http://www.eurekalert.org/pub_releases/2011-01/eu-pfs010611.php

Pandemic flu strain could point way to universal vaccine

The search for a universal flu vaccine has received a boost from a surprising source: the 2009 H1N1 pandemic flu strain.

Several patients infected with the 2009 H1N1 strain developed antibodies that are protective against a variety of flu strains, scientists from Emory University School of Medicine and the University of Chicago have found. The results were published online Monday in the Journal of Experimental Medicine.

"Our data shows that infection with the 2009 pandemic influenza strain could induce broadly protective antibodies that are only rarely seen after seasonal flu infections or flu shots," says first author Jens Wrammert, PhD, assistant professor of microbiology and immunology at Emory University School of Medicine and the Emory Vaccine Center. "These findings show that these types of antibodies can be induced in humans, if the immune system has the right stimulation, and suggest that a pan-influenza vaccine might be feasible."

The antibodies isolated from a group of patients who were infected with the 2009 H1N1 strain could guide researchers in efforts to design a vaccine that gives people long-lasting protection against a wide spectrum of flu viruses, say the researchers. Next, the research team is planning to examine the immune responses of people who were vaccinated against the 2009 H1N1 strain but did not get sick.

The research comes from a collaboration between the laboratories of Rafi Ahmed, PhD, at Emory and Patrick Wilson, PhD at the University of Chicago. Ahmed is director of the Emory Vaccine Center and a Georgia Research Alliance Eminent Scholar. Wilson is assistant professor of medicine at the University of Chicago's Knapp Center for Lupus and Immunology Research.

Scientists from Columbia, Harvard and the National Institutes of Health (NIH) also contributed to the study, which was funded by the National Institute of Allergy and Infectious Diseases, part of the NIH, and by the American Recovery and Reinvestment Act of 2009.

The nine patients studied were recruited through the Hope Clinic, the clinical division of the Emory Vaccine Center. They had a range of disease severities, from mild illness that waned after a few days to a severe case that required a two-month hospital stay including ventilator support. Most of the participants were in their 20s or 30s. Blood samples were usually taken about 10 days after the onset of symptoms.

The team of researchers identified white blood cells from the patients that made antibodies against flu virus, and then isolated the antibody genes from individual cells. They used the genes to produce antibodies in cell culture -- a total of 86 varieties -- and then tested which flu strains they reacted against.

Five antibodies isolated by the team could bind all the seasonal H1N1 flu strains from the last decade, the devastating "Spanish flu" strain from 1918 and also a pathogenic H5N1 avian flu strain.

Seasonal flu shots contain three inactivated viral strains, each grown in chicken eggs. Over the last decade, it was standard that one of the three is an H1N1 strain. However, vaccination with any one H1N1 strain doesn't usually result in protection against all of them – that's why the 2009 strain could make so many people sick.

Some of the antibodies the team identified stick to the "stalk" region of part of the virus (a protein called hemagglutinin). Because this part of the virus doesn't change as much as other regions, scientists have proposed to make it the basis of a vaccine that could provide broader protection.

"Previously, this type of broadly protective, stalk-reactive antibody was thought to be very rare," Wrammert says. "In contrast, in the patients we studied, these stalk-reactive antibodies were surprisingly abundant."

The team tested whether three of the antibodies they isolated could protect mice against the 2009 H1N1 strain or two other common lab strains. Two antibodies could protect mice against an otherwise lethal dose of any of the three strains, even when the antibody was given 60 hours after infection. However, one antibody only protected against the 2009 H1N1 strain.

The antibody that only reacted to the 2009 H1N1 strain came from the patient with the most severe illness. The antibody genes from that patient suggest that the patient had a complete lack of preexisting immunity to H1N1 viruses, the authors write. In cases where patients experienced a milder illness, it appears that immune cells that developed in response to previous seasonal flu shots or infections formed a foundation of response to 2009 strain.

"The result is something like the Holy Grail for flu-vaccine research," says study author Patrick Wilson, PhD, assistant professor of medicine at the University of Chicago. "It demonstrates how to make a single vaccine that could potentially provide permanent immunity to all influenza. The surprise was that such a very different influenza strain, as opposed to the most common strains, could lead us to something so widely applicable."

Additional authors include Dimitrios Koputsananos, Gui-Mei Li, Srilatha Edupuganti, Megan McCausland, Ionna Slountzou, Behzag Razavi. Carlos Del Rio, Rama Rao Amara, Youliang Wang, Mark Mulligan, Richard Compans, and Aneesh Mehta from Emory University; Michael Morrissey, Nai-Ying Zheng, Jane-Hwei Lee, Min Huang, Zahida Ali, Kaval Kaur, and Sara

Andrews from the University of Chicago; Mady Hornig and Ian Lipkin of Columbia University; Jinhua Sui and Wayne Marasco of Harvard Medical School; Suman Das, Christopher O'Donnell, Jon Yewdell and Kanta Subbarao of the NIH. Drs. Ahmed and Wrammert and Emory University are entitled to royalties derived from the sale of products related to the research described in this paper. This study could affect their personal financial status. The terms of this arrangement have been reviewed and approved by Emory University in accordance with its conflict of interest policies.

http://www.eurekalert.org/pub_releases/2011-01/jaaj-srm010711.php

Statin risks may outweigh benefits for patients with a history of brain hemorrhage

A computer decision model suggests that for patients with a history of bleeding within the brain, the risk of recurrence associated with statin treatment may outweigh the benefit of the drug in preventing cardiovascular disease, according to a report posted online today that will appear in the May print issue of Archives of Neurology, one of the JAMA/Archives journals.

The benefits of statins for reducing the risk of heart disease and stroke are well established, but more widespread use of statin therapy remains controversial, according to background information in the article. "A particular subgroup of patients for whom the advisability of statin use is unclear are those at high risk for intracerebral hemorrhage," or a stroke caused by bleeding within the brain, the authors write. "The reason for added concern is the increased incidence of intracerebral hemorrhage observed among subjects randomized to statin therapy in a clinical trial of secondary stroke prevention."

"Because intracerebral hemorrhage sufferers commonly have co-morbid [co-occurring] cardiovascular risk factors that would otherwise warrant cholesterol-lowering medication, it is important to weigh the risks and benefits of statin therapy in this population," write M. Brandon Westover, M.D., Ph.D., of Massachusetts General Hospital and Harvard Medical School, Boston, and colleagues. The researchers used a Markov decision model to evaluate these benefits and risks. Based on prior research, simulated patients were assigned to states that correspond to disease risk and could then experience any combination of events which may lead to the increased risk of stroke or heart disease, change in quality of life or death.

"Our analysis indicates that in settings of high recurrent intracerebral hemorrhage risk, avoiding statin therapy may be preferred," the authors write. "For lobar intracerebral hemorrhage [bleeding in the cerebrum] in particular, which has a substantially higher recurrence rate than does deep intracerebral hemorrhage, statin therapy is predicted to increase the baseline annual probability of recurrence from approximately 14 percent to approximately 22 percent, offsetting the cardiovascular benefits for both primary and secondary cardiovascular prevention."

In the case of deep intracerebral hemorrhage, a type of stroke due to bleeding deep within the brain that has a lower risk of recurrence, the benefits and risks of statin use were more evenly balanced. "Consequently, the optimal treatment option may vary with specific circumstances," the authors write.

The mechanism by which statins might increase the risk of hemorrhagic stroke are unknown, the authors note. The association may be due to an increased risk of brain bleeding among those with lower cholesterol levels, or potential anti-clotting properties of statins.

"In summary, mathematical decision analysis of the available data suggests that, because of the high risk of recurrent intracerebral hemorrhage in survivors of prior hemorrhagic stroke, even a small amplification of this risk by use of statins suffices to recommend that they should be avoided after intracerebral hemorrhage," the authors conclude. "In the absence of data from a randomized clinical trial (ideally comparing various agents and doses), the current model provides some guidance for clinicians facing this difficult decision."

(Arch Neurol. Published online January 10, 2011. doi:10.1001/archneurol.2010.356. Available pre-embargo to the media at www.jamamedia.org.)

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Editorial: Do No Harm With Statin Treatment

"The question prompting the decision analysis model reported by Westover et al epitomizes a common conundrum faced by clinicians—the need to make a therapeutic decision for a given patient in the absence of guidance from specific, high-quality clinical trial data," writes Larry B. Goldstein, M.D., of Duke University and Durham VA Medical Center, Durham, N.C., in an accompanying editorial.

"In this case, exploratory data from two clinical trials (Heart Protection Study and SPARCL) suggest, but do not prove, a statin-associated increased risk of brain hemorrhage that may reduce the overall benefit of treatment in patients with a history of cerebrovascular disease."

The available data are "generally consistent with the conclusion of the decision analysis—the risk of statin therapy likely outweighs any potential benefit in patients with (at least recent) brain hemorrhage and should generally be avoided in this setting," Dr. Goldstein writes. "Until and unless there are data to the contrary, or

warranted by specific clinical circumstances, the use of statins in patients with hemorrhagic stroke should be guided by the maxim of nonmaleficence—Primum non nocere."

(Arch Neurol. Published online January 10, 2011. doi:10.1001/archneurol.2010.349. Available pre-embargo to the media at www.jamamedia.org.)

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http://www.eurekalert.org/pub_releases/2011-01/uok-rid011011.php

Research identifies drug target for prion diseases, 'mad cow'

University of Kentucky scientists make discovery

LEXINGTON, Ky. – Scientists at the University of Kentucky have discovered that plasminogen, a protein used by the body to break up blood clots, speeds up the progress of prion diseases such as mad cow disease.

This finding makes plasminogen a promising new target for the development of drugs to treat prion diseases in humans and animals, says study senior author Chongsuk Ryou, a researcher at the UK Sanders-Brown Center on Aging and professor of microbiology, immunology and molecular genetics in the UK College of Medicine.

"I hope that our study will aid in developing therapy for prion diseases, which will ultimately improve the quality of life of patients suffering from prion diseases," Ryou said. "Since prion diseases can lay undetected for decades, delaying the ability of the disease-associated prion protein to replicate by targeting the cofactor of the process could be a monumental implication for treatment."

The study was reported in the December issue of The FASEB Journal (www.fasebj.org), published by the Federation of American Societies for Experimental Biology.

Ryou's team used simple test-tube reactions to multiply disease-associated prion proteins. The reactions were conducted in the presence or absence of plasminogen. They also found that the natural replication of the prions was stimulated by plasminogen in animal cells.

"Rogue prions are one of nature's most interesting, deadly and least understood biological freak shows," says Dr. Gerald Weissmann, editor-in-chief of The FASEB Journal. "They are neither virus nor bacteria, but they kill or harm you just the same. By showing how prions hijack our own clot-busting machinery, this work points to a new target for anti-prion therapy."

According to the U.S. National Institute of Allergy and Infectious Diseases, prion diseases are a related group of rare, fatal brain diseases that affect animals and humans. The diseases are characterized by certain misshapen protein molecules that appear in brain tissue. Normal forms of these prion protein molecules reside on the surface of many types of cells, including brain cells, but scientists do not understand what normal prion protein does. On the other hand, scientists believe that abnormal prion protein, which clumps together and accumulates in brain tissue, is the likely cause of the brain damage that occurs. Scientists do not have a good understanding of what causes the normal prion protein to take on the misshapen abnormal form.

Prion diseases are also known as transmissible spongiform encephalopathies, and include bovine spongiform encephalopathy ("mad cow" disease) in cattle; Creutzfeldt-Jakob disease in humans; scrapie in sheep; and chronic wasting disease in deer and elk. These proteins may be spread through certain types of contact with infected tissue, body fluids, and possibly, contaminated medical instruments.

