http://www.bbc.co.uk/news/health-20084303

Cheap colour test picks up HIV

A cheap test which could detect even low levels of viruses and some cancers has been developed by UK researchers.

By James Gallagher Health and science reporter, BBC News

The colour of a liquid changes to give either a positive or negative result. The designers from Imperial College London say the device could lead to more widespread testing for HIV and other diseases in parts of the world where other methods are unaffordable. The prototype, which needs wider testing, is described in the journal Nature Nanotechnology.

The test can be configured to a unique signature of a disease or virus - such as a protein found on the surface of HIV. If that marker is present it changes the course of a chemical reaction. The final result is blue if the marker is there, red if the marker is not. The researchers say this allows the results to be detected with "the naked eye".

Prof Molly Stevens told the BBC: "This method should be used when the presence of a target molecule at ultra-low concentration could improve the diagnosis of disease. "For example, it is important to detect some molecules at ultra-low concentrations to test cancer recurrence after tumour removal. "It can also help with diagnosing HIV-infected patients whose viral load is too low to be detected with current methods."

Early testing showed the presence of markers of HIV and prostate cancer could be detected. However, trials on a much larger scale will be needed before it could be used clinically. The researchers expect their design will cost 10 times less than current tests. They say this will be important in countries where the only options are unaffordable.

Fellow researcher Dr Roberto de la Rica said: "This test could be significantly cheaper to administer, which could pave the way for more widespread use of HIV testing in poorer parts of the world."

http://www.eurekalert.org/pub_releases/2012-10/w-caa102912.php

Complementary and alternative therapy improved lives of arthritis patients

Quarter of patients with rheumatoid arthritis and osteoarthritis used complementary and alternative therapy to help manage their condition

Nearly a quarter of patients with rheumatoid arthritis and osteoarthritis used complementary and alternative therapy (CAT) to help manage their condition, according to a study in the November issue of the Journal of Clinical Nursing. Researchers interviewed 250 patients aged between 20 and 90 years of age. More than two-thirds (67%) had rheumatoid arthritis and the remainder had osteoarthritis. They found that 23% used CAT in addition to prescribed drugs and that just under two-thirds of those (64%) felt that the therapy was beneficial, reporting improvements in pain intensity, sleeping patterns and activity levels.

"Our study underlines the importance of healthcare professionals being knowledgeable about the potential use of CAT when providing medical care to patients with arthritis" says lead author Professor Nada Alaaeddine, Head of the Regenerative and Inflammation Lab in the Faculty of Medicine, University of St Joseph, Beirut, Lebanon.

"Although CAT might have beneficial effects in rheumatoid arthritis and osteoarthritis, patients should be cautious about their use and should tell their healthcare providers that they are using them to make sure they don't conflict with their existing treatment."

Key findings of the survey included:

CAT users had an average age of 45 years, significantly younger than the average non CAT user, who was aged 57 years.

CAT use was higher in patients with osteoarthritis (29%) than rheumatoid arthritis (20%).

The most common CAT used was herbal therapy (83%), followed by exercise (22%), massage (12%), acupuncture (3%), yoga and meditation (3%) and dietary supplements (3%).

Just under a quarter of the patients using CAT (24%) sought medical care because of possible side effects, but they were not serious and were reversible. The most common side effects included skin problems (16%) and gastrointestinal problems (9%).

The majority did not tell their healthcare provider about their CAT use (59%).

CAT users were asked to rate the amount of pain they felt and the percentage who said that they experienced no pain rose from 12% to 43% after CAT use. The number who slept all night rose from 9% to 66%.

CAT users also reported an improvement in daily activities. The percentage who said that their pain did not limit them at all rose from 3% to 12% and the percentage who said they could do everything, but with pain, rose from 26% to 52%.

"CAT use is increasing and this study shows that it provided self-reported benefits for patient with rheumatoid arthritis and osteoarthritis" says Professor Alaaeddine. "It is, however, important that patients discuss CAT use

with their healthcare practitioner and that they are made aware of possible side effects, in particular the possible interactions between herbal and prescribed drugs."

Use of complementary and alternative therapy among patients with rheumatoid arthritis and osteoarthritis. Alaaeddine et al. Journal of Clinical Nursing. 21, pp3198. (November 2012). doi: 10.1111/j.1365-2702.2012.04169.x

http://www.eurekalert.org/pub_releases/2012-10/bu-hst102912.php

How silver turns people blue

Scientists unlock chemical processes behind argyria

PROVIDENCE, R.I. - Researchers from Brown University have shown for the first time how ingesting too much silver can cause argyria, a rare condition in which patients' skin turns a striking shade of grayish blue.

"It's the first conceptual model giving the whole picture of how one develops this condition," said Robert Hurt, professor of engineering at Brown and part of the research team. "What's interesting here is that the particles someone ingests aren't the particles that ultimately cause the disorder."

Scientists have known for years argyria had something to do with silver. The condition has been documented in people who (ill advisedly) drink antimicrobial health tonics containing silver nanoparticles and in people who have had alternative medical treatments involving silver. Tissue samples from patients showed silver particles actually lodged deep in the skin, but it wasn't clear how they got there.

As it turns out, argyria is caused by a complex series of chemical reactions, Hurt says. His paper on the subject, authored with Brown University colleagues Jingyu Liu, Zhongying Wang, Frances Liu, and Agnes Kane, was published online earlier this month in the journal ACS Nano.

Hurt and his team show that nanosilver is broken down in the stomach, absorbed into the bloodstream as a salt and finally deposited in the skin, where exposure to light turns the salt back into silver metal and creates the telltale bluish hue. That final stage, oddly, involves the same photochemical reaction used to develop black-and-white photographs.

From silver to salt and back again

Hurt and his team have been studying the environmental impact of silver, specifically silver nanoparticles, for years. They've found that nanosilver tends to corrode in acidic environments, giving off charged ions — silver salts — that can be toxic in large amounts. Hurt's graduate student, Jingyu Liu (now a postdoctoral researcher at the National Institute of Standards and Technology), thought those same toxic ions might also be produced when silver enters the body, and could play a role in argyria.

To find out, the researchers mixed a series chemical treatments that could simulate what might happen to silver inside the body. One treatment simulated the acidic environment in the gastrointestinal tract; one mimicked the protein content of the bloodstream; and a collagen gel replicated the base membranes of the skin.

They found that nanosilver corrodes in stomach acid in much the same way it does in other acidic environments. Corrosion strips silver atoms of electrons, forming positively charged silver salt ions. Those ions can easily be taken into the bloodstream through channels that absorb other types of salt. That's a crucial step, Hurt says. Silver metal particles themselves aren't terribly likely to make it from the GI tract to the blood, but when some of them are transformed into a salt, they're ushered right through. From there, Hurt and his team showed that silver ions bind easily with sulfur present in blood proteins, which would give them a free ride through the bloodstream. Some of those ions would eventually end up in the skin, where they'd be exposed to light.

To re-create this end stage, the researchers shined ultraviolet light on collagen gel containing silver ions. The light caused electrons from the surrounding materials to jump onto the unstable ions, returning them to their original state — silver metal. This final reaction is ultimately what turns patients' skin blue. The photoreaction is similar to the way silver is used in black and white photography. When exposed to light, silver salts on a photographic film reduce to silver metal and darken, creating an image.

Implications for nanosilver safety

Despite its potential toxicity, silver has been valued for centuries for its ability to kill germs, which is why silver nanoparticles are used today in everything from food packaging to bandages. Regulators have established limits for occupational exposure to silver, but there are questions as to whether there should be special limits on the nanoparticle form.

This research "would be one piece of evidence that you could treat nanoparticles in the same way as other forms of silver," Hurt says. That's because the bioavailable form of silver — the form that is absorbed into the bloodstream — is the silver salt that's made in the stomach. Any silver metal that's ingested is just the raw material to make that bioavailable salt. So ingesting silver in any form, be it nano or not, would have basically the same effect, Hurt said. "The concern in this case is the total dose of silver, not what form it's in," Hurt said. "This study implies that silver nanoparticles will be less toxic than an equivalent amount of silver salt, at least in this exposure scenario."

The National Science Foundation and the Superfund Research Program of the National Institute of Environmental Health Sciences funded the research.

http://www.eurekalert.org/pub_releases/2012-10/bmj-beu102912.php

BMJ editor urges Roche to fulfil promise to release Tamiflu trial data

Journal launches open data campaign to compel greater accountability in healthcare

In an open letter to company director, Professor Sir John Bell, she says: "Billions of pounds of public money have been spent on [Tamiflu] and yet the evidence on its effectiveness and safety remains hidden from appropriate and necessary independent scrutiny." The letter is published on the BMJ's website (bmj.com/tamiflu) alongside correspondence by the Cochrane team with Roche, the US Centres for Disease Control (CDC) and the World Health Organisation (WHO), as part of an open data campaign aimed at persuading Roche to give doctors and patients access to the full data on Tamiflu.

Dr Godlee's letter follows recent reports that the European Medicines Agency (EMA) has initiated infringement proceedings against Roche to investigate deficiencies in safety reporting, including the processing of around 80,000 reports on suspected adverse drug reactions. Dr Godlee is also one of 28 signaturies to a letter published in The Times today (thetimes.co.uk/letters) calling on drug companies to "come clean" and make clinical trial data for all drugs in current use available to healthcare professionals.

Pressure from politicians is also mounting. Last week, Sarah Wollaston, a GP and Conservative MP, raised the issue of missing data in Parliament, while Health Minister Norman Lamb has agreed to meet experts to discuss the issue of access to clinical trial data.

In December 2009, Roche made a public promise to release full clinical trial reports of its antiviral drug oseltamivir (Tamiflu) in response to a major investigation by the BMJ and researchers Peter Doshi and Tom Jefferson from the Cochrane Collaboration. The investigation found no clear evidence that Tamiflu prevents complications like pneumonia in healthy people. It also raised serious concerns about access to drug data, the use of ghost writers in drug trials, and the drug approval process. Since the investigation, some further data have been released to the Cochrane reviewers, but the full data set has still not been provided.

The Cochrane reviewers now know that there are at least 123 trials of Tamiflu and that the majority (60%) of patient data from Roche Phase 3 completed treatment trials remain unpublished. Their main concerns relate to "the likely overstating of effectiveness and the apparent under-reporting of potentially serious adverse effects." Meanwhile, Tamiflu has been a great commercial success for Roche and has been added to the World Health Organisation's list of essential medicines.

In her letter, Dr Godlee appeals to Professor Bell "to bring your influence to bear on your colleagues on Roche's board." She adds: "In refusing to release these data of enormous public interest, you put Roche outside the circle of responsible pharmaceutical companies. Releasing the data would do a great deal to restore confidence in your company and its board of directors."

In a response not for publication, Professor Bell said he has referred the matter to Roche and is awaiting a response. "The open correspondence on bmj.com aims to hold specific individuals and organisations to account," writes Dr Godlee in an accompanying editorial. "Their actions are preventing independent scrutiny of the results of clinical trials and putting patients' lives at risk. We also hope it will contribute to a sea change in the public mood."

A poll on bmj.com last week asked: "Who is mainly at fault for denying access to negative clinical trial results?" Of the 569 votes, 69% said pharma, 13.5% said regulators, and 9% said legislators.

The BMJ plans to launch other campaigns linked to its investigations in the future.

http://www.eurekalert.org/pub_releases/2012-10/hasf-bsi102212.php

Breakfast sandwich is a time bomb in a bun

Study finds that just 1 high-fat meal can affect your heart health

Eat a breakfast sandwich and your body will be feeling the ill effects well before lunch – now that's fast food! High-fat diets are associated with developing atherosclerosis (narrowing of the arteries) over a lifetime. But how quickly can damage start?

Just one day of eating a fat-laden breakfast sandwich – processed cheese and meat on a bun – and "your blood vessels become unhappy," says Heart and Stroke Foundation researcher Dr. Todd Anderson, director of the Libin Cardiovascular Institute of Alberta and head of cardiac science at the University of Calgary.

Atherosclerosis can eventually lead to serious problems including heart disease, stroke or even death.

Delegates at the Canadian Cardiovascular Congress heard today about a study at Dr. Anderson's lab, led by student researcher Vincent Lee. The key ingredients: breakfast sandwiches and a group of healthy, non-smoking university students.

Fats can build up in your arteries over decades. One important gauge of how "happy" your arteries feel is how much blood flow can increase in your arm in response to its brief interruption – measured as VTI (velocity time integral). You can measure VTI with doppler ultrasound at rest and then after a blood pressure cuff been inflated.

"VTI tells us how much blood flow you can you get in your arm," says Dr. Anderson. The higher the better, which means the small vessels can dilate to capacity, and the blood vessel hormones are working well.

So what would happen to the university students after starting their day with a breakfast of fat champions?

The objective of this study was to assess the acute effects of just one high-fat meal on microvascular function, an indicator of overall vascular (blood vessel) health.

The students were studied twice, once on a day they had no breakfast, and once on a day when they consumed two commercially available breakfast sandwiches, total of 900 calories and 50 g of fat. Two hours after eating the sandwiches, their VTI had decreased by 15-20 per cent, reports Dr. Anderson.

From just one isolated meal, the results are temporary. But the study shows that such a high-fat offering can do more harm, and do it more quickly, than people might think.

"I won't say don't ever have a breakfast sandwich," says Dr. Anderson. But enough of a diet like that, and you can see how you can build up fat in the walls of your arteries.

Dr. Anderson is also co-chair of the group that updated the Canadian Lipid Guidelines (on managing and treating high blood cholesterol), presented at the Canadian Cardiovascular Congress.

"This study reminds us that our behaviours are the backbone of preventing heart disease," says Heart and Stroke Foundation spokesperson Dr. Beth Abramson.

"Remember that whether you eat at home or go to a restaurant, you're still in charge of what you eat. So consider all the choices, and try to cut down on saturated and trans fats, calories and sodium. That's one of the keys to decrease your risk of heart disease and stroke."

