http://www.eurekalert.org/pub_releases/2011-05/quot-mcs052211.php

Mushroom compound suppresses prostate tumors

A mushroom used in Asia for its medicinal benefits has been found to be 100 per cent effective in suppressing prostate tumour development in mice during early trials, new Queensland University of Technology (QUT) research shows.

The compound, polysaccharopeptide (PSP), which is extracted from the 'turkey tail' mushroom, was found to target prostate cancer stem cells and suppress tumour formation in mice, an article written by senior research fellow Dr Patrick Ling in the international scientific journal PLoS ONE said.

Dr Ling, from the Australian Prostate Cancer Research Centre-Queensland and Institute for Biomedical Health & Innovation (IHBI) at QUT, said the results could be an important step towards fighting a disease that kills 3000 Australian men a year. "The findings are quite significant," Dr Ling said.

"What we wanted to demonstrate was whether that compound could stop the development of prostate tumours in the first place. "In the past, other inhibitors tested in research trials have been shown to be up to 70 per cent effective, but we're seeing 100 per cent of this tumour prevented from developing with PSP.

"Importantly, we did not see any side effects from the treatment."

Dr Ling said conventional therapies were only effective in targeting certain cancer cells, not cancer stem cells, which initiated cancer and caused the disease to progress.

During the research trial, which was done in collaboration with The University of Hong Kong and Provital Pty Ltd, transgenic mice that developed prostate tumours were fed PSP for 20 weeks.

Dr Ling said no tumours were found in any of the mice fed PSP, whereas mice not given the treatment developed prostate tumours. He said the research suggested that PSP treatment could completely inhibit prostate tumour formation.

"Our findings support that PSP may be a potent preventative agent against prostate cancer, possibly through targeting of the prostate cancer stem cell population," he said.

He said PSP had been previously shown to possess anti-cancer properties, and 'turkey tail' mushrooms (known as Coriolus versicolor or Yun-zhi) had been widely used in Asia for medicinal benefits.

However, Dr Ling said it was the first time it had been demonstrated that PSP had anti-cancer stem cell effects. Although 'turkey tail' mushrooms had valuable health properties, Dr Ling said it would not be possible to get the same benefit his research showed from simply eating them.

http://www.bbc.co.uk/news/health-13469716

Bacteria 'linked' to Parkinson's disease

The bacteria responsible for stomach ulcers have been linked to Parkinson's disease, according to researchers in the US.

Mice infected with Helicobacter pylori went onto develop Parkinson's like symptoms.

The study, presented at a meeting of the American Society for Microbiology, argues that infection could play "a significant role". The charity Parkinson's UK said the results should be treated with caution.

Parkinson's disease affects the brain and results in slow movements and a tremor.

Middle-aged mice, the equivalent of being between 55 and 65 in humans, were infected. Six months later they showed symptoms related to Parkinson's, such as reduced movement and decreased levels of a chemical, dopamine, in the brain. These changes were not noticed in younger mice.

Toxic

Dr Traci Testerman, from the Louisiana State University Health Sciences Center, said: "Our findings suggest that H. pylori infection could play a significant role in the development of Parkinson's disease in humans.

"The results were far more dramatic in aged mice than in young mice, demonstrating that normal ageing increases susceptibility to Parkinsonian changes in mice, as is seen in humans."

The researchers believe the bacteria are producing chemicals which are toxic to the brain.

They said H. pylori was able to "steal" cholesterol from the body and process it by adding a sugar group. Stomach ulcer The bacteria responsible for stomach ulcers may have a role in Parkinson's say researchers.

Dr Testerman said this new chemical was almost identical to one found in seeds from the cycad plant, which had been shown to trigger a Parkinson's-like disease among people in Guam.

She told the BBC: "H. pylori eradication in late stage Parkinson's disease is unlikely to result in significant improvement. "Certain neurons are killed before symptoms begin, and more are killed as the disease progresses. Those neurons will not grow back."

Dr Kieran Breen, director of research at Parkinson's UK, said: "We believe Parkinson's is most likely caused by a combination of environmental factors together with an individual's genetic susceptibility to developing the condition.

He said there was some evidence that bacteria can prevent the main drug to treat Parkinson's, levodopa, being absorbed, but there was no strong evidence that people who have H. pylori in their gut are actually more likely to develop Parkinson's. He added: "The current study is interesting and suggests that the bacteria may release a toxin that could kill nerve cells.

"However, the results should be treated with caution. The research was carried out in mice that were infected with relatively high doses of the bacterium or its extract. "While they developed movement problems, we don't know whether this was actually due to the death of nerve cells. Further research needs to be carried out".

http://www.bbc.co.uk/news/science-environment-13469924

Laser puts record data rate through fibre

By Jason Palmer Science and technology reporter, BBC News

Researchers have set a new record for the rate of data transfer using a single laser: 26 terabits per second.

At those speeds, the contents of nearly 1,000 high-definition DVDs could be sent down an optical fibre in a second. The trick is to use what is known as a "fast Fourier transform" to unpick more than 300 separate colours of light in a laser beam, each encoded with its own string of information.

The technique is described in the journal Nature Photonics.

The push for higher data rates in light-based telecommunications technologies has seen a number of significant leaps in recent years. While the earliest optical fibre technologies encoded a string of data as "wiggles" within a single colour of light sent down a fibre, newer approaches have used a number of tricks to increase data rates.

Among them is what is known as "orthogonal frequency division multiplexing", which uses a number of lasers to encode different strings of data on different colours of light, all sent through the fibre together. At the receiving end, another set of laser oscillators can be used to pick up these light signals, reversing the process.

Check the pulse

While the total data rate possible using such schemes is limited only by the number of lasers available, there are costs, says Wolfgang Freude, a co-author of the current paper from the Karlsruhe Institute of Technology in Germany. "Already a 100 terabits per second experiment has been demonstrated," he told BBC News.

"The problem was they didn't have just one laser, they had something like 370 lasers, which is an incredibly expensive thing. If you can imagine 370 lasers, they fill racks and consume several kilowatts of power."

Professor Freude and his colleagues have instead worked out how to create comparable data rates using just one laser with exceedingly short pulses.

Within these pulses are a number of discrete colours of light in what is known as a "frequency comb".

When these pulses are sent into an optical fibre, the different colours can mix together and create 325 different colours in total, each of which can be encoded with its own data stream.

Last year, Professor Freude and his collaborators first demonstrated how to use a smaller number of these colours to transmit over 10 terabits per second.

At the receiving end, traditional methods to separate the different colours will not work. In the current experiment, the team sent their signals down 50km of optical fibre and then implemented what is known as an optical fast Fourier transform to unpick the data streams.

Colours everywhere

The Fourier transform is a well-known mathematical trick that can in essence extract the different colours from an input beam, based solely on the times that the different parts of the beam arrive, and at what intensity. Light escaping from optical fibre The authors say the technique can be easily integrated into existing silicon photonics technology

The team does this optically - rather than mathematically, which at these data rates would be impossible - by splitting the incoming beam into different paths that arrive at different times.

In this way, stringing together all the data in the different colours turns into the simpler problem of organising data that essentially arrive at different times.

Professor Freude said that the current design outperforms earlier approaches simply by moving all the time delays further apart, and that it is a technology that could be integrated onto a silicon chip - making it a better candidate for scaling up to commercial use.

He concedes that the idea is a complex one, but is convinced that it will come into its own as the demand for ever-higher data rates drives innovation. "Think of all the tremendous progress in silicon photonics," he said. "Nobody could have imagined 10 years ago that nowadays it would be so common to integrate relatively complicated optical circuits on to a silicon chip."

http://www.eurekalert.org/pub_releases/2011-05/jhmi-wdk052311.php

What doesn't kill the brain makes it stronger

Johns Hopkins team discovers brain defense in mice and a possible new strategy for treating neurologic disorders

Johns Hopkins scientists say that a newly discovered "survival protein" protects the brain against the effects of stroke in rodent brain tissue by interfering with a particular kind of cell death that's also implicated in complications from diabetes and heart attack.

Reporting in the May 22 advance online edition of Nature Medicine, the Johns Hopkins team says it exploited the fact that when brain tissue is subjected to a stressful but not lethal insult a defense response occurs that protects cells from subsequent insult. The scientists dissected this preconditioning pathway to identify the most critical molecular players, of which a newly identified protein protector – called Iduna -- is one.

Named for a mythological Norwegian goddess who guards a tree full of golden apples used to restore health to sick and injured gods, the Iduna protein increased three- to four-fold in preconditioned mouse brain tissue, according to the scientists.

"Apparently, what doesn't kill you makes you stronger," says Valina Dawson, Ph.D., professor of neurology and neuroscience in the Johns Hopkins Institute of Cell Engineering. "This protective response was broad in its defense of neurons and glia and blood vessels – the entire brain. It's not just a delay of death, but real protection that lasts for about 72 hours."

The team noted that Iduna works by interrupting a cascade of molecular events that result in a common and widespread type of brain cell death called parthanatos often found in cases of stroke, Parkinson's Disease, diabetes and heart attack. By binding with a molecule known as PAR polymer, Iduna prevents the movement of cell-death-inducing factor (AIF) into a cell's nucleus.

In some of the experiments, Dawson and her team exposed mouse brain cells to short bursts of a toxic chemical, and then screened these "preconditioned" cells for genes that turned on as a result of the insult. Focusing on Iduna, the researchers turned up the gene's activity in the cells during exposure to the toxic chemical that induced preconditioning. Cells deficient in Iduna did not survive, but those with more Iduna did.

In another series of experiments in live mice, the team injected a toxic chemical into the brains of a control group of normal mice and also into a group that had been genetically engineered to produce three to four times the normal amount of Iduna – as if they had been preconditioned. The engineered mice with more Iduna were much less susceptible to brain cell death: They had more functional tissue and markedly reduced stroke damage in their brains. In addition, the Iduna mice were less impaired in their ability to move around in their cages.

"Identifying protective molecules such as Iduna might someday lead to drugs that trigger the brain survival mechanism when people have a stroke or Parkinson's disease," says Ted Dawson, M.D., Ph.D., Leonard and Madlyn Abramson Professor in Neurodegenerative Diseases and scientific director of the Johns Hopkins Institute for Cell Engineering. In research published April 5 in Science Signaling, the Dawsons' laboratories previously revealed the mechanism that underpins AIF's pivotal role in parthanatos.