The co-author of the study is Charles E. Mays, formerly a graduate student in the Ryou lab.

http://www.eurekalert.org/pub_releases/2011-01/w-shr011011.php

Spanish heart risk study challenges image of healthy Mediterranean diet and lifestyle

Risk factors were similar to those found in the US and UK

A Spanish study has challenged the long-held belief that people in the Mediterranean all enjoy more healthy diets and lifestyles, after discovering alarmingly high cardiovascular risk factors similar to those found in the UK and USA. Research published in the January issue of IJCP, the International Journal of Clinical Practice, also found strong links between low levels of education and increased risk. "Cardiovascular diseases account for 33 per cent of deaths in Spain, making it the main cause of mortality in the country" says Dr Ricardo Gómez-Huelgas from the Internal Medicine Department at Hospital Carlos Haya, Malaga.

The study was carried out on a random selection of 2,270 adults attending a healthcare centre in Malaga, Andalucia, a region with one of the highest rates of cardiovascular disease in Spain. The participants ranged from 18 to 80, with an average of just under 44 years, 50.3 per cent were female and 58 per cent had low educational levels.

More than 60 per cent were overweight or obese and 77 per cent did not get enough exercise. The researchers also found that 28 per cent smoked, 33 per cent had high blood pressure, seven per cent had diabetes and 65 per

cent had high cholesterol levels. Just under 30 per cent of the patients had three or more cardiovascular risk factors that could be modified by changes to their lifestyle or diet.

"Most of the cardiovascular risk factors increased with age, with the exception of smoking and low levels of 'good' cholesterol, and we noted some differences between the sexes" says Dr Gómez-Huelgas.

"We also found that a low education level was associated with a high prevalence of cardiovascular risk factors and this association was significant when it came to smoking, obesity, abdominal obesity and high levels of fatty molecules. "The prevalence of obesity, diabetes, high blood pressure and high cholesterol in Spain have all risen at an alarming rate over the last 20 years and this is likely to cause future increases in bad health and death due to cardiovascular disease."

Other key findings of the study include:

* Men had a higher prevalence of smoking, high blood pressure, high levels of fatty molecules and impaired fasting glucose - which can lead to diabetes - than women.

* Women were more likely to demonstrate a higher prevalence of physical inactivity and abdominal obesity. Young female smokers with sedentary lifestyles were a particular concern.

* Obesity increased with age - 84 per cent of people over 50 were overweight or obese and 82 per cent had abdominal obesity, compared with 61 per cent and 56 per cent for the study as a whole.

"Our findings are cause for concern" says Dr Gómez-Huelgas. "We found high rates of obesity, abnormal lipid and fat levels and hypertension in the study group. And the high rates of smoking and sedentary lifestyles in young women raises fears for a large increase in cardiovascular deaths in this group in the near future. There are also issues around public health messages for people with lower education levels who tend to have higher risk factors.

"The drive to reduce cardiovascular disease by tackling these risk factors poses a real challenge for the healthcare profession. We hope that our findings can help to reduce risk factors among the most vulnerable sections of the community."

"The study by Dr Gómez-Huelgas and colleagues challenges the belief that cardiovascular disease, one of the fastest growing diseases in the developing world, is more likely to affect the chilly north than the sunny south" says Dr Anthony Wierzbicki, a London-based Consultant in Metabolic Medicine.

"In fact, the risk levels found in this study show parallels with the USA and are worse than those reported by recent UK studies.

"The myth that the Mediterranean diet and lifestyle is so healthy is based on 40-year old data from rural areas and so much has changed during those four decades. Studies like this are invaluable because they identify those people most at risk and provide valuable information that helps us to improve both screening and prevention strategies."

The paper and editorial can be viewed free online at: http://onlinelibrary.wiley.com/doi/10.1111/j.1742-1241.2010.02543.x/pdf http://onlinelibrary.wiley.com/doi/10.1111/j.1742-1241.2010.02566.x/pdf

Note to editors:

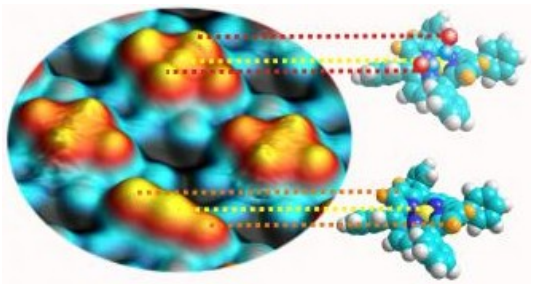
** Paper: Prevalence of cardiovascular risk factors in an urban adult population from southern Spain. IMAP study. IJCP, the International Journal of Clinical Practice. Gomez-Huelgas et al. 65.1, pp 35-40. (January 2011). DOI: 10.1111/j.1742-1241.2010.02543.x*

** Editorial: Cardiovascular screening: which populations, what measure of risk? Wierzbicki A. IJCP, the International Journal of Clinical Practice. 65.1, pp 3-5. (January 2011). DOI: 10.1111/j.1742-1241.2010.02566.x*

http://www.eurekalert.org/pub_releases/2011-01/tum-doo011011.php

Direct observation of carbon monoxide binding to metal-porphyrines

New insights from the nano world



The mechanism for binding oxygen to metalloporphyrins is a vital process for oxygen-breathing organisms. Understanding how small gas molecules are chemically bound to the metal complex is also important in catalysis or the implementation of chemical sensors. When investigating these binding mechanisms, scientists use porphyrin rings with a central cobalt or iron atom. They coat a copper or silver support surface with these substances.

A scanning tunneling microscopy image (left) shows four porphyrins. The models (right) illustrate the two systems shown in the picture. The protrusions correspond to the central atom (yellow sphere) and the two elevated portions to the saddle (orange). The characteristic cross shape results from the attached carbon monoxide molecules (red and blue). Knud Seifert (TUM)

An important characteristic of porphyrins is their conformational flexibility. Recent research has shown that each specific geometric configuration of the metalloporphyrins has a distinct influence on their functionality. In

line with the current state of research, the scientists expected only a single CO molecule to bind axially to the central metallic atom. However, detailed scanning tunnel microscopy experiments by Knud Seifert revealed that, in fact, two gas molecules dock between the central metallic atom and the two opposite nitrogen atoms. Decisive is the saddle shape of the porphyrin molecules, in which the gas molecules assume the position of the rider.

The significance of the saddle geometry became apparent in model calculations done by Marie-Laure Bocquet from the University of Lyon. Her analysis helped the researchers understand the novel binding mode in detail. She also showed that the shape of the molecular saddle remains practically unchanged, even after the two gas molecules bind to the porphyrin.

The porphyrins reacted very differently when the researchers replaced the carbon monoxide with stronger-binding nitrogen monoxide. As expected, this binds directly to the central atom, though only a single molecule fits in each porphyrin ring. This has a significant effect on the electronic structure of the carrier molecule, and the characteristic saddle becomes flattened. Thus, the porphyrin reacts very differently to different kinds of gas – a result that is relevant for potential applications, such as sensors.

Dr. Willi Auwaerter, one of the authors, is thrilled: "What's new is that we actually saw, for the first time, the mechanism on a molecular level. We even can selectively move individual gas molecules from one porphyrin to another."

The team aims to explain the physical and chemical processes on surfaces and in nanostructures. Once these fundamental questions are answered, they will take on new challenges: How big is the influence of the central atom? How does the binding change in planar conformations? How can such systems be utilized to implement catalyzers and sensors through controlled charge transfers?

The research was funded by the Deutsche Forschungsgemeinschaft (Cluster of Excellence "Munich Center for Advanced Photonics"), the TUM Institute for Advanced Study, the European Research Council (ERC Advanced Grant MolArt), as well as the Spanish Ministerio de Ciencia E Innovacion. The Leibniz Rechenzentrum of the Bayerische Akademie der Wissenschaften provided computing time. The research group of Professor Barth is member of the Catalysis Research Center (CRC) of the TUM.

Cis-dicarbonyl binding at cobalt and iron porphyrins with saddle-shape conformation, Knud Seufert, Marie-Laure Bocquet, Willi Auwärter, Alexander Weber-Bargioni, Joachim Reichert, Nicolás Lorente und Johannes V. Barth, Nature Chemistry, Online 9. January 2011 – DOI: 10.1038/NCHEM.956 Link: http://www.nature.com/nchem/journal/vaop/ncurrent/full/nchem.956.html

Further publications on this topic:

Discriminative Response of Surface-Confined Metalloporphyrin Molecules to Carbon and Nitrogen Monoxide, Knud Seufert, Willi Auwaerter und Johannes V. Barth, Journal of the American Chemical Society, 2010, 132, 18141 – DOI: 10.1021/ja1054884 Link: http://pubs.acs.org/doi/abs/10.1021/ja1054884

http://news.discovery.com/human/power-balance-maker-admits-bands-are-worthless.html

Power Balance Maker Admits Bands Are Worthless

By Benjamin Radford | Mon Jan 10, 2011 12:30 PM ET

The Australian manufacturer of Power Balance, the wildly popular rubbery bracelets embedded with holograms claimed to somehow adjust the body's energy or vibrations, has admitted that there is no proof their product works.

A representative of Power Balance Australia issued a statement that read in part, "We admit that there is no credible scientific evidence that supports our claims. Therefore we engaged in misleading conduct."

Power Balance bracelets achieved global popularity, in part because they were embraced by a parade of celebrities. Dozens of professional athletes, movie stars and musicians use them and have been photographed wearing the bands.

So what were A-listers like Robert DeNiro, Shaq, Kate Middleton, and P. Diddy getting out of them?

Australian researcher Richard Saunders told Discovery News, "The claims are that these bands will improve your strength, your balance, and your flexibility. They also suggest it will improve your well-being, give you clarity of thought, improve your stamina and sports performance, that sort of thing."

Saunders, co-host of the Skeptic Zone podcast, was asked by an Australian television show to test the bands on a representative from Power Balance. "I tested the head of the Australian branch, and he failed five times out

of five tests. So it was pretty conclusive. These were blind and double-blind tests where he had to tell which one out of six volunteers had the band on. He was pretty shocked when they failed to work."

Australian Competition and Consumer Commission chairman Graeme Samuel stated that "Suppliers of these types of products must ensure that they are not claiming supposed benefits when there is no supportive scientific evidence. Consumers should be wary of other similar products on the market that make unsubstantiated claims, when they may be no more beneficial than a rubber band."

How, exactly, were the bands said to work in the first place? Josh Rodarmel, co-creator of the bracelets, tried to explain the "science" behind his product by claiming that everything in nature has a "frequency," and that the Power Balance bands restore a "natural healing frequency."

Claims like this, though common in New Age and "alternative" health circles, are laughable to scientists and skeptics like Harriet Hall, a retired medical doctor and former Air Force surgeon.

Hall, who runs a Web site called SkepDoc, devoted to examining dubious medical claims, told Discovery News that Power Balance claims about body vibrations and resonance are pure nonsense. "This whole resonance and vibration business is pseudoscience emanating from the myth of the human energy field—not the kind of energy physicists measure, but some vague and unproven life energy like the acupuncturists' qi (or "chi"). Statements like "We are a frequency" and "We are a bunch of cells held together by a frequency" are completely at odds with scientific knowledge. I e-mailed the company and asked simple questions like, 'How do you measure the frequency of a rock?' They didn't answer."

So if you ask, "What's the frequency, Josh?", he's got no answer.

While the Australian manufacturer of Power Balance bands has been forced to admit its products have no scientific support, other Power Balance distributors around the world continue to insist the product is effective (though it's not clear why scientific evidence for the band's efficacy would only apply outside of Australia).

http://www.physorg.com/news/2011-01-lithium-ion-ultracapacitor-recharge-power-tools.html

Lithium-ion ultracapacitor could recharge power tools in minutes

With a hybrid energy-storage device that combines a lithium-ion battery with an ultracapacitor, power tools could be recharged in about one minute and have a lifetime of more than 20,000 charges.

