

<http://www.scientificamerican.com/article.cfm?id=demonic-device-converts-inform>

Demonic device converts information to energy
Experiment inspired by a paradox tempts a bead uphill.

By Zeeya Merali

The laws of physics say that you can't get energy for nothing -- worse still, you will always get out of a system less energy than you put in. But a nanoscale experiment inspired by a nineteenth-century paradox that seemed to break those laws now shows that you can generate energy from information.

Masaki Sano, a physicist at the University of Tokyo, and his colleagues have demonstrated that a bead can be coaxed up a 'spiral staircase' without any energy being directly transferred to the bead to push it upwards. Instead, it is persuaded along its route by a series of judiciously timed decisions to change the height of the 'steps' around it, based on information about the bead's position. In this sense, "information is being converted to energy", says Sano. The work is published by Nature Physics today¹.

The team's set-up was inspired by a nineteenth-century thought experiment proposed by Scottish physicist James Clerk Maxwell, which -- controversially, at the time -- suggested that information could be converted into energy. In the thought experiment, a demon guards a door between two rooms, each filled with gas molecules. The demon allows only fast-moving gas particles to pass out of the room on the left and into the room on the right, and only slow-moving particles to pass in the opposite direction.

As a result, the room on the right gradually gets warmer as the average speed of particles in that room increases, and the room on the left gets colder. The demon thus creates a difference in temperature without ever imparting any energy directly to the gas molecules -- simply by knowing information about their speeds. This seems to violate the second law of thermodynamics, which states that you cannot make a system more ordered without any energy input.

A paradox put into practice

To create a real-life version of the demon experiment, Sano and his colleagues placed an elongated nanoscale polystyrene bead, which could rotate either clockwise or anticlockwise, into a bath of buffer solution. The team applied a varying voltage around the bead, making it progressively harder for the bead to rotate a full 360 degrees in the anticlockwise direction. This effectively created a "spiral staircase" that was harder to "climb up" in the anticlockwise direction than to "fall down" in the clockwise direction, says Sano.

When left alone, the bead was randomly jostled by the surrounding molecules, sometimes being given enough of a push to turn anticlockwise against the voltage -- or jump up the stairs -- but more often turning clockwise -- or going "downstairs". But then the team introduced their version of Maxwell's demon.

They watched the motion of the bead, and when it randomly turned anticlockwise they quickly adjusted the voltage -- the equivalent of Maxwell's demon slamming the door shut on a gas molecule -- making it tougher for the bead to turn back clockwise. The bead is thus encouraged to keep climbing "upstairs", without any energy being directly imparted to the bead, says Sano.

The experiment does not actually violate the second law of thermodynamics, because in the system as a whole, energy must be consumed by the equipment -- and the experimenters -- to monitor the bead and switch the voltage as needed. But it does show that information can be used as a medium to transfer energy, says Sano. The bead is driven as a mini-rotor, with a information-to-energy conversion efficiency of 28%.

"This is a beautiful experimental demonstration that information has a thermodynamic content," says Christopher Jarzynski, a statistical chemist at the University of Maryland in College Park. In 1997, Jarzynski formulated an equation to define the amount of energy that could theoretically be converted from a unit of information²; the work by Sano and his team has now confirmed this equation. "This tells us something new about how the laws of thermodynamics work on the microscopic scale," says Jarzynski.

Vlatko Vedral, a quantum physicist at the University of Oxford, UK, says that it will be interesting to see whether the technique can be used to drive nanomotors and artificial molecular machines. "I would also be excited to see whether something like this is already at work in nature," he says. "After all, you could say that all living systems are 'Maxwell's demons', trying to defy the tendency for order to turn back into randomness."

<http://www.bbc.co.uk/news/science-environment-11756858>

Pterosaur reptile used "pole vault" trick for take-off

A new study claims that the ancient winged reptiles known as pterosaurs used a "pole-vaulting" action to take to the air.

They say the creatures took off using all four of their limbs. The reptiles vaulted over their wings, pushing off first with their hind limbs and then thrusting themselves upwards with their powerful arm muscles - not dissimilar to some modern bats.

The research is published in the open-access journal Plos One.

Pterosaurs lived at the same time as the dinosaurs, but belonged to a different group of reptiles. They existed from the Triassic Period until the end of the Cretaceous - about 220 million years ago to 65 million years ago.

In their study, Dr Mark Witton at Portsmouth University, UK, and Dr Michael Habib of Chatham University, Pennsylvania, US, reappraised giant pterosaur fossils. Their findings challenge other claims that the giant pterosaurs - such as Pteranodon and the largest azhdarchids - were not capable of flying.



Animation of the pterosaur's take-off - courtesy of Julia Molnar, Genus Studios

'Too heavy'

Researchers have previously suggested that these creatures were too heavy to have taken to the skies.

There have also been doubts that the ancient reptiles could have taken off using the same action as birds.

"Most birds take off either by running to pick up speed and jumping into the air before flapping wildly, or if they're small enough, they may simply launch themselves into the air from a standstill," said Dr Witton.

"Previous theories suggested that giant pterosaurs were too big and heavy to perform either of these manoeuvres."

He added: "These creatures were not birds; they were flying reptiles with a distinctly different skeletal structure, wing proportions and muscle mass. They would have achieved flight in a completely different way to birds and would have had a lower angle of take off and initial flight trajectory."

Muscle bulk

The authors of the latest study suggest that, with up to 50kg of forelimb muscle, the creatures could easily have launched themselves into the air despite their massive size and weight.

Dr Habib explained: "Instead of taking off with their legs alone, like birds, pterosaurs probably took off using all four of their limbs.

"By using their arms as the main engines for launching instead of their legs, they use the flight muscles - the strongest in their bodies - to take off and that gives them potential to launch much greater weight into the air," he explained.

"When they were far enough off the ground, they could start flapping their wings before finding a thermal or another area of uplift to gain some altitude and glide off to wherever they wanted to go," he told BBC News.

The largest pterosaurs may have had wingspans up to 13m and weighed up to 544kg.

But the authors' reappraisal of pterosaur fossils suggests these numbers may have been overestimated. They argue that the biggest creatures may have had 10-11m wingspans and weighed between 200 and 250 kg.

<http://www.nytimes.com/2010/11/14/magazine/14fob-consumed-t.html>

Walgreens Tackles 'Food Deserts'

By ROB WALKER

Among students of the contemporary metropolis, "food deserts" have become a widely known problem. The term is generally used to describe urban neighborhoods where there are few grocers selling fresh produce, but a cornucopia of fast-food places and convenience stores selling salty snacks (though, strictly speaking, the term can be applied to rural or suburban areas, too).

Often the problem afflicts low-income areas abandoned or shunned by food businesses that focus on better-off consumers; the residents of food deserts, apparently, are not providing enough profit to be offered more healthful grub. These are places where the market for nutritious sustenance has essentially failed.

Perhaps the marketplace can reverse its own failure, but a little prodding from other entities may be required. One example emerged this summer in Chicago when Walgreens, the drugstore chain founded in that city more than 100 years ago, started selling an expanded selection of food, including fresh fruits and vegetables, at 10 locations selected because they were in food deserts. The experiment in creating these "food oases" is intriguing because it involves a well-known retail brand not typically associated with groceries — and, really, because it involves a well-known retail brand at all.

Chicago was the focus of a 2006 study by the Mari Gallagher Research and Consulting Group (commissioned by LaSalle Bank) that helped popularize the phrase "food desert" by linking it to block-by-block grocery-access data and made forceful arguments about the impact the lack of options had on public health. While the same issues exist in many places (and Gallagher has since assessed locales like Detroit and Birmingham, Ala.), it seems likely that the prominent association between Chicago and the food-desert problem

played some role in motivating city politicians; the Walgreens foray into groceries followed an appeal from Mayor Richard Daley's office.

A drugstore might not seem the obvious venue for solving a grocery-store problem, but Walgreens offered something useful: ubiquity. "That's the exciting thing about Walgreens, they're in so many places," Gallagher says. (It was during her research on Detroit that she was struck by the fact that pharmacies were practically the only mainstream chain presence, aside from fast food, in many neighborhoods.) Thus the pharmacy chain did not have to open new stores in food deserts, because it was already operating in plenty of them, and could use Gallagher's data to pick locations for its experiment. Still, refitting the stores to offer 750 or so new products, including whole new categories, without expanding their actual size was a big undertaking. (About 20 to 25 percent of the square footage in each participating store is now given over to food.) And Walgreens had to line up new suppliers and adjust to the risks of selling things like lettuce and bananas that can go bad on the shelf if not bought quickly, says Jim Jensen, the chain's divisional merchandise manager for consumables.

Then again, if you're a big retailer looking to explore a new category, there are advantages to knowing in advance that the market isn't exactly saturated. Walgreens is offering few specifics about how the test run is going. (The company put me in touch with Bridgett James, manager of the 67th and Stony Island Avenue location, who said that customers love it.) But Don Whetstone, senior director of new format development, frames groceries as a business opportunity. "We didn't build this just for Chicago" he says.

It's certainly easy, given the scope of the food-desert challenge, to imagine other municipalities encouraging Walgreens to bring its concept elsewhere; customers in other cities who have heard about the effort have already starting asking local Walgreens managers when produce will be available. Meanwhile, more non-junk-food items and ready-made meal options (sandwiches, for example) have been spotted at drugstore chains like CVS and Duane Reade; Wal-Mart has said it will test smaller stores within cities instead of at their fringes.

Gallagher, whose research has evidently done a great deal to spark all this experimentation, has been working with new measurements to help more retailers adjust their product mix to more healthful foods in areas that lack access to them. Another clever attention-getting statistic she has come up with is a measurement of "years of life gained" through access to better food.

While Gallagher is pleased to see the Walgreens experiment unfold, "there's not a single solution," she says. And in fact there's an overlap between that view and her general theme, which is that the goal is fundamentally to increase choice. She is less concerned about purging food deserts of fast food or other processed-sustenance options than she is with adding more healthful options to the menu. "Choice," she maintains, "is a good driver." In other words, if this marketplace failure is going to be resolved, it's hard to see how anything but the marketplace can do it.

<http://news.discovery.com/dinosaurs/dinosaur-era-monster-fish-had-fist-sized-teeth.html>

Dinosaur-Era 'Monster' Fish Had Fist-Sized Teeth

By Jennifer Viegas

The world's largest lungfish tooth was recently unveiled at the Society of Vertebrate Paleontology annual meeting in Pittsburgh, Pa.

The tooth belonged to a carnivorous "monster" of a fish that also breaks the record for world's largest lungfish, according to project leader Kenshu Shimada, an associate professor in DePaul University's Environmental Science Program and Department of Biological Sciences.

Measuring in at over 13 feet long, this lungfish beat out the prior record-holder, an 11.5-foot long lungfish from Africa. The largest living lungfish measures only around 6.5 feet long.

Shimada, who is also a research associate in Paleontology at the Sternberg Museum of Natural History, told me today that the specimen is the largest lungfish tooth ever recorded (both in terms of fossil forms and modern forms).

The anatomical features of the tooth suggest that it is either from the Jurassic or Cretaceous period (i.e., late Mesozoic = "dinosaur era").

Right upper lungfish tooth plate; Credit for images: Kenshu Shimada

The fossil lungfish is a new species, but a name cannot be given because of its uncertain origin. Its occurrence is mysterious because it was found in central Nebraska, where there are no known "dinosaur-aged" rocks. Thus, it was possibly transported by a river or by a "paleo-Indian" (as a "curious object") from Wyoming area where Mesozoic lungfishes are known to occur.

The discovery of such a large animal is startling, making paleontologists wonder how much we still don't know about the ecosystem during the "Age of Dinosaurs."



The specimen, now housed in the University of Nebraska State Museum, was collected in 1940 by a local Nebraska resident and remained unstudied until this research; this research exemplifies the fact that there are 'scientific treasures' still waiting to be discovered in museum collections.



Drawing showing just how large this new Dino Era lungfish was during its lifetime

Although today's lungfish aren't nearly as impressive in terms of size, they are still remarkable due to their very unfish-like behaviors and incredible survivor skills, as [this Animal Planet video](#) shows.

<http://www.scientificamerican.com/article.cfm?id=how-pain-can-make-you-fee>

How Pain Can Make You Feel Better

Scientists find a strange connection between physical pain and positive emotions

By Joseph C. Franklin

What do you do when you're stressed out? Talk to friends? Listen to music? Have a drink, or eat some ice cream? Or maybe practice yoga? These things are all pleasant options, and they're obvious, effective ways to deal with stress. Chances are that you would not even think about doing something like, say, cutting your arm with a knife until you draw blood. Yet inflicting pain is exactly what millions of Americans – particularly adolescents and young adults – do to themselves when they're stressed.

This is called nonsuicidal self-injury (NSSI), and it most commonly takes the form of cutting or burning the skin. Traditionally, many doctors, therapists, and family members have believed that people engage in NSSI primarily to manipulate others. However, recent research has found that such social factors only motivate a minority of cases and usually represent cries for help rather than coldhearted attempts to exploit caretakers. Although there are many reasons why people engage in this kind of self-injury, the most commonly reported reason is simple, if seemingly odd: to feel better. Several studies support the claim that self-inflicted pain can lead to feeling better. For example, Schmahl and colleagues scanned the brains of people with a history of NSSI during a painful experimental task designed to mimic NSSI. They found that the pain led to decreased activity in the areas of the brain associated with negative emotion. The reality of this effect provokes a perplexing question: How could self-inflicted pain possibly lead to feeling better?

One possible answer to this question is that some people are simply hard-wired to like pain. Although NSSI is associated with an increased pain threshold and tolerance, people who engage in NSSI still report feeling pain and, furthermore, report that this pain is unpleasant. Moreover, if these people are hard-wired to like pain, it is unclear why they primarily engage in NSSI when stressed or why they stick to moderate self-injury (e.g., cutting the skin) rather than severe self-injury (e.g., limb amputation).