By studying the 3-D structure of AIF, the team first identified the molecular pocket that looked like a potential PAR binding site. They then swapped that region out for a different one to see if it indeed took up PAR. Using HeLa cells in addition to mouse nerve and skin cells, the scientists noted that the AIF with the swapped region did not bind PAR and was not able to move into the nucleus.

The team genetically manipulated neurons so that they didn't make any AIF, then in some cells added wild-type AIF, and in others added an AIF that did not bind PAR. When those cells were stressed using the "stroke in a dish" technique, the cells with normal AIF died while those with the AIF that could not bind PAR did not, revealing that PAR binding to AIF is required for parthanatos.

"These findings suggest that identifying chemicals that block PAR binding to AIF could be very protective," says Ted Dawson. "On the other hand, identifying chemicals that mimic the effect of PAR polymer could be novel therapeutic agents that would kill cancers by causing cell death."

Hopkins authors on the Iduna paper, in addition to Valina and Ted Dawson, are Shaida A. Andrabi, HoChul Kang, Yun-Il Lee, Jian Zhang, Zhikai Chi, Andrew B. West, Raymond C. Koehler and Guy G. Poirier. Other authors include Jean-Francios Haince of Centre Hospitalier Universitaire de Quebec.

Hopkins authors on the AIF paper, in addition to Valina and Ted Dawson, are Yingfei Wang, No Soo Kim, HoChul Kang, Karen K. David and Shaida A. Andrabi. Additional authors are Guy G. Poirier and Jean-Francois Haince of the Laval University Medical Research Center.

The Iduna work was supported by the National Institute of Neurological Disorders and Stroke (NINDS), the McKnight Endowment for the Neurosciences and the National Institute of Drug Abuse.

The AIF research was supported by the National Institute of Neurological Disorders and Stroke, American Heart Association and a Canadian Institutes Health Research grant.

http://www.eurekalert.org/pub_releases/2011-05/uobc-hgf052011.php

Happy guys finish last, says new study on sexual attractiveness

Women find happy guys significantly less sexually attractive than swaggering or brooding men, according to a new University of British Columbia study that helps to explain the enduring allure of "bad boys" and other iconic gender types.

The study – which may cause men to smile less on dates, and inspire online daters to update their profile photos – finds dramatic gender differences in how men and women rank the sexual attractiveness of non-verbal expressions of commonly displayed emotions, including happiness, pride, and shame.

Very few studies have explored the relationship between emotions and attraction, and this is the first to report a significant gender difference in the attractiveness of smiles. The study, published online today in the American Psychological Association journal Emotion, is also the first to investigate the attractiveness of displays of pride and shame.

"While showing a happy face is considered essential to friendly social interactions, including those involving sexual attraction – few studies have actually examined whether a smile is, in fact, attractive," says Prof. Jessica Tracy of UBC's Dept. of Psychology. "This study finds that men and women respond very differently to displays of emotion, including smiles."

In a series of studies, more than 1,000 adult participants rated the sexual attractiveness of hundreds of images of the opposite sex engaged in universal displays of happiness (broad smiles), pride (raised heads, puffed-up chests) and shame (lowered heads, averted eyes).

The study found that women were least attracted to smiling, happy men, preferring those who looked proud and powerful or moody and ashamed. In contrast, male participants were most sexually attracted to women who looked happy, and least attracted to women who appeared proud and confident.

"It is important to remember that this study explored first-impressions of sexual attraction to images of the opposite sex," says Alec Beall, a UBC psychology graduate student and study co-author. "We were not asking participants if they thought these targets would make a good boyfriend or wife – we wanted their gut reactions on carnal, sexual attraction." He says previous studies have found positive emotional traits and a nice personality to be highly desirable in a relationship partners.

Tracy and Beall say that other studies suggest that what people find attractive has been shaped by centuries of evolutionary and cultural forces. For example, evolutionary theories suggest females are attracted to male displays of pride because they imply status, competence and an ability to provide for a partner and offspring.

According to Beall, the pride expression accentuates typically masculine physical features, such as upper body size and muscularity. "Previous research has shown that these features are among the most attractive male physical characteristics, as judged by women," he says.

The researchers say more work is needed to understand the differing responses to happiness, but suggest the phenomenon can also be understood according to principles of evolutionary psychology, as well as socio-cultural gender norms.

For example, past research has associated smiling with a lack of dominance, which is consistent with traditional gender norms of the "submissive and vulnerable" woman, but inconsistent with "strong, silent" man, the researchers say. "Previous research has also suggested that happiness is a particularly feminine-appearing expression," Beall adds.

"Generally, the results appear to reflect some very traditional gender norms and cultural values that have emerged, developed and been reinforced through history, at least in Western cultures," Tracy says. "These include norms and values that many would consider old-fashioned and perhaps hoped that we've moved beyond."

Displays of shame, Tracy says, have been associated with an awareness of social norms and appeasement behaviors, which elicits trust in others. This may explain shame's surprising attractiveness to both genders, she says, given that both men and women prefer a partner they can trust.

While this study focused on sexual attraction between heterosexual men and women in North America, the researchers say future studies will be required to explore the relationship between emotions and sexual attractiveness among homosexuals and non-Western cultures.

Overall, the researchers found that men ranked women more attractive than women ranked men.

Download sample study images of happiness, pride and shame at: www.publicaffairs.ubc.ca/2011/05/24/happy-guys-finish-last-says-new-study-on-sexual-attractiveness View more images used in the study at: www.ubc-emotionlab.ca/emotionattraction

http://www.eurekalert.org/pub_releases/2011-05/bmj-idc052311.php

Increasing daily calcium will not reduce the risk of fractures in later life

Research: Dietary calcium intake and risk of fracture and osteoporosis: prospective longitudinal cohort study

While moderate amounts of calcium (around 700 mg a day) are vital for maintaining healthy bones, there is no need to start increasing calcium intake in order to reduce the risk of fractures or osteoporosis in later life, finds a paper published on bmj.com today.

As people age, their bones lose calcium and they are more at risk of fractures and osteoporosis - this is especially the case for women. As well as causing individual suffering, fractures are a huge drain on health services.

With ageing populations, this burden will increase in the coming years and therefore preventing them is a major public health issue, say the authors, led by Dr Eva Warensjö from Uppsala University in Sweden.

The importance of increasing calcium intake to compensate for the loss of calcium has been debated for a long time and there is still no clear advice. This is reflected by the wide range of daily calcium recommendations for the over fifties – in the UK it is currently 700 mg; it is 800 mg in Scandinavia and 1,200 mg in the US.

In order to investigate the links between long-term dietary calcium intake and the risk of fractures, the authors reviewed data from a large population study of Swedish women carried out in 1987.

Over 61,433 women (born between 1914 and 1948) took part in the Swedish Mammography Study and of these 5,022 participated in a smaller sub-research group. All participants were followed up for 19 years.

During the follow-up, 14,738 (24%) women had a first fracture and, of these, 3,871 (6%) had a first hip fracture. Twenty percent of the sub-group had osteoporosis.

The researchers used a series of questionnaires to gain in-depth knowledge of the participants' changing diet and in particular their calcium intake and use of supplements and multivitamins.

The women also provided information about their menopausal status, whether or not they used post-menopausal oestrogen therapy, their weight, height, smoking habits, how much physical activity they did and their educational attainment.

The results show that women had the lowest risk of having a fracture when they consumed around 750 mg a day of calcium. However, the fracture risk in women who started to increase their calcium intake over time did not decrease.

There is some evidence that high intake of calcium may actually increase the rate of hip fractures, though the authors stress that this result needs to be interpreted with caution.

The authors conclude that while low levels of calcium intake (less than 700 mg per day) increase the risk of fractures and osteoporosis, there is no need to start increasing calcium intake above the amount. Increases did not further reduce the fracture and osteoporosis risk.

http://www.eurekalert.org/pub_releases/2011-05/yu-sdf052311.php

Scientists discover fossil of giant ancient sea predator

New Haven, Conn.—*Paleontologists have discovered that a group of remarkable ancient sea creatures existed for much longer and grew to much larger sizes than previously thought, thanks to extraordinarily well-preserved fossils discovered in Morocco.*

The creatures, known as anomalocaridids, were already thought to be the largest animals of the Cambrian period, known for the "Cambrian Explosion" that saw the sudden appearance of all the major animal groups and the establishment of complex ecosystems about 540 to 500 million years ago. Fossils from this period suggested these marine predators grew to be about two feet long. Until now, scientists also thought these strange invertebrates—which had long spiny head limbs presumably used to snag worms and other prey, and a circlet of plates around the mouth—died out at the end of the Cambrian.

Anomalocaridids had long, spiny head limbs presumably used to snag prey, and a series of blade-like filaments in segments across the animal's back, which scientists think might have functioned as gills. **Esben Horn**

Now a team led by former Yale researcher Peter Van Roy (now at Ghent University in Belgium) and Derek Briggs, director of the Yale Peabody Museum of Natural History, has discovered a giant fossilized anomalocaridid that measures one meter (more than three feet) in length. The anomalocaridid fossils reveal a

series of blade like filaments in each segment across the animal's back, which scientists think might have functioned as gills.

In addition, the creature dates back to the Ordovician period, a time of intense biodiversification that followed the Cambrian, meaning these animals existed for 30 million years longer than previously realized.

"The anomalocaridids are one of the most iconic groups of Cambrian animals," Briggs said. "These giant invertebrate predators and scavengers have come to symbolize the unfamiliar morphologies displayed by organisms that branched off early from lineages leading to modern marine animals, and then went extinct. Now we know that they died out much more recently than we thought."

The specimens are just part of a new trove of fossils from Morocco that includes thousands of examples of soft-bodied marine fauna dating back to the early Ordovician period, 488 to 472 million years ago. Because hard shells fossilize and are preserved more readily than soft tissue, scientists had an incomplete and biased view of the marine life that existed during the Ordovician period before the recent discoveries in Morocco. The animals found in Morocco inhabited a muddy sea floor in fairly deep water, and were trapped by sediment clouds that buried them and preserved their soft bodies.

"The new discoveries in Morocco indicate that animals characteristic of the Cambrian, such as the anomalocaridids, continued to have a considerable impact on the biodiversity and ecology of marine communities many millions of years later," Van Roy said.