Ioxus' product line of hybrid lithium-ion ultracapacitors. Image credit: Ioxus.

(PhysOrg.com) -- Although many people keep a few power tools in the garage or basement for weekend projects, the tools usually don't get used very often. Fully recharging the battery in a drill or saw can take several hours, even if the tool is only used for a few minutes. But with a hybrid energy-storage device that combines a lithium-ion battery with an ultracapacitor, power tools could be recharged in about one minute and have a lifetime of more than 20,000 charges. The downside is that the power tool could run for only about 1/15 as long as it would on a normal battery.

The new lithium-ion ultracapacitor was developed by Ioxus, a company based in Oneonta, New York. The company specializes in making ultracapacitors for hybrid-electric buses and engine start-stop systems in fuel-efficient cars.

In general, hybrid lithium-ion ultracapacitors are similar to traditional lithium-ion batteries, except that they store charge at the surface of the electrodes instead of within the electrodes. Although the concept of hybrid lithium-ion ultracapacitors has been around for 20 years, demand for alternative energy-storage devices has inspired recent improvements.

Typically, standard ultracapacitors can store only about 5% as much energy as lithium-ion batteries. Ioxus' new hybrid system can store about twice as much as standard ultracapacitors, although this is still much less than standard lithium-ion batteries.

However, the advantage of ultracapacitors is that they can capture and release energy in seconds, providing a much faster recharge time compared with lithium-ion batteries. In addition, traditional lithium-ion batteries can be recharged only a few hundred times, which is much less than the 20,000 cycles provided by the hybrid system. In other words, the hybrid lithium-ion ultracapacitors have more power than lithium-ion batteries, but less energy storage.

In the future, the hybrid lithium-ion ultracapacitor could also be used for regenerative braking in vehicles, especially if it could be scaled up to provide greater energy storage. Since vehicle braking systems need to be recharged hundreds of thousands of times, the hybrid system's cycle life will also need to be improved.

http://www.physorg.com/news/2011-01-couch-potatoes-beware-spent-tv.html

Couch potatoes beware: Too much time spent watching TV is harmful to heart health

Spending too much leisure time in front of a TV or computer screen appears to dramatically increase the risk for heart disease and premature death from any cause, perhaps regardless of how much exercise one gets, according to a new study published in the January 18, 2011, issue of the Journal of the American College of Cardiology.

Data show that compared to people who spend less than two hours each day on screen-based entertainment like watching TV, using the computer or playing video games, those who devote more than four hours to these activities are more than twice as likely to have a major cardiac event that involves hospitalization, death or both.

The study – the first to examine the association between screen time and non-fatal as well as fatal cardiovascular events – also suggests metabolic factors and inflammation may partly explain the link between prolonged sitting and the risks to heart health.

"People who spend excessive amounts of time in front of a screen - primarily watching TV - are more likely to die of any cause and suffer heart-related problems," said Emmanuel Stamatakis, PhD, MSc, Department of Epidemiology and Public Health, University College London, United Kingdom. "Our analysis suggests that two or more hours of screen time each day may place someone at greater risk for a cardiac event."

In fact, compared with those spending less than two hours a day on screen-based entertainment, there was a 48% increased risk of all-cause mortality in those spending four or more hours a day and an approximately 125% increase in risk of cardiovascular events in those spending two or more hours a day. These associations were independent of traditional risk factors such as smoking, hypertension, BMI, social class, as well as exercise.

The findings have prompted authors to advocate for public health guidelines that expressly address recreational sitting (defined as during non-work hours), especially as a majority of working age adults spend long periods being inactive while commuting or being slouched over a desk or computer.

"It is all a matter of habit. Many of us have learned to go back home, turn the TV set on and sit down for several hours – it's convenient and easy to do. But doing so is bad for the heart and our health in general," said Dr. Stamatakis. "And according to what we know so far, these health risks may not be mitigated by exercise, a finding that underscores the urgent need for public health recommendations to include guidelines for limiting recreational sitting and other sedentary behaviors, in addition to improving physical activity."

Biological mediators also appear to play a role. Data indicate that one fourth of the association between screen time and cardiovascular events was explained collectively by C-reactive protein (CRP), body mass index, and high-density lipoprotein cholesterol suggesting that inflammation and deregulation of lipids may be one pathway through which prolonged sitting increases the risk for cardiovascular events. CRP, a well-established marker of low-grade inflammation, was approximately two times higher in people spending more than four hours of screen time per day compared to those spending less than two hours a day.

Dr. Stamatakis says the next step will be to try to uncover what prolonged sitting does to the human body in the short- and long-term, whether and how exercise can mitigate these consequences, and how to alter lifestyles to reduce sitting and increase movement and exercise. The present study included 4,512 adults who were respondents of the 2003 Scottish Health Survey, a representative, household-based survey. A total of 325 all-cause deaths and 215 cardiac events occurred during an average of 4.3 years of follow up.

Measurement of "screen time" included self-reported TV/DVD watching, video gaming, as well as leisure-time computer use. Authors also included multiple measures to rule out the possibility that ill people spend more time in front of the screen as opposed to other way around. Authors excluded those who reported a previous cardiovascular event (before baseline) and those who died during the first two years of follow up just in case their underlying disease might have forced them to stay indoors and watch TV more often. Dr. Stamatakis and his team also adjusted analyses for indicators of poor health (e.g., diabetes, hypertension).

Provided by American College of Cardiology

http://www.eurekalert.org/pub_releases/2011-01/esoc-sfm010911.php

Study finds more breaks from sitting are good for waistlines and hearts

Stand up, move more, more often

It is becoming well accepted that, as well as too little exercise, too much sitting is bad for people's health. Now a new study has found that it is not just the length of time people spend sitting down that can make a difference, but also the number of breaks that they take while sitting at their desk or on their sofa. Plenty of breaks, even if they are as little as one minute, seem to be good for people's hearts and their waistlines.

The study, which is published online today (Wednesday 12 January) in the European Heart Journal [1], is the first in a large, representative, multi-ethnic population to look at the links of the total amount of time spent sitting down and breaks in sedentary time, with various indicators of risk for heart disease, metabolic diseases such as diabetes, and inflammatory processes that can play a role in atherosclerosis (blocked arteries).

It found that prolonged periods of sedentary time, even in people who also spent some time in moderate-to-vigorous exercise, were associated with worse indicators of cardio-metabolic function and inflammation, such as larger waist circumferences, lower levels of HDL ("good") cholesterol, higher levels of C-reactive protein (an important marker of inflammation) and triglycerides (blood fats).

However, the study also found that, even in people who spent a long time sitting down, the more breaks they took during this time, the smaller their waists and the lower the levels of C-reactive protein.

There were some racial and ethnic differences. The most significant was that longer sedentary time had a marked adverse effect on waist circumference for non-Hispanic whites only, but made no difference to Mexican Americans and appeared to be beneficial for non-Hispanic blacks.

Dr Genevieve Healy, a research fellow [2] at the School of Population Health, The University of Queensland, Australia, who led the study, said: "Overall, for length of sedentary time, the most clinically significant findings were for blood fats and markers of insulin resistance. For the number of breaks in sedentary time, the most significant differences were observed for waist circumference. The top 25% of people who took the most breaks had, on average, a 4.1cm smaller waist circumference than those in the lowest 25%."

Dr Healy and her colleagues analysed data from 4,757 people aged 20 and over, who took part in the US National Health and Nutrition Examination Survey between 2003 and 2006. The participants wore a small device called an accelerometer, which monitored the amount and intensity of walking or running activity. It was worn on the right hip during waking hours for seven days and it gave researchers information on sedentary time and breaks in sedentary time. Measurements were taken of waist circumference, blood pressure, cholesterol levels and C-reactive protein concentrations, and they also measured levels of triglycerides, plasma glucose and insulin in a sub-sample of participants who were fasting when attending a morning examination.

The researchers accounted statistically for socio-demographic differences between study participants, their medical histories and their lifestyles (smoking, alcohol intake, diet). The least amount of sedentary time was 1.8 hours per day, the most 21.2 hours per day; the least number of breaks over the full seven days was 99, and the most was 1,258.

Dr Healy said: "The benefits of regular participation in moderate-to-vigorous intensity exercise are well accepted scientifically and by the general public. However, the potential adverse health impact of prolonged sitting (which is something that we do on average for more than half of our day), is only just being realised. Our research highlights the importance of considering prolonged sedentary time as a distinct health risk behaviour that warrants explicit advice in future public health guidelines. In particular, the findings are likely to have implications for settings where prolonged sitting is widespread, such as in offices.

"Our research showed that even small changes, which could be as little as standing up for one minute, might help to lower this health risk. It is likely that regular breaks in prolonged sitting time could be readily incorporated into the working environment without any detrimental impact on productivity, although this still needs to be determined by further research. 'Stand up, move more, more often' could be used as a slogan to get this message across."

She said that existing occupational health and safety guidelines recommend regular changes in posture and a variety of work tasks, and that these would help to incorporate more breaks from sitting in the working day, and might lead to less sedentary time overall. Practical tips that might help to do this in an office-based workplace included:

* Standing up to take phone calls
* Walking to see a colleague rather than phoning or emailing
* Having standing meetings or encouraging regular breaks during meetings for people to stand up
* Going to a bathroom on a different level
* Centralising things such as rubbish bins and printers so that you need to walk to them
* Taking the stairs instead of the lift where possible.

Dr Healy said that the size of the differences in the various cardio-metabolic and inflammatory risk biomarkers between the top and bottom 25% of people in terms of their sedentary time was large enough to suggest that "in theory, population-wide reductions in sedentary time of between one to two hours a day could have a substantial impact on the prevention of cardiovascular disease."

She concluded: "Prolonged sedentary time is likely to increase with future technological and social innovations, and it is important to avoid prolonged periods of sitting and to move more throughout the day.

Reducing and regularly breaking up sedentary time may be an important adjunct health message, alongside the well-established recommendation for regular participation in exercise. While further evidence of a causal nature is required, less sitting time would be unlikely to do harm. It would, at the very least, contribute to increased overall levels of daily energy expenditure and could help to prevent weight gain."

[1] "Sedentary time and cardio-metabolic biomarkers in US adults: NHANES 2003-06". European Heart Journal. doi:10.1093/eurheartj/ehq451

[2] The study was supported by a National Health and Medical Research Council/National Heart Foundation of Australia postdoctoral fellowship to Dr Healy; a Victorian Health Promotion Foundation Public Health Research Fellowship to David Dunstan; and a Queensland Health Core Research Infrastructure grant and NHMRC Program Grant funding to Elisabeth Winkler and Neville Owen.

http://www.bbc.co.uk/news/health-12152500

Swine flu offers 'extraordinary super immunity'

By Michelle Roberts Health reporter, BBC News

H1N1 virus Swine flu infection boosted immunity to surprising degrees

People who recover from swine flu may be left with an extraordinary natural ability to fight off flu viruses, findings suggests. In beating a bout of H1N1 the body makes antibodies that can kill many other flu strains, a study in the Journal of Experimental Medicine shows.

Doctors hope to harness this power to make a universal flu vaccine that would protect against any type of influenza. Ultimately this could replace the "best guess" flu vaccines currently used. Such a vaccine is the "holy grail" for flu researchers. Many scientists are already testing different prototypes to put an end to the yearly race to predict coming flu strains and quickly mass produce a new vaccine each flu season.