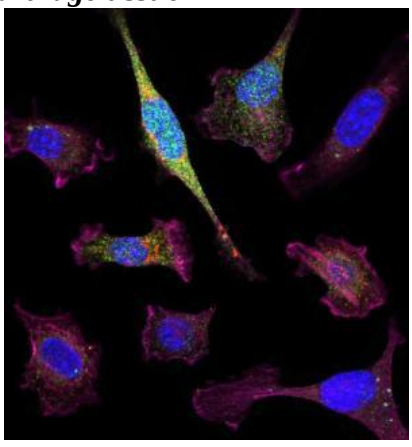
The Canadian Cardiovascular Congress 2012 is co-hosted by the Heart and Stroke Foundation and the Canadian Cardiovascular Society.

Statements and conclusions of study authors are solely those of the study authors and do not necessarily reflect Foundation or CCS policy or position. The Heart and Stroke Foundation and the Canadian Cardiovascular Society make no representation or warranty as to their accuracy or reliability.

http://www.sciencedaily.com/releases/2012/10/121029154322.htm

Researchers Engineer Cartilage from Pluripotent Stem Cells

iPSCs may be a viable source of patient-specific articular cartilage tissue



ScienceDaily - A team of Duke Medicine researchers has engineered cartilage from induced pluripotent stem cells that were successfully grown and sorted for use in tissue repair and studies into cartilage injury and osteoarthritis. The finding is reported online in the Proceedings of the National Academy of Sciences, and suggests that induced pluripotent stem cells, or iPSCs, may be a viable source of patient-specific articular cartilage tissue.

"This technique of creating induced pluripotent stem cells -- an achievement honored with this year's Nobel Prize in medicine for Shimya Yamanaka of Kyoto University -- is a way to take adult stem cells and convert them so they have the properties of embryonic stem cells," said Farshid Guilak, PhD, Laszlo Ormandy Professor of Orthopaedic Surgery at Duke and senior author of the study.

Illuminating Chondrogenesis: Pictured are murine induced pluripotent stem cells undergoing chondrogenesis. In addition to type II collagen (red), F-actin (magenta), and nucleus (blue), upon differentiation cells express green fluorescent protein under the control of a chondrocyte-specific promoter. Diekman et al. employed cell sorting to produce tissue-engineered cartilage for potential use in treating cartilage defects or discovering new drugs for osteoarthritis. **(Credit: Image compiled from multiple fields, courtesy of Brian Diekman and Johannah Sanchez-Adams)**

"Adult stems cells are limited in what they can do, and embryonic stem cells have ethical issues," Guilak said. "What this research shows in a mouse model is the ability to create an unlimited supply of stem cells that can turn into any type of tissue -- in this case cartilage, which has no ability to regenerate by itself."

Articular cartilage is the shock absorber tissue in joints that makes it possible to walk, climb stairs, jump and perform daily activities without pain. But ordinary wear-and-tear or an injury can diminish its effectiveness and progress to osteoarthritis. Because articular cartilage has a poor capacity for repair, damage and osteoarthritis are leading causes of impairment in older people and often requires joint replacement.

In their study, the Duke researchers, led by Brian O. Diekman, PhD, a post-doctoral associate in orthopaedic surgery, aimed to apply recent technologies that have made iPSCs a promising alternative to other tissue engineering techniques, which use adult stem cells derived from the bone marrow or fat tissue.
One challenge the researchers sought to overcome was developing a uniformly differentiated population of chondrocytes, cells that produce collagen and maintain cartilage, while culling other types of cells that the powerful iPSCs could form.
To achieve that, the researchers induced chondrocyte differentiation in iPSCs derived from adult mouse fibroblasts by treating cultures with a growth medium. They also tailored the cells to express green fluorescent protein only when the cells successfully became chondrocytes. As the iPSCs differentiated, the chondrocyte cells that glowed with the green fluorescent protein were easily identified and sorted from the undesired cells. The tailored cells also produced greater amounts of cartilage components, including collagen, and showed the characteristic stiffness of native cartilage, suggesting they would work well repairing cartilage defects in the body.
"This was a multi-step approach, with the initial differentiation, then sorting, and then proceeding to make the tissue," Diekman said. "What this shows is that iPSCs can be used to make high quality cartilage, either for replacement tissue or as a way to study disease and potential treatments."
Diekman and Guilak said the next phase of the research will be to use human iPSCs to test the cartilage-growing technique. "The advantage of this technique is that we can grow a continuous supply of cartilage in a dish," Guilak said. "In addition to cell-based therapies, iPSC technology can also provide patient-specific cell and tissue models that could be used to screen for drugs to treat osteoarthritis, which right now does not have a cure or an effective therapy to inhibit cartilage loss."
In addition to Guilak and Diekman, study authors include Nicolas Christoforou; Vincent P. Willard; Alex Sun; Johannah Sanchez-Adams; and Kam W. Leong.
The National Institutes of Health (AR50245, AR48852, AG15768, AR48182, Training Grant T32AI007217) and the Arthritis Foundation funded the study.
Brian O. Diekman, Nicolas Christoforou, Vincent P. Willard, Haosi Sun, Johannah Sanchez-Adams, Kam W. Leong, and Farshid Guilak. Cartilage tissue engineering using differentiated and purified induced pluripotent stem cells. Proceedings of the National Academy of Sciences, 2012; DOI: 10.1073/pnas.1210422109

http://www.eurekalert.org/pub_releases/2012-10/bmj-cow102912.php

Couple of weekly portions of oily fish can help ward off stroke

But fish oil supplements don't have the same effect

Eating at least two servings of oily fish a week is moderately but significantly associated with a reduced risk of stroke, finds a study published on bmj.com today.
But taking fish oil supplements doesn't seem to have the same effect, say the researchers.
Regular consumption of fish and long chain omega 3 fatty acids has been linked with a reduced risk of coronary heart disease and current guidelines recommend eating at least two portions of fish a week, preferably oily fish like mackerel and sardines. But evidence supporting a similar benefit for stroke remains unclear.
So an international team of researchers, led by Dr. Rajiv Chowdhury at Cambridge University and Professor Oscar H. Franco at Erasmus MC Rotterdam, analysed the results of 38 studies to help clarify the association between fish consumption and risk of stroke or mini-stroke (transient ischaemic attack or TIA). Collectively, these conditions are known as cerebrovascular disease.
The 38 studies involved nearly 800,000 individuals in 15 countries and included patients with established cardiovascular disease (secondary prevention studies) as well as lower risk people without the disease (primary prevention studies). Differences in study quality were taken into account to identify and minimise bias.
Fish and long chain omega 3 fatty acid consumption was assessed using dietary questionnaires, identifying markers of omega 3 fats in the blood, and recording use of fish oil supplements. A total of 34,817 cerebrovascular events were recorded during the studies.
After adjusting for several risk factors, participants eating two to four servings a week had a moderate but significant 6% lower risk of cerebrovascular disease compared with those eating one or fewer servings of fish a week, while participants eating five or more servings a week had a 12% lower risk.
An increment of two servings per week of any fish was associated with a 4% reduced risk of cerebrovascular disease. In contrast, levels of omega 3 fats in the blood and fish oil supplements were not significantly associated with a reduced risk.
Several reasons could explain the beneficial impact of eating fish on vascular health, say the authors. For example, it may be due to interactions between a wide range of nutrients, like vitamins and essential amino acids, commonly found in fish. Alternatively, eating more fish may lead to a reduction in other foods, like red

meat, that are detrimental to vascular health. Or higher fish intake may simply be an indicator of a generally healthier diet or higher socioeconomic status, both associated with better vascular health.
The differences seen between white and oily fish may be explained by the way they are typically cooked (white fish is generally battered and deep fried, adding potentially damaging fats).
Although there's a possibility that some other unmeasured (confounding) factor may explain their results, the authors conclude that "they reinforce a potentially modest beneficial role of fish intake in the cause of cerebrovascular disease."
In addition, they say their findings are in line with current dietary guidelines that encourage fish consumption for all; and intake of fish oils to people with pre-existing or at high risk of heart disease. They also support the view that future nutritional guidelines should be principally "food based."
In an accompanying editorial, authors from the Division of Human Nutrition at Wageningen University suggest that although it is "reasonable" to advise patients that eating one or two portions of fish per week could reduce the risk of coronary heart disease and stroke, any benefit of long chain omega 3 fatty acid supplementation is likely to be small. They say it is possible, however, that patients with additional risk factors such as diabetes may benefit.

http://nyti.ms/UsKS8s

Massachusetts Orders Another Pharmacy to Close

Massachusetts shut down another compounding pharmacy after a surprise inspection last week found conditions that called into question the sterility of its products, state officials said Sunday.

By ABBY GOODNOUGH

BOSTON - The pharmacy, Infusion Resource in Waltham, voluntarily surrendered its license over the weekend, said Dr. Madeleine Biondolillo, director of the Bureau of Health Care Safety and Quality at the Massachusetts Public Health Department. Inspectors who visited Infusion Resource on Tuesday found “significant issues with the environment in which medications were being compounded,” Dr. Biondolillo said during a news conference here. She would not disclose details, but said that in another troubling discovery, patients had apparently been receiving intravenous medications at the pharmacy, against state regulations.
The findings led the state to immediately issue a cease-and-desist order, Dr. Biondolillo said, preventing Infusion Resource from dispensing any drugs. But she added that as of yet, there was no evidence of any contaminated drugs produced there.
The latest shutdown comes amid a continuing investigation of New England Compounding Pharmacy, the company believed responsible for a national meningitis outbreak in which 25 people have died, at least 344 others have fallen ill and as many as 14,000 people are thought to have been exposed. State and federal inspections in recent weeks found unsanitary conditions at New England Compounding, from surfaces coated with mold and bacteria to residue on sterilization equipment.
New England Compounding has suspended operations and laid off most of its employees.
Gov. Deval Patrick last week directed the state’s Board of Registration in Pharmacy to immediately start unannounced inspections of compounding pharmacies that prepare sterile, injectable medications. There are 25 such pharmacies in Massachusetts, and Mr. Patrick has acknowledged that the state rules governing them were insufficient. Although the Food and Drug Administration can inspect compounding pharmacies and issue warnings, the agency says states have ultimate jurisdiction.
At the news conference on Sunday, Dr. Lauren Smith, the interim commissioner of the Massachusetts Department of Public Health, said the state was bringing on five additional inspectors to help with unannounced visits to compounding pharmacies. The goal is to inspect all of them by Jan. 1, she added.
Dr. Smith also said the state had asked Sophia Pasedis, a member of the pharmacy board who works at Ameridose, a sister company to New England Compounding that is also under investigation and currently shut down, to resign from the board. State officials said earlier this month that Ms. Pasedis had recused herself from any board actions concerning New England Compounding and Ameridose. But on Sunday, Dr. Smith said there was “no definitive proof” that Ms. Pasedis, the vice president of regulatory affairs and compliance at Ameridose, had consistently done so. Ms. Pasedis has so far declined to step down, Dr. Smith said, but her term expires next month. She has been on the pharmacy board since 2004.
Dr. Biondolillo said the manager of record at Infusion Resource used to work at Ameridose.
Infusion Resource was last inspected by the state when it opened in December 2009, she said, and was found to be in compliance at the time. The state has not received any complaints about the pharmacy since then, she added.
In an e-mailed statement, Bernard F. Lambrese, the chief executive of Infusion Resource, said, “No issues were cited relating to the integrity of our products nor to the quality of our compounding practices.” He added that

the pharmacy was working to address concerns cited by the inspectors, including the condition of the flooring in the room where the pharmacy mixes drugs, and would then seek to be relicensed.
Dr. Biondolillo said that Infusion Resource supplies specialized medications to patients after they have been discharged from a hospital. According to its Web site, Infusion Resource is part of a company based in East Providence, R.I.
Also on Sunday, Representative Edward J. Markey, a Massachusetts Democrat in whose district New England Compounding is located, issued a report on the practice of compounding that stated there had been "adverse medical incidents" related to compounding in at least 34 states since 2001, according to F.D.A. documents.
Citing F.D.A. records, the report said there had been 23 deaths and at least 86 serious illnesses associated with the practice of compounding. The statistics did not include the current meningitis outbreak.
The report also included a review of state pharmacy boards and found that they do not generally undertake enforcement actions that relate to the safety or scope of compounding. Instead, the report said, their focus tends to be more on traditional pharmacy activities, including licensing and controlled substances.
Massachusetts officials have said that tracking volume from compounding pharmacies was not part of their regulatory mandate. But Dr. Smith said the state would soon issue emergency rules requiring compounding pharmacies to submit frequent reports on production and distribution of injectable drugs.
"I know that we face great challenges," she said. "At the same time, though, we have a rare opportunity to create meaningful change." *Sabrina Tavernise contributed reporting from Washington.*