The paper appears in the May 26 issue of the journal Nature. This research was supported by a National Geographic Society Research and Exploration grant and by Yale University. DOI: 10.1038/nature09920

http://www.eurekalert.org/pub_releases/2011-05/bcom-lcm052311.php

Lecithin component may reduce fatty liver, improve insulin sensitivity

HOUSTON – ***A natural product called DLPC (dilauroyl phosphatidylcholine) increases sensitivity to insulin and reduces fatty liver in mice, leading Baylor College of Medicine (www.bcm.edu) researchers to believe it may provide a treatment for prediabetic patients. DLPC is an unusual phospholipid and a trace component of the dietary supplement lecithin.***

Dr. David D. Moore (www.bcm.edu/mcb/index.cfm?pmid=7696), professor of molecular and cellular biology at BCM, and his colleagues at first thought that DLPC would provide a useful tool in studying the function of a receptor protein – liver receptor homolog -1 or LRH-1 – that regulates the production of bile acids in the liver.

Studies in mice soon showed that DLPC could stimulate LRH-1 activity. In addition to a small increase in bile acid levels, DLPC improved regulation of glucose and fat within the liver. A report on this work appears in the current issue of the journal Nature (www.nature.com). Moore is collaborating with Dr. Lawrence Chan (http://www.bcm.edu/medicine/diabetes-endocrinology/?pmid=1189), director of the Diabetes and Endocrine Research Center (http://www.bcm.edu/diabetescenter/) at BCM, on a pilot study to find out how well DLPC works in patients with prediabetes.

"We know it works well in mice," said Moore. The link of LRH-1 to bile acids may contribute to its effect on glucose levels and fat because small, non-toxic increases in bile acid levels can improve metabolic disorders.

Dr. Jae Man Lee, then a graduate student in Moore's laboratory, first proposed screening compounds to see which activated LRH-1. He found that DLPC, a structurally unusual phosphatidylcholine (a form of phospholipid that is important in the formation of cell membranes) enhanced LRH-1 activity in cells.

In mice, DLPC induced the production of bile acid enzymes and lowered fat in the liver. It also increased levels of bile acids and regulated glucose or sugar circulating in the blood. In two kinds of mice that had resistance to insulin, DLPC also decreased fatty liver and lowered glucose levels in the blood. However, DLPC had no effect in mice that had no LRH-1 in the liver.

The effect on the insulin resistant mice was striking.

"Their overall body weight was not changed," said Moore. "But they had improved sensitivity to insulin (which helps keep glucose levels in check) and less fatty livers. We are interested in why it gets rid of the fat in the liver."

DLPC decreased the levels of proteins associated with formation of fatty acids and triglycerides, including a key regulator called SREBP-1c that encourages the deposition of fat in tissues. "DLPC is a natural product," said Moore. "Lecithin is a mixture of many compounds but DLPC is one of them."

The ongoing clinical study, which involves people who are overweight but not diabetic, employs an approved form of DLPC that is used in liposomes, little globules of fat that take drugs into the body. An initial glucose tolerance test to determine how sensitive the people are to insulin at the start of the study is followed by another after the subjects take DLPC or a placebo for two months. Neither the patients in study nor the physicians know who is getting DLPC and who is getting the placebo.

The study is still enrolling subjects, and there are no results yet.

Others who took part in the basic science research include Dr. Yoon Kwang Lee and Jennifer L. Mamrosh of BCM, Dr. Scott A. Busby and Dr. Patrick R. Griffin of Scripps Research Institute in Jupiter, Florida and Dr. Manish C. Pathak and Dr. Eric A. Ortlund of Emory University School of Medicine in Atlanta. (Yoon Kwang Lee is now at Northeastern Ohio Colleges of Medicine and Pharmacy in Rootstown, Ohio).

Funding for this work came from the National Institutes of Health, the Alkek Foundation, the National Institute of Diabetes and Digestive and Kidney Diseases and the Robert R.P. Doherty Jr. - Welch Chair in Science.

http://www.eurekalert.org/pub_releases/2011-05/uoc-mfr052311.php

Mars formed rapidly into runt of planetary litter

Mars developed in as little as two to four million years after the birth of the solar system, far more quickly than Earth, according to a new study published in the May 26 issue of the journal Nature.

The red planet's rapid formation helps explain why it is so small, say the study's co-authors, Nicolas Dauphas at the University of Chicago and Ali Pourmand at the University of Miami (UM) Rosenstiel School of Marine & Atmospheric Science.

Mars probably is not a terrestrial planet like Earth, which grew to its full size over 50 to 100 million years via collisions with other small bodies in the solar system, said Dauphas, an associate professor in geophysical sciences.

"Earth was made of embryos like Mars, but Mars is a stranded planetary embryo that never collided with other embryos to make an Earthlike planet," Dauphas said. The new work provides supporting evidence for this idea, which was first proposed 20 years ago on the basis of planetary growth simulations.

The new evidence likely will change the way planetary scientists view Mars, observed Pourmand, assistant professor in marine geology and geophysics at the UM Rosenstiel School. "We thought that there were no embryos in the solar system to study, but when we study Mars, we are studying embryos that eventually made planets like Earth."

There had been large uncertainties in the formation history of Mars because of the unknown composition of its mantle, the rock layer that underlies the crust. "Now we can shrink those uncertainties to the point where we can do interesting science," Dauphas said.

This image shows the relative size of the inner planets of the solar system (from l-r): Mercury, Venus, Earth and Mars. New research conducted by scientists at the universities of Chicago and Miami supports the idea that Mars owes its small size to its relatively rapid formation. **Lunar and Planetary Institute**

Hafnium-tungsten chronometer

Dauphas and Pourmand were able to refine the age of Mars by using the radioactive decay of hafnium to tungsten in meteorites as a chronometer. Hafnium 182 decays into tungsten 182 in a half-life of nine million years. This relatively rapid decay process means that almost all hafnium 182 will disappear in 50 million years, providing a way to assemble a fine-scale chronology of early events in the solar system.

"To apply that system you need two gradients," Pourmand explained. "You need the hafnium-tungsten ratio of the mantle of Mars and you need the tungsten isotopic composition of the mantle of Mars." The latter was well known from analyses of martian meteorites, but not the former.

Previous estimates of the formation of Mars ranged as high as 15 million years because the chemical composition of the martian mantle was largely unknown. Scientists still wrestle with large uncertainties in the composition of Earth's mantle because of composition-altering processes such as melting.

"We have the same problem for Mars," Dauphas said. Analyses of martian meteorites provide clues as to the mantle composition of Mars, but their compositions also have changed.

Solving some lingering unknowns regarding the composition of chondrites, a common type of meteorites, provided the data they needed. As essentially unaltered debris left over from the birth of the solar system, chondrites serve as a Rosetta stone for deducing planetary chemical composition.

Cosmochemists have intensively studied chondrites, but still poorly understand the abundances of two categories of elements that they contained, including uranium, thorium, lutetium and hafnium.

Dauphas and Pourmand thus analyzed the abundances of these elements in more than 30 chondrites, and compared those to the compositions of another 20 martian meteorites.

"Once you solve the composition of chondrites you can address many other questions," Dauphas said, including a refinement of the age of the Milky Way galaxy, which he published in 2005 http://www-news.uchicago.edu/releases/05/050629.milkyway.shtml.

Hafnium and thorium both are refractory or non-volatile elements, meaning that their compositions remain relatively constant in meteorites. They also are lithophile elements, those that would have stayed in the mantle when the core of Mars formed. Thus, if scientists could measure the hafnium-thorium ratio in the martian mantle, they would have the ratio for the whole planet, which they need to reconstruct its formation history.

Mars-meteorite connection

The relationships between hafnium, thorium, and tungsten dictated that the hafnium-thorium ratio in the mantle of Mars must be similar to the same ratio in chondrites. To derive the martian mantle's hafnium-thorium ratio, they divided the thorium-tungsten ratio of the martian meteorites by the thorium-hafnium ratio of the chondrites.

"Why do you do that? Because thorium and tungsten have very similar chemical behavior," Dauphas said.

Once Dauphas and Pourmand had determined this ratio, they were able to calculate how long it took Mars to develop into a planet. A computer simulation based on these data showed that Mars must have reached half its present size only two million years after the formation of the solar system.

A quickly forming Mars would help explain the puzzling similarities in the xenon content of its atmosphere and that of Earth. "Maybe it's just a coincidence, but maybe the solution is that part of the atmosphere of Earth was inherited from an earlier generation of embryos that had their own atmospheres, maybe a Marslike atmosphere," Dauphas said.

The short formation history of Mars further raises the possibility that aluminum 26, which is known from meteorites, turned the planet into a magma ocean early in it history. Aluminum 26 has a half-life of 700,000 years, so it would have disappeared too quickly to contribute to the internal heat of Earth.

If Mars formed in two million years, however, significant quantities of aluminum 26 would remain. "When this aluminum 26 decays it releases heat and can completely melt the planet," Pourmand said.

Funding source: National Aeronautics and Space Administration, the National Science Foundation, and the Packard Foundation.

Citation: "Hf-W-Th evidence for rapid growth of Mars and its status as a planetary embryo," by N. Dauphas and A. Pourmand, Nature, May 26, 2011.

http://www.eurekalert.org/pub_releases/2011-05/uoc--acm052211.php

Autism changes molecular structure of the brain, UCLA study finds

Discovery points to a common cause for multifaceted disease

For decades, autism researchers have faced a baffling riddle: how to unravel a disorder that leaves no known physical trace as it develops in the brain.

Now a UCLA study is the first to reveal how the disorder makes its mark at the molecular level, resulting in an autistic brain that differs dramatically in structure from a healthy one. Published May 25 in the advance online edition of Nature, the findings provide new insight into how genes and proteins go awry in autism to alter the mind.

The discovery also identifies a new line of attack for researchers, who currently face a vast array of potential fronts for tackling the neurological disease and identifying its diverse causes.

"If you randomly pick 20 people with autism, the cause of each person's disease will be unique," said principal investigator Dr. Daniel Geschwind, the Gordon and Virginia MacDonald Distinguished Chair in Human Genetics and a professor of neurology and psychiatry at the David Geffen School of Medicine at UCLA. "Yet when we examined how genes and proteins interact in autistic people's brains, we saw well-defined shared patterns. This common thread could hold the key to pinpointing the disorder's origins."

The research team, led by Geschwind, included scientists from the University of Toronto and King's College London. They compared brain tissue samples obtained after death from 19 autism patients and 17 healthy volunteers. After profiling three brain areas previously linked to autism, the group zeroed in on the cerebral cortex, the most evolved part of the human brain.