Another possible answer is that these people want to punish themselves and that they simply like punishment. It is true that self-punishment is a commonly reported reason for engaging in NSSI; however, by definition, punishments increase negative emotion and make a behavior less likely to occur in the future. Thus, self-punishment may motivate some of these people, but self-punishment cannot be the reason that NSSI reduces bad feelings. During NSSI, something else must accompany the negative emotion associated with self-punishment and pain. Exciting new research now suggests that this "something else" is the relief that occurs when something that causes acute, intense pain is removed.

To illustrate this effect, imagine that one morning you visit the doctor for a routine check-up, and later that afternoon the doctor's office calls to inform you that you're in the advanced stages of cancer and have weeks to live.... Now imagine that the doctor's office calls back five minutes later and tells you that they mixed up your lab work with someone else's – you're actually in good health. You would not immediately go back to how you felt before the first phone call; rather, you would feel extreme relief, lasting for hours or even days. Note that it was not a reward (e.g., winning the lottery) that made you feel better, only the introduction and removal of something unpleasant.

New research suggests that the introduction and removal of physical pain may have a similar effect. Tanimoto and colleagues found that fruitflies avoided odors associated with the introduction of a shock, but approached odors associated with the removal of a shock. Similarly, Bresin and colleagues found that the removal various forms of experimental pain were associated with a reduction in negative emotion in people with no history of NSSI. This relief effect was particularly strong for people who had higher levels of negative emotion. This latter finding may help to explain why people with higher levels of negative emotion are more likely to engage in NSSI: they have more negative emotion to reduce, and thus more relief to gain. Using biological measures, Franklin and colleagues obtained similar effects in both people with and without a history of NSSI. These new findings are especially interesting because it turns out that both general negative emotion and pain-induced negative emotion are processed in the same brain areas. This means that pain relief and

emotional relief are essentially the same thing. Indeed, it was recently shown that pain relievers like acetaminophen also relieve emotional pain.

Many people find that it's hard to get emotional relief with traditional strategies (e.g., talking with friends). Consequently, they may resort to generating pain relief in order to generate emotional relief. Unfortunately, this also means that they have to generate acute, intense pain; that is, they have to engage in NSSI. Despite being an effective emotion relief strategy, NSSI is also a health-risk behavior that is associated with an increased risk of suicide. In short, NSSI can be a good thing for temporary emotional relief, but it's a bad thing for health.

The vast majority of people who engage in NSSI are not seeking to manipulate anyone and they're not wired differently than the rest of us. They simply tap into the natural emotional relief that accompanies the removal of intense, acute pain. They do this because they have trouble finding healthier ways to reduce their stress. Accordingly, ostracizing people who engage in NSSI only creates more stress and makes NSSI worse. The best way to help someone who engages in NSSI is to guide them to healthier ways to feel better.

http://www.eurekalert.org/pub_releases/2010-11/uoca-rft111510.php

Researchers find tie between fat outside of the arteries and cardiovascular disease

CINCINNATI—*Researchers at the University of Cincinnati (UC) have found that fat around the outside of arteries may lead to the development of cardiovascular disease and could be linked to its onset in individuals with diabetes.*

David Manka, PhD, a researcher in the division of cardiovascular diseases, and his team found that this fat—known as perivascular adipose tissue—could possibly lead to the formation of fatty buildup inside of arteries and could cause existing buildup to break loose, leading to stroke or heart attack. These findings are being presented at the American Heart Association's Russell Ross Memorial Lectureship in Vascular Biology: Emerging Concepts in Vascular Disease on Nov. 16.

"Obesity is a growing problem, but most information that is coming from scientists and clinicians involves visceral adipose tissue—or the beer belly—which leads to a higher risk of cardiovascular disease," Manka says. "The fat that grows around the larger arteries throughout the body has been largely ignored. With this study, we wanted to see if it had any effect on the onset of cardiovascular disease, particularly in diabetics or those who are at risk."

Manka and his team transplanted fat tissue around the arteries of knockout mouse models that were predisposed for cardiovascular disease and diabetes.

"Your typical mouse doesn't naturally have that perivascular adipose tissue outside of the artery," he explains. "We found that disease and buildup formed right inside of the artery next to the transplanted fat in these mice models. Besides the disease, we found that this fat tissue caused smaller blood vessels to grow around the larger blood vessels, called the vasa vasorum, which we don't see otherwise. Both of these effects are local effects on the adjacent artery." Manka says this is the first time this development has been observed.

"Before this, we didn't know which came first - the vasa vasorum formation or the fat formation in the arteries," he says. "If you don't have the fat outside of the vessel, you won't have the activation of the vasa vasorum, which is thought to cause fat deposits to rupture, leading to stroke or heart attack. We are trying to establish cause and effect between the vasa vasorum and plaque instability, and now we have the model to test this."

Manka says these results show that perivascular fat is sensitive to metabolic cues and could be the link between metabolic dysfunction and vascular disease. "This may be one of the reasons diabetics have increased rates of cardiovascular disease," he says. "We still don't know exactly what that link is. The perivascular fat is sensing these metabolic stimuli and is becoming dysfunctional itself, translating to local inflammation of vessel."

Manka says the next step for researchers is to identify the molecular pathways that are differentially regulated in the various kinds of fat to see which cause disease and which are linked to inflammation.

"We can then try to find ways to target them and stop or reverse the adverse effects of this perivascular fat on vascular disease," he says. "These findings will help us discover targeted therapies and may lead to quicker diagnosis, impacting the way physicians diagnose and treat cardiovascular disease."

<http://www.nytimes.com/2010/11/16/health/16really.html>

The Claim: Drinking Water Before Meals Aids Weight Loss

By ANAHAD O'CONNOR

THE FACTS Late November marks the start of the gluttonous holiday season. But a simple step might help keep food intake in check: a glass of water before meals.

Dieters have been encouraged to employ this trick for ages, with the reasoning quite simple: the water fills the stomach, thus reducing hunger. But only in recent years have studies borne this out.

In the most recent, a randomized trial published in the journal *Obesity* in February, scientists at Virginia Tech followed a group of overweight subjects age 55 and up on low-calorie diets for about three months. Half the people were told to drink two cups of water before every meal. At the end of the study, the water group had lost an average of 15.5 pounds, compared with 11 pounds in the other group.

A 2008 study showed a similar effect, finding a 13 percent reduction in calorie intake in overweight subjects who consumed water before breakfast. But a third study, this one in 2007, had a peculiar finding: drinking water 30 minutes before a meal reduced calorie intake and feelings of hunger in older adults, but had little effect on subjects under 35. It's not clear why, but the researchers pointed out that because older adults are at increased risk of being overweight and obese, further studies should determine whether this is effective for the aging population.

Studies show the average person gains about a pound between Thanksgiving and January. Most adults gain one to two pounds a year over a lifetime, so staving off the holiday pound can go a long way.

THE BOTTOM LINE Drinking water before a meal can reduce calorie intake, though the effect seems most prominent in older people.

<http://www.bbc.co.uk/news/science-environment-11763484>

Japan probe collected particles from Itokawa asteroid

By Jonathan Amos Science correspondent, BBC News

Japanese scientists have confirmed that particles found inside the Hayabusa probe after its seven-year space trip are from the asteroid Itokawa.

A statement from the country's space agency said microscopic analysis of 1,500 grains retrieved from the craft's sample canister proved they were of extraterrestrial origin. The announcement represents a huge triumph for Japan. It is the first time samples from an asteroid have been returned to Earth.

"It's a world first and a remarkable accomplishment that [Hayabusa] brought home material from a celestial body other than the Moon," Japan's science and technology minister, Yoshiaki Takagi, told a news conference in Tokyo.

Junichiro Kawaguchi, the project manager on the mission, told reporters: "I don't know how to describe what has been beyond our dreams, but I'm overwhelmed by emotion."

The Hayabusa mission spent three weeks orbiting asteroid Itokawa in 2005 and attempted to pluck dust from its surface. The \$200m (£125m) mission encountered many technical problems, from being hit by a solar flare to experiencing propulsion glitches.

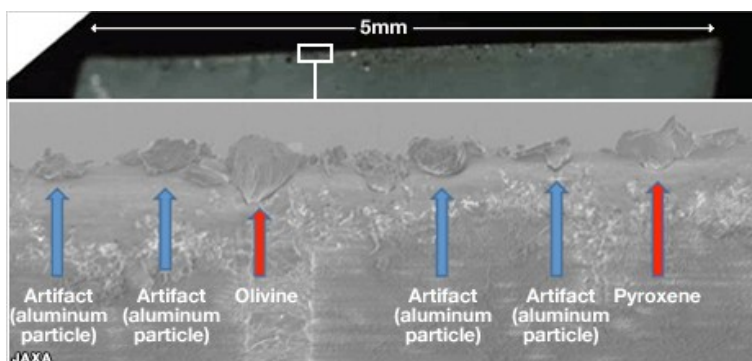
No-one was quite sure whether it had succeeded at the time because the capture mechanism appeared to fail just as the craft approached the asteroid's surface to make the acquisition. But each time an issue came up, the Japanese project team found an elegant solution to keep Hayabusa alive and bring it back to Earth - albeit three years late.

The sample capsule was delivered safely to Earth over Australia in June. The main Hayabusa spacecraft, however, was destroyed on re-entry to the atmosphere.

Scientists at the Japanese space agency's (Jaxa) Sagami-hara Campus in Kanagawa then spent the next five months subjecting minuscule grains found inside the canister to detailed examination.

"Almost all of them are extraterrestrial and come from Itokawa," Jaxa announced in its statement.

It would appear that Hayabusa must have disturbed the surface of the asteroid sufficiently in its approach to kick up dust into the probe's capture tool, even if the mechanism itself did not work as designed.



Particles from Hayabusa (Jaxa) The surface of a spatula is viewed under an electron microscope

Professor Trevor Ireland is an Australian scientist working on the mission and was involved in the preliminary examination. "The identification of extraterrestrial particles in the Hayabusa sample capsule is an astounding achievement," he said. "While the particles are small, no more than the width of a human hair, they hold the tell-tale signature of extraterrestrial material."

The particles contain the minerals olivine, pyroxene and plagioclase.

The dramatic re-entry into Earth's atmosphere of the Hayabusa sample capsule

Although common on Earth, these particles are said to be quite different in the Hayabusa samples, in their relative abundances and in their atomic composition.

The analysis fits with what Hayabusa saw with its remote-sensing instruments at Itokawa. These minerals are also common in certain meteorites, as is the mineral troilite (an iron sulphide) which has also been identified.

"This latter mineral is not found on the surface of the Earth," said Professor Ireland, who is affiliated to the Australian National University in Canberra. "As such, everything points to a successful sample return from Itokawa."

The Hayabusa particles represent only the fourth set of extraterrestrial materials brought to our planet by spacecraft. Those other materials include the Moon rocks recovered by US and Soviet missions; cometary dust captured by the American Stardust probe; and particles in the "solar wind" returned by the Genesis spacecraft, also operated by the US.

<http://www.newscientist.com/article/dn19729-telltale-bacteria-could-reveal-time-of-drowning.html>

Telltale bacteria could reveal time of drowning

*** Updated 11:32 17 November 2010 by Wendy Zukerman**

When a fisherman's body washed ashore on Australia's Queensland coast last week, police initially had no way of working out when he had died.

"Unless a body is witnessed entering the water, there is no reliable method for determining the length of time that a body has been submerged," says Gemma Dickson, a forensic biologist at the University of Otago in Dunedin, New Zealand.

That could soon change. Dickson and colleagues have discovered how the type of marine bacteria colonising a body changes as it decomposes, providing a "clock" of how long bodies have been in the water.

At present, forensic scientists have no accurate way of estimating time of death for bodies fished out of water. Looking at how badly decomposed the body, for instance, is unreliable. And well-established methods that determine time of death for corpses on land, such as insect infestation, aren't likely to be useful with submerged bodies.

So Dickson and colleagues submerged three adult pigs' heads in Otago Harbour, New Zealand, while sampling the bacteria on their decomposing skin every two to four days. The heads were underwater for three weeks, or until they were reduced to a skull. To see how water temperature affected the bacteria, the team submerged the first head in autumn, the second in early winter and the third in late winter.

Dickson found that stages of decomposition had different bacterial signatures. For example, for the heads submerged in winter, *Psychromonas* bacteria colonised during the first stages of decomposition, while specific genera in the Bacteroidales order only colonised after 10 days of submersion. "These genera could be analysed in isolation or together to predict time of entry into the water" says Dickson.

The results will be published in the journal *Forensic Science International*.

Developing decay

"This opens a lot of possibilities and there is a lot of potential to develop this further," says entomologist Helen Spafford at the University of Hawai'i at Manoa, who was not involved in the work.

But more research will be needed before the technique can be used in the real world, says Ian Dadour, a forensic scientist at the University of Western Australia in Perth, also not involved in the study. He says the small size of the study and the fact that the heads were submerged in different seasons mean that the results will have to be replicated elsewhere before they can be useful.

In any event, Queensland police will not need the new technique. Witnesses had seen a fisherman fall into the water after trying to retrieve a rod, only a few hours before the body was washed ashore.

When this article was first posted, we mistook Pseudoalteromonas for Psychromonas. We have also replaced a "several genera of flavobacteria only emerged after 17 days underwater" with "specific genera in the Bacteroidales order only colonised after 10 days of submersion. 'These genera could be analysed in isolation or together to predict time of entry into the water,' says Dickson."

http://www.sciencenews.org/view/generic/id/65528/title/Alcohol_heart_benefits_show_up_even_after_bypass_surgery

Alcohol heart benefits show up even after bypass surgery

Two to three drinks a day linked to decrease in heart problems after operation in men.

By Nathan Seppa

CHICAGO — The cardiac benefits of having a daily drink or two might extend to a surprising group — men with heart disease so bad it has required coronary bypass surgery.

The value of light-to-moderate drinking for cardiovascular health has shown up previously in healthy people, with studies showing that — other things being equal — people who regularly drank in moderation had less heart disease and fewer strokes than did nondrinkers.