Dr Patrick Wilson who led the latest research said the H1N1 swine flu virus that reached pandemic levels infecting an estimated 60 million people last year, had provided a unique opportunity for researchers.

"It demonstrates how to make a single vaccine that could potentially provide immunity to all influenza.

"The surprise was that such a very different influenza strain, as opposed to the most common strains, could lead us to something so widely applicable."

Extraordinary immunity

In the nine patients they studied who had caught swine flu during the pandemic, they found the infection had triggered the production of a wide range of antibodies that are only very rarely seen after seasonal flu infections or flu vaccination. Five antibodies isolated by the team could fight all the seasonal H1N1 flu strains from the last decade, the devastating "Spanish flu" strain from 1918 which killed up to 50m people, plus a potentially deadly bird flu H5N1 strain.

The researchers believe the "extraordinarily" powerful antibodies were created as the body learned how to fight the new infection with swine flu using its old memory of how to fight off other flu viruses.

Next they plan to examine the immune response of people who were vaccinated against last year's swine flu but did not get sick to see if they too have the same super immunity to flu.

Dr Sarah Gilbert is a expert in viruses at Oxford University and has been testing her own prototype universal flu vaccine. She said: "Many scientists are working to develop a vaccine that would protect against the many strains of flu virus. "This work gives us more confidence that it will be possible to generate a universal flu vaccine." But she said it would take many years for a product to go through the necessary tests and trials.

"It will take at least five years before anything like this could be widely available."

The number of deaths this winter from flu verified by the Health Protection Agency currently is 50, with 45 of these due to swine flu.

http://www.eurekalert.org/pub_releases/2011-01/jaaj-zva010611.php

Zoster vaccine associated with lower risk of shingles in older adults

Vaccination for herpes zoster, a painful rash commonly known as shingles, among a large group of older adults was associated with a reduced risk of this condition, regardless of age, race or the presence of chronic diseases, according to a study in the January 12 issue of JAMA.

"The pain of herpes zoster is often disabling and can last for months or even years, a complication termed postherpetic neuralgia. Approximately 1 million episodes of herpes zoster occur in the United States annually, but aside from age and immunosuppression, risk factors for this condition are not known," the authors write.

Although prelicensure data provided evidence that herpes zoster vaccine works in a select study population under idealized circumstances, the vaccine needs to be evaluated in field conditions to show whether benefits of the vaccine can be generalized to conditions of clinical practice, according to background information in the article. The researchers note that this is particularly important for the herpes zoster vaccine, given the medical and physiological diversity in the elderly population for whom the vaccine is indicated.

Hung Fu Tseng, Ph.D., M.P.H., of Southern California Kaiser Permanente, Pasadena, Calif., and colleagues evaluated the risk of herpes zoster after receipt of herpes zoster vaccine among individuals in general practice settings. The study included community-dwelling adults, age 60 years or older, who were members of a managed care organization. There were 75,761 members in the vaccinated cohort, who were age matched (1:3) to 227,283 unvaccinated members.

Compared with the unvaccinated cohort, individuals in the vaccinated cohort were more likely to be white, women, and to have had more outpatient visits, and a lower prevalence of chronic diseases. There were 5,434 herpes zoster cases identified in the study (6.4 cases per 1,000 persons per year among vaccinated individuals and 13.0 cases per 1,000 persons per year among unvaccinated individuals). In the fully adjusted analysis, vaccination was associated with reduced risk of herpes zoster.

The reduction in risk did not vary by age at vaccination, sex, race, or with presence of chronic diseases. Herpes zoster vaccine recipients had reduced risks of ophthalmic herpes zoster and hospitalizations coded as herpes zoster. Overall, the vaccine was associated with a 55 percent reduction in incidence of herpes zoster.

"Herpes zoster vaccine was licensed recently, which means the durability of its protection needs to be assessed in future studies. Meanwhile, however, this vaccine has the potential to annually prevent tens of thousands of cases of herpes zoster and postherpetic neuralgia nationally. To date, herpes zoster vaccine uptake has been poor due to weaknesses in the adult vaccine infrastructure and also due to serious barriers to the vaccine among clinicians and patients. Solutions to these challenges need to be found so that individuals seeking to receive herpes zoster vaccine will be able to reduce their risk of experiencing this serious condition," the authors conclude. *JAMA. 2011;305[2]:160-166. Available pre-embargo to the media at www.jamamedia.org*

http://www.eurekalert.org/pub_releases/2011-01/bmj-cpl011111.php

Common painkillers linked to increased risk of heart problems

The drugs include traditional non-steroidal anti-inflammatory drugs (NSAIDS) as well as new generation anti-inflammatory drugs, known as COX-2 inhibitors.

The researchers say that doctors and patients need to be aware that prescription of any anti-inflammatory drug needs to take cardiovascular risk into account. NSAIDs have been the cornerstone of managing pain in patients with osteoarthritis and other painful conditions. In 2004, the COX-2 inhibitor rofecoxib was withdrawn from the market after a trial found that the drug increased the risk of cardiovascular disease. Since then, there has been much debate about the cardiovascular safety of COX-2 inhibitors and traditional NSAIDs, which several studies have not been able to resolve.

So researchers in Switzerland performed a comprehensive analysis of all randomised controlled trials comparing any NSAID with other NSAIDs or placebo. They included 31 trials and 116,429 patients taking seven different drugs (naproxen, ibuprofen, diclofenac, celecoxib, etoricoxib, rofecoxib, lumiracoxib) or placebo to provide a more reliable estimate of the cardiovascular risks of these drugs than previous studies.

Overall, the number of harmful outcomes that could be compared for placebo versus treatment was low. In 29 trials there was a total of 554 heart attacks; in 26 trials there were 377 strokes, and in 28 trials there were 676 deaths. So the absolute risk of cardiovascular problems among people taking painkillers was low, but the researchers did find that, relative to placebo, the drugs carried important risks.

For instance, compared with placebo, rofecoxib and lumiracoxib were associated with twice the risk of heart attack, while ibuprofen was associated with more than three times the risk of stroke. Etoricoxib and diclofenac were associated with the highest (around four times) risk of cardiovascular death.

Naproxen appeared least harmful in terms of cardiovascular safety among the seven analysed preparations.

Although the number of cardiovascular events in the trials was low, the authors say "our study provides the best available evidence on the safety of this class of drugs." They conclude: "Although uncertainty remains, little evidence exists to suggest that any of the investigated drugs are safe in cardiovascular terms. Cardiovascular risk needs to be taken into account when prescribing any non-steroidal anti-inflammatory drug."

An accompanying editorial says these cardiovascular risks are worrying because many patients have both cardiovascular disease and musculoskeletal disease, and suggests that it is time for an evaluation of a broader range of alternatives.

http://www.nytimes.com/2011/01/11/health/11brody.html

Have a Food Allergy? It's Time to Recheck

By JANE E. BRODY

Food allergies have generated a great deal of anxiety in recent years, with some schools going so far as to ban popular staples — especially peanut butter — after appeals from worried parents.

Some airlines have quit serving peanut snacks, and more and more restaurants are offering dishes for diners concerned about gluten or dairy allergies.

There is no question that some foods, especially peanuts and shellfish, can provoke severe reactions in a small fraction of the population. But a new analysis of the best available evidence finds that many children and adults who think they have food allergies are mistaken.

According to a definitive report compiled for the National Institute of Allergy and Infectious Diseases by a 25-member panel of experts, a big part of the problem is misdiagnosis, from overreliance on two tests — a skin-prick test and a blood test for antibodies — that can produce misleading results.

The mere presence of antibodies to a particular substance in food does not mean that someone would have an allergic reaction after eating that food. in And a skin-prick test can remain positive long after an allergy is gone.

Sometimes a diagnosis is based on no test at all, solely on a patient's or parent's report of a bad reaction after a particular food was eaten. People often mistake food intolerance, like difficulty digesting the lactose in milk, for an allergy. (Allergies involve the immune system; lactose intolerance results from deficiency of an enzyme.)

Facts and Fallacies

The only test that can definitively establish a food allergy is a so-called oral challenge, in which the patient ingests the suspect food and waits for a reaction. This can be safely done only by an experienced health professional with emergency treatment at hand in case of a severe reaction.

Understandably, doctors are often reluctant to try an oral challenge. But in challenges where a suspect food is compared with a placebo and neither doctor nor patient knows which food is which, only about a third of the foods have been found to cause allergies, the panel reported.

Nonetheless, genuine food allergies seem to have risen during the last decade or two, for reasons no one knows, said Dr. Anthony S. Fauci, director of the allergy institute. The institute, a division of the National Institutes of Health, sponsored the panel's two-year effort to establish national guidelines for the definition, diagnosis and treatment of food allergies.

According to the panel's detailed and well-documented report, about one child in 20 and one adult in 25 have a food allergy, nowhere near popular estimates that up to 30 percent of Americans are afflicted.

The panel also reported that most children outgrow allergies to milk, egg, soy and wheat, but until they are properly tested they may not know it is now safe to eat the food — or, perhaps more important, to receive a vaccine prepared in eggs.

Allergies to peanuts and tree nuts are relatively rare (about half of 1 percent of the population in each case, according to the panel). But they tend to be lifelong and life-threatening, and can require extreme vigilance.

Some food allergies start in adulthood, and tend to last indefinitely as well. In particular, shellfish allergies, which can be life-threatening, occur in only 0.5 percent of children but 2.5 percent of adults.

It is not possible to predict the severity of a food allergy reaction based on past reactions. In the case of nut allergy, for example, subsequent exposures can be much worse than what a child first experienced.

There are no treatments for food allergy except to avoid the culprit food, which may require careful reading of labels and potentially embarrassing inquiries when eating away from home. Although immunotherapy has been proposed as a means of curbing an established food allergy, the panel did not recommend this outside of "highly controlled clinical settings."

Many packaged food labels now warn not only that a particular allergen is present, but also that the product was prepared where allergens like nuts, wheat or soy are present. But Mount Sinai Medical Center in Manhattan did a study of parents' label reading and found that they were surprisingly poor at identifying foods to which their children were allergic.

Symptoms of food allergies are often confusing and can be mistaken for other problems. They can affect the skin (for example, as eczema or hives), eyes, upper or lower respiratory tract, any part of the digestive tract, and the cardiovascular system. But unless a food allergy is proved, the panel does not recommend avoiding foods to control allergic dermatitis, asthma or inflammation of the esophagus.

As for vaccines, the panel said that even children with an egg allergy could safely be immunized for measles, mumps, rubella and varicella (chickenpox), but the flu vaccine should not be given.

When and When Not to Worry

The experts found little evidence that restricting a woman's diet during pregnancy and lactation was effective in preventing food allergies in her offspring. Nor did they find strong evidence that exclusive breast-feeding for four to six months can prevent allergic disease. The panel said substituting soy for cow's milk infant formula did not prevent food allergies in infants thought to be at risk because of a family history of allergy.

Moreover, there is danger in restricting children's diets for fear of allergies, even real ones: They can develop nutrient deficiencies that result in retarded growth and development. Thus, the panel recommended "nutritional counseling and regular growth monitoring for all children with food allergies."

The panel devoted the last section of its lengthy report to food-induced anaphylaxis, a potentially fatal disorder that is often recognized too late for adequate treatment. The most common food causes of anaphylaxis, the panel said, are peanuts, tree nuts, milk, eggs, fish and crustacean shellfish, and a life-threatening reaction can occur even the first time a person is exposed.

Symptoms that occur within minutes to several hours after exposure may involve lesions of the skin and mouth; difficulty breathing; a precipitous drop in blood pressure, dizziness or rapid heart rate; abdominal pain, vomiting or diarrhea; and anxiety, mental confusion, lethargy or seizures.