The researchers focused on gene expression — how a gene's DNA sequence is copied into RNA, which directs the synthesis of cellular molecules called proteins. Each protein is assigned a specific task by the gene to perform in the cell. By measuring gene-expression levels in the cerebral cortex, the team uncovered consistent differences in how genes in autistic and healthy brains encode information.

"We were surprised to see similar gene expression patterns in most of the autistic brains we studied," said first author Irina Voineagu, a UCLA postdoctoral fellow in neurology. "From a molecular perspective, half of these brains shared a common genetic signature. Given autism's numerous causes, this was an unexpected and exciting finding."

The researchers' next step was to identify the common patterns. To do this, they looked at the cerebral cortex's frontal lobe, which plays a role in judgment, creativity, emotions and speech, and at its temporal lobes, which regulate hearing, language and the processing and interpreting of sounds.

When the scientists compared the frontal and temporal lobes in the healthy brains, they saw that more than 500 genes were expressed at different levels in the two regions. In the autistic brains, these differences were virtually non-existent.

"In a healthy brain, hundreds of genes behave differently from region to region, and the frontal and temporal lobes are easy to tell apart," Geschwind said. "We didn't see this in the autistic brain. Instead, the frontal lobe closely resembles the temporal lobe. Most of the features that normally distinguish the two regions had disappeared."

Two other clear-cut patterns emerged when the scientists compared the autistic and healthy brains. First, the autistic brain showed a drop in the levels of genes responsible for neuron function and communication. Second, the autistic brain displayed a jump in the levels of genes involved in immune function and inflammatory response.

"Several of the genes that cropped up in these shared patterns were previously linked to autism," said Geschwind. "By demonstrating that this pathology is passed from the genes to the RNA to the cellular proteins, we provide evidence that the common molecular changes in neuron function and communication are a cause, not an effect, of the disease."

The next step will be for the research team to expand its search for the genetic and related causes of autism to other regions of the brain.

Autism is a complex brain disorder that strikes in early childhood. The disease disrupts a child's ability to communicate and develop social relationships and is often accompanied by acute behavioral challenges. In the United States, autism spectrum disorders are diagnosed in one in 110 children — and one in 70 boys. Diagnoses have expanded tenfold in the last decade.

The study was funded by the National Institute of Mental Health, the Canadian Institutes of Health Research, and Genome Canada. Tissue samples were provided by the Autism Tissue Project, the Harvard Brain Bank and the Medical Research Council's London Brain Bank for Neurodegenerative Disease.

Geschwind's and Voineagu's co-authors included Jennifer Lowe, Yuan Tian, Steve Horvath, Jonathan Mill and Rita Cantor of UCLA; Benjamin Blencowe and Xinchen Wang of the University of Toronto; and Patrick Johnston of King's College London.

http://www.eurekalert.org/pub_releases/2011-05/wt-itf052411.php

International trial finds polypill halves predicted heart disease and stroke risk

The world's first international polypill trial has shown that a four-in-one combination pill can halve the predicted risk of heart disease and stroke.

The results are published online today in the open access journal PLoS One [1].

The once-a-day polypill contains aspirin and agents to lower blood pressure and cholesterol. These drugs are currently prescribed separately to millions of patients and are known individually to cut the risk of disease, but many experts believe that combining them into a single pill will encourage people to take the medications more reliably.

The trial tested the effectiveness and tolerability of the polypill in 378 people with raised risk of cardiovascular disease, who did not necessarily have high blood pressure or cholesterol, against a placebo. The participants came from the UK, Australia, Brazil, India, New Zealand, The Netherlands, and the USA, with core funding for the central coordination of the trial provided by the Wellcome Trust.

"The results show a halving in heart disease and stroke can be expected for people taking this polypill long-term," said Professor Anthony Rodgers of The George Institute for Global Health, who led the international consortium.

"We know from other trials that long-term there would also be a 25-50% lower death rate from colon cancer, plus reductions in other major cancers, heart failure and renal failure," Professor Rodgers said. "These benefits would take several years to 'kick in', but of course one of the hopes with a polypill is it helps people take medicines long-term."

National trials of similar combination 'polypill' treatments have previously been conducted in India, Iran and Sri Lanka, but this is the first trial to combine data from patients at international centres and the first to look reliably at the incidence of side effects against a placebo.

The authors noted that the benefits, while large, were not as massive as previous researchers have suggested, and the side effects were also not as rare as first thought. In the short-term about 1 in 6 people experienced a side effect. Most were mild but about 1 in 20 overall stopped treatment due to side effects, indicating that treatment is best targeted to those at raised risk of disease.

Professor Simon Thom of Imperial College London, who led the UK arm of the trial, commented: "We now need to conduct larger trials to test whether these medicines are best provided in the form of a polypill, or as separate medicines, and whether this combination strategy improves patient adherence to cardiovascular medication."

This polypill will be available in India soon and then elsewhere within a few years, according to regulatory timelines within each individual country.

Dr Ted Bianco, Director of Technology Transfer at the Wellcome Trust, commented: "Few of us would dissent from the view that prevention is better than cure in most matters medical. It is good news, indeed, to see the evidence base grow for the potential use of a new generation of combination products as a safe and affordable option in the battle against heart attack and stroke."

In the UK, around one in three of all deaths are attributable to cardiovascular disease [2]. Globally, around 80% of all deaths from cardiovascular disease and diabetes occur in low or middle income countries, according to recent estimates [3].

In 2001, the World Health Organisation and the Wellcome Trust convened a meeting of experts to discuss affordable interventions for non-communicable diseases, including the potential of a fixed-dose combination pill to reduce the risk of cardiovascular diseases. From here a programme of research was outlined to assess whether this approach is safe, effective and practical.

Additional funding for the trial was provided by the British Heart Foundation, the Health Research Council of New Zealand, the National Heart Foundation of New Zealand, the National Health and Medical Research Council of Australia and the Brazilian Ministry of Health.

http://www.eurekalert.org/pub_releases/2011-05/acs-roa052511.php

Recycling of Alzheimer's proteins could be key to new treatments

The formation of abnormal strands of protein called amyloid fibrils — associated with two dozen diseases ranging from Alzheimer's to type-2 diabetes — may not be permanent and irreversible as previously thought, scientists are reporting in the Journal of the American Chemical Society.

Rather, protein molecules are constantly attaching and detaching from the fibrils, in a recycling process that could be manipulated to yield new treatments for Alzheimer's and other diseases.

In a study that focused on the fibrils associated with Alzheimer's disease (AD), Natàlia Carulla and colleagues explain that scientists once believed that the fibrils themselves caused the memory loss and other symptoms of AD. During the last 10 years, however, suspicion has fallen on some toxic intermediate of the process through which those fibrils form in the brain. This study suggests that fibrils could be a source of those toxic intermediates.

The new study used laboratory techniques to detail molecular recycling within fibrils formed by two proteins, Aβ40 and Aβ42, which is most associated with AD. After monitoring recycling for 40 days, they found that both Aβ40 and Aβ42 molecules recycle within the fibril population, although to different extents. After 40 days, 80 percent of the molecules making up Aβ40 fibrils underwent recycling while only 30 percent did so in Aβ42 fibrils. These observations imply that Aβ42 recycles more slowly.

"In the context of AD, demonstrating that recycling occurs in the fibrils is a step forward but it is also crucial to identify the recycling species involved; whether they are individual Aβ units or small aggregates made of several units," explains Carulla. "It will be important to address if differences in the recycling species within Aβ40 and Aβ42 fibrils are relevant in the development of Alzheimer's disease. We are now working towards this aim. Once we have this information, we will be in a position to devise new therapeutic strategies that can modulate recycling."

The authors acknowledge funding from the Fundació La Caixa, Fundació La Marató de TV3, the Generalitat de Catalunya, and the Ministerio de Ciencia e Innovación.

http://www.eurekalert.org/pub_releases/2011-05/uow-rs9052511.php

Research says 9/11 produced permanent shift to Republican party among new young US voters

Research led by the University of Warwick's Centre for Competitive Advantage in the Global Economy has found that not only did the events of 9/11 produce an immediate shift in favour of the Republican party among new young US voters but that shift persisted into later years.

The research shows that party strategists should focus on winning over voters when they are young.

The researchers Professor Sharun Mukand, from the University of Warwick, and Professor Ethan Kaplan, from Stockholm University and the University of Maryland, looked at whether the mere act of registering for a political party today can affect future politics by causing enduring support for that party. Their results clearly

show that the decision to register with a political party today can have effects that last for years, perhaps even for a lifetime.

The researchers examined the political affiliations of a group of first-time voters in California who registered to vote when they became eligible, at age 18. Because of slight differences in their birthdates, these voters registered just before and just after the terrorist attacks of 11 September 2001. The attacks caused a nationwide political shift toward the right, as George W. Bush's emphasis on the war on terror and homeland security boosted his public approval ratings to the peak of his presidency.

The results of their analysis are striking. Two basically identical groups of people take up markedly different political agendas. They find that voters with birthdays in September were more likely to register as Republicans than voters with birthdays in August – by more than two percentage points. The political affiliation of these voters persisted through to the year 2008 - with those born in September consistently remaining two percent more likely to be Republican. This was true even for those voters who moved and, thus, had to change their registration.

This research may explain why politically partisan realignments happen very slowly. When President Lyndon B. Johnson signed the Civil Rights act in 1964, he said that his Democratic Party had "lost the South for a generation." In fact, the loss took a generation to take place. Clear, persistent support for the Republican Party among Southern whites only emerged in 1994.

Professor Sharun Mukand from the University of Warwick said: "Our research shows that party strategists should focus on winning over voters when they are young. However our findings have important implications for the political arena and for public policies. Policies may persist simply because support for a party endures. In particular, if voters are unwilling to shift political allegiance in response to new, politically relevant information, then policies out of tune with changing times may live on."

The researchers note that 9/11 is not the only moment in the last decade of US politics which had a significant impact on young voters.

Professor Ethan Kaplan said "Consider the implications of our findings when applied to the 2008 U.S. election. In this election, according to Pew Research Center, two third of voters ages 18-29 voted for Obama in 2008. This compares to 53 percent of the general population. Our analysis suggests that this gap between the Obama "youth voters" and the general population is remarkably persistent over several election cycles. Indeed, our calculations suggest that the 2008 youth vote gap will be a phenomenon affecting US elections for decades to come."