http://www.eurekalert.org/pub_releases/2012-10/cwru-era103012.php

Empathy represses analytic thought, and vice versa

Brain physiology limits simultaneous use of both networks

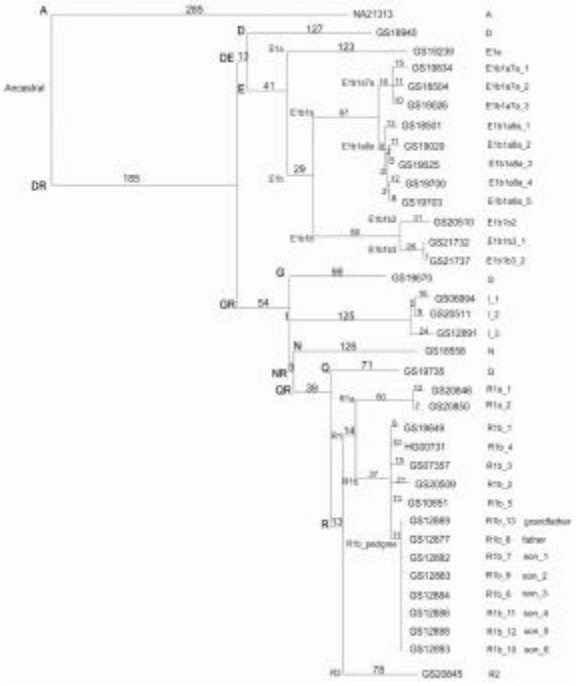
New research shows a simple reason why even the most intelligent, complex brains can be taken by a swindler's story – one that upon a second look offers clues it was false.
When the brain fires up the network of neurons that allows us to empathize, it suppresses the network used for analysis, a pivotal study led by a Case Western Reserve University researcher shows.
How could a CEO be so blind to the public relations fiasco his cost-cutting decision has made?
When the analytic network is engaged, our ability to appreciate the human cost of our action is repressed.
At rest, our brains cycle between the social and analytical networks. But when presented with a task, healthy adults engage the appropriate neural pathway, the researchers found.
The study shows for the first time that we have a built-in neural constraint on our ability to be both empathetic and analytic at the same time
The work suggests that established theories about two competing networks within the brain must be revised. More, it provides insights into the operation of a healthy mind versus those of the mentally ill or developmentally disabled.
"This is the cognitive structure we've evolved," said Anthony Jack, an assistant professor of cognitive science at Case Western Reserve and lead author of the new study. "Empathetic and analytic thinking are, at least to some extent, mutually exclusive in the brain."
The research is published in the current online issue of NeuroImage.
A number of earlier studies showed that two large scale brain networks are in tension in the brain, one which is known as the default mode network and a second known as the task positive network. But other researchers have suggested that different mechanisms drive this tension:
One theory says that we have one network for engaging in goal directed tasks. This theory posits that our second network allows the mind to wander.
The other theory says that one network is for external attention, and the second network is for internal attention.
The new study shows that adults presented with social or analytical problems – all external stimuli – consistently engaged the appropriate neural pathway to solve the problem, while repressing the other pathway.
The see-sawing brain activity was recorded using functional magnetic resonance imaging.
Jack worked with former Case Western Reserve undergraduates Abigail Dawson, now a graduate student at the University of Otago in Dunedin, New Zealand; Katelyn Begany, now a graduate student at the University of California, Berkeley; and Kevin P. Barry, now a graduate student at Rensselaer Polytechnic Institute. Other co-authors are, from Case Western Reserve: former research assistant, Regina L. Leckie and Angela H. Ciccia, an assistant professor of psychological sciences; and Abraham Z. Snyder, MD, a professor of radiology at Washington University in St. Louis.

Jack said that a philosophical question inspired the study design: "The most persistent question in the philosophy of mind is the problem of consciousness. Why can we describe the workings of a brain, but that doesn't tell us what it's like to be that person?"
"The disconnect between experiential understanding and scientific understanding is known as the explanatory gap," Jack said. "In 2006, the philosopher Philip Robbins and I got together and we came up with a pretty crazy, bold hypothesis: that the explanatory gap is driven by our neural structure. I was genuinely surprised to see how powerfully these findings fit that theory." Philip Robbins is an associate professor of philosophy at the University of Missouri.
These findings suggest the same neural phenomenon drives the explanatory gap as occurs when we look at a visual illusion such as the duck-rabbit, he continued. The drawing of the head of the animal can be seen as a duck facing one direction or a rabbit facing the other, but you can't see both at once.
"That is called perceptual rivalry, and it occurs because of neural inhibition between the two representations," Jack said. "What we see in this study is similar, but much more wide-scale. We see neural inhibition between the entire brain network we use to socially, emotionally and morally engage with others, and the entire network we use for scientific, mathematical and logical reasoning.
"This shows scientific accounts really do leave something out - the human touch. A major challenge for the science of the mind is how we can better translate between the cold and distant mechanical descriptions that neuroscience produces, and the emotionally engaged intuitive understanding which allows us to relate to one another as people."
The researchers recruited 45 healthy college students, and asked each to take five 10-minute turns inside a magnetic resonance imager. Meanwhile, the researchers randomly presented them with 20 written and 20 video problems that required them to think about how others might feel and with 20 written and 20 video problems that required physics to solve.
After reading the text or viewing the video, the students had to provide an answer to a yes-no question within seven seconds. Each student's session in the MRI included twenty 27-second rest periods, as well as variable delays between trials lasting 1, 3 or 5 seconds. Students were told to look at a red cross on the screen in front of them and relax during the rests.
The MRI images showed that social problems deactivated brain regions associated with analysis, and activated the social network. This finding held true whether the questions came via video or print. Meanwhile, the physics questions deactivated the brain regions associated with empathizing and activated the analytical network.
"When subjects are lying in a scanner with nothing to do, which we call the resting state, they naturally cycle between the two networks," Jack said. "This tells us that it's the structure of the adult brain that is driving this, that it's a physiological constraint on cognition."
The finding has bearings on a variety of neuropsychiatric disorders, from anxiety, depression and ADHD to schizophrenia – all of which are characterized by social dysfunction of some sort, Jack said. "Treatment needs to target a balance between these two networks. At present most rehabilitation, and more broadly most educational efforts of any sort, focus on tuning up the analytic network. Yet, we found more cortex dedicated to the social network."
Perhaps most clearly, the theory makes sense in regards to developmental disabilities such as autism and Williams syndrome. Autism is often characterized by a strong ability to solve visuospatial problems, such as mentally manipulating two and three-dimensional figures, but poor social skills. People with Williams syndrome are very warm and friendly, but perform poorly on visuospatial tests.
But, even healthy adults can rely too much on one network, Jack said. A look at newspaper business pages offers some examples.
"You want the CEO of a company to be highly analytical in order to run a company efficiently, otherwise it will go out of business," he said. "But, you can lose your moral compass if you get stuck in an analytic way of thinking."
"You'll never get by without both networks," Jack continued. "You don't want to favor one, but cycle efficiently between them, and employ the right network at the right time."
The researchers continue to test the theory, studying whether brains will shift from the social network to the analytical when students in the MRI see people depicted in a dehumanizing way, that is, as animals or objects. The group is also studying whether disgust and social stereotyping confound our moral compass by recruiting the analytical network and depressing social network activity.

http://phys.org/news/2012-10-biggest-expansion-prehistory.html

The biggest expansion of man in prehistory?

DNA sequencing of 36 complete Y chromosomes has uncovered a previously unknown period when the human population expanded rapidly.



A rooted genetic family tree of 36 Y chromosomes.

This population explosion occurred 40 to 50 thousand years ago, between the first expansion of modern humans out of Africa 60 to 70 thousand years ago and the Neolithic expansions of people in several parts of the world starting 10 thousand years ago.

This is the first time researchers have used the information from large-scale DNA sequencing to create an accurate family tree of the Y chromosome, from which the inferences about human population history could be made. Since the Y chromosome is found only in men, its history and evolution are easy to study and interpret.

This study also highlights how information generated by other genetic studies, in this case by the company Complete Genomics, can be used to investigate human genetic archaeology. The lengths between the branches and the length of each branch on the Y chromosome family tree provide insights into the evolution of the human population. The closer the branches are, the more rapidly the population was expanding and separating, most likely into different geographic areas. The longer the branch length, the greater the time that group of people have been separated from the other groups.

"We have always considered the expansion of humans out of Africa as being the largest population expansion of modern humans, but our research questions this theory," says Ms Wei Wei, first author from the Wellcome Trust Sanger Institute and the West China University of Medical Sciences.

"The out-of-Africa expansion, which happened approximately 60,000 years ago, was extremely large in geographical terms with humans spreading around the globe. Now we've found a second wave of expansion that is much larger in terms of human population growth and occurred over a very short period, somewhere between 40,000 to 50,000 years ago."

There is no obvious archaeological event that would explain why this sudden expansion in the human population occurred.

One possible theory is that during the original out-of-Africa expansion, humans moved along the coastlines of the world, settling as they went. Their origins and genetic makeup would mean that these people were suited to coastal life, but not to the demands of living inland. This would have prevented large population growth as the coasts could only sustain a certain number of people.

"We think this second, previously unknown population boom, may have occurred as humans adapted to their new environment after the first out-of-Africa expansion," says Dr Qasim Ayub, lead author from the Wellcome Trust Sanger institute.

"We think that when humans moved from the horn of Africa to Asia, Australia and eventually Europe, they remained in small groups by the coasts. It took them tens of thousands of years to adapt to the mountainous, forested surroundings on the inner continents. However, once their genetic makeup was suited to these new environments, the population increased extremely rapidly as the groups travelled inland and took advantage of the abundance of space and food."

The work highlights how it is now possible to obtain new biological insights from existing DNA sequencing data sets, and the value of sharing data. The majority of the DNA information used for this study was obtained from freely-available online data-sets.

"We have provided a nearly ten-fold increase in the number of genetic markers found on Y chromosomes and discovered new historical insights into the evolution of modern humans using DNA sequencing information from just 36 men," says Dr Chris Tyler-Smith, lead author from the Wellcome Trust Sanger Institute. "We now want to look at ten times this number of Y chromosomes in data from the 1000 Genomes Project. Who knows what we will find then?"

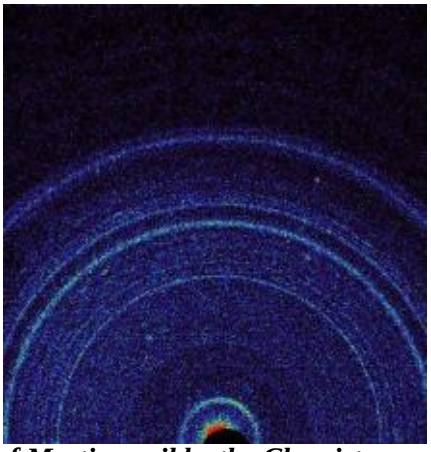
More information: Genome Res. 2012 doi:10.1101/gr.143198.112 Provided by Wellcome Trust Sanger Institute

http://www.sciencedaily.com/releases/2012/10/121030154244.htm

Mars Like Hawaii? NASA Rover's First Soil Studies Help Fingerprint Martian Minerals

NASA's Mars rover Curiosity has completed initial experiments showing the mineralogy of Martian soil is similar to weathered basaltic soils of volcanic origin in Hawaii.

ScienceDaily - The minerals were identified in the first sample of Martian soil ingested recently by the rover. Curiosity used its Chemistry and Mineralogy instrument (CheMin) to obtain the results, which are filling gaps and adding confidence to earlier estimates of the mineralogical makeup of the dust and fine soil widespread on the Red Planet.



"We had many previous inferences and discussions about the mineralogy of Martian soil," said David Blake of NASA Ames Research Center in Moffett Field, Calif., who is the principal investigator for CheMin. "Our quantitative results provide refined and in some cases new identifications of the minerals in this first X-ray diffraction analysis on Mars."

The identification of minerals in rocks and soil is crucial for the mission's goal to assess past environmental conditions. Each mineral records the conditions under which it formed. The chemical composition of a rock provides only ambiguous mineralogical information, as in the textbook example of the minerals diamond and graphite, which have the same chemical composition, but strikingly different structures and properties.

First X-ray View of Martian Soil: This graphic shows results of the first analysis of Martian soil by the Chemistry and Mineralogy (CheMin) experiment on NASA's Curiosity rover. The image reveals the presence of crystalline feldspar, pyroxenes and olivine mixed with some amorphous (non-crystalline) material. The soil sample, taken from a wind-blown deposit within Gale Crater, where the rover landed, is similar to volcanic soils in Hawaii. The colors in the graphic represent the intensity of the X-rays, with red being the most intense. **(Credit: NASA/JPL-Caltech/Ames)**

CheMin uses X-ray diffraction, the standard practice for geologists on Earth using much larger laboratory instruments. This method provides more accurate identifications of minerals than any method previously used on Mars. X-ray diffraction reads minerals' internal structure by recording how their crystals distinctively interact with X-rays. Innovations from Ames led to an X-ray diffraction instrument compact enough to fit inside the rover. These NASA technological advances have resulted in other applications on Earth, including compact and portable X-ray diffraction equipment for oil and gas exploration, analysis of archaeological objects and screening of counterfeit pharmaceuticals, among other uses.

"Our team is elated with these first results from our instrument," said Blake. "They heighten our anticipation for future CheMin analyses in the months and miles ahead for Curiosity."

The specific sample for CheMin's first analysis was soil Curiosity scooped up at a patch of dust and sand that the team named Rocknest. The sample was processed through a sieve to exclude particles larger than 0.006 inch (150 micrometers), roughly the width of a human hair. The sample has at least two components: dust distributed globally in dust storms and fine sand originating more locally. Unlike conglomerate rocks Curiosity investigated a few weeks ago, which are several billion years old and indicative of flowing water, the soil material CheMin has analyzed is more representative of modern processes on Mars.

"Much of Mars is covered with dust, and we had an incomplete understanding of its mineralogy," said David Bish, CheMin co-investigator with Indiana University in Bloomington. "We now know it is mineralogically similar to basaltic material, with significant amounts of feldspar, pyroxene and olivine, which was not unexpected. Roughly half the soil is non-crystalline material, such as volcanic glass or products from weathering of the glass. " Bish said, "So far, the materials Curiosity has analyzed are consistent with our initial ideas of the deposits in Gale Crater recording a transition through time from a wet to dry environment. The ancient rocks, such as the conglomerates, suggest flowing water, while the minerals in the younger soil are consistent with limited interaction with water."

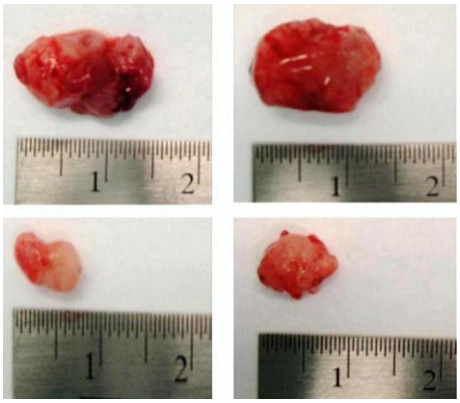
During the two-year prime mission of the Mars Science Laboratory Project, researchers are using Curiosity's 10 instruments to investigate whether areas in Gale Crater ever offered environmental conditions favorable for microbial life. NASA's Jet Propulsion Laboratory, a division of Caltech in Pasadena, manages the project for NASA's Science Mission Directorate, Washington, and built Curiosity and CheMin.