Anyone with a life-threatening food allergy must always have readily available two doses of self-injectable epinephrine (commonly known by the brand EpiPen), to be injected into the thigh muscle. Treatment with an antihistamine is not an effective substitute, the panel warned. Fatalities result when the use of epinephrine is delayed or the dose given is inadequate. When in doubt, treat, the panel said; then call 911. The EpiPen is a stopgap measure to buy time until life-saving care can be administered.

Parents, baby sitters, school nurses and camp counselors must have two epinephrine pens handy and know how to use them for each child at risk of anaphylaxis. The pens must be stored at 59 to 89 degrees Fahrenheit, and must be replaced annually.

http://www.physorg.com/news/2011-01-hot-booze-material-superconductor.html

Hot booze turns material into a superconductor

(PhysOrg.com) -- *A Japanese scientist who "likes alcohol very much" has discovered that soaking samples of material in hot party drinks for 24 hours turns them into superconductors at ambient temperature.*

The scientist, Dr. Yoshihiko Takano of the National Institute for Materials Science (NIMS) in Tsukuba, Japan, made the discovery after a party, soaking samples of a potential superconductor in hot alcoholic drinks before testing them next day for superconductivity. The commercial alcoholic beverages, especially wine, were much more effective than either water or pure alcohol.

Superconductors are metallic substances that allow electricity to flow through them with zero resistance below a certain temperature. Those found so far only work at very low temperatures (often as low as near absolute zero), and so finding one that works at room temperature could have important applications, such as power lines with superconducting cables, and perhaps in levitation of large objects like trains, since superconductors can repel magnetic fields. The phenomenon is still not completely understood even though superconductors have been known since their discovery in 1911 by a Dutch scientist Heike Kamerlingh Onnes.

The researchers created the samples of FeTe0.8S0.2 by sealing iron (Fe), tellurium (Te) and tellurium sulfide (TeS) powders into an evacuate quartz tube and heating the mixture at 600°C for 10 hours. This material is not normally a superconductor but can become one if exposed to oxygen or if soaked in water.

After a party for a visiting researcher Takano wondered if the drinks they were consuming would work as well as pure water. To find out, they tested the FeTe0.8S0.2 samples with beer, red and white wine, Japanese sake, Shochu (a clear distilled liquor) and whisky, and with various concentrations of ethanol and water. The samples were all heated and kept at 70°C for 24 hours.

The results were that the ethanol-water samples showed increased superconductivity that was not dependant on the ethanol concentration. The samples heated in alcoholic drinks all showed greater superconductivity, but again not dependant on the alcohol content. Red wine was the most effective. The research team calculated the superconducting volume fraction of the samples and found they ranged from 23.1% for Sochu up to 62.4% for red wine, but none of the ethanol samples were over 15%.

The authors speculate that because wine and beer oxidize easily and since oxygen induces superconductivity in the material, the beverages could be playing an important role in supplying oxygen into the sample as a catalyst. Further research is needed to confirm the exact mechanism.

More information: Superconductivity in FeTe1-xSx induced by alcohol, by Keita Deguchi, et al. arXiv:1008.0666v1 [cond-mat.supr-con] http://arxiv.org/abs/1008.0666

http://www.newscientist.com/article/dn19944-would-a-placebo-work-for-you.html

Would a placebo work for you?

*** 22:00 11 January 2011 by Jessica Hamzelou**

Could you be tricked into believing a sugar pill will ease your pain? A brain scan could reveal whether you would respond to a placebo or not.

Tor Wager at the University of Colorado, Boulder, and colleagues took another look at two studies that involved scanning the brains of people given a painful stimulus. Each consisted of two trials where volunteers were given an ineffective cream to ease the pain. In one trial they were told it was a fake, in the other an analgesic.

When comparing brain responses from each trial, the group identified several brain structures that were more or less active before and during the painful stimulus in those who experienced a placebo effect. In placebo responders, activity dropped in areas processing pain, but increased in areas involved in emotion. This suggests that, rather than blocking pain signals into the brain, the placebo is changing the interpretation of pain.

The meaning of pain

In responders, "a lot of the action happens when people are expecting pain", Wager says. "What makes a placebo responder is the ability to re-evaluate the meaning of pain before it happens."

His team created a map of relevant brain areas using information from 35 of the 47 participants. With this map they were better able to predict how much the placebo would diminish pain in the remaining participants.

The map could be useful for working out how much of a drug's effect is due to a placebo response in clinical trials and for identifying good candidates for placebo therapy.

"It's difficult for experimental drugs to prove their superiority to placebo treatment and predicting placebo responders may help to deal with this challenge," says Luana Colloca at the National Institutes of Health in Bethesda, Maryland. *Journal reference: Journal of Neuroscience, DOI: 10.1523/jneurosci.3420-10.2011*

http://www.physorg.com/news/2011-01-full-access-tamiflu-trial-independent.html

Call for full access to Tamiflu trial data to allow for independent scrutiny

Leading researchers today call for access to all clinical trial data (published and unpublished) to allow drugs to be independently assessed by the scientific community.

Tom Jefferson and colleagues from the Cochrane Group argue that the current system for assessing the safety and effectiveness of drugs, based on published trial data only, is "wholly inadequate" and "ethically dubious." They propose a new approach that would allow in-depth scrutiny of the complete set of trial data for a new drug.

Their call comes after they reviewed the evidence for the antiviral drug oseltamivir (Tamiflu), and were unable to find sufficient published data to support the conclusion that oseltamivir reduces complications in healthy adults. As a result, Roche (oseltamivir's manufacturer) publicly pledged to make full results for ten unpublished clinical trials available for scrutiny. Yet, to date, they have failed to fulfil this promise.

The Cochrane team's concern deepened after finding reports of ten serious adverse events in patients enrolled in two key manufacturer-funded trials that were not reported in journal publications arising from those trials.

Other recent cases, where the "true" effects of drugs have emerged only after all the evidence (including unpublished data) has been analysed, have further highlighted the importance of independent evaluation.

"The answer is to make the data freely available: we should accept nothing less than a full dataset," say the authors. "Before licensing a drug - and certainly before large purchase decisions are made - our governments and policy makers should ensure that all researchers can access data in sufficient detail to allow for the independent exploration and re-analysis of trials," they add.

Their proposed new approach involves compiling a complete list of drug trials (published and unpublished) and requesting full clinical study reports. It is available at

http://www.editorial-unit.cochrane.org/neuraminidase-inhibitors-influenza-hta-project

They urge researchers, the public, and the media to work together to put pressure on industry to embrace the ethical responsibility to release data in the public interest. They also call on medical journals to require submission of the most detailed report available.

They conclude: "It is time the media, the Cochrane Collaboration, and any reader interested in knowing what they are prescribing or are being prescribed increase the pressure on policy makers. If you swallow a medication, you need to know how it works - for real." *Provided by British Medical Journal*

http://www.newscientist.com/article/dn19945-foxes-zero-in-on-prey-via-earths-magnetic-field.html

Foxes zero in on prey via Earth's magnetic field

*** 00:01 12 January 2011 by Michael Marshall**

It sounds like something a guided missile would do. Foxes seem to zero in on prey using Earth's magnetic field. They are the first animal thought to use the field to judge distance rather than just direction.

Hynek Burda of the University of Duisburg-Essen in Essen, Germany, noticed that the foxes he was watching in the Czech Republic almost always jumped on their prey in a north-easterly direction. Given that cows position themselves using Earth's magnetic field, he wondered if something similar was at work.

Foxes jump high into the air before dropping onto prey. Burda's team found that when the foxes could see their prey they jumped from any direction but when prey were hidden, they almost always jumped north-east. Such attacks were successful 72 per cent of the time, compared with 18 per cent of attacks in other directions.

All observers saw the same thing, but Burda remained baffled, until he spoke to John Phillips at Virginia Tech in Blacksburg. Phillips has suggested that animals might use Earth's magnetic field to measure distance.

The pair think a fox hunts best if it can jump the same distance every time. Burda suggests that it sees a ring of "shadow" on its retina that is darkest towards magnetic north, and just like a normal shadow, always appears to be the same distance ahead. The fox moves forward until the shadow lines up with where the prey's sounds are coming from, at which point it is a set distance away.

The idea is "highly speculative but not implausible", says Wolfgang Wiltschko of the University of Frankfurt, Germany. *Journal reference: Biology Letters, DOI: 10.1098/rsbl.2010.1145*

http://www.eurekalert.org/pub_releases/2011-01/uoc--wcp011211.php

Why coffee protects against diabetes

Researchers discover molecular mechanism behind drink's prophylactic effect

Coffee, that morning elixir, may give us an early jump-start to the day, but numerous studies have shown that it also may be protective against type 2 diabetes. Yet no one has really understood why.

Now, researchers at UCLA have discovered a possible molecular mechanism behind coffee's protective effect. A protein called sex hormone–binding globulin (SHBG) regulates the biological activity of the body's sex hormones, testosterone and estrogen, which have long been thought to play a role in the development of type 2 diabetes. And coffee consumption, it turns out, increases plasma levels of SHBG.

Reporting with colleagues in the current edition of the journal Diabetes, first author Atsushi Goto, a UCLA doctoral student in epidemiology, and Dr. Simin Liu, a professor of epidemiology and medicine with joint appointments at the UCLA School of Public Health and the David Geffen School of Medicine at UCLA, show that women who drink at least four cups of coffee a day are less than half as likely to develop diabetes as non-coffee drinkers.

When the findings were adjusted for levels of SHBG, the researchers said, that protective effect disappeared.

The American Diabetes Association estimates that nearly 24 million children and adults in the U.S. — nearly 8 percent of the population — have diabetes. Type 2 diabetes is the most common form of the disease and accounts for about 90 to 95 percent of these cases.

Early studies have consistently shown that an "inverse association" exists between coffee consumption and risk for type 2 diabetes, Liu said. That is, the greater the consumption of coffee, the lesser the risk of diabetes. It was thought that coffee may improve the body's tolerance to glucose by increasing metabolism or improving its tolerance to insulin.

"But exactly how is elusive," said Liu, "although we now know that this protein, SHBG, is critical as an early target for assessing the risk and prevention of the onset of diabetes."

Earlier work by Liu and his colleagues published in the New England Journal of Medicine had identified two mutations in the gene coding for SHBG and their effect on the risk of developing type 2 diabetes; one increases risk while the other decreases it, depending on the levels of SHBG in the blood.

A large body of clinical studies has implicated the important role of sex hormones in the development of type 2 diabetes, and it's known that SHBG not only regulates the sex hormones that are biologically active but may also bind to receptors in a variety of cells, directly mediating the signaling of sex hormones.

"That genetic evidence significantly advanced the field," said Goto, "because it indicated that SHBG may indeed play a causal role in affecting risk for type 2 diabetes."

"It seems that SHBG in the blood does reflect a genetic susceptibility to developing type 2 diabetes," Liu said. "But we now further show that this protein can be influenced by dietary factors such as coffee intake in affecting diabetes risk — the lower the levels of SHBG, the greater the risk beyond any known diabetes risk factors."

For the study, the researchers identified 359 new diabetes cases matched by age and race with 359 apparently healthy controls selected from among nearly 40,000 women enrolled in the Women's Health Study, a large-scale cardiovascular trial originally designed to evaluate the benefits and risks of low-dose aspirin and vitamin E in the primary prevention of cardiovascular disease and cancer.

They found that women who drank four cups of caffeinated coffee each day had significantly higher levels of SHBG than did non-drinkers and were 56 percent less likely to develop diabetes than were non-drinkers. And those who also carried the protective copy of the SHBG gene appeared to benefit the most from coffee consumption. When the investigators controlled for blood SHBG levels, the decrease in risk associated with coffee consumption was not significant. This suggests that it is SHBG that mediates the decrease in risk of developing type 2 diabetes, Liu said.