The research is published as a University of Warwick's Centre for Competitive Advantage in the Global Economy working appear entitled "The Persistence of Political Partisanship: Evidence from 9/11, Sharun Mukand is a University of Warwick economics professor and a research at its Centre for Competitive Advantage in the Global Economy. Ethan Kaplan is an assistant professor of economics at Stockholm University and the University of Maryland. The full paper can be found at: http://bit.ly/j71A27

http://www.eurekalert.org/pub_releases/2011-05/sp-tso052011.php

Tinted specs offer real migraine relief, says fMRI study

Los Angeles, CA – *Precision tinted lenses have been used widely to reduce visual perceptual distortions in poor readers, and are increasingly used for migraine sufferers, but until now the science behind these effects has been unclear.*

Now research published in the journal Cephalalgia, published by SAGE, uses functional magnetic resonance imaging (fMRI) for the first time to suggest a neurological basis for these visual remedies.

The new research shows how coloured glasses tuned to each migraine sufferer work by normalizing activity in the brain. The researchers saw specific abnormal brain activity (known as hyperactivation) when migraine sufferers saw intense patterns. The tinted lenses considerably reduced the effect.

Jie Huang along with colleagues from Michigan State University and the University of Michigan, US, and the University of Essex, UK, homed in on specific visual stimuli known to trigger migraines. These patterns, high contrast stripes or 'gratings,' can give the illusion of shape, colour and movement. These not only trigger migraines but also may cause seizures in those with photosensitive epilepsy.

Before the brain imaging took place, participants were tested and prescribed precision ophthalmic tints (POTs) with an Intuitive Colorimeter. Previous studies have suggested that some 42% of migraine with aura sufferers saw their migraine frequency halved on days when they wore POTs. The researchers used the colorimeter to illuminate text with coloured light, manipulating hue and saturation at constant luminance. For each test participant this gave an optimal hue and saturation (chromaticity) of light that led to the greatest comfort, reducing perceptual distortion. The test subjects then viewed stressful striped patterns illuminated with their optimal coloured light settings to screen for efficacy. The researchers used these readings to generate both

effective POTs for each migraine sufferer and also two other pairs of grey and coloured lenses with slightly different properties as controls. 11 patients who frequently suffered from migraine enrolled in the fMRI study. Each patient was paired with a migraine-free control, who was also tested with that patient's three sets of lenses.

Once in the fMRI machine, the researchers exposed subjects to a range of striped patterns – these had varying likelihood of triggering distortion and discomfort. This study aimed to investigate the effect of the POTs on the cortical activation induced by the stressful pattern in each of the visual areas of the brain. Although patients reported some relief using all of the lenses (by around 40%), the POT lenses had a significant effect when viewing the stressful stripes (70% discomfort reduction). Both control and migraine patients responded similarly to the non-stressful stripe patterns, and in these cases all three lenses made no difference to the result. The POTs specifically suppressed cortical activation for migraine sufferers in visual area V2 of the occipital cortex of the brain, and this POT-suppressed cortical activation was also extended to the other extra-striate visual areas V3, V3A, and V4

"The reduced cortical activation in V2 by the POTs may have been responsible for the POT-induced suppression of the illusions and distortions, considering that V2 neurons but not V1 neurons in macaque monkeys respond to illusory contour stimuli," Huang suggests.

The cause of these responses to specific visual stimuli is likely to differ from the photophobia (light sensitivity) migraine sufferers often report during an attack. Going forward, the authors suggest that the specific characteristic of the cortical activation in the extra-striate visual areas they recorded could provide a potential biomarker for identifying those migraine patients suffering cortical hyperactivation. This biomarker could prove useful not only for further evaluation of POTs but also for studying the effectiveness of drugs to prevent migraine. *Under strict embargo until 12:01am BST 26th May 2011*

fMRI evidence that precision ophthalmic tints reduce cortical hyperactivation in migraine by Jie Huang, Xiaopeng Zong, Arnold Wilkins, Brian Jenkins, Andrea Bozoki, Yue Cao is published today (26 May, 2011) in the journal Cephalalgia. The article will be free to read for a limited period from http://cep.sagepub.com/

http://www.eurekalert.org/pub_releases/2011-05/babs-rsa051011.php

Reindeer see a weird and wonderful world of ultraviolet light

Researchers have discovered that the ultraviolet (UV) light that causes the temporary but painful condition of snow blindness in humans is life-saving for reindeer in the arctic.

A BBSRC-funded team at UCL has published a paper today (12 May) in the Journal of Experimental Biology that shows that this remarkable visual ability is part of the reindeer's unique adaptation to the extreme arctic environment where they live. It allows them to take in live-saving information in conditions where normal mammalian vision would make them vulnerable to starvation, predators and territorial conflict. It also raises the question of how reindeer protect their eyes from being damaged by UV, which is thought to be harmful to human vision.

Lead researcher Professor Glen Jeffery said "We discovered that reindeer can not only see ultraviolet light but they can also make sense of the image to find food and stay safe. Humans and almost all other mammals could never do this as our lenses just don't let UV through into the eye.

"In conditions where there is a lot of UV – when surrounded by snow, for example – it can be damaging to our eyes. In the process of blocking UV light from reaching the retina, our cornea and lens absorb its damaging energy and can be temporarily burned. The front of the eye becomes cloudy and so we call this snow blindness. Although this is normally reversible and plays a vital role to protect our sensitive retinas from potential damage, it is very painful."

Human beings are able to see light with wavelengths ranging from around 700nm, which corresponds to the colour red, right through all the colours of the rainbow in sequence to 400nm, which corresponds to violet. Professor Jeffery and his team tested the reindeer's vision to see what wavelengths they could see and found that they can handle wavelengths down to around 350-320nm, which is termed ultraviolet, or UV, because it exceeds the extreme of the so-called visible spectrum of colours.

The winter conditions in the arctic are very severe; the ground is covered in snow and the sun is very low on the horizon. At times the sun barely rises in the middle of the day, making it dark for most of the time. Under these conditions light is scattered such that the majority of light that reaches objects is blue or UV. In addition to this, snow can reflect up to 90% of the UV light that falls on it.

Professor Jeffery continued "When we used cameras that could pick up UV, we noticed that there are some very important things that absorb UV light and therefore appear black, contrasting strongly with the snow. This includes urine - a sign of predators or competitors; lichens - a major food source in winter; and fur, making predators such as wolves very easy to see despite being camouflaged to other animals that can't see UV."

This research raises some interesting questions about the effect of UV on eye health. It had always been assumed that human eyes don't let UV in because of the potential that it will cause damage, just as it does to our skin. In our eyes, UV could damage our sensitive photoreceptors that cannot be replaced. This would lead to irreversible damage to our vision. Arctic reindeer are able to let UV into their eyes and use the information effectively in their environment without suffering any consequences.

Professor Jeffery added "The question remains as to why the reindeer's eyes don't seem to be damaged by UV. Perhaps it's not as bad for eyes as we first thought? Or maybe they have a unique way of protecting themselves, which we could learn from and perhaps develop new strategies to prevent or treat the damage the UV can cause to humans."

Professor Douglas Kell, Chief Executive, BBSRC said "We can learn a lot from studying the fundamental biology of animals and other organisms that live in extreme environments. Understanding their cell and molecular biology, neuroscience, and other aspects of how they work can uncover the biological mechanism that meant they can cope with severe conditions. This knowledge can have an impact on animal welfare and has the potential to be taken forward to new developments that underpin human health and wellbeing."

http://medicalxpress.com/news/2011-05-drug-treatment-men-prostate-cancer.html

Drug treatment extends lives of men with prostate cancer

(Medical Xpress) -- ***A drug recently approved by the Food & Drug Administration for the treatment of prostate cancer is proving to give some patients the gift of time.***

A new study shows abiraterone acetate extends the lives of men with the most advanced form of the disease by about four months. The study in the May 26, 2011 issue of the New England Journal of Medicine was co-authored by Thomas W. Flaig, MD, medical oncologist at the University of Colorado Hospital's Tony Grampsas Urologic Oncology Clinic and assistant professor at the University of Colorado School of Medicine.

"Abiraterone acetate is a new, life-extending pill for the treatment of advanced prostate cancer. Unlike the traditional chemotherapy drugs used in these situations, abiraterone is generally very well tolerated," said Flaig.

The multi-center Phase III clinical trial of 1195 participants looked at the effectiveness of treating patients who had received prior chemotherapy with a combination of abiraterone acetate (Zytiga) and prednisone. When this trial was initiated, there were no treatments that clearly prolonged survival in this late phase of prostate cancer. The patients were randomized to receive abiraterone acetate plus prednisone or a placebo plus prednisone each day. Treatment continued until the cancer progressed, there were unfavorable reactions, a new treatment was initiated or the patient withdrew from the trial.

The study shows participants taking abiraterone acetate lived about four months longer than participants taking the placebo. In addition, more patients receiving abiraterone acetate experienced a significant drop in the PSA blood level than those on the placebo.

"The survival benefit observed in this study is especially notable, since this was seen in the most advanced cases of prostate cancer," said Flaig. "Other studies are being done to examine the benefit of using abiraterone acetate earlier in the disease process, where it may be even more effective."

The FDA approved abiraterone acetate at the end of April. The tablet has few side effects but careful medical attention is required to monitor for specific potential side effects including liver blood test changes, low potassium levels, leg swelling and high blood pressure. *Provided by University of Colorado Denver*

http://www.eurekalert.org/pub_releases/2011-05/cwru-pom052411.php

Parts of moon interior as wet as Earth's upper mantle

Lunar water reinforces ties to Earth but challenges origin theory

Parts of the moon's interior contains as much water as the upper mantle of the Earth - 100 times more of the precious liquid than measured before – research from Case Western Reserve University, Carnegie Institution for Science, and Brown University shows.

The scientists discovered water along with volatile elements in lunar magma trapped inside of crystals that are trapped inside of tiny volcanic glass beads returned to Earth by Apollo 17.

The discovery, published in the May 26 Science Express, challenges assumptions of how the moon formed and the origin of frozen water at the lunar poles.

"These samples provide the best window we have to the amount of water in the interior of the Moon," said James Van Orman, professor of geological sciences at Case Western Reserve and an author of the paper. "The interior seems to be pretty similar to the interior of the Earth, from what we know about water abundance."

In fact, the researchers found the concentrations of water and volatile elements including fluorine, chlorine and sulfur in lunar magma are nearly identical to concentrations in solidified magma from primitive terrestrial mid-ocean ridges on Earth.

