

Deep brain stimulation shows promising results for unipolar and bipolar depression
A new study shows that deep brain stimulation is a safe and effective intervention for treatment-resistant depression in patients with either unipolar major depressive disorder or bipolar II disorder

ATLANTA—A new study shows that deep brain stimulation (DBS) is a safe and effective intervention for treatment-resistant depression in patients with either unipolar major depressive disorder (MDD) or bipolar II disorder (BP). The study was led by Helen S. Mayberg, MD, professor in the Departments of Psychiatry and Behavioral Sciences and Neurology at Emory University School of Medicine, with co-investigators Paul E. Holtzheimer, MD, lead psychiatrist and now associate professor and director of the Mood Disorders Service, Dartmouth Medical School, and neurosurgeon Robert E. Gross, MD, PhD, associate professor in the Departments of Neurosurgery and Neurology at Emory. Gross served as chief neurosurgeon for the study. The study was published Online First by Archives of General Psychiatry, one of the JAMA/Archives journals.

"Depression is a serious and debilitating medical illness," says Mayberg. "When we found that the potential for effective and sustained antidepressant response with DBS for patients with otherwise treatment resistant major depressive disorder was high, the next step was to determine if patients with intractable bipolar depression could also be successfully treated."

An earlier study by Mayberg done in Toronto in collaboration with scientists at Toronto Western Hospital, University Health Network and Emory, was the first to show such results for patients with treatment-resistant major depressive disorder. Mayberg conducted this new expanded trial at Emory to include patients with bipolar II disorder.

Bipolar spectrum disorder, sometimes referred to as manic-depression, is characterized by bouts of mania or hypomania alternating between episodes of depression. Although people with bipolar II disorder do not have full manic episodes, depressive episodes are frequent and intense, and there is a high risk of suicide. A major challenge in treating bipolar depression is that many antidepressant medications may cause patients to "switch" into a hypomanic or manic episode.

DBS uses high-frequency electrical stimulation targeted to a predefined area of the brain specific to the particular neuropsychiatric disorder. Here, each study participant was implanted with two thin wire electrodes, one on each side of the brain. The other end of each wire was connected under the skin of the patient's neck to a pulse generator implanted in the chest – similar to a pacemaker – that directs the electrical current.

Study participants received single-blind stimulation for four weeks (patients did not know if the DBS system was on or off), followed by active stimulation for 24 weeks. Patients were evaluated for up to two years following onset of active stimulation. Seventeen patients were enrolled in the study.

A significant decrease in depression and increase in function were associated with continuing stimulation. Remission and response rates were 18 percent and 41 percent after 24 weeks; 36 percent and 36 percent after one year and 58 percent and 92 percent after two years of active stimulation. Patients who achieved remission did not experience a spontaneous relapse. Efficacy was similar for Major Depressive Disorder and Bi-Polar patients, and no participant experienced a manic or hypomanic episode.

Mayberg and her colleagues continue to refine this intervention. Current studies include demographic, clinical and imaging predictors of response and remission, and introduction of psychotherapeutic rehabilitation. Why and how this treatment works is the primary focus of ongoing research.

"Most of these patients have been in a depressed state for many years and are disabled and isolated," says Holtzheimer. "As their depression improves, they need a process to help them achieve full recovery that includes integration back into society. "We hope to optimize the rate of improvement for these patients by using a model of care that provides psychotherapeutic rehabilitation built on evidence-based psychotherapy but tailored to the specific individual's situation."

The study was funded by grants from the Dana Foundation, Stanley Medical Research Institute, Woodruff Foundation, and Emory Healthcare. The study was performed under a physician sponsored IDE to Dr Mayberg (G060028 and registered at Clinicaltrials.gov ID#: NCT00367003). Investigational DBS devices were donated by St. Jude Medical Neuromodulation Inc., which was otherwise uninvolved in the study.

Holtzheimer has received grant funding from the Greenwall Foundation, NARSAD, National Institutes of Health Loan Repayment Program and National Institute of Mental Health (NIMH); he has received consulting fees from St. Jude Medical Neuromodulation.

Gross has received consulting fees from St. Jude Medical Neuromodulation, Boston Scientific and Bayer Healthcare and he has equity in Neurovista.

Mayberg has a consulting agreement with St. Jude Medical Neuromodulation, which has licensed her intellectual property to develop SCC DBS for the treatment of severe depression. The terms of these arrangements have been reviewed and approved by Emory University in accordance with their conflict-of-interest policies.

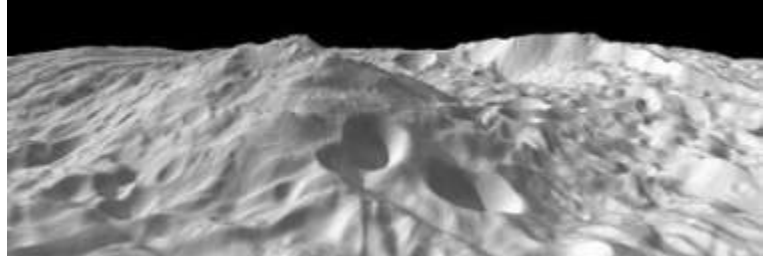
<http://www.physorg.com/news/2012-01-space-mountain-terrestrial-meteorites.html>

Space mountain produces terrestrial meteorites

When NASA's Dawn spacecraft entered orbit around giant asteroid Vesta in July, scientists fully expected the probe to reveal some surprising sights.

But no one expected a 13-mile high mountain, two and a half times higher than Mount Everest, to be one of them. The existence of this towering peak could solve a longstanding mystery: How did so many pieces of Vesta end up right here on our own planet?

For many years, researchers have been collecting Vesta meteorites from "fall sites" around the world. The rocks' chemical fingerprints leave little doubt that they came from the giant asteroid.

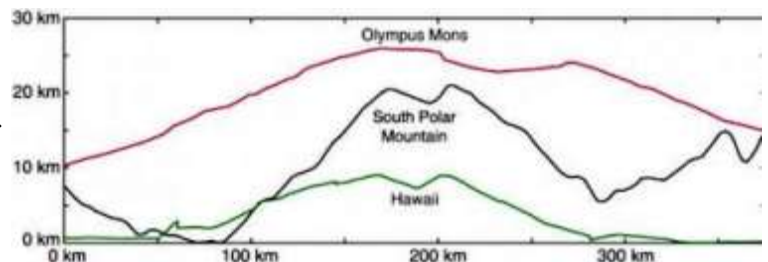


A side view of Vesta's great south polar mountain.

Earth has been peppered by so many fragments of Vesta, that people have actually witnessed fireballs caused by the meteoroids tearing through our atmosphere. Recent examples include falls near the African village of Bilanga Yanga in October 1999 and outside Millbillillie, Australia, in October 1960.

"Those meteorites just might be pieces of the basin excavated when Vesta's giant mountain formed," says Dawn PI Chris Russell of UCLA. Russell believes the mountain was created by a 'big bad impact' with a smaller body; material displaced in the smashup rebounded and expanded upward to form a towering peak. The same tremendous collision that created the mountain might have hurled splinters of Vesta toward Earth. "Some of the meteorites in our museums and labs," he says, "could be fragments of Vesta formed in the impact -- pieces of the same stuff the mountain itself is made of."

To confirm the theory, Dawn's science team will try to prove that Vesta's meteorites came from the mountain's vicinity. It's a "match game" involving both age and chemistry. "Vesta formed at the dawn of the solar system," says Russell. "Billions of years of collisions with other space rocks have given it a densely cratered surface."



Cross-section of the south polar mountain on Vesta with the cross sections of Olympus Mons on Mars, the largest mountain in the solar system, and the Big Island of Hawaii as measured from the floor of the Pacific, the largest mountain on Earth. These latter two mountains are both shield volcanoes. Credit: Russell et. al. (2011), EPSC

The surface around the mountain, however, is tellingly smooth. Russell believes the impact wiped out the entire history of cratering in the vicinity. By counting craters that have accumulated since then, researchers can estimate the age of the landscape. "In this way we can figure out the approximate age of the mountain's surface. Using radioactive dating, we can also tell when the meteorites were 'liberated' from Vesta. A match between those dates would be compelling evidence of a meteorite-mountain connection."

For more proof, the scientists will compare the meteorites' chemical makeup to that of the mountain area.

"Vesta is intrinsically but subtly colorful. Dawn's sensors can detect slight color variations in Vesta's minerals, so we can map regions of chemicals and minerals that have emerged on the surface. Then we'll compare these colors to those of the meteorites." Could an impact on Vesta really fill so many museum display cases on Earth? Stay tuned for answers. *Source: Science@NASA*

<http://nyti.ms/sdG23f>

Genome Study Points to Adaptation in Early African-Americans

Researchers scanning the genomes of African-Americans say they see evidence of natural selection as their ancestors adapted to the harsh conditions of their new environment in America.

By NICHOLAS WADE

The scientists, led by Li Jin of the Chinese Academy of Sciences in Shanghai, report in the journal *Genome Research* that certain disease-causing variant genes became more common in African-Americans after their ancestors reached American shores — perhaps because they conferred greater, offsetting benefits. Other gene variants have become less common, the researchers say, like the gene for sickle cell hemoglobin, which in its

more common single-dose form protects against malaria. The Shanghai team suggests the gene has become less common in African-Americans because malaria is much less of a threat.

The purpose of studying African-American genomes is largely medical. Most searches for variant genes that cause disease take place in people of European ancestry, and physicians want to make sure they have not missed variants that may be more common in African-Americans and helpful for developing treatments or diagnosis. Such searches often reveal events in a population's history by pinpointing genes that have changed under the pressure of natural selection.

The unusually common variants identified by the Shanghai team are associated with higher risk of hypertension, prostate cancer, sclerosis and bladder cancer. "Most of the genes associated with African-American ethnic diseases," they write, "may have played an important role in African-Americans' adaptation to local environment." But the authors have not yet been able to identify the benefits they believe such genes conferred.

Mark D. Shriver, a geneticist at Penn State, said it was plausible that some versions of a gene would become more common as African-Americans adjusted to a new environment. "It's very valid to expect that there will be factors subject to genetic adaptation and that are now more prevalent in contemporary African-Americans than in the ancestral group," he said.

But Alkes L. Price, a geneticist at the Harvard School of Public Health, said the Shanghai team's results, though plausible, fell short of proof. "This paper does not provide evidence of selection having occurred post-Africa," he said.

The Shanghai researchers used a method for studying admixture, a geneticist's term for when two populations or races intermarry; China has several such populations, perhaps accounting for the team's interest. Using gene chips that analyze common variations in the human genome, researchers can deconstruct the chromosomes of an African-American, say, assigning each chunk of DNA to an African or European origin.

The scientists found that of the African-American genomes in their sample, 22 percent of the DNA came from Europeans, on average, and the rest from African ancestors, a figure in line with other estimates.

They then looked for sites along the genome where either European or African ancestry was present at statistically significant levels above the average, finding four regions with very common European ancestry and two with very common African ancestry. Most of these sites harbored genes of unknown function, but one, of European origin, holds a gene that combats influenza, suggesting it has become more common in African-Americans by conferring protection from the disease.

Dr. Price, however, said that two other research teams had applied the same method to African-American genomes without finding any statistically significant excess of European or African ancestry. The Chinese team, in his view, should have applied a correction factor to their statistics and, had they done so, would have obtained the same result.

In another approach, the Shanghai team focused on all the DNA segments of the African origin in the African-American genomes, discarding all the European DNA. They then compared the African component of African-American genomes with the DNA of the Yoruba of Nigeria, a well-studied population that happens to be genetically very close to the West African population from which many slaves were taken.

The Shanghai team then asked how the African genome had changed after Africans arrived in the United States. They found that versions of some genes had become more common and others less so. The less common genes included several known to be involved in protection against malaria.

Dr. Price, however, said the decrease in gene frequency might have another explanation — the fact that resistance to malaria varies in strength in different regions of West Africa. The Shanghai team may be looking at the difference in malaria resistance between the Yoruba and other African populations, not the difference between today's African-Americans and their African ancestors, he said.

Researchers can analyze the ancestry of admixed populations because of the way the hereditary material is shuffled between generations. People have a double set of chromosomes, of which one member of each pair comes from the mother and one from the father. When the egg or sperm is made, the maternal and paternal copies of a chromosome line up and swap large chunks of DNA.

The swapped segments are so large that it takes many generations before they are whittled down to a length too small to be recognized. Meanwhile, the ancestry of each segment can be identified from its pattern of single-nucleotide polymorphisms, or SNPs, the sites on the human genome where there is commonly variation in the A, T, C and G units that make up DNA.

Among human populations, there are very few absolute differences, meaning those in which all members of one population will have, for example, unit T at a site and all members of another will have unit G. But populations do have characteristic percentages. Among Europeans, 70 percent may have C and 30 percent A at

a particular SNP site, whereas in Africans the ratio may be 40 percent C and 60 percent A. So a section of genome with C at this SNP site is somewhat more likely to be European.

This is hardly decisive in itself. But take a row of 10 SNPs, and if European ancestry is more likely for most of them, then that section of DNA is probably European in origin.

Geneticists can thus deconstruct the genomes of admixed populations into a mosaic in which each segment can be traced back to one or the other of the two parent populations. This is the basis of the Shanghai team's approach. But proving that natural selection has been at work in very recent times - in this case, the last 300 years - is very difficult, because the traces of selection are still small. To be sure of detecting such weak selection signals, Dr. Jin and his colleagues conclude, researchers in the future should analyze many thousands of genomes.

<http://www.scientificamerican.com/article.cfm?id=12-must-see-skywatching>

12 Must-See Skywatching Events in 2012

The top 12 "skylights" for this coming year include a "double planet" in May and a Venus transit of the sun in June.

By Joe Rao | Monday, January 2, 2012 | 1

As the year 2011 comes to a close, some might wonder what is looming sky-wise for 2012? What celestial events might we look forward to seeing?

I've selected what I consider to be the top 12 "skylights" for this coming year, and list them here in chronological order. Not all these events will be visible from any one locality ... for the eclipses, for instance, you'll probably have to do some traveling ... but many can be observed from the comfort of your backyard.

Hopefully your local weather will cooperate on most, if not all, of these dates. Clear skies!

Jan. 4: Quadrantid meteor shower peaks

This meteor shower reaches its peak in the predawn hours of Jan. 4 for eastern North America. The Quadrantid meteor shower is a very short-lived meteor display, whose peak rates only last several hours. The phase of the moon is a bright waxing gibbous, normally prohibitive for viewing any meteor shower, but the moon will set by 3 a.m., leaving the sky dark for a few hours until the first light of dawn; that's when you'll have the best shot at seeing many of these bluish-hued meteors.

From the eastern half of North America, a single observer might count on seeing as many as 50-to-100 "Quads" in a single hour. From the western half of the continent the display will be on the wane by the time the moon sets, with hourly rates probably diminishing to around 25 to 50 meteors.

Feb. 20 to March 12: Best evening apparition of Mercury

In February and March, the "elusive" innermost planet Mercury moves far enough from the glare of the sun to be readily visible soon after sunset. Its appearance will be augmented by two other bright planets (Venus and Jupiter), which also will be visible in the western sky during this same time frame.

Mercury will arrive at its greatest elongation from the sun March 5. It will be quite bright (-1.3-to-0 magnitude) before this date and will fade rapidly to +1.6 magnitude thereafter. Astronomers measure the brightness of objects in terms of magnitude, with lower numbers corresponding to brighter objects.

March 3: Mars arrives at opposition

On March 3, the Earth will be passing Mars as the two planets wheel around the sun in their respective orbits. Because Mars reaches aphelion - its farthest point from the sun - on Feb. 15, this particular opposition will be an unfavorable one. In fact, two days after opposition, Mars will be closest to Earth at a distance of 62.6 million miles.

Compare this with the August 2003 opposition when Mars was only 34.6 million miles away. Nonetheless, even at this unfavorable opposition the fiery-hued Mars will be an imposing naked-eye sight, shining at magnitude -1.2, just a bit dimmer than Sirius, the brightest star, and will be visible in the sky all night long.

March 13: Brilliant "double planet"

The two brightest planets, Venus and Jupiter, team up to make for an eye-catching sight in the western sky soon after sunset. They will be separated by 3 degrees on this evening, Venus passing to the northwest (upper right) of Jupiter and shining nearly eight times brighter than "Big Jupe." Although they will gradually go their separate ways after this date, on March 25 and 26, a crescent moon will pass by, adding additional beauty to this celestial scene.

May 5: Biggest full moon of 2012

The moon turns full at 11:35 p.m. Eastern Daylight Time and just 25 minutes later it will arrive at its closest point to the Earth in 2012, at a distance of 221,801 miles. Expect a large range in ocean tides (exceptionally low to exceptionally high) for the next few days.

May 20: Annular eclipse of the sun

The path of annularity for this eclipse starts over eastern China and sweeps northeast across southern and central Japan. The path continues northeast then east, passing just south of Alaska's Aleutian Island chain. The path then turns to the southeast, making landfall in the western United States along the California-Oregon coast. It will pass over central Nevada, southern Utah, northern Arizona, the extreme southwest corner of Colorado and most of New Mexico before coming to an end over northern Texas.

Since the disk of the moon will appear smaller than the disk of the sun, it will create a "penny on nickel" effect, with a fiery ring of sunlight shining around the moon's dark silhouette. Locations that will witness this eerie sight include Eureka and Reading, Calif.; Carson City, Reno and Ely, Nev.; Bryce Canyon in Utah; Arizona's Grand Canyon; Albuquerque and Santa Fe in New Mexico and just prior to sunset for Lubbock, Tex.