And there's bad news for decaf lovers. "Consumption of decaffeinated coffee was not significantly associated with SHBG levels, nor diabetes risk," Goto said. "So you probably have to go for the octane!"

Other authors of the study included Brian Chen, of UCLA, and Julie Buring, JoAnn Manson and Yiqing Song, of Brigham and Women's Hospital and Harvard Medical School. Funding was provided by the National Institutes of Health. No conflicts of interest were reported by the authors.

http://www.eurekalert.org/pub_releases/2011-01/acs-ses011211.php

Scientific evidence supports effectiveness of Chinese drug for cataracts

Scientists are reporting a scientific basis for the long-standing belief that a widely used non-prescription drug in China and certain other countries can prevent and treat cataracts, a clouding of the lens of the eye that is a leading cause of vision loss worldwide.

Their study appears in Inorganic Chemistry, an ACS journal.

In the study, Tzu-Hua Wu, Fu-Yung Huang, Shih-Hsiung Wu and colleagues note that eye drops containing pirenoxine, or PRX, have been reputed as a cataract remedy for almost 60 years. Currently, the only treatment for cataracts in Western medicine is surgical replacement of the lens, the clear disc-like structure inside the eye that focuses light onto the nerve tissue in the back of the eye. Despite the wide use of pirenoxine, there have been few scientific studies on its actual effects, the scientists note.

To fill that gap, the scientists tested pirenoxine on cloudy solutions that mimic the chemical composition of the eye lens of cataract patients. The solutions contained crystallin — a common lens protein — combined with either calcium or selenite, two minerals whose increased levels appear to play key roles in the development of cataracts. Presence of PRX reduced the cloudiness of the lens solution containing calcium by 38 percent and reduced the cloudiness of the selenite solution by 11 percent. "These results may provide a rationale for using PRX as an anti-cataract agent and warrant further biological studies," the article notes.

The authors acknowledge funding from the National Science Council, Shin Kong Wu Ho-Su Memorial Hospital, and Academia Sinica (Taiwan).

ARTICLE FOR IMMEDIATE RELEASE "Ditopic Complexation of Selenite Anions or Calcium Cations by Pirenoxine: An Implication for Anti-Cataractogenesis"

http://www.eurekalert.org/pub_releases/2011-01/uoca-psm011211.php

Popular sleep medicine puts older adults at risk for falls, cognitive impairment

Adults who take one of the world's most commonly prescribed sleep medications are significantly more at risk for nighttime falls and potential injury, according to a new study by the University of Colorado at Boulder.

The study, which involved 25 healthy adults, showed 58 percent of the older adults and 27 percent of the young adults who took a hypnotic, sleep-inducing drug called zolpidem showed a significant loss of balance when awakened two hours after sleep. The findings are important because falls are the leading cause of injury in older adults, and 30 percent of adults 65 and older who fall require hospitalization each year, said CU-Boulder Associate Professor Kenneth Wright, lead study author.

To measure balance, the research team used a technique known as a "tandem walk" in which subjects place one foot in front of the other with a normal step length on a 16-foot-long, six-inch-wide beam on the floor. In 10 previous practice trials with no medication, none of the 25 participants stepped off the beam, indicating no loss of balance. All participants were provided with stabilizing assistance to prevent falls during the trials, he said.

"The balance impairments of older adults taking zolpidem were clinically significant and the cognitive impairments were more than twice as large compared to the same older adults taking placebos," said Wright, a faculty member in the integrative physiology department. "This suggests to us that sleep medication produces significant safety risks."

The new CU-Boulder study is the first to measure both the walking stability and cognition of subjects taking hypnotic sleep medicines or placebos. In addition to the balance problems caused by zolpidem, the study also showed that waking up after two hours of sleep after taking zolpidem enhances sleep inertia, or grogginess, a state that temporarily impairs working memory. The study participants were given computerized performance tests that involved adding randomly generated numbers.

A paper on the subject was published Jan. 13 in the Journal of the American Geriatric Society. Co-authors included CU-Boulder's Daniel Frey, Justus Ortega, Courtney Wiseman and Claire Farley. The study was funded primarily by the National Institutes of Health.

The effects of sleep inertia even without sleep medication has previously been shown to cause cognitive impairment, said Wright. But when the CU-Boulder study subjects took zolpidem rather than a placebo, the cognitive impairments essentially doubled. One unexpected study finding was that young people taking placebos appear to be more cognitively impacted by sleep inertia than older adults taking placebos, he said.

A 2006 study led by Wright showed that study subjects who took no sleep medicine and were awakened after eight hours of sleep were more cognitively impaired, for a short period of time, than a totally sleep deprived person.

Several billion doses of zolpidem have been prescribed worldwide, said Wright, who also directs CU-Boulder's Sleep and Chronobiology Laboratory. Zolpidem is a generic drug that is marketed under a number of different brand names, including Ambien, Zolpimist, Edluar, Hypogen, Somidem and Ivedal.

The CU-Boulder team also measured balance and cognition in older adults who took no sleep medication and were kept awake for two hours past their normal bedtime. They found that 25 percent of these older adults failed the tandem walking balance test, which is consistent with what is seen in people who have insomnia. "Just having insomnia itself increases your risk of falls, even without sleep medication," he said.

The finding that zolpidem affected older adults more than younger adults in balance tests may be explained in part by the fact that both groups were given five milligram doses on study nights. While the normal dose for older adults is five milligrams, the standard dosage for younger adults being treated for insomnia is 10 milligrams. "This is an area that needs more study," he said.

The study results showing that both hypnotic sleep medications and sleep inertia cause significant impairment have important public health implications, said Wright. In older adults, falls have caused millions of nonfatal injuries annually and more than 300,000 fatalities worldwide. "Falls can be very debilitating, especially when older people break their hips and require hospitalization, causing their quality of life to go down," said Wright.

In addition, the cognitive impairments caused by both zolpidem and sleep inertia may impact decision-making, including responding to situations like fire alarms and medical emergencies as well as caring for sick children or driving to a clinic or hospital, said Wright.

"One of the goals of this study was to understand the risk of this sleep medication and of sleep inertia on human safety and cognition and to educate adults and health care workers about potential problems," said Wright. "We are not suggesting that sleep medications should not be used, because they have their place in terms of the treatment of insomnia."

One possible solution to reducing falls of older people due to zolpidem, other sleep medications or sleep inertia would be to install bedside commodes for those who frequently wake up in the night to void themselves, said Wright. Additional research is needed on this important public health and safety topic, he said.

http://www.eurekalert.org/pub_releases/2011-01/uoz-bpc011211.php

BSE pathogens can be transmitted by air

Airborne prions are also infectious and can induce mad cow disease or Creutzfeldt-Jakob disorder.

This is the surprising conclusion of researchers at the University of Zurich, the University Hospital Zurich and the University of Tübingen. They recommend precautionary measures for scientific labs, slaughterhouses and animal feed plants.

The prion is the infectious agent that caused the epidemic of mad cow disease, also termed bovine spongiform encephalopathy (BSE), and claimed the life of over 280,000 cows in the past decades. Transmission of BSE to humans, e.g. by ingesting food derived from BSE-infected cows, causes variant Creutzfeldt-Jakob disease which is characterized by a progressive and invariably lethal break-down of brain cells.

It is known that prions can be transmitted through contaminated surgical instruments and, more rarely, through blood transfusions. The consumption of food products made from BSE-infected cows can also induce the disease that is responsible for the death of almost 300 people. However, prions are not generally considered to be airborne – in contrast to many viruses including influenza and chicken pox.

A high rate of infection

Prof. Adriano Aguzzi's team of scientists at the universities of Zurich and Tübingen and the University Hospital Zurich have now challenged the notion that airborne prions are innocuous. In a study, mice were housed in special inhalation chambers and exposed to aerosols containing prions. Unexpectedly, it was found that inhalation of prion-tainted aerosols induced disease with frightening efficiency. Just a single minute of exposure to the aerosols was sufficient to infect 100% of the mice, according to Prof. Aguzzi who published the findings in the Open-Access-Journal "PLoS Pathogens." The longer expo-sure lasted, the shorter the time of incubation in the recipient mice and the sooner clinical signs of a prion disease occurred. Prof. Aguzzi says the findings are entirely unexpected and appear to contradict the widely held view that prions are not airborne.

The prions appear to transfer from the airways and colonize the brain directly because immune sys-tem defects – known to prevent the passage of prions from the digestive tract to the brain – did not prevent infection.

Protecting humans and animals

Precautionary measures against prion infections in scientific laboratories, slaughterhouses and animal feed plants do not typically include stringent protection against aerosols. The new findings suggest that it may be

advisable to reconsider regulations in light of a possible airborne transmission of prions. Prof. Aguzzi recommends precautionary measures to minimize the risk of a prion infection in humans and animals. He does, however, emphasize that the findings stem from the production of aerosols in laboratory conditions and that Creutzfeldt-Jakob patients do not exhale prions.

http://www.eurekalert.org/pub_releases/2011-01/bmj-io011311.php

Is 'breast only' for first 6 months best?

Analysis: 6 months of exclusive breast feeding: How good is the evidence?

Current guidance advising mothers in the UK to exclusively breast feed for the first six months of their baby's life is being questioned by child health experts on bmj.com today. The authors, led by Dr Mary Fewtrell, a consultant paediatrician at the UCL Institute of Child Health in London, have reviewed the evidence behind the current guidance and say the time is right to reappraise this recommendation.

The researchers stress that while they fully back exclusive breast feeding early in life, they are concerned that exclusively doing so for six months and not introducing other foods may not always be in the child's best interests.

In 2001 the World Health Organisation (WHO) made its global recommendation that infants should be exclusively breast fed for the first six months. Many western countries did not follow this recommendation but in 2003 the UK health minister announced that the UK would comply.

Fewtrell and colleagues support six months exclusive breast feeding in less developed countries where access to clean water and safe weaning foods is limited and there is a high risk of infant death and illness. However they have reservations about whether the WHO's guidance about when to introduce other foods is right for the UK.

The WHO's recommendation that mothers should breast feed exclusively for six months is largely based on a systematic review undertaken in 2000 that considered existing research in this area, say the authors. This review concluded that exclusively breast fed babies have fewer infections and that the babies experience no growth problems.

Dr Fewtrell argues that the evidence that breast milk alone provides sufficient nutrition for six months is questionable. She says there is a higher risk of iron deficiency anaemia if babies are exclusively breast fed and that there could also be a higher incidence of celiac disease and food allergies if children are not introduced to certain solid foods before six months.

The authors also fear that prolonged exclusive breast feeding may reduce the window for introducing new tastes, particularly bitter taste which may be important in the later acceptance of green leafy vegetables. This could encourage unhealthy eating in later life and lead to obesity, they say.

Fewtrell and colleagues conclude that it is time to review the UK's guidance in the light of the evidence that has built up on this issue over the last ten years.

http://www.eurekalert.org/pub_releases/2011-01/uoc-gct011011.php

GM chickens that don't transmit bird flu developed

Breakthrough could prevent future bird flu epidemics

Chickens genetically modified to prevent them spreading bird flu have been produced by researchers at the Universities of Cambridge and Edinburgh. The study, funded by the Biotechnology and Biological Sciences Research Council (BBSRC), is to be published in the Friday, 14 January issue of the journal Science.

The scientists have successfully developed genetically modified (transgenic) chickens that do not transmit avian influenza virus to other chickens with which they are in contact. This genetic modification has the potential to stop bird flu outbreaks spreading within poultry flocks. This would not only protect the health of domestic poultry but could also reduce the risk of bird flu epidemics leading to new flu virus epidemics in the human population.