The discovery strengthens the theory that the moon and Earth have a common origin but forces scientists to reconsider the current theory of the process: that a huge impact in Earth's early history ejected material into orbit that became the moon.

Part of the origin theory says that water and other volatile elements and compounds were depleted due to the heat and violence of the impact.

This research indicates otherwise and provides new clues to the process of lunar formation.

"Water plays a critical role in determining the tectonic behavior of planetary surfaces, the melting point of planetary interiors, and the location and eruptive style of planetary volcanoes," said Erik Hauri, a geochemist with Carnegie's Department of Terrestrial Magnetism (DTM), and lead author. "We can conceive of no sample type that would be more important to return to Earth than these volcanic glass samples ejected by explosive volcanism, which have been mapped not only on the Moon but throughout the inner solar system."

The presence of this much water in lunar magma also forces scientists to consider volcanic activity as a possible source of ice found in the shadows of craters at the poles.

Thomas Weinreich, an undergraduate researcher working with Alberto Saal, a professor of geological sciences at Brown University, discovered the tiny magma pockets, called inclusions, inside olivine crystals, inside lunar glass beads.

The orange-colored beads, which are the size of a period on a page, came from deep inside the moon during volcanic eruptions.

Much of the volatile material from the magma escaped during eruption except what was protected inside crystals, Van Orman explained.

In seven samples, researchers ground and polished their way to the surface of the inclusions then measured the volatile elements that existed prior to eruption. From these measurements, the team was able to estimate the amount of water in the moon's interior.

Three years ago the same team, in a study led by Saal, reported the first evidence for the presence of water in lunar volcanic glasses and applied magma degassing models to estimate how much water was originally in the magmas before eruption.

"The bottom line," said Saal, "is that in 2008, we said the primitive water content in the lunar magmas should be similar to lavas coming from the Earth's depleted upper mantle. Now, we have proven that is indeed the case."

http://www.eurekalert.org/pub_releases/2011-05/s-nra052611.php

Nuclear radiation affects baby gender

New study challenges belief that exposure to nuclear radiation has no or negligible genetic effects in humans

Ionizing radiation is not without danger to human populations. Indeed, exposure to nuclear radiation leads to an increase in male births relative to female births, according to a new study by Hagen Scherb and Kristina Voigt from the Helmholtz Zentrum München. Their work shows that radiation from atomic bomb testing before the Partial Test Ban Treaty in 1963, the Chernobyl accident, and from living near nuclear facilities, has had a long-term negative effect on the ratio of male to female human births (sex odds). Their work is published in the June issue of Springer's journal, Environmental Science and Pollution Research.

Ionizing radiation from nuclear activity is known to have mutagenic properties and is therefore likely to have detrimental reproductive effects. It is thought that it may cause men to father more sons and mothers to give birth to more girls. Scherb and Voigt look at the long-term effects of radiation exposure on sex odds - a unique genetic indicator that may reveal differences in seemingly normal as well as adverse pregnancy outcomes between maternal exposure and paternal exposure. In particular, they focus on sex odds data with respect to global atmospheric atomic bomb test fallout in Western Europe and the US, fallout due to nuclear accidents in the whole of Europe, and radioactive releases from nuclear facilities under normal operating conditions in Switzerland and Germany.

Their analyses show a significant gender gap in all three cases:

* Increases in male births relative to female births in Europe and the US between 1964-1975 are a likely consequence of the globally emitted and dispersed atmospheric atomic bomb test fallout, prior to the test ban in 1963, that affected large human populations overall after a certain delay.

* There was a significant jump of sex odds in Europe in the year 1987 following Chernobyl, whereas no such similar effect was seen in the US, which was less exposed to the consequences of the catastrophe.

* Among populations living in the proximity of nuclear facilities (within 35km or 22 miles), the sex odds also increased significantly in both Germany and Switzerland during the running periods of those facilities.

Taken together these findings show a long-term, dose-dependent impact of radiation exposure on human sex odds, proving cause and effect. What is less clear is whether this increase in male births relative to female births is the result of a reduced frequency of female births or an increased number of male births. The authors estimate that the deficit of births and the number of stillborn or impaired children after the global releases of ionizing radiation amount to several millions globally.

Scherb and Voigt conclude: "Our results contribute to disproving the established and prevailing belief that radiation-induced hereditary effects have yet to be detected in human populations. We find strong evidence of an enhanced impairment of humankind's genetic pool by artificial ionizing radiation."

Reference: *Scherb H & Voigt K (2011). The human sex odds at birth after the atmospheric atomic bomb tests, after Chernobyl, and in the vicinity of nuclear facilities. Environmental Science and Pollution Research; DOI 10.1007/s11356-011-0462-z*

http://www.msnbc.msn.com/id/43187290/ns/health-health_care/

Smoking-pill suicides overlooked in missing reports

Drugmaker sent data to FDA through 'improper channels'

By JoNel Aleccia Health writer

Hundreds of reports of suicides, psychotic reactions and other serious problems tied to the popular stop-smoking drug Chantix were left out of a crucial government safety review because Pfizer Inc., the drug's manufacturer, submitted years of data through "improper channels."

Some 150 suicides — more than doubling those previously known — were among 589 delayed reports of severe issues turned up in a new analysis by the non-profit Institute for Safe Medication Practices.

"We've had a major breakdown in safety surveillance," said Thomas J. Moore, the ISMP senior scientist who analyzed the data. The serious problems — including reports of completed suicides, suicide attempts, aggression and hostility and depression — had been mixed among some 26,000 records of non-serious side effects such as nausea and rashes, with some dating back to 2006, the year Chantix, or varenicline, was approved.

They echo previous claims that the drug can induce extreme reactions in people trying to quit cigarettes, including vivid nightmares, crippling depression and sudden, violent outbursts.

"It's really chilling," said Moore, who analyzed 26 Chantix reactions in a paper published in the September 2010 issue of the Journal of Pharmacotherapy. "This seems to unleash something in people. It can be violence to anything around."

Moore's case studies describe "inexplicable and unprovoked" reactions in Chantix patients with no previous history of violence or mental illness, including:

* A 24-year-old woman who started beating her boyfriend in bed because "he looked so peaceful" and later attempted suicide;
* A 42-year-old man who punched a stranger at a bowling alley;
* A 47-year-old woman who died after she came out of a room, yelled at her daughters and then shot herself.

Federal Food and Drug Administration officials acknowledged that they asked Pfizer to resubmit thousands of records after realizing that the company was sending required reports in an inappropriate format that could not be added to the agency's Adverse Events Reporting System, or AERS.

"Last year, FDA became aware that a few manufacturers were submitting adverse events reports to FDA through improper channels," the agency said in a statement.

Pfizer officials said they were submitting reports as required and that when the FDA asked them to change, they did so immediately. They said there's no proof that Chantix causes suicide or other serious side effects.

Moore, who has served as an expert witness in court regarding Chantix, said it's the riskiest drug among those analyzed from the FDA's adverse event reports. In the third quarter of 2010, it ranked first in reported deaths, with twice as many fatalities logged as any other drug, he said.

New reports don't change FDA's position

FDA officials said the new reports did not change the agency's position on the risks and benefits of the controversial drug, which received a black box warning that included suicide — the strongest caution possible — in 2009, according to agency officials who would not speak on the record.

"At this point, based on the data, FDA does not have any new safety concerns with Chantix, though those that have been established remain under active review," the agency said in a statement posted in response to the ISMP report.

Agency officials said they're continuing to review Chantix in clinical trials and two large observational studies with the Veterans Administration and the Department of Defense. But Moore said the new data should raise immediate alarms about the drug that was prescribed 3.2 million times last year to people trying to stop

smoking — and 1.1 million times already this year, according to data from the firm Wolters Kluwer Pharma Solutions.

"To us, it raises questions about whether this drug is safe for widespread clinical use," Moore said. "Does this tip the balance?"

That's a view echoed by families of people who allegedly became suddenly and inexplicably violent after taking Chantix. Sean M. Wain, 34, of Beaver County, Pa., shot himself and his wife, Natalie, 33, in May 2009 in what a lawyer for their families claims was a Chantix-fueled rage.

If the FDA had more information about suicides and other side effects tied to Chantix, the agency might have taken stronger action sooner, said Victor H. Prebanic, who represents Robert Erdelen and George Wain, fathers of the slain couple.

"If Pfizer had been more forthcoming, the black box warning might have emerged earlier," Prebanic said. "For all we know, the drug would not have been available."

The lawsuit, filed this month, is the latest among hundreds of claims filed against Pfizer regarding Chantix. At least 1,545 injury claims that cite Chantix are pending in federal court.

Pfizer officials, however, said that the firm was following the FDA's rules and changed their reporting process once the agency asked for clarification.

"All post-marketing reports of adverse events are reviewed by Pfizer and reported to regulators, including FDA, in accordance with regulatory guidelines," the company said in a statement. "Pfizer takes patient safety and regulatory reporting obligations very seriously."

Suicide is an 'expected' event?

The problem appears to have been caused in part by federal Food and Drug Administration rules that don't require firms to submit new reports of death or serious harm in the agency's system for urgent review when such risks are already known.

FDA requires drugmakers to submit adverse events in two ways: There's an "expedited" system that requires companies to report serious and unexpected adverse events into the AERS system within 15 days.

Companies are also required to submit less-serious and expected adverse events quarterly in so-called "periodic reports." In those cases, problems previously included on drug labels — including suicide and suicide attempts — are considered to be expected events.

In Pfizer's case, the firm was submitting the periodic reports as required, but combining summaries and individual case reports in a single text file, the FDA said.

That meant that the individual reports of injury were not logged in the FDA's AERS system, drastically reducing known reports of suicides and other psychiatric problems tied to Chantix, Moore said.

"It's very clear the suicide risk of this drug was higher than we knew," he said.

Overall, there were 1,055 reports of serious problems with Chantix reported in the third quarter of 2010, more than any other prescription medication regularly monitored by the drug safety agency, Moore said.

Before last July, the FDA had logged 122 reports of suicides linked to Chantix, including 37 reported by Pfizer and 85 reported by health professionals or consumers, Moore reported. After the 150 new Pfizer reports were added, the total jumped to 272.

In addition, the 589 new reports of severe problems included 102 cases of possible hostility and aggression, 156 cases of depression and 56 cases of possible psychosis. Those were mixed among the 26,000 reports of less-serious problems.