A partial eclipse of the sun will be visible over a large swath of the United States and Canada, including Alaska and Hawaii, but no eclipse will be visible near and along the Atlantic Seaboard.

June 4: Partial eclipse of the moon

This partial lunar eclipse favors the Pacific Ocean; Hawaii sees it high in the sky during the middle of its night. Across North America the eclipse takes place between midnight and dawn. The farther east one goes, the closer the time of moonset coincides with the moment that the moon enters the Earth's dark umbral shadow.

In fact, over the Northeastern United States and eastern Canada, the only evidence of this eclipse will be a slight shading on the moon's left edge (the faint penumbral shadow) before moonset. Over the Canadian Maritimes, the moon will set before the eclipse begins. At maximum, more than one-third of the moon's lower portion (37.6-percent) will be immersed in the umbra.

June 5: Rare transit of Venus across the sun

The passage of Venus in front of the sun is among the rarest of astronomical events, rarer even than the return of Halley's Comet every 76 years. Only six transits of Venus are known to have been observed by humans before: in 1639, 1761, 1769, 1874, 1882 and, most recently, in 2004.

The next one will occur in the year 2117. When Venus is in transit across the solar disk, the planet appears as a distinct, albeit tiny, round black spot with a diameter just 1/32nd of the sun. This size is large enough to readily perceive with the naked eye. HOWEVER ... prospective observers are warned to take special precautions (as with a solar eclipse) when attempting to view the silhouette of Venus against the blindingly brilliant solar disc.

The beginning of the transit will be visible from all of North America, Greenland, extreme northern and western portions of South America, Hawaii, northern and eastern portions of Asia including Japan, New Guinea, northern and eastern portions of Australia, and New Zealand. The end will be visible over Alaska, all of Asia and Indonesia, Australia, Eastern Europe, the eastern third of Africa, and the island nation of Madagascar.

Aug. 12: Perseid meteor shower

Considered to be among the best of the annual displays thanks to its high rates of up to 90 per hour for a single observer, as well as its reliability. Beloved by summer campers and often discovered by city dwellers who might be spending time in the country under dark starry skies. [10 Perseid Meteor Shower Facts]

Last summer a bright moon wrecked the shower by blotting out many of the fainter streaks, but in 2012 the moon will be three days past last quarter phase on this peak morning – a fat waning crescent presenting only a minor nuisance for prospective observers.

Nov. 13: Total eclipse of the sun

The first total solar eclipse since July 2010. Virtually the entire path of totality falls over water. At the very beginning, the track cuts through Australia's Northern Territory just to the east of Darwin, then across the Gulf of Carpentaria, then through northern Queensland, passing over Cairns and Port Douglas before heading out to sea. The rest of the eclipse path, including the point of the maximum duration of totality (4 minutes, 2 seconds) is, unfortunately, pretty much wasted by falling over the open waters of the Pacific Ocean.

Dec. 13-14: Geminid meteor shower

If there is one meteor display guaranteed to put on a very entertaining show it is the Geminid meteor shower. Now considered by most meteor experts to be at the top of the list, surpassing in brilliance and reliability even the August Perseids.

Bundle warmly against the winter chill; you can start observing as soon as darkness falls on the evening of Dec. 13 as Gemini starts coming up above the eastern horizon and continue through the rest of the night. Around 2 a.m. when Gemini is almost directly overhead, you might see as many as two meteor sightings per minute ... 120 per hour! And the moon is new, meaning that it will not be a factor at all.

Dec. 25: Christmas evening and Jupiter

On Christmas, many will be looking skyward and wondering what that brilliant silvery "star" is hovering just above the waxing gibbous moon. It's not a star (or Santa returning to the North Pole), but the largest planet in our solar system, Jupiter, serving as a sort of holiday ornament with our nearest neighbor in space to cap off a year of interesting and predictable sky events that we all can enjoy!

This story was updated to include the correct date of the next Venus transit of the sun, which occurs in 2117.

www.newscientist.com/article/mg21228441.500-how-crossword-puzzles-mess-with-your-mind.html

How crossword puzzles mess with your mind

The agony and the ecstasy of solving a crossword puzzle can reflect a surprising amount about the subconscious mind

03 January 2012 by Stephen Battersby

TACKLING a crossword can crowd the tip of your tongue. You know that you know the answers to 3 down and 5 across, but the words just won't come out. Then, when you've given up and moved on to another clue, comes blessed relief. The elusive answer suddenly occurs to you, crystal clear.

The processes leading to that flash of insight can illuminate many of the human mind's curious characteristics. Crosswords can reflect the nature of intuition, hint at the way we retrieve words from our memory, and reveal a surprising connection between puzzle solving and our ability to recognise a human face.

"What's fascinating about a crossword is that it involves many aspects of cognition that we normally study piecemeal, such as memory search and problem solving, all rolled into one ball," says Raymond Nickerson, a psychologist at Tufts University in Medford, Massachusetts. In a paper published earlier this year, he brought profession and hobby together by analysing the mental processes of crossword solving (*Psychonomic Bulletin and Review*, vol 18, p 217).

1 across: "You stinker!" - audible cry that allegedly marked displacement activity (6)

Most of our mental machinations take place pre-consciously, with the results dropping into our conscious minds only after they have been decided elsewhere in the brain. Intuition plays a big role in solving a crossword, Nickerson observes. Indeed, sometimes your pre-conscious mind may be so quick that it produces the goods instantly.

At other times, you might need to take a more methodical approach and consider possible solutions one by one, perhaps listing synonyms of a word in the clue.

Even if your list doesn't seem to make much sense, it might reflect the way your pre-conscious mind is homing in on the solution. Nickerson points to work in the 1990s by Peter Farvolden at the University of Toronto in Canada, who gave his subjects four-letter fragments of seven-letter target words (as may happen in some crossword layouts, especially in the US, where many words overlap). While his volunteers attempted to work out the target, they were asked to give any other word that occurred to them in the meantime. The words tended to be associated in meaning with the eventual answer, hinting that the pre-conscious mind solves a problem in steps.

Should your powers of deduction fail you, it may help to let your mind chew over the clue while your conscious attention is elsewhere. Studies back up our everyday experience that a period of incubation can lead you to the eventual "aha" moment. Don't switch off entirely, though. For verbal problems, a break from the clue seems to be more fruitful if you occupy yourself with another task, such as drawing a picture or reading (*Psychological Bulletin*, vol 135, p 94). So if 1 across has you flummoxed, you could leave it and take a nice bath, or better still read a novel. Or just move on to the next clue.

1 down: Sounds like... sounds like Umberto's (6)

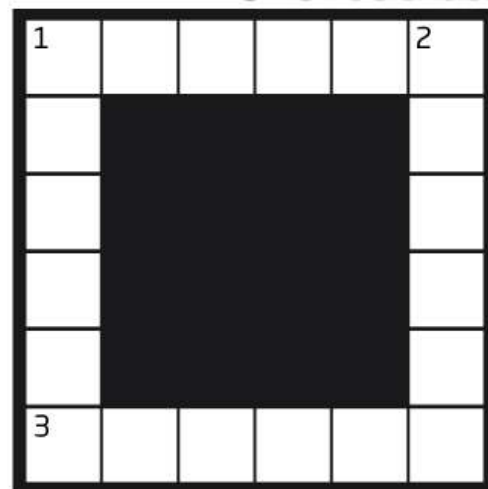
Pre-conscious processing is hidden from us, so it is not clear how the mind sifts through our mental lexicon to answer a clue. As written language is only a recent reflection of the long-evolved spoken word, Nickerson suspects that sounds are important. He illustrates this with a simple puzzle: quickly think of four-letter words ending in -any, -iny, -ony, -uny and -eny. When you've done it, read on.

You probably had little trouble with the first four, but may have struggled with the last one. Nickerson thinks that is because the only common word ending in -eny has a different pattern of stress from the natural way of reading the three-letter fragment. Research supports this idea, showing that a three-letter syllable forms a more

Window on the mind

Use the clues embedded in the story to solve this crossword

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effective clue than three other consecutive letters. So our mental dictionary is not just alphabetical, but also phonological. In which case, it may help to say the clue or your guesses out loud.

2 down: Nearly, nearly all, at the tips of many of solvers' tongues (6)

When solving these puzzles, you might initially have a strong feeling about whether you know the answer or not - and these intimations are likely to be right. Given a mixture of solvable and unsolvable word association tests, subjects tend to guess correctly which ones they will and won't be able to answer. In crosswords, says Nickerson, this "feeling of knowing" can be useful. If you are pretty sure you know the answer, you sensibly spend more time trying to get it; if you are certain that you don't, you move on and try to get intersecting words instead.

Psychologists make a fine distinction between this feeling of knowing and a sense of something being "on the tip of the tongue". The latter, more irritating state is the feeling that an answer will come soon, rather than that it will come eventually. It is often false, as the phantom of revelation fades away. One theory is that a wrong word retrieved from our memory blocks the way for the right word - a state that Nickerson recognises in crossword solving when an initial wrong guess makes it more difficult to find the true solution.

3 across: Choose from among various electronics (6)

Be careful with the more difficult puzzles - cryptic crosswords can warp the mind in surprising ways. Michael Lewis of Cardiff University in the UK came to this conclusion while investigating why results from police line-ups are so unreliable. He was following up research showing that face recognition can become temporarily impaired after a task known as the local Navon stimulus. The subject is presented with a large alphabetical letter made up from repetitions of a smaller letter, and is asked to read out the smaller letters while ignoring the larger one. This seemingly innocuous preparation made them much worse at a face recognition test.

Nobody is likely to perform this obscure task before they are called to pick out someone in a line-up, so Lewis decided to look at more common waiting room activities: sudoku puzzles, reading a book, literal crosswords and cryptic crosswords. Lewis thought the sudoku puzzles would have the biggest effect; the crosswords were only there as controls. But the subjects tackling the first three tasks all achieved roughly the same results in face recognition tests, whereas those wrestling with cryptic clues performed far worse (Perception, vol 35, p 1433).

Lewis speculates that some form of suppression may play a role. In the Navon task you must suppress the global picture, and in cryptic crosswords it helps to suppress larger linguistic units and break up phrases to look for hidden wordplay and definitions. As a side effect, that seems to suppress our ability to see a face as a whole unit. The phenomenon goes beyond visual and verbal realms - Navon stimuli also affect wine-tasting ability, says Lewis. "It suggests there is some overlap in processing between all these tasks."

Crosswords naturally probe connections between ideas and words, and Nickerson suggests that psychologists could make more use of these puzzles when studying cognition. The human mind is itself a fiendish puzzle, so perhaps it's not surprising that they cast light on its workings. Even if that light turns out to be oblique; aslant; indirect; elliptical... *Answers: 1A Eureka, 1D Echoes, 2D Almost, 3A Select*

<http://www.bbc.co.uk/news/science-environment-16393296>

Impossible crystals are 'from space'

Examples of a crystal previously thought to be impossible in nature may have come from space, a study shows.

Quasicrystals have an unusual structure - in between those of crystals and glasses. Until two years ago, quasicrystals had only been created in the lab - then geologists found them in rocks from Russia's Koryak mountains.

In PNAS journal, a team says the chemistry of the Russian crystals suggests they arrived in meteorites.

Quasicrystals were first described in the 1980s by Israeli researcher Daniel Schechtman, who was awarded last year's Nobel Prize in Chemistry for the discovery. Schechtman's ideas were initially treated with doubt or scorn by some of his peers, who thought the structures were "impossible".

The minerals were the first reported naturally-occurring quasicrystals. Icosahedrite, ideally $Al_{13}Cu_{24}Fe_{13}$

Rule breaker

Quasicrystals break some of the rules of symmetry that apply to conventional crystalline structures. They also exhibit different physical and electrical properties.



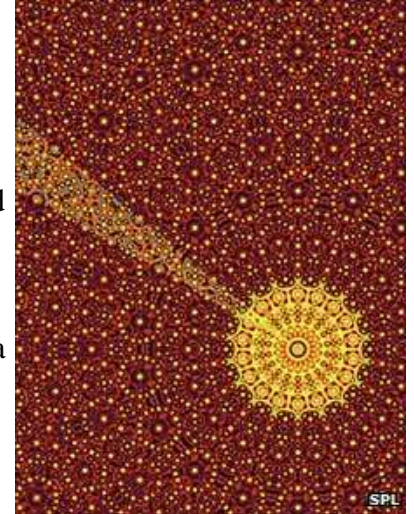
In 2009, Luca Bindi, from the University of Florence, Italy, and his colleagues [reported finding quasicrystals](#) in mineral samples from the Koryak mountains in Russia's far east. The mineral - an alloy of aluminium, copper, and iron - showed that quasicrystals could form and remain stable under natural conditions. But the natural process that created the structures remained an open question.

Now, Dr Bindi, Paul Steinhardt from Princeton University and others claim that tests point to an extra-terrestrial origin for the Russian minerals.

They used the technique of mass spectrometry to measure different forms - or isotopes - of the element oxygen contained in parts of the rock sample.

The pattern of oxygen isotopes was unlike any known minerals that originated on Earth. It was instead closer to that sometimes found in a type of meteorite known as a carbonaceous chondrite.

The samples also contained a type of silica which only forms at very high pressures. This suggests it either formed in the Earth's mantle, or was formed in a high-velocity impact, such as that which occurs when a meteorite hits the Earth's surface. "Our evidence indicates that quasicrystals can form naturally under astrophysical conditions and remain stable over cosmic timescales," the team writes in PNAS.



The "forbidden symmetry" of the quasicrystal was first spied in 1982

<http://www.scientificamerican.com/article.cfm?id=what-hand-you-favor-shapes-moral-space>

What Hand You Favor Shapes Your Moral Space

Being right- or left-handed affects your psychology in many ways, recent research shows

By Mandira Hegde and Andrew Il Yang | Tuesday, January 3, 2012 | 10

You're out to dinner at a restaurant that just recently opened. Steamed mussels or steamed calamari? Three cheese ravioli or eggplant parmesan? Strawberry cheesecake or chocolate mousse? With so many good choices, how to decide?

A series of studies led by psychologist Daniel Casasanto suggests that one thing that may shape our choice is the side of the menu an item appears on. Specifically, Casasanto and his team have shown that for left-handers, the left side of any space connotes positive qualities such as goodness, niceness, and smartness. For right-handers, the right side of any space connotes these same virtues. He calls this idea that "people with different bodies think differently, in predictable ways" the body-specificity hypothesis.

In one of Casasanto's experiments, adult participants were shown pictures of two aliens side by side and instructed to circle the alien that best exemplified an abstract characteristic. For example, participants may have been asked to circle the "more attractive" or "less honest" alien. Of the participants who showed a directional preference (most participants did), the majority of right-handers attributed positive characteristics more often to the aliens on the right whereas the majority of left-handers attributed positive characteristics more often to aliens on the left.

Handedness was found to predict choice in experiments mirroring real-life situations as well. When participants read near-identical product descriptions on either side of a page and were asked to indicate the products they wanted to buy, most righties chose the item described on the right side while most lefties chose the product on the left. Similarly, when subjects read side-by-side resumes from two job applicants presented in a random order, they were more likely to choose the candidate described on their dominant side.

Follow-up studies on children yielded similar results. In one experiment, children were shown a drawing of a bookshelf with a box to the left and a box to the right. They were then asked to think of a toy they liked and a toy they disliked and choose the boxes in which they would place the toys. Children tended to choose to place their preferred toy in the box to their dominant side and the toy they did not like to their non-dominant side.

Casasanto has also shown that body specificity is malleable. When participants were forced to temporarily use their non-dominant hand, their natural bias flipped to associate positive qualities with the side they were forced to use. In a recent study, adult right-handers were asked to wear a bulky glove on their right hand, temporarily turning them into lefties. After a short period of time, participants began showing a "good-is-left" bias like natural lefties, placing items thought to be "good" in a box to their left. This suggests that changes in motor experience can change the direction of the body-specific bias in a matter of minutes.

These results have potentially lucrative implications for marketing strategy. Approximately 70 to 95 percent of all people are right-handed. Would companies be able to better market their products by placing their products on shelves or billboards to the right of their competitor's products? Should companies vie to have their advertisements placed to the far right on web pages?

These experiments also raise an important question for artificial intelligence: If our cognition and decisions are partially rooted in how we use our body to navigate our environment, will intelligent machines of the future require a physical presence in order to match human intelligence? Some neuroscientists believe that motility was a major driving force in the evolution of the brain. It might be the case that even forms of intelligence based on silicon will not get far without a physical world to explore.

http://www.eurekalert.org/pub_releases/2012-01/sfsu-dfp122011.php

Deadly fly parasite spotted for first time in honey bees

SF State researchers new find may help understanding of 'colony collapse disorder'

SAN FRANCISCO -- Honey bees can become the unwitting hosts of a fly parasite that causes them to abandon their hives and die after a bout of disoriented, "zombie-like" behavior, San Francisco State University researchers have found. The phenomenon, first observed on the SF State campus, may help scientists learn more about colony collapse disorder (CCD). This mysterious ailment has drastically increased honey bee colony losses across the United States since its discovery in 2006.