For more information about Curiosity and its mission, visit: http://www.nasa.gov/msl and http://mars.jpl.nasa.gov/msl .
For more information about a commercial application of the CheMin technology, visit: http://blogs.getty.edu/iris/mars-rover-technology-helps-unlock-art-mysteries/ .
You can follow the mission on Facebook and Twitter at: http://www.facebook.com/marscuriosity and http://www.twitter.com/marscuriosity .

http://www.sciencedaily.com/releases/2012/10/121030161232.htm

Common Food Preservative May Slow, Even Stop Tumor Growth

Nisin, a common food preservative, may slow or stop squamous cell head and neck cancers, a University of Michigan study found.



ScienceDaily - What makes this particularly good news is that the Food and Drug Administration and the World Health Organization approved nisin as safe for human consumption decades ago, says Yvonne Kapila, the study's principal investigator and professor at the University of Michigan School of Dentistry. This means that obtaining FDA approval to test nisin's suggested cancer-fighting properties on patients in a clinical setting won't take as long as a new therapy that hasn't been tried yet on people, she says.
Antibacterial agents like nisin alter cell properties in bacteria to render it harmless. However, it's only recently that scientists began looking to antibacterial agents like nisin to see if they altered properties in other types of cells, such as cancer cells or cells in tumors.

Top control group shows growth of tumors that weren't treated with nisin. Bottom group shows growth of tumors that were treated with nisin. Those tumors are significantly smaller. (Credit: Image courtesy of University of Michigan)

Oral cancer is a leading cause of death worldwide, and oral squamous cell carcinoma accounts for more than 90 percent of oral cancers. However, survival rates for oral cancer haven't improved in decades, according to the study. "The poor five-year survival rates for oral cancer underscore the need to find new therapies for oral cancer," Kapila said. "The use of small antibacterial agents, like nisin, to treat cancer is a new approach that holds great promise. Nisin is a perfect example of this potential because it has been used safely in humans for many years, and now the laboratory studies support its anti-tumor potential."

The U-M study, which looked at the use of antimicrobials to fight cancerous tumors, suggests nisin, in part, slows cell proliferation or causes cell death through the activation of a protein called CHAC1 in cancer cells, a protein known to influence cell death.

The study is the first to show CHAC1's new role in promoting cancer cell death under nisin treatment. The findings also suggest that nisin may work by creating pores in the cancer cell membranes that allow an influx of calcium. It's unclear what role calcium plays in nisin-triggered cell death, but it's well known that calcium is a key regulator in cell death and survival.

Additionally, the findings suggest that nisin slows or stops tumor growth by interrupting the cell cycle in "bad" cells but not the good cells; thus nisin stops cancer cell proliferation but doesn't hurt good cells.

Nam E. Joo, Kathryn Ritchie, Pachiyappan Kamarajan, Di Miao, Yvonne L. Kapila. Nisin, an apoptogenic bacteriocin and food preservative, attenuates HNSCC tumorigenesis via CHAC1. Cancer Medicine, 2012; DOI: 10.1002/cam4.35

http://www.eurekalert.org/pub_releases/2012-10/vumc-gtf103112.php

Green tea found to reduce rate of some GI cancers

Women who drink green tea may lower their risk of developing some digestive system cancers

Women who drink green tea may lower their risk of developing some digestive system cancers, especially cancers of the stomach/esophagus and colorectum, according to a study led by researchers from Vanderbilt-Ingram Cancer Center. The study by lead author Sarah Nechuta, Ph.D., MPH, assistant professor of Medicine, was published online in advance of the Nov. 1 edition of the American Journal of Clinical Nutrition. Wei Zheng, M.D., Ph.D., MPH, professor of Medicine, chief of the Division of Epidemiology and director of the Vanderbilt Epidemiology Center, was the principal investigator for the study.

To determine green tea's impact on cancer risk, the investigators surveyed women enrolled in the Shanghai Women's Health Study, a population-based study of approximately 75,000 middle-aged and older Chinese women. During the initial interview participants were asked if they drank tea, the type of tea consumed and how much they consumed. Most of the Chinese women reported drinking primarily green tea.

The researchers found that regular tea consumption, defined as tea consumption at least three times a week for more than six months, was associated with a 17 percent reduced risk of all digestive cancers combined. A further reduction in risk was found to be associated with an increased level of tea drinking. Specifically, those who consumed about two to three cups per day (at least 150 grams of tea per month) had a 21 percent reduced risk of digestive system cancers.

The trend toward fewer digestive cancers was strongest for stomach/esophageal and colorectal cancers. "For all digestive system cancers combined, the risk was reduced by 27 percent among women who had been drinking tea regularly for at least 20 years," said Nechuta. "For colorectal cancer, risk was reduced by 29 percent among the long-term tea drinkers. These results suggest long-term cumulative exposure may be

particularly important." Tea contains polyphenols or natural chemicals that include catechins like EGCG and ECG. Catechins have antioxidant properties and may inhibit cancer by reducing DNA damage and blocking tumor cell growth and invasion.
The researchers also asked about other lifestyle factors including the kinds of food eaten regularly, exercise habits, education level and occupation. Women who had ever smoked or who drank alcohol were excluded from the study. Regular tea drinkers in the study were younger, had higher education, exercised more and consumed more fruits and vegetables. While the researchers adjusted for these factors, they could not rule out an effect from these and other unmeasured lifestyle habits.
The study was conducted in nonsmoking and nondrinking Chinese women to minimize the potential influence of these two risk factors on the results for tea consumption and digestive system cancer risk.
Other investigators who contributed to the study included Xiao Ou Shu, M.D., Ph.D., MPH, Gong Yang, M.D., MPH, Hui Cai, M.D., Ph.D., VICC; Yu-Tang Gao, M.D., Hong-Lan Li, M.D., Yong-Bing Xiang, M.D., MPH, Department of Epidemiology, Shanghai Cancer Center; Bu-Tian Ji, M.D., Dr.P.H., Wong-Ho Chow, Ph.D., Division of Cancer Epidemiology and Genetics, National Cancer Institute.
The research was supported by funding from the National Cancer Institute (grant number R37 CA70867), which is a division of the National Institutes of Health.

http://www.eurekalert.org/pub_releases/2012-10/acs-ahd103112.php

A heady discovery for beer fans: The first gene for beer foam could improve froth

The yeast used to make beer has yielded what may be the first gene for beer foam, scientists are reporting in a new study.

Published in ACS' Journal of Agricultural and Food Chemistry, the discovery opens the door to new possibilities for improving the frothy "head" so critical to the aroma and eye appeal of the world's favorite alcoholic beverage, they say.
Tomás G. Villa and colleagues explain that proteins from the barley and yeast used to make beer contribute to the quality of its foam. The foamy head consists of bubbles containing carbon dioxide gas, which yeast produces during fermentation. Proteins gather around the gas, forming the bubbles in the foam. Studies have shown that proteins from the yeast stabilize the foam, preventing the head from disappearing too soon. But until now, no one knew which yeast gene was responsible for making the foam-stabilizing protein.
The researchers identified the gene, which they call CFG1. The gene is similar to those already identified in wine and sake yeasts that also are involved in foaming. "Taken together all the results shown in the present paper make … CFG1 gene a good candidate to improve the foam character in the brewing industry," they say.

http://www.wired.com/wiredscience/2012/10/the-worlds-largest-wetland-is-not-where-youd-expect/

The World's Largest Wetland Is Not Where You'd Expect

In Antarctica is an entire hydrological system that just happens to be covered by ice

By Jeffrey MarlowEmail Author

To most observers, Antarctica is a barren wasteland, a frozen continent best known for its endless icescapes and harrowing stories of survival. But when flying over the white continent, John Priscu sees something different: a rich network of raging rivers and enormous lakes, an entire hydrological system that just happens to be covered by ice.
Through the magic of radar imagery, scientists have been able to see through the ice — which can reach thicknesses of several thousand of meters — to the dramatic landscape of craggy peaks and deep valleys beneath the glaciers. There, sandwiched between the ice and rock, river systems that rival the Amazon in spatial extent feed lakes and, possibly, fuel an entire hidden biosphere.

Scientists examine the iron-tinged ice at Blood Falls, Antarctica. Image: John Priscu

In a presentation to the Center for Dark Energy Biosphere Investigation, Priscu, a Professor of Ecology at Montana State University, highlighted a few of his favorite subglacial lakes, sites where exotic chemical mixtures and unique physical realities converge to create bizarre environments.
At the foot of Taylor Glacier, an icefall several stories tall is streaked with orange and red bands, earning the name Blood Falls. "Taylor glacier used to be well above an ancient coastline," Priscu notes, "and when the climate changed, the ocean water receded, the glacier advanced, and it trapped salty marine water under the ice." Over time, the subglacial water lost its oxygen and got saltier, creating a viscous brine that is liquid — and thus more available to enterprising microbes — down to -10°C. Water emerging from the base of the glacier

contains abundant Fe2+ due to anaerobic microbial metabolism; when the solution emerges, it's quickly oxidized, painting the icefall red with rust. But mysteries remain: "We don't understand why the water comes out at this spot," concedes Priscu. "And where did all of the iron come from? What kinds of metabolism occur underneath the glacier? There's got to be something going on."

Satellite imagery also provides evidence of an active hydrologic cycle. At Adventurer Trench, the ice has moved up and down as subglacial lakes fill and drain. Photos taken two years apart reveal a nine-meter elevation change of the ice. The flat surface indicates a lake far below ("anything less than a 10-degree angle of ice on the surface strongly suggests you've got a lake," according to Priscu), and the elevation change points to an enormous flood that swelled the lake's volume.

To Priscu, the detection of microbes in glacier outflow and the first forays into subglacial lakes is just the tip of the proverbial iceberg. "The whole bottom of the Antarctic ice sheet is wet," he explains. "It's our planet's largest wetland, and it's got all of the biogeochemistry to go along with that." Life could even exist throughout the glaciers themselves, inhabiting microscopic niches between crystals of frozen water, where thin films of liquid persist. It's been shown before, after all, but the pervasiveness of the phenomenon in the world's largest ice sheet remains to be seen.

Priscu has been conducting research in Antarctica for 29 years, and he's begun to think differently about the world's highest, coldest continent. "Growing up, you're indoctrinated as a scientist into thinking that Antarctica is just a big benign block of ice," Priscu recalls. "We wanted to change that paradigm; it just doesn't make sense, that we can have so much real estate on our planet and so much fresh water, that it couldn't have life."

http://www.eurekalert.org/pub_releases/2012-10/foas-spt103112.php

Single protein targeted as the root biological cause of several childhood psychiatric disorders

New research in The FASEB Journal suggests that dysfunction in the SRGAP3 protein may lead to schizophrenia, hydrocephalus, mental retardation and some forms of autism in childhood

A new research discovery has the potential to revolutionize the biological understanding of some childhood psychiatric disorders. Specifically, scientists have found that when a single protein involved in brain development, called "SRGAP3," is malformed, it causes problems in the brain functioning of mice that cause symptoms that are similar to some mental health and neurological disorders in children. Because this protein has similar functions in humans, it may represent a "missing link" for several disorders that are part of an illness spectrum. In addition, it offers researchers a new target for the development of treatments that can correct the biological cause rather than treat the symptoms. This discovery was published in November 2012 print issue of The FASEB Journal.

"Developmental brain disorders such as schizophrenia, hydrocephalus, mental retardation and autism are among the most devastating diseases in children and young adults," said Dusan Bartsch, Ph.D., a researcher involved in the work from the Department of Molecular Biology at the Central Institute of Mental Health at the University of Heidelberg in Mannheim, Germany. "We hope that our findings will contribute to a better understanding, and in the end, to better treatments for these disorders."

Bartsch and colleagues made this discovery using mice with the SRGAP3 protein inactivated. Then they conducted several experiments comparing these mice to normal mice. The mice with inactive SRGAP3 showed clear changes in their brains' anatomy, which resulted in altered behavior similar to certain symptoms in human neurological and psychiatric diseases. An involvement of SRGAP3 in different brain disorders could indicate that these disorders are possibly connected, as SRGAP3 is a key player in brain development. These different disorders could be connected via the SRGAP3 protein because they all emerge from disturbed development of the nervous system.

"Since Freud put biological psychiatry on the map, we've slowly increased our understanding of how mental health is dictated by chemistry," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "Eventually we'll understand the complex biology underlying most psychiatric illnesses, from genes to proteins to cell signaling to overt behaviors. Along the way, as in this report, we're likely to find single targets close to the roots of apparently different mental illnesses."

Details: Robert Waltereit, Uwe Leimer, Oliver von Bohlen und Halbach, Jutta Panke, Sabine M. Hölter, Lillian Garrett, Karola Wittig, Miriam Schneider, Camie Schmitt, Julia Calzada-Wack, Frauke Neff, Lore Becker, Cornelia Prehn, Sergej Kutscherjawy, Volker Endris, Claire Bacon, Helmut Fuchs, Valérie Gailus-Durner, Stefan Berger, Kai Schönig, Jerzy Adamski, Thomas Klopstock, Irene Esposito, Wolfgang Wurst, Martin Hrabě de Angelis, Gudrun Rappold, Thomas Wieland, and Dusan Bartsch. Srgap3−/− mice present a neurodevelopmental disorder with schizophrenia-related intermediate phenotypes. FASEB J 26:4418-4428, doi:10.1096/fj.11-202317 ; http://www.fasebj.org/content/26/11/4418.abstract

http://www.eurekalert.org/pub_releases/2012-10/s-nhf103112.php

New hope for survivors of stroke and traumatic brain injury

Single dose of etanercept targets brain inflammation years after damage

A new ground-breaking study about to be published in the Adis journal CNS Drugs provides clinical evidence that, for the first time, chronic neurological dysfunction from stroke or traumatic brain injury can rapidly improve following a single dose of a drug that targets brain inflammation, even years after the stroke or traumatic event.