But moderate drinking's protective benefits may also extend to those who already have some cardiovascular disease, suggests work presented by cardiac surgeon Umberto Benedetto of the University of Rome La Sapienza. Benedetto reported the new findings November 14 at the meeting of the American Heart Association.

He and his colleagues recruited 1,221 people who had disease severe enough to require coronary artery bypass surgery, in which a vessel is taken from another part of the body and grafted onto the heart. The grafted vessel serves as a clean conduit to restore normal blood flow to the heart muscle. In the United States, doctors perform the surgery, which bypasses a hopelessly clogged artery, on more than 300,000 people each year.

The Italian team focused on men, who represented four-fifths of the people in the study. During a post-surgery follow-up period that averaged 3.5 years, about one in six had a heart attack, required more surgery, had a stroke or died. Those who continued to drink alcohol, though not to excess, after surgery were 11 to 39 percent less likely to encounter one of these problems as were teetotalers, the researchers found. The optimal alcohol intake in the men was about two drinks per day, Benedetto says.

There were too few women in the study to do a separate analysis, but generally moderate drinking for women is defined as one daily drink, which adjusts for weight differences.

Only one earlier study had investigated the effect of alcohol consumption in people who had undergone coronary bypass surgery, and that research measured alcohol intake before the operation, not afterward, as the new one did, he says. "We find that some people stop drinking after surgery, since they believe it might be dangerous," Benedetto says. "Maybe the message of this study is that patients ... who drink a little should not be discouraged" from continuing after bypass surgery.

Cardiologist Erin Michos of Johns Hopkins University in Baltimore says she doesn't encourage moderate drinkers to stop. "But for individuals that don't drink, I don't encourage them to start," she says. Michos also notes that the benefits of alcohol on vascular diseases stem from a regular, modest intake, not binge drinking. "Up to two drinks per day can't be weighted over a week as ten in one sitting," she says.

Despite more than 10 years of research on the topic, some doctors are still leery of encouraging any alcohol consumption, whether a patient has heart disease or not, says cardiologist Valentin Fuster of Mt. Sinai School of Medicine in New York, a former president of AHA. "It's important to deal with this with great caution," he says. And although the cardiac benefits of light drinking are well-established, Fuster points out, the mechanism by which alcohol accomplishes this feat is not.

<http://www.newsobserver.com/2010/11/15/803914/ineffective-drug-shows-flawed.html>

Ineffective drug shows flawed test process

A controversial drug used to treat acute heart failure points out flaws in the drug approval process, doctors at Duke University reported Sunday at the American Heart Association's annual meeting.

The drug nesiritide was approved in 2001 and hailed as a breakthrough in treating the shortness of breath that strikes most people in the throes of heart failure. Nesiritide was later blamed for kidney problems and deaths, but the Duke-led study found no such problems after a large international trial with more than 7,000 patients.

At the same time, however, the researchers found the drug wasn't much help, either - a setback to the 5 million people in the United States who have the potentially deadly condition.

"It's clear there were not significant advantages," Dr. Clyde Yancy, a cardiologist at Baylor University Medical Center in Texas, said Sunday. Other doctors at the event said the drug, which had once been widely used, isn't warranted in most cases.

The findings, years after the drug has been on the market, suggests the drug approval process needs to be more rigorous so patients can trust the therapies they're given.

"If you don't do good trials, you have a bunch of products on the market and no one knows how good they are - you have chaos," Dr. Robert Califf, vice chancellor of clinical research at Duke and co-chairman of the study, said in an interview.

In recent years, scares related to the diabetes drug Avandia, the pain-reliever Vioxx, and other therapies have eroded confidence in the safety of medicines.

Califf said drug companies, regulators and clinicians should all demand longer, more comprehensive studies to restore trust in the process.

In the case of nesiritide, an intravenous drug marketed by a unit of Johnson & Johnson, relatively small studies were conducted before the U.S. Food and Drug Administration approved it in 2001.

The approval process typically requires three phases of trials to prove a new therapy is safe and effective. Patients in these trials, however, tend to be a relatively healthy sample of people afflicted with a given disease, often picked to participate because they have uncomplicated cases. And the trials, which can cost hundreds of millions of dollars, last only as long as necessary to generate the data proving safety and effect.

But the real world is different from a study. Patients have complex and numerous ailments, take lots of drugs to treat them, and stay on medications for years. As a result, drugs that clear the approval process often turn out to have unforeseen side effects.

Like many newly approved drugs, nesiritide hit the market with much excitement, finally providing doctors with an injection they could give frantic patients who labor to breathe. "Patients when they come in with heart failure feel like they're drowning," said Dr. Adrian Hernandez, a Duke cardiologist who led the study. Nesiritide seemed to ease that problem. But within a few years, other researchers analyzed the data from the drug's approval trials and flagged problems. Patients given the therapy appeared to have an increased risk of kidney failure and death. Sales of the drug plummeted.

Johnson & Johnson decided to fund a large trial to figure out if the risks were real. Califf's team at Duke headed the study, which began in 2007, involved more than 400 medical centers in the United States and abroad, and cost at least \$100 million to study thousands of patient in real-world circumstances.

Results reported Sunday showed a much different profile for the drug. It was safe but not terribly effective unless used within a few hours of the start of symptoms. Califf said all of the confusion stems from those early, small trials that didn't provide enough data to make judgments. With small numbers, he said, "It's hard to tell a signal from the noise."

For doctors, the results are disappointing. Despite decades of effort, few new treatments for severe heart failure have shown benefit. "Many thought this was a very powerful drug that would have sustained improvement in patients' breathing," Hernandez said.

While the findings were mixed for nesiritide, Califf said the most recent study is a success for science. He said the effort should serve as a model for how studies should be conducted on both prospective and existing therapies. And changing the process should be a priority for the FDA, clinicians and drug companies, Califf said.

<http://www.bbc.co.uk/news/health-11767440>

Garlic 'remedy for hypertension'

By Helen Briggs Health reporter, BBC News

Garlic may be useful in addition to medication to treat high blood pressure, a study suggests.

Australian doctors enrolled 50 patients in a trial to see if garlic supplements could help those whose blood pressure was high, despite medication.

Those given four capsules of garlic extract a day had lower blood pressure than those on placebo, they report in scientific journal *Maturitas*. The British Heart Foundation said more research was needed.

Garlic has long been thought to be good for the heart. Garlic supplements have previously been shown to lower cholesterol and reduce high blood pressure in those with untreated hypertension.

In the latest study, researchers from the University of Adelaide, Australia, looked at the effects of four capsules a day of a supplement known as aged garlic for 12 weeks. They found systolic blood pressure was around 10mmHg lower in the group given garlic compared with those given a placebo.

Researcher Karin Ried said: "Garlic supplements have been associated with a blood pressure lowering effect of clinical significance in patients with untreated hypertension. "Our trial, however, is the first to assess the effect, tolerability and acceptability of aged garlic extract as an additional treatment to existing antihypertensive medication in patients with treated, but uncontrolled, hypertension."

Experts say garlic supplements should only be used after seeking medical advice, as garlic can thin the blood or interact with some medicines.

Ellen Mason, senior cardiac nurse at the British Heart Foundation, said using garlic for medicinal purposes dates back thousands of years, but it is essential that scientific research proves that garlic can help conditions such as raised blood pressure.

She said: "This study demonstrated a slight blood pressure reduction after using aged garlic supplements but it's not significant enough or in a large enough group of people to currently recommend it instead of medication.

"It's a concern that so many people in the UK have poorly controlled blood pressure, with an increased risk of stroke and heart disease as a consequence. So enjoy garlic as part of your diet but don't stop taking your blood pressure medication."

http://www.eurekalert.org/pub_releases/2010-11/nu-wem111510.php

Why estrogen makes you smarter

Scientists discover how estrogen works and flip its switch to reap benefits without risks

CHICAGO --- Estrogen is an elixir for the brain, sharpening mental performance in humans and animals and showing promise as a treatment for disorders of the brain such as Alzheimer's disease and schizophrenia. But

long-term estrogen therapy, once prescribed routinely for menopausal women, now is quite controversial because of research showing it increases the risk of cancer, heart disease and stroke.

Northwestern Medicine researchers have discovered how to reap the benefits of estrogen without the risk. Using a special compound, they flipped a switch that mimics the effect of estrogen on cortical brain cells. The scientists also found how estrogen physically works in brain cells to boost mental performance, which had not been known.

When scientists flipped the switch, technically known as activating an estrogen receptor, they witnessed a dramatic increase in the number of connections between brain cells, or neurons. Those connections, called dendritic spines, are tiny bridges that enable the brain cells to talk to each other.

"We created more sites that could allow for more communication between the cells," said lead investigator Deepak Srivastava, research assistant professor in neuroscience at Northwestern University Feinberg School of Medicine. "We are building more bridges so more information can go from one cell to another."

The findings will be presented Nov. 17 at Neuroscience 2010 in San Diego. Peter Penzes, associate professor of physiology and of psychiatry and behavioral sciences at the Feinberg School, is the senior investigator.

Previous research has shown an increase in dendritic spines improves mental performance in animals. In humans, people who have Alzheimer's disease or schizophrenia often have a decrease in these spines.

"We think there is a strong link between the number of dendritic spines and your mental performance," Srivastava said. "A major theory is if you increase the number of spines, it could be a way to treat these significant mental illnesses. "

Northwestern scientists also found strong clues that estrogen can be produced in cortical brain cells. They identified aromatase, a critical protein needed to produce estrogen, to be in precisely the right spot in the brain cell to make more dendritic spines.

"We've found that the machinery needed to make estrogen in these brain cells is near the dendritic spines," Srivastava said. "It's exactly where it's needed. There's a lot of it in the right place at the right time. "

Next, Srivastava said, he wants to further identify the key molecules involved in the dendritic spine production and target them in the same way as the estrogen receptor in order to ultimately be able to treat schizophrenia and other mental disorders.

Nick Brandon, head of psychiatry at Pfizer Inc., whose group collaborated with the Penzes lab for this work, added, "We are very excited by the emerging data in this area. There is a great deal of literature and precedent for a role of estrogen and estrogen signaling in major mental illnesses. This adds to our understanding of the specific neuronal functions. As we understand the effects of these specific estrogen receptor beta compounds in preclinical models, we are discovering effects on specific neuronal functions, which could be relevant for the treatment of cognitive disorders, depression and schizophrenia. "

The research was supported by the National Institutes of Health, the American Heart Association and the National Alliance for Research into Schizophrenia and Depression.

http://www.eurekalert.org/pub_releases/2010-11/aaop-nnh102010.php

New needle-free HPV vaccine increases effectiveness, availability in developing world
Arlington, Va. — ***New research being presented at the 2010 FIP Pharmaceutical Sciences World Congress in association with the American Association of Pharmaceutical Scientists Annual Meeting and Exposition will highlight a targeted inhalable dry powder vaccine that may prove preferable in terms of needle avoidance and expected lower cost than the current commercial human papillomavirus (HPV) vaccine used throughout the world.***

HPV is the number one cause of cervical cancer, which is the second most common cancer in women around the globe. According to the World Health Organization, nearly a quarter of a million women die each year from cervical cancer, 80 percent of them in developing countries.

Lead researcher David McAdams and colleagues from the University of Colorado at Boulder created a dry powder that goes directly to the mucous membranes in the respiratory tract or mouth. Since HPV is a disease that affects the mucous membranes, the powder is more targeted. "Imagine the vaccine as a car," said McAdams. "Using this delivery method is similar to parking in your driveway instead of driving around the block a few times to find a spot."

The dry powder has added benefits for developing countries. For example, the current HPV vaccine is delivered by a needle injection, which is highly susceptible to contamination. The powder, as a solid, rather than a frozen liquid, may be more stable than current HPV vaccines, which makes it easier to store and transport in developing countries.

"While there are effective HPV vaccines on the market, cost, refrigeration and needle disposal shorten the reach they have," commented McAdams. "Our goal is to develop an economical, safe and easily administered HPV vaccine for everyone."

For the first time, FIP's PSWC and the AAPS Annual Meeting and Exposition will join to hold the world's largest pharmaceutical sciences meeting to improve global health through advances in pharmaceutical sciences. An estimated 10,000 scientists from more than 60 countries will participate in 100 sessions, including 40 symposia and roundtables.

http://www.eurekalert.org/pub_releases/2010-11/uowo-vca111710.php

Vitamin C: A potential life-saving treatment for sepsis

Physicians caring for patients with sepsis may soon have a new safe and cost-effective treatment for this life-threatening illness.

Research led by Dr. Karel Tylml and his colleagues at The University of Western Ontario and Lawson Health Research Institute have found that vitamin C can not only prevent the onset of sepsis, but can reverse the disease.

Sepsis is caused by a bacterial infection that can begin anywhere in your body. Your immune system goes into overdrive, overwhelming normal processes in your blood. The result is that small blood clots form, blocking blood flow to vital organs. This can lead to organ failure. Babies, the elderly and those with weakened immune systems are most likely to get sepsis. But even healthy people can become deathly ill from the disease.

According to Dr. Tylml, a professor at Western's Schulich School of Medicine & Dentistry, patients with severe sepsis have a high mortality rate, nearly 40 percent, because there is no effective treatment.

"There are many facets to sepsis, but the one we have focused on for the past 10 years is the plugging of capillaries," says Dr. Tylml. Plugged capillaries prevent oxygenation and the supply of life-supporting materials to your organ tissue and stop the removal of metabolic waste product. Plugged capillaries are seen in organs of septic patients. These organs may eventually fail, leading to multiple organ failure and death. Dr. Tylml's lab was the first to discover this plugging by using intravital microscopy, a technique Dr. Tylml pioneered in Canada.

According to Dr. Tylml's most recent publication, oxidative stress and the activated blood clotting pathway are the major factors responsible for the capillary plugging in sepsis. Through his research, Dr. Tylml has discovered that a single bolus of vitamin C injected early at the time of induction of sepsis, prevents capillary plugging. He has also found that a delayed bolus injection of vitamin C can reverse plugging by restoring blood flow in previously plugged capillaries.