So far, the fly parasite has only been found in honey bee hives in California and South Dakota, said SF State Professor of Biology John Hafernik. But the possibility that it is an emerging parasite "underlines the danger that could threaten honey bee colonies throughout North America, especially given the number of states that commercial hives cross and are deployed in," Hafernik and colleagues write in the January 3, 2012 issue of PLoS ONE.

Hafernik, who also serves as president of the California Academy of Sciences, didn't set out to study the parasitized bees. In 2008, he was just looking for some insects to feed the praying mantis that he had brought back to SF State's Hensill Hall after an entomology field trip. He scrounged the bees from underneath the light fixtures outside the biology building.

"But being an absent-minded professor," Hafernik joked, "I left them in a vial on my desk and forgot about them. Then the next time I looked at the vial, there were all these fly pupae surrounding the bees."

The fly, *Apocephalus borealis*, deposits its eggs into a bee's abdomen. Usually about seven days after the bee dies, fly larvae push their way into the world from between the bee's head and thorax. But it's the middle part of this macabre story that may be the most scientifically interesting to those studying the dramatic and mysterious disappearance of honey bees.

After being parasitized by the fly, the bees abandon their hives in what is literally a flight of the living dead to congregate near lights. "When we observed the bees for some time—the ones that were alive—we found that they walked around in circles, often with no sense of direction," said Andrew Core, an SF State graduate student from Hafernik's lab who is the lead author on the study.

Core won first place at the 2011 California State University Research Competition and the Geraldine K. Lindsay Award for excellence in the natural sciences at the annual meeting of the Pacific Division of the American Association for the Advancement of Science for his presentation of the bee research.



This shows Phorid larvae exiting a bee. John Hafernik

Bees usually just sit in one place, sometimes curling up before they die, said Core. But the parasitized bees were still alive, unable to stand up on their legs. "They kept stretching them out and then falling over," he said. "It really painted a picture of something like a zombie."

Bees that left the hives at night were more likely to bear the parasite than those who foraged during the day, the researchers found. Genetic tests of parasitized hives also showed that both bees and flies were often infected with deformed wing virus and a fungus called *Nosema ceranae*.

Some researchers have pointed to the virus and fungus as potential culprits in colony collapse disorder, and hive abandonment is the primary characteristic of the disorder. It may be time, Hafernik said, to consider how the fly parasite fits into the CCD picture. He said the next step is to find out exactly how the parasite is affecting the bees' behavior. It is possible, he said, that the parasite is somehow interfering with the bees' "clock genes" that help them keep a normal day-night rhythm.

The researchers also don't know if the infected bees are leaving the hive of their own accord, or whether they give off some sort of chemical signal that provokes their hive mates into throwing them out. "A lot of touching and tasting goes on in a hive," Hafernik said, "and it's certainly possible that their co-workers are finding them

and can tell that there's something wrong with them." The scientists will deploy a range of tools -- from tiny radio tags to video monitoring -- to help them answer these questions and discover ways to protect the hives.

"We don't know the best way to stop parasitization, because one of the big things we're missing is where the flies are parasitizing the bees," Hafernik noted. "We assume it's while the bees are out foraging, because we don't see the flies hanging around the bee hives. But it's still a bit of a black hole in terms of where it's actually happening."

Genetic analysis of the parasites confirmed that they are the same flies that have been infecting bumblebees, raising the possibility that the fly is an emerging and potentially costly new threat to honey bees.

"Honey bees are among the best-studied insects in the world," Hafernik noted. "So at one level, we would expect that if this has been a long-term parasite of honey bees, we would have noticed."

Colleagues in this study, "A new threat to honey bees, the parasitic phorid fly Apocephalus borealis." include SF State students Jonathan Ivers, Christopher Quock, Travis Siapno and Seraphina DeNault; SF State Assistant Professor of Biology Christopher D. Smith; graduate student Charles Runckel and Professor of Biology Joseph DeRisi from the University of California, San Francisco; and phorid expert Brian Brown from the Natural History Museum of Los Angeles County.

http://www.eurekalert.org/pub_releases/2012-01/ehs-ssi010312.php

Sexual satisfaction in women increases with age According to new study in the American Journal of Medicine

Philadelphia, PA -- A new study of sexually active older women has found that sexual satisfaction in women increases with age and those not engaging in sex are satisfied with their sex lives. A majority of study participants report frequent arousal and orgasm that continue into old age, despite low sexual desire. The study appears in the January issue of the American Journal of Medicine.

Researchers from the University of California, San Diego School of Medicine and the Veterans Affairs San Diego Healthcare System evaluated sexual activity and satisfaction as reported by 806 older women who are part of the Rancho Bernardo Study (RBS) cohort, a group of women who live in a planned community near San Diego and whose health has been tracked for medical research for 40 years. The study measured the prevalence of current sexual activity; the characteristics associated with sexual activity including demographics, health, and hormone use; frequency of arousal, lubrication, orgasm, and pain during sexual intercourse; and sexual desire and satisfaction in older women.

The median age in the study was 67 years and 63% were postmenopausal. Half the respondents who reported having a partner had been sexually active in the last 4 weeks. The likelihood of sexual activity declined with increasing age. The majority of the sexually active women, 67.1%, achieved orgasm most of the time or always. The youngest and oldest women in the study reported the highest frequency of orgasm satisfaction.

40% of all women stated that they never or almost never felt sexual desire, and one third of the sexually active women reported low sexual desire. Lead investigator Elizabeth Barrett-Connor, MD, Distinguished Professor and Chief, Division of Epidemiology, Department of Family and Preventive Medicine, University of California, San Diego School of Medicine, comments, "Despite a correlation between sexual desire and other sexual function domains, only 1 in 5 sexually active women reported high sexual desire. Approximately half of the women aged 80 years or more reported arousal, lubrication, and orgasm most of the time, but rarely reported sexual desire. In contrast with traditional linear model in which desire precedes sex, these results suggest that women engage in sexual activity for multiple reasons, which may include affirmation or sustenance of a relationship."

Regardless of partner status or sexual activity, 61% of all women in this cohort were satisfied with their overall sex life. Although older age has been described as a significant predictor of low sexual satisfaction, the percentage of RBS sexually satisfied women actually increased with age, with approximately half of the women over 80 years old reporting sexual satisfaction almost always or always.

Not only were the oldest women in this study the most satisfied overall, those who were recently sexually active experienced orgasm satisfaction rates similar to the youngest participants. "In this study, sexual activity was not always necessary for sexual satisfaction. Those who were not sexually active may have achieved sexual satisfaction through touching, caressing, or other intimacies developed over the course of a long relationship," says first author Susan Trompeter, MD, Associate Clinical Professor of Medicine, Division of General Internal Medicine, Department of Medicine at the University of California, San Diego School of Medicine and Staff Physician at the VA San Diego Healthcare System.

"Emotional and physical closeness to the partner may be more important than experiencing orgasm. A more positive approach to female sexual health focusing on sexual satisfaction may be more beneficial to women than a focus limited to female sexual activity or dysfunction," Trompeter concludes.

The article is "Sexual Activity and Satisfaction in Healthy Community-Dwelling Older Women," by Susan E. Trompeter, MD, Ricki Bettencourt, MS, and Elizabeth Barrett-Connor, MD. It appears in the American Journal of Medicine, Volume 125, Issue 1 (January 2012) published by Elsevier.

http://www.eurekalert.org/pub_releases/2012-01/f-sf-dai010312.php

Deer antlers inspire a new theory on osteoporosis

The loss of manganese could mean that calcium does not stick to bones and could cause osteoporosis.

This is the new theory put forward by researchers at the University of Castilla-La Mancha (UCLM) in Spain after studying deer antlers. The hypothesis published this month in the *Frontiers of Bioscience* journal still needs to be confirmed by the scientific community.

Through the study of deer antlers, researchers of the Research Institute of Hunting Resources (IREC, joint centre UCLM-CSIC-JCCM) suggest that the origin of osteoporosis could not be directly linked to the lack of calcium but rather to the lack of a mineral essential to calcium absorption. In particular they believe that this could be manganese, according to a new theory published in the latest issue of the *Frontiers of Bioscience* journal.

According to Tomás Landete, sub-director of the IREC and one of team's researchers, "previous antler studies show that manganese is necessary for calcium absorption. Our hypothesis is that when the human body absorbs less manganese or when it is sent from the skeleton to other organs that require it, such as the brain, the calcium that is extracted at the same time is then not properly absorbed and is excreted in the urine. It is in this way that osteoporosis can slowly strike."

The theory must now be validated with more studies and medical trials but its creators believe that it is a "step in a totally new direction in osteoporosis research as it considers calcium loss to be a consequence of the disease and not the origin."

The idea for the new proposal came from a dramatic increase in antler breakages seen in Spain in 2005. When scientists analysed these antlers in detail, they realised that weakening was due to manganese depletion caused by the deer's diet. That year saw an intensely cold winter which in turn caused plants to reduce their manganese concentrations in response to such stress.

"Antlers grow by transferring 20% of the skeleton's calcium towards their structure. We therefore saw that it was not calcium deficiency that caused the weakening but rather the deficiency of manganese," clarifies Landete. "The lack of manganese was almost as if the 'glue' that sticks calcium to antlers bones was missing."

Links to Alzheimer's and Parkinson's Disease

In the case of humans, the researchers suggest that manganese is extracted from the bones when it is required by the "most important" organs, such as the brain. The researcher adds that "maintaining the bones is important, but even more so is sustaining the working of the brain, which uses 25% of our energy intake when at rest."

The team also points out that when this vital mineral runs out after the onset of osteoporosis, conditions like Alzheimer's disease, Parkinson's disease, and senile dementia could strike. To put this theory to the test, they analysed data from 113 patients who were operated on for osteoporosis and osteoarthritis (wear and tear of joint cartilage) at Hellín Hospital in Albacete, Spain between 2008 and 2009. Some 40% of those operated on for osteoporosis showed some form of cerebral dysfunction whereas this was not the case in any of the 68 patients operated on for osteoarthritis.

Furthermore, the percentage increased with age and only amongst those patients with osteoporosis. The exhaustion of manganese reserves could be behind the bone disease and the cerebral degeneration. "We are collecting human bones to confirm this. However, studies on rats in which Alzheimer's disease has been induced by aluminium intoxication show that as the severity of this disease increases, manganese levels in the bones decrease," says Landete.

The researcher also recalls studies that link manganese to Parkinson's disease and show that astrocytes, which provide support to neurons, have specific enzymes that require manganese. In any case, researchers outline that their theory "is not a final solution to such diseases but constitutes the first step in a new direction" – a new direction that requires validation and confirmation from the scientific community.

References: *Tomas Landete-Castillejos, Inmaculada Molina-Quilez, Jose Antonio Estevez, Francisco Ceacero, Andrés José García, Laureano Gallego. "Alternative hypothesis for the origin of osteoporosis: The role of Mn". Frontiers in Bioscience (Elite Edition) 4: 1385-1390, January 2012. Doi: 10.2741/468.*

Alzheimer's damage occurs early

The first changes in the brain of a person with Alzheimer's disease can be observed as much as ten years in advance - ten years before the person in question has become so ill that he or she can be diagnosed with the disease.

This is what a new study from Lund University in Sweden has found. Physician Oskar Hansson and his research group are studying biomarkers – substances present in spinal fluid and linked to Alzheimer's disease. The group has studied close to 140 people with mild memory impairment, showing that a certain combination of markers (low levels of the substance beta-amyloid and high levels of the substance tau) indicate a high risk of developing Alzheimer's disease in the future.

As many as 91 per cent of the patients with mild memory impairment who had these risk markers went on to develop Alzheimer's within a ten-year period. In contrast, those who had memory impairment but normal values for the markers did not run a higher risk of getting Alzheimer's than healthy individuals.

Oskar Hansson previously carried out a study showing that pathological changes can be seen in the brain of an Alzheimer's patient five years before the diagnosis. The new study has thus doubled this time span to ten years.

"This is a very important finding with regard to the development of new therapies against the disease. All prospective therapies have so far shown to be ineffective in stopping the disease, and many people are concerned that the pharmaceutical companies will give up their efforts in this field. But these failures may depend on the fact that the new therapies were initiated too late. When a patient receives a diagnosis today, the damage has already gone too far," says Oskar Hansson.

With the help of the biomarkers studied by the group, pharmaceutical companies will now be able to identify the people with mild symptoms who run the highest risk of developing Alzheimer's within a ten-year period. These individuals can then be offered the opportunity of taking part in trials for new medicines, while those who run a low risk of developing the disease do not need to be involved. A new trial of this kind is already underway, on the basis of the earlier study by the Hansson group.

The 90 per cent accuracy of the risk markers means that they are not sufficient as the only method for early diagnosis of Alzheimer's. But if they can be combined with a clinical assessment and, for example, imaging of the blood flow in the brain, it should be possible to increase the level of accuracy, according to Oskar Hansson. However, this will only be relevant once drugs that are effective in slowing down the disease have been developed. Only then will it really be meaningful to identify patients earlier than is currently possible.

By observing how the levels of the biomarkers develop over the ten years before the patient's diagnosis, the research group has also been able to map the progression of the disease in the brain. The results indicate that it starts with a modified turnover of beta-amyloid. Only later is this followed by changes in the tau protein and damage to nerve cells. This can be important information for those developing new therapies for Alzheimer's.

Provided by Lund University

Mid-lane driving helps older adults stay safe

It's official: older adults are naturally inclined to drive in the middle of the road, leaving the younger generation to cut corners.

Medical Xpress - This tendency to sit mid-lane is an in-built safety mechanism that helps pensioners stay safe behind the wheel, according to researchers at the University of Leeds. The findings of the study, which are published in the Journal of Experimental Psychology Human Perception and Performance, have shown how older people naturally adapt when they can no longer move with the freedom they once had. Researchers hope that the work will be used to find new ways of helping patients recover lost motor skills, for example, after a stroke.

Aging causes the body to respond more slowly and movements to become less precise. To see how this might affect performance behind the wheel, a team from the University of Leeds' Institute of Psychological Sciences compared the motor skills of healthy younger adults, aged between 18 and 40, with a group of over-60s.

Using a touch-screen laptop, participants were asked to trace wiggly lines of varying widths - slowly, quickly and at their own preferred pace. They were also asked to steer along 'virtual' winding roads when sitting in a driving simulator.

The researchers found that the older adults made allowances for their age by adopting a 'middle-of-the-road' strategy in both tests. This meant they remained well inside the wiggly lines when tracing, and stayed in the middle of the road lines when driving. Younger participants, in contrast, had a greater tendency to cut corners.

However, when study participants were asked to drive faster in the simulator and to follow narrower paths,

all tended to cut corners more - regardless of their age. "Our results suggest that this compensation strategy is a general phenomenon and not just tied to driving. It seems older people naturally adjust their movements to compensate for their reduced level of skill," said postgraduate researcher Rachel Raw, lead author of the study.

"But this compensation can only take you so far, and when conditions are difficult, perhaps because of snow or hail, or when driving at night time on poorly lit roads, older adults can struggle," she said.

"It is important to establish what strategies are adopted by older drivers in order to ensure their safety - as well as the safety of other road users." said psychology researcher Dr. Richard Wilkie, who supervised the work. "More generally, understanding how older people learn to adapt to a diminished level of skill has implications for our approach to rehabilitating patients with reduced movement, for instance, after a stroke."

More information: Raw RK et al, 'Movement control in older adults: does old age mean middle of the road?' *Journal of Experimental Psychology Human Perception and Performance* is published online in advance of publication [doi: 10.1037/a0026568]. Provided by University of Leeds

<http://medicalxpress.com/news/2012-01-silver-bullet-supplement-brain-aging.html>

'Silver bullet' supplement could slow brain aging

Professor David Rollo and a group of researchers at McMaster may have found a "silver bullet" when it comes to slowing the aging of the brain.

The team's latest paper documents a new dietary supplement that completely maintains learning ability in older mice. "These findings are not just significant, they're remarkable," says Rollo. The tests were conducted by Vadim Aksenov, a PhD candidate in the Rollo laboratory in McMaster's Department of Biology.

A complex nutritional supplement containing 30 ingredients, including vitamins such as B1, C, D and E, along with beta-carotene, ginseng, green tea extract, cod liver oil and other acids and minerals, was used in the test. It was designed to offset five mechanisms associated with aging.

For mice aged 20-31 months (roughly equivalent to a 70-80-year-old human), those without the mixture in their diet showed no ability to learn new information. However, those who had taken the supplement displayed learning abilities equivalent to young mice, and more effectively completed the task.

The trials focused on a region of the brain associated with Alzheimer's disease. Other findings revealed that brain mass was increased by up to 10 per cent as a result of taking the supplement. The function of the cellular furnaces that provide brain energy (mitochondria) was also increased. But what does it all mean for humans?

"This diet was our first try, so the door is just opening up," says Rollo. "Whether these results will translate to humans remains to be seen." A major goal in anti-aging research involves the reduction of poisonous "free radicals" and their associated damage, while also maintaining mitochondrial function and energy supply later in life. The new supplement does both. Unlike stand-alone vitamins, pills or anti-aging products, the combination of ingredients is far more effective in maintaining brain function.

While human testing has yet to begin, Rollo is hopeful that the supplement may one day slow the progression of Alzheimer's, Parkinson's and other neurodegenerative diseases in older adults. If human trials prove safe and successful, most of the aging population could access the ingredients at local health food stores.