The observational study[1] of 629 patients, conducted over the course of nearly two years, documents a diverse range of positive effects, including statistically significant rapid clinical improvement in motor impairment, spasticity, cognition, etc. in the stroke group, with a similar pattern of improvement seen in the traumatic brain injury (TBI) group. The study involved 617 patients treated an average of 42 months after stroke and 12 patients treated an average of 115 months after TBI, long after further spontaneous meaningful recovery would be expected.

The study was conducted at the Institute of Neurological Recovery (INR) in the USA. The drug utilized was etanercept, a therapeutic that selectively binds and neutralizes an inflammatory immune molecule that may remain elevated for years following stroke. Etanercept was administered utilizing a novel delivery method, invented by Edward Tobinick M.D., lead author of the study.

"These results represent a sea change in the therapeutic possibilities for stroke and TBI patients," said Steven Ralph PhD, Associate Professor at Griffith University School of Medical Science in Australia. "Rarely do we see such a radical breakthrough in medical treatment as this for stroke. A previous example was the advance with thrombolytic therapy using drugs such as tissue plasminogen activator (t-PA) for the treatment of acute stroke with their significant impact when applied at the early stages. However, no similar treatment has existed for chronic stroke until now."

Professor Ralph recently led a team of physicians to the INR for training in the new etanercept delivery method, prior to their initiation of randomized trials in Australia. "Our team observed, first hand, rapid clinical improvement in stroke patients following this brief office treatment," said Professor Ralph.

In an accompanying editorial[2], Professor Ian Clark, a world expert on tumor necrosis factor (TNF) and brain dysfunction, discusses the science underlying the novel treatment method and clinical results. The high prevalence of chronic post-stroke and post-TBI neurological disability, with millions of individuals affected worldwide, highlights the study's significance.

1. Tobinick E, Kim N, Reyzin G, et al. Selective TNF Inhibition for Chronic Stroke and Traumatic Brain Injury – An Observational Study Involving 629 Consecutive Patients Treated with Perispinal Etanercept. CNS Drugs. 2012;16(12). DOI 10.1007/s40263-012-0013-2

2. Clark, I. New Hope for Survivors of Stroke and Traumatic Brain Injury. CNS Drugs. 2012;16(12). DOI 10.1007/s40263-012-0014-1

http://www.eurekalert.org/pub_releases/2012-10/foas-haw103112.php

How and why herpes viruses reactivate to cause disease

New research published in the Journal of Leukocyte Biology suggests that T-cells responsible for controlling Herpes reduce significantly during times of new infection, allowing latent herpes virus to reactivate

The mere mention of the word "herpes" usually conjures negative images and stereotypes, but most people have been infected with some form of the virus. For most, a sore appears, heals and is forgotten, although the virus remains latent just waiting for the right circumstances to come back. Now, the mystery behind what triggers the virus to become active again is closer to being solved thanks to new research published in the Journal of Leukocyte Biology's November 2012 issue. In the report, scientists show how the immune system may lose its control over the virus when facing new microbial threats, such as when it must fend off other viral invaders or bacteria.

"Because almost all people are infected by one or more herpes family viruses during their lifetime, the potential impact of these findings are significant," said Charles H. Cook, M.D., FACS, FCCM, director of surgical critical care at The Ohio State University College of Medicine in Columbus, Ohio, and a researcher involved in the work. "We hope that by understanding how these latent viral infections are controlled that we can prevent reactivation events and improve people's lives."

To make this discovery, researchers studied mice with latent herpes family cytomegalovirus (CMV) during severe bacterial infections. They found that T-cells responsible for CMV control were reduced significantly during a new infection with bacteria. This, in effect, reduced the "brakes" which kept the virus under control, allowing the virus to reactivate and cause disease. When the immune system eventually sensed the reactivation, the memory T-cell levels returned to normal, effectively restoring the body's control over the virus.

"Finding ways to control herpes flare ups is important, not only for the health of the person with the virus, but also for preventing its transmission," said John Wherry, Ph.D., Deputy Editor of the Journal of Leukocyte Biology. "This report highlights the important interplay when we are 'co-infected' with more than one microbe and provides important insights into why the immune system sometimes fails as well as how it can regain control of latent herpes virus infections."

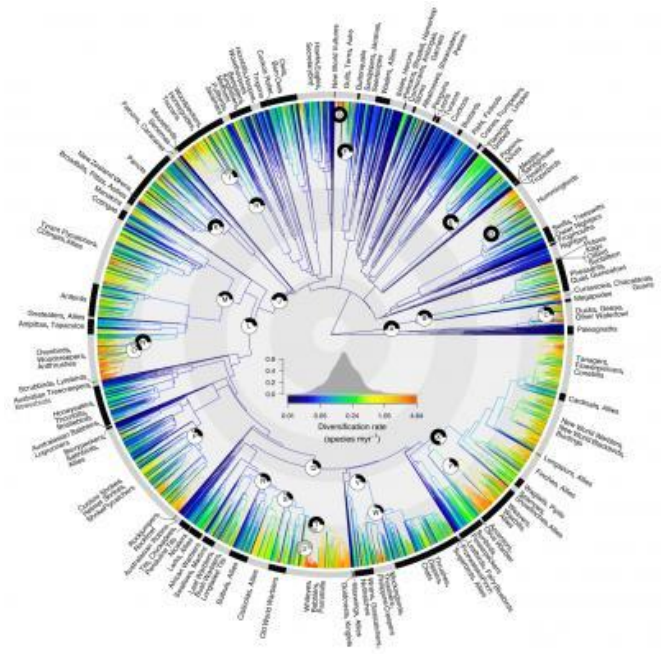
The Journal of Leukocyte Biology publishes peer-reviewed manuscripts on original investigations focusing on the cellular and molecular biology of leukocytes and on the origins, the developmental biology, biochemistry and functions of granulocytes, lymphocytes, mononuclear phagocytes and other cells involved in host defense and inflammation. The Journal of Leukocyte Biology is published by the Society for Leukocyte Biology.

Details: Jonathan Campbell, Joanne Trgovcich, Michelle Kincaid, Peter D. Zimmerman, Paul Klenerman, Stuart Sims, and Charles H. Cook. Transient CD8-memory contraction: a potential contributor to latent cytomegalovirus reactivation. J Leukoc Biol 92:933-937; doi:10.1189/jlb.1211635 ; http://www.jleukbio.org/content/92/5/933.abstract

http://www.eurekalert.org/pub_releases/2012-10/uos-fef103012.php

First ever family tree for all living birds reveals evolution and diversification

The world's first family tree linking all living bids and revealing when and where they evolved and diversified since dinosaurs walked the earth has been created by scientists from the University of Sheffield.



This shows the Bird Family Tree. **University of Sheffield Enlarge**

Experts used the family tree to map out where the almost 10,000 species of birds live to show where the most diversification has taken place in the world.

Researchers, from the University of Sheffield, Yale University, University of Tasmania and Simon Fraser University, say the creation of new species has speeded-up over the last 50 million years. Surprisingly, species formation is not faster in the species rich tropics, but was found to be faster in the Western Hemisphere compared to the Eastern Hemisphere as well as on islands.

As well as being the first time scientists have created a family tree for birds, it is hoped the research could help prioritise conservation efforts in a bid to save the most diverse species from extinction.

Dr Gavin Thomas, of the University of Sheffield's Department of Animal and Plant Sciences, said: "We have built the first ever family tree showing the evolutionary relationship among the species of birds. We used fossils and genetic data to estimate the ages of all the different branches of the bird tree so that we could assess how diversity has accumulated through time. Our work is indebted to researchers from museums and universities who have collected astounding amounts of genetic data from birds around the world."

Despite major steps forward in modern super computers it has still taken the researchers almost five years to analyse the millions of year's worth of fossil data, DNA, maths and maps, to create this never-before-snapshot of how the thousands of birds alive made it to where they are today. To even enable the scientists to calculate which species were more or less diverse they had to create a new "species rate" measure.

Dr Thomas added: "Diversification is the net outcome of new species arising, called speciation, and existing species going extinct. We combined this data with existing data on the geographic ranges of all living bird species so that we could map diversification across the world.

"This 'phylogeny' is important because it is the first that includes all living birds. It means we can ask questions about biodiversity and evolution on a global scale and gain new insight into how diversity has changed over millions of years as well as understand those changes. More widely, one way in which the phylogeny can be used, and which may not be obvious, is in helping to prioritise conservation efforts.

"We can identify where species at greatest risk of extinction are on the tree and ask how much distinct evolutionary history they represent. Some species have many close relatives and represent a small amount of distinct evolutionary history whereas others have few close relatives and their loss would represent the disappearance of vast amounts of evolutionary history that could never be recovered. Environmental change has very likely affected diversification over time. Climate change could be a part of that through its effects on the extent of different types of habitat."

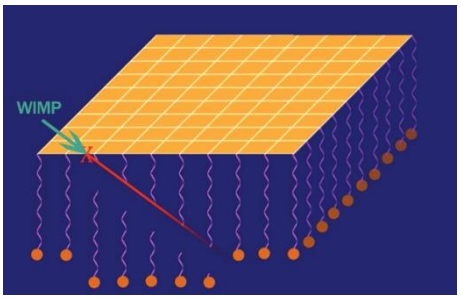
The paper – titled 'The global diversity of birds in space and time' - is published in the journal Nature.

http://www.sciencenews.org/view/generic/id/346113/title/Hunting_dark_matter_with_DNA

Hunting dark matter with DNA

Particle physicists propose a new way to detect dark matter using the molecule of life

By Tanya Lewis



RALEIGH, N.C. — Physicists racing to detect the mysterious substance known as dark matter are thinking outside the box by looking inside the cell. A new proposal for tracking dark matter particles relies on strands of DNA.

All the ordinary stuff in the universe, from the atoms in people to the hot plasma in stars, makes up only about 5 percent of the universe's mass and energy. Nearly one-quarter of the universe is composed of dark matter. (The rest is an even more puzzling entity known as dark energy.) Though several experiments claim to have detected dark matter, the results don't agree and aren't definitive.

In a proposed method for detecting dark matter, particles of dark matter would smack into gold, kicking off atomic nuclei that would sever strands of DNA in their paths. **Credit: A. Drukier et al./arXiv.org 2012**

Katherine Freese, a theoretical physicist at the University of Michigan in Ann Arbor, proposed October 28 at the New Horizons in Science meeting that a new kind of DNA-based detector could not only spot a leading candidate for dark matter, called WIMPs, but could also determine incoming particles' direction of flight. The proposal also appeared online earlier this year at arXiv.org.

"It's a very smart way to apply technology developed from biology to a fundamental particle physics problem," says Jocelyn Monroe, a dark matter physicist at MIT and the University of London.

A halo of WIMPs, short for weakly interacting massive particles, is thought to encircle the galaxy. As the sun orbits the galaxy's center, it should encounter a "wind" of WIMPs from the direction of the constellation Cygnus. At any point on Earth, such a wind should strengthen and weaken daily as the planet rotates.

Freese and her colleagues' proposed detector, which would be sensitive to these fluctuations, consists of a stack of thin gold sheets with single-stranded pieces of DNA hanging from them. When a WIMP smacked into the nucleus of a gold atom, the nucleus would whiz off, cutting through the DNA at specific locations in the strands. Scientists would then collect and sequence the DNA to reconstruct the path traveled by the nucleus, and by extrapolation, that of the WIMP. If the detector spotted the daily fluctuation and the particles' paths proved consistent with the WIMP wind's direction, it would be compelling evidence that the signals came from dark matter.

"The advantage of these detectors is that the difference between DNA bases is a nanometer, so it's much better resolution," says Freese - about a thousand times better than current detectors. The device could be a fraction of existing detectors' size, as well as cheaper.

Still, the technique has yet to be demonstrated, says Joel Schnur, a biomolecular scientist at George Mason University in Fairfax, Va. "What is the real sensitivity to cleavage of DNA? How many particles will come down over time? And, can it detect them?" he asks.

If the project goes forward, Freese and colleagues could begin to answer some of these questions.

K. Freese. Dark Matter in the Universe and the ssDNA Tracker. Talk at New Horizons in Science meeting, October 28, 2012.
R. Cowen. Signs of dark matter from Minnesota mine. Science News, Vol.179, No. 12, June 4, 2011, p. 10. Available online
R. Cowen. XENON100 fails to find dark matter. Science News, Vol.179, No. 10, May 7, 2011, p. 12. Available online
N. Drake. Dark matter search turns up empty. Science News, Vol.181, No. 10, May 19, 2012, p. 5. Available online

http://phys.org/news/2012-10-all-carbon-solar-cell.html

First all-carbon solar cell

Stanford scientists build the first all-carbon solar cell

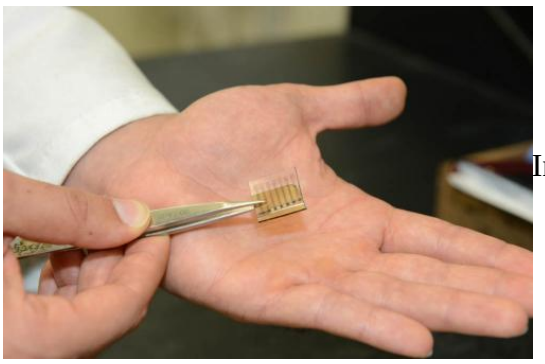
Phys.org - Stanford University scientists have built the first solar cell made entirely of carbon, a promising alternative to the expensive materials used in photovoltaic devices today. The results are published in the Oct. 31 online edition of the journal ACS Nano.

