http://medicalxpress.com/news/2011-09-vietnam-mutant-bird-flu-greater.html

No sign Vietnam mutant bird flu greater threat: UN

A mutant strain of the deadly bird flu H5N1 virus detected in Vietnam does not appear to pose an increased risk to human health, the United Nations said on Monday.

The UN Food and Agriculture Organisation (FAO) last week voiced concern about the appearance in Vietnam and China of the strain, warning of "a possible major resurgence" of the virus, which developed into a pandemic in 2009. After Indonesia, Vietnam has recorded the highest number of human deaths from bird flu, with 59 since 2003, according to World Health Organisation (WHO) data.

"The last human H5N1 cases in Vietnam were reported in April 2010, but none caused by the new strain," the WHO and FAO said in a joint statement issued in response to questions from AFP.

"There is no evidence to suggest yet that this new virus strain will have any increased risk to human health."

Bird flu is currently affecting poultry in four provinces, according to Vietnam's animal health department.

The mutant strain, known as H5N1 - 2.3.2.1, was first noticed in Vietnam in 2009. It has replaced the previously dominant strain and has been identified in 16 Vietnamese provinces this year, the UN statement said.

In two of the 16 -- where a further variant of the mutant strain was found -- the current vaccine was only partially effective but outbreaks of the disease were quickly controlled, the UN said.

"Nevertheless, poultry producers and the general public should always take simple precautions to reduce exposure to the virus from infected poultry," it said.

"These include extra vigilance for unusual poultry mortality, rapid reporting of disease to the authorities and good hygiene practices while handling, slaughtering and preparing poultry for consumption."

Despite Vietnam's efforts to control H5N1 since it was first detected in 2003, the virus remains "endemic" with several provinces infected annually, the UN said.

To reduce the threat of infections, changes must be made to the way farmers, traders and markets and slaughterhouses operate, it added.

"There is urgent need for adopting good poultry production practices, particularly in the small farming sector." The H5N1 virus typically spreads from birds to humans via direct contact.

http://medicalxpress.com/news/2011-09-india-patent-case-threatens-cheap.html

India patent case threatens cheap drug supply: MSF

Supply of cheap, copycat drugs for the developing world could be badly threatened if Swiss firm Novartis wins a challenge to India's patent law, medical charity MSF said on Monday.

The warning came as the Supreme Court was due to hear more arguments Tuesday in an appeal by Novartis seeking patent protection for a newer version of its leukaemia drug Glivec -- a case watched closely by global pharmaceutical firms.

"If the patent law challenge is successful, it would have a devastating impact on access to affordable medicines across the developing world," Leena Menghaney, India representative of Medecins Sans Frontieres (MSF), told a news conference.

Novartis is contesting the Indian patent office's rejection of a patent application for the updated version of Glivec that is better absorbed by the body. MSF calls the improvement a "minor modification".

The drugmaker's challenge goes to the heart of India's patent act, which says a patent cannot be granted for an old drug unless changes make it significantly more therapeutically effective.

The Supreme Court case is the final act in a lengthy legal battle between Novartis and patient rights groups in India, where local firms produce generic drugs at a fraction of the cost of brand-name originals.

Indian generic versions of Glivec sell for 8,000 rupees ($174) for a month's treatment compared with 120,000 rupees for the brand-name version, MSF said.

Pharmaceutical multinationals argue that protecting patents is crucial to stimulating the research and development of new drugs. India, known as the "pharmacy to the developing world," has long been a key provider of cheap generic medicines as it did not issue drug patents until 2005, when it was obliged to adhere to WTO intellectual property regulations. Now, India allows patents for new inventions after 1995 or for an updated drug showing much greater therapeutic efficacy. The base compound for Glivec was discovered in 1993.

But India rejects applications for minor changes to existing drugs, which critics say are aimed at extending the life of original patent monopolies from their original 20 years -- a practice known as "evergreening".

A spokesman for Novartis said on Monday the court's decision was essential to the "viability of the innovative pharmaceutical business in this country", adding that Glivec had received patent protection in nearly 40 countries.

The cost difference between generic and brand name drugs is crucial for poor people around the world, MSF said, noting generics from India have pushed down prices for older anti-AIDS drugs by 99 percent. MSF buys 80 percent of its generic AIDS drugs from India and the humanitarian group said it is currently keeping 170,000 people in 19 countries alive on the treatment. "We couldn't afford to treat them all without these generic drugs," Joanna Keenan, spokesman for Geneva-based MSF, told AFP.

If the court accepts Novartis's arguments, the ruling could set a precedent allowing firms to acquire patents on modified versions of existing medicines -- extending the time of their exclusive right to make drugs, MSF said.

"It would create a scenario in which only the richest survive. The outcome of this case is literally a matter of life and death for people," Loon Gangte, who heads an Indian group representing people living with HIV/AIDS, told AFP.

http://www.physorg.com/news/2011-09-coffee-key-ingredient-treatments-parkinson.html

Coffee could offer key ingredient for new treatments for Parkinson's disease

Scientists from Heptares Therapeutics have used Diamond Light Source, the UK's national synchrotron facility, to understand the structure of a protein involved in Parkinson's disease and other neurological disorders.

Their findings, published this week in the journal Structure, could pave the way for a new generation of targeted drug treatments.

The team used Diamond's Microfocus Macromolecular Crystallography (MX) beamline (I24) to reveal the complex structure of the vital adenosine A2A receptor and show how xanthine-based drugs such as caffeine bind to their target. Adenosine A2A receptors regulate the effects of neurotransmitters in the brain, cardiovascular and immune systems, and are of particular interest as a drug target for Parkinson's disease. Although it was known that caffeine inhibits the action of the adenosine, the exact molecular mechanism involved was not fully understood.

"These co-structures of xanthines in complex with the adenosine A2A receptor advance our understanding of what is happening at the molecular level when the drug binds to its target and blocks the receptor's response. Along with novel chemotypes discovered by our team, the structural data we collected at Diamond is enabling us to develop highly optimised next-generation drug candidates for Parkinson's disease and other neurological disorders," said Dr. Fiona Marshall, Chief Scientific Officer at Heptares.

The adenosine A2A receptor is a G-protein-coupled receptor (GPCR). GPCRs are responsible for transmitting chemical signals into a variety of different cell types. There are over 700 GPCRs encoded in the human genome and as many as 75 of these have clinical validation, presenting a wide range of opportunities as therapeutic targets in areas including cancer, diabetes, central nervous system disorders, obesity and pain.

Dr. Andrew Doré, Senior Scientist at Heptares, says: "GPCRs represent the single most important family of drug targets in the human body because they are central to so many biological processes. The design of drugs for GPCRs is hampered by the lack of structural information so access to a facility like the Diamond synchrotron is vital to our research. It has enabled us to solve the 3D structure of the adenosine A2A receptor in complex with caffeine and other xanthines as well as our own novel drug candidates."

Caffeine is a methylxanthine, a stimulant derivative of xanthine, as is theophylline (in tea), and theobromine (in chocolate). Methylxanthines are among the most widely consumed substances in the world. Caffeine is present in many foods and drinks and reportedly consumed at an average rate of 200mg per day by Americans (Ref. 1). In 2000, the Journal of the American Medical Association (JAMA) published research showing a correlation between higher intake of caffeine and lower incidence of Parkinson's disease, a devastating and incurable neurological disorder (Ref. 2).

While caffeine exerts a broad range of adverse effects, and is therefore poorly suited for use as a drug, pharmaceutical researchers have generated more potent and selective adenosine receptor modulators. A2A receptor antagonists, in particular, have shown clinical efficacy in the treatment of Parkinson's disease. First generation A2A antagonists using older furan and xanthine type chemical structures have been associated with various safety, tolerability, and pharmacokinetic limitations. Heptares have used structural information to generate the next-generation of A2A antagonists.

More information: *Structure of the adenosine A2A receptor in complex with ZM241385 and the xanthines XAC and caffeine. Doré, AS et al. Structure (2011) 19, 1–11. doi:10.1016/j.str.2011.06.014*

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Ross, GW et al. Association of Coffee and Caffeine Intake with the Risk of Parkinson's Disease. JAMA (2000) 283(20), 2674-2679 Provided by Diamond Light Source

http://www.eurekalert.org/pub_releases/2011-09/uoa-ahw090211.php

Ancient humans were mixing it up

Anatomically modern humans interbred with more archaic hominin forms even before they migrated out of Africa, a UA-led team of researchers has found.

It is now widely accepted that anatomically modern humans of the species Homo sapiens originated in Africa and eventually spread throughout the world. Ancient DNA recovered from fossil Neanderthal bones suggests they interbred with more archaic hominin forms once they had left their evolutionary cradle for the cooler climates of Eurasia, but whether they exchanged genetic material with other, now extinct archaic hominin varieties in Africa remained unclear.

In a paper published in the Proceedings of the National Academy of Sciences, or PNAS, a team led by Michael Hammer, an associate professor and research scientist with the UA's Arizona Research Labs, provides evidence that anatomically modern humans were not so unique that they remained separate.

"We found evidence for hybridization between modern humans and archaic forms in Africa. It looks like our lineage has always exchanged genes with their more morphologically diverged neighbors," said Hammer, who also holds appointments in the UA's department of ecology and evolutionary biology, the school of anthropology, the BIO5 Institute and the Arizona Cancer Center.

The team reports that contemporary African populations contain a small proportion of genetic material brought in by an archaic population that split from the ancestors of anatomically modern humans about 700,000 years ago. Hammer added that recent advances in molecular biology have made it possible to extract DNA from fossils tens of thousands of years old and compare it to that of modern counterparts.

However, "We don't have fossil DNA from Africa to compare with ours," he said. "Neanderthals lived in colder climates, but the climate in more tropical areas make it very tough for DNA to survive that long, so recovering usable samples from fossil specimens is extremely difficult if not impossible."

"Our work is different from the research that led to the breakthroughs in Neanderthal genetics," he explained. "We couldn't look directly for ancient DNA that is 40,000 years old and make a direct comparison." To get past this hindrance, Hammer's team followed a computational and statistical approach. "Instead, we looked at DNA from modern humans belonging to African populations and searched for unusual regions in the genome."

Because nobody knows the DNA sequences of those now extinct archaic forms, Hammer's team first had to figure out what features of modern DNA might represent fragments that were brought in from archaic forms.

"What we do know is that the sequences of those forms, even the Neanderthals, are not that different from modern humans," he said. "They have certain characteristics that make them different from modern DNA."

The researchers used simulations to predict what ancient DNA sequences would look like had they survived within the DNA of our own cells.

"You could say we simulated interbreeding and exchange of genetic material in silico," Hammer said. "We can simulate a model of hybridization between anatomically modern humans and some archaic form. In that sense, we simulate history so that we can see what we would expect the pattern to look like if it did occur."

According to Hammer, the first signs of anatomically modern features appeared about 200,000 years ago. Non-modern varieties of Homo are thought to have emerged about 300,000 years earlier and have survived until as recently as 30,000 years ago or even later.

First, the team sequenced vast regions of human genomes from samples taken from six different populations living in Africa today and tried to match up their sequences with what they expected those sequences to look like in archaic forms. The researchers focused on non-coding regions of the genome, stretches of DNA that do not contain genes, which serve as the blueprints for proteins.

"Then we asked ourselves what does the general pattern of variation look like in the DNA that we sequenced in those African populations, and we started to look at regions that looked unusual," Hammer said. "We discovered three different genetic regions fit the criteria for being archaic DNA still present in the genomes of sub-Saharan Africans. Interestingly, this signature was strongest in populations from central Africa."

The scientists applied several criteria to tag a DNA sequence as archaic. For example, if a DNA sequence differed radically from the ones found in a modern population, it was likely to be ancient in origin. Another telltale sign is how far it extends along a chromosome. If an unusual piece is found to stretch a long portion of a chromosome, it is an indication of being brought into the population relatively recently.

"We are talking about something that happened between 20,000 and 60,000 years ago – not that long ago in the scheme of things," Hammer said. "If interbreeding occurs, it's going to bring in a whole chromosome, and over time, recombination events will chop the chromosome down to smaller pieces. And those pieces will now

be found as short, unusual fragments. By looking at how long they are we can get an estimate of how far back the interbreeding event happened."

Hammer said that even though the archaic DNA sequences account for only two or three percent of what is found in modern humans, that doesn't mean the interbreeding wasn't more extensive.

"It could be that this represents what's left of a more extensive archaic genetic content today. Many of the sequences we looked for would be expected to be lost over time. Unless they provide a distinct evolutionary advantage, there is nothing keeping them in the population and they drift out."

In a next step, Hammer's team wants to look for ancient DNA regions that conferred some selective advantage to the anatomically modern humans once they acquired them.

"We think there were probably thousands of interbreeding events," Hammer said. "It happened relatively extensively and regularly." "Anatomically modern humans were not so unique that they remained separate," he added. "They have always exchanged genes with their more morphologically diverged neighbors. This is quite common in nature, and it turns out we're not so unusual after all."