Jiangang Long, Jiankang Liu, Henry Szechtman, Parul Khanna and Sarthak Matravadia were also involved in the study. *Provided by McMaster University*

http://www.eurekalert.org/pub_releases/2012-01/slu-rsp010412.php

Research shows progress toward a genital herpes vaccine

More than 8,000 women participated in NIH-funded study

ST. LOUIS - An investigational vaccine protected some women against infection from one of the two types of herpes simplex viruses that cause genital herpes, according to findings in the *New England Journal of Medicine*.

The vaccine was partially effective at preventing herpes simplex virus type 1 (HSV-1), but did not protect women from herpes simplex virus type 2 (HSV-2). There were less than half of the cases of genital herpes caused by HSV-1 – 58 percent fewer -- in women who received the investigational vaccine compared to women who received the control vaccine.

"There is some very good news in our findings. We were partially successful against half of the equation – protecting women from genital disease caused by HSV-1," said Robert Belshe, M.D., director of the Saint Louis University Center for Vaccine Development and lead author of the study. "It's a big step along the path to creating an effective vaccine that protects against genital disease caused by herpes infection. It points us in the direction to work toward making a vaccine that works on both herpes simplex viruses."

Both HSV-1 and HSV-2 are members of the herpesvirus family. Typically, HSV-2 causes lesions and blisters in the genital area. HSV-1 generally causes sores in the mouth and lips, although it increasingly has been found to cause genital disease.

There currently is no cure or approved vaccine to prevent genital herpes infection, which affects about 25 percent of women in the United States and is one of the most common communicable diseases. Once inside the body, HSV remains there permanently. The virus can cause severe neurological disease and even death in infants born to women who are infected with HSV and the virus is a risk factor for sexual transmission of HIV.

The clinical trial of an investigational genital herpes vaccine was funded by the National Institute of Allergy and Infectious Diseases (NIAID), which is part of the National Institutes of Health, along with GlaxoSmithKline (GSK), and conducted at 50 sites in the U.S. and Canada.

The study enrolled 8,323 women between ages 18 and 30 who did not have HSV-1 or HSV-2 infection at the start of the study. They were randomly assigned to receive either three doses of the investigational HSV vaccine that was developed by GSK or a hepatitis A vaccine, which was the control.

Participants were followed for 20 months and evaluated carefully for occurrence of genital herpes disease. In addition, all study participants were given blood tests to determine if asymptomatic infection with HSV-1 or HSV-2 occurred during the trial. Researchers found that two or three doses of the investigational vaccine offered significant protection against genital herpes disease caused by HSV-1. However the vaccine did not protect women from genital disease caused by HSV-2.

"We were surprised by these findings," said Belshe, who also is a professor of infectious diseases and immunology at Saint Louis University School of Medicine. "We didn't expect the herpes vaccine to protect against one type of herpes simplex virus and not another. We also found it surprising that HSV-1 was a more common cause of genital disease than was HSV-2."

HSV-1 infection has become an increasingly common cause of genital disease, likely because more couples are engaging in oral sex. HSV-1 and HSV-2 are spread by direct contact – mouth to mouth, mouth to genitals and genitals to genitals – even when the infected person shows no symptoms, Belshe added.

Researchers are conducting laboratory tests on serum obtained from study participants as they continue to study why the vaccine protected women from genital disease caused by HSV-1 and not HSV-2.

One hypothesis, Belshe said, is HSV-1 is more easily killed by antibodies than is HSV-2. This means that the vaccine antibodies might work better against HSV-1 and result in protection from HSV-1 but not HSV-2.

Earlier studies of the investigational herpes vaccines showed it protected against genital herpes disease in women who were not infected with HSV-1 or HSV-2, but whose sexual partners were known to have genital herpes. Researchers believe the reason for the different outcome in the most recent clinical trial could be related to the fact that different populations were studied. The women in the earlier studies may have been protected due to immunologic or behavioral factors not present in the later study.

"It's always important to confirm scientific findings in repeated studies, which is why we investigated the vaccine in a large, placebo controlled trial," Belshe said. "Our findings confirmed the validity of the scientific process. You've got to have good scientific evidence that something actually works."

<http://medicalxpress.com/news/2012-01-genital-herpes-reactivate-high-dose.html>

Study shows genital herpes can reactivate even during high dose antiviral therapy
A study combining three trials of antiviral therapy to treat genital herpes has shown that the virus can reactivate in 'breakthrough episodes' even when doses of antiviral therapy are high.

A study combining three trials of antiviral therapy to treat genital herpes (herpes simplex virus type 2/HSV-2) has shown that the virus can reactivate in 'breakthrough episodes' even when doses of antiviral therapy are high. Thus new therapies are needed to successfully prevent onward transmission of this common infection that affects some one in five of the general population. These are the conclusions of an Article published Online First by the Lancet, written by Dr Christine Johnston, University of Washington Virology Research Clinic, Seattle, WA, USA, and colleagues.

Symptoms of HSV-2 infection include ulcers in the skin or mucus membranes of the mouth, lips, or genitals. However, most people with this infection do not have obvious symptoms, but even so, can shed the virus and transmit it to sexual partners. Once someone is infected, HSV-2 is able to hide in the nervous system of the host, enabling it to reactivate periodically in those infected. During re-activation, the virus in a nerve cell is transported along the nerve to the skin, where new replication and 'shedding' occur and cause new sores. Intensive genital secretion collection shows that HSV shedding episodes are three-times more frequent than was previously realised.

In this study, three separate but complementary open-label cross-over studies involving 113 patients were carried out, comparing no medication with aciclovir 400 mg twice daily (standard-dose aciclovir); valaciclovir 500 mg daily (standard-dose valaciclovir) with aciclovir 800 mg three times daily (high-dose aciclovir); and standard-dose valaciclovir with valaciclovir 1 g three times daily (high-dose valaciclovir).

The results showed that short episodes of subclinical (symptom free) shedding persist with both standard-dose and high-dose aciclovir and valaciclovir. Although HSV shedding was reduced by 50% with the highest doses of valaciclovir (1 g, three times daily) compared with standard dose valaciclovir (500 mg daily), the rate of breakthrough shedding episodes did not change—about 16 episodes per year.

The authors say: "Our finding that high-dose valaciclovir increases the kinetics of viral clearance, but not expansion, supports the hypothesis that these antiviral drugs do not suppress the release of virions into the genital tract." They add: "That we could not eliminate or even alter the frequency of shedding episodes with high-dose valaciclovir suggests that the maximum benefit of shedding reduction has probably been reached for currently available antiviral drugs."

They conclude: "Although currently available anti-HSV therapy benefits patients by preventing clinical HSV recurrences, suppressive therapies with greater potency, including antiviral drugs or immunotherapy in the form of therapeutic vaccines, are needed to provide substantial public health benefits, such as prevention of HSV-2 transmission and HIV-1 acquisition and transmission."

In a linked Comment, Dr Philippe Van de Perre and Dr Nicolas Nagot INSERM U 1058, Montpellier, France, and Université Montpellier 1, Montpellier, France, say that development of new classes of antiviral drug such as helicase-primase inhibitors is important but such drugs would need good long-term coverage and adherence to successfully prevent shedding and onward transmission of HSV-2. They add: "These needs are unlikely to be met because about 20% of the general population is infected with HSV-2 in the USA and Europe, most of whom have no clinical need for antiherpetic therapy."

They conclude: "Alternative control tools, such as immunotherapeutic strategies (therapeutic vaccines), are in preclinical development, but they are hampered by the absence of an adequate animal model and the lack of commitment from pharmaceutical companies and the public sector."

[More information: paper online: theLancet0140-6736\(11\)61750-9/abstract](http://www.thelancet.com/paper/online/0140-6736(11)61750-9/abstract)

http://www.eurekalert.org/pub_releases/2012-01/acs-dlr010412.php

Dried licorice root fights the bacteria that cause tooth decay and gum disease ***Scientists are reporting two substances in licorice that kill the major bacteria responsible for tooth decay and gum disease***

Scientists are reporting identification of two substances in licorice - used extensively in Chinese traditional medicine - that kill the major bacteria responsible for tooth decay and gum disease, the leading causes of tooth loss in children and adults. In a study in ACS' Journal of Natural Products, they say that these substances could have a role in treating and preventing tooth decay and gum disease.

Stefan Gafner and colleagues explain that the dried root of the licorice plant is a common treatment in Chinese traditional medicine, especially as a way to enhance the activity of other herbal ingredients or as a flavoring. Despite the popularity of licorice candy in the U.S., licorice root has been replaced in domestic candy with anise oil, which has a similar flavor. Traditional medical practitioners use dried licorice root to treat various ailments, such as respiratory and digestive problems, but few modern scientific studies address whether licorice really works. (Consumers should check with their health care provider before taking licorice root because it can have undesirable effects and interactions with prescription drugs.) To test whether the sweet root could combat the bacteria that cause gum disease and cavities, the researchers took a closer look at various substances in licorice.

They found that two of the licorice compounds, licoricidin and licorisoflavan A, were the most effective antibacterial substances. These substances killed two of the major bacteria responsible for dental cavities and two of the bacteria that promote gum disease. One of the compounds — licoricidin — also killed a third gum disease bacterium. The researchers say that these substances could treat or even prevent oral infections.

<http://www.sciencedaily.com/releases/2012/01/120104133153.htm>

Hypothermia Underutilized in Cardiac Arrest Cases Treated in U. S. Hospitals, Study Suggests

Therapeutic hypothermia has been proven to reduce mortality and improve neurologic outcomes after a heart attack, yet it was rarely used in a sample of more than 26,000 patients

ScienceDaily - Therapeutic hypothermia has been proven to reduce mortality and improve neurologic outcomes after a heart attack, yet it was rarely used in a sample of more than 26,000 patients, according to a study published in Therapeutic Hypothermia and Temperature Management, a peer-reviewed journal published by Mary Ann Liebert, Inc.

Therapeutic hyperthermia was used in only 0.35% of cases of out-of-hospital cardiac arrest in this study. The authors, Pratik Patel, Sayona John, Rajeev Garg, Richard Temes, Thomas Bleck, and Shyam Prabhakaran, from

Rush University Medical Center, Chicago, IL, state that "Continued education, dissemination of evidence-based guidelines to community hospitals, the development of and preferential transport of patients to designated cardiac arrest treatment centers, and enhanced reimbursement may help increase its application in clinical practice." The article is entitled "Therapeutic Hypothermia After Cardiac Arrest is Underutilized in the United States." "This informative study underscores the need to more efficiently target and treat cardiac arrest patients that would benefit from hypothermic therapy.

The fact that therapeutic hypothermia is underutilized at U.S. hospitals emphasizes the need to identify and address barriers to this evidence-based therapy," says W. Dalton Dietrich, PhD, Editor-in-Chief of the Journal and Kinetic Concepts Distinguished Chair in Neurosurgery, Professor of Neurological Surgery, Neurology and Cell Biology and Anatomy, University of Miami Leonard M. Miller School of Medicine.

<http://medicalxpress.com/news/2012-01-successfully-previously-lethal-doses.html>

Researchers successfully treat previously lethal doses of radiation

Multiple scenarios exist where warfighters may be exposed to high levels of radiation.

Countermeasures against possible high doses of radiation are an ongoing high priority for Department of Defense research and development organizations.

Scientists working on a DARPA-funded research effort have determined that an antibiotic and a protein fight radiation sickness more effectively when they are combined than when used separately. While doctors already use antibiotics to treat radiation sickness, researchers have found that adding bactericidal/permeability-increasing protein (BPI), a protein found in immune systems, allowed them to increase the survival rates of mice exposed to toxic levels of radiation to nearly 80 percent. More important, this treatment with BPI and antibiotics was effective up to a day after exposure to radiation.

"The fact that this treatment can be administered up to a day after radiation exposure is so important," said Millie Donlon, DARPA's program manager for this effort. "This is because most of the existing treatments we have require they be administered within hours of exposure to potentially lethal radiation – something that might not always be possible in the confusion that would likely follow such an exposure event." Humans are known to be more sensitive than mice to the endotoxins treated by BPI, making a treatment such as this potentially more effective in humans. These are commonly used drugs that have been approved by the Food and Drug Administration for use in other scenarios such as bone marrow transplants and radiation treatment. They also have a long shelf life, making them easy to stockpile for future use.

Researchers have yet to determine why the combination of BPI and antibiotics work so well together. They've found, however, that mice that received both of these drugs not only had higher survival rates, but also started generating new blood cells more quickly. This has potential for positive impact on many logistical considerations tied to radiation exposure, such as need for hospital time and requirements for donors and transfusions.

This research is the result of earlier efforts in this area conducted as part of DARPA's Radiation Bio-Dosimetry (RaBiD) program. RaBiD was an effort to develop non- or minimally invasive, portable and low-cost radiation bio-dosimeters, as well as novel radiation mitigation technologies that can be administered 12 or more hours after exposure and provide better than 90-percent survivability to humans. RaBiD began in 2008 and ended in August of last year. *Provided by DARPA*

http://www.eurekalert.org/pub_releases/2012-01/cp-dro122911.php

Dogs read our intent

Dogs pick up not only on the words we say but also on our intent to communicate with them, according to a report published online in the Cell Press journal Current Biology on January 5.

The findings might help to explain why so many people treat their furry friends like their children; dogs' receptivity to human communication is surprisingly similar to the receptivity of very young children, the researchers say. "Increasing evidence supports the notion that humans and dogs share some social skills, with dogs' social-cognitive functioning resembling that of a 6-month to 2-year-old child in many respects," said József Topál of the Hungarian Academy of Sciences. "The utilization of ostensive cues is one of these features: dogs, as well as human infants, are sensitive to cues that signal communicative intent."

Those cues include verbal addressing and eye contact, he explained. Whether or not dogs rely on similar pathways in the brain for processing those cues isn't yet clear.

Topál's team presented dogs with video recordings of a person turning toward one of two identical plastic pots while an eye tracker captured information on the dogs' reactions. In one condition, the person first looked straight at the dog, addressing it in a high-pitched voice with "Hi dog!" In the second condition, the person gave only a low-pitched "Hi dog" while avoiding eye contact.

The data show that the dogs were more likely to follow along and look at the pot when the person first expressed an intention to communicate. "Our findings reveal that dogs are receptive to human communication in a manner that was previously attributed only to human infants," Topál said.

As is often the case in research, the results will undoubtedly confirm what many dog owners and trainers already know, the researchers say. Notably, however, it is the first study to use eye-tracking techniques to study dogs' social skills. "By following the eye movements of dogs, we are able to get a firsthand look at how their minds are actually working," Topál said. "We think that the use of this new eye-tracking technology has many potential surprises in store."

Téglás et al.: "Dogs' gaze following is tuned to human communicative signals."

http://www.eurekalert.org/pub_releases/2012-01/uoc--chm010512.php

Chinese herbal medicine may provide novel treatment for alcohol abuse

FINDINGS: UCLA researchers have identified how a component of an ancient Chinese herbal anti-hangover medicine called dihydromyricetin, isolated from the plant *Hovenia*, counteracts acute alcohol intoxication and withdrawal symptoms.

The research team found that dihydromyricetin blocks the action of alcohol on the brain and neurons and also reduces voluntary alcohol consumption, with no major side effects, in an early study with rats. Specifically, dihydromyricetin inhibited alcohol's effect on the brain's GABAA receptors, specific sites targeted by chemicals from brain cells. Alcohol normally enhances the GABAA receptors' influence in slowing brain cell activity, reducing the ability to communicate and increasing sleepiness - common symptoms of drunkenness.

The next stage of the research will involve human clinical trials, the researchers said.

IMPACT: The research team determined that dihydromyricetin may provide a molecular target and cellular mechanism to counteract alcohol intoxication and dependence, leading to new therapeutic treatments - all based on an ancient "folk medicine" treatment that has been used by humans for at least 500 years.

Alcohol use disorders are the most common form of substance abuse, affecting more than 76 million people worldwide, according to the World Health Organization. Only an estimated 13 percent of people identified as having an alcohol use disorder receive medical treatment, partly due to a lack of effective medications without major side effects. Although alcohol impacts most organ systems, its effect on the brain in developing intoxicating, sedative and addictive properties is critical.

AUTHORS: Associate Professor Jing Liang, M.D., Ph.D., and Professor Richard W. Olsen, Ph.D., both from the department of molecular and medical pharmacology at the David Geffen School of Medicine at UCLA, are available for interviews.

FUNDING: The study was funded by the National Institutes of Health.

JOURNAL: The research appears in the Jan. 4 online edition of the *Journal of Neuroscience*:

<http://www.jneurosci.org/content/32/1/390>. A copy of the full study is also available.

<http://medicalxpress.com/news/2012-01-diabetic-mice-breakthrough-multiple-sclerosis.html>

Diabetic mice provide a surprising breakthrough for multiple sclerosis research

Using a mouse model for diabetes may provide a surprising breakthrough for research into a cure for MS

Medical Xpress - In humans, active periods of the debilitating disease Multiple Sclerosis (MS) can last for mere minutes or extend to weeks at a time. They're caused by lesions in the brain that develop, partly heal, and then recur. Research into a cure has been difficult, because to date scientists have not been able to replicate these brain recurring symptoms in laboratory mice. That's frustrating because these lab animals, known as animal "models," are the primary tool for research into the mechanisms and potential treatments for MS.