"Our research in mice with sepsis has found that early as well as delayed injections of vitamin C improves chance of survival significantly," explains Dr. Tylml. "Furthermore, the beneficial effect of a single bolus injection of vitamin C is long lasting and prevents capillary plugging for up to 24 hours post-injection."

Dr. Tylml and his colleagues are eager to find appropriate support to move this research from the bench to the bedside to see if these findings translate to patients with sepsis.

The potential benefit of this treatment is substantial. "Vitamin C is cheap and safe. Previous studies have shown that it can be injected intravenously into patients with no side effects," says Dr. Tylml. "It has the potential to significantly improve the outcome of sepsis patients world-wide. This could be especially beneficially in developing countries where sepsis is more common and expensive treatments are not affordable."

<http://www.newscientist.com/article/dn19737-mirror-trick-could-boost-bluray-discs.html>

Mirror trick could boost Blu-ray discs

*** 11:37 17 November 2010 by Kate McAlpine**

A trick of the light could bring microscopic images into sharper 3D focus. And with a twist, the technique could stack more layers of data into storage formats like DVD and Blu-ray.

An optical lens might appear to focus light to a fine point, but on the nanoscopic scale, the focal point is smeared out in the direction of light propagation – the beam's optical axis – to create a cigar-shaped cylinder. Improving that axial resolution is key to focusing clearly on nanoscopic layers within a sample under the microscope to pick out important detail. It could also allow lasers to focus more precisely within a Blu-ray disc, making it possible to squeeze more layers – and more data – onto each disc.

In the 1990s, a solution was found – the 4Pi microscope. It splits a laser light beam in two: half is directed through a lens positioned over the sample of interest to focus on it from above, while the other passes through a lens beneath the sample and focuses on it from below. Within the sample, the two beams interfere in just the right way to build on one another, creating a spherical focal spot that can be just 100 nanometres across – five times smaller than the typical cigar-shaped focal spot.

It's all done with mirrors

Unfortunately, aligning the two lenses and beam paths to interfere correctly is difficult, rendering a 4Pi microscope expensive. Anne Sentenac of the Fresnel Institute in Marseille, France, and her team have found a way to simplify things. Their set-up still has a lens above the object, but instead of splitting the laser beam and directing half of it through a lens below the object, they simply place a mirror there. Once the light has passed through the thin sample, some is reflected back towards the object from beneath, reducing the size of the focal spot in the same way as the second laser beam in the 4Pi.

To achieve the desired effect, the researchers used a liquid crystal modulator to modify the light beam so that it had two focal points when it travelled through the lens. One of those focal points coincided with object of interest, but the other was further away: the light heading for the second focal spot comes into focus only once it has passed through the object, reflected off the mirror, and re-entered the object from below. Using the technique, Sentenac's team could pull light into a spherical beam spot 200 nanometres across.

Zone of darkness

However, the limits of the lens meant that a 100-nanometre fluorescent bead placed at the centre of the focus with its poles lined up with the axis of interfering light beams had a dark band passing through its equator, where illumination was poor. The team can reduce the problem with a specially shaped mirror, which can reflect more light into the dim areas, says Geoffroy Lerosey of the Langevin Institute in Paris, France.

Not only will this microscopy technique give biologists better 3D resolution in their studies of cells, it could also burn more detailed patterns into devices, says Mathias Fink at Denis Diderot University, Paris. "If you want to create a 3D pattern which must have a very good spatial resolution, you need to manipulate light to burn the material exactly where you want," he says.

Typical Blu-ray discs have just one to three data-bearing layers, but researchers have recorded as many as 20. By reducing the length of the beam spot, they could triple that number, says Sentenac.

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<http://www.livescience.com/culture/beer-helped-rise-of-civilization-101104.html>

Beer Lubricated the Rise of Civilization, Study Suggests

By Charles Q. Choi, LiveScience Contributor

May beer have helped lead to the rise of civilization? It's a possibility, some archaeologists say.

Their argument is that Stone Age farmers were domesticating cereals not so much to fill their stomachs but to lighten their heads, by turning the grains into beer. That has been their take for more than 50 years, and now one archaeologist says the evidence is getting stronger.

Signs that people went to great lengths to obtain grains despite the hard work needed to make them edible, plus the knowledge that feasts were important community-building gatherings, support the idea that cereal grains were being turned into beer, said archaeologist Brian Hayden at Simon Fraser University in Canada.

"Beer is sacred stuff in most traditional societies," said Hayden, who is planning to submit research on the origins of beer to the journal *Current Anthropology*.

The advent of agriculture began in the Neolithic Period of the Stone Age about 11,500 years ago. Once-nomadic groups of people had settled down and were coming into contact with each other more often, spurring the establishment of more complex social customs that set the foundation of more-intricate communities.

The Neolithic peoples living in the large area of Southwest Asia called the Levant developed from the Natufian culture, pioneers in the use of wild cereals, which would evolve into true farming and more settled behavior. The most obvious explanation for such cultivation is that it was done in order to eat.

Archaeological evidence suggests that until the Neolithic, cereals such as barley and rice constituted only a minor element of diets, most likely because they require so much labor to get anything edible from them — one typically has to gather, winnow, husk and grind them, all very time-consuming tasks.

Hayden told LiveScience he has seen that hard work for himself. "In traditional Mayan villages where I've worked, maize is used for tortillas and for chicha, the beer made there. Women spend five hours a day just grinding up the kernels."

However, sites in Syria suggest that people nevertheless went to unusual lengths at times just to procure cereal grains - up to 40 to 60 miles (60 to 100 km). One might speculate, Hayden said, that the labor associated with grains could have made them attractive in feasts in which guests would be offered foods that were difficult or expensive to prepare, and beer could have been a key reason to procure the grains used to make them.

"It's not that drinking and brewing by itself helped start cultivation, it's this context of feasts that links beer and the emergence of complex societies," Hayden said.

Feasts would have been more than simple get-togethers — such ceremonies have held vital social significance for millennia, from the Last Supper to the first Thanksgiving.

"Feasts are essential in traditional societies for creating debts, for creating factions, for creating bonds between people, for creating political power, for creating support networks, and all of this is essential for developing more complex kinds of societies," Hayden explained. "Feasts are reciprocal — if I invite you to my feast, you have the obligation to invite me to yours. If I give you something like a pig or a pot of beer, you're obligated to do the same for me or even more."

"In traditional feasts throughout the world, there are three ingredients that are almost universally present," he said. "One is meat. The second is some kind of cereal grain, at least in the Northern Hemisphere, in the form of breads or porridge or the like. The third is alcohol, and because you need surplus grain to put into it, as well as time and effort, it's produced almost only in traditional societies for special occasions to impress guests, make them happy, and alter their attitudes favorably toward hosts."

The brewing of alcohol seems to have been a very early development linked with initial domestication, seen during Neolithic times in China, the Sudan, the first pottery in Greece and possibly with the first use of maize. Hayden said circumstantial evidence for brewing has been seen in the Natufian, in that all the technology needed to make it is there — cultivated yeast, grindstones, vessels for brewing and fire-cracked rocks as signs of the heating needed to prepare the mash.

"We still don't have the smoking gun for brewing in the Natufian, with beer residues in the bottom of stone cups or anything like that," Hayden said. "But hopefully people will start looking for that - people haven't yet."

<http://news.discovery.com/archaeology/vikings-native-american-woman.html>

Vikings Possibly Carried Native American to Europe

Medieval texts suggest the Vikings arrived in the New World more than 1,000 years ago.
content provided by AFP

The first Native American to arrive in Europe may have been a woman brought to Iceland by the Vikings more than 1,000 years ago, a study by Spanish and Icelandic researchers suggests.

The findings boost widely-accepted theories, based on Icelandic medieval texts and a reputed Viking settlement in Newfoundland in Canada, that the Vikings reached the American continent several centuries before Christopher Columbus traveled to the "New World."

Spain's CSIC scientific research institute said genetic analysis of around 80 people from a total of four families in Iceland showed they possess a type of DNA normally only found in Native Americans or East Asians.

"It was thought at first that (the DNA) came from recently established Asian families in Iceland," CSIC researcher Carles Lalueza-Fox was quoted as saying in a statement by the institute. "But when family genealogy was studied, it was discovered that the four families were descended from ancestors who lived between 1710 and 1740 from the same region of southern Iceland."

The lineage found, named C1e, is also mitochondrial, which means that the genes were introduced into Iceland by a woman. "As the island was virtually isolated from the 10th century, the most likely hypothesis is that these genes corresponded to an Amerindian woman who was brought from America by the Vikings around the year 1000," said Lalueza-Fox.

The researchers used data from the Reykjavik-based genomics company deCODE Genetics.

He said the research team hopes to find more instances of the same Native American DNA in Iceland's population, starting in the same region in the south of the country near the massive Vatnajökull glacier.

The report, by scientists from the CSIC and the University of Iceland, was also published in the latest edition of the American Journal of Physical Anthropology. The journal said 75 to 80 percent of contemporary Icelanders can trace their lineage to Scandinavia and the rest to Scotland and Ireland. But the C1e lineage is "one of a handful that was involved in the settlement of the Americas around 14,000 years ago."

"Contrary to an initial assumption that this lineage was a recent arrival (in Iceland), preliminary genealogical analyses revealed that the C1 lineage was present in the Icelandic mitochondrial DNA pool at least 300 years ago" said the journal. "This raised the intriguing possibility that the Icelandic C1 lineage could be traced to Viking voyages to the Americas that commenced in the 10th century."

http://www.eurekalert.org/pub_releases/2010-11/uorm-wmm111810.php

Well-known molecule may be behind alcohol's benefits to heart health **Raise a glass -- moderate consumption is key -- to the molecule 'notch'**

Many studies support the assertion that moderate drinking is beneficial when it comes to cardiovascular health, and for the first time scientists have discovered that a well-known molecule, called Notch, may be behind alcohol's protective effects. Down the road, this finding could help scientists create a new treatment for heart disease that mimics the beneficial influence of modest alcohol consumption.

"Any understanding of a socially acceptable, modifiable activity that many people engage in, like drinking, is useful as we continue to search for new ways to improve health," said Eileen M. Redmond, Ph.D., lead study

author and associate professor in the Department of Surgery, Basic and Translational Research Division, at the University of Rochester Medical Center. "If we can figure out at the basic science level how alcohol is beneficial it wouldn't translate to doctors prescribing people to drink, but hopefully will lead to the development of a new therapy for the millions of people with coronary heart disease."

Population studies looking at patterns of health and illness and associated factors have shown that heart disease and cardiac-related death is 20 to 40 percent lower in light to moderate drinkers, compared to people who don't drink. Redmond notes that even if the reduction is only 20 percent, that still translates to a considerable benefit that warrants further investigation to better understand how alcohol works its protective magic.

In the study, published in *Arteriosclerosis, Thrombosis and Vascular Biology*, scientists found that alcohol at moderate levels of consumption – generally considered one to three drinks per day – inhibits Notch, and subsequently prevents the buildup of smooth muscle cells in blood vessels, which contributes to narrowing of the arteries and can lead to a heart attack or stroke.

In trying to uncover the molecular players involved when it comes to alcohol and improved cardiovascular health, Redmond and her team focused in on Notch because research has shown it influences the fate – growth, migration or death – of vascular smooth muscle cells. In blood vessels, the growth and movement of smooth muscle cells plays a key role in the development of atherosclerosis, the hardening and narrowing of arteries, and in restenosis, the re-narrowing of arteries after they have been treated to remove buildups of plaque: Both are risk factors for heart attack and stroke.

The team studied the effects of moderate amounts of alcohol in human coronary artery smooth muscle cells and in the carotid arteries of mice. In both scenarios, regular, limited amounts of alcohol decreased Notch, which in turn decreased the production and growth of smooth muscle cells, leaving vessels open and relatively free of blockages or build-up – a desirable state for a healthy heart.

Specifically, in human smooth muscle cells, treatment with moderate levels of alcohol significantly decreased the expression of the Notch 1 receptor and inhibited Notch signaling, leading to decreased growth of smooth muscle cells. The inhibitory effect of moderate alcohol on smooth muscle cell growth was reversed if the Notch pathway was artificially switched on in these cells.

In a mouse model of vessel remodeling, daily feeding of alcohol – equivalent to two drinks per day, adjusted for body weight – inhibited Notch in the vessel wall and markedly reduced vessel thickening, compared to the control, no alcohol group. Vessel remodeling occurs when vessels change shape and thickness in response to different injurious stimuli.

"At the molecular level, this is the first time anyone has linked the benefits of moderate drinking on cardiovascular disease with Notch," said David Morrow, Ph.D., an instructor in the Department of Surgery at the Medical Center, first author of the study and an expert on Notch. "Now that we've identified Notch as a cell signaling pathway regulated by alcohol, we're going to delve deeper into the nuts and bolts of the process to try to find out exactly how alcohol inhibits Notch in smooth muscle cells."

Researchers admit that uncovering how alcohol inhibits Notch signaling in these cells will not be an easy task. According to Redmond, "The Notch pathway is complex, and there are multiple potential regulatory points which could be affected by alcohol."

In addition to Redmond and Morrow, co-authors on the study include John P. Cullen, Ph.D., and Weimin Liu, M.D., Ph.D., also in the Department of Surgery, Research Division at the University of Rochester Medical Center, and Paul A. Cahill, Ph.D. at the Vascular Health Research Center, Dublin City University, Ireland. The study was funded by grants from the National Institute on Alcohol Abuse and Alcoholism at the National Institutes of Health and the American Heart Association.

http://www.eurekalert.org/pub_releases/2010-11/uom-sft111810.php

Spacecraft flew through 'snowstorm' on encounter with comet Hartley 2

COLLEGE PARK, Md. - On its recent trip by comet Hartley 2, the Deep Impact spacecraft took the first pictures of, and flew through, a storm of fluffy particles of water ice being spewed out by carbon dioxide jets coming from the rough ends of the comet. The resulting images and data shed new light on the nature and composition of comets, according to the University of Maryland-led EPOXI science team, which today announced its latest findings and released the first images of this comet created snowstorm. See images at:

<http://epoxi.umd.edu/index.shtml>

"When we visited Hartley 2, it was in the midst of a cometary ice storm generated by jets of carbon dioxide gas carrying a couple of tons of water ice off the comet every second," said University of Maryland astronomer Michael A'Hearn, science team leader and principal investigator for the spacecraft's Deep Impact and EPOXI missions. "At the same time, a different process was causing water vapor to come out of the comet's mid-section."