The paper, Genetic Evidence for Archaic Admixture in Africa, was co-authored by August Woerner from the UA's ARL Division of Biotechnology, Fernando Mendez from the UA's department of ecology and evolutionary biology, Joseph Watkins from the UA's Mathematics Department and Jeffrey Wall from the Institute for Human Genetics at the University of California San Francisco.

http://www.eurekalert.org/pub_releases/2011-09/uof-mrf090211.php

Male-female ring finger proportions tied to sex hormones in embryo; may offer health insights

Why men's ring fingers are longer than their index fingers

Biologists at the University of Florida have found a reason why men's ring fingers are generally longer than their index fingers — and why the reverse usually holds true for women.

The finding could help medical professionals understand the origin of behavior and disease, which may be useful for customizing treatments or assessing risks in context with specific medical conditions.

Writing this week in the Proceedings of the National Academy of Sciences, developmental biologists Martin Cohn, Ph.D., and Zhengui Zheng, Ph.D., of the Howard Hughes Medical Institute and the department of molecular genetics and microbiology at the UF College of Medicine, show that male and female digit proportions are determined by the balance of sex hormones during early embryonic development. Differences in how these hormones activate receptors in males and females affect the growth of specific digits.

The discovery provides a genetic explanation for a raft of studies that link finger proportions with traits ranging from sperm counts, aggression, musical ability, sexual orientation and sports prowess, to health problems such as autism, depression, heart attack and breast cancer. It has long been suspected that the digit ratio is influenced by sex hormones, but until now direct experimental evidence was lacking.

"The discovery that growth of the developing digits is controlled directly by androgen and estrogen receptor activity confirms that finger proportions are a lifelong signature of our early hormonal milieu," Cohn said. "In addition to understanding the basis of one of the more bizarre differences between the sexes, it's exciting to think that our fingers can tell us something about the signals that we were exposed to during a short period of our time in the womb. There is growing evidence that a number of adult diseases have fetal origins. With the new data, we've shown that that the digit ratio reflects one's prenatal androgen and estrogen activity, and that could have some explanatory power."

Cohn and Zheng, also members of the UF Genetics Institute, found that the developing digits of male and female mouse embryos are packed with receptors for sex hormones. By following the prenatal development of the limb buds of mice, which have a digit length ratio similar to humans, the scientists controlled the gene signaling effects of androgen — also known as testosterone — and estrogen.

Essentially, more androgen equated to a proportionally longer fourth digit. More estrogen resulted in a feminized appearance. The study uncovered how these hormonal signals govern the rate at which skeletal precursor cells divide, and showed that different finger bones have different levels of sensitivity to androgen and estrogen.

Since Roman times, people have associated the hand's fourth digit with the wearing of rings. In many cultures, a proportionally longer ring finger in men has been taken as a sign of fertility.

"I've been struggling to understand this trait since 1998," said John T. Manning, Ph.D., a professor at Swansea University in the United Kingdom, who was not involved in the current research. "When I read this study, I thought, thank goodness, we've attracted the attention of a developmental biologist with all the sophisticated techniques of molecular genetics and biology."

In dozens of papers and two books, including the seminal "Digit Ratio" in 2002, Manning has studied the meaning of the relative lengths of second and fourth digits in humans, known to scientists as the 2D:4D ratio.

"When Zheng and Cohn blocked testosterone receptors, they got a female digit ratio," Manning said. "When they added testosterone they got super male ratios, and when they added estrogen, super female ratios. And they've provided us with a list of 19 genes that are sensitive to prenatal testosterone and prenatal estrogen.

"I find this completely convincing and very useful," Manning said. "We can now be more focused in our examination of the links between digit ratio and sex-dependent behaviors, diseases of the immune system, cardiovascular disorders and a number of cancers."

Cohn, whose uses the tools of genetics, genomics and molecular biology to study limb development, said his lab began studying the digit ratios after Zheng became determined to find an explanation.

"He suggested that the 2D:4D ratio would be an interesting question, and I have to admit to being skeptical," Cohn said. "When he came back with the initial results, I was blown away. We looked at each others hands, then got busy planning the next experiment."

The National Institute of Environmental Health Sciences and the Howard Hughes Medical Institute supported this research.

http://www.physorg.com/news/2011-09-dwarf-planet-mysteries-beckon-horizons.html

Dwarf planet mysteries beckon to New Horizons

PhysOrg.com - *At this very moment one of the fastest spacecraft ever launched - NASA's New Horizons - is hurtling through the void at nearly one million miles per day. Launched in 2006, it has been in flight longer than some missions last, and still has four more years of travel to go.*

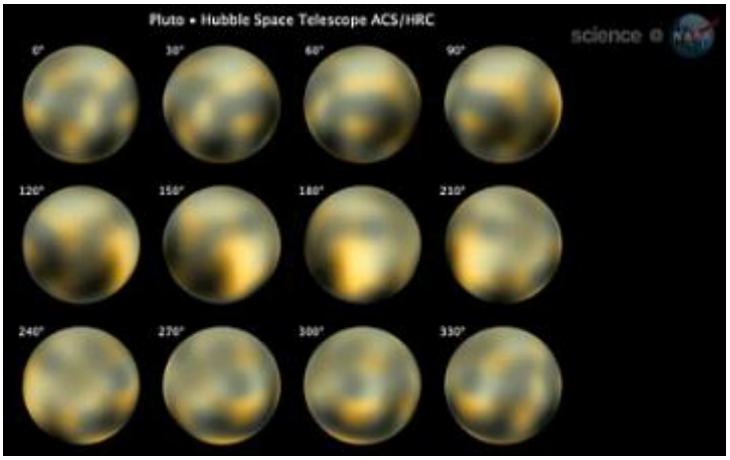
New Horizons headed for the lonely world of Pluto on the outer edge of the solar system. Although astronomers now call Pluto a dwarf planet, "it's actually a large place, about 5,000 miles around at the equator," says Alan Stern, principal investigator for the mission. "And it's never been explored." Indeed, no spacecraft has ever visited Pluto or any dwarf planet. "This is a whole new class of worlds," says Stern. "To understand the solar system, we need to understand worlds like Pluto."

Pluto is a resident of the Kuiper Belt, a vast region beyond the orbit of Neptune. Stern believes "the Kuiper Belt contains a thousand dwarf planets or more – a whole zoo of them! Dwarf planets are, in fact, the most numerous class of planets in the solar system, and probably in the whole universe."

Pluto is a world of mysteries. For one thing, Stern wonders, what are the molasses-colored patches on Pluto's surface seen by the Hubble Space Telescope? Some scientists think they could be deposits of primordial organic matter. "New Horizon's spectrometers will help us identify the kinds of organic molecules on Pluto. We expect to find something pretty interesting."

Hubble recently contributed more intrigue by spotting a new moon circling Pluto -- bringing the total to four. Composite Hubble images of Pluto now resemble a miniature planetary system. New Horizons will hunt for even more moons as it approaches the dwarf planet.

The probe is primed for detective work -- equipped with instruments capable of "knocking the socks off anything Voyager carried." In addition to state of the art spectrometers, New Horizons wields one of the largest and highest resolution interplanetary telescopes ever flown. It's called LORRI, short for Long-Range Reconnaissance Imager. "At closest approach to Pluto – about 10,000 km up – LORRI can resolve details almost as well as a spy camera. The view will be incredible. If we flew this instrument over Earth at that altitude, we could see individual buildings and their shapes."



Pluto's surface

What will we see on Pluto? Some researchers say we could spot icy geysers. Some say we could see those surface deposits of organic material. Stern says simply, "There could be all kinds of surprises! It's a first exploration of a new kind of planet."

Heading far from home, "New Horizons is like Noah's Ark – our ship has two of everything, for backup," says Stern. "Two heaters, two computer systems, two of everything except the scientific instruments. And even those have capabilities to back each other up."

When New Horizons reaches Pluto it will have traveled 9 1/2 years – longer than any spacecraft has ever flown to reach its main target. To save power and reduce wear and tear, it hibernates much of the time. But all systems will be ready to spring into action upon arrival in 2015. Mark your calendar. *Provided by Science@NASA*

http://www.eurekalert.org/pub_releases/2011-09/ru-9pm090611.php

99-cent pricing may not be worth the penny, says Rutgers-Camden researcher

CAMDEN — *Just-below pricing, or 99-cent endings, is a common marketing tool used to attract customers looking to get bang for their buck. But a Rutgers–Camden professor says that, in some cases, a penny saved doesn't always translate into a penny earned for retailers.*

"The difference between a good product and a poor product in the consumers' eyes could come down to that penny," says Robert Schindler, a professor of marketing at the Rutgers School of Business–Camden. "When consumers care more about product quality than price, just-below pricing has been found to actually hurt retail sales."

Schindler, one of the world's leading pricing scholars, is conducting a meta-analysis of the effect 99-cent price endings have on consumers. For years, he has studied the marketing strategy behind pricing an item at, say, $29.99 instead of $30. The penny may not seem like much, but people actually perceive a big difference in price and think they're getting a bargain.

The illusion, Schindler says, isn't the last number on the price tag. It's the first number.

"People focus more on the left-most digit," says Schindler, who reviewed about 100 different studies in performing his meta-analysis. "Just-below pricing certainly makes it seem like the price is less than it actually is. It gives an image of being a bargain or a discount."

Schindler says most people won't perceive a big difference in price between a $20 item and a $25 item. But by dropping the price of each item by one cent, "something that costs $19.99 is considered much less expensive when compared to something priced $24.99."

But while just-below pricing has been effective in increasing sales, Schindler has found that it can also work against retailers. "On the other side, it can give the image that an item is of low or questionable quality," he says.

Schindler says most people are more concerned about quality over price when buying luxury products, services, or making risky purchases.

"Retailers don't want those items to come across as cheap," Schindler says. "For example, if you're going to do some work on a person's house, you wouldn't want your price to reflect that you might do a poor job. In that case, the customer is concerned about quality and I would suggest not using 99-cent endings. It's better to be straightforward when selling that kind of product."

Schindler has been recognized as one of the top pricing researchers in the world by an article published in the Journal of Business Research, which surveyed the articles, authors, and institutions that have contributed most to the topic of pricing over the past 30 years.

The publication recently ranked Schindler as the fourth-most productive pricing researcher in number of articles adjusted for multiple authorship and the 13th-most productive researcher in absolute number of articles.

Schindler's research has had a profound impact on how marketers, retailers, and scholars study consumer behavior. In 2007, Fordham University held a scholarly conference focusing on Schindler's definitive research. Schindler was awarded the Lifetime Achievement Award in Pricing Research at the conference, which was held in New York.

He recently completed the forthcoming textbook Pricing Strategies: A Marketing Approach (Sage Publications), a book written to make basic pricing concepts more accessible to business students.

"We want students to be able to have the fundamentals so that pricing can be part of their business education, whether they want to be an entrepreneur, part of a big company, part of a small company, or something else," Schindler says. "Very often, there are far more courses in production, distribution, and promotion than there are in pricing," he says. "That pricing isn't taught that much represents a gap in business education and this book is designed to fill that gap."

Schindler, a Cherry Hill resident, received his bachelor's degree from the University of Pennsylvania and his master's degree and doctorate from the University of Massachusetts. He teaches "Principles of Marketing," "Pricing Strategies," and "Consumer Analysis" at the Rutgers School of Business–Camden.

http://www.eurekalert.org/pub_releases/2011-09/bmj-cwh090511.php

Children who have their adenoids out do not get fewer upper respiratory infections

Research: Effectiveness of adenoidectomy in children with recurrent upper respiratory tract infections, open randomised controlled trial

Children who have their adenoids surgically removed do not get fewer upper respiratory tract infections such as sinusitis and colds, finds research published on bmj.com today.

Upper respiratory tract infections are extremely common in children and many of them are referred for ear, nose and throat (ENT) surgery. Indeed, having adenoids taken out (adenoidectomy) is one of the most frequently performed surgical procedures in children in western countries, says the study.

One of the main reasons adenoidectomy is performed is to reduce the incidence of upper respiratory tract infections. However, the clinical effectiveness of the procedure in children with recurrent upper respiratory tract infections is lacking, say the authors, led by Professor Anne Schilder from the University Medical Centre Utrecht. Schilder and colleagues studied a group of 111 children aged between one and six selected for adenoidectomy, half of them were assigned to have the operation, the other half initially not.

The research took place between April 2007 and October 2010 across 11 general hospitals and two academic centres in the Netherlands. The participants were followed up for 24 months after surgery.

The results show that the children in the adenoidectomy group had 7.91 episodes of upper respiratory tract infections per person compared with 7.84 episodes in the other group. Days of absence from school or day care, and health related quality of life, was similar in both groups. The findings also reveal that the prevalence of upper respiratory tract infections decreased over time for both groups. In conclusion the authors say "in children selected for adenoidectomy for recurrent upper respiratory tract infections, a strategy of immediate surgery confers no clinical benefits over a strategy of initial watchful waiting."