But now, by using a mouse model for diabetes instead, Dr. Dan Frenkel of Tel Aviv University's Department of Neurobiology, working alongside Prof. Yaniv Assaf and Ph.D. student Hilit Levy, may provide a surprising breakthrough for research into a cure for MS. The team has discovered that when mice with Type 1 Diabetes are injected with myelin protein - the insulating material that coats neurons - they experience the periods of relapsing and remitting disability associated with brain lesions in humans. And for the first time, they've been able to monitor this brain lesion process using magnetic resonance imaging.

Dr. Frenkel believes his finding will lead to the development of more effective treatments for MS. This research has been published in *Experimental Neurology*.

Tracking lesions in the brain

MS, an autoimmune disease in which the immune system attacks in the brain and inhibits the transfer of signals between neurons, often leads to devastating disabilities such as blindness and paralysis. From its onset, the disease attacks in peaks which become increasingly more severe until patients are permanently disabled.

Traditionally, mouse model populations for MS research have been created by injecting mice with myelin protein emulsified in bacteria. With the addition of bacteria, the immune system mobilizes against the myelin, creating an MS-like autoimmune response. However, the disease does not present in this model as it does in human sufferers - most mouse models experience a single inflammatory peak which leaves them with permanent symptoms such as paralysis of the legs. The damage can be detected in the spinal cord, but not in the brain.

"We discovered that when we gave them the same myelin protein injection, a mouse model that develops Type 1 Diabetes will instead exhibit peaks of inflammatory responses similar to those of chronic progressive MS, which relapses and remits," Dr. Frenkel says. The mice also suffer from brain lesions in addition to spinal cord damage, making them a more viable model for studying and developing treatment for MS in humans.

Using a special MRI machine for imaging small animals, the researchers followed each mouse model over the course of several months, noting the activity of the brain and the development of lesions corresponding to peaks of inflammation. The lesions and the inflammation in the brain can be followed in the same way within these animals as in a human with MS, says Dr. Frenkel. "Now, we can follow the different stages that occur after the autoimmune response is already triggered, and look for different targets that will not only help to enhance recovery, but prevent further damage as well."

Turning temporary recovery into permanent repair

Currently, all FDA approved drugs on the market to treat MS were developed using traditional mouse models. Their focus is to delay the clinical signs of the disease caused by autoimmunity, lengthening the time between attacks. So far, this method has led to a temporary fix, but not a cure. With his alternative mouse model, Dr. Frenkel says, researchers can gather more information on how the brain heals after an attack, and start to develop treatment options that mimic this natural recovery process - turning temporary recovery into permanent repair.

"With the use of magnetic resonance imaging, we can follow the brain lesions within the mouse model, and characterize the process of relapsing," Dr. Frenkel says. They have already begun to develop treatments with initial success. "We are looking at ways to encourage the glia cells - cells in the brain that support the neurons - to promote brain repair," he says. *Provided by Tel Aviv University*

<http://medicalxpress.com/news/2012-01-link-virus-ms-treatment.html>

Research proving link between virus and MS could point the way to treatment and prevention

A new study from researchers at Queen Mary, University of London shows how a particular virus tricks the immune system into triggering inflammation and nerve cell damage in the brain, which is known to cause MS.

Previous research has suggested a link between the Epstein-Barr virus (EBV) and multiple sclerosis but the research has remained controversial since scientists have so far failed to substantiate the link.

The new study proves the virus is involved in a manner more sophisticated and subtle than previously imagined, and may offer new ways to treat or prevent the disease.

MS is a neurological condition that affects around 100,000 people in the UK. It can cause vision problems, difficulties with walking and fatigue, and tends to strike mainly young and middle-aged women. Its causes are not completely understood but both genes and environment are known to play a role. Some previous research has suggested that EBV triggers MS but subsequent studies have failed to find the connection.

The new research, which is published in the journal *Neurology*, looked at post mortem brains of MS patients, examining areas where neurological damage had recently occurred.

Lead researcher, Dr Ute-Christian Meier explained: "EBV is quite a clever virus; when it's not growing and spreading it can hide away in our immune cells. "In this study we used a different technique which allowed us to detect the virus in the brains of some people affected by MS, even when it was hiding away in the cells."

Dr Meier and her team of collaborators found that, although the virus was not actively spreading, it was releasing a chemical message into areas of the brain nearby. This chemical message - made up of small RNA molecules - was activating the body's immune system, causing inflammation. This damages nerve cells in the brain and causes MS symptoms.

Dr Meier continued: "We have to be careful and have to study more MS brains but this is potentially very exciting research. Now we understand how EBV gets smuggled into the brain by cells of the immune system and that it is found at the crime scene, right where the attack on our nervous system occurs. Now we know this, we may have a number of new ways of treating or even preventing the disease."

One possibility is the widely-used cancer treatment Rituximab; a drug which is known to kill the cells of the immune system in which the virus hides. It is now being trialed as a treatment for MS.

Another possible approach, using anti-viral treatment, will be tested in clinical trials currently in preparation by Professor Gavin Giovannoni and colleagues, also at Queen Mary.

"If we can pinpoint EBV as a trigger, it's possible that we could alter the course of MS or potentially even prevent the condition by treating the virus," Dr Meier added. "MS so often strikes young women and its unpredictable nature makes it an incredibly difficult disease to live with. We desperately need better ways to tackle the condition."

Interestingly, the research also hinted that infection with EBV and its action on the immune system could also be playing a role in other brain diseases such as cancer and stroke. *Provided by Queen Mary, University of London*

<http://medicalxpress.com/news/2012-01-statin-percent-higher-uk.html>

Study finds statin costs 400 percent higher in US compared to UK

In the United States, the cost paid for statins in people under the age of 65 who have private insurance is approximately 400 percent higher than comparable costs paid by the government in the United Kingdom

In the United States, the cost paid for statins (drugs to lower cholesterol) in people under the age of 65 who have private insurance is approximately 400 percent higher than comparable costs paid by the government in the United Kingdom (U.K.). These findings, from the Boston University School of Medicine (BUSM) Boston Collaborative Drug Surveillance Program, are the first results of a comprehensive comparison of prescription drug costs between the U.S. and U.K. The study appears on-line in the journal *Pharmacotherapy*.

Expenditures for prescription drugs remain a large part of the ongoing debate on the costs of medical care in the U.S. and U.K. Because of the many complex and interactive variables that contribute to these costs, well-defined estimates of the actual and relative usage and costs for the two countries have not been reliably documented. Data for this study came from two large electronic medical databases, one in each country. Costs were derived from private health insurance claims in the U.S., while the costs were originated from a general practice research database constructed in 1990 in the U.K.

The study is based upon a 2005 sample of 280,000 people age 55-64 in each country. Statins were prescribed to an estimated 32.7 percent of people in the U.S. and 24.4 percent in the U.K. In the U.S. the estimated annual cost of statins ranged from a high of \$1,428 for simvastatin (generic unavailable), to a low of \$314 for lovastatin (available in generic formulation). In the U.K. the annual cost varied from a high of \$500 for atorvastatin (generic not available), to a low of \$164 for simvastatin (available in generic). The estimated cost per pill was at least twice as high for each statin prescribed in both countries.

When the annual cost for each annual statin user together with the number of users were combined, the total estimated cost for statin users was \$69.5 million in people covered by private insurance companies in the U.S. The total estimated annual cost for statin users covered by the government in the U.K. was \$15.7 million.

"In addition to differences in overall statin use and per unit costs, another significant factor contributing to the disparity of costs appears to be the availability and utilization of generics," said lead author Hershel Jick, MD, Director Emeritus of BUSM's Collaborative Drug Surveillance Program and associate professor of medicine at BUSM.

According to the researchers, simvastatin was approved in the U.S. for sale in generic formulation in late June 2006. Accordingly, within the next six months more than 60 percent of users switched from the brand preparation to the generic. The resultant estimated cost was reduced more than 60 percent. According to the researchers, however, it still was four times higher than that in the U.K.

Provided by Boston University Medical Center

<http://medicalxpress.com/news/2012-01-statins-interstitial-lung-abnormalities-smokers.html>

Statins may increase risk of interstitial lung abnormalities in smokers

Use of statins may influence susceptibility to or the progression of interstitial lung disease (ILD) in smokers, according to a new study.

While some studies have suggested that statins might be beneficial in the treatment of fibrotic lung disease, others have suggested that they may contribute to the progression of pulmonary fibrosis by enhancing secretion of inflammasome-regulated cytokines, and numerous case reports have suggested that statins may contribute to the development of various types of ILD. The findings were published online ahead of print publication in the American Thoracic Society's *American Journal of Respiratory and Critical Care Medicine*.

"Based on earlier case reports of statin-associated ILD and data suggesting that smoking is associated with the interstitial lung abnormalities (ILA) which underlie ILD, we hypothesized that statins would increase the

risk for ILA in a population of smokers," said George R. Washko MD, MMsC, and Gary M. Hunninghake MD, MPH, of the Division of Pulmonary and Critical Care at Brigham and Women's Hospital in Boston.

"Accordingly, we evaluated the association between statin use and ILA in a large cohort of current and former smokers from the COPDGene study. In addition to the association between statin use and ILA we found in humans, we also demonstrated that statin administration aggravated lung injury and fibrosis in bleomycin-treated mice." Bleomycin has been shown to induce lung inflammation and fibrosis.

Assessment included pulmonary function testing and CT scanning for radiologic features of ILA. Among 1,184 subjects with no evidence of ILA, 315 (27%) used statins, compared with 66 of 172 (38%) subjects with ILA. After adjustment for a number of covariates, including a history of high cholesterol or coronary artery disease, statin users had a 60 percent increase in the odds of having ILA, compared to subjects not taking statins. No other positive associations between ILA and cardiovascular medications or disorders were detected. The association between statin use and ILA was greatest with statins with higher hydrophilicity (readily absorbed or dissolved in water), such as pravastatin, and in higher age groups.

The effects of statins on lung injury and fibrogenesis were also examined in a study in mice, which were pretreated with pravastatin prior to intratracheal bleomycin administration. Statin use was found to exacerbate bleomycin-induced lung fibrosis. In a further in vitro study, statin pretreatment was shown to enhance Nlrp3-inflammasome activation through mitochondrial reactive oxygen species generation in macrophages. "These results implicate activation of the NLRP3 inflammasome in fibrotic lung disease," said Jin-Fu Xu MD, and Augustine M. K. Choi, MD, of the Department of Pulmonary Medicine, Shanghai Pulmonary Hospital, Tongji University School of Medicine, in Shanghai, China and the Division of Pulmonary and Critical Care at Brigham and Women's Hospital in Boston, respectively.

There were some limitations to both studies. Findings in the mouse model were not replicated in human samples. All study subjects were current or former smokers, perhaps limiting the applicability of the results to others. Cigarette smoking by itself may lead to pulmonary inflammation. Finally, the duration and dosage of statin therapy was not available for the majority of patients.

"While statin use was associated with ILA in our study, caution should be used when extrapolating these findings to the care of patients," concluded Dr. Hunninghake. "The significant benefits of statin therapy in patients with cardiovascular disease probably outweigh the risk of developing ILA, and statin use may benefit some patients with respiratory disease. Clinicians should be aware, though, that radiological evidence of ILD can develop in some patients treated with statins." *Provided by American Thoracic Society*

http://www.eurekalert.org/pub_releases/2012-01/pp-anw010512.php

A new wild ginger discovered from the evergreen forest of Western Ghats of South India
Intensive botanical explorations for members of the ginger family in India have resulted in the discovery of an interesting species of Cardamom from the Western Ghats of Kerala

Intensive botanical explorations for taxonomic studies on the members of the ginger family (Zingiberaceae) in India by V.P. Thomas and M. Sabu of the University of Calicut, have resulted in the discovery of an interesting species of Amomum (Cardamom) from Silent Valley National Park on the Western Ghats of Kerala.

The ginger family consists of 53 genera and over 1,200 species, many of which are widely used as spices, for medical purposes, or simply for decoration. Amomum Roxb. is the second largest genus within the Zingiberaceae, comprising about 150-180 species, including several types of cardamom. Widely distributed in Southeast Asia, the genus is represented by 23 species in India, mostly restricted to North-East India, South India and the Andaman-Nicobar Islands.



This is the fruit of A. nilgircum. Credit: Professor M. Sabu

In the new species, the authors show some similarities with *A. masticatorium*, although the two are clearly distinct. The new plant's name refers to its locality, i.e. Nilgiri hills, a part of Western Ghats and one of the hotspots of the Indian subcontinent. The most notable feature of the plant is the presence of long ligules that reach up to 9 cm long and small flowers with a long corolla tube. Almost all parts of the plant are hairy.

It is a high altitude species (found above 1,200 m), and attempts to conserve it outside its natural locality were unsuccessful. The conservation status evaluation revealed that it falls under the critically endangered

category of the International Union for Conservation of Nature, 2001. Conservation measures are to be carried out very urgently to recover the plant from extinction.

Original source: Thomas VP, Sabu M, Prabhu Kumar KM (2012) Amomum nilgircum (Zingiberaceae), a new species from Western Ghats, India. PhytoKeys 8: 99-104. doi: 10.3897/phytokeys.8.2152

<http://bit.ly/wgbnY2>

Chimps learn about nature's medicine chest from elders

CHIMPANZEES may learn from their elders to recognise plants with medicinal properties.

But as with all evidence that primates self-medicate, the finding is controversial.

For 11 months, Shelly Masi of France's National Museum of Natural History in Paris and colleagues monitored 44 wild chimps in Uganda, noting whenever they ate medically useful plants. Whenever older chimps did so, Masi's team found that younger chimps paid more attention than usual (Physiology & Behavior, DOI: 10.1016/j.physbeh.2011.08.012).

The researchers speculate that the chimps may learn from elders to eat the plants for medicinal purposes, although they never directly observed any cases of ill animals "treating" themselves. "Wild apes seldom show disease symptoms, so observations associating illness and a feeding choice may be rare," says Masi.

The team also monitored western gorillas in the Central African Republic, but found they paid less attention to elders when it came to medicinal foods. Gorillas eat more vegetation than chimps, so may take in medicines by default rather than by design, they say.

Michael Huffman at the University of Kyoto in Japan, who studies self-medication in Africa's great apes, is not convinced by the new claims for how chimps learn the skill. "But their ideas are out there now, and it's up to the scientific process to replicate or refine them."

www.newscientist.com/article/mg21228441.800-the-hard-way-our-odd-desire-to-do-it-ourselves.html

The hard way: Our odd desire to do it ourselves

From self-assembly furniture to cake mix, we value the things we make ourselves – however badly we do it

06 January 2012 by Laura Spinney

WHEN instant cake mixes hit US shelves in the late 1940s, sales were disappointing. Pioneering consumer psychologist Ernest Dichter went into the nation's kitchens to investigate. His interviews with housewives led him to a startling conclusion. The mixes made baking too easy; cooks felt undervalued. On Dichter's recommendation the next generation of mixes required the addition of a fresh egg. They sold like hot cakes.

The story is an example of an odd phenomenon in modern consumer societies. Economic orthodoxy dictates that we should place more value on items that spare us work. As we increasingly identify ourselves as money-rich and time-poor, we should be prepared to spend more of the former to save the latter. But humans and economic orthodoxy don't always see eye to eye. "People have this very strong, internalised notion that effort equals quality," says behavioural economist Michael Norton of Harvard Business School in Boston, Massachusetts.

The idea seems embedded in animal psyches. In 1962, psychologists Douglas Lawrence and Leon Festinger of Stanford University in California showed that rats offered the same food reward were more eager to climb up a ramp at a 50-degree incline to get at it than one angled at a less daunting 25 degrees. For most of human history, it was also a good rule of thumb: the higher up the tree you climbed, the more and better fruit you were likely to find, simply because it was less accessible.

Things started to go awry for humans during the industrial revolution. Many of the tasks essential to survival became automated - a process that, arguably, reached its apogee in the instant cake mix. Our thought processes evolve more slowly, however, leading to cake-mix confusion, and leaving us open to marketing trickery. "You can make people believe that if effort is put in, the result is of higher quality," says Norton.

He has dubbed this phenomenon the IKEA effect, in honour of an obscure start-up that harnessed it and went on to great things. The world's largest furniture retailer is a master of shifting labour costs to the buyer and earning kudos in return. This year, Norton and his colleagues Daniel Mochon and Dan Ariely set out to find out exactly how.

In a series of experiments they asked people to assemble IKEA boxes - a boring, banal task - or to engage in the more pleasurable activities of folding origami or building Lego sets. The participants then had to bid small sums for the products of their labour, or for a custom- or expert-made equivalent. The results were impressive. People bid considerably more for their own creations, even when they were plain old IKEA boxes. When it came to origami, they stumped up nearly as much for their own forlorn frog or bird as for the same animal

folded by an expert - even though other participants subsequently rated their efforts as "nearly worthless crumpled paper" (Journal of Consumer Psychology, DOI: 10.1016/j.jcps.2011.08.002).

But is it really the act of creating something that increases our sense of its worth? A rival interpretation was provided by the economist Richard Thaler in 1980. Known as the endowment effect, it suggests that we value things more highly because we own them. Others have since suggested that this effect intensifies the more time we spend with something. To test this, Norton and his colleagues had their participants "unbuild" Lego constructions, and so spend more time in contact with them. The result was that they no longer valued them any more highly than similar, custom-made products. Those who were forced to abandon half-built objects likewise no longer had quite the same sense of the objects' worth.