"This is the first time we've ever seen individual chunks of ice in the cloud around a comet or jets definitively powered by carbon dioxide gas," said A'Hearn, who won the 2008 Kuiper astronomy prize for seminal contributions over his career to the study of comets. "We looked for, but didn't see such ice particles around Tempel 1."

According to A'Hearn evidence of large chunks around comets including Hartley 2 has been found with the Arecibo Radio telescope, but Arecibo can't detect individual particles or determine what the chunks are made of. Around Hartley 2, the spacecraft clearly imaged clouds of large ice particles with the largest ranging from golf ball sized to the size of a basketball.

"When we first saw all the specks surrounding the nucleus, our mouths dropped," said EPOXI mission co-investigator Pete Schultz of Brown University. "Stereo images reveal that there are snowballs in front and behind the nucleus, making it look like a scene in one of those crystal snow globes."



This is one of the first images from spacecraft's large telescope, the HRI. It shows the cloud of water ice particles around the nucleus of the comet. Credit: NASA/UMD/JPL

A Changing Comet Picture

According to A'Hearn, Schultz, and University of Maryland astronomer Jessica Sunshine, the new findings show that Hartley 2 "works" quite differently than Tempel 1 or the other three comets with nuclei imaged by spacecraft. "CO₂ appears to be a key to understanding Hartley 2, and explains why the smooth and rough areas of the comet respond differently to solar heating and have different mechanisms by which water comes out of the interior of the comet," said Sunshine, who is the EPOXI deputy principal investigator.

"CO₂ jets blast out water ice from specific locations in the rough areas resulting in a cloud of ice and 'snow,'" Sunshine explained. "Underneath the smooth middle area, water ice evaporates into water vapor that flows through the porous material with the result that close to the comet in this area we see a lot of water vapor."

According to Sunshine and the other members of the science team, the smooth area of comet Hartley 2, looks and behaves like most of the surface of comet Tempel 1, with water evaporating below the surface and percolating out through the dust. However the rough areas of Hartley 2, with CO₂ jets spraying out ice particles, are very different.

A'Hearn said that more detailed analysis will be needed to determine whether the difference in outgassing between the smooth and rough regions of the comet likely is the result of a mixing of dry-ice rich clumps with dry-ice poor clumps during the comet's formation some 4.5 billion years ago, or whether that difference is due to more recent evolutionary changes.

The Deep Impact spacecraft has three instruments -- two telescopes with digital color cameras and an infrared spectrometer. The spectrometer measures the absorption, emission and reflection of light that is unique (spectroscopic signature) to each molecular compound or element. It is this instrument that allows Maryland scientists to identify the CO₂ gas, water ice, water vapor and other materials seen on the comet's surface, in the jets, and in the coma, or cloud of particles and gas, around it.

The science team released the first images from the High Resolution Imager (HRI), the stronger of the spacecraft's two telescopes. The images clearly show clouds of icy particles above the elongated nucleus of Hartley, which is 1.4 miles (2.2 km) in length and 0.25 miles (0.4 km) wide at the neck.

The HRI can provide images with tremendous detail, but it takes much longer to process these images than those from the smaller MRI telescope. HRI images require computerized and manual correction, or deconvolution, to compensate for the fact that the telescope is slightly out of focus.

A Deeper Impact on Comet Science

With its latest EPOXI mission data, the Deep Impact spacecraft is adding to an already extensive scientific legacy. Launched in January 2005, the spacecraft made history and world-wide headlines when it smashed a probe into comet Tempel 1 on July 4th of that year. Following the conclusion of that mission, a Maryland-led team of scientists won approval from NASA to fly the Deep Impact spacecraft to a second comet.

EPOXI is a combination of the names for the extended mission's two components: the Extrasolar Planet Observations and Characterization (EPOCh), and the flyby of comet Hartley 2, called the Deep Impact Extended Investigation (DIXI). During the initial phases of EPOXI, the Deep Impact spacecraft provided information on possible extrasolar planets, imaged Earth to provide "colorful" findings that someday may help identify earthlike worlds around other stars and was one of three spacecraft to find for the first time clear evidence of water on the Moon.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the EPOXI mission for NASA's Science Mission Directorate, Washington. The University of Maryland, College Park, is home to the mission's principal investigator, Michael A'Hearn and ten other members of the EPOXI science team. Drake Deming of NASA's Goddard Space Flight Center, Greenbelt, Md., is the science lead for the mission's extrasolar planet observations. The spacecraft was built for NASA by Ball Aerospace & Technologies Corp., Boulder, Colo.
http://www.eurekalert.org/pub_releases/2010-11/uoc--utu111710.php

UCLA team uncovers mechanism behind organ transplant rejection
Suggests new therapies to prevent chronic rejection, stop cancer progression

UCLA researchers have pinpointed the culprit behind chronic rejection of heart, lung and kidney transplants. Published in the Nov. 23 edition of Science Signaling, their findings suggest new therapeutic approaches for preventing transplant rejection and sabotaging cancer growth.

The team focused on the mechanism behind narrowing of the donor's grafted blood vessels, which blocks blood from reaching the transplanted organ. Starved of oxygen and other nutrients, the organ eventually fails, forcing the patient back on the transplant waiting list.

"Chronic rejection is the No. 1 cause of organ failure in the first year of transplant," explained Elaine Reed, director of the UCLA Immunogenetics Center and professor of pathology at the David Geffen School of Medicine at UCLA. "In the first five years, some 40 percent of organs fail after transplant due to blockage of the grafted blood vessels. Currently, we have no way to treat this deadly condition."

Earlier research by Reed's laboratory discovered that patients whose immune systems manufactured antibodies to their donor's human leukocyte antigens (HLA) were at higher risk for chronic rejection.

In this study, Reed and her colleagues looked at how HLA molecules on donor tissue provoke an immune response in the patient. The team examined how the patient's antibodies trigger signals that spark overgrowth of the cells lining the inner blood vessels of the grafted organ.

The scientists discovered that HLA's ability to stimulate cell growth and movement depends upon a quid pro quo relationship with another molecule called integrin beta 4.

"Integrin enables cells to survive and spread, which is essential for tumor progression," said Reed. "We suspect that integrin hijacks HLA and takes over its functions. When we suppressed integrin, HLA was unable to make cells grow and move." Conversely, when the team suppressed HLA, integrin could no longer support cells' communication with their environment. The finding implies that HLA is required for functions regulated by integrin, such as cellular movement.

"Ours is the first study to demonstrate a physical and functional liaison between HLA and integrin," said Reed. "HLA's role in helping integrin is a completely new function that has never been described before."

The UCLA findings offer valuable insight into the molecular mechanisms that allow HLA to stimulate cellular growth and movement.

"What I'm excited about from a medical point of view is how our findings offer new therapeutic opportunities," said Reed. "If we can identify ways to disrupt the relationship between HLA and integrin, we may be able to prevent chronic organ rejection in transplant patients."

The UCLA team's next step will be to investigate how integrin and HLA function together to promote cancer growth. The research suggests a new approach for halting cancer progression by preventing angiogenesis, the process by which a tumor develops its own blood supply.

"By interfering with integrin's reliance upon HLA to signal cells, we can sabotage cells' ability to sprout new blood vessels to feed the tumor," observed Reed.

Reed's UCLA coauthors included Xiaohai Zhang and Enrique Rozengurt.

The study was supported by grants from the National Institute of Allergy and Infectious Diseases, the National Heart Lung and Blood Institute and the National Institute of Diabetes, Digestive and Kidney Disease.

http://news.bbc.co.uk/earth/hi/earth_news/newsid_9195000/9195714.stm

Ancient seaweed is living fossil
By Matt Walker Editor, Earth News

Ancient seaweed that have been found growing in the deep sea are "living fossils", researchers have reported.

The two types of seaweed, which grow more than 200m underwater, represent previously unrecognised ancient forms of algae, say the scientists. As such, the algae could belong to the earliest of all known green plants, diverging up to one billion years ago from the ancestor of all such plants. Details of the discovery are published in the Journal of Phycology.

"The algae occur in relatively deep marine waters - 210m, which is certainly deep for a photosynthetic organism," Professor Frederick Zechman told the BBC.

"They can be found in shallower water but typically under ledges in low light. "They appear to possess special chlorophyll pigments that allow them to utilise the low intensity blue light found at depth."

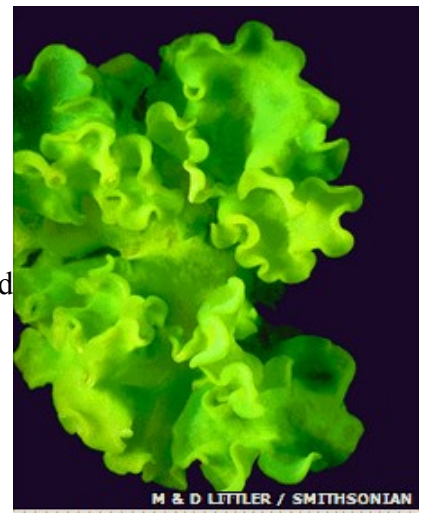
Professor Zechman of California State University in Fresno, US, sampled the seaweeds with a team of researchers based across the US and in Belgium. The algae had previously been identified. They belong to the scientific groups, or genera, called Palmophyllum and Verdigellas .

But Professor Zechman's team is the first to study their genetic make-up, and it is this research that has revealed their startling ancestry.

Green origins

Green plants in general belong to one of two groups, or clades.

One clade includes all land plants and the green algae with the most complex structures, known as charophytes or more commonly stoneworts. The other clade, known as the Chlorophyta, comprises all other green algae.



Verdigellas: older than we thought

Most studies have sought to determine what ancient plants gave rise to the land plants and stoneworts.

But little research has been done into the origin of the other green algae.

So Professor Zechman's team collected and studied Palmophyllum algae from New Zealand waters and Verdigellas from the western Atlantic Ocean.

These algae are unusual as they are multicellular, but their individual cells do not interact with each other in any meaningful way. Instead, single cells sit in a gelatinous matrix, which can form complex shapes such as stalks.

The scientists analysed the DNA within the nuclei and chloroplasts in the algae's cells.

Instead of belonging to the Chlorophyta, the scientists discovered that both types of algae actually belong to a distinct new group of green plants, one that is incredibly ancient. The algae are so different that they should be assigned their own Order, a high level taxonomic group, say the scientists.

What is more, "by comparing those gene sequences to the same genes in other green plants, we have discovered that these green algae are among the earliest diverging green plants... if not the earliest diverging lineage of green plants," Professor Zechman told the BBC. "That would put them in the ball park of over a billion years old."

Plant progenitor

The discovery could "vastly change" our view of which green plant was the ancestor to all those we see today, he says. That progenitor of green plants is currently thought to be a single-celled plant that had a tail-like structure called a flagellum, which allows the cell to move itself in water.

But no single-celled or flagellated algae of the types studied by Professor Zechman's team have been observed, suggesting the earliest green plants may not have had flagella after all.

Professor Zechman said the previously unrecognised ancient algae could be characterised as "living fossils", even though no actual fossils of such algae are known to exist. The algae's ability to harness low light intensities allows them to grow in deep water habitats - and that may be the key to their incredible longevity.

At such depths, plants face less stress from the actions of waves, variations in temperature and fewer herbivores that might feed on them.

<http://www.newscientist.com/article/mg20827874.800-life-is-found-in-deepest-layer-of-earths-crust.html>

Life is found in deepest layer of Earth's crust

* 18 November 2010 by Michael Marshall

IT'S crawling with life down there. A remote expedition to the deepest layer of the Earth's oceanic crust has revealed a new ecosystem living over a kilometre beneath our feet. It is the first time that life has been found in the crust's deepest layer, and an analysis of the new biosphere suggests life could exist lower still.

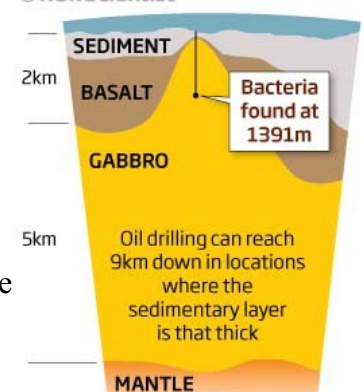
On a hypothetical journey to the centre of the Earth starting at the sea floor, you would travel through sediment, a layer of basalt, and then hit the gabbroic layer, which lies directly above the mantle. Drilling expeditions have reached this layer before, but as the basalt is difficult to pierce it happens rarely.

To facilitate the task, the Integrated Ocean Drilling Programme set its sights on the Atlantis Massif. Tectonic activity beneath this submerged mountain in the central Atlantic Ocean has pushed the gabbroic layer within 70 metres of the sea floor,

Life's deepest limits

Bacteria have been found living in the deepest layer of oceanic crust

©NewScientist



making it easier to reach (see diagram). A team led by Stephen Giovannoni of Oregon State University in Corvallis drilled down to 1391 metres, where temperatures reach 102 °C.

There, they found communities of bacteria that were sparse but widespread. The type of bacteria they found came as a surprise to Giovannoni, who has previously found micro-organisms living in the basalt layer. "We expected to find similar organisms in the deeper layer," he says. "But actually it was very different."

One key difference was that archaea were absent in the gabbroic layer. Also, genetic analysis revealed that unlike their upstairs neighbours, many of the gabbroic bugs had evolved to feed off hydrocarbons like methane and benzene. This is similar to the bacteria found in oil reservoirs and contaminated soil, which could mean that the bacteria migrated down from shallower regions rather than evolving inside the crust, the team say (PLoS ONE, DOI: 10.1371/journal.pone.0015399).