In an accompanying editorial, Professor Kari Kvaerner from Oslo University Hospital concurs that the best way for health professionals to treat children with recurrent upper respiratory tract infections appears to be "careful follow-up and a strategy of watchful waiting."

http://www.eurekalert.org/pub_releases/2011-09/plos-oda083111.php

One drink a day may be related to good overall health in women when older

Women who drink 15 grams or less of alcohol a day (the equivalent of one drink of any alcoholic beverage) at midlife may be healthier when older than women who do not drink at all, who consume more than two drinks a day, or who consume four drinks or more at the one time.

A study led by Qi Sun from the Harvard School of Public Health and the Brigham and Women's Hospital in Boston, USA, and published in this week's PLoS Medicine suggests that in women, regular, moderate alcohol consumption during middle age (average age 58 years) is related to good overall health—that is, having no major chronic diseases, such as heart disease or diabetes, and no major cognitive and physical impairment, or mental health limitations—in those who live to 70 years and beyond. The authors define this good overall health as "successful ageing."

The authors used information from periodic food frequency questionnaires given to the 121,700 female nurses enrolled in the US Nurses' Health Study (which began in 1976) to assess the alcohol consumption of the nurses during middle age. The authors then included in their analysis the vast majority (98.1%) of participants who were not heavier drinkers (45 g/d) when middle-aged and examined the health status in the 13,984 women who lived to 70 years and over.

After discounting other factors, such as smoking, that might affect their health status, the authors found that women who drank 5 g of alcohol per day (between a 1/3 and 1 drink per day) had about a 20% higher chance of good overall health when older compared to non-drinkers. Furthermore, women who drank alcohol regularly had a better chance of good overall health when older than occasional drinkers: compared to women who didn't drink, women who drank five to seven days a week had almost 50% greater chance of good overall health when older.

The authors conclude: "These data suggest that regular, moderate consumption of alcohol at midlife may be related to a modest increase in overall health status among women who survive to older ages."

They add: "The 2010 US Department of Agriculture dietary guidelines note that moderate alcohol consumption of up to one drink per day for women and up to two drinks per day for men may provide health benefits in some people. Our data support this recommendation and provide novel evidence suggesting that light-to-moderate alcohol consumption at the levels of one to two drinks/day or slightly less at midlife may benefit overall health at older ages in US women."

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Competing Interests: *OIO has received research grants from the US National Institutes of Health (National Institute on Aging and National Institute of Mental Health), the Alzheimer's Association, and Harvard University. OIO is also a member of the Board of Directors of the Massachusetts and New Hampshire Chapter of the Alzheimer's Association. All other authors have declared that no competing interests exist.*

Citation: *Sun Q, Townsend MK, Okereke OI, Rimm EB, Hu FB, et al. (2011) Alcohol Consumption at Midlife and Successful Ageing in Women: A Prospective Cohort Analysis in the Nurses' Health Study. PLoS Med 8(9): e1001090. doi:10.1371/journal.pmed.1001090*

http://www.eurekalert.org/pub_releases/2011-09/uosc-ppi090611.php

Peer pressure? It's hardwired into our brains

The rewards outweigh the risks – when you're in a group, anyway.

A new USC study explains why people take stupid chances when all of their friends are watching that they would never take by themselves. According to the study, the human brain places more value on winning in a social setting than it does on winning when you're alone. Georgio Coricelli of the USC Dornsife College of Letters, Arts and Sciences led a multinational team of researchers that measured activity in the regions of the brain associated with rewards and with social reasoning while participants in the study entered in lotteries.

Their study appears this month in the Proceedings of the National Academy of Sciences.

The researchers found that the striatum, a part of the brain associated with rewards, showed higher activity when a participant beat a peer in the lottery, as opposed to when the participant won while alone. The medial prefrontal cortex, a part of the brain associated with social reasoning, was more activated as well. Those participants who won in a social setting also tended to engage in more risky and competitive behavior in subsequent lotteries.

"These findings suggest that the brain is equipped with the ability to detect and encode social signals, make social signals salient, and then, use these signals to optimize future behavior," Coricelli said.

As Coricelli explained, in private environments, losing can more easily be life-threatening. With no social support network in place, a bad gamble can spell doom. In group environments, on the other hand, rewards tend to be winner-takes-all. Nowhere is this more clear than in sexual competition, where -- to borrow a phrase from racing legend Dale Earnhardt, Sr. -- second place is just first loser.

"Among animals, there are strong incentives for wanting to be at the top of the social ranking," Coricelli said. "Animals in the dominant position use their status to secure privileged access to resources, such as food and mates."

The research was supported by the Human Frontier Science Program, the Fondation pour la Recherche Medicale, the National Science Foundation, and the Agence Nationale de la Recherche and Provincia Autonoma de Trento.

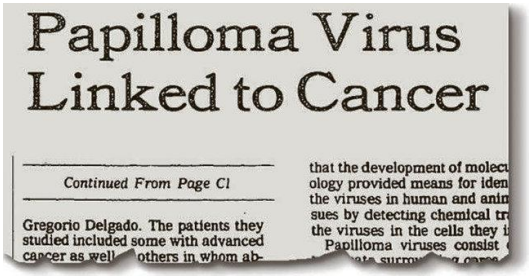
http://www.nytimes.com/2011/09/06/health/06first.html?_r=1&partner=rss&emc=rss

First Mention Human Papillomavirus, 1985

By NIKOLAS BAKALAR

An article, headlined "Clue to Parasite as Cause of Cancer," described an experiment with chickens carried out by Dr. Peyton Rous of the Rockefeller Institute, the first to demonstrate that any cancer could be caused by infection.

Dr. Rous was cautious, hesitant to claim that the microbe causing cancer in chickens was a virus. An article on Jan. 11, 1914, quoted him as saying, “No single attribute among those determined suffices to show the nature of the agent; yet, taken together, its characters are those which we associate with micro-organisms.”


Papilloma Virus Linked to Cancer

Continued From Page C1

Gregorio Delgado. The patients they studied included some with advanced cancer as well ... others in whom ab-

that the development of molecu... ology provided means for iden... the viruses in human and anim... sues by detecting chemical tr... the viruses in the cells they i... Papilloma viruses consist ...

Spurred by Dr. Rous’s discovery, scientists would for the next 75 years try to prove that human cancer, too, could be caused by a virus. By the late 1960s, several had been found to be associated with cancer in animals, and herpes simplex 2 was widely believed to be a contributor to cervical cancer in humans. But there was still no proof.

The search for a germ that could cause cancer began in the late 19th century, and on Feb. 14, 1912, The New York Times reported the first success in the hunt.

As it turned out, another virus associated with cervical cancer would be the first definitively implicated: human papillomavirus, or HPV.

The Times first mentioned HPV on Feb. 12, 1985. The report said that scientists, including Dr. Harald zur Hausen of the University of Heidelberg in Germany (who would later win a Nobel Prize for his work), were “finding strong evidence linking viruses in the family called papilloma with genital cancers, notably cancers of the cervix and vulva.” The evidence, the article said, came “as close to proving a causal connection as is possible short of developing a vaccine against the virus and proving that it prevents the cancers.” That vaccine was still 20 years in the future.

On Aug. 2, 2002, in an article about Merck & Co., The Times listed an HPV vaccine as one of the drugs in the company’s pipeline but provided few details. Three months later Denise Grady, a Times medical reporter, wrote, “The vaccine that Merck is now testing, and hopes to market, will immunize patients against both HPV-16 and HPV-18, which together cause 70 percent of all cases of cervical cancer.” She added that it was also effective against two other types of HPV that cause most genital warts.

Under the headline “Vaccine Prevents Most Cervical Cancer” on Oct. 7, 2005, Ms. Grady reported that a two-year study of 12,000 women had found the vaccine, now called Gardasil, highly effective. “If widely used,” she wrote, “the vaccine could save many lives.”

On June 9, 2006, The Times noted that Gardasil had been approved by the Food and Drug Administration for girls and women ages 9 to 26. “The vaccine is not approved for use in boys, although Merck hopes one day to change that,” the article said. That change would come a little more than three years later, as The Times reported on Oct. 17, 2009.

Dr. Rous’s experiments held up well, and his name appeared on several occasions in the pages of The Times after the announcement of his discovery, usually when he was given an award or an honorary degree. His chickens, it turned out, developed tumors because they were infected with a retrovirus like the one that causes AIDS in humans. The microbe, now called Rous sarcoma virus, was the first oncovirus, or cancer-causing virus, ever found. On Oct. 14, 1966, The Times reported that the Nobel Prize in Medicine or Physiology had been awarded to the 87-year-old Dr. Rous, about 55 years after his seminal discovery.

http://www.technologyreview.com/biomedicine/38464/

Old Blood Impairs Young Brains

A study suggests that age-related chemical signals in blood impair the growth of new neurons, but young blood can refresh old brains.

By Courtney Humphries

Audio »

It's a cliché of vampire tales that young blood is preferable to old, but a new study suggests there's some truth to it. A paper published today in Nature finds that when younger mice are exposed to the blood of older mice, their brain cells behave more like those found in aging brains, and vice versa. The researchers who carried out the work also uncovered chemical signals in aged blood that can dampen the growth of new brain cells, suggesting that the decline in brain function with age could be caused in part by blood-borne factors rather than an intrinsic failure of brain cells.

To arrive at the discovery, the researchers studied pairs of old and young mice that were literally joined at the hip. They used a technique called parabiosis, in which two mice are surgically joined together along the flank, which causes them to develop a shared circulatory system. The technique has been used to study the development of the blood system, and more recently has been used to investigate the effects of age by joining old and young mice.

Lead author Tony Wyss-Coray, a neuroscientist at Stanford University, says that five weeks after creating these May-December pairings, "we found striking effects both on the young and old brains." The young mice had a reduction in the production of new neurons (neurogenesis), an increase in brain inflammation, and less activity in synapses connecting neurons. The older mice, in contrast, had an increase in new neurons, less inflammation, and greater activity at synapses. "You could almost call this a rejuvenation effect," Wyss-Coray says.

To see whether the effect could influence behavior, they injected, in separate experiments, young mice with plasma from older mice and vice versa, and found that old plasma impaired the younger animals' ability to perform learning and memory tasks, whereas young plasma improved the abilities of older mice.

Blood cells from one mouse cannot travel into the brain of the other because of the blood-brain barrier, so the team concluded that free-floating molecules in the blood, capable of passing through, must be responsible for the effects. By comparing more than 60 chemokines—chemical messengers secreted by cells that circulate in the blood—the researchers identified several associated with the detrimental effect of old blood. Administering one of these chemicals, called CCL11, to young mice dampened neurogenesis and impaired learning and memory. CCL11 has been studied for its role in allergies and asthma, but it's not clear how it influences neurons.

Richard Ransohoff, director of the Neuroinflammation Research Center at the Cleveland Clinic, who was not involved with the work, says that the work is intriguing in the context of a study that last year linked neurogenesis to the ratio of two different types of immune cells in the blood. Both findings are "very, very surprising," he says, and suggest that "the process of neurogenesis can be affected from outside the brain." Because stem cells that give rise to new neurons "live in a microenvironment, and that environment is very intimately associated with blood vessels," he says, these cells may be influenced by chemicals that travel through the blood, including signals from the immune system.

Wyss-Coray says that the group will continue investigating whether specific blood factors cause cognitive decline with age—or offer protective effects in younger brains. Ransohoff also points out that such factors could be useful as biomarkers for neurogenesis and other signs of brain health, since the blood is vastly more accessible than the brain.

http://www.science20.com/news_articles/dexamethasone_may_stop_arthritis_it_starts-82328

Dexamethasone May Stop Arthritis Before It Starts

Around 27 million Americans have arthritis, three million of which began with a joint injury that provokes slow and steady cartilage deterioration.

A new study from MIT suggests that glucocorticoid dexamethasone, a steroid drug currently used to treat inflammatory diseases, could also prevent osteoarthritis from ever developing in those people if given soon after the injury.

Severe joint injuries are more common in younger people, who are likelier to participate in sports such as basketball or skiing in which they are at a higher risk of tearing ligaments such as the anterior cruciate ligament (ACL). Military service and car accidents are also common sources of joint injuries in young people. In most cases, the patient is treated with non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen to reduce pain and swelling. Weeks or months later, they might have surgery to stabilize the joint. In the new study, the MIT researchers tested the effects of glucocorticoids, which doctors have been prescribing to treat chronic rheumatoid arthritis in the elderly for decades.

The researchers experimented on human and bovine cartilage tissue. First they damaged the tissue, then flooded it with inflammatory proteins called cytokines, which are typically released after a joint injury. Cytokines hasten cartilage breakdown. In damaged tissue treated immediately with the glucocorticoid dexamethasone, cartilage breakdown was halted. The drug also worked when given a day or two after the injury, which is important because people who suffer joint injuries might not get to see a doctor right away, Grodzinsky says.

The researchers don't yet know if dexamethasone could reverse cartilage damage that has already occurred, but plan to test that in future studies. They are also planning animal studies to determine how many joint treatments are necessary to maintain the protective effect. If those animal studies yield positive results, the findings could be rapidly translated to human treatments, Grodzinsky says, because the drug is already approved for human use.