The IKEA effect suggests that when looking around for last-minute gift inspiration for Aunt Agatha, you could do worse than get her some flat-pack shelving. Although she might look askance at the Allen key and cryptic instructions that fall out of the package, in the long run she will thank you.

Something similar may also help to explain why in many spheres we are seeing a return to the cult of the artisan. These days there are websites where you can pay more to do more, from mixing your own muesli to designing your own T-shirt. According to Martin Schreier, who studies innovation and marketing at Bocconi University in Milan, Italy, such sites satisfy two basic human needs: they allow people to achieve "preference fit", by tailoring objects to their own specifications, and they require them to invest effort in the production process, which causes them to value those objects more highly. Schreier's lab experiments have shown that people are willing to pay twice as much for a product they have customised than for an identical, off-the-peg one - and the perceived increase in value is attributable in roughly equal parts to preference fit and effort investment (Management Science, vol 56, p 125).

Kelly Herd, who studies marketing at Indiana University in Bloomington, identifies a third factor: a customised product takes on elements of the customer's identity, reflecting them back to themselves. This, she thinks, could help explain the huge discrepancy between how people who have designed and customised an object rate them, and how other people rate them. "People create pretty objectively unattractive stuff but they love it," she says.

So here's a thought for when the mass-produced gifts have been safely stowed away: might our wildly inflated estimation of the fruits of our own labours be harnessed as a motivational tool in the workplace? Schreier thinks so. He points out that, as Karl Marx noted, another effect of the industrial revolution was to divide up the production process and assign each worker a part of it, meaning that no single worker had the satisfaction of bringing a process they had started to completion. One way to recapture that satisfaction, even with the most banal and repetitive processes, would be to make workers focus not on one task but to follow products through every stage of the production line.

But exploiting the IKEA effect in the workplace might harbour dangers, warns Norton. "When you develop things yourself, you believe they are better, and therefore you can't possibly see any value in anybody else's idea," he says. At its most extreme, this results in a form of corporate nationalism known as "Not Invented Here" syndrome, in which companies refuse to adopt products or ideas that originate outside, even if doing so would provide a competitive advantage. When Steve Jobs and Steve Wozniak approached Atari and Hewlett-Packard in the 1970s with their idea for a personal computer, the two outsiders were shown the door. Apple, the company Jobs and Wozniak then went on to create, has guarded against making the same mistake by regularly acquiring other companies and technologies.

Such corporate machinations seem a world away from life under the tinsel, but it seems they all come from the same atavistic motivation. That is something worth mulling further over a cup of tea. Best make it yourself, though. After all, it's only you that really knows how.

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<http://web.mit.edu/newsoffice/2011/stable-continents-0106.html>

At the core of a continent

New data finds regions of North America have remained extremely stable for more than one billion years

Like lines in a deeply weathered face, the cracks and fissures in the Earth's crust reveal a long and tumultuous lifetime. Massive continent-bearing plates have come together and broken apart, setting off earthquakes and volcanic eruptions that have fragmented underlying rock, changing the face of the planet over billions of years.

Despite a geologically fractious history, Earth's rigid outer layer, or lithosphere, retains ancient sections called cratons in which rocks have been left relatively undisturbed since they formed billions of years ago.

These cratons typically occur at the center of continental landmasses, and contain some of Earth's oldest rocks. How these cratons have survived on Earth's surface, avoiding destruction by both plate-tectonic processes and erosion over billions of years, has been of interest to geologists for decades.

In a new paper published today in *Science*, researchers at MIT have reconstructed the ancient history of the Wyoming Province, one of the oldest fragments within the North American craton. The team found that at this site, the continental crust experienced a short, intense period of erosion between 1.8 and 1.5 billion years ago before settling into a more stable period that has persisted to the present day. They did this by developing a novel technique to pinpoint when continents transition from high to low rates of erosion, which they say could also be used in other parts of the world to reconstruct similar histories.

"In our continental masses, the most stable regions have been exactly this way for billions of years," says lead author Terrence Blackburn, a graduate student in MIT's Department of Earth, Atmospheric and Planetary Sciences (EAPS). "Today the North American craton is eroding very slowly, and our data tell us regions like that have been behaving like that for vast amounts of Earth's history."



Geologic map of United States describing bedrock types and age of bedrock formations. Age of bedrock, from youngest to oldest, is indicated by color change: yellow, green, blue, red. Image: U.S. Geological Survey

At the crust of the matter

Blackburn worked with colleagues at MIT and the University of Colorado to investigate samples from the North American craton in a region of Montana where two continental fragments collided 1.8 billion years ago, forming a mountain range. Scientists have found that over time the mountain range eroded — first quickly, then much more slowly, over a billion years or more.

To pinpoint exactly when this transition in erosion happened, the group worked to reconstruct the thermal history of lower crustal xenoliths — fragments of crust that resided deep within the lithosphere for billions of years before relatively recent volcanic activity brought them to the surface. Blackburn and his colleagues reasoned that the rate of erosion on the surface affects the amount of heat escaping from deeper in Earth's crust: Like removing one's hat, eroding a mountaintop lets more heat escape. The team then developed a new technique to determine the rate at which these xenoliths cooled over more than a billion years.

The researchers reconstructed the thermal history of these once-deeply buried samples, using a radiometric dating technique that estimates the time at which rocks form. The technique measures the radioactive decay of uranium into lead to establish an absolute age of events in Earth history.

In a slight twist on the technique, Blackburn and his colleagues focused on dating minerals that lose radioactive lead at high temperatures — the hotter a rock, the more lead diffuses out. Only when the rock cools will the mineral begin to retain lead, effectively starting a radiometric "clock." This temperature-sensitive dating technique is called "thermochronology." By establishing the timing and rate of cooling within the lithosphere, the team was able to reconstruct the thermal evolution of the lithosphere, and infer the amount of erosion the region experienced.

"This data set we have tells us for the first time what is the maximum duration at which fast erosion of topographically high mountains can last," Blackburn says. "It's just a fraction of the craton's lifetime, three hundred million years at most, before the mountain belts are flattened, and after that, erosion is very slow."

Blackburn says the new technique may be used to reconstruct the histories of other continental masses. *The paper's other authors include EAPS professor Sam Bowring; EAPS assistant professor J. Taylor Perron; EAPS research associate Francis Dudas; and Kevin Mahan and Katherine Barnhart from the University of Colorado.*

<http://news.discovery.com/tech/ebook-paranga-010612.html>

E-Reader Lets You Physically Turn the Page

A new device gives you the best of both worlds -- an e-reader and a page-turner.

By Alyssa Danigelis | Fri Jan 6, 2012 07:40 AM ET

The page-turning animations on iPads and e-readers can be cute and fun, but they don't replace the actual feeling of turning pages that e-book holdouts seek. To bridge the gap, a new prototype device looks and behaves more like the paper version, allowing the user to physically flip the page.

"E-books have grown in popularity, but we think they lost the physical features that real books have," said Yuichi Itoh, an associate professor at Osaka University and project manager for the new device, called "Paranga." Itoh worked with Osaka University students as well as Worcester Polytechnic Institute alumni to develop the hardware and software for the reader.

The device is a mixture of high and low technology. Inspired by flipbooks, the prototype has two facing parts resembling an open-faced book. Page turning is controlled on the right-hand side, which is made from a flexible rubber sheet covered in spongy cloth. Along the sheet's edge, a narrow cylindrical roller with page-like grooves connects to sensors inside the device.

The left side of the device has a small LCD monitor that displays content, including animations and text. As the user moves a thumb along the roller, the system is programmed so that the corresponding pages will turn on the monitor. A "bend" sensor along the center of the sheet detects flexing, so the more the rubber sheet is bent, the faster the pages will turn on the monitor -- just like in a paper book.

Paranga also allows users to flip pages infinitely and in order, Itoh said. That could be particularly helpful when someone wants to rapidly peruse a book to find a particular page, he added.

To create the right effect, the team initially observed numerous people flipping through a variety of real books. Then they created a series of initial prototypes by pulling apart magazines, Itoh said. Finally they settled on the bend sensor and rotary encoder as the best mechanism for determining the user's page-turning intentions.

The device isn't aimed at sophisticated e-book readers. Instead, Itoh said that Paranga would be more useful for children and the elderly because it looks and feels more like a real book, making it easier to understand and control. Currently the team thinks Paranga has the potential to become a children's toy, but several issues will need addressing before it could be commercialized, Itoh said. One is cost since the most recent prototype was made for about \$260, including the monitor. Itoh suggested that turning Paranga into an attachment that connects to a tablet device through Bluetooth could bring the price down to under \$100.

The original Paranga prototype was released in late 2010 at the International Collegiate Virtual Reality Contest in Japan. Since then, the device was updated for the 2011 SIGGRAPH conference on computer graphics and interactive techniques that took place in Hong Kong last month. Now the team is working on improving the page-flipping mechanism's accuracy, Itoh said.

At SIGGRAPH, the Paranga team demonstrated a new feature of the device. The story shown on the pages changed according to the speed that the pages are turned. For example, in an animated story inspired by the movie "The Matrix," turning the pages slowly shows one character getting shot but flipping them quickly shows him twisting around, dodging the bullets. "We believe it is a new way of enjoying e-books," Itoh said.

Thomas Coughlin is a senior member of IEEE and founder of Coughlin Associates, a data storage consulting firm based in Atascadero, California. He also chairs the annual Storage Visions and Creative Storage conferences. Coughlin said he's been trying out several e-book devices, including the Nook, the Kindle, and the iPad. He sees Paranga as part of a wider trend to give e-reader devices sophisticated capabilities and make them more interactive. "I'd love to have something with flexible displays where I could flip the display and move to new pages," he said. Coughlin added that he expects paper books to become obsolete in the next several decades. "Using a book would be like using an 8-track tape. In 20 years or so this will be, 'Gosh, people used to use these things?'"

<http://www.newscientist.com/blogs/shortsharpscience/2012/01/sudoku-mystery-solved.html>

Exhaustive search solves fiendish Sudoku mystery

There is now a limit to how hard the fiendish number puzzle can get

Jacob Aron, reporter

Relax, Sudoku fans. There is now a limit to how hard the fiendish number puzzle can get. Mathematicians have discovered that a Sudoku puzzle must provide at least 17 starting numbers, or clues, in order to be valid. Any fewer will not produce a unique answer.

It is easy to see that there must be some minimum number of clues required for a valid puzzle. Imagine a starting 9x9 grid with just a single "1" filled in - it's clear that this could correspond to many different answers. However, no one knew the exact number of clues required.

Now a team lead by Gary McGuire at University College Dublin, Ireland have proved it is not possible to create a 16-clue puzzle with a unique answer, so the minimum number of clues must be 17.

Their work ends an exhaustive search that has run for a quite a few years. Sudoku aficionados had already found nearly 50,000 17-clue puzzles, but no one had managed to find a completely unique 16-clue puzzle. The closest anyone had got was a 16-clue puzzle with just two possible solutions.

McGuire and colleagues solved the problem using a piece of software that can check any completed Sudoku grid for the presence of n-clue puzzles buried within it. To understand how this works, think of starting with a filled-out grid and gradually removing digits until you achieve a valid starting grid with n digits.

An earlier version of their software took an hour to search a single completed grid, but their latest revision can check for 16-clue puzzles in just a few seconds. That is important because there are around 6.7×10^{21} such grids to check, though exploiting various mathematical symmetries reduces that number to just under five and a half billion. After a search that tested all the possibilities and lasted the whole of 2011, the team discovered no 16-clue puzzles, which implies there are no 15 or fewer clue puzzles either, so the minimum must be 17.

Besides solving a Sudoku mystery, the team say their work could also be applied to solving the vertex cover problem, which arises in the branch of mathematics known as graph theory and has applications in gene sequencing and software testing.

www.newscientist.com/article/dn21333-thinnest-siliconchip-wires-refuse-to-go-quantum.html

Thinnest silicon-chip wires refuse to go quantum

Not everything is weird at the nanoscale. Wires so small you'd expect them to obey the strange laws of quantum mechanics have instead displayed the same electrical properties as ordinary electrical interconnects.

13:24 06 January 2012 by Anil Ananthaswamy

The finding bodes well for conventional computers, because these tiny, conductive wires could make chips smaller. It could be bad news, though, for the super-fast quantum computers that are hoped to come next.

So far, conventional computers have followed Moore's law: the density of transistors that a conventional integrated-circuit chip can hold doubles approximately every two years, yielding ever-better performance out of ever-smaller devices.

However, it's getting harder to build smaller interconnects to wire up the devices on the silicon chip. As the width of metal wires drops to few tens of nanometres, their resistivity soars because electrons start interacting with nearby surfaces, dissipating more heat and lowering efficiency.

Phosphorous infusion

Also, as wires get down to nanometre scales, quantum behaviour usually dominates. For instance, the entire wire can exist in a superposition of states because of a property called quantum coherence. The wave behaviour of electrons in the wire might then cause them to interfere with each other, disrupting the electrical properties you would expect to see at larger scales.

Now, Michelle Simmons of the University of New South Wales in Sydney, Australia, and colleagues have etched channels in a silicon chip just 1.5 nanometres wide that behave just like larger wires.

The trick was to infuse them with phosphorus atoms, which provide electrons that can move freely and conduct electricity, turning each channel into a wire. Because the entire wire, except for its ends, was enclosed in the silicon, it was isolated from other surfaces that could disrupt its conductivity.

Coolly classical

The team found that these wires conducted electricity nearly as well as state-of-the-art copper interconnects used in modern microprocessors – despite being much thinner. Moreover, when they built wires of different lengths, the wires followed Ohm's law, in which the resistance of a wire increases with length – a property of non-quantum, or "classical" conductors.

The lack of quantum behaviour surprises David Ferry of Arizona State University in Tempe – especially because the experiments were carried out at a mere 4.2 kelvin. "Usually when you go to [such] low temperatures, you expect quantum mechanics to dominate the world. Here they have Ohm's law, suggesting that it's just like classical behaviour at room temperature," he says.

He reckons the large number of phosphorus atoms in the wire provided a very high density of electrons (1021 per cubic centimetre) and that their mutual scattering destroyed any quantum coherence, leading to classical behaviour.

That bodes well for doing the experiment at higher temperatures. "If they behave classically at low temperature, then they are also likely to behave classically at room temperature," says Simmons.

Coherent problem?

Indeed, Simmons says that the new wires are great news for those hoping for ever-tinier computing devices. "It shows that you can maintain low resistivity and make very thin conducting wires, which is obviously essential for down-scaling devices towards the atomic scale," she says.

The implications for quantum computing are less clear. Simmons's team had already shown that individual phosphorus atoms can exist in a superposition of spin states, making up the quantum bits, or qubits, needed for

quantum computation. She thinks that the nanowires could be used to interconnect qubits and help build quantum circuits.

Ferry thinks otherwise. "This lack of quantum coherence is good for Moore's law, but it's bad for quantum computing, because you need quantum coherence for quantum computing. This may make it less likely to occur." *Journal reference: Science, DOI: 10.1126/science.1214319*

http://www.eurekalert.org/pub_releases/2012-01/uoc--tcm010612.php

Tobacco company misrepresented danger from cigarettes

A new analysis of tobacco industry documents shows that Philip Morris USA manipulated data on the effects of additives in cigarettes, obscuring toxicity levels and increasing the risk of heart diseases and cancer

A new UCSF analysis of tobacco industry documents shows that Philip Morris USA manipulated data on the effects of additives in cigarettes, including menthol, obscuring actual toxicity levels and increasing the risk of heart, cancer and other diseases for smokers.

Tobacco industry information can't be taken at face value, the researchers conclude. They say their work provides evidence that hundreds of additives, including menthol, should be eliminated from cigarettes on public health grounds. [*The article is published in PLoS Medicine.*](#)

In the new, independent study, the scientists reassessed data from Philip Morris' "Project MIX," which detailed chemical analyses of smoke and animal toxicology studies of 333 cigarette additives. Philip Morris, the nation's largest tobacco company, published its findings in 2002. By investigating the origins and design of Project MIX, the UCSF researchers conducted their own inquiry into the Philip Morris results. They stressed that many of the toxins in cigarette smoke substantially increased after additives were added to cigarettes.

They also found, after obtaining evidence that additives increased toxicity, that tobacco scientists adjusted the protocol for presenting their results in a way that obscured these increases.

"We discovered these post-hoc changes in analytical protocols after the industry scientists found that the additives increased cigarette toxicity by increasing the number of fine particles in the cigarette smoke that cause heart and other diseases," said senior author Stanton A. Glantz, PhD, UCSF professor of medicine and director of the Center for Tobacco Control Research and Education at UCSF. "When we conducted our own analysis by studying additives per cigarette – following Philip Morris' original protocol -- we found that 15 carcinogenic chemicals increased by 20 percent or more," he said.

Additionally, in the independent study, the researchers discovered the reason behind Philip Morris' failure to identify many toxic effects in animal studies: its studies were too small. "The experiment was too small in terms of the number of rats analyzed to statistically detect important changes in biological effects," Glantz said. "Philip Morris underpowered its own studies."

The results of "Project MIX" were first published as four papers in a 2002 edition of Food and Chemical Toxicology, a journal whose editor and many members of its editorial board had financial ties to the tobacco industry. While Philip Morris was trying to get the papers published, the company scientist who led Project Mix sent an email to a colleague describing the peer review process as "[*an inside job.*](#)"

In the new study, the researchers used documents made public as a result of litigation against the tobacco industry. The documents are available to the public through UCSF's Legacy Tobacco Documents Library.