"This deep biosphere is a very important discovery," says Rolf Pedersen of the University of Bergen, Norway. He points out that the reactions that produce oil and gas abiotically inside the crust could happen in the mantle, meaning life may be thriving deeper yet.

http://www.eurekalert.org/pub_releases/2010-11/cmh-nsi111910.php

New study into bladder regeneration heralds organ replacement treatment A medical model developed for regenerating bladders by using stem cells

Researchers in the United States have developed a medical model for regenerating bladders using stem cells harvested from a patient's own bone marrow. The research, published in STEM CELLS, is especially relevant for paediatric patients suffering from abnormally developed bladders, but also represents another step towards new organ replacement therapies.

The research, led by Dr Arun Sharma and Earl Cheng from the Feinberg School of Medicine at Northwestern University and Children's Memorial Research Center, focused on bone marrow mesenchymal stem cells (MSCs) taken from the patient. Previously studies into the regenerative capacity of cells in bladders have focused on animal models, but these have translated poorly in clinical settings.

"Advances in the use of bone marrow stem cells taken from the patient opens up new opportunities for exploring organ replacement therapies, especially for bladder regeneration", said senior author Sharma. "Several findings from our study have demonstrated the plasticity of stem cells derived from bone marrow which make them ideal for this type of work."

The team discovered that bone marrow mesenchymal stem cells (MSCs) have phenotypic and physiological similarities with bladder smooth muscle cells (bSMCs) implying that MSCs can serve as an alternative cell source for potentially damaged bSMCs.

"For our research we developed a primate-based model, using the baboon bladder in conjunction with bone marrow MSCs to attempt partial bladder regeneration," said Sharma. "We found that the mesenchymal stem cells utilized throughout the study retained the ability to populate a surgically grafted area while remaining active 10 weeks after surgery."

The transplanted bone marrow cells also retained the ability to express key smooth muscle cell markers, attributes that are required for the continual expansion and contractile cycles of a functional bladder.

Currently information about the cellular and molecular interactions that govern bladder regeneration is scarce, however the team's research demonstrates the feasibility of MSCs in partial bladder regeneration and their use of a primate-based mode provides valuable insight into these processes as they may apply to humans."

"This newly described bladder augmentation model represents a unique insight into the bladder regeneration process and provides strong evidence that MSCs can be exploited for tissue engineering purposes," concluded Sharma. "The non-human primate bladder augmentation model established in this study will also further provide key pre-clinical data that may eventually be translated in a clinical setting."

"Bioengineering the repair of the bladder is not a simple matter. The combination of the clinical SIS material and patient supplied MSCs provides a good combination for further testing," said Mark Pittenger, Associate Editor of STEM CELLS. "Dr. Sharma and his colleagues are advancing the pioneering work of Dr. Anthony Atala. The progress in this field in the last few years is quite promising and more clinical studies are needed."

Full Citation: Sharma A, Bury M, Marks A, Fuller N, Meisner J, Tapaskar N, Hall L, Matoka D, Cheng E, "A Non-Human Primate Model for Urinary Bladder Regeneration Utilizing Autologous Sources of Bone Marrow Derived Mesenchymal Stem Cells", STEM CELLS, Wiley-Blackwell, November 2010: DOI

About the Research: This work was performed in conjunction with Northwestern University Feinberg School of Medicine, Department of Urology, Children's Memorial Hospital Division of Pediatric Urology, and the Institute for BioNanotechnology in Medicine (IBNAM) and through a generous gift from Sara C. Star

For more information, please visit: [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1549-4918](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1549-4918)

Red wine packed with antidiabetes compounds

* 14:54 19 November 2010 by Cian O'Luanaigh

Red wine is a potent source of antidiabetic compounds – but they might not get past your gut. The finding is sure to enliven the ongoing debate over the drink's health benefits.

Alois Jungbauer and colleagues at the University of Natural Resources and Life Sciences in Vienna, Austria, tested 10 reds and two whites to find out how strongly the wines bound to a protein called PPAR-gamma, which is targeted by the antidiabetic drug rosiglitazone. (This drug is marketed under the brand name Avandia and, while still available in the US, has been withdrawn in Europe because of fears over side effects.)

PPAR-gamma is a type of protein called a receptor. Among other things, it regulates the uptake of glucose in fat cells. Rosiglitazone targets PPAR-gamma in fat cells to make them more sensitive to insulin and improve the uptake of glucose. It is used as a treatment for type 2 diabetes, a condition where people either do not make enough insulin to keep their body's glucose levels down, or become resistant to normal insulin levels.

Several studies have shown that moderate consumption of red wine can reduce the risk of type 2 diabetes. So Jungbauer and colleagues determined the wines' binding affinity for PPAR-gamma and compared the results with the effects of rosiglitazone. They found that the white wines had low binding affinities, but all the reds bound readily: the tendency of 100 millilitres of red wine – about half a glass – to bind to PPAR-gamma is up to four times as strong as the same tendency in the daily dose of rosiglitazone.

Red and green

"It's incredible. It's a really high activity," says Jungbauer. "At first we were worried it was an artefact, but then we identified the compounds responsible in the wine."

The flavonoid epicatechin gallate – which is also present in green tea – had the highest binding affinity, followed by the polyphenol ellagic acid, which comes from the oak barrels the wine is kept in. The researchers think that some of the antidiabetic activity of red wine could be due to these compounds activating PPAR-gamma.

But Jungbauer warns that these compounds don't make red wine a magic bullet. The compounds in a glass of wine may have other antidiabetic effects and in any case, not all of the compounds will be absorbed and available to the body to use. "Wine also contains ethanol, which will add to your calories," he says.

Véronique Cheynier, research director at the department of oenology at the University of Montpellier 1, France, says that most polyphenols do not pass through the digestive tract unchanged and may not be absorbed at all.

True temperance

The next step for Jungbauer and his team will be to measure the metabolic effects of the wine compounds on healthy people. Jungbauer stresses that moderate consumption is the key to health benefits from wine. "It is important to limit the intake of wine. Obesity is one of the major problems of our society," he says.

Paras Mishra of the University of Louisville, Kentucky, who was not involved in the study, warns that drinking too much wine "could be bad even in diabetes". *Journal reference: Food and Function, DOI: 10.1039/c0fo00086h*

<http://news.discovery.com/archaeology/ancient-chinese-dinner-archaeology.html>

Chinese Noodle Dinner Buried for 2,500 Years

Noodles, moon cakes and other foods dating to 2,500 years ago were recently unearthed in a Chinese cemetery.

By Jennifer Viegas | Fri Nov 19, 2010 10:29 AM ET

Noodles, cakes, porridge, and meat bones dating to around 2,500 years ago were recently unearthed at a Chinese cemetery, according to a paper that will appear in the *Journal of Archaeological Science*.

Since the cakes were cooked in an oven-like hearth, the findings suggest that the Chinese may have been among the world's first bakers. Prior research determined the ancient Egyptians were also baking bread at around the same time, but this latest discovery indicates that individuals in northern China were skillful bakers who likely learned baking and other more complex cooking techniques much earlier.

"With the use of fire and grindstones, large amounts of cereals were consumed and transformed into staple foods," lead author Yiwen Gong and his team wrote in the paper.

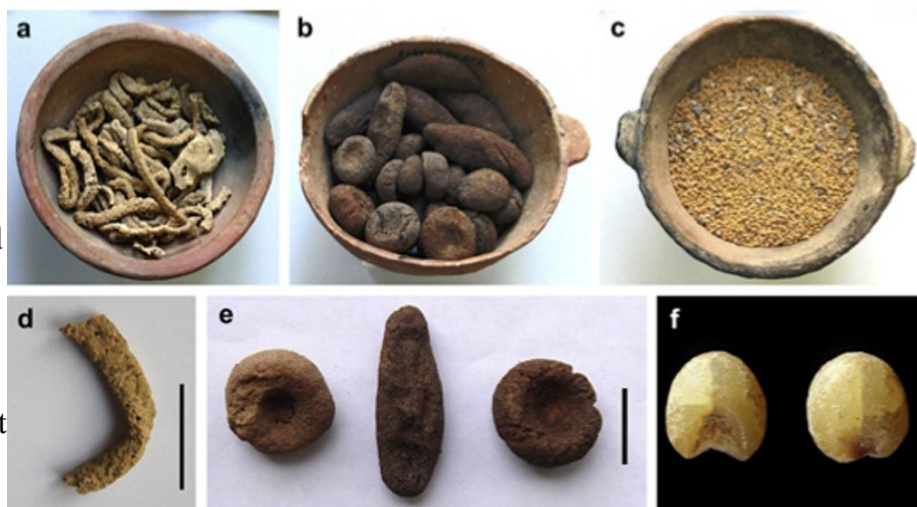
Gong, a researcher at the Graduate University of Chinese Academy of Sciences, and his team dug up the foods at the Subeixi Cemeteries in the Turpan District of Xinjiang, China. This important cultural communication center between East and Central China has a desert climate.

"As a result, the climate is so dry that many mummies and plant remains have been well preserved without decaying," according to the scientists, who added that the human remains they unearthed at the site looked more European than Asian.

"Judging from the preserved mummies, most of them resemble typical Europeans, with light-colored hair, deep-set eyes, and protruding noses," the researchers wrote. "Of the 19 mummies examined, only three are Mongolian."

The individuals may have been living in a semi agricultural, pastoral artists' community, since a pottery workshop was found nearby, and each person was buried with pottery. The archaeologists also found bows, arrows, saddles, leather chest-protectors, boots, woodenwares, knives, an iron aw, a leather scabbard, and a sweater in the graves. But the scientists focused this particular study on the excavated food.

The food included noodles mounded in an earthenware bowl, sheep's heads (which may have held symbolic meaning), another earthenware bowl full of porridge, and elliptical-shaped cakes as well as round baked goods that resembled modern Chinese moon cakes.



Among food recently found buried in China for 2,500 years were (a and d) noodles and (b and e) cakes that resemble today's Chinese moon cakes. Yiwen Gong

Chemical analysis of the starches revealed that both the noodles and cakes were made of common millet.

The scientists next put new millet through a barrage of cooking experiments to see if they could duplicate the micro-structure of the ancient foods, which would then reveal how the prehistoric chefs cooked the millet.

The researchers determined that boiling damages the appearance of individual millet grains, while baking leaves them more intact. The scientists therefore believe the millet grains in one bowl were once boiled into porridge, the noodles were boiled, and the cakes were baked.

"Baking technology was not a traditional cooking method in the ancient Chinese cuisine, and has been seldom reported to date," according to the authors, who nevertheless believe these latest food discoveries indicate baking must have been a widespread cooking practice in northwest China 2,500 years ago.

The discoveries add to the growing body of evidence that millet was the grain of choice for this part of China. Houyuan Lu of the Chinese Academy of Sciences' Institute of Geology and Physics, along with other researchers, unearthed millet-made noodles dating to 4,000 years ago at the Laijia archaeological site, also in northwest China. In that case, "the noodles were thin, delicate, more than 19.7 inches in length and yellow in color," according to Lu and his colleagues. "They resemble the La-Mian noodle, a traditional Chinese noodle that is made by repeatedly pulling and stretching the dough by hand."

Gong and his team point out that millet was domesticated about 10,000 years ago in northwest China and was probably a food staple because of its drought resistance and ability to grow in poor soils.

<http://www.physorg.com/news/2010-11-youtube-psas-comments-persuasive-videos.html>

YouTube PSAs: Comments more persuasive than videos

(PhysOrg.com) -- Michigan State University researchers, studying public service announcements placed on YouTube about marijuana use, have found that the comments accompanying the PSAs are more influential among viewers than the videos themselves.

The researchers showed four anti-marijuana PSAs, and the accompanying comments, to college students and asked for their evaluations of the PSAs and their attitudes about marijuana.

What was found was that negative, derisive comments about the video led the students to perceive the video as worse than when the comments were positive, even though they watched the videos individually. And when students identified with the anonymous commenters, the comments affected their perceptions of marijuana's harmful effects.

"Generally, the comments changed people's attitudes more than the variations of the videos," said Joseph Walther, a professor in the Department of Telecommunication, Information Studies and Media, and the Department of Communication, who led the research. Results of the research were published in a recent edition of the journal Human Communication Research.

"We were somewhat surprised that it affected people's marijuana attitudes," Walther said. "We thought people would already have opinions about marijuana and that a set of comments on a YouTube page would not influence them. But we were wrong."

What wasn't surprising, Walther said, was that many of the research subjects were swayed by opinions offered by anonymous viewers.

"The theory is that when you don't know about the person who is communicating with you as an individual, the more you assume that you're just like them," he said. "It's kind of a crowd effect. But if you knew who these individuals were, that crowd effect would go away."

About 150 college-age students were shown four anti-marijuana PSAs, some more visually interesting, some more compelling than others. The students were also shown the comments and then asked to fill out a questionnaire assessing the video.

"Perceptions of the videos' quality," Walther said, "were affected by the positive or negative nature of the comments."

Other members of the research team included MSU epidemiology professor James Anthony, and MSU doctoral students David DeAndrea and Jinsuk Kim.

To see the PSAs that were viewed by study participants, visit: http://www.youtube.com/watch?v=_PI_PmMK0v8 ;

<http://www.youtube.com/watch?v=2igbXWmzt6U> ;

<http://www.youtube.com/watch?v=m9oS0DG7E9w>; or <http://www.youtube.com/watch?v=Rkj7uAQ8YV8> .

Provided by Michigan State University

<http://www.bbc.co.uk/news/health-11784759>

'I had my menopause at 28'

By Jane Elliott Health reporter, BBC News

When Katy Hayward failed to get pregnant quickly she knew something was wrong.

Doctors reassured her that she was in 'peak health', but Katy was worried and pushed to see a specialist.

"I just knew something was not right," she said.

And at the age of just 28 she was given the devastating news that she had gone into an early menopause.