Moore has asked the FDA to investigate the 150 new suicide reports, particularly if the events occurred before the 2009 black box warning listed suicide as a possible side effect.

For their part, FDA officials said they are considering changing regulations to allow expedited reports of suicides and other serious problems, even if they've previously been identified as expected. First proposed in 2003, that change is still pending.

http://web.mit.edu/newsoffice/2011/hawaii-hotspot-0527.html

Hotspot in the hot seat

New seismic imaging alters the picture beneath Hawaii.

Jennifer Chu, MIT News Office

The Hawaiian archipelago, and its chain of active and extinct volcanoes, has long been viewed as a geological curiosity. While most volcanoes arise at the boundaries of shifting tectonic plates, the Hawaiian chain lies smack in the middle of the Pacific plate, nowhere near its borders.

Now a study by researchers at MIT and Purdue University, published this week in Science, paints an unexpected picture of what's beneath Hawaii. Using a new imaging technique adapted from uses in oil and gas exploration, MIT's Robert van der Hilst and colleagues produced high-resolution images that peek hundreds of

kilometers below the Earth's surface. They found a hotspot — but not where many scientists had thought it would be. Instead, the MIT team found evidence of hot mantle activity some 600 kilometers deep and 2,000 kilometers wide, in an area far west of the "Big Island" of Hawaii.

Many geologists had thought the Hawaiian Islands resulted from a stationary plume of white-hot material rising from the Earth's lower mantle, spewing out masses of magma in fits of volcanic eruption. This theory held that the massive Pacific plate, moving slowly northwestward, carries newly formed volcanoes away from the hotspot, forming the Hawaiian island chain seen today.

According to the theory, the Big Island, the newest formation in the chain, sits directly over the blistering plume. Scientists have attempted to characterize this hotspot for decades, believing that if a plume exists, it may be a window into the Earth's deep processes that could help quantify how the Earth loses heat from its core.

"The implication [of this new work] is that there is no simple, deep plume directly beneath Hawaii," says Van der Hilst, the Cecil and Ida Green Professor of Earth and Planetary Sciences at MIT, and director of the Earth Resources Laboratory. "So the textbooks on Hawaii will have to be rewritten."

Heat wave

The team developed a new deep-Earth imaging technique using seismic- and mineral-physics data to determine the temperature of the Earth at various depths. Extreme temperature profiles, they reasoned, might suggest plumes or hotspots.

Seismic waves travel through the Earth's interior at speeds that are primarily influenced by temperature: The higher the temperature, the slower the waves. For years, seismologists have used seismic wave speeds to create — much like CAT scans — 3-D views of the Earth's internal structure. This tomographic technique works well near earthquake sites or below vast networks of seismographic sensors. But Hawaii, as Van der Hilst observes, is in a no-man's land of seismic data, far from any tectonic upheaval and adequate seismograph arrays.

Van der Hilst — along with co-authors Qin Cao, an MIT graduate student; mineral physicist Dan Shim, associate professor of earth, atmospheric and planetary sciences at MIT; and Maarten de Hoop of Purdue University — came up with a new technique, combining seismic data and mineral physics to map temperatures in the Earth's mantle. The team first collected all available seismic data from the Incorporated Research Institutions for Seismology Data Management Center, based in Seattle, which collects and distributes seismic information to the research community. This amounted to more than 100,000 records of seismic waves from more than 5,000 earthquakes in the last 20 years. Much of the data came from the so-called "Ring of Fire," a massive horseshoe of seismic and volcanic activity surrounding the entirety of the Pacific Ocean.

The team then modified a technique used in the oil and gas industry. Typically, companies such as Shell and Exxon Mobil create seismic shocks, and then listen to the echoes that bounce back. The seismic reflection creates a map of the underlying rock compositions, and clues to where oil and gas might lie.

Instead of creating shocks, Van der Hilst's team took advantage of Earth's natural shocks — earthquakes — and analyzed seismic waves as they reflected off the rocks underneath Hawaii. By analyzing seismic reflections, the team determined mineral compositions at various depths, noting the boundaries at which minerals changed. Knowing at which pressures and temperatures such boundaries occur in laboratory simulations, they were able to map out the temperatures deep beneath Hawaii.

Seismic shift

Cao, the lead author of the study, developed an algorithm that worked the massive amount of seismic data into deep-Earth temperature maps, revealing the newfound hotspot west of Hawaii. Van der Hilst says the discovery of this 2,000-kilometer-wide anomaly refutes the popular theory of a narrow, pipe-like plume rising straight up to Hawaii from the core-mantle boundary — a finding he anticipates will shake up the geodynamical and geochemical communities studying mantle convection.

Yang Shen, a professor of seismology and marine geophysics at the University of Rhode Island, says the new imaging technique provides much higher-resolution images of the Earth's mantle than previous techniques, and may change the conventional wisdom on Hawaii's hotspots.

"The observation is intriguing because it does not fit nicely within the current plume model," Shen says. "So I think the paper will force us to rethink … mantle plumes and convection."

Cao is now refining the mapping algorithm, and plans to make it accessible to other researchers in the next few months. As countries set up more earthquake monitors in the coming years, Van der Hilst says the new imaging technique will allow seismologists to draw up higher-resolution images of deep-Earth processes.

"I think this could be the technique of the future," Van der Hilst says. "The receiver networks are exploding, and in the next five to 10 years we can probably do even more spectacular things."

http://www.eurekalert.org/pub_releases/2011-05/uow-sc052611.php

Super-sticky 'ultra-bad' cholesterol revealed in people at high risk of heart disease

Scientists from the University of Warwick have discovered why a newly found form of cholesterol seems to be 'ultra-bad', leading to increased risk of heart disease.

The discovery could lead to new treatments to prevent heart disease particularly in people with type 2 diabetes and the elderly.

The research, funded by the British Heart Foundation (BHF), found that 'ultrabad' cholesterol, called MGmin-low-density lipoprotein (LDL), which is more common in people with type 2 diabetes and the elderly, appears to be 'stickier' than normal LDL. This makes it more likely to attach to the walls of arteries. When LDL attaches to artery walls it helps form the dangerous 'fatty' plaques' that cause coronary heart disease (CHD).

CHD is the condition behind heart attacks, claiming 88,000 lives in the UK every year (1).

The researchers made the discovery by creating human MGmin-LDL in the laboratory, then studying its characteristics and interactions with other important molecules in the body.

They found that MGmin-LDL is created by the addition of sugar groups to 'normal' LDL – a process called glycation – making LDL smaller and denser. By changing its shape, the sugar groups expose new regions on the surface of the LDL. These exposed regions are more likely to stick to artery walls, helping to build fatty plaques. As fatty plaques grow they narrow arteries - reducing blood flow - and they can eventually rupture, triggering a blood clot that causes a heart attack or stroke.

The discovery might also explain why metformin, a widely prescribed type 2 diabetes drug, seems to lead to reduced heart disease risk. Metformin is known to lower blood sugar levels, and this new research shows it may reduce the risk of CHD by blocking the transformation of normal LDL to the more 'sticky' MGmin-LDL.

Dr Naila Rabbani, Associate Professor of Experimental Systems Biology at Warwick Medical School, who led the study, said: "We're excited to see our research leading to a greater understanding of this type of cholesterol, which seems to contribute to heart disease in diabetics and elderly people. Type 2 diabetes is a big issue – of the 2.6 million diabetics in the UK, around 90 per cent have type 2. It's also particularly common in lower income groups and South Asian communities. (2, 3) "The next challenge is to tackle this more dangerous type of cholesterol with treatments that could help neutralise its harmful effects on patients' arteries."

Dr Shannon Amoils, Research Advisor at the BHF, which funded the study, said: "We've known for a long time that people with diabetes are at greater risk of heart attack and stroke. There is still more work to be done to untangle why this is the case, but this study is an important step in the right direction.

"This study shows how the make-up and the shape of a type of LDL cholesterol found in diabetics could make it more harmful than other types of LDL. The findings provide one possible explanation for the increased risk of coronary heart disease in people with diabetes.

"Understanding exactly how 'ultrabad' LDL damages arteries is crucial, as this knowledge could help develop new anti-cholesterol treatments for patients." The research was published in the journal Diabetes.

For more information please call Kate Cox, Communications Manager, Warwick Medical School on +44 (0)2476 574522 or +44 (0) 7920 531221 or kate.cox@warwick.ac.uk To contact Dr Rabbani call: +44 (0)7880 850730 or email: N.Rabbani@warwick.ac.uk OR the BHF press office on 020 7554 0164 or 07764 290 381 (out of hours) or email newsdesk@bhf.org.uk ***Notes to editors***

1. Scarborough P et al (2010). Coronary heart disease statistics 2010 edition. British Heart Foundation: London.

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http://www.eurekalert.org/pub_releases/2011-05/tpco-aob052711.php

Acupuncture of benefit to those with unexplained symptoms

Attending frequently with medically unexplained symptoms is distressing for both patient and doctor and effective treatment or management options are limited: one in five patients have symptoms that remain unexplained by conventional medicine.

Studies have shown that the cost to the NHS of managing the treatment of a patient with medically unexplained symptoms can be twice that of a patient with a diagnosis.

A research team from the Institute of Health Services Research, Peninsula Medical School, University of Exeter, has carried out a randomised control trial and a linked interview study regarding 80 such patients from GP practices across London, to investigate their experiences of having five-element acupuncture added to their usual care. This is the first trial of traditional acupuncture for people with unexplained symptoms.

The results of the research are published in the British Journal of General Practice. They reveal that acupuncture had a significant and sustained benefit for these patients and consequently acupuncture could be

safely added to the therapies used by practitioners when treating frequently attending patients with medically unexplained symptoms.

The patient group was made up of 80 adults, 80 per cent female with an average age of 50 years and from a variety of ethnic backgrounds who had consulted their GP at least eight times in the past year. Nearly 60 per cent reported musculoskeletal health problems, of which almost two-thirds had been present for a year.

In the three months before taking part in the study, the 80 patients had accounted for the following NHS experiences: 21 patient in-days; 106 outpatient clinic visits; 52 hospital clinic visits (for treatments such as physiotherapy, chiropody and counselling); 44 hospital visits for investigations (including 10 magnetic resonance imaging – MRI – scans); and 75 visits to non-NHS practitioners such as opticians, dentists and complementary therapists.

The patients were randomly divided into an acupuncture group and a control group. Eight acupuncturists administered individual five-element acupuncture to the acupuncture group immediately, up to 12 sessions over 26 weeks. The same numbers of treatments were made available to the control group after 26 weeks.