Co-authors of the study include Marcia Wertz, RN, PhD, of UCSF's Department of Social and Behavioral Sciences.

A video describing the paper is available at <http://www.scivee.tv/node/37778>.

The study was supported by the National Cancer Institute.

<http://www.physorg.com/news/2012-01-late-heavy-bombardment.html>

New research casts doubt on the late heavy bombardment

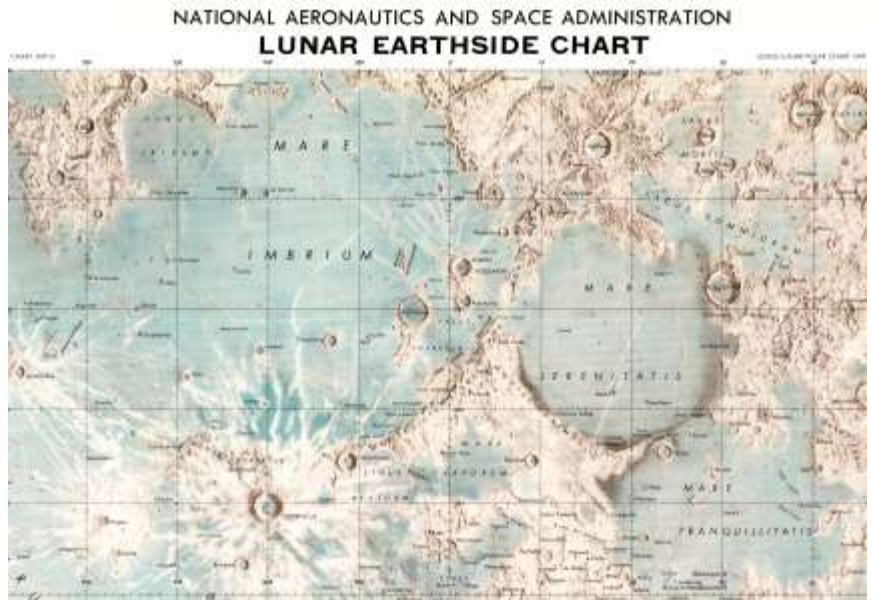
Was the early solar system bombarded with lots of big impacts? This is a question that has puzzled scientists for over 35 years.

And it's not just an academic one. We know from rocks on Earth that life began to evolve very early on, at least 3.8 billion years ago. If the Earth was being pummeled by large impacts at this time, this would certainly have affected the evolution of life. So, did the solar system go through what is known as the Late Heavy Bombardment (LHB)? Exciting new research, using data from the Lunar Reconnaissance Orbiter Camera (LROC) may cast some doubt on the popular LHB theory.

It's actually quite a heated debate, one that has polarized the science community for quite some time. In one camp are those that believe the solar system experienced a cataclysm of large impacts about 3.8 billion years ago. In the other camp are those that think such impacts were spread more evenly over the time of the early solar system from approximately 4.3 to 3.8 billion years ago.

The controversy revolves around two large impact basins, which are found fairly close to each other on the Moon. The Imbrium basin is one of the youngest basins on the near side of the Moon, while the Serenitatis basin is thought to be one of the oldest. Both are flooded with volcanic basalts and are big enough to be seen from Earth with the naked eye.

Scientists know the relative ages of such lunar basins because of a concept called superposition. Basically, superposition states that what is on top must be younger than what is beneath. Using such relationships, scientists can determine which basins are older and which are younger.



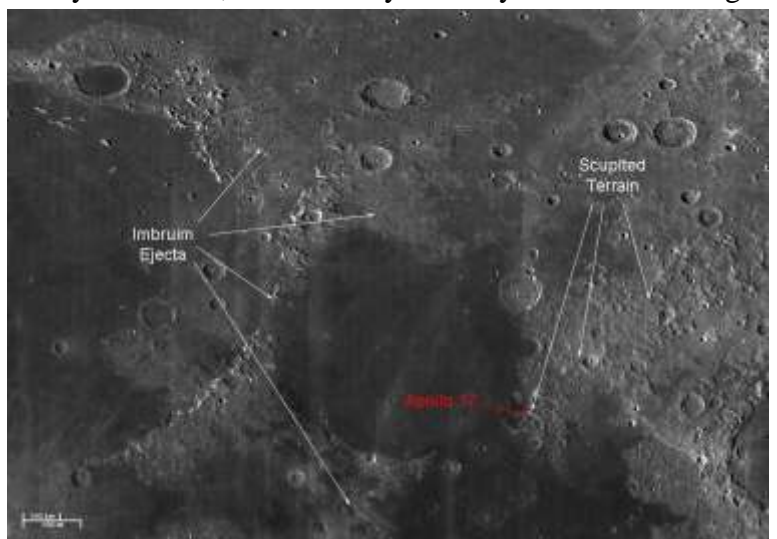
What if the Apollo 17 samples didn't come from the Serenitatis basin, where the astronauts collected them, but rather from the Imbrium basin, located some 600 km away? Studies from the new Lunar Reconnaissance Orbiter Camera suggest this may be the case. If true, this means Serenitatis is much older than the Imbrium basin and a solar system-wide impact catastrophe is not needed to explain the uncannily close ages of the Imbrium and Serenitatis basins.

Image credit: NASA

To get an absolute age, though, scientists need actual bits of rock, so they can use radiometric dating techniques. The lunar samples returned by the Apollo program provided exactly that. But, the Apollo samples suggest that the Imbrium and Serenitatis basins are barely 50 million years apart.

Relative age dating tells us there are over 30 other basins that formed within that time frame. This means that roughly one major impact occurred every 1.5 million years! Now, 1.5 million years may sound like a long time. But consider the last large impact that happened on Earth, the Chicxulub event 65 million years ago, which is thought to have exterminated the dinosaurs. Imagine another 40 dinosaur-killing impacts occurring since then. It would be surprising if any life survived such a barrage!

This is why a team of researchers, led by Dr. Paul Spudis of the Lunar and Planetary Institute, is looking very carefully at this question. Their research is using the principle of superposition to show that several of the areas visited by the Apollo program were blanketed by material from the Imbrium impact. This could mean that many of the collected Apollo materials may be sampling the same event.



Recent high quality data from the Lunar Reconnaissance Orbiter Camera shows that the sculpted terrain, which is present at the Apollo 17 landing site, is related to material that is known to be from the Imbrium impact. This means that Apollo 17 may have sampled Imbrium and not Serenitatis material. This could explain the unusually close ages of these two basins, suggested by the Apollo samples. If so, the Serenitatis impact may have occurred much earlier than previously thought, meaning that a barrage of frequent bombardments did not occur, and life on Earth could have evolved without being molested by too many impact events. Credit: NASA/GSFC/Arizona State University

Dr. Spudis's research focuses on the Montes Taurus area, between the Serenitatis and Crisium basins, not far from the Apollo 17 landing site. This is a region dominated by sculpted hills that have been interpreted to be ejected material from the adjacent Serenitatis basin impact. But, Dr. Spudis and his team have found that, instead, this sculpted material comes from the Imbrium basin some 600 kilometers away.

Previous data of this area, from the Lunar Orbiter IV camera, hadn't shown this because a fog on the camera lens made the details difficult to see (this fog problem was eventually resolved, and Lunar Orbiter IV provided a lot of useful data on other parts of the Moon). The new LROC data, however, shows that the sculpted terrain seen at Apollo 17 is very widespread, extending far beyond the Montes Taurus region. Furthermore, the

grooves and lineated features of this terrain point to the Imbrium basin, not the Serenitatis basin, and line up with similar features in the Alpes and Fra Mauro Formations, which are known to be ejecta from the Imbrium impact. In the north of Serenitatis, these Imbrium formations even seem to transform into the Montes Taurus, confirming that the sculpted hills do, in fact, originate from the Imbrium impact.

If the sculpted hills are Imbrium ejecta, then it is possible that Apollo 17 sampled Imbrium and not Serenitatis materials. That casts suspicion on the very close radiometric ages of these two basins. Perhaps these ages are so close because we effectively measured the same material. In that case, the age of Serenitatis could be much older than the 3.87 billion years the Apollo 17 samples suggest. If true, this would mean that there was no Late Heavy Bombardment at the time life was forming on the early Earth, leaving life to evolve with relatively few impact-related interruptions.

More information: Spudis et al., 2011, Journal of Geophysical Research, V116, E00H03

<http://news.discovery.com/tech/cheese-inspired-wrap-cleans-itself-120106.html>

Cheese-Inspired Plastic Wrap Cleans Itself

Bioengineers cooked up a living, functional plastic wrap-like material made with cheese fungus that actually cleans itself

By Alyssa Danigelis | Fri Jan 6, 2012 10:49 AM ET

Cheese just got even more awesome. Inspired by the way rinds work, bioengineers from the Swiss Federal Institute of Technology cooked up a living, functional plastic wrap-like material made with cheese fungus that actually cleans itself. Cheese rinds have the special ability to protect a tasty interior while simultaneously helping it ripen. Swiss researchers leveraged this knowledge to create a unique "living material." They took a thin plastic sheet and spread it with a fungus mixture made from *Penicillium roqueforti*, best known for making blue cheese blue.

A porous plastic membrane was then pressed over the top to complete the thin sandwich, according to a German description of it from the Institute. The pores were tiny enough to keep the fungus in the middle layer but wide enough to let in liquids. When the researchers dropped a sugary solution on the material, the fungus ate it all up and then went back to being dormant. As long as the material stayed moist and didn't dry out, it kept working, one of the researchers told the *Globe & Mail*.

The group, led by associate professor of chemical and bioengineering Wendelin Stark and PhD student Lukas Gerber, published an article about the material this week in the *Proceedings of the National Academy of Sciences*.

The researchers say the material could still work after being rubbed with alcohol disinfectant as well as following a soapy scrubbing. Although their fungus wrap was prepared as a conceptual design, Gerber told *Globe & Mail* reporter Tu Thanh Ha that he envisions the fungi eventually being used to make antimicrobial fabrics that activate only when certain germs are present.

"Composites of classical industrial ingredients and living microorganisms can provide a novel form of functional or smart materials," the researchers wrote in *PNAS*. Not too shabby for a cheese mold.

<http://www.scientificamerican.com/article.cfm?id=new-reusable-materials-pull-co2-from-air>

New, Reusable Materials Could Pull CO₂ Straight from Air

The materials are step toward an economy structured around recycling carbon instead of mining fossil fuels

By Umair Irfan and ClimateWire | Friday, January 6, 2012 | 16

Researchers have developed a new class of materials that can readily and efficiently absorb carbon dioxide from a smokestack or even directly from the atmosphere. The substances can help alleviate problems associated with carbon dioxide emissions, like climate change and ocean acidification. At the University of Southern California, scientists used a polymer called polyethylenimine (PEI) as the basis for their new materials, which offered several advantages over existing strategies to filter carbon. "It's very easy to prepare," explained Alain Goepfert, a senior research scientist at the Loker Hydrocarbon Research Institute at USC.

The polymer is coated with a substance called fumed silica in differing amounts to determine the optimal coating. "It's much easier than the synthesis of other adsorbers, for example metallic organic frameworks," said Goepfert. Adsorption refers to atoms sticking to a given material's surface, as opposed to absorption, where the atoms permeate the material. "It's also cheap," he said, noting that PEI is available for sale commercially at low cost.

To collect carbon dioxide, Goepfert said the material can be packed into columns, which are then inserted into flues and chimneys in factories and power plants. The adsorber collects carbon dioxide as waste gases flow through it. When it becomes saturated, the PEI device is replaced. The PEI materials also have a strong enough

affinity for carbon dioxide that they can remove carbon dioxide directly from the air, where it is present in very low concentrations and factors like humidity impede other adsorbers.

Pushing to make material 'dirt cheap'

The nitrogen atom in the polymer forms a reversible link to carbon in the gas's presence. When the adsorber is heated above 100 degrees Celsius, it releases the carbon. This allows the material to be reused, but it also creates an easy way to collect and concentrate carbon dioxide.

The collected gas can then be put to work by converting it into fuel, according to G.K. Surya Prakash, a professor of chemistry at USC who conducted the study with Goeppert. He envisions an economy structured around recycling carbon instead of mining more fossil fuels and views PEI materials as a step in that direction.

"We are interested in CO₂ capture because we think CO₂ is the best source of carbon for mankind. As a chemist, I tell people, 'Hey, guys! CO₂ is the solution,'" said Prakash. "Earth doesn't have an energy problem; the Earth has an energy carrier problem."

Nonetheless, it may still be some time before PEI materials see widespread use. "For CO₂ applications, there still needs to be work done," said Prakash, who wants to improve the materials' durability and wants to drive their already low costs down further. "You need to make it dirt cheap" before PEI gains acceptance, he said.

Goeppert, Prakash and their collaborators, including Nobel laureate George Olah, published their findings in November last year in the Journal of the American Chemical Society. The trio also laid out their vision for synthetic fuels in "Beyond Oil and Gas: The Methanol Economy."

<http://www.sciencedaily.com/releases/2012/01/120105161748.htm>

Ten Gynecologic Cancer Symptoms Women Shouldn't Ignore *Pelvic pain and abnormal bleeding aren't the only signs of gynecologic cancer.*

ScienceDaily - As part of Cervical Health Awareness Month in January, experts at The University of Texas MD Anderson Cancer Center share other symptoms that often are overlooked.

More than 80,000 women in the United States are diagnosed each year with a gynecologic cancer, such as cervical, endometrial (also known as uterine) or ovarian cancer. "Unfortunately, because symptoms for these cancers are often vague, many women mistake them for other less serious conditions," said Therese Bevers, M.D., medical director of MD Anderson's Cancer Prevention Center. "So, it's important to know exactly what to look for because gynecologic cancers are usually most treatable when found early."

Below are 10 symptoms of cervical and other gynecologic cancers that every woman should watch for. "Alert your doctor if these symptoms appear, especially if you've already gone through menopause," Bevers said.

1. Swollen leg. Does one leg look or feel swollen for no reason? This may be a sign of cervical cancer. Typically, though, a swollen leg isn't a sign of cancer unless there's also pain, discharge or other cervical cancer symptoms.
2. Abnormal vaginal bleeding. More than 90% of women diagnosed with endometrial cancer experience irregular bleeding. Women who've already undergone menopause should have any bleeding -- including spotting -- evaluated. Women who haven't gone through menopause should see a doctor about bleeding between periods, heavy bleeding or bleeding during sex.
3. Unexplained weight loss. Women who suddenly lose more than 10 pounds without changing diet or exercise habits should see their doctor.
4. Vaginal discharge colored with blood. Bloody, dark or smelly discharge usually signals infection. But sometimes, it's a sign of cervical or endometrial cancer.
5. Constantly needing bathroom breaks. Constantly need to use the bathroom or feel continuous bladder pressure? This may be a sign of cancer. "Take note especially if you also feel full, have abdominal pain and experience bloating," Bevers said.
6. Loss of appetite or constant feeling full. Never hungry anymore? Or constantly full? These appetite changes may be symptoms of ovarian cancer.
7. Pain in the pelvis or abdominal area. Ongoing abdominal pain or discomfort -- including gas, indigestion, pressure, bloating and cramps -- can signal ovarian cancer. And, constant pelvic pain or pressure can be a sign of endometrial cancer.
8. Belly bloat. Women often feel bloated after eating or drinking a lot, especially during their menstrual cycles. But a woman may have ovarian cancer if she continues feeling bloated for more than two weeks or after her period ends.
9. Constant fatigue. A little rest should typically cure fatigue. But women should see a doctor if fatigue constantly interferes with work or leisure activities.

10. Persistent indigestion or nausea. Feeling queasy for an extended period of time? Occasionally, persistent indigestion or nausea can signal gynecologic cancers, so play it safe and see a doctor.

"Remember, having one or more of these symptoms doesn't mean you have cancer," Bevers said. "But if they last two weeks or longer, see your doctor. After all, it's better to be safe than sorry."

http://www.eurekalert.org/pub_releases/2012-01/uof-gwc010612.php

Global warming caused by greenhouse gases delays natural patterns of glaciation, researchers say

Unprecedented levels of greenhouse gases in the Earth's atmosphere are disrupting normal patterns of glaciation

GAINESVILLE, Fla. - Unprecedented levels of greenhouse gases in the Earth's atmosphere are disrupting normal patterns of glaciation, according to a study co-authored by a University of Florida researcher and published online Jan. 8 in Nature Geoscience.

The Earth's current warm period that began about 11,000 years ago should give way to another ice age within about 1,500 years, according to accepted astronomical models. However, current levels of carbon dioxide are trapping too much heat in the atmosphere to allow the Earth to cool as it has in its prehistoric past in response to changes in Earth's orbital pattern. The research team, a collaboration among University College London, University of Cambridge and UF, said their data indicate that the next ice age will likely be delayed by tens of thousands of years. That may sound like good news, but it probably isn't, said Jim Channell, distinguished professor of geology at UF and co-author.

"Ice sheets like those in western Antarctica are already destabilized by global warming," said Channell. "When they eventually slough off and become a part of the ocean's volume, it will have a dramatic effect on sea level." Ice sheets will continue to melt until the next phase of cooling begins in earnest.

The study looks at the prehistoric climate-change drivers of the past to project the onset of the next ice age. Using astronomical models that show Earth's orbital pattern with all of its fluctuations and wobbles over the last several million years, astronomers can calculate the amount of solar heat that has reached the Earth's atmosphere during past glacial and interglacial periods.