The research team also investigated how dexamethasone exerts its protective effects. Though the process is not yet fully understood, they found some evidence that it blocks the degradation of aggrecan, a protein-carbohydrate complex that is a major structural and biomechanically functional component of cartilage. Appropriate drug delivery localized to joint cartilage is also under study.

"In essence, it's repurposing an existing drug," says Alan Grodzinsky, senior author of the study, a professor of biological, mechanical and electrical engineering, and the director of MIT's Center for Biomedical Engineering.

Grodzinsky and colleagues reported their findings in Arthritis Research and Therapy. Other authors of the paper are Yihong Lu, a recent MIT biological engineering PhD recipient, and Christopher Evans, the Maurice Edmond Mueller Professor of Orthopedic Surgery at Harvard Medical School.

http://www.newscientist.com/article/dn20874-dolphins-call-each-other-by-name.html

Dolphins call each other by name

12:52 07 September 2011 by Michael Marshall

Dave the dolphin whistles, and his friend Alan whistles back. We can't yet decipher their calls, but some of the time Dave may be calling: "Alan! Alan! Alan! Alan!"

Stephanie King of the University of St Andrews, UK, and colleagues monitored 179 pairs of wild bottlenose dolphins off the Florida coast between 1988 and 2004. Of these, 10 were seen copying each other's signature whistles, which the dolphins make to identify themselves to each other.

The behaviour has never been documented before, and was only seen in pairs composed of a mother and her calf or adults who would normally move around and hunt together.

The copied whistles changed frequency in the same way as real signature whistles, but either started from a higher frequency or didn't last as long, suggesting Dave was not merely imitating Alan.

Copying only happened when a pair had become separated, which leads King to speculate that they were trying to get back together. She believes the dolphins were mimicking another animal's whistle as a way of calling them by name. King presented her research last week at the summer conference of the Association for the Study of Animal Behaviour in St Andrews.

Justin Gregg of the Dolphin Communication Project in Old Mystic, Connecticut, remains cautious, and points out that the dolphins may copy the signature whistles simply because they hear them a lot. To be sure that they are using the whistles to refer to a specific individual, researchers would need to show that dolphins responded when their signature whistle was copied, he says.

There is no other species that is known to combine signature calls and vocal mimicry in this way, says Phyllis Lee of the University of Stirling, UK. "But I bet parrots could do it," she adds. "They have very long lifespans and complex social structures, and they do a lot of mimicry."

Dolphins don't whistle

Signature they may be, but it appears that dolphins' whistles aren't actually whistles. A true whistle relies on pushing air through a chamber, but a similar sound can be produced by a vibrating membrane.

To find out which way dolphins do it, Peter Madsen of Aarhus University in Denmark and colleagues recorded a bottlenose dolphin whistling after breathing helium. The sounds were largely the same whether the dolphin was breathing helium or air. If the dolphin was really whistling, the helium would have changed the frequency of the sound (Biology Letters, DOI: 10.1098/rsbl.2011.0701).

http://www.science20.com/alpha_meme/ephedra_aphrodisiac_axis_evil-82340

Ephedra Aphrodisiac From The Axis Of Evil

By vongehr

Yesterday, I enjoyed a stimulating tea that has been enjoyed all over the northern hemisphere for thousands of years.

We prepared (see pictures below) and consumed early in the morning together with some nutmeg, after which we went shopping, exercised, played two rounds of basketball with a friend and some strangers in the afternoon, and suchlike little endeavors alternating every few hours with returning home, because yes, ephedra is a strong aphrodisiac. And we only drank a beer and ate some fruit all day, because ephedra is indeed a very good appetite suppressant, extremely useful if you want to lose weight.

From time to time, I like to present our poor US American fellows with a reality check on their delusions about being the defenders of the free world. What I just described can get you into jail nowadays if you do it in the "land of the free"; you have been warned. Brewing a cup of what is basically Mormon Tea* has been turned into extracting a dangerous precursor chemical.

I am not sure exactly why, but it involves some mix of prison industry lobbying for more incarceration, pharmaceutical industry lobbying for criminalizing medicines that are not profitable to them [see for example the problem with Attention Deficit Hyperactivity Disorder (ADHD) and the "war on drugs" effectively denying treatment to the poor], and plain fear mongering to ensure a panicky populace supportive of more wars to hide real problems.

One victim is my good old friend the ephedra plant, which I have seen in many botanical gardens in Europe and the US. Once I found an Ephedra branch in a psychiatrist's office, which resulted in an interesting exchange and an extra large prescription of goodies – all is well in white America if you are well off.

Ephedra, known in China as 麻黄 (má huáng), this good old friend of all those in the know produces ephedrine: The total alkaloid content of ephedra is 1-3%, and ephedrine makes up 50-80% of those alkaloids. Plant sources can have quite varied concentrations, but 5g of medicinal ephedra can contain up to 100mg of ephedrine – a strong dose. Ephedrine only needs to lose a single oxygen atom, or "be hydrogenated", to result in methamphetamine, one of the best cognitive enhancers:

Alternatively, you can use oxidation via say potassium permaganate (KMnO4) inside a fridge in order to produce methcathinone – very easy, very pleasurable, smells very nice like pistachio ice-cream, and is also totally illegal in the US, though cathinone has been safely used for eons, namely when chewing khat, a plant that is also illegal now in the land of the free, which will be soon free of anything to do except for worshiping cars and guns.

This is all just the tip of an iceberg: My friend Ephedra and ephedrine are so thoroughly attacked, even Pseudoephedrine nasal decongestant has been demonized along the way. Incredibly stupid misinformation against harmless diet pills has been forced down our throats so that by now you can only buy more dangerous stuff like bitter orange that does not even work at all instead. The list of stupid goes on and on; my article here hardly scratches the surface of the issue. Thus, do not be surprised if you find the internet full of crap telling you how horribly dangerous and evil it is what I did. And it all started with a walk to the friendly corner pharmacy:

Here in China, you can buy large bags of dried ephedra plant at close to no cost and no fear of going to jail. Here you see my bag with the dried ephedra, four heaped tablespoons of which I put already into the head of the coffee grinder type thingy to the upper right, which I described when making nutmeg liquor (it is a soybean milk maker actually, but here I only use the chopper attachment, not the sieve):

Add two cups of water and bring to a boil, then decant from the rough pieces after three minutes into a bowl, then wait a minute for the medium rough pieces to settle down, then start to get the tea from the top of the bowl

and transfer it spoon by spoon into drinking cups or glasses: Repeat once or twice adding a cup of water to the pot, boiling, and decanting in order to get all the ephedrine out of the plant and into the cups:

You should not take it very often though, because ephedrine is a cardiotoxic just like coffee. On the stimulant spectrum that starts from coffee on one end and goes to methamphetamine at the other, ephedrine is at the coffee end. In other words: ephedrine, just like the body's own norepinephrine, interacts with cell surface adrenergic receptors and activates the sympathetic nervous system rather than the central nervous system.

But no fear, Starbucks won't be illegal. Coffee is the worst; Caffeine addiction does not give much cognitive enhancement back in return for the heart trouble it triggers; the defenders of freedom perhaps deem such system stabilizing.

** Mormon Tea is made from American ephedra (Ephedra trifurca or navadenis or viridis), a close relative of the Ephedra sinica and distachia varieties. American ephedra contains much less ephedrine.*

http://www.physorg.com/news/2011-09-traffic-gridlock.html

What causes traffic gridlock?

Everyday life enters a different phase on the Tuesday after Labor Day, the unofficial start of autumn in the United States.

As students and employees return from vacation, and vehicles fully flood roadways once again, drivers face an increased risk of what may be the worst hassle a commuter can encounter: traffic gridlock.

Gridlock occurs when vehicles cannot pass through an intersection -- even if they have a green light and the right of way. Vehicles that were unable to make it completely through the traffic signal before the light turned red now block the "box" -- the area of the intersection where both roads overlap -- causing delays and unnerving blares from car horns.

Greg Mitchell, a manufacturer's representative from the Bronx who has driven in New York City for 20 years, has experienced gridlock many times when driving between sales calls in Manhattan.

"It's frustrating when you're at an intersection and you see vehicles in the intersection that shouldn't be," Mitchell said. "On the other hand, I don't want to be the guy sitting in the middle of an intersection when the light changes to red and the cross-traffic is sitting there, aimed at my driver's side door, honking their horns. That's not a fun feeling either."

Striving to figure out how to prevent this urban nuisance, traffic-physics researcher Boris Kerner of the Daimler Automotive Group in Germany has developed an explanation for how gridlock occurs. A preprint of his new model can be viewed in a preprint at the website arXiv. Surprisingly, his new model suggests gridlock can occur even when traffic flow is relatively light. The culprit? Someone in the line of traffic near a light signal slows down, triggering a chain of events that can reduce the speed of all traffic behind it, build up successively longer lines of vehicles with every green-yellow-red cycle, and eventually lead to gridlock.

Continuing a physics approach that originates from the early 1960s, Kerner and his colleagues developed a mathematical description that treats vehicles in traffic like objects in natural systems, such as a network of electrical signals traveling in the brain, or complex molecules in a thick liquid bouncing against each other as they are being sucked up through a straw. In all these cases, the objects can together make abrupt "phase transitions" from one state to another -- from a smooth liquid to a molasses-like one, from normal electrical activity to epilepsy, and from free-moving vehicle traffic to a jam. Unlike ice resting in a freezer, these systems are all dynamic, and far from equilibrium. Introduce a disturbance above a critical level, and like a roll of the dice, this can sometimes -- randomly -- cause the system to change its phase abruptly and dramatically.

In traditional models, traffic has been treated as having only two distinct phases -- either the cars are moving freely, or they are congested. However, in the mid-1990s, Kerner introduced a three-phase model. There is a "free flow" phase, plus two different phases of congestion -- an all-out "jam," and a state of "synchronized flow" in which vehicles are locked into a reduced speed, such as when vehicles in three lanes slow down together after merging into two lanes.

Kerner developed the three-phase model to describe highway traffic in a more realistic fashion, showing how vehicles could move from free flow to synchronized flow to a jam. The model provided insights that led to solutions aimed at improving traffic flow, such as the ANCONA system, in which vehicles await their turn to enter an on-ramp based on precisely timed traffic signals. However, Kerner didn't believe his model, designed for highway traffic, was needed to describe city traffic.

"Until 2007, I believed that earlier traffic flow theories and models could explain traffic at light signals in a city network, in particular, traffic gridlock observed almost each day in large cities of the industrial world," Kerner wrote in an email to Inside Science. "I changed my mind only about four years ago."

As Kerner discovered, classic traffic models weren't predicting gridlock even at moderate levels of traffic flow. However, in his model, the same chain of events that caused highway traffic to move from free flow to synchronized flow to gridlock in city streets.

"I was surprised to learn that Kerner believes that his three-phase theory, which was developed to describe highway traffic, can be applied to traffic on city streets. Once you accept this assumption, the results of his simulations are not so surprising," commented L. Craig Davis, a former Ford Motor Company research scientist who performed traffic-physics research at University of Michigan and Michigan State University.

In the new paper, Kerner performs a simulation of a line of vehicles approaching a traffic signal. In the model, cars in free flow can travel at a maximum allowed speed of nearly 35 mph. With a small flow of traffic on a street the model shows that all vehicles at the red light can clear the intersection when the signal turns green.

"In accordance with earlier traffic theories and models, gridlock should not occur under these conditions," Kerner explained. Vehicles that pass the green light without stopping can move at free flow speed.

However, the line of vehicles can make a transition from free flow to synchronized flow "if one of these vehicles decelerates randomly," according to Kerner. Traffic in synchronized flow has a maximum speed of approximately 25 mph. "As a result, there is a decrease in the number of vehicles passing the light signal during the green light," he explained.

This effect increases the number of vehicles waiting in line at the red light of the next cycle of the light signal. Consequently, when this longer line of vehicles cannot clear during the next green light, the line begins to grow. "Traffic breakdown has occurred at the light signal," Kerner stated.

Whether a decelerating vehicle ultimately causes gridlock is random, according to the new model. In Kerner's simulations, a decelerating vehicle sometimes caused vehicles behind it to slow down to a critical speed, compelling them to make the transition to synchronized flow. This In turn guaranteed the emergence of gridlock. At other times synchronized flow, and therefore gridlock, never occurred.

"The occurrence of a critical speed for synchronized flow is a random event," Kerner wrote. "[This random occurrence] is a common feature of many other non-equilibrium systems of natural science in which phase transitions occur." While Kerner has done extensive real-world measurements in his earlier research, it's important to note that this work is just at the stage of a simulation.

"So far, no one has reported empirical evidence from real city-traffic data that the transition Kerner predicted actually occurs," Davis pointed out. "But if confirmed, it will be an important discovery."
With a physical description of gridlock, Kerner plans to come up with ways to break up gridlock in future work.

"Correctly understanding the scenario Kerner studied could lead to congestion mitigation," Davis wrote, "perhaps by dynamically controlling the length of the red and green phases of the traffic light. I'm sure that his paper will generate considerable comment and will stimulate further research."