At 26 weeks the patients were asked to complete a number of questionnaires including the individualised health status questionnaire "Measure Yourself Medical Outcome Profile."

The acupuncture group registered a significantly improved overall score when compared with the control group. They also recorded improved wellbeing but did not show any change in GP and other clinical visits and the number of medications they were taking. Between 26 and 52 weeks the acupuncture group maintained their improvement and the control group, now receiving their acupuncture treatments, showed a 'catch up' improvement.

The associated qualitative study, which focused on the patients' experiences, supported the quantitative work.

This element identified that the participating patients had a variety of longstanding symptoms and disability including chronic pain, fatigue and emotional problems which affected their ability to work, socialise and carry out everyday tasks. A lack of a convincing diagnosis to explain their symptoms led to frustration, worry and low mood.

Participating patients reported that their acupuncture consultations became increasingly valuable. They appreciated the amount of time they had with each acupuncturist and the interactive and holistic nature of the sessions – there was a sense that the practitioners were listening to their concerns and, via therapy, doing something positive about them.

As a result, many patients were encouraged to take an active role in their treatment, resulting in cognitive and behavioural lifestyle changes, such as: a new self-awareness about what caused stress in their lives, and a subsequent ability to deal with stress more effectively; and taking their own initiatives based on advice from the acupuncturists about diet, exercise, relaxation and social activities.

Comments from participating patients included: "the energy is the main thing I have noticed. You know, yeah, it's marvellous! Where I was going out and cutting my grass, now I'm going out and cutting my neighbour's after because he's elderly"; "I had to reduce my medication. That's the big help actually, because medication was giving me more trouble…side effects"; and "It kind of boosts you, somehow or another."

Dr. Charlotte Paterson, who managed the randomised control trial and the longitudinal study of patients' experiences, commented: "Our research indicates that the addition of up to 12 five-element acupuncture consultations to the usual care experienced by the patients in the trial was feasible and acceptable and resulted in improved overall well-being that was sustained for up to a year.

"This is the first trial to investigate the effectiveness of acupuncture treatment to those with unexplained symptoms, and the next development will be to carry out a cost-effectiveness study with a longer follow-up period. While further studies are required, this particular study suggests that GPs may recommend a series of five-element acupuncture consultations to patients with unexplained symptoms as a safe and potentially effective intervention."

She added: "Such intervention could not only result in potential resource savings for the NHS, but would also improve the quality of life for a group of patients for whom traditional biomedicine has little in the way of effective diagnosis and treatment."

http://www.physorg.com/news/2011-05-celebrates-years-diabetes.html

Man celebrates 85 years of living with diabetes

A leading diabetes research center named the San Diego resident the first American known to live 85 years with the disease, a life that has paralleled — and benefited from — the evolution in treatment.

(AP) -- When Bob Krause turned 90 last week, it was by virtue of an unflagging determination and a mentality of precision that kept his body humming after being diagnosed with diabetes as a boy.

A leading diabetes research center named the San Diego resident the first American known to live 85 years with the disease, a life that has paralleled - and benefited from - the evolution in treatment.

Krause's wife of 56 years, his family and friends celebrated his longevity Sunday with a party and a medal from the Joslin Diabetes Center to commemorate his 85-year milestone.

"Bob has outlived the life expectation of a normal healthy person born in 1921," said his physician, Dr. Patricia Wu, attributing Krause's success to his strong character. "He knows that he has to deal with this and he sees this as a part of his life, he doesn't let this get him down."

The trim, white-haired Krause puts it more succinctly: "I'm a stubborn old man. I refuse to give up."

That trait certainly plays into how closely he has tracked his body's chemistry and become expert in the life-saving math that has kept his diabetes under control.

About 18.8 million Americans have been diagnosed with diabetes and an estimated 7 million more live with the disease unwittingly. Krause's form of diabetes, type 1, was once known more commonly as juvenile diabetes, and the more common form of diabetes often tied to obesity is type 2.

About 3 million Americans live with type 1 diabetes, a chronic illness in which their bodies don't make enough insulin, which is needed to convert blood sugar into energy. The exact cause is unknown, though genetics and autoimmune problems are thought to play a role.

Life expectancy is diminished for many diabetics because they face a higher risk of serious health complications, including heart disease, stroke, blindness, kidney damage and limb amputations. Many struggle to manage blood pressure.

The former University of Washington mechanical engineering professor says he's succeeded because he treats his body like a car and he only eats enough food to fuel the machine.

"To keep your diabetes under control you only eat the food you need to before you have activities to perform," Krause said. "I eat to keep me alive instead of eating all the time, or for pleasure."

He says he's not as active as he once was, so he doesn't need a lot of fuel - or variation in diet. For breakfast every day, he eats a bowl of nuts and five pitted prunes. He usually skips lunch and eats a salad with some lean meat for dinner. "I was surprised when they told me I was the oldest, because I knew there were others out there. I certainly didn't think I was a loner," Krause said after being presented the medal.

The first time Krause met Dr. Wu at Kaiser Permanente San Diego, he came into the endocrinologist's office with a briefcase full of meticulous hand-drawn graphs charting months of his blood sugar levels, caloric intake and insulin doses.

He tests his blood up to a dozen times a day and he brings in updated charts every visit, Wu said.

"I think that's a testament of why he is successful in living with this very difficult to live with condition," she said. "Because of his persistence, his consistency, his hard work."

Krause's careful attention is not unlike many others who have been awarded by Joslin for successfully living with the illness for decades, according to researcher Stephanie Hastings.

The Boston-based center has honored long-time diabetes survivors since 1948, and 34 have earned 75-year medals. Hastings said Krause is like many longtime successful diabetics, who "always have more information than we need." If anything, Wu has worked with Krause over the past three years to be a little less rigid so that he doesn't overdose himself with insulin and push his blood sugar too low.

It can be tough to change the patterns of a patient who has dealt with an illness for so long.

Krause was lucky to be diagnosed with diabetes not long after the commercial production of insulin made it widely available. It was 1926, and he was 5 years old and living in Detroit where his father worked for the U.S. Rubber Co. Krause's younger brother Jackie died of diabetes after being diagnosed a year earlier because insulin wasn't yet available.

Before the discovery of insulin, a diabetes diagnosis was a death sentence, with an expected survival of a couple years at most if patients undertook starvation diets to buy more time.

"I watched Jackie die by starving to death," Krause said. "Before insulin, diabetics would just die because eating doesn't make any difference: anything that you ate couldn't be converted and you literally starved to death because your body couldn't absorb anything."

Canadian scientists Frederick Banting and John Macleod made the discovery in 1921 through experiments with a mixture of ground cow pancreas water and salts that eventually became insulin.

When experimenting with the mixture in humans began in 1922, scientists found they were literally injecting life into people who were wasting away. The discovery led to a Nobel Prize in 1923.

When Krause began taking insulin, diabetics had to boil glass syringes with long needles, sharpening the point when it would go blunt with wear. Krause remembers how his mother, having lost one child to diabetes, weighed every piece of food Krause ate and kept him on a strict diet. By the time he was 6, he was giving himself injections in the arms or legs at every meal.

Back then, blood sugar testing was imprecise, messy and inconvenient. Krause would boil his urine in a test tube and drop a tablet into it that would turn different colors based on how much blood sugar was in the sample.

Since 1978, Krause has relied on his insulin pump to administer his dosages into his stomach, though he enters the amount of the dose himself rather than relying on automated doses of insulin that pumps can give throughout the day.

Krause's son, Tom Krause, said his engineer father has always been precise, measured and calculated - down to the box of sugar cubes he always kept next to his bed in case he felt faint. "Having a sugar cube is a precise measurement - that's how much he kept track, down to the cube of sugar," said Tom Krause, 50.

And though Tom Krause inherited his father's diabetes, he doesn't share his father's regimented control of the illness. "My dad, he is just a machine in how well he cares and manages his diabetes, with his willpower and how long he's been doing it," Tom Krause said.

Krause praises the advent of blood testing as one of the most life-changing moments in diabetes medicine, since it allows him to get a more precise reading of his blood sugar levels by pricking his finger for a test strip that is read by a machine. "It's easier to control things today than it was back then. Back then you just ate a meal and that's all you ate all day long, you didn't eat anything in between and if your blood sugar got low, you would feel faint and drink orange juice and wait," Krause said.

Though they've worked together to make sure his treatment keeps up with the times, Krause reminds Wu of the same thing each time he leaves her office. "He'll say, `I've been doing this for 80-number of years and it has gotten me this far and I'm still here, so who are you to tell me how to do this? I've been doing this since before you were born,'" Wu recalls with a laugh.

More information: Joslin Diabetes Center: http://www.joslin.org

http://www.physorg.com/news/2011-05-high-radioactivity-japan-nuclear-workers.html

High radioactivity found in Japan nuclear workers

Two workers from Japan's stricken Fukushima nuclear plant have been contaminated by high levels of radioactive iodine, the operator said Monday, prompting fears over their long-term health.

The workers, reportedly men in their 30s and 40s, may have already been exposed to radiation levels higher than the recently boosted official annual limit, Japanese media suggested.

Tokyo Electric Power Company (TEPCO) said it had been measuring the internal exposure to radiation of all employees involved in emergency work at the Fukushima Daiichi plant crippled by the March 11 earthquake and tsunami. Internal exposure occurs when people take radioactive substances into their bodies through tainted air or food and drink.

The company notified the governmental atomic energy agency of the possible problem and the agency confirmed that "the thyroid glands of two male employees showed high levels of radiation (iodine-131)", TEPCO said in a statement.

The Jiji Press news agency said the two workers had stopped working at the plant and were not sick at the moment. They will undergo further check-ups.

The inspection by the government agency found 9,760 and 7,690 becquerels of iodine-131 in the thyroid glands of the workers, 10 times higher than other workers at Fukushima, reports said.

The two men were working at a variety of locations at Fukushima Daiichi, including the central control room, in March and April, including on March 11 and during the following days.

The tests sparked fears that their radiation exposure had been several hundred millisieverts, Jiji said.

A few days after the disaster, the government boosted the annual limit of radiation exposure for emergency workers to 250 millisieverts from 100 as the nation battled the world's worst nuclear crisis since Chernobyl in 1986. No workers have been confirmed to have been exposed radiation higher than the annual limit since the disaster. Radioactive iodine is known to accumulate in the thyroid gland.