"We know from past records that Earth's orbital characteristics during our present interglacial period are a dead ringer for orbital characteristics in an interglacial period 780,000 years ago," said Channell. The pattern suggests that our current period of warmth should be ending within about 1,500 years.

However, there is a much higher concentration of greenhouse gases trapping the sun's heat in the Earth's atmosphere now than there was in at least the last several million years, he said. So the cooling that would naturally occur due to changes in the Earth's orbital characteristics are unable to turn the temperature tide.

Over the past million years, the Earth's carbon dioxide levels, as recorded in ice core samples, have never reached more than 280 parts per million in the atmosphere. "We are now at 390 parts per million," Channell said. The sudden spike has occurred in the last 150 years.

For millions of years, carbon dioxide levels have ebbed and flowed between ice ages. Orbital patterns initiate periods of warming that cause ocean circulation to change. The changes cause carbon dioxide-rich water in the deep ocean to well up toward the surface where the carbon dioxide is released as a gas back into the atmosphere. The increase in atmospheric carbon dioxide then drives further warming and eventually the orbital pattern shifts again and decreases the amount of solar heat that reaches the Earth.

"The problem is that now we have added to the total amount of CO₂ cycling through the system by burning fossil fuels," said Channell. "The cooling forces can't keep up."

Channell said that the study, funded by the National Science Foundation in the U.S, and the Research Council of Norway and the Natural Environment Research Council in the United Kingdom, brings to the forefront the importance of atmospheric carbon dioxide because it shows the dramatic effect that it is having on a natural cycle that has controlled our Earth's climate for millions of years. "We haven't seen this high concentration of greenhouse gases in the atmosphere for several million years," Channell said. "All bets are off."

<http://www.newscientist.com/article/dn21335-before-dna-before-rna-life-in-the-hodgepodge-world.html>

Before DNA, before RNA: Life in the hodge-podge world

Take note, DNA and RNA: it's not all about you. Life on Earth may have begun with a splash of TNA – a different kind of genetic material altogether.

18:00 08 January 2012 by Michael Marshall

Because RNA can do many things at once, those studying the origins of life have long thought that it was the first genetic material. But the discovery that a chemical relative called TNA can perform one of RNA's defining functions calls this into question. Instead, the very first forms of life may have used a mix of genetic materials.

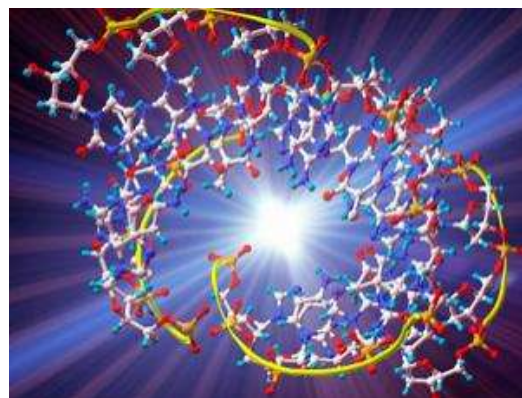
RNA, DNA... TNA

Today, most life bar some viruses uses DNA to store information, and RNA to execute the instructions encoded by that DNA. However, many biologists think that the earliest forms of life used RNA for everything, with little or no help from DNA.

A key piece of evidence for this "RNA world" hypothesis is that RNA is a jack of all trades. It can both store genetic information and act as an enzyme, seemingly making it the ideal molecule to start life from scratch.

Now it seems TNA might have been just as capable, although it is not found in nature today.

It differs from RNA and DNA in its sugar backbone: TNA uses threose where RNA uses ribose and DNA deoxyribose. That gives TNA a key advantage, says John Chaput of Arizona State University in Tempe: it is a smaller molecule than ribose or deoxyribose, possibly making TNA easier to form.



In the beginning (Image: Pasieka/Science Photo Library)

Chaput and his colleagues have now created a TNA molecule that folds into a three-dimensional shape and clamps onto a specific protein. These are key steps towards creating a TNA enzyme that can control a chemical reaction, just like RNA.

The team took a library of TNAs and evolved them in the presence of a protein. After three generations, a TNA turned up that had a complex folded shape like an enzyme and could bind to the protein.

No TNA world

That doesn't mean TNA was the original genetic material, though. Chaput thinks it probably wasn't, if only because the chemistry of early Earth was so messy that TNA would not have arisen on its own. Rather, many different kinds of genetic material probably formed in a genetic hodge-podge. "The most likely scenario is that nature sampled lots of different things," says Chaput.

That's in line with a recent study by Nobel prizewinner Jack Szostak of Harvard University and colleagues. He created mosaic nucleic acids that were half DNA, half RNA. Like Chaput's TNA, some of these could bind to target molecules (Proceedings of the National Academy of Sciences, DOI: 10.1073/pnas.1107113108).

However, there are problems with the hodge-podge world hypothesis. For one thing, there is no trace of TNA or its cousins in modern organisms. For another, although TNA looks simpler than RNA, we can't be sure it was easier to make some 4 billion years ago because no one has actually made it in the conditions that existed on Earth before life began, says John Sutherland of the MRC Laboratory of Molecular Biology in Cambridge, UK.

Chaput points out that we still know very little about what TNA can do, because the technology to evolve the molecules in the lab is so new. The research, he says, is just getting going.

Journal reference: Nature Chemistry, DOI: 10.1038/nchem.1241

Cousins of DNA

TNA is just one of many nucleic acids that may have been important in the first life on Earth. Here are three others.

PNA (peptide nucleic acid) ditches the sugar in its backbone and inserts a peptide instead, so it is more closely related to proteins. Like DNA, it can form double strands with itself, as well as with DNA or RNA, making it a promising genetic system (Science, DOI: 10.1126/science.1174577). It is also easy to make long PNA molecules in the conditions of prebiotic Earth, even at temperatures of 100 °C (Proceedings of the National Academy of Sciences, DOI: 10.1073/pnas.97.8.3868).

GNA (glycol nucleic acid) is even simpler than TNA, with just three carbon atoms in its backbone, yet can still form helical molecules, much like DNA (The Journal of Organic Chemistry, DOI: 10.1021/jo201469b).

ANA (amyloid nucleic acid) consists of nucleic acids attached to amyloid proteins, infamous for their role in Alzheimer's disease. ANA fibres have been suggested as the first organisms (PLoS One, DOI: 10.1371/journal.pone.0019125), because the amyloid could protect genetic material contained within.

Two drink-free days a week needed, MPs' report says

People should have at least two days a week completely clear of alcohol, a group of MPs says.

By James Gallagher Health reporter, BBC News

It is one of the recommendations in a report by the Commons science and technology committee, which is calling for a review of all government guidelines on alcohol in the UK. It says there are "sufficient concerns" about the recommendations on how much people should drink.

The report has been welcomed by charities and public health experts.

Advice on the maximum units of alcohol that should be consumed was introduced in 1987 - 21 units in a week for men and 14 for women. In 1995, the advice was changed to recommend that men did not regularly drink more than three to four units per day. The figures were two to three units for women. It also says that after heavy drinking people should leave 48 hours for the body to recover.

The report questioned whether this "appeared to endorse daily drinking". It said having two alcohol-free days would "would enforce the message that drinking every day should be avoided". It also says there "could be merit" in setting a lower limit for older people in the same manner as there are more specific rules for children and pregnant women. The idea of increasing the daily limit, was however, ruled out.

The report highlighted problems when it came to understanding how many units of alcohol there are in a drink.

A survey by the Office for National Statistics suggested that 90% of people had heard of units, yet fewer than one in three knew how much one unit of wine was and that only 13% kept a check on the units they drank.

The report does support the concept of the unit, but said more work was needed to help people understand them. It says: "There are sufficient concerns about the current drinking guidelines to suggest that a thorough review of the evidence concerning alcohol and health risks is due."

The chairman of the committee, Andrew Miller, said: "Alcohol guidelines are a crucial tool for government in its effort to combat excessive and problematic drinking. It is vital that they are up-to date and that people know how to use them." "Unfortunately, public understanding of how to use the guidelines and what an alcohol unit looks like is poor, although improving. "While we urge the UK health departments to re-evaluate the guidelines more thoroughly, the evidence we received suggests that the guidelines should not be increased and that people should be advised to take at least two drink-free days a week."

Alan Maryon-Davis, a professor of public health, said: "Broadly speaking [alcohol guidelines] are fit for purpose, but they need a bit of clarification. "The word 'daily' I would object to. It gives the impression that it is a good idea to drink every day, which clearly isn't." He thinks that phrases such as "in a day" or "in 24 hours" should be adopted.

Review welcome

Prof Sir Ian Gilmore, from the Alcohol Health Alliance UK, said: "The main recommendation of setting up a review of evidence to come up with clear guidelines would be very valuable indeed."

Wine and Spirit Trade Association spokesman Gavin Partington said: "People want simple, consistent advice on how to drink responsibly. "Through our commitment to the Responsibility Deal, the vast majority of alcohol labels on UK shelves will contain responsible drinking guidelines by 2013, supported by point-of-sale information in both the on-and-off trades."

Alcohol Concern chief executive Eric Appleby said: "Accessible and reliable public information on alcohol harm is an essential element in tackling Britain's problem with alcohol misuse. However, the government must accept that information alone is insufficient. "With the new alcohol strategy currently being developed, the government has the opportunity to confront alcohol harm on several fronts, including minimum price control and the empowerment of communities to control local licensing."

Chris Sorek, chief executive of alcohol awareness charity Drinkaware, said: "Drinkaware welcomes the committee's recommendation for greater efforts on helping people understand the unit guidelines and how to use them. "While the committee recognises that public awareness of alcohol units is now high, it supports Drinkaware's evidence that more needs to be done to raise awareness of how many units are in alcoholic drinks."

A spokesperson for the Department of Health said: "It's crucial that people have good advice about alcohol so they can take responsibility for their own health. "The current guidelines were developed following a thorough review of the evidence and consultation with experts. We will consider these recommendations and look at whether it is necessary to review our guidance. "Next month, we are launching new Change4Life adverts which will advise people about the harm alcohol can do to our health. We will also shortly be publishing a strategy to tackle alcohol misuse."

<http://www.scientificamerican.com/article.cfm?id=global-economy-could>

Global Economy Could Endure Disaster for a Week

The global economy could withstand widespread disruption from a natural disaster or attack by militants for only a week as governments and businesses are not sufficiently prepared to deal with unexpected events, a report by a respected think-tank said.

By Nina Chestney

LONDON Reuters - The global economy could withstand widespread disruption from a natural disaster or attack by militants for only a week as governments and businesses are not sufficiently prepared to deal with unexpected events, a report by a respected think-tank said.

Events such as the 2010 volcanic ash cloud, which grounded flights in Europe, Japan's earthquake and tsunami and Thailand's floods last year, have showed that key sectors and businesses can be severely affected if disruption to production or transport goes on for more than a week.

"One week seems to be the maximum tolerance of the 'just-in-time' global economy," said the report by Chatham House, the London-based policy institute for international affairs.

The current fragile state of the world's economy leaves it particularly vulnerable to unforeseen shocks. Up to 30 percent of developed countries' gross domestic product could be directly threatened by crises, especially in the manufacturing and tourism sectors, according to the think-tank.

It is estimated that the 2003 outbreak of severe acute respiratory syndrome (SARS) in Asia cost businesses \$60 billion, or about 2 percent of east Asian GDP, the report said.

After the Japanese tsunami and nuclear crisis in March last year, global industrial production declined by 1.1 percent the following month, according to the World Bank. The 2010 volcanic ash cloud cost the European Union 5-10 billion euros and pushed some airlines and travel companies to the verge of bankruptcy.

"I would like to think we can learn from those experiences and be more resilient for longer but it won't happen unless governments and businesses are better prepared and put in place different supply chains which can be relied on when disasters strike," said Alyson Warhurst, chief executive of UK-based risk analysis company Maplecroft.

'BE PREPARED'

Costs can escalate quickly when transport or major production hubs are disrupted for more than a few days, which can in turn threaten food and water supplies and energy and communication networks, the report said.

In the event of prolonged disruption, some businesses would be forced to cut investment and jobs or consider closing down, leading to a permanent reduction in countries' growth.

In general, governments and businesses are under-prepared to respond to high-impact, unpredictable events, with worst-case scenarios rarely factored into their contingency plans.

"Contingency and business planning often assumes the return of status quo ante post-crisis. But this approach will be inadequate in a world of complex economic and social risks, when there is no return to business-as-usual practices," said Bernice Lee, the report's lead author. "Industries - especially high-value manufacturing - may need to re-consider their just-in-time business model in an interdependent world," she added.

Climate change and water scarcity will only add to risks, putting even more pressure on infrastructure and resources. Experts have been warning governments over the past few years that they are not properly prepared to deal with national crises. The UK government came under fire in 2007 for its lack of preparation and response to severe floods, which cost the economy 3.2 billion pounds.

The think-tank recommended various ways to improve responses from governments and businesses to extreme events. It particularly highlighted social media networks as a useful "one-stop shop" for information in the event of a crisis. In the London riots last year, social networks such as Twitter proved invaluable for many people to track the rioters' movements across the UK capital and take precautions.

The full report is available at www.chathamhouse.org

<http://medicalxpress.com/news/2012-01-medical-genetics-team-inherited-diseases.html>

Medical genetics team pinpoints causes of inherited diseases

A child's diagnosis with a congenital deformity or developmental delay raises challenging questions: Could the problem be inherited? What's the prognosis? If other children are born to the same parents, what is the recurrence risk?

Medical Xpress - The medical genetics team at Lucile Packard Children's Hospital helps answer these questions. The group combines a human touch with diagnostic, clinical and research expertise to help families and referring physicians navigate genetic disease. They handle an array of conditions, including craniofacial

anomalies, such as cleft palate; autism-like symptoms; chromosomal defects, such as Down syndrome and Fragile X syndrome; and rare biochemical defects, such as phenylketonuria and mitochondrial disorders.

“When it comes to our capacity for handling the complex cases, I cannot think of a better place for patients,” said Gregory Enns, MD, director of the Biochemical Genetics Program and associate professor medical genetics in pediatrics. His colleagues offer diagnosis, genetic counseling, family planning, prenatal diagnostics, neonatal newborn screening and management of chronic genetic and metabolic disease, he noted.

The team receives referrals from practitioners across the United States and around the world. For each referral, a genetic counselor contacts the family by telephone to learn what diagnostic testing the child has received and obtain medical records. Clinic visits focus on the next steps in diagnosis and treatment, often including testing from the hospital’s biochemical genetics lab, which is unique in Northern California.

“Partly because of the support of our lab, we pursue rare diagnoses much further than many institutions,” said Jonathan Bernstein, MD, PhD, clinical associate professor of pediatric genetics. “Reaching a diagnosis gives families the peace of mind of knowing what’s going on at the level of cause as opposed to symptoms.”

Regardless of whether a diagnosis is established, the medical geneticists work closely with other providers at Packard Children’s to ensure patients receive all the treatment they need. In some cases, referrals are directed within the team itself, such as to its Down syndrome clinic. Many patients are seen by other Packard departments. When relevant, patients go to the cancer genetics group at Stanford Hospital & Clinics. And the team works to help families obtain support from others facing similar diagnoses.

“We’re like quarterbacks, arranging coordination of services to meet our patients’ needs,” Enns said.

For rare metabolic diseases, Packard Children’s offers a standard of care unmatched elsewhere in the world. In 2010, a multidisciplinary team at Packard used a first-of-its-kind combination of drugs to ward off brain damage in a newborn who had a rare urea cycle disorder until he received a curative liver transplant. “It was gene therapy with a scalpel,” Enns said. In many other cases, patients with rare disorders can benefit from research conducted at Stanford or in collaboration with other institutions.

Referrals to medical genetics should go through Packard Children’s referrals center, Enns said.

“We are always happy to hear from referring physicians before or after a patient’s visit,” Bernstein added. “If they want to discuss whether a referral is appropriate for a specific patient, we’re glad to work on that, too.”
Provided by Stanford University Medical Center

<http://www.bbc.co.uk/news/world-asia-16446239>

Vietnam man Nguyen Duy Hai has 90kg tumour removed

A Vietnamese man is in a stable condition in hospital after doctors removed a giant tumour which weighed far more than the rest of his body.

Nguyen Duy Hai's 90kg (198lb) tumour, which was growing on his right leg, was removed in a complex 12-hour operation. The lead doctor, an American, waived his fee and other costs were funded through donations, the hospital said.

Family members burst into tears of happiness when they discovered he had survived, reported VietNamNet. Mr Hai, who is believed to be 31, has been living with the tumour - which is non-cancerous and linked to a rare genetic disorder - since he was four years old, reported AFP news agency.



A previous operation failed to stop the dramatic growth of the tumour

Part of his leg was amputated when he was 17 in an attempt to stem the growth of the tumour, reports said, but without success. The tumour prevented Mr Hai walking and also hampered sleep.

This latest operation was carried out on Thursday at the France-Vietnam (FV) hospital in Ho Chi Minh City and led by US Dr McKay McKinnon, who previously successfully removed an 80kg tumour from a Romanian woman, AFP reported.

Family members and friends left their home in the mountainous central area of Da Lat to go to Ho Chi Minh city, where they prayed for Mr Hai and wept tears of joy once they learned he had survived, VietNamNet said.