Dr Laurence Tiley, Senior Lecturer in Molecular Virology from the University of Cambridge, Department of Veterinary Medicine, said: "Chickens are potential bridging hosts that can enable new strains of flu to be transmitted to humans. Preventing virus transmission in chickens should reduce the economic impact of the disease and reduce the risk posed to people exposed to the infected birds. The genetic modification we describe is a significant first step along the path to developing chickens that are completely resistant to avian flu. These particular birds are only intended for research purposes, not for consumption."

Professor Helen Sang, from The Roslin Institute at the University of Edinburgh, said, "The results achieved in this study are very encouraging. Using genetic modification to introduce genetic changes that cannot be achieved by animal breeding demonstrates the potential of GM to improve animal welfare in the poultry industry. This work could also form the basis for improving economic and food security in many regions of the world where bird flu is a significant problem."

To produce these chickens, the Cambridge and Edinburgh scientists introduced a new gene that manufactures a small "decoy" molecule that mimics an important control element of the bird flu virus. The replication machinery of the virus is tricked into recognising the decoy molecule instead of the viral genome and this interferes with the replication cycle of the virus.

When the transgenic chickens were infected with avian flu, they became sick but did not transmit the infection on to other chickens kept in the same pen with them. This was the case even if the other chickens were normal (non-transgenic) birds.

Dr Tiley continued, "The decoy mimics an essential part of the flu virus genome that is identical for all strains of influenza A. We expect the decoy to work against all strains of avian influenza and that the virus will find it difficult to evolve to escape the effects of the decoy. This is quite different from conventional flu vaccines, which need to be updated in the face of virus evolution as they tend only to protect against closely matching strains of virus and do not always prevent spread within a flock."

Professor Douglas Kell, BBSRC Chief Executive, said: "Infectious diseases of livestock represent a significant threat to global food security and the potential of pathogens, such as bird flu, to jump to humans and become pandemic has been identified by the Government as a top level national security risk. The BBSRC funds world-class research to help to protect the UK from such eventualities and the present approach provides a very exciting example of novel approaches to producing disease-resistant poultry."

1. The paper 'Suppression of avian influenza transmission in genetically modified chickens' will be published in the 14 December 2011 edition of Science.

3. BBSRC is the UK funding agency for research in the life sciences and the largest single public funder of agriculture and food-related research.

Sponsored by Government, in 2010/11 BBSRC is investing around £470 million in a wide range of research that makes a significant contribution to the quality of life in the UK and beyond and supports a number of important industrial stakeholders, including the agriculture, food, chemical, healthcare and pharmaceutical sectors.

http://www.eurekalert.org/pub_releases/2011-01/uops-mvp011411.php

Measles virus plays role in Paget's disease of bone, Pitt-led team says

PITTSBURGH, Jan. 14 – *A gene from the measles virus plays a key role in the development of Paget's disease of bone, according to a team of researchers led by the University of Pittsburgh School of Medicine.*

Their findings, recently published in Cell Metabolism, confirm a long-held speculation that the childhood infection is an environmental trigger for the disease and reveal how the viral gene contributes to the development of its characteristic bone lesions.

"Our earlier work showed that bone cells called osteoclasts in about 70 percent of these patients contain a certain measles virus protein," noted senior investigator, G. David Roodman, M.D., Ph.D., professor and vice chair for research, Department of Medicine. "Also, when we engineered normal osteoclasts in mice to contain, or express, the measles protein, pagetic bone lesions formed."

Osteoclast abnormalities lead to imbalance in the normal processes of bone dissolution and rebuilding. According to the National Institute of Arthritis and Musculoskeletal and Skin Diseases, an estimated 1 million Americans have Paget's disease (PD) of bone. Bones are enlarged but fragile, leading to pain and a greater likelihood of fracture. Arthritis, hearing loss and kidney stones can occur.

In the new study, Dr. Roodman's team sought to understand the roles of mutations in a gene called p62, which is common among PD patients, and measles virus nucleocapsid protein (MVNP) by examining the marrow of affected and unaffected bones of 12 PD patients and of eight people without PD. They also bred mice with the p62 mutation and MVNP.

The team found that marrow from eight of the 12 PD patients expressed MVNP; three patients expressed the protein in both affected and unaffected bone sites, and four patients did not make it at either type of site. Osteoclast precursor cells from PD patients who made MVNP formed pagetic osteoclasts in test tube experiments and displayed other typical PD responses. Osteoclasts appeared normal, though, when the precursor cells came from PD patients who didn't make MVNP.

"It's not clear why this would happen," Dr. Roodman said. "It could be that other viruses or genes are triggering PD in these patients."

Mice with a p62 gene mutation and MVNP developed dramatic bone lesions. Other tests indicate that the presence of MVNP increases production of the cell-signaling protein interleukin-6, which in turn leads to osteoclast changes that are seen in PD.

The prevalence of Paget's disease has dropped during the past 25 years, Dr. Roodman said. That could reflect the impact of measles vaccination or that another environmental factor involved in PD has changed.

Co-authors include lead author Noriyoshi Kurihara, D.D.S., Ph.D., and others from the University of Pittsburgh School of Medicine, as well as researchers from Teijin Bio-Medical Research, Tokyo, Japan; Laval University, Quebec City, Que.; Helen Hayes Hospital, West Haverstraw, N.Y.; Columbia University, New York; and Virginia Commonwealth University, Richmond, Va.

The study was funded by the National Institutes of Health and the Paget's Foundation.

http://www.physorg.com/news/2011-01-material-superconductor.html

Light touch transforms material into a superconductor

(PhysOrg.com) -- ***A non-superconducting material has been transformed into a superconductor using light, Oxford University researchers report.***

One hundred years after superconductivity was first observed in 1911, the team from Oxford, Germany and Japan observed conclusive signatures of superconductivity after hitting a non-superconductor with a strong burst of laser light.

"We have used light to turn a normal insulator into a superconductor," says Professor Andrea Cavalleri of the Department of Physics at Oxford University and the Max Planck Department for Structural Dynamics, Hamburg. "That's already exciting in terms of what it tells us about this class of materials. But the question now is can we take a material to a much higher temperature and make it a superconductor?"

The material the researchers used is closely related to high-temperature copper oxide superconductors, but the arrangement of electrons and atoms normally act to frustrate any electronic current.

In the journal Science, they describe how a strong infrared laser pulse was used to perturb the positions of some of the atoms in the material. The compound, held at a temperature just 20 degrees above absolute zero, almost instantaneously became a superconductor for a fraction of a second, before relaxing back to its normal state.

Superconductivity describes the phenomenon where an electric current is able to travel through a material without any resistance – the material is a perfect electrical conductor without any energy loss.

High-temperature superconductors can be found among a class of materials made up of layers of copper oxide, and typically superconduct up to a temperature of around –170°C. They are complex materials where the right interplay of the atoms and electrons is thought to "line up" the electrons in a state where they collectively move through the material with no resistance.

"We have shown that the non-superconducting state and the superconducting one are not that different in these materials, in that it takes only a millionth of a millionth of a second to make the electrons "synch up" and superconduct," says Professor Cavalleri. "This must mean that they were essentially already synched in the non-superconductor, but something was preventing them from sliding around with zero resistance. The precisely tuned laser light removes the frustration, unlocking the superconductivity."

The advance immediately offers a new way to probe with great control how superconductivity arises in this class of materials, a puzzle ever since high-temperature superconductors were first discovered in 1986.

But the researchers are hopeful it could also offer a new route to obtaining superconductivity at higher temperatures. If superconductors that work at room temperature could be achieved, it would open up many more technological applications.

"There is a school of thought that it should be possible to achieve superconductivity at much higher temperatures, but that some competing type of order in the material gets in the way," says Professor Cavalleri. "We should be able to explore this idea and see if we can disrupt the competing order to reveal superconductivity at higher temperatures. It's certainly worth trying!" ***Provided by Oxford University***

http://www.sciencenews.org/view/generic/id/68657/title/When_good_cholesterol_is_even_better

When good cholesterol is even better

HDL's efficiency, not just quantity, appears important for heart health

By Tina Hesman Saey

How much good cholesterol a person has is not as important as how well that good cholesterol works to stop heart disease, a new study suggests. High-density lipoprotein — also known as HDL, or "good" cholesterol — is healthy for the heart, previous studies have indicated. People with high blood levels of the molecule tend to have lower risk of developing heart disease than people with low levels.

But a new study suggests that the amount of good cholesterol in the blood may not be the most important factor in protecting against clogged arteries and cardiovascular disease. The study, published January 13 in the New England Journal of Medicine, shows that HDL's efficiency at removing fats from arteries is a better predictor of who will develop heart disease than is the level of good cholesterol in the blood.

The results "suggest that just measuring HDL levels isn't enough to figure out what's going on," says Jay Heinecke, an endocrinologist at the University of Washington in Seattle, who wrote an editorial comment on the research in the same issue of the journal. "It opens up the idea that there's a lot we don't know about HDL."

In the study, some people's good cholesterol was more efficient at relieving the white blood cells of a cholesterol burden than other people's, found researchers led by Daniel Rader at the University of Pennsylvania School of Medicine in Philadelphia. Healthy people with this trait, known technically as a higher cholesterol efflux capacity, had less thickening of their carotid arteries than did people with less efficient cholesterol-clearing HDL. And, in a separate group of people, HDL functioning was a better indicator than HDL levels of whether the person had heart disease, the team found.

Doctors won't be able to test their patients' HDL efficiency any time soon. "We don't yet have an assay or a test that can be used in a clinical setting," says Rader. But the work does shed light on some important questions about how good cholesterol works.

"It says that the good cholesterol is more complicated than the bad cholesterol story," says Christopher Cannon, a cardiologist at Brigham and Women's Hospital in Boston. Bad cholesterol can build up in arteries, thickening the vessels and narrowing the space blood can squeeze through, so reducing artery damage is as straightforward as lowering the amount of bad cholesterol in the blood. "But good cholesterol actually has to do something to pull bad cholesterol out of the arteries" and send it to the liver for disposal, Cannon says. Exactly how the molecule accomplishes that task efficiently remains to be seen, and is next on the list for Rader and his colleagues to study.

"Now they have to put themselves to work," says Valentin Fuster, director of the Mount Sinai Heart center in New York City, ticking off a list of research questions raised by the finding. Measurements of thickening of the carotid artery, which feeds oxygen-rich blood to the head and neck, aren't good indicators of what is happening to arteries feeding the heart, he notes. While the study has value, Fuster would like to see more work showing how HDL efficiency affects arterial disease and how cholesterol-clearing capacity relates to other heart disease risk factors, such as age.

http://news.discovery.com/earth/megastorm-californias-other-big-one.html

Megastorm: California's Other "Big One"

By John D. Cox | Fri Jan 14, 2011 01:01 PM ET

California is in the path of a winter rainfall phenomenon that one of these days could swamp the Golden State from the northern redwoods to the southern beaches, a trillion-dollar storm, a deluge more ruinous than a major earthquake, the U.S Geological Survey warned this week.

The agency unveiled the ***"ARkstorm Scenario,"*** an extensive study by 117 scientists, engineers and other experts of meteorological circumstances that could bring about such a natural disaster and the economic and social consequences that could ensue.

Just in the last 15 years, since microwave technology aboard satellites produced images of water vapor in the atmosphere, scientists have come to realize that most major winter rainstorms over California, and virtually all flooding episodes, are the result of the unloading of airborne streams of tropical moisture that have come to be called "Atmospheric Rivers." (Hence the name, ARk - Atmospheric Rivers 1,000.) The scenario envisions nearly a month of uninterrupted rainfall over northern and southern California.