"Carbon has the potential to deliver high performance at a low cost," said study senior author Zhenan Bao, a professor of chemical engineering at Stanford. "To the best of our knowledge, this is the first demonstration of a working solar cell that has all of the components made of carbon. This study builds on previous work done in our lab."

Unlike rigid silicon solar panels that adorn many rooftops, Stanford's thin film prototype is made of carbon materials that can be coated from solution. "Perhaps in the future we can look at alternative markets where flexible carbon solar cells are coated on the surface of buildings, on windows or on cars to generate electricity," Bao said.

The coating technique also has the potential to reduce manufacturing costs, said Stanford graduate student Michael Vosgueritchian, co-lead author of the study with postdoctoral researcher Marc Ramuz.

"Processing silicon-based solar cells requires a lot of steps," Vosgueritchian explained. "But our entire device can be built using simple coating methods that don't require expensive tools and machines."



Carbon nanomaterials

The Bao group's experimental solar cell consists of a photoactive layer, which absorbs sunlight, sandwiched between two electrodes. In a typical thin film solar cell, the electrodes are made of conductive metals and indium tin oxide (ITO). "Materials like indium are scarce and becoming more expensive as the demand for solar cells, touchscreen panels and other electronic devices grows," Bao said. "Carbon, on the other hand, is low cost and Earth-abundant."

This shows the new all-carbon solar cell consists of a photoactive layer, which absorbs sunlight, sandwiched between two electrodes. **Credit: Mark Shwartz / Stanford University**

For the study, Bao and her colleagues replaced the silver and ITO used in conventional electrodes with graphene – sheets of carbon that are one atom thick –and single-walled carbon nanotubes that are 10,000 times narrower than a human hair. "Carbon nanotubes have extraordinary electrical conductivity and light-absorption properties," Bao said.

For the active layer, the scientists used material made of carbon nanotubes and "buckyballs" – soccer ball-shaped carbon molecules just one nanometer in diameter. The research team recently filed a patent for the entire device.

"Every component in our solar cell, from top to bottom, is made of carbon materials," Vosgueritchian said. "Other groups have reported making all-carbon solar cells, but they were referring to just the active layer in the middle, not the electrodes."

One drawback of the all-carbon prototype is that it primarily absorbs near-infrared wavelengths of light, contributing to a laboratory efficiency of less than 1 percent – much lower than commercially available solar cells. "We clearly have a long way to go on efficiency," Bao said. "But with better materials and better processing techniques, we expect that the efficiency will go up quite dramatically."

Improving efficiency

The Stanford team is looking at a variety of ways to improve efficiency. "Roughness can short-circuit the device and make it hard to collect the current," Bao said. "We have to figure out how to make each layer very smooth by stacking the nanomaterials really well."

The researchers are also experimenting with carbon nanomaterials that can absorb more light in a broader range of wavelengths, including the visible spectrum. "Materials made of carbon are very robust," Bao said. "They remain stable in air temperatures of nearly 1,100 degrees Fahrenheit."

The ability of carbon solar cells to out-perform conventional devices under extreme conditions could overcome the need for greater efficiency, according to Vosgueritchian. "We believe that all-carbon solar cells could be used in extreme environments, such as at high temperatures or at high physical stress," he said. "But obviously we want the highest efficiency possible and are working on ways to improve our device."

"Photovoltaics will definitely be a very important source of power that we will tap into in the future," Bao said. "We have a lot of available sunlight. We've got to figure out some way to use this natural resource that is given to us." *More information: pubs.acs.org/doi/full/10.1021/nn304410w*

http://www.eurekalert.org/pub_releases/2012-11/bumc-t103112.php

The cost of prescription drugs -- a comparison of 2 countries

People over age 65 in the US pay threefold for statins compared to UK costs

Boston - In the United States, the cost paid for statins (drugs to lower cholesterol) in people under the age of 65 who have private insurance continues to exceed comparable costs paid by the government in the United Kingdom (U.K.) by more than three fold. These results from Boston University's Boston Collaborative Drug Surveillance Program, are a follow up of an ongoing comparison of prescription drug costs between the U.S. and U.K. The initial results reported on relative drug costs in 2005. The current updated results for 2009 appear this week in the journal Pharmacotherapy.

In a comparable base population of about 1.2 million people in each country, the estimated number prescribed a statin increased from 103,000 in 2005 to 125,000 in the U.S. in 2009 and from to 67,000 to105,000 in the U.K. The total estimated cost for statins in the U.S. paid by private health insurance companies was $87 million in 2005. In July 2006, simvastin (Zocor) was made available in a generic formulation and became the most widely

prescribed statin. The cost per pill fell from $3.91 in 2005 to $0.20 in 2009. As a result, despite the increase in number of statin users in the U.S. the total private insurance cost for all statins fell from an estimated $87 million in 2005 to $47 million in 2009. In the U.K., where costs are paid for by the government and generic statins were widely available and prescribed, the total statin cost was estimated to be $17 million in 2005. Because the cost of generic statins continued to be reduced the total cost fell to $14 million in 2009 despite a large increase in the number of users.

Cost estimates for Proton Pump Inhibitors show a similar pattern to those for statins. The total cost for continuous users was estimated to be $14 million in the U.S. compared to $4 million in the U.K. in 2005. Costs in both countries fell about 20 percent in 2009 as generic formulations became more available at lower cost.

In the U.S., over the past decade, roughly 180 million people below age 65 years have been covered annually by private health insurance companies. Based on the large sample of about 1.2 million people (0.7 percent) the researchers estimate that the total cost of branded statins paid by private insurance companies was more than $10 billion in 2005. Due to the availability of generic formulations of these drugs, the cost fell by half in 2009 for a savings of some $5 billion. Reductions related to other prescription drugs have regularly occurred.

"The cost of prescription drugs incur a tremendous burden to the U.S. economy, whether paid by private insurance companies through higher insurance premiums or paid by the government that provides this service for the military, other government employees, the elderly and others," said author of the accompany editorial Hershel Jick, MD, director emeritus of the Collaborative Drug Surveillance Program and associate professor of medicine at Boston University School of Medicine.

According to Jick, these results are based on reliable, inexpensive and transparent resources that can be used to form a basis for considering public and private policy related to the cost of prescription drugs. "Information on a substantial majority of drugs, including those prescribed primarily for children, can be derived from these continuous reliable electronic data resources. They yield critical insight into the difference in drug costs between the U.S. private sector compared to the U.K. government that can lead to creation of policy that provides greater efficiency and large cost savings," he added.

http://onlinelibrary.wiley.com/doi/10.1002/j.1875-9114.2012.01224/full

http://www.eurekalert.org/pub_releases/2012-11/jhm-srs103112.php

Study: Repeated surgeries appear to extend life of patients with deadliest of brain cancers

People who undergo repeated surgeries to remove glioblastomas - the most aggressive and deadliest type of brain tumors - may survive longer than those who have just a one-time operation, new Johns Hopkins research suggests.

Glioblastoma, the brain cancer that killed Sen. Edward Kennedy, inevitably returns after tumor-removal surgery, chemotherapy, and/or radiation. The median survival time after diagnosis is only 14 months. With recurrence a near certainty, experts say, many have questioned the value of performing second, third or even fourth operations, especially given the dangers of brain surgery, including the risk of neurological injury or death.

"We are reluctant to operate on patients with brain cancer multiple times as we are afraid to incur new neurological deficits or poor wound healing, and many times we are pessimistic about the survival chances of these patients," says Alfredo Quinones-Hinojosa, M.D., a professor of neurosurgery at the Johns Hopkins University School of Medicine and leader of the study published recently in the Journal of Neurosurgery. "But this study tells us that the more we operate, the longer they may survive. We should not give up on these patients."

For the study, Quinones-Hinojosa and his team reviewed the records of 578 patients who underwent surgery to remove a glioblastoma between 1997 and 2007 at The Johns Hopkins Hospital. At the last follow-up, 354 patients had one surgery, 168 had two resections, and 41 and 15 patients had three and four operations, respectively. The median survival for patients who underwent one, two, three and four operations was 6.8 months, 15.5 months, 22.4 months and 26.6 months, respectively.

Quinones-Hinojosa cautions that his analysis may overestimate the value of multiple surgeries based on patient selection, and that it's possible that the patients who did better had tumors with a biology that predisposed them to live longer. Further research will need to confirm his more positive conclusion.

Glioblastomas are cancerous tumors that become deeply intertwined with healthy brain tissue and, as a result, are difficult to remove. They are notoriously difficult to eradicate with surgery alone. "The only thing that has been proven to work for glioblastoma throughout history is surgery," Quinones-Hinojosa says. "Without surgery, these patients don't have much of a chance."

Along with reducing the size of tumors, repeated surgeries may also increase the efficacy of radiation and chemotherapy. Quinones-Hinojosa says with each successive surgery, the procedure itself becomes more technically challenging as the anatomy changes, blood vessels are damaged and tissues become frail.

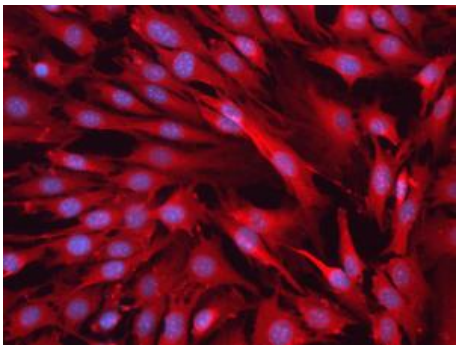
Patients, their families and their doctors must determine whether repeated surgery is the best course of action, weighing the potential risks against the potential benefits, Quinones-Hinojosa says. The procedure should only be done if it can be done relatively safely and patients can tolerate anesthesia and the long recovery period.
Other Johns Hopkins researchers involved in the study include Kaisorn L. Chaichana, M.D.; Patricia Zadnik, B.A.; Jon D. Weingart, M.D.; Alessandro Olivi, M.D.; Gary L. Gallia, M.D., Ph.D.; Jaishri Blakeley, M.D.; Michael Lim, M.D.; and Henry Brem, M.D.

http://www.sciencedaily.com/releases/2012/11/121101172148.htm

Softening Arteries, Protecting the Heart: Connection Between 'Good' Cholesterol and Collagen in Heart Health

Keeping arteries soft and supple might reduce disease risk, but the mechanisms of how arteries stave off hardening has remained elusive

ScienceDaily - Arterial stiffening has long been considered a major risk factor for cardiovascular disease. Keeping arteries soft and supple might reduce disease risk, but the mechanisms of how arteries stave off hardening has remained elusive.



Researchers from the Perelman School of Medicine, University of Pennsylvania, Wistar Institute, and The Children's Hospital of Philadelphia have discovered that the protein apolipoprotein E (apoE) plays a major role in maintaining arterial softness by suppressing production of the extracellular matrix, a network of connective tissue in the body. Their research appeared in the most recent issue of Cell Reports.

Collagen production (stained red) in aortic smooth muscle cells. The cell nuclei are stained blue. **(Credit: Richard K. Assoian, PhD, Perelman School of Medicine, Univeristy of Pennsylvania; Cell Reports)**

ApoE is a component of several lipoproteins, including HDL, the "good" cholesterol, and is generally believed to forestall atherosclerosis. But several recent major studies have questioned the link between HDL and cardiovascular protection. Meanwhile, other research involving cultured cells has indicated that apoE has effects beyond its role in regulating lipid levels as a component of HDL. The present work suggests that it may be the apoE-containing HDL that confers the main benefit of HDL by promoting arterial softness.

Analyzing genetic datasets of regular mice and mutant mice without apoE, the researchers showed definite differences in gene expression, with the apoE-null mice displaying marked increase in indicators of stiffening -- the proteins collagen, fibronectin, and lysyl oxidase in response to stiffening in the aorta, which led to severe atherosclerosis. To attempt to mitigate the atherosclerosis seen in the apoE-null mice, the researchers fed them a high-fat diet and treated them with a lysyl oxidase inhibitor, which softened their arteries.

Despite highly elevated cholesterol, the mice showed a marked improvement in their atherosclerosis. The results suggest that the lack of apoE results in arterial stiffness, and that even with high cholesterol, increasing arterial elasticity by pharmacologic means can greatly reduce atherosclerotic disease.

"HDL can't be looked at as just one compound, because it is a mixture of different molecular components," explains senior author Richard K. Assoian, PhD, professor of Pharmacology. "The component that has these effects on arterial stiffening is a minor part of total HDL." Assoian notes that this could help to reconcile the conflicting clinical evidence regarding the link between HDL and reduced cardiovascular disease. "It might be the apoE HDL fraction that you need to keep high and not worry about the total HDL," he suggests. Because apoE is only about 6 percent of total HDL, "it could go up sky high or not at all, and you probably wouldn't detect it in these studies that try to raise total HDL."

The possibility of preventing or treating atherosclerosis by promoting arterial elasticity independent of cholesterol could be a boon for the many people unable to tolerate the statin drugs that are the usual treatment. "Perhaps there are other routes that you could use, independent of cholesterol and statins, that could help keep atherosclerosis at bay," says co-first author Devashish Kothapalli, PhD. "We think controlling stiffening is one of those. We showed in the paper that even when cholesterol is remarkably high, if you soften tissues back to a healthy level, atherosclerosis is inhibited."

Targeting arterial stiffening could also provide added benefit for patients already on statins. "Ultimately we would hope that controlling stiffening could be used in conjunction with a statin for the large percentage of people who are already on statins but need extra help," says co-first author Shu-Lin Liu, PhD.

Although the current study demonstrates how apoE and apoE-containing HDL promote cardiovascular health by maintaining arterial softness, Assoian notes that a practical treatment would likely not target apoE, because it "does a lot of other things that you don't want to interfere with. So the goal in my mind would be to develop something that is really targeting stiffness but not affecting any of the lipid aspects of atherosclerosis that apoE

and HDL control. The lysyl oxidase inhibitor drug we used in this study, BAPN, is good for proof of principle, but not useful on a practical level, because there are too many side effects."