In the meantime, Mitchell believes that a lot is up to the driver. People can avoid gridlock conditions if they adjust their schedules, or take mass transit. And if they ever find themselves at a congested intersection, in front of a "stale" green light about to turn yellow, they should try to avoid being part of the problem.

"I do think that there is an individual conscious decision to be made whether to move through that green light or sit back and not block the box," Mitchell said. *Provided by Inside Science News Service*

http://www.eurekalert.org/pub_releases/2011-09/qdp-ttr090711.php

Time to reboot thinking on trans fats - natural trans fats from dairy and beef are good

Edmonton, Alberta, Canada ***Not all trans fats are created equal and it's time for a change in nutrition labels in North America to reflect this, particularly when it comes to dairy and beef products.***

According to a scientific review published in the latest edition of Advances in Nutrition, natural trans fats produced by ruminant animals such as dairy and beef cattle are not detrimental to health and in fact show significant positive health effects. Some evidence even links these natural trans fats to reduced risk of cardiovascular disease and cancer.

"The body of evidence clearly points to a change needed in how nutrition labels are handled," says Dr. Spencer Proctor, one of the review authors and Director of the Metabolic and Cardiovascular Diseases Laboratory at the University of Alberta in Canada. "Right now, in Canada and U.S. a substantial portion of natural trans fats content is included in the nutrition label trans fats calculation, which is misleading for the consumer. We need a reset in our approach to reflect what the new science is telling us."

Consumers are bombarded on a regular basis about what they should and shouldn't eat. Quite often fat is the primary target of what to avoid and trans fats in particular have a negative reputation. However, the scientific

review in Advances in Nutrition reveals that consuming natural trans fats produced by ruminant animals has different health effects than consuming industrial trans fats, such as partially hydrogenated vegetable oils used in the preparation of some foods such as some baked goods.

As the scientific evidence mounts, there is slowly rising public awareness of this difference. A change in how trans fat information is presented on nutrition labels would be a huge step forward, says Proctor. In some European countries, for example, natural trans fat is not included in the nutrition label calculation. Another approach may be to have separate listings for industrial trans fats and natural trans fats.

By definition, ruminant trans fat is naturally-occurring, found in meat and dairy foods. Industrial produced trans fat is a component of partially hydrogenated vegetable oils, which have been highly associated with cholesterol and coronary heart disease.

According to the review, the naturally occurring trans fat has a different fatty acid profile than industrial trans fat, which contributes to its different physiological effects. Also, the amount of natural trans fat consumed has been relatively stable and much lower than the amounts consumed from partially hydrogenated oils that have been associated with adverse effects.

Researchers evaluated an evidence base from numerous epidemiological and clinical studies in the Advances in Nutrition review. Based on the promising findings to date, plans for new studies are gaining momentum to further investigate the health implications of natural ruminant-derived trans fats.

For example, one leading scientific program is headed by Proctor, who recently was approved for a $1 million research grant from the Alberta Livestock and Meat Agency (ALMA) to further this line of study over the next several years. This represents a continuation of strong support for research programs by the livestock industry in Alberta. "With industry, science, regulators and other important groups in this area working together, we can continue to make strides to help the public better understand the health implications of natural ruminant trans fats," says Proctor. *The scientific review on natural trans fats in Advances in Nutrition is available*

http://boards.medscape.com/forums?128@736.YTxza9wXsdB@.2a0d4a36!comment=1

Vampire Bat Causes Fatal Rabies Encephalitis in USA

Andrew Wilner, MD, Neurology, 10:46PM Sep 1, 2011

Clinical History

According to the patient's mother, the 19 year old boy had been bitten by a bat on the left foot while sleeping in Michoacan, Mexico, before coming to Louisiana to work as a laborer on a sugar cane plantation. After one week of work, he developed generalized fatigue, left shoulder pain, and left hand numbness. Initially, his symptoms were attributed to overexertion. He then experienced hyperesthesia of his left shoulder, left hand weakness, generalized areflexia, and drooping of the left upper eyelid. A presumptive diagnosis of the Miller-Fisher variant of acute inflammatory demyelinating polyneuropathy (Guillain Barre) syndrome was made. He became febrile, had respiratory distress, and lapsed into a coma. A lumbar puncture revealed 87 WBCs (97% lymphocytes) and a protein of 233 mg/dL. Rabies virus specific immunoglobulin G and immunoglobulin M were present in the CSF. Rabies virus antigen was detected in postmortem brain tissue, and antigenic typing isolated the vampire bat rabies variant.

I chatted with Brett Petersen, MD, MPH, Medical Officer, Poxvirus and Rabies Branch, CDC, who was kind enough to answer my many questions. He told me that this case is unusual because vampire bats are only found in Latin America, not in the US. Dr. Petersen explained that patients may develop hypersalivation and hydrophobia due to painful laryngeal spasms. "Even the sight of water can create pain," he stated.

According to Dr. Petersen, bat rabies is uniformly fatal, even for infected bats. However, the long incubation period of the virus allows it to be transmitted from bat to bat. In human cases, the median incubation period is 85 days. In general, for a person to be infected with bat rabies, the virus must be inoculated under the skin from the bat's saliva. This requires a bite or a scratch (Hooper et al. 2011), although infection by aerosolized virus has been proposed.

Rabies is caused by a Lyssavirus and has the highest case fatality of any infectious disease (Blanton et al. 2010). With rare exceptions, every patient dies.

Vampire Bats

Characterized by big ears and razor sharp teeth, vampire bats feed at night, quietly landing or jumping onto their prey. However, because of the bat's padded feet and wrists, the victim may be unaware of the bat's presence. Heat sensors in the bat's nose detect accessible blood vessels close to the skin's surface. The bat has an anticoagulant in its saliva that allows it to lap up blood with its tongue. After feeding for approximately 30 minutes, the bat may have ingested so much blood that it is barely able to fly. Victims may not realize they have been bitten. Bat teeth are very fine and may leave only pinpoint puncture marks <1mm that may be nearly

undetectable (De Serres et al. 2008). In the past 20 years, most of the people infected with bat rabies did not report a bat bite (De Serres et al. 2008).

The number of rabies cases in the US has decreased dramatically due to the elimination of canine rabies by vaccination programs for dogs. Rabies now comes from wildlife such as raccoons, bats, skunks and foxes (Blanton et al. 2010). This is in contrast to the global situation, where rabies kills approximately 55,000 people per year, mostly due to rabid dogs (De Serres et al. 2008). Humans are not natural reservoirs for rabies virus (Hooper et al. 2011).

Since the elimination of dogs as a rabies reservoir in the US, bat rabies has become the most common cause of human rabies. In 2009, only 4 cases of rabies were identified in the US. Of these, 3 were due to bats. A fourth case of rabies was in a physician who had been bitten by a rabid dog while traveling in India.

Vampire bats are the leading cause of human rabies in Latin America. One concern about global warming is that it could possibly affect the range of vampire bats, introducing them into the Southern USA, resulting in an increase in bat rabies.

Post-Exposure Prophylaxis

Over 20,000 people receive rabies post-exposure prophylaxis in the US each year, and there are no reported failures (Hooper et al. 2011). The purpose of post-exposure prophylaxis is to prevent the virus from reaching the central nervous system. While the neurotropic virus travels through peripheral nerve axons to the central nervous system, there is no clinical evidence of infection. Post-exposure prophylaxis is 100% effective if administered before symptoms develop. However, once the rabies virus has entered the central nervous system and caused symptoms, the outcome is nearly always fatal.

The current recommendations for postexposure prophylaxis are 4 doses of rabies vaccine and 1 dose of rabies immunoglobulin. The wound should be vigorously cleaned and infiltrated with rabies immunoglobulin. The immunoglobulin provides immediate protection while the vaccination induces endogenous antibodies. While the older rabies vaccine was made from nervous tissue and was painful, the current vaccine is made from human diploid cell culture or purified chick embryo cells and is no more painful than other vaccines. In 2008, the CDC revised its vaccination guidelines from 5 shots down to 4, administered on days 0 (right away), 3, 7, and 14. Allergic reactions are infrequent (1/1000), but patients should be closely supervised (De Serres et al. 2009). Persons with altered immunocompetence should receive the older 5 dose regimen. If work or travel predispose individuals to rabies exposure, they can be vaccinated prophylactically. There is also research on an intranasal vaccine (Cruz et al. 2008).

Conclusions:

For those who have received excessive exposure to vampires from TV, cinema and other media, their suffering may continue, as a vaccine is still unavailable. However, if one is bitten by a bat, the CDC recommends the following:

1. If the bat is available, test it for rabies. If the test is negative, no anti-rabies prophylaxis is needed.
2. If the bat flies away, assume it was rabid and administer post-exposure prophylaxis according to the CDC guidelines.
3. Treat as soon as possible after the bite.

Rabies, although rare, should be considered in the differential diagnosis of unexplained acute, progressive, encephalomyelitis. Because of the relatively long incubation period of the rabies virus, a travel history should be obtained from the patient because of the possibilty of infection outside the US. Prompt post-exposure treatment is critical-once a patient has developed symptoms, there is no established therapy (Jackson 2011).

More information on bat rabies can be found on the CDC rabies web page.

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http://www.eurekalert.org/pub_releases/2011-09/aaoo-wts090711.php

When that shoulder aches too much to move

Treatment options for stiff and painful shoulders caused by adhesive capsulitis

Adhesive capsulitis, sometimes described as "frozen shoulder," is a condition where the connective tissue around the shoulder joint becomes chronically inflamed, causing thickening and tightening in the affected joint. Diagnosing adhesive capsulitis can be difficult because its symptoms—restricted movement and considerable pain—are similar to a variety of shoulder-related musculoskeletal conditions, including arthritis. Proper diagnosis of adhesive capsulitis may require extensive investigation into the patient's medical history to eliminate other causes.

According to a recent literature review published in the Journal of the American Academy of Orthopaedic Surgeons (JAAOS), "patients with a painful stiff shoulder are frequently diagnosed with frozen shoulder" which is a vague diagnosis because there are many factors that contribute to motion loss in the shoulder, says Robert J. Neviaser, MD, Professor and Chairman of the Department of Orthopaedic Surgery at George Washington University Medical Center in Washington, D.C., who co-authored the review with his son, Andrew S. Neviaser, MD, Assistant Professor in the department.

Adhesive capsulitis is not necessarily the result of an injury. The condition can start out as some soreness in the shoulder before the patient begins to notice some progressive restriction of movement.

Common adhesive capsulitis symptoms include:

Night pain, and patients typically cannot sleep on the affected side.

Restricted movement to the extent that patients tend to have difficulty dressing, combing their hair, or reaching into a back pocket.

Many patients have minimal or no pain once the shoulder gets fairly restrictive in motion, but will notice pain when suddenly reaching beyond the limits of the stiffness.

Populations most at-risk:

Women between ages 40 and 60 are most prone to develop adhesive capsulitis.

People with diabetes have an increased risk of developing the condition.

Persons with less physically active occupations than in persons who perform manual labor—usually the non-dominant shoulder is the one involved.

Managing pain/restoring shoulder movement:

The best way to help restore the patient's range of movement and significantly reduce shoulder discomfort begins with gentle, progressive stretching exercises over weeks, sometimes months, in order to relieve adhesive capsulitis symptoms.

"The first step in treatment is a physical therapy program to stretch the capsule slowly and progressively. This is usually successful. We limit surgical interventions to patients who do not show adequate progress over a period of months of physical therapy, and are still significantly restricted in their movement and function in daily life. If surgery is required, arthroscopic capsular release—removal of the thickened and scarred capsule—has shown improved pain relief and restoration of shoulder function two to five years after the surgery, but while successful, surgery is rarely needed," said Dr. Neviaser.

Notes on diagnosis:

According to Dr. Neviaser, "As a result of an inflammatory process, the joint lining develops scarring which becomes a restraint to movement—like a tether. And within the limits of what that restraint or tether allows, the person is usually uncomfortable, but they can function. If they suddenly reach beyond that, without thinking—such as going to reach for something—then they develop a sharp, severe pain, because what they're doing, effectively, is microscopic tearing of the scar tissue."

"Probably the only condition that is similar during the physical examination is shoulder-joint arthritis," said Dr. Neviaser. "But with shoulder-joint arthritis, when you try to move the shoulder, you often get a ratchety, grinding sensation—which you do not get with adhesive capsulitis, and of course, the x-rays will show the arthritic changes." While MRIs and other imaging tests can be valuable in excluding other causes of the symptoms, they are not generally required for diagnosis.

http://www.eurekalert.org/pub_releases/2011-09/uoc--efa090611.php

Evidence for a persistently iron-rich ocean changes views on Earth's early history

Discovery challenges previous models for the environment in which early life evolved

RIVERSIDE, Calif. -- Over the last half a billion years, the ocean has mostly been full of oxygen and teeming with animal life. But earlier, before animals had evolved, oxygen was harder to come by. Now a new study led by researchers at the University of California, Riverside reveals that the ancient deep ocean was not only devoid of

oxygen but also rich in iron, a key biological nutrient, for nearly a billion years longer than previously thought -- right through a key evolutionary interval that culminated in the first rise of animals.