Help needed

"I was shocked," she said. Having a child is a rite of passage for a woman. This was one of the hardest things I have ever gone through.

Katy, now 30, was referred to a specialist to see whether anything could be done to save her eggs, but it was already too late. Her only hope now is egg donation - but she faces a lengthy wait of up to five years.

Katy has put motherhood plans on hold, but says she would still like a baby one day. She says young women like her are offered little help and advice to cope with the condition and its side effects.

"I had hot flushes and irregular periods and the GP just put me on HRT treatment. I had to ask for counselling," she said.

Study help

Now a project at the the Menopause Research Unit at Guy's Hospital London hopes to make things better for women like Katy.

Dr Beth Cartwright, from the unit, explained that there is so little known about the condition that they do not even know the best treatment regime.

Treatments. Photo: AJ Photo/SPL The study hopes to decide on treatments

In premature ovarian failure, the level of the female hormone oestrogen is very low and hormone replacement - through HRT or the contraceptive pill - is recommended to alleviate 'menopausal' symptoms and protect against bone loss and cardiovascular disease.

"We don't know what the best treatment is - or the effects of not taking any treatment," said Dr Cartwright.

"We need to see whether HRT or the pill is the best. No-one has really looked at before."

"At the moment we have to say to women that its up to them what they take."

She hopes the study will help change this.

"Through a number of tests, scans and questionnaires over a two year period, we will compare the effects of the different treatments and the no-treatment option on bone health, cardiovascular health, sexual function, symptom control, psychological wellbeing and overall quality of life.

"All women taking part will receive comprehensive care relevant to their premature ovarian failure and their participation will help in the treatment of early menopause in the future."

Katy, from Lancashire, said that she had felt isolated until she met Dr Cartwright and her team, but that now she felt she was getting the help she needs.

"I was on HRT and it was not working, but they said I could go on the pill and it has been absolutely magnificent. I feel better and it stopped the hot flushes.

Early menopause facts

Women who have an early menopause experience more bone loss and fractures and more chance of having heart attack and stroke - due to a loss of oestrogen
Early menopause affects one woman in 1,000 under 30;
one in 100 under 40 and five in 100 under 45

"The study will help others and in time there will be a better management programme and gynaecologists will be more aware. "And they won't just slide a piece of paper across the table with details of support groups, which is what happened to me."

http://www.eurekalert.org/pub_releases/2010-11/ason-pit111010.php

Protein in the urine: A warning sign for cognitive decline

1. Small Amounts of Urinary Protein Predict More Rapid Cognitive Decline in Elderly Women Screening Efforts in Older Individuals May Be Warranted

A new study has found that low amounts of albumin in the urine, at levels not traditionally considered clinically significant, strongly predict faster cognitive decline in older women. The study involved more than 1,200 women aged >70 years in the Nurses' Health Study who were phoned every two years for three cycles and tested for general cognition, verbal/word memory, verbal fluency (speed in making word associations), and working/short-term memory. Julie Lin, MD (Brigham and Women's Hospital) and her colleagues found that participants with a urinary albumin-to-creatinine ratio of >5 mcg/mg at the start of the study experienced cognitive decline at a rate 2 to 7 times faster in all cognitive measures than that attributed to aging alone over an average 6 years of follow-up. "The strongest association was seen with a decline in the verbal fluency score, which has been attributed to progressive small vessel disease in the brain, which supports the view that albuminuria is an early marker of diffuse vascular disease," said Dr. Lin. "Therefore, in light of the aging U.S. population, which is at risk for cognitive decline and vascular disease, simple, non-invasive screening for albumin in the urine as an independent predictor for subsequent cognitive decline may represent an important public health issue."

Study co-authors include Fran Grodstein, PhD, Jae Hee Kang, PhD, and Gary Curhan, MD, ScD, (Brigham and Women's Hospital).

Disclosures: Dr. Curhan is a consultant for Takeda Pharmaceuticals; receives grants/research support from Astellas and honoraria from Takeda Pharmaceuticals. Dr. Lin, Dr. Grodstein, and Dr. Hee Kang reported no other financial disclosures. The study abstract, "A Prospective Study of Albuminuria and Cognitive Decline in Women," [SA-FC355] will be presented as an oral presentation on Saturday, November 20 Day, Date at 5:18 PM MT in Room 405 of the Colorado Convention Center in Denver, CO.

2. Urinary Protein Excretion Increases Risk of Cognitive Impairment Simple Urine Tests Could Identify Individuals at Risk

Two characteristics of kidney disease—excreting protein in the urine (albuminuria) and low kidney function—increase individuals' risk of becoming confused and forgetful. To see whether these two characteristics are related or independent in their effects on cognitive decline, Manjula Kurella Tamura, MD (Stanford University) and her colleagues studied clinical data from 19,399 individuals participating in the Renal Reasons for Geographic and Racial Differences in Stroke (REGARDS) study. A total of 1,184 participants (6.1%) developed cognitive impairment over an average follow-up of 3.8 years. Individuals with albuminuria were 1.31-1.57 times more likely to develop cognitive impairment compared to individuals without albuminuria. This association was strongest for individuals with normal kidney function (eGFR ≥ 60 ml/min/1.73m²) and attenuated among individuals with low levels of kidney function. Conversely, low kidney function (eGFR <60 ml/min/1.73m²) was associated with a higher risk for developing cognitive impairment only among individuals without albuminuria. Surprisingly, individuals with albuminuria and normal kidney function had a higher probability for developing cognitive impairment as compared to individuals with moderate reductions in kidney function (eGFR 45-59 ml/min/1.73m²) in the absence of albuminuria. The findings indicate that the presence of protein in the urine, even in small amounts, could be a warning sign that a patient may later have difficulty thinking clearly. "The results are important because albuminuria is easily measured and potentially modifiable. Incorporating information about albuminuria along with kidney function should help clinicians identify patients at high risk for subsequent cognitive decline and dementia," said Dr. Kurella Tamura.

Study co-authors include Virginia Wadley, PhD, Mary Cushman, Frederick Unverzagt, PhD, Neil Zakai, MD, Brett Kissela, MD, David Warnock, MD, and William McClellan, MD (for the REGARDS Study Group, University of Alabama at Birmingham).

Disclosures: The study received pharmaceutical company support in addition to funding from the National Institute of Neurological Disorders and Stroke. Dr. Cushman is a consultant for Glaxo Smith Kline and receives grants/research support from Amgen. Dr. Unverzagt holds ownership in Eli Lilly. Dr. Warnock is a consultant for Genzyme and Gilhead, holds ownership in Parion and Relypsa, and receives honoraria from Genzyme, Amicus, Amgen, Gilhead, and Shire. Dr. McClellan receives grant/research support from and is a scientific advisor for Amgen. Dr. Wadley, Dr. Zakai, and Dr. Kissela reported no financial disclosures.

The study abstract, "Albuminuria, Kidney Function and the Incidence of Cognitive Impairment in US Adults," [SA-FC359] will be presented as an oral presentation on Saturday, November 20 Day, Date at 6:06 PM MT in Room 405 of the Colorado Convention Center in Denver, CO.

<http://www.physorg.com/news/2010-11-elderly-blame-fractures-falls-sodium.html>

Elderly can blame fractures and falls on low sodium

Older adults with even mildly decreased levels of sodium in the blood (hyponatremia) experience increased rates of fractures and falls, according to a study presented at the American Society of Nephrology's 43rd Annual Meeting and Scientific Exposition.

Falls are a serious health problem for the elderly and account for about 50 percent of deaths due to injury in the elderly.

"Screening for a low sodium concentration in the blood, and treating it when present, may be a new strategy to prevent fractures," comments Ewout J. Hoorn, MD, PhD (Erasmus Medical Center, Rotterdam, the Netherlands). However, hyponatremia does not appear to affect the risk of osteoporosis, as defined by low bone mineral testing, so more research is needed to understand the link between sodium levels and fracture risk.

The study included more than 5,200 Dutch adults over age 55, all with initial information on sodium levels and six-year follow-up data on fractures and falls. "A number of recent studies suggested a relationship between hyponatremia, falls, osteoporosis, and fractures," Hoorn explains. The authors' goal was to confirm these possible associations using prospective, long-term follow-up data.

About eight percent of the study participants, all community dwelling adults, had hyponatremia. This group of older participants had a higher rate of diabetes and was more likely to use diuretics (water pills) than those with normal sodium levels. Subjects with hyponatremia had a higher rate of falls during follow-up: 24 versus 16 percent. However, there was no difference in bone mineral density between groups, so hyponatremia was not related to underlying osteoporosis.

Nevertheless, the group with low sodium levels had a higher rate of fractures. With adjustment for other risk factors, the risk of vertebral / vertebral compression fractures was 61 percent higher in the older adults with hyponatremia. The risk of non-spinal fractures, such as hip fractures, was also significantly increased: a 39 percent difference.

The relationship between hyponatremia and fracture risk was independent of the increased rate of falls in the low-sodium group. Subjects with hyponatremia also had a 21 percent increase in the risk of death during follow-up.

Hyponatremia is the most common electrolyte disorder, usually developing because the kidneys retain too much water. "Although the complications of hyponatremia are well-recognized in hospitalized patients, this is one of the first studies to show that mild hyponatremia also has important complications in the general population," says Hoorn.

Further study will be needed to clarify the mechanism by which low sodium levels increase fracture risk. In the meantime, "Screening older adults for and treatment of hyponatremia in older adults may be an important new strategy to prevent fractures," adds Hoorn. *Provided by American Society of Nephrology*

http://www.eurekalert.org/pub_releases/2010-11/ason-pjb111010.php

Pomegranate juice: Beyond antioxidants, potential benefits for dialysis patients

Pomegranate juice reduces damage to tissues, inflammation and infections

Studies in recent years have claimed multiple health benefits of pomegranate juice, including that it is a good source of antioxidants and lowers both cholesterol and blood pressure, especially in diabetic and hypertensive patients. A preliminary study now suggests that it can ward off a number of complications in kidney disease patients on dialysis, including the high morbidity rate due to infections and cardiovascular events, according to a paper being presented at the American Society of Nephrology's 43rd Annual Meeting and Scientific Exposition in Denver, CO.

Batya Kristal, MD, FASN (Western Galilee Hospital, in Nahariya, Ruth & Bruce Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel), PhD candidate, Lilach Shema, and colleagues studied 101 dialysis patients who received either pomegranate juice or another placebo drink at the beginning of each dialysis session, three times a week for one year.

Laboratory tests showed that patients who drank pomegranate juice experienced reduced inflammation and the damage of oxidative stress caused by free radicals, was minimized. Furthermore, pomegranate juice drinkers were less likely to be hospitalized due to infections. These findings support other studies that suggest pomegranate juice has potent antioxidant properties.

Recent analyses of data not included in this abstract, revealed that those who drank pomegranate juice also showed an improvement in cardiovascular risk factors, such as reduced blood pressure, improvement in lipid profile and fewer cardiovascular events, suggesting that they had better heart health. These results are in agreement with other studied populations and particularly important for hemodialysis patients, because most kidney disease patients die either from cardiovascular-related causes or infections.

The authors say their findings suggest that drinking a controlled amount of pomegranate juice with a safe and monitored content of potassium may help reduce the complications that often occur in dialysis patients. It is important to consider the risk involved in potassium overload, especially in chronic kidney disease (CKD) patients with dietary potassium restriction.

"Considering the expected epidemic of CKD in the next decade, further clinical trials using pomegranate juice aimed at reducing the high cardiovascular morbidity of CKD patients and their deterioration to end-stage renal disease should be conducted," said Dr. Kristal.

Study co-authors include Ronit Geron, MD, Galina Shapiro, Shifra Sela, PhD (Western Galilee Hospital), and Liora Ore (University of Haifa).

Disclosures: The authors reported no financial disclosures. The study was supported by the Chief Scientist Office of the Ministry of Health, Israel; Jess & Midred Fisher Family Cardiology Research Fund, and the Office of the Executive Vice President for Research, Technion, Israel.

"One Year of Pomegranate Juice Consumption Decreases Oxidative Stress, Inflammation and Incidence of Infections in Hemodialysis Patients," [TH-FC059] will be presented as an oral presentation on Thursday, November 18, 2010 at 6:06 PM MT in Korbel 4A of the Colorado Convention Center in Denver, CO.

<http://www.bbc.co.uk/news/world-europe-11804943>

Pope's condom comments welcomed by campaign groups

Catholic reformers and groups working to combat HIV have welcomed remarks by Pope Benedict that the use of condoms might not always be wrong.

The Pope said their use might be justified on a case by case basis to prevent the spread of HIV/Aids.

The remarks, due to be published in a book next week, mark a softening of his previously hard line against condoms in the battle against HIV, analysts say.

But the Vatican spokesman said this was no "revolution" in Church teaching. "The pope maintains that condom use to lessen the danger of infection is a 'first assumption of responsibility,'" said Fr Federico Lombardi, quoting from the book. "The reasoning of the pope cannot certainly be defined as a revolutionary turn."

The Vatican has long opposed condoms as an artificial form of contraception.

This has drawn heavy criticism, particularly from Aids campaigners, who say condoms are one of the few methods proven to stop the spread of HIV.

'Significant shift'

Pope Benedict said during a visit to Cameroon last year that handing out condoms might actually make HIV infection worse, drawing criticism from several EU states.

In his latest comments, however, he said the use of condoms might be justified in exceptional circumstances.

He gave the example of male prostitutes where, he said, using condoms to prevent the spread of AIDS could be seen as an act of moral responsibility, even though condoms were "not really the way to deal with the evil of HIV infection".

This marks a significant shift in his previously implacable opposition to the use of condoms, says the BBC's religious affairs correspondent, Robert Pigott.

UNAIDS, the United Nations programme on HIV/Aids, welcomed the comments as a "significant and positive step forward. This move recognises that responsible sexual behaviour and the use of condoms have important roles in HIV prevention," said UNAIDS Executive Director Michel Sidibe.