This work was funded by the National Heart Lung and Blood Institute (Grants 66250, 22633, 56083, 093283)

The above story is reprinted from materials provided by University of Pennsylvania School of Medicine.

Devashish Kothapalli, Shu-Lin Liu, Yong Ho Bae, James Monslow, Tina Xu, Elizabeth A. Hawthorne, Fitzroy J. Byfield, Paola Castagnino, Shilpa Rao, Daniel J. Rader, Ellen Puré, Michael C. Phillips, Sissel Lund-Katz, Paul A. Janmey, Richard K. Assoian. Cardiovascular Protection by ApoE and ApoE-HDL Linked to Suppression of ECM Gene Expression and Arterial Stiffening. Cell Reports, 2012; DOI: 10.1016/j.celrep.2012.09.018

http://www.eurekalert.org/pub_releases/2012-11/f-cum110212.php

Cannabis use mimics cognitive weakness that can lead to schizophrenia

fMRI study finds neural correlates to support cognitive model

Researchers at the University of Bergen in Norway have found new support for their theory that cannabis use causes a temporary cognitive breakdown in non-psychotic individuals, leading to long-term psychosis. In an fMRI study published this week in Frontiers in Psychiatry, researchers found a different brain activity pattern in schizophrenia patients with previous cannabis use than in schizophrenic patients without prior cannabis use. The results reinforce the researchers' model where cannabis users suffering from schizophrenia actually may have higher cognitive abilities than non-cannabis using schizophrenics. This difference may indicate that the cannabis-user group did not have the same mental propensity for psychosis.

"While brain activity for both groups was similar, there are subtle differences between schizophrenia sufferers with a history of cannabis use and those who have never used cannabis. These differences lead us to believe that the cognitive weakness leading to schizophrenia is imitated by the effects of cannabis in otherwise non-psychotic people," explains Else-Marie Loeberg, lead author on the article and associate professor of Psychology at the University of Bergen, Norway.

The 26 patients involved in the study attempted difficult cognitive tasks while in the fMRI machine. They were asked to listen to different syllables in each ear and try to say which syllable was spoken when instructed to concentrate on either the left or right ear—a difficult task for anyone but particularly difficult for schizophrenia patients who often have impaired attention, limited executive functioning and difficulty in processing verbal cues.

The study shows that schizophrenia sufferers with previous cannabis use had consistently higher levels of brain activity while undergoing these tests as well as a higher number of correct answers. These results are in line with previous conclusions from the Bergen researchers who support the idea that cannabis users with schizophrenic characteristics do not appear to suffer from the same neuro-cognitive weaknesses as other patients with schizophrenia.

This implies that it is the cannabis use itself that leads otherwise non-psychotic individuals down the nightmarish path towards schizophrenia by imitating the cognitive weakness that is the main risk factor for developing the psychological condition.

Article: An fMRI study of neuronal activation in schizophrenia patients with and without previous cannabis use.
Authors: Loeberg Else-Marie, Nygard Merethe, Helle Siri, Berle Jan ÿystein, Johnsen Erik, Kroken Rune, Jørgensen Hugo, Hugdahl Kenneth.
Journal: Frontiers in Psychiatry
http://www.frontiersin.org/Journal/Abstract.aspx?s=996&name=schizophrenia&ART_DOI=10.3389/fpsyt.2012.00094

http://bit.ly/TDn7ha

Diabetes linked to flu

The flu virus has another trick up its sleeve – it may trigger diabetes. The good news is that this discovery may give us a way to prevent some forms of the disease.

16:08 02 November 2012 by Debora MacKenzie

In diabetes, cells do not take up sugar from the blood. This can happen because cells have lost sensitivity to the hormone insulin, leading to what is called type 2 diabetes. Linked to diet and lifestyle, this form of the disease is rapidly becoming more common worldwide. Another cause of diabetes happens when the immune system destroys the pancreatic cells that produce insulin. People inherit a genetic predisposition for this condition, called type 1 diabetes, but an environmental trigger is also needed for it to appear.

Since the 1970s, researchers have suspected that viruses may provide this trigger, as type 1 diabetes often sets in suddenly after an infection. Enteroviruses and rotaviruses were both implicated; something about these infections confuses the immune system enough to make it attack the pancreas. But the picture remained unclear.

Then Ilaria Capua, of the World Organisation for Animal Health reference lab for bird flu in Legnaro, Italy, and her team decided to infect turkeys with flu. They did this because they knew birds with flu often have an

inflamed pancreas, even when they have strains of the virus that do not normally spread outside the lungs. The team found that many of the turkeys developed severe pancreatic damage and diabetes.
Next, the researchers infected human pancreatic tissue with two common flu viruses. Both "grew really well" in the tissue, including in insulin-producing cells, says Capua.

Inflammatory response

Crucially, the presence of flu in the pancreatic cells triggered production of a set of inflammatory chemicals that have been shown to be central to the autoimmune reactions that lead to type 1 diabetes. One theory is that immune cells present bits of the infected tissue to destructive T-cells, to teach them to recognise the virus. But in the process the T-cells also learn to recognise the cells that make insulin, and to destroy them.
Can flu reach the pancreas? In humans, the virus is normally restricted to the lungs and gut, but can sometimes get into the blood. The virus might also travel up the duct that links the small intestine to the pancreas, Capua suspects. "Either way, when it gets to the pancreas it finds a good place to replicate."
Capua is now testing the effects of flu on mouse models of type 1 diabetes. She is also looking for signs of recent flu infection in people with newly diagnosed diabetes. She suspects the H1N1 swine flu virus that caused the pandemic of 2009, and is still circulating, could be a particularly good trigger. Doctors in Japan and Italy have reported many newly diagnosed cases of type 1 diabetes in people who had recently had flu, and an upsurge in type 1 diabetes after the 2009 pandemic.

Real impact

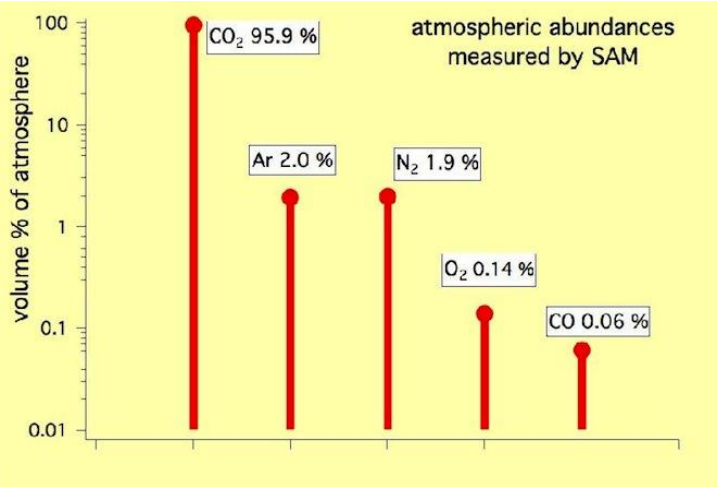
"The great thing is that even if flu only causes a few per cent of type 1 diabetes cases, we can vaccinate and prevent flu in people who are genetically predisposed, and that can have a real impact," says Capua. There are 65,000 new cases of type 1 diabetes worldwide annually, and that figure is growing by 3 to 5 per cent each year.
The link between diabetes and flu adds to growing evidence that many diseases considered non-infectious are actually caused by infection – and can therefore spread.
There is also new evidence that flu can cause heart attacks. Previously, this was suspected, because of the surge in heart attacks that regularly follows the annual flu season. But researchers at the University of Toronto, Canada, have now demonstrated the effect in individual patients. They reported this week that vaccinating adults for flu, whether they already have cardiac problems or not, makes them half as likely to have a heart attack or stroke in the following year (Canadian Journal of Cardiology, doi.org/jnr).
Journal reference: Journal of Virology, doi.org/jnp

http://www.sciencedaily.com/releases/2012/11/121102151611.htm

NASA Rover Finds Clues to Changes in Mars' Atmosphere

NASA's car-sized rover, Curiosity, has taken significant steps toward understanding how Mars may have lost much of its original atmosphere.

ScienceDaily - Learning what happened to the Martian atmosphere will help scientists assess whether the planet ever was habitable. The present atmosphere of Mars is 100 times thinner than Earth's.
A set of instruments aboard the rover has ingested and analyzed samples of the atmosphere collected near the "Rocknest" site in Gale Crater where the rover is stopped for research. Findings from the Sample Analysis at Mars (SAM) instruments suggest that loss of a fraction of the atmosphere, resulting from a physical process favoring retention of heavier isotopes of certain elements, has been a significant factor in the evolution of the planet. Isotopes are variants of the same element with different atomic weights.



Curiosity's first sniff of the Martian atmosphere reveals the relative abundances of different gases. **Image: NASA/JPL-Caltech, SAM/GSFC**

Initial SAM results show an increase of five percent in heavier isotopes of carbon in the atmospheric carbon dioxide compared to estimates of the isotopic ratios present when Mars formed. These enriched ratios of heavier isotopes to lighter ones suggest the top of the atmosphere may have been lost to interplanetary space. Losses at the top of the atmosphere would deplete lighter isotopes. Isotopes of argon also show enrichment of the heavy isotope, matching previous estimates of atmosphere composition derived from studies of Martian meteorites on Earth. Scientists theorize that in Mars' distant past its environment may have been quite different,

with persistent water and a thicker atmosphere. NASA's Mars Atmosphere and Volatile Evolution, or MAVEN, mission will investigate possible losses from the upper atmosphere when it arrives at Mars in 2014.
With these initial sniffs of Martian atmosphere, SAM also made the most sensitive measurements ever to search for methane gas on Mars. Preliminary results reveal little to no methane. Methane is of interest as a simple precursor chemical for life. On Earth, it can be produced by either biological or non-biological processes. Methane has been difficult to detect from Earth or the current generation of Mars orbiters because the gas exists on Mars only in traces, if at all. The Tunable Laser Spectrometer (TLS) in SAM provides the first search conducted within the Martian atmosphere for this molecule. The initial SAM measurements place an upper limit of just a few parts methane per billion parts of Martian atmosphere, by volume, with enough uncertainty that the amount could be zero.
"Methane is clearly not an abundant gas at the Gale Crater site, if it is there at all. At this point in the mission we're just excited to be searching for it," said SAM TLS lead Chris Webster of NASA's Jet Propulsion Laboratory in Pasadena, Calif. "While we determine upper limits on low values, atmospheric variability in the Martian atmosphere could yet hold surprises for us."
In Curiosity's first three months on Mars, SAM has analyzed atmosphere samples with two laboratory methods. One is a mass spectrometer investigating the full range of atmospheric gases. The other, TLS, has focused on carbon dioxide and methane. During its two-year prime mission, the rover also will use an instrument called a gas chromatograph that separates and identifies gases. The instrument also will analyze samples of soil and rock, as well as more atmosphere samples.
"With these first atmospheric measurements we already can see the power of having a complex chemical laboratory like SAM on the surface of Mars," said SAM Principal Investigator Paul Mahaffy of NASA's Goddard Space Flight Center in Greenbelt, Md. "Both atmospheric and solid sample analyses are crucial for understanding Mars' habitability."
SAM is set to analyze its first solid sample in the coming weeks, beginning the search for organic compounds in the rocks and soils of Gale Crater. Analyzing water-bearing minerals and searching for and analyzing carbonates are high priorities for upcoming SAM solid sample analyses.
Researchers are using Curiosity's 10 instruments to investigate whether areas in Gale Crater ever offered environmental conditions favorable for microbial life. JPL, a division of the California Institute of Technology in Pasadena, manages the project for NASA's Science Mission Directorate, Washington, and built Curiosity. The SAM instrument was developed at Goddard with instrument contributions from Goddard, JPL and the University of Paris in France.
For more information about Curiosity and its mission, visit: http://www.nasa.gov/msl and http://mars.jpl.nasa.gov/msl .

http://nyti.ms/XbdusL

Telescope Detects Light From the Earliest Stars

Ancient starlight, emitted by the first stars in the universe, has been detected using the Fermi Gamma-ray Space Telescope.

By SINDYA N. BHANOO

Marco Ajello, an astrophysicist at the University of California, Berkeley, and his colleagues report the finding in the current issue of the journal Science. Dr. Ajello conducted the research while working at Stanford University. “These were probably the very first objects to form in our universe,” he said. “They formed just about 500 million years after the Big Bang.”
Scientists suggest that the Big Bang occurred about 13 billion years ago, resulting in the creation of our universe, which continues to expand. The first stars in the universe were massive and primarily made up of hydrogen. They probably burned through the hydrogen quickly and exploded into supernovas early on. Although those original stars are long gone, the light from them is still traveling to us, Dr. Ajello said.
Measuring the ancient starlight directly was impossible because the light from our own galaxy is overpowering. So instead, the researchers used gamma rays. For this, they relied on blazars, faraway galaxies that emit gamma rays.
“They are like lighthouses farther and farther away from us,” Dr. Ajello said. “They are located at different distances from us, and from them we are able to measure the amount of starlight in different epochs.”
The researchers collected data on light in the universe 4 billion years, 8 billion years and 11 billion years after the Big Bang. In the future, Dr. Ajello hopes to take measurements at points even closer to the beginning of the universe.
“Since the universe is always expanding, the best way to measure is to go as early as possible in the history of the universe,” he said. “Two billion or one billion years after the Big Bang will give us more accurate measurements.”

http://www.scientificamerican.com/article.cfm?id=redhead-pigment-boosts-skin-cancer-risk

Redhead Pigment Boosts Skin-Cancer Risk

'Ginger' mice are found to be more susceptible to melanoma even without any exposure to ultraviolent radiation

By Kerri Smith and Nature magazine

Fair-skinned, red-haired folks know — sometimes through painful experience — that they are more susceptible to the damaging effects of the Sun's ultraviolet (UV) rays, including sunburn, skin ageing and a higher risk of skin cancers. But a study published today in Nature suggests that in mice, the pigment responsible for this colouring has a role in the development of melanoma.