"The implications of our work are far reaching," said Timothy Lyons, a professor of biogeochemistry and the principal investigator of the study. "We will need to rethink, in a fundamental way, all of our models for how life-essential nutrients were distributed in the ocean through time and space."

Study results appear in the Sept. 8 issue of Nature.

Previous ocean chemistry models

Most scientists agree that the early Earth, before 2.4 billion years ago, contained only trace quantities of oxygen and that the oceans were dominantly full of dissolved iron. But there is far less agreement among scientists about the chemical composition of the ocean during the middle chapters of Earth's history in the wake of atmospheric oxygenation—about 2.4 to 0.5 billion years ago—when the diversity of organisms that we know today, including the animals, first got their footing.

Classic models for this time window maintain that the ocean, all depths, became rich in oxygen in parallel with its first accumulation in the atmosphere. This increase in oxygen in seawater has been linked to the disappearance of iron ore deposits known as 'banded iron formations,' the source of almost all of the iron used to make steel today. Oxygen, the argument goes, would have 'rusted' the oceans, stripping them of dissolved iron.

More than a decade ago, however, another idea gained traction: hydrogen sulfide. Produced by bacteria in the absence of oxygen, hydrogen sulfide, it was argued, might instead have scrubbed the iron out of the ocean during Earth's middle history, dealing the fatal blow to the iron deposits. In an ocean full of hydrogen sulfide, diverse life-sustaining elements, including iron, can be stripped from the seawater, potentially causing a biotic crisis.

Fresh perspective

"The problem all along was a general lack of physical evidence in the oceans for the amounts of oxygen, iron, and sulfide in the Earth's middle history, particularly in a critical billion-year window between roughly 1.8 and 0.8 billion years ago," said Noah Planavsky, a doctoral student in UC Riverside's Department of Earth Sciences and the lead author of the new study. "Some earlier work supported a return to an iron-rich ocean 0.8 billion years ago. Rather than a return, however, we predicted that iron may have dominated the deep ocean continuously right up to the oxygenation and concomitant rise of animals a mere half-billion years ago."

Planavsky and his colleagues at UCR and in Canada, Australia, and China sought to remedy the data deficiency. New rock samples they collected from across the globe suggest a previously unknown continuity in ocean chemistry over much of its history. These data, the first of their kind, point towards continuous oxygen-poor, iron-rich conditions for 90 percent of Earth's history, with oxygen and hydrogen sulfide, when present, limited mostly to the surface layers and along the margins of the oceans, respectively.

The task now is to reconsider whether the purported shortages of nutrients attributed to widespread hydrogen sulfide were indeed real and a throttle on early evolution. "Our new knowledge that the deep ocean was anoxic and iron-rich does not mean life had it easy, though," Lyons says. "Enough sulfide could have persisted around the edges of the ocean to severely limit other key nutrients. We are still testing this hypothesis."

Ironing out the details

The researchers' results also indicate that neither oxygen nor hydrogen sulfide turned off iron deposition around 1.8 billion years ago, when the last major iron ores were seen. They suggest instead that hydrothermal systems on the seafloor are the most important factor controlling the distribution of iron ore.

"These hydrothermal systems are high-temperature vents on the seafloor tied to magmatic activity, and they can pump huge amounts of iron into the ocean," Planavsky explained. "Previous researchers have suggested that there was a decrease in the amount of iron from hydrothermal systems around 1.8 billion years ago. Our results support this idea with compelling physical evidence, while showing that iron could persist in the ocean at levels below those necessary to form ore deposits."

"The next step is to better merge this refined chemical perspective with traditional and emerging views of evolving life, recognizing that life and the environment co-evolve in an intimate dance of cause-and-effect relationships," Lyons added.

Planavsky and Lyons were joined in the study by Clint Scott, Chao Li, Chris Reinhard, Amy Kelly, and Gordon Love, all colleagues at UCR; Peter McGoldrick of the University of Tasmania; Xuelei Chu of the Chinese Academy of Sciences; and Andrey Bekker of the University of Manitoba, Canada.

The study was supported by grants to Planavsky from the National Science Foundation-Graduate Research Fellowship Program, the Geological Society of America and the American Philosophical Society; and to Lyons from the National Science

Foundation-Geobiology and Low-Temperature Geochemistry Program, the NASA Exobiology Program, the NASA Astrobiology Institute, the University of Tasmania Visiting Fellows Program and the Agouron Institute.

http://www.eurekalert.org/pub_releases/2011-09/uob-wda090611.php

Where does all the gold come from?

Ultra high precision analyses of some of the oldest rock samples on Earth by researchers at the University of Bristol provides clear evidence that the planet's accessible reserves of precious metals are the result of a bombardment of meteorites more than 200 million years after the Earth was formed.

During the formation of the Earth, molten iron sank to its centre to make the core. This took with it the vast majority of the planet's precious metals – such as gold and platinum. In fact, there are enough precious metals in the core to cover the entire surface of the Earth with a four metre thick layer. The research is published today in Nature.

The removal of gold to the core should leave the outer portion of the Earth bereft of bling. However, precious metals are tens to thousands of times more abundant in the Earth's silicate mantle than anticipated. It has previously been argued that this serendipitous over-abundance results from a cataclysmic meteorite shower that hit the Earth after the core formed. The full load of meteorite gold was thus added to the mantle alone and not lost to the deep interior.

To test this theory, Dr Matthias Willbold and Professor Tim Elliott of the Bristol Isotope Group in the School of Earth Sciences analysed rocks from Greenland that are nearly four billion years old, collected by Professor Stephen Moorbath of the University of Oxford. These ancient rocks provide a unique window into the composition of our planet shortly after the formation of the core but before the proposed meteorite bombardment.

The researchers determined the tungsten isotopic composition of these rocks. Tungsten (W) is a very rare element (one gram of rock contains only about one ten-millionth of a gram of tungsten) and, like gold and other precious elements, it should have entered the core when it formed. Like most elements, tungsten is comprised of several isotopes, atoms with the same chemical characteristics but slightly different masses. Isotopes provide robust fingerprints of the origin of material and the addition of meteorites to the Earth would leave a diagnostic mark on its W isotope composition.

Dr Willbold observed a 15 parts per million decrease in the relative abundance of the isotope 182W between the Greenland and modern day rocks. This small but significant change is in excellent agreement with that required to explain the excess of accessible gold on Earth as the fortunate by-product of meteorite bombardment.

Dr Willbold said: "Extracting tungsten from the rock samples and analysing its isotopic composition to the precision required was extremely demanding given the small amount of tungsten available in rocks. In fact, we are the first laboratory world-wide that has successfully made such high-quality measurements."

The impacting meteorites were stirred into the Earth's mantle by gigantic convection processes. A tantalising target for future work is to study how long this process took. Subsequently, geological processes formed the continents and concentrated the precious metals (and tungsten) in ore deposits which are mined today.

Dr Willbold continued: "Our work shows that most of the precious metals on which our economies and many key industrial processes are based have been added to our planet by lucky coincidence when the Earth was hit by about 20 billion billion tonnes of asteroidal material."

This research was funded by the Natural Environment Research Council (NERC), the Science and Technology Facilities Council (STFC) and the Deutsche Forschungsgemeinschaft (DFG).

Notes to editors *Paper: 'The tungsten isotopic composition of the Earth's mantle before the terminal bombardment' Matthias Willbold, Tim Elliott and Stephen Moorbath Nature*

http://www.eurekalert.org/pub_releases/2011-09/rumc-mma090211.php

Medical management alone may be best treatment course for stroke prevention

Initial results published in New England Journal of Medicine

CHICAGO – Patients with narrowed arteries in the brain who received intensive medical treatment had fewer strokes and deaths than patients who received a brain stent in addition to medical treatment, according to the initial results from the first, nationwide stroke prevention trial to compare the two treatment options.

Rush University Medical Center is the only hospital in Chicago and one of two sites in Illinois that participated in the clinical trial funded by the National Institute of Neurological Disorders and Stroke (NINDS), which is part of the NIH. The results of the National Institutes of Health (NIH) study called Stenting versus Aggressive Medical Management for Preventing Recurrent Stroke in Intracranial Stenosis (SAMMPRIS) are published in the online first edition of the New England Journal of Medicine.

"Stenting was associated with a higher stroke and death rate at 30 days (14.7 percent) versus aggressive medical management alone," said Dr. Shyam Prabhakaran, neurologist and site lead investigator at Rush. "At this time, stenting cannot be supported in routine practice; however, whether subgroups may benefit from this or other interventions in the future needs further study. This study provides an answer to the longstanding question of what to do to prevent a devastating second stroke in a high risk population," said Prabhakaran, co-author of the New England Journal of Medicine article. "All patients should be managed aggressively with medications."

The medical regimen used in the study included daily blood-thinning medications and aggressive control of blood pressure and cholesterol. New enrollment in the study was halted in April because early data indicated that strokes and deaths occurred more significantly among the stented patients at the 30-day mark compared to a group of study participants who received medical management alone.

In addition to the intensive medical program, half of the patients participating in the study received an intervention of a self-expanding stent that widens the major artery in the brain and facilitates blood flow. Study authors suggest one possible explanation for the higher stroke rate in the group that received stents. Patients who have had recent stroke symptoms sometimes have unstable plaque in their arteries which the stent could have dislodged. The device used in the study, called the Gateway-Wingspan intracranial angioplasty and stenting system, is the only system currently FDA approved for certain high-risk stroke patients.

Study participants were in the highest risk category with blockage or narrowing of the arteries from 70-99 percent. Stroke patients with moderate cerebral arterial blockage (50-69 percent) were excluded because their risk of stroke is low with the usual medical management and because researchers thought this group would be unlikely to benefit from stenting.

The SAMMPRIS trial enrolled 451 patients at 50 hospital sites in the U.S. Study investigators analyzed whether patients had a second stroke or died within 30 days of enrollment, or had a stroke in the same area of the brain from 30 days to the end of follow-up. Patients in the study were between 30 and 80 years of age and had experienced a recent transient ischemic attack, a type of stroke that resolved within 24 hours, or another type of non-disabling stroke, which was caused by a large degree of stenosis in the cerebral artery.

The initial hypothesis was that the addition of intracranial stenting to intensive medical therapy would decrease the risk of stroke of death by 35 percent over two years. Instead, researchers found that 14.7 percent of patients in the stenting group experienced a stroke or died compared to the 5.8 percent of patients treated with drug therapy alone.

The study's design for medical management included a daily dosage of 325 milligrams of aspirin, and 75 milligrams a day of clopidogrel, which is a medication used to prevent blood clots, for 90 days after enrollment. Also, patients received aggressive management of key stroke risk factors including high blood pressure and high levels of low density lipoprotein (LDL), the unhealthy form of cholesterol. All patients also participated in a lifestyle modification program which focused on quitting smoking, increasing exercise, and controlling diabetes and cholesterol. All patients that participated in the trial will continue to be followed for two years to determine longer-term effects of both interventions.

"The SAMMPRIS study is a call to arms to all physicians caring for patients with this high risk condition. It provides evidence that highly effective medications when used in combination and when strict targets for risk factor modification are met can have substantial stroke prevention benefits," said Prabhakaran.

http://www.scientificamerican.com/article.cfm?id=ancient-sea-jelly-makes-tree

Ancient Sea Jelly Shakes Evolutionary Tree of Animals

Fossil suggests evolutionary order requires revision

By Amy Maxmen and Nature magazine | Wednesday, September 7, 2011 | 2

A 580-million-year-old fossil is casting doubt on the established tree of animal life. The invertebrate, named Eoandromeda octobrachiata because its body plan resembles the spiral galaxy Andromeda, suggests that the earliest branches in the tree need to be reordered, say the authors of study in Evolution and Development .

The researchers, led by paleontologist Feng Tang of the Chinese Academy of Geological Sciences in Beijing, believe that Eoandromeda is the ancient ancestor of modern ocean dwellers known as comb jellies - gelatinous creatures similar to jellyfish, but rounder and with eight rows of iridescent paddles along their sides. If they are right, it would be the oldest known fossil of a comb jelly. And that would support a rewrite of the animal tree.

Comb jellies sit alongside two other major groups near the base of the tree, but their relative positions remain contentious. Normally, sponges are identified as the first to evolve, followed by the cnidaria - jellyfish, sea anemones and their kin - and then by the comb jellies.

" Eoandromeda puts a little piece of weight in favour of a more basal position for comb jellies," says Stefan Bengtson, a palaeontologist at the Swedish Museum of Natural History and a co-author on the paper.

Family squabbles

That evidence comes from the fossil's shape: it has octoradial symmetry, meaning its body can be sliced into eight identical pieces. This is in stark contrast to modern comb jellies, which, like humans, flies and sea anemones, have biradial or bilateral symmetry - their body plan can be sliced into only two identical pieces.