The Kenya Treatment Access Movement (KETAM), which works to combat the spread of HIV, welcomed what it said was the Pope's acceptance of reality that abstinence did not always work. "It's accepting the reality on the ground," said David Kamau, head of the KETAM. "If the Church has failed to get people to follow its moral values and practice abstinence, they should take the next best step and encourage condom use."

The Catholic reform group We Are Church said the comments showed the Pope was able to learn from experience.

Analysis
David Willey BBC News, Rome
<i>This appears to be a relaxation of a hitherto uncompromising Vatican ban on the use of artificial contraception. There CAN be exceptions in the name of combating Aids, the Pope says.</i>
<i>It is already clear from the welcome the Pope's words have received from dissident Catholics, from Aids workers and from Vatican observers that this does mark a major shift in Vatican attitudes, if not in the formal teaching of the Catholic Church.</i>
<i>"It's a marvellous victory for common sense," was the reaction of Jon O'Brien - the head of the American dissident Catholic group Catholics for Choice.</i>
<i>A crack has opened in the Church's ban on contraception because of the aids epidemic, particularly in Africa. Catholic moral theologians have been discussing for years the theory of what the Pope has now openly expressed in terms of accepting the lesser of two evils.</i>

The British gay rights campaigner, Peter Tatchell, told the BBC the Pope's comments were significant but needed "clarification".

'Not a moral solution'

The new book - Light of the World: The Pope, the Church and the Signs of the Times - is based on a series of interview the Pope gave the German Catholic journalist, Peter Seewald, earlier this year.

When asked whether the Catholic Church was not opposed in principle to the use of condoms, the Pope replied: "She of course does not regard it as a real or moral solution, but, in this or that case, there can be nonetheless, in the intention of reducing the risk of infection, a first step in a movement toward a different way, a more human way, of living sexuality."

Pope Benedict said the "sheer fixation on the condom implies a banalisation of sexuality" where sexuality was no longer an expression of love, "but only a sort of drug that people administer to themselves".

Although Pope Benedict reiterated the Church's fundamental opposition to contraception, and repeated his view that condoms were not the answer to curbing HIV, he added that there was much in the area of sexual ethics that needed to be pondered and expressed in new ways.

Austen Ivereigh, coordinator of the Catholic Voices group, said that while this was the first time the Pope had voiced such an opinion on condoms, it was in line with what Catholic moral theologians have been saying for many years.

"The Church's teaching on contraception predates the discovery of Aids," Mr Ivereigh told the BBC news website. "The prevalence of HIV raised the question of whether condoms could be used to prevent the transmission of the virus. "If the intention is to prevent transmission of the virus, rather than prevent contraception, moral theologians would say that was of a different moral order."

'Lack of understanding'

But Clifford Longley, who writes for The Tablet, a British Catholic newspaper, said the development was far more significant than a nuanced change in attitude. He said the "small concession... could easily become a collapse in the whole edifice of Catholic teaching on contraception".

"The implication seems to me to be much vaster than even the Pope anticipates," said Mr Longley.

The UK's Family Planning Association criticised the Pope's wider opposition to condom use, despite his recent comments.

Chief Executive Julie Bentley said: "The Pope's previously stated view that condoms do not protect against HIV is wholly wrong and irresponsible. "Whilst we welcome the Pope's suggestion that he would support some use of condoms, we remain very disappointed that he implies this should only be in limited circumstances. This view demonstrates his lack of understanding that HIV can affect all people who have sex, regardless of who they are and who they have sex with.

"Thousands of people across the world trust his word, and he therefore has a responsibility to give correct information on how people can protect themselves when having sex. That means he should be encouraging and supporting condom use at all times".

The Vatican newspaper, L'Osservatore Romano, published excerpts of the interview in its Saturday edition.

<http://www.physorg.com/news/2010-11-tigers-extinct-years-unprotected.html>

Tigers could be extinct in 12 years if unprotected

(AP) -- Wild tigers could become extinct in 12 years if countries where they still roam fail to take quick action to protect their habitats and step up the fight against poaching, global wildlife experts told a "tiger summit" Sunday.

The World Wildlife Fund and other experts say only about 3,200 tigers remain in the wild, a dramatic plunge from an estimated 100,000 a century ago.

James Leape, director general of the World Wildlife Fund, told the meeting in St. Petersburg that if the proper protective measures aren't taken, tigers may disappear by 2022, the next Chinese calendar year of the tiger.

Their habitat is being destroyed by forest cutting and construction, and they are a valuable trophy for poachers who want their skins and body parts prized in Chinese traditional medicine.

The summit approved a wide-ranging program with the goal of doubling the world's tiger population in the wild by 2022 backed by governments of the 13 countries that still have tiger populations: Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, Vietnam and Russia.

The Global Tiger Recovery Program estimates the countries will need about \$350 million in outside funding in the first five years of the 12-year plan. The summit will be seeking donor commitments to help governments finance conservation measures.

"For most people tigers are one of the wonders of the world," Leape told The Associated Press. "In the end, the tigers are the inspiration and the flagship for much broader efforts to conserve forests and grasslands."

The program aims to protect tiger habitats, eradicate poaching, smuggling, and illegal trade of tigers and their parts, and also create incentives for local communities to engage them in helping protect the big cats.

The summit, which runs through Wednesday, is hosted by Russian Prime Minister Vladimir Putin, who has used encounters with tigers and other wild animals to bolster his image. It's driven by the Global Tiger Initiative which was launched two years ago by World Bank President Robert Zoellick.

Leape said that along with a stronger action against poaching, it's necessary to set up specialized reserves for tigers and restore and conserve forests outside them to let tigers expand. "And you have to find a way to make it work for the local communities so that they would be partners in tigers conservation and benefit from them," Leape said. "To save tigers you need to save the forests, grasslands and lots of other species," he added. "But at the same time you are also conserving the foundations of the societies who live there. Their economy depends very much on the food, water and materials they get from those forests."

About 30 percent of the program's cost would go toward suppressing the poaching of tigers and of the animals they prey on. Russia's Natural Resources Minister Yuri Trutnev said that Russia and China will create a protected area for tigers alongside their border and pool resources to combat poaching.

Leape said that for some of the nations involved outside financing would be essential to fulfill the goals.

"We need to see significant commitment by the multilateral and bilateral institutions like the Global Environment Facility and the World Bank plus individual governments like the U.S. and Germany," Leape told the AP.

For advocates, saving tigers has implications far beyond the emotional appeal of preserving a graceful and majestic animal.

"Wild tigers are not only a symbol of all that is splendid, mystical and powerful about nature," the Global Tiger Initiative said in a statement. "The loss of tigers and degradation of their ecosystems would inevitably result in a historic, cultural, spiritual, and environmental catastrophe for the tiger range countries."

Three of the nine tiger subspecies - the Bali, Javan, and Caspian - already have become extinct in the past 70 years. Much has been done recently to try to save tigers, but conservation groups say their numbers and habitats have continued to fall, by 40 percent in the past decade alone.

In part, that decline is because conservation efforts have been increasingly diverse and often aimed at improving habitats outside protected areas where tigers can breed, according to a study published in September in the *Popular Library of Science Biology* journal.

Putin has done much to draw attention to tigers' plight. During a visit to a wildlife preserve in 2008, he shot a female tiger with a tranquilizer gun and helped place a transmitter around her neck as part of a program to track the rare cats.

Later in the year, Putin was given a 2-month-old female Siberian tiger for his birthday. State television showed him at his home gently petting the cub, which was curled up in a wicker basket with a tiger-print cushion. The tiger now lives in a zoo in southern Russia.

<http://www.physorg.com/news/2010-11-spontaneous-mutations-important-mental-retardation.html>

Spontaneous mutations important cause of mental retardation

New research by Dutch geneticists affiliated with the Radboud University Nijmegen Medical Centre demonstrates that spontaneous mutations are an important cause of mental retardation.

The majority of mental retardation is caused by spontaneous mutations in paternal sperm or maternal egg cells, the scientists say.

With this conclusion, the researchers have not only resolved an important paradox but have also caused a small revolution in the world of medical genetics. They present their work in the journal *Nature Genetics*.

Mental retardation is a severe disorder that affects approximately two percent of the general population. Over the last few years, several genes have been identified to cause this disorder, but these have so far only explained a limited number of cases. The main genetic cause, referred to as the 'missing heritability', still awaits discovery. But what is this missing heritability for mental retardation?

Dutch researchers affiliated with the Radboud University Nijmegen Medical Centre, under supervision of Joris Veltman and Han Brunner, show in their article in *Nature Genetics* that newly generated (de novo) mutations explain a large portion of mental retardation. As such, mental retardation is not transmitted from one generation to the next, but occurs through spontaneously arisen genetic changes in the egg or sperm cells of the parents; The child has a defect in one of the genes, which still shows a normal function in both parents.

The researchers read the genetic code of all 20,000 genes for 10 patients with mental retardation. A similar analysis was performed for their healthy parents. By comparing the genetic codes obtained, differences in genes between parents and child could be precisely determined.

For nine out of ten children, the researchers indeed found such changes, each time in a different gene. For three children, the change identified was irrelevant to their disorder. But more important, for the remaining six children, they found two changes that are definitely relevant to their disorder and the four other changes are most likely related to their disorder. Geneticist Joris Veltman: "Apparently, the mental retardation observed in six of these ten children can be explained by a novel genetic change, a de novo mutation. This is more than half of all - so far - unexplained mental retardation!"

In the world of medical genetics, mental retardation reflects an intriguing paradox. Individuals with mental retardation seldom have children themselves; as such, they do not pass their impairment on to the next generation. Nonetheless, the frequency of mental retardation in the general population balances and remains around two percent. How can this be possible? Then what is the cause of mental retardation? This question has never been answered to full satisfaction.

Veltman and Brunner now offer a surprising resolution for this paradox. A majority of mental retardation occurred by chance; by novel mutations in the genetic code of the children. It is expected that approximately 1,000 of all 20,000 genes can cause mental retardation. When a de novo mutation hits one of these genes, it will result in mental retardation.

Parents of children with mental retardation often want to understand the cause of the mental retardation, but also want to estimate their recurrence risk for future pregnancies. Clinical geneticist Han Brunner: "In more than half of the cases we could not answer this question as we did not know the cause. With this approach, it is now possible to elucidate up to sixty percent of all currently unsolved causes. In addition, we can now determine the recurrence risk for those families in which a de novo mutation caused the mental retardation. This risk will be only marginally increased compared to the general population. For many parents this is a reassuring message which may play a role in their decision making process for additional children."

On average, one new mutation will appear during the process that copies all parental genes to their child. With 1,000 of all 20,000 genes potentially playing a role in mental retardation, the chance of having a child with mental retardation is relatively high. A similar scenario is likely to be true for other diseases in which a large number of genes play a role, such as schizophrenia and autism. The concept of de novo mutations might be equally important for these diseases.

These findings may cause a small revolution for genetic research, a shift in paradigm. Veltman: "So far, mental retardation was thought to be caused by an interaction of multiple genes. We describe this as complex genetics. Indeed, in the general population mental retardation can be caused by as many as thousand genes. But on an individual level, each case -- as we now found -- is caused by a mutation in a single gene. This newly generated mutation can be readily identified by reading the genetic code of the parents and their child, because there is only one distinguishing factor, which is the causative mutation. This opens a new window of opportunity to look at disease, diagnostics, therapy and prevention."

This research has only now been made possible due to recent technological developments. Brunner: "At the beginning of this year, the department of human genetics heavily invested in state-of-art sequencing equipment. This machine does not read the genetic code of a single gene, but enables the readout of all 20,000 genes in a single experiment. This enormous acceleration of analyzing the genome, which is referred to as 'Next Generation Sequencing', has caused a revolution in genetics. With this, personal genomics will become feasible, both from a financial aspect as well as from the time span needed to complete such an experiment. Our research is a nice example of this." *Provided by UMC St Radboud*

<http://www.physorg.com/news/2010-11-kids-er-fell-cold-medicines.html>

Kids' ER visits fell after cold medicines' removal

Removing cough and cold medicines for very young children from store shelves led to a big decline in emergency room visits for bad reactions to the drugs, government research found.

But the results released online Monday are a mixed bag: Some parents were still giving their infants and toddlers these medicines, and many ER cases still involved youngsters who apparently got hold of the medications themselves.

That suggests parents who stopped using them hadn't discarded old bottles or kept them out of reach after manufacturers voluntarily withdrew medicines labeled for infants and kids up to age 2 in 2007.

The bottom-line message: "Keep all medicines up and away and out of sight," said Dr. Daniel Budnitz, the study's senior author and a researcher at the Centers for Disease Control and Prevention.

Budnitz said the results also indicate the need for better childproof containers.

The study appears in the journal *Pediatrics*.

Makers of over-the-counter cough and cold medicines voluntarily withdrew the products, mostly syrups, in October 2007. Pediatricians had complained that the products don't work in young kids and posed a safety risk because of accidental overdoses causing extreme drowsiness, increased heart rate and even some deaths.

The Food and Drug Administration in 2008 warned against using the medicines in children younger than 2; labels now advise against using them in children younger than 4, Budnitz noted.

CDC researchers compared nonfatal ER visits in children younger than 2 with bad reactions to cough and cold medicines in the 14 months before the withdrawal and in the 14 months afterward. A total of 63 nationally representative hospitals were involved. Extrapolating, the number of visits nationwide linked with cough and cold medicine dropped by more than half, from 2,790 visits to 1,248, the researchers found.

However, two-thirds of the cases before and after involved kids taking medicine on their own. Dr. Elizabeth Powell, an ER physician at Chicago's Children's Memorial Hospital, called that result disappointing but said it may have taken a while for parents to get the message "so these things aren't laying around the house."

The removal left many parents feeling helpless about relieving their children's cold symptoms. Powell said parents often bring babies with stuffy noses and other cold symptoms to the emergency room seeking help. She tells them there's little doctors can do other than suggesting parents remove excess mucous with a bulb device and try acetaminophen (Tylenol) or ibuprofen for comfort.

More information: American Academy of Pediatrics: <http://www.aap.org>