"The hypothetical storm depicted here would strike the U.S. West Coast and be similar to the intense California winter storms of 1861 and 1862 that left the central valley of California impassible," the authors said. "The storm is estimated to produce precipitation that in many places exceeds levels only experienced on average once every 500 to 1,000 years."

In addition to property and "business interruption" losses of anywhere from $725 billion to $1 trillion, the team estimated that emergency managers would be faced with the task of evacuating 1.5 million people during the storm and its aftermath. "The numbers that have been presented here are shocking, no doubt about it," observed co-author Laurie Johnson, a private planning specialist who worked on Katrina Hurricane recovery. Such a storm could pose "a fiscal crisis that will cascade through every level of government."

The report was presented at an "ARkstorm Summit," a two-day conference in Sacramento designed to alert government emergency managers and other state and local "lifeline" officials to the potential for such a weather disaster and how flood control and other measures could help alleviate its worst impacts.

VIDEO: A computer model simulates the enormous flow of water vapor from the topics that could result in a catastrophic winter flood in California. SOURCE; U.S. Geological Survey

http://news.nationalgeographic.com/news/2011/01/110114-galaxy-x-space-dark-matter-dwarf-satellite-science-chakrabarti/

Dark-Matter Galaxy Detected: Hidden Dwarf Lurks Nearby?

Signs point to an invisible "Galaxy X" just outside our own.

Richard A. Lovett in Seattle, Washington for National Geographic News

An entire galaxy may be lurking, unseen, just outside our own, scientists announced Thursday.

The invisibility of "Galaxy X"—as the purported body has been dubbed—may be due less to its apparent status as a dwarf galaxy than to its murky location and its overwhelming amount of dark matter, astronomer Sukanya Chakrabarti speculates.

Detectable only by the effects of its gravitational pull, dark matter is an invisible material that scientists think makes up more than 80 percent of the mass in the universe. (See "Dark Matter Detected for First Time.")

Chakrabarti, of the University of California, Berkeley, devised a technique similar to that used 160 years ago to predict the existence of Neptune, which was given away by the wobbles its gravity induced in Uranus's orbit.

Based on gravitational perturbations of gases on the fringes of our Milky Way galaxy, Chakrabarti came to her conclusion that there's a heretofore unknown dwarf galaxy about 260,000 light-years away.

With an estimated mass equal to only one percent the mass of the Milky Way, Galaxy X is still the third largest of the Milky Way's satellite galaxies, Chakrabarti predicts. The two Magellanic are each about ten times larger.

If it exists, Galaxy X isn't likely to be composed entirely of dark matter.

It should also have a sprinkling of dim stars, Chakrabarti said. "These should provide enough light for astronomers to see it, now that they know where to look," she said.

The reason the dark matter galaxy hasn't yet been seen, she added, is because it lies in the same plane as the Milky Way disc. Clouds of gas and dust stand between us and Galaxy X, confounding telescopes.

Galaxy X Addresses Fundamental Problem

If Galaxy X's existence is confirmed, it would be a major step in verifying our understanding of how the universe condensed from primordial matter and energy after the big bang, Chakrabarti said.

Current theory correctly predicts the distribution of distant galaxies, she said. But it also predicts hundreds of dwarf galaxies around the Milky Way, and to date only a few dozen have been found.

This "missing satellite problem" she said, "is a fundamental problem in cosmology."

More Dark Galaxies Out There?

Galaxy X could soon lead to Galaxies Y and Z, according to Chakrabarti.

"This is basically a new method to render dark galaxies visible," she said, adding that her technique should be able to detect dim dwarf galaxies as small as a thousandth the mass of the Milky Way.

The new finding is a useful contribution to projects aiming to map the distribution of dark matter on the far edges of the universe, according to David Pooley, a Texas-based dark matter astronomer with Eureka Scientific, a private corporation that helps scientists secure research funding.

"All of these dark matter studies are really starting to map out the distribution of dark matter," said Pooley, who was not part of Chakrabarti's team. "Any information we get is extremely valuable."

Galaxy X: The Search Begins

Now that astronomers know where to look for Galaxy X, they should be able to find it, especially if they conduct the search in dust-penetrating infrared light, Chakrabarti said. "Say you're looking for a car with very dim headlights, in the fog," she said. "If you know approximately where to look, you would have a better chance of finding it." Chakrabarti hopes to do some looking herself within the next few months and is seeking to secure time at a large infrared telescope.

Even if Galaxy X isn't confirmed, she said, her findings will still shed new light on a shady subject.

The absence of X would mean there's some other oddity out there throwing off the calculations—perhaps an unexpected distribution pattern of the halo of dark matter thought to surround the Milky Way.

"We still stand to learn something very fundamental," she said.

The Galaxy X study is pending in the Astrophysical Journal.

http://www.bbc.co.uk/news/business-12196371

Herbal remedies face licence rule

By Nigel Cassidy Business reporter

Hundreds of traditional and imported remedies on the shelves of health food shops and herbalists are set to be banned under new licensing rules.

The EU directive aims to protect users from any damaging side-effects that can arise from taking unsuitable medicines. Only high quality, long-established and scientifically safe herbal medicines will be sold over the counter.

Some traders who sell products imported from outside the EU say their business will be hit.

Popular

Herbal medicines - with names such as Cascara Bark and Horny Goat Weed - have become popular.

But from the first of May an EU directive will be enforced, under which all such products must be licensed, following fears that some products could cause harm. Producers and independent health store owners say the directive, passed in 2004, is draconian and skewed in favour of the largest European manufacturers.

Selwyn Soe runs The Herbal Factory, a contract manufacturer of herbal remedies in Croydon, south London. He believes smaller firms like his own will be squeezed out altogether.

"Unfortunately it looks as if we will have to close down because of this legislation," he said.

"The problem for us is that although we would have to pay many thousands of pounds for a licence to keep making each product, unlike a drug company we would not have a licence to make that product exclusively. It just will not be worth paying out the money."

Vanish

The Maple Leaf Pharmacy in Twickenham, west London, specialises in alternative and holistic medicine alongside its conventional chemist business. Owner Galen Rosenberg estimates that about 20% of the health products sold in his pharmacy will simply vanish off the shelves. In some health food shops a far larger percentage of existing lines are likely to be outlawed.

Mr Rosenberg said he welcomed improved labelling, indicating side-effects, but said the rest of the directive was over the top. "For instance, we have something which we recommend for hot flushes during menopause. The results have been excellent, but from April I will not be able to order these products in, because the producing company is not large and will not be able to afford the hundreds of thousands of pounds needed to invest for the new regulations," he said.

"The new rules are very much in favour of large companies. It is the loss of freedom of choice which worries me. We also expect massive price increases because of the cost of compliance."

Regulation

However, the regulator of all these pills and potions says the aim is to protect consumers, not to pick off small suppliers.

Richard Woodfield, of the Medicines and Healthcare Products Regulatory Agency, also rejects any suggestions that the legislation is draconian. "What regulation does is to ensure products meet assured standards. Although the standards are challenging, they are achievable and manageable," he said. "We already have 24 different companies regulating under the scheme and they are certainly not all large companies."

Yet a leading medicines specialist says he fears the consumer may not be much wiser come May this year.

Professor David Colquhoun, professor of pharmacology at University College London, said the changes were of limited value because the rules did not require makers to show any evidence of whether the newly licensed products were effective.

There are fears that people determined to keep taking their favourite herbs may go online and choose to buy them from merchants who may be careless about quality or potency.

The EU insists that in future, only high quality, long established and scientifically safe herbal medicines can be sold over the counter. But the label still will not be able to tell customers if they can be shown to work.

http://www.physorg.com/news/2011-01-scientists-aim-mammoth-life.html

Scientists aim to bring mammoth back to life

Mammoths, which went extinct about 10,000 years ago, may once again walk the Earth.

A team of researchers will attempt to resurrect the species using cloning technologies after obtaining tissue this summer from the carcass of a mammoth preserved in a Russian mammoth research laboratory. It has already established a technique to extract DNA from frozen cells.

"Preparations to realize this goal have been made," said Prof. Akira Iritani, leader of the team and a professor emeritus of Kyoto University.

Under the plan, the nuclei of mammoth cells will be inserted into an elephant's egg cells from which the nuclei have been removed to create an embryo containing mammoth genes. The embryo will then be inserted into an elephant's womb in the hope that the animal will give birth to a baby mammoth.

Researchers from Kinki University's Graduate School of Biology-Oriented Science and Technology began the study in 1997. On three occasions, the team obtained mammoth skin and muscle tissue excavated in good condition from the permafrost in Siberia. However, most nuclei in the cells were damaged by ice crystals and were unusable. The plan to clone a mammoth was abandoned.

In 2008, Dr. Teruhiko Wakayama of Kobe's Riken Center for Developmental Biology succeeded in cloning a mouse from the cells of mouse that had been kept in deep-freeze for 16 years. The achievement was the first

in the world. Based on Wakayama's techniques, Iritani's team devised a technique to extract the nuclei of eggs--only 2 percent to 3 percent are in good condition--without damaging them.

Last spring, the team invited Minoru Miyashita, a professor of Kinki University who was once head of Osaka's Tennoji Zoo, to participate in the project.

Miyashita asked zoos across the nation to donate elephant egg cells when their female elephants died.

The team also invited the head of the Russian mammoth research laboratory and two U.S. African elephant researchers as guest professors to the university. The research became a joint effort by Japan, Russia and the United States.

If a cloned mammoth embryo can be created, Miyashita and the U.S. researchers, who are experts in animal in vitro fertilization, will be responsible for transplanting the embryo into an African elephant.

The team said if everything goes as planned, a mammoth will be born in five to six years.

"If a cloned embryo can be created, we need to discuss, before transplanting it into the womb, how to breed [the mammoth] and whether to display it to the public," Iritani said. "After the mammoth is born, we'll examine its ecology and genes to study why the species became extinct and other factors."

http://www.eurekalert.org/pub_releases/2011-01/bc-bbb011411.php

Big breakfast bunkum

Does eating a big breakfast help weight loss or is it better to skip breakfast altogether?

Available information is confusing but new research published in BioMed Central's open access journal Nutrition Journal clears a path through these apparently contradictory reports.

Dr Volker Schusdziarra, from the Else-Kröner-Fresenius Center of Nutritional Medicine, conducted a study on over 300 people who were asked to keep a journal of what they usually ate. Within the group sometimes people ate a big breakfast, sometimes small, and sometimes skipped it all together.

Schusdziarra said that "the results of the study showed that people ate the same at lunch and dinner, regardless of what they had for breakfast", this means that a big breakfast (on average 400kcal greater than a small breakfast) resulted in a total increase in calories eaten over the day of about 400kcal. The only difference seen was the skipping of a mid morning snack when someone ate a really big breakfast, however this was not enough to offset the extra calories they had already eaten.

The group addressed previous research, which suggests that eating a big breakfast reduces total calorie intake over the day, and showed that this data is misleading. This earlier research only looked at the ratio of breakfast calories to daily calories and in Schusdziarra's study this ratio seems to be most affected by people eating less during the day. In other words their breakfast was proportionally, but not absolutely, bigger. So it seems that there is no magic and that, unfortunately, in the fight for weight-loss, eating a large breakfast must be counteracted by eating substantially less during the rest of the day. In order to lose weight sensibly NHS guidelines suggest restricting calorie intake, cutting down on saturated fat and sugar, and eating 5-a-day fruit and veg.

Notes to Editors *1. Impact of breakfast on daily energy intake – an analysis of absolute versus relative breakfast calories Volker Schusdziarra, Margit Hausmann, Claudia Wittke, Johanna Mittermeier, Marietta Kellner, Aline Naumann, Stefan Wagenpfeil, Johannes Erdmann*