"There is something about the redhead genetic background that is behaving in a carcinogenic fashion, independent of UV," says David Fisher, a cancer biologist at Massachusetts General Hospital in Boston, who led the study. "It means that shielding from UV would not be enough."

Compared to people with darker skin, those with fair, freckly skin and red hair produce a different form of the pigment melanin. This red–yellow form, called pheomelanin, is less effective at protecting the skin from UV damage than the darker form, eumelanin. The difference is caused by a mutation in the gene MC1R.

But for a number of years there have been hints that UV exposure alone might not account entirely for the risk of melanoma in redheads. Fisher and his team wanted to investigate the molecular backdrop for this increased risk.

The researchers looked at how melanomas develop in mouse models of olive-skinned, ginger and albino colouring. The last group had the same genetic background as the dark-skinned mice but lacked the enzyme needed to synthesize melanin. The researchers also tweaked each group's genes to be more susceptible to developing benign moles, which Fisher says is a probable first step in the development of melanoma.

No sunlight needed

The researchers planned to expose the mice to UV light and monitor differences in melanoma development. But before they got to that part of the experiment, about half the ginger mice had developed melanomas. Fisher says that he and his team were shocked. "The first thing we needed to do was bring a UV meter into the animal room to be sure there wasn't some inadvertent UV being radiated out of the light bulbs or something," he says. "And it turned out there was not."

The result suggested that the pigment itself was a cause of melanoma. The researchers suggest that the increased melanoma risk could have something to do with the pigment-production process, or a by-product of it, in melanin-containing cells called melanocytes.

Eugene Healy, a clinical dermatologist at the University of Southampton, UK, says that although the mechanism is interesting, it is probably a less common trigger of melanoma than UV radiation. Indeed, in the UK, 8 out of 10 cases of melanoma are due to UV exposure. In humans, most melanomas develop on skin that sees the sun. "You almost never see melanoma, for example, on the buttocks," says Healy.

To complicate the picture, one of Healy's own studies, published in 2010, suggested that pheomelanin was protective against the effects of UV radiation in another type of skin cell, the keratinocyte.

The sun-safety message does not change because of the latest results. "UV is very tightly and convincingly linked to the formation of most non-melanoma types of skin cancer," Fisher says. "One of the most important messages from this is to avoid an assumption that this takes UV off the hook." It is possible that UV exposure worsens the carcinogenic mechanism of the red pigment, he adds.

Healy is keen to avoid alarming people with fair complexions. "Whatever risk was there, was always there. But we don't see lots of spontaneous melanomas in redheads. We shouldn't be sending out a worrying message for them."

http://www.eurekalert.org/pub_releases/2012-11/aha-jfm102412.php

Japanese family members less likely than others to give CPR for cardiac arrest

Family members didn't give CPR for cardiac arrests as often as passers-by or friends in a Japanese study presented at the American Heart Association's Scientific Sessions 2012.

Cardiac arrest is the sudden loss of heart function, typically resulting from an abnormal heart rhythm that causes the heart to quiver erratically and stop pumping blood. According to the American Heart Association, effective bystander CPR provided immediately after sudden cardiac arrest can double or triple a victim's chance of survival.

In a review of 547,218 cardiac arrests occurring in 2005-09, researchers identified almost 140,000 incidents witnessed by bystanders without a physician's involvement. Bystander groups studied included family members, friends and colleagues, passers-by and others.

Researchers found:

The time interval between collapse and emergency call and between call and arrival to patients was shortest when witnessed by passers-by.

Family members were least likely (36.5 percent) to administer CPR, but most likely to receive telephone instructions from dispatchers (45.8 percent).

The telephone instruction to family members most frequently failed (39.4 percent) and family members most often used chest compressions only (67.9 percent).

"If you go into cardiac arrest in front of your family, you may not survive," said Hideo Inaba, M.D., Ph.D., lead author of the study and professor and chairman of the Department of Emergency Medical Science at Kanazawa University Graduate School of Medicine in Kanazawa, Japan. "Different strategies, including basic life support instruction targeting smaller households, especially those with elderly residents, would improve survival, as would recruiting well-trained citizens willing to perform CPR on victims whose arrest was witnessed by family members."

CPR provided by family members may have been ineffective due to their lack of knowledge or fear of injuring their loved one, said Inaba. Cultural and demographic issues in Japan, which has a large gender gap, may also have contributed to the findings, he said.

In a study conducted in 2008, researchers found that Japanese women were less likely to attempt CPR. Men accounted for a majority of cardiac arrests in the current study, and their wives or daughters-in-law witnessed most of them, researchers said.

Japan has a rapidly aging population, with elderly people, mostly couples, in 42 percent of households in 2010, Inaba said.

"These characteristics of Japanese households might have contributed to our observations and may be different from households in the United States," Inaba said. "Also, the percentage of older persons in Japan is larger than in the U.S. population. So the results may be less applicable." Furthermore, the database didn't include the exact location of each cardiac arrest, although basic life support response and outcomes differ between locations. The type of bystander who responds is also closely related to the location of the cardiac arrest.

Co-authors are: Takahisa Kamikura, M.D.; Tetsuo Maeda, M.D.; Yoshitaka Hamada, M.D., Ph.D.; Satoru Sakagami, M.D., PhD; and Taiki Nishi and Keiko Takase, master course students.

Author disclosures are on the abstract.

All downloadable video/audio interviews, B-roll, animation and images related to this news release are on the right column of the release link at http://newsroom.heart.org/pr/aha/_prv-japanese-family-members-less-likely-239557.aspx.

http://www.bbc.co.uk/news/magazine-20170787

Japan and blood types: Does it determine personality?

Are you A, B, O or AB? It is a widespread belief in Japan that character is linked to blood type. What's behind this conventional wisdom?

By Ruth Evans Tokyo

Blood is one thing that unites the entire human race, but most of us don't think about our blood group much, unless we need a transfusion. In Japan, however, blood type has big implications for life, work and love.

Here, a person's blood type is popularly believed to determine temperament and personality. "What's your blood type?" is often a key question in everything from matchmaking to job applications.

According to popular belief in Japan, type As are sensitive perfectionists and good team players, but over-anxious. Type Os are curious and generous but stubborn. ABs are arty but mysterious and unpredictable, and type Bs are cheerful but eccentric, individualistic and selfish. About 40% of the Japanese population is type A and 30% are type O, whilst only 20% are type B, with AB accounting for the remaining 10%.

Four books describing the different blood groups characteristics became a huge publishing sensation, selling more than five million copies. Morning television shows, newspapers and magazines often publish blood type horoscopes and discuss relationship compatibility. Many dating agencies cater to blood types, and popular anime (animations), manga (comics) and video games often mention a character's blood type.

A whole industry of customised products has also sprung up, with soft drinks, chewing gum, bath salts and even condoms catering for different blood groups on sale.

Blood types, however, are simply determined by proteins in the blood. Although scientists regularly try to debunk these beliefs, they remain popular in Japan. One reason often given is that in a relatively uniform and homogenous society, it provides a simple framework to divide people up into easily recognisable groups.

"Being the same is considered a good thing here in Japanese society," says translator Chie Kobayashi. "But we enjoy finding little differences that distinguish people. On the other hand, it can also lead to bad things being said about the minority B and AB types."

What's your blood type?

The main blood group system is ABO, with four blood types: A, B, O, AB
Rhesus system, for which you can be positive or negative, is the second most important with regard to blood transfusions
In total there are 32 recognised blood group systems, which all have either positive or negative indicators
The discovery of the latest two blood types - Langereis and Junior - were announced by researchers from Vermont earlier this year

It was only in 1901 that the ABO blood group system was discovered by the Austrian scientist Karl Landsteiner. His Nobel prize-winning work made it possible to identify the different blood groups, paving the way for transfusions to be carried out safely. Theorists of eugenics later hijacked his research during the inter-war years, with the Nazis using his work to further their ideas of racial supremacy.

It was also adopted by Japan's militarist government in the 1930s to train better soldiers, and during World War II, the Imperial Army is reported to have formed battle groups according to blood type.

The study of blood types in Japan gained mass appeal with the publication of a book in the 1970s by Masahiko Nomi, who had no medical background. More recently, his son Toshitaka went on to promote it further through a series of popular books - he also runs the Institute of Blood Type Humanics. He says his aim is not to judge or stereotype people, but simply to make the best of someone's talents and improve human relationships.

Between them, father and son have published dozens of books on the subject, not just the handful of bestsellers.

These beliefs have been used in unusual ways.

The women's softball team that won gold for Japan at the Beijing Olympics is reported to have used blood type theories to customise training for each player. Some kindergartens have even adopted methods of teaching along blood group lines, and even major companies reportedly make decisions about assignments based on employees' blood types. In 1990 the Asahi Daily newspaper reported that Mitsubishi Electronics had announced the creation of a team composed entirely of AB workers, thanks to "their ability to make plans".

These beliefs even affect politics. One former prime minister considered it important enough to reveal in his official profile that he's a type A, whilst his opposition rival was type B. Last year a minister, Ryu Matsumoto, was forced to resign after only a week in office, when a bad-tempered encounter with local officials was televised. In his resignation speech he blamed his failings on the fact that he was blood type B.

A minister quits

In July 2011, Minister for Reconstruction Ryu Matsumoto resigned after being criticised for making insensitive remarks. He blamed his blood type.
"I would like to offer my apologies for offending the people in the disaster-hit areas. I thought I was emotionally close to the disaster victims, but I lacked sufficient words and my comments were too harsh.
"My blood's type B, which means I can be irritable and impetuous, and my intentions don't always come across.
"My wife called me earlier to point that out. I think I need to reflect about that."

Not everyone sees the blood type craze as simply harmless fun. It sometimes manifests itself as prejudice and discrimination, and it seems this is so common, the Japanese now have a term for it - bura-hara, meaning blood-type harassment. There are reports of discrimination against type B and AB groups leading to children being bullied, the ending of happy relationships, and loss of job opportunities.

Despite repeated warnings, many employers continue to ask blood types at job interviews, says Terumitsu Maekawa, professor of comparative religion at Tokyo's Asia University and author of several books about blood groups. He's critical about sweeping popular beliefs about blood types. "We can point out some general tendencies as a group, but you can't say this person is good or bad because of their blood type."

His own research, he says, is based more on empirical research rather than popular superstition. In his books he explores the theory that predominant blood types may determine religious beliefs and societal norms.

In the Western world, O and A types make up almost 85% of people, but in India and Asia, B types predominate. Japan, he says, is unusual in Asia in that it has more variety of blood types.

"A type societies tend to be characterised by monotheism such as Christianity and Judaism, with one fundamental analysis of human beings and a strong sense of societal norms. But societies dominated by B types are more prone to polytheism - like Buddhism and Hinduism - with lots of gods, and they think people are all different." Professor Maekawa, himself type B, says in Japan his blood group is often criticised for being too individualistic and selfish. "It isn't very nice. But it doesn't annoy me or hurt me, because it has no scientific basis at all."

In a smart state-of-the-art clinic busy with lots of people donating blood, director Akishko Akano says he's not aware that the negative image of certain blood types has an impact on their work, or dissuades minority B and AB types from coming forward. A bigger problem in Japan's rapidly ageing society, he says, is persuading enough young people to volunteer as blood donors.

In the next room, I find Masako, lying on a bed strapped to a quietly purring machine as a nurse takes samples. This is the eighth time she's given blood. Her blood type is AB, which is rare as it accounts for only 10% of people in Japan. "People sometimes don't like me," she tells me. "They think I am weird and strange. Lots of people tell me they don't understand what I am thinking about." Although Masako laughs as she tells me this, it seems that in Japan, no amount of scientific debunking can kill the widely held notion that blood tells all.

http://bit.ly/RKeWf8

Hi, we're overhead! Get a text message from NASA when the International Space Station flies over your house

Service launched to celebrate 12th anniversary of crews working aboard

Most visible around dawn and dusk and appears as a fast moving light

By Daily Mail Reporter

It's the third brightest object in the sky after the sun and the moon, but most people still couldn't tell you where the International Space Station is.

But now a new service from NASA called Spot the Station will send you a text message when the station is over your house.

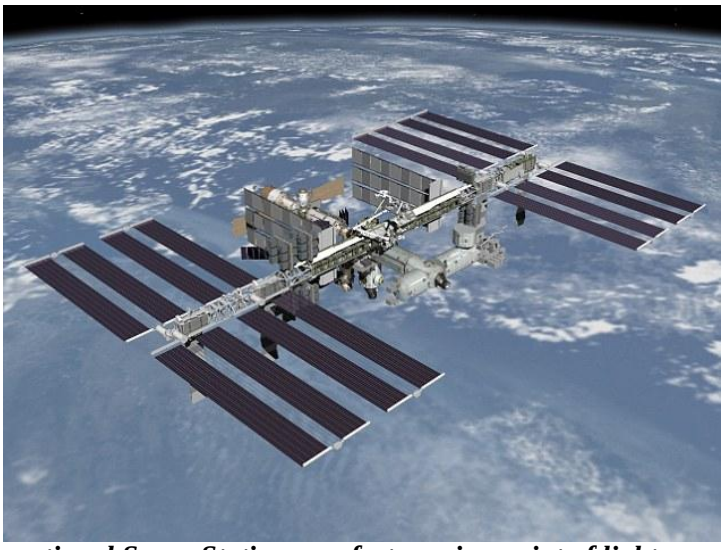
Once you know where to look people should be able to see it easily – even without a telescope.

A decade in the stars: Spot the Station was launched to coincide with the 12th year of crew living and working on the International Space Station

The service was launched to celebrate the 12th anniversary of crews living and working aboard the station.

'It's really remarkable to see the space station fly overhead and to realize humans built an orbital complex that can be spotted from Earth by almost anyone looking up at just the right moment,' said William Gerstenmaier, NASA's associate administrator for human exploration and operations.

'We're accomplishing science on the space station that is helping to improve life on Earth and paving the way for future exploration of deep space.'



Luminary: On a clