone points using an adhesive made from a mix of resin and ground pigment.

In 2006, Italian researchers found two sharpened stones, dating to more than 100,000 years ago, that Neandertals had apparently attached to handles using birch-bark tar. The tar-stained stones lay among the bones of an animal that belonged to a now-extinct elephant species.

In the new study, Boëda’s team identified black stains on 200 out of more than 1,000 stone implements excavated from several related sediment layers at Umm el Tlel. Seven pieces of burned flint found in those newly excavated layers were dated to 70,000 years ago using a method that measured the radiation dose that had accumulated since the artifacts had been heated.

Black residue on stone tools clung to areas that had been grasped by hand or attached to handles, the researchers note. Geochemical analyses revealed a close correspondence between bits of residue extracted from three artifacts and bitumen collected from tar sands located 40 kilometers from the Syrian site.

A closer investigation showed that the ancient residue and modern bitumen shared nearly identical chemical compositions.

The researchers then made an adhesive out of bitumen mixed with quartz and gypsum and applied it in various amounts to 10 experimentally produced stone implements. After drying, the mixture displayed microscopic features much like those of residue on the Umm el Tlel artifacts, the scientists say.

Blocking molecular pathway with whimsical name possible therapeutic target for pancreatic cancer

Research will be presented at American Society for Cell Biology conference

A possible new therapeutic target for pancreatic cancer, the most lethal form of human cancer, has been identified in the proteins whose DNA recipe comes from gene, "Seven-In-Absentia," according to researchers at the American Society for Cell Biology (ASCB) 48th Annual Meeting, Dec. 13-17, 2008 in San Francisco.

In their studies with the fruit fly, Drosophila melanogaster, at the Mayo Clinic College of Medicine in Minnesota, scientists found a link between the "Seven-In-Absentia" or SINA gene and the aggressive cellular transformation, oncogenesis and metastasis that characterize pancreatic cancer.

Scientists already knew that a mutation in the K-RAS gene underlies the abnormal, excessive cell growth of pancreatic cancer. Because the mutated form of this growth-promoting gene is hyperactivated, a major signaling pathway that drives cell growth is in over-drive in most patients with this cancer.

The "Seven-In-Absentia-Homolog" (SIAH) protein seems to work as a check and balance mechanism in the K-RAS pathway by chewing up and turning off the excessive growth-promoting proteins produced by the hyperactive, mutated form of the gene, says Amy Tang whose Mayo lab conducted the research. "By attacking the SIAH-based protein degrading machinery, we block tumor formation in one of the most aggressive human cancers cells known," she reports.

Because of these results, SIAH may be an attractive new target for novel anti-RAS and anti-cancer therapy in pancreatic cancer, the median survival of which is only six months, and the mortality rate is 95 percent.

By inhibiting SIAH function, Tang and her colleagues were able to completely abolish both tumorigenesis and metastasis of human pancreatic cancer cells that were growing in "nude" mice that have immune system deficits that prevent them from rejecting foreign tissue. "It is likely to move into the clinical setting for study as an interventional treatment in pancreatic cancer in human patients," Tang says, referring to the SIAH inhibition.

SINA produces a family of RING domain E3 ubiquitin ligases. In all creatures, ubiquitin ligases turn cell pathways on or off by degrading proteins.

In humans, the SIAH ubiquitin ligases sit smack in the middle of the molecular pathway that leads to pancreatic cancer, Tang explains. The Tang lab found that SIAH ubiquitin ligases were specifically and markedly "upregulated" in pancreatic cancers.

The increased SIAH expression seemed to correlate with increased grades and aggressiveness of pancreatic cancer. Moreover, SIAH is normally required for mammalian K-RAS signal transduction.

Immunity stronger at night than during day

Research will be presented at American Society for Cell Biology conference

The immune system's battle against invading bacteria reaches its peak activity at night and is lowest during the day.

Experiments with the laboratory model organism, Drosophila melanogaster, reveal that the specific immune response known as phagocytosis oscillates with the body's circadian rhythm, according to Stanford researchers who presented their findings at the American Society for Cell Biology (ASCB) 48th Annual Meeting, Dec. 13-17, 2008 in San Francisco.

"These results suggest that immunity is stronger at night, consistent with the hypothesis that circadian proteins upregulate restorative functions such as specific immune responses during sleep, when animals are not engaged in metabolically costly activities," explains Mimi Shirasu-Hiza of Stanford University.

Shirasu-Hiza and her colleague David Schneider turned to the fruit fly, Drosophila melanogaster, as the model system to help them define the relationship between innate immunity and circadian rhythm, which is the oscillating protein clock or timing mechanism in cells.

Circadian rhythm paces the human body as well as the fruit fly through its days and nights, setting the rest/activity cycle that cues when to eat, sleep and mate over a 24-hour cycle.

In phagocytosis, the innate immune response targeted by the Stanford researchers, specific immune cells engulf and destroy the bacteria invading the body.

In humans, immune responses such as phagocytosis not only are involved in clearing bacterial infection but also are implicated in a growing number of human diseases, including cancer and neurodegenerative disorders.

In previous experiments, the researchers noted that flies sick with bacterial infection lost their circadian rhythm and that flies lacking circadian rhythm were highly susceptible to infection.

The flies were infected with two different bacterial pathogens, Listeria monocytogenes and Streptococcus pneumoniae. To determine whether circadian proteins regulate immunity, the scientists infected flies with these pathogens at different times of day or night. The flies infected at night had a better chance of surviving than did the flies infected during the day. In addition, the researchers also detected low phagocytic activity in some flies with a mutated circadian clock.

Brain-boosting drugs 'not to be feared'

* 14 December 2008

SOCIETY should embrace the use of drugs that boost brain power. That's the message from a group of neuroscientists, psychiatrists and ethicists.

A recent survey found that at some US universities, up to 25 per cent of students routinely buy Ritalin or Adderall - prescription drugs to treat attention-deficit hyperactivity disorder - on black markets to boost memory and concentration. The stimulant Modafinil has also been touted as a mind enhancer.

However, studies of the effect of some of these drugs on cognitive function in healthy people have shown mixed results. Henry Greely of Stanford Law School in California, and his colleagues, call for more research on this, as well as into the drugs' safety. Cognitive enhancers found to be safe and effective should be welcomed, not feared, they say (Nature, DOI: 10.1038/456702a).

"This isn't like steroids and sports... enhancement is not a dirty word," says Greely, adding that using drugs in this way is not "unnatural".

He and his colleagues argue that a safe pill should be seen as no different to other strategies we already use to improve our minds, like a good night's sleep or a strong cup of coffee. Inexpensive drugs may even have the potential to be a more egalitarian way to get ahead than expensive tutoring, they say.

Brain pills could give an edge to nations whose citizens opt to raise their intelligence, suggests neuroethicist Julian Savulescu of the University of Oxford.