If Eoandromeda appeared after the cnidarians, the authors argue, bilateral symmetry would have to have evolved twice - once for the cnidarians and again for the bilateral organisms that came after Eoandromeda. Far simpler is the idea that Eoandromeda evolved first (see 'Simplest solution'). "This model of animal relationships calls for the least number of origins of bilateral symmetry," says Bengtson.

The proposal is in tune with DNA studies that place comb jellies closer to the root of the evolutionary tree.

"It's great to have concordance between what these guys see in the fossil record and what's coming out of the genome," says Andy Baxevanis, a genomicist at the National Human Genome Research Institute in Bethesda, Maryland.

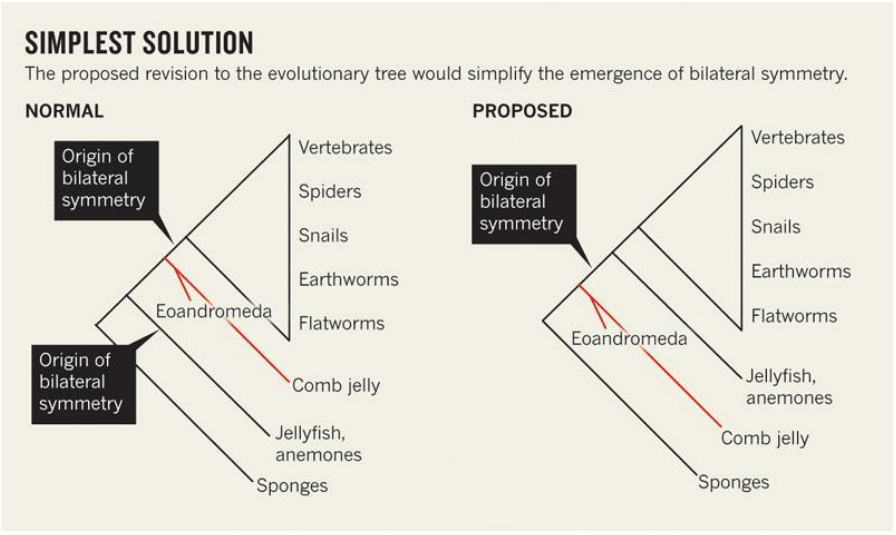
An Eoandromeda fossil, found in southeastern China **Image: Feng Tang**

His team recently sequenced the genome of the comb jelly Mnemiopsis leidyi , and is now comparing it to sequences from sponges, cnidarians, worms and other animals to sort out which lineages came first. So far, he says, the results suggest that sponges and comb jellies appeared before cnidarians.

The matter is far from settled, however. Some scientists even doubt that the fossil is in fact that of a comb jelly. The eight spiral arms are reminiscent of the eight iridescent rows, or combs, along the sides of modern comb jellies, but the fossil lacks some key characteristics of modern comb jellies, such as tentacles and a mouth. Differences between living animals and ancient fossils are expected, but the differences also allow for debate.

A galaxy of possibilities

" Eoandromeda fossils are excellent and very important, but the trouble is that the interpretation reflects the ideology of the person giving it," says Dolph Seilacher, a retired palaeontologist at the University of Tübingen in Germany who studies fossils from Eoandromeda 's time.



In the 1980s, Seilacher argued that many of the bizarre fossils from this period were abnormally large, single-celled, amoeba-like organisms in a kingdom he named Vendobionta. Until the vendobionts went extinct, he argues, multicellular animals "lived in the shadow of these unicellular giants". To Seilacher, the golf-ball-sized Eoandromeda looks like one of these giants.

Bengtson says he can't prove the fossil is a comb jelly, but its comb-like arms indicate that it is one. "The only reason to suggest they are vendobionts," he says, "is that they happen to be of that age."

Claus Nielsen, a retired evolutionary biologist at the Natural History Museum of Denmark in Copenhagen, doesn't think Eoandromeda represents comb jellies either. "I can't visualize it swimming at all," he says, noting the ancient fossil's spiraled arms. "I would say it's a beautiful and very exciting fossil, but what the heck?"

http://www.guardian.co.uk/science/2011/sep/08/australopithecus-sediba-ancestor-modern-humans

Australopithecus sediba may be an ancestor of modern humans

Researchers say two skeletons found in a cave in South Africa may belong to a species that was the direct ancestor of Homo erectus, and hence modern humans

It was a traumatic and lingering death. The adult female and young male probably fell through a fissure in a cave roof and remained alive for days or weeks with little or no food before finally meeting their end. The pair – possibly a mother and her son – were then washed by a rainstorm into an underground pool where they gradually solidified into rock.

Their unusual demise nearly 2m years ago, and the preservation of most of their fossilised skeletons, has given scientists a unique glimpse of what kind of creature they were. The researchers who have studied them in

detail believe they may be direct ancestors of modern humans. The ancient bones were recovered from sediments in a subterranean cave at Malapa, South Africa, 25 miles (40km) from Johannesburg.

The discovery of the partial skeletons was made public last year, but in a series of papers published in the US journal Science on Thursday, researchers report the first comprehensive analysis of the individuals' anatomy.

Through a combination of high resolution scans and precision measurements of the skull, pelvis, hand and foot, the authors argue that Australopithecus sediba, or the "southern ape", was an immediate ancestor of Homo erectus, the ancient form from which modern humans arose.

Lee Berger, a palaeoanthropologist at the University of Witwatersrand in Johannesburg who led the team, said the skeletons possessed an extraordinary mix of primitive, ape-like features alongside traits that define modern humans today. "What is remarkable about Australopithecus sediba is that, as a field, it is a discovery we never thought would be made: a bona fide transitional species," Berger told the Guardian.

"It is a humbling experience. These are skeletons that you realise are going to be studied by humans for as long as humans study themselves. And that gives you some pause," he added.

At least 25 other animals died alongside them, including sabre-toothed cats, hyenas, woodland antelope and at least one primitive form of zebra. Around the cave was a sub-tropical alpine forest, with mixed woodlands and forests, Berger said.

A. sediba walked upright and stood around 1.3m tall. It had a chimp-sized body, long arms similar to those of orang-utans, and was adept at climbing. But other features appear distinctly human, Berger said. "The pelvis is shaped like a human pelvis, but longer, almost like a Neanderthal's. The hand is incredibly human-like, with short fingers and a long thumb. And then there is the brain," he added.

Researchers used a powerful x-ray scanner at the European Synchrotron Facility in Grenoble, France, to create exquisitely detailed maps of the interior of the skull of one of the individuals. The bumps and other contours revealed the imprint of a small brain, only 420 cubic centimetres in volume, but one that was apparently reorganising from a primitive structure into a more modern form.

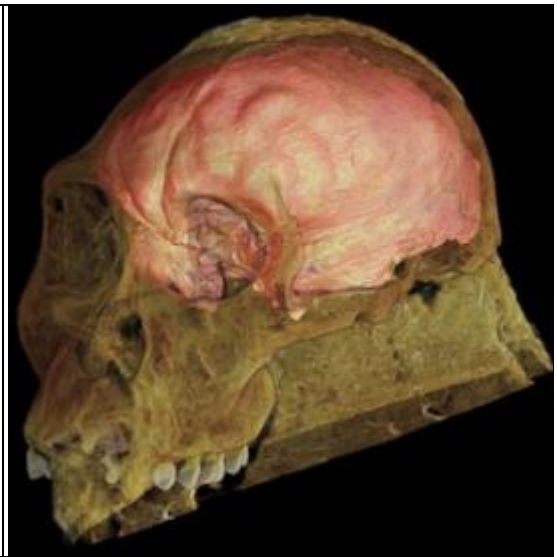
Kristian Carlson, a colleague of Berger's who worked on the brain scans, said some areas of the organ appeared more developed than expected.

"There are areas above and behind the eyes that are expanded and they are responsible for multitasking, reasoning and long-term planning. These are changes that mirror the differences that humans exhibit from chimpanzees," Carlson said. The discovery challenges the previously held theory that our ancient ancestors grew large brains before they reorganised to resemble the modern human brain.

Further measurements of the brain, skull and hand suggest that the creature may have been intelligent enough to wield tools and even communicate non-verbally, Berger said. "They could probably smile, and that is something unique to humans that chimps cannot do, they grimace. Australopithecus sediba has the beginning of our face," he said.

Other palaeontologists have yet to be convinced that the creature was an immediate ancestor of H. erectus - and hence our own species H. sapiens. But if Berger is correct, the fossils fill a gap between Lucy, the 3.2m-year-old hominin unearthed in Ethiopia, and H. erectus, which lived from 1.8m to 1.3m years ago and likely gave rise to modern humans in Africa.

Left ***The cranium of the juvenile male Australopithecus sediba.***
Brett Eloff/Lee Berger/University of Witwatersrand



Right ***Researchers were able to reconstruct a virtual brain cast of the humanlike creature***
Paul Tafforeau ESRF

"No matter where this species is eventually put in the family tree, whether you agree with our idea that it's the best candidate ancestor of Homo erectus, or whether it is a species that mimicked the developmental processes that led to our genus, or whether it turned out to be an evolutionary dead end, these are some of the

finest transitional fossils that have ever been discovered for any mammal species, and I don't say that lightly," Berger told the Guardian.

Chris Stringer, head of human origins at the Natural History Museum in London, said: "For the last 30 years, attention has focused on East Africa as the place where the first humans evolved, with a possible transition from Australopithecus to Homo erectus, via the intermediate species Homo habilis occurring there about 2 million years ago. "In that view, the South African australopithecines were side-branches in human evolution, leading only to extinction. These new and detailed descriptions of the skeletons of two individuals from the Malapa site return the spotlight to South Africa as the possible location for the postulated transition from Australopithecus to Homo.

"Australopithecus sediba resembles its presumed local ancestor, Australopithecus africanus, in its ape-sized brain, ape-like body shape, and the form of the shoulders and arms. Yet despite the fact that the hands had a powerful grip, they show more human proportions, suggesting greater dexterity. And the shape of the front of the brain cavity, the face, teeth, pelvis and legs also show more human characteristics, confirming that sediba is the most human-like australopithecine yet discovered, providing valuable clues to the evolutionary changes that led to the genus Homo.

"However, it is possible that australopithecines in different parts of Africa were taking up tool-making, meat-eating and travelling longer distances overground, which could have driven the parallel evolution of human-like features," he said. "Whatever you call these things, there seem to be a number of different species running around at the same time – a number of experiments in being hominin," Carol Ward, a palaeoanthroplogist at the University of Missouri, Columbia, told the journal Science.

• *This article was amended on 9 September 2011 because the original incorrectly spelled Berger's name as Burger.*

http://www.eurekalert.org/pub_releases/2011-09/cp-wiq090711.php

When infants gain the capacity for pain

A new study has for the first time revealed the time in development when infants appear able to tell the difference between pain and basic touch.

The researchers, who report their findings online in the Cell Press journal Current Biology on September 8, say that the results, based on recordings of brain activity in preterm infants, may have implications for clinical care.

The evidence suggests that developing brain networks become mature enough to identify pain as distinct from touch fairly late in development.

"Babies can distinguish painful stimuli as different from general touch from around 35 to 37 weeks gestation—just before an infant would normally be born," said Lorenzo Fabrizi of University College London.

Infants can't actually tell you whether something hurts or not, so the researchers relied on recordings of brain activity by electroencephalography (EEG).

According to the researchers, recent studies have emphasized the importance of bursts of neuronal activity, both spontaneous and evoked, during the formation of functional brain circuitry. That bursting pattern of activity shifts in development to adult-like responses that are more specific to particular sensory inputs.

EEG recordings of infants between the ages of 28 to 45 weeks gestation show that the brain begins to produce distinct responses to a simple touch versus a clinically essential heel lance considered as painful at about 35 to 37 weeks gestation. (Babies' due dates are based on 40 weeks of pregnancy, and babies are generally considered full term at 37 weeks).

The results may have implications for the treatment, care, and development of premature newborns, Fabrizi said, noting that these children can often grow up to be either more or less sensitive to pain than usual.

"Repeated noxious stimulation of the kind used in this study is a feature of neonatal intensive care," the researchers wrote. "Our finding that noxious heel lance increases neuronal bursting activity in the brain from the earliest age raises the possibility that excess noxious input may disrupt the normal formation of cortical circuits, and that this is a mechanism underlying the long-term neurodevelopmental consequences and altered pain behavior in ex preterm children."

http://www.eurekalert.org/pub_releases/2011-09/jotn-ftt090711.php

Fewer than 3 doses of cervical cancer vaccine effective

Fewer than three doses of the human papillomavirus (HPV) vaccine Cervarix may be just as effective as the standard three-dose regimen when it comes to preventive measures against cervical cancer, according to a new study published September 9 in the Journal of the National Cancer Institute.

Across the globe, cervical cancer is the third most common cancer among women, and HPV types 16 and 18 are a large contributor to the development of the disease. The HPV 16/18 vaccine is currently given in three doses over six months, making it an expensive and sometimes difficult to complete. No previous study has

reported on the efficacy of fewer doses of the vaccine in protecting women against the HPV infections that lead to cervical cancer.

To determine whether a lower number of doses of the Cervarix vaccine would be efficacious, Aimée R. Kreimer, Ph.D., of the Division of Cancer Epidemiology and Genetics, National Cancer Institute, National Institutes of Health, and a team of researchers conducted an analysis of data from the NCI-sponsored Costa Rica Vaccine Trial, where women received either three doses of Cervarix or the control vaccine. Of the 7,466 women enrolled, 20% received fewer than three doses due to involuntary factors, such as pregnancy or referrals to colposcopy during routine patient management. The researchers compared the frequency of persistent infection with HPV 16 or 18 in the HPV and control arms of the trial during 4 years of follow-up in women who received one or two doses of the vaccine and in women who received 3 doses.

Once researchers excluded women who had no follow-up or who were HPV16 and HPV18 DNA positive at the time of enrollment, 5,967 women received three doses of the treatment, 802 received two doses and 384 women received only one dose.

The researchers found similar levels of protection against HPV16 and HPV18 from the vaccine among women receiving one, two, and three doses of the vaccine. For settings in which the cost of vaccine and logistics of implementation are important factors, they write, "Our clinical efficacy data provide suggestive evidence that an HPV vaccine program that provides fewer doses to more women could potentially reduce cervical cancer incidence more than a standard three-dose program that uses the same total number of doses but in fewer women." They add that they were surprised by the evidence of protection from one dose, since other subunit vaccines typically require at least two shots. They caution that it remains to be determined whether fewer than three doses will provide strong protection for substantially longer periods than the 4 years of the current study.

They conclude, "If randomized studies and cost-effectiveness analyses confirm the benefits of administering fewer doses, and the duration of protection is sufficient, then the need for fewer doses may help make primary prevention of cervical cancer a reality."

In an accompanying editorial, Cosette Marie Wheeler, Ph.D., of the Department of Pathology and Department of Obstetrics and Gynecology at the University of New Mexico writes that there is a need for additional, larger studies specifically designed to evaluate the efficacy of one, two and three doses of the vaccine for adolescent girls. However, because of the high cost of clinical trials, she writes that phase IV effectiveness studies and population-based surveillance programs may be useful.

In any case, the Kreimer study represents a step in the right direction, Wheeler writes. "The age old adage of less is more may apply to HPV vaccination, and if so, the report of Kreimer et al. represents an important step on the road to more effective and sustainable cervical cancer prevention programs.

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http://www.physorg.com/news/2011-09-unexpected-relatives-smallpox.html

The unexpected relatives of smallpox

PhysOrg.com - ***A protein shared by the simple viruses that infect single-cell organisms, and their highly complex counterparts that affect mammals, could hold to the key to understanding and ultimately neutralising the deadly pox family of viruses.***

In research published today in PLoS Pathogens Dr. Fasseli Coulibaly, of Monash University's Department of Biochemistry and Molecular Biology, and Dr. Alok Mitra from the University of Auckland, have discovered that a protein, D13, is common to poxvirus and viruses infecting bacteria.

Dr. Coulibaly said the discovery was important from both evolutionary and public health perspectives.

"Being common to both families of viruses means D13 may have existed in its current form for billions of years. These viruses have been on separate development paths for a long time."

"These long-distance evolutionary links are difficult to find and can only be discovered using technology like X-ray crystallography using the Australian Synchrotron," said Dr. Coulibaly

Dr. Coulibaly said the discovery should lead to a better understanding of the poxvirus family.

"Given the common element, we can use what's been discovered about much simpler forms of viruses that contain D13, to better understand poxviruses. It's a Rosetta Stone for poxvirus."

Smallpox, the best known of the human poxviruses has been eradicated and only two official, highly secure stocks remain, meaning a small risk of deliberate release. However, other forms of pox infect animals and have the potential to jump species to humans.

"We've discovered how D13 plays its key role in the development of vaccinia, the weakened form of smallpox," said Dr. Coulibaly. "Potentially, this means we can develop drugs that target D13 and so block the

formation of poxvirus. "As D13 is common to all poxviruses, the potential exists to develop anti-viral drugs that are effective against a whole family of viruses, similar to effect of antibiotics on bacterial infections."

Dr. Coulibaly and his team plan to further develop and test D13 inhibitors as a potential basis for antiviral medication. *Provided by Monash University*

http://www.scientificamerican.com/article.cfm?id=sea-radiation-from-fukushima

Sea Radiation from Fukushima Seen Triple of Prior Estimate

Radioactive material released into the sea in the Fukushima nuclear power plant crisis is more than triple the amount estimated by plant operator Tokyo Electric Power Co, Japanese researchers say.

TOKYO (Reuters) - Radioactive material released into the sea in the Fukushima nuclear power plant crisis is more than triple the amount estimated by plant operator Tokyo Electric Power Co, Japanese researchers say.

Japan's biggest utility estimated around 4,720 trillion becquerels of cesium-137 and iodine-131 was released into the Pacific Ocean between March 21 and April 30, but researchers at the Japan Atomic Energy Agency (JAEA) put the amount 15,000 trillion becquerels, or terabecquerels.

Government regulations ban shipment of foodstuff containing over 500 becquerels of radioactive material per kg.

Takuya Kobayashi, a researcher at the agency, said on Friday the difference in figures was probably because his team measured airborne radioactive material that fell into the ocean in addition to material from contaminated water that leaked from the plant.

He believed Tepco excluded radiation that originally came from airborne material. The report does not include cesium-134 as the research group initially lacked resources to measure it, meaning the amount of estimated radioactive material will increase with further calculations.

The March 11 earthquake and tsunami knocked out reactor cooling systems at Fukushima Daiichi, 240 km (150 miles) north of Tokyo, triggering meltdowns and radiation leaks.

Huge amounts of contaminated water accumulated during efforts to cool the reactors, with much of it reaching the sea, and radiation has been found in fish, seaweed and other seafood.

Tepco edged closer this week to its near-term goal of bringing the reactors to a state of cold shutdown by January, with the temperature at the second of three damaged units falling below boiling point.

(Reporting by Yuko Takeo; Editing by Michael Watson)

http://www.eurekalert.org/pub_releases/2011-09/uotm-bcp090811.php

Breast cancer patients with BRCA gene diagnosed almost 8 years earlier than generation before

Findings could potentially impact counseling, screening of women with BRCA mutation

Houston, TX – Women with a deleterious gene mutation are diagnosed with breast cancer almost eight years earlier than relatives of the previous generation who also had the disease and/or ovarian cancer, according to new research from The University of Texas MD Anderson Cancer Center.

The findings, published online in Cancer and updated since first presented at the 2009 Breast Cancer Symposium, could have an impact on how women at highest risk for the disease are counseled and even screened in the future, explained Jennifer Litton, M.D., assistant professor in MD Anderson's Department of Breast Medical Oncology.

"In our practice, we've noticed that women with a known deleterious BRCA gene mutation are being diagnosed earlier with the disease than their moms or aunts," said Litton, the study's first author. "With this study, we looked at women who had been both treated and had their BRCA testing at MD Anderson to determine if what we were seeing anecdotally was consistent scientifically, a phenomenon known as anticipation."

It's estimated that five to 10 percent of all breast cancers are associated with either the BRCA1 or 2 mutation, both of which are associated with an increased risk for breast and ovarian cancers. According to the American Cancer Society (ACS), women with BRCA1 or 2 have a 60 percent lifetime risk of developing breast cancer, compared to a 12 percent risk for women in the general population.

Given their greater risk, women with known BRCA mutations and/or whose mothers and/or aunts from either side of the family have the mutation are screened beginning at age 25. In 2007, as a complement to mammography, ACS guidelines added Magnetic Resonance Imaging (MRI) in the surveillance of these women at highest risk, as MRI is thought to catch smaller tumors even earlier. Consideration of prophylactic mastectomies is also a component of their surveillance, said Litton.

"Currently, BRCA positive women are counseled to start screening by 25 years, or five to ten years earlier than their youngest affected family member. However, our findings show that we may need to continue to

follow these trends with future generations, and make changes accordingly in order to best advise and care for women at greatest risk," Litton said.

For the retrospective study, the researchers identified 132 BRCA positive women with breast cancer who participated in a high-risk protocol through MD Anderson's Clinical Cancer Genetics Program between 2003 and 2009. Reviewing each woman's pedigree (family tree), 106 were found to have a female family member in the previous generation who also had a BRCA-related cancer, either breast or ovarian. Age at diagnosis, location of mutation and birth year were recorded in both the older (gen1) and younger (gen2) women.

The study found that in gen2, the median age of diagnosis was 42, compared to age 48 in gen1. In comparing generations within a family, the median difference was six years. By using new mathematical models to evaluate for anticipation, the difference in age between generations was 7.9 years.

"These findings are certainly concerning and could have implications on the screening and genetic counseling of these women," Litton said. "In BRCA positive women with breast cancer, we actually might be seeing true anticipation -- the phenotype or cancer coming out earlier per generation. This suggests more than the mutation could be involved, perhaps lifestyle and environmental factors are also coming into play."

The research reconfirms that women with BRCA mutations should continue to be screened per the guidelines - mammography, MRI and consideration of prophylactic surgeries - yet perhaps with increased suspicion and even at an earlier age, said Litton, who notes that the addition of MRI screening may account for some of the change in diagnosis seen in the study.

Further analysis is needed given the relatively small number of women in the cohort and the possibility of recall bias, as the gen2 women were providing their family histories, Litton explained. As follow up study, Litton plans to look into biological basis for potential earlier diagnosis.

The study was funded by the Nellie B. Connally Breast Cancer Research Fund.

In addition to Litton, other authors on the all-MD Anderson study include: Gabriel Hortobagyi, M.D. chair; Banu Arun, M.D., the study's senior author; Ana Maria Gonzalez-Angulo, M.D., Kaylene Ready; Angelica Gutierrez Barrera; Huiqin Chen, all of the Department of Breast Medical Oncology; Funda Meric-Bernstam, M.D., Department of Surgery; Karen Lu, M.D., Department of Gynecologic Oncology; Carol Etzel, Ph.D., Department of Epidemiology; and Huong Le-Petross, M.D., Department of Diagnostic Radiology.

http://www.bbc.co.uk/news/science-environment-14855666

British flowers are the source of a new cancer drug

By Leila Battison Science reporter

The search for more effective cancer treatments may soon harness the healing power of the Autumn crocus.

Researchers are poised to start clinical trials with a new "smart bomb" treatment, derived from the flower, targeted specifically at tumours. The treatment, called colchicine, was able to slow the growth of and even completely "kill" a range of different cancers, in experiments with mice. The research was highlighted at the British Science Festival in Bradford. The team behind it, from the Institute for Cancer Therapeutics (ICT) at the University of Bradford, has published the work in the journal Cancer Research.

The native British Autumn crocus, otherwise known as "meadow saffron" or "naked lady", is recorded in early herbal guides as a treatment for inflammation. This is because it contains the potent chemical colchicine, which is known to have medicinal properties, including anti-cancer effects. But colchicine is toxic to other tissues in the body, as well as cancer, so until now its use has been limited.

Extracts from the Autumn crocus are already used to treat gout

The researchers at ICT have now altered the colchicine molecule so it is inactive in the body until it reaches the tumour. Once there, the chemical becomes active and breaks up the blood vessels supplying the tumour, effectively starving it. This effect is made possible because of enzymes that all tumours produce, whose usual function is to break down the normal cells nearby, allowing the tumour to spread.

The modified colchicine molecule has a protein attached to it that makes it harmless. But the tumour enzyme specifically targets the protein and removes it. The colchicine is then activated, and the process of breaking down blood vessels and starving the cancerous cells begins.

Optimistic but cautious

One of the things that may make this drug so effective, Professor Patterson said, is that it will be "only active in the tumour, and not cause damage to normal tissue".

Because the enzyme necessary to activate the toxic colchicine is produced only by solid tumours, it may be possible to treat cancers effectively with virtually no side effects to the rest of the body.

Moreover, as the drug will be activated wherever the enzyme is produced, the delivery mechanism should allow treatment of particularly problematic cases of metastasis, where the cancer spreads from its initial site.

Pre-clinical tests in mice have shown startlingly successful results.

"What we're looking for is a delay in the growth of the tumour," said Professor Patterson. "But sometimes the treatment is so effective that in half of the studies, the mice appeared to be cured of their cancer. All mice responded to the treatment."

Just one dose of the colchicine produced this remarkable effect. But if it passes clinical tests, the researchers believe it will be used alongside existing cancer treatments, as part of the complex process of tackling the disease. The researchers hope that the treatment will enter the initial stage of clinical testing at St James's Hospital in Leeds within the next 18 months.

Professor Patterson said that he was "very optimistic about the opportunities of the treatment, but still cautious because everything done to date has been in the laboratory".

Paul Workman, head of cancer therapeutics at the Institute of Cancer Research, called the work an "interesting new approach". "The project is still at quite an early stage but the results so far look promising in the laboratory models that have been studied," he said. "If confirmed in more extensive laboratory studies, drugs based on this approach could be very useful as part of combination treatments for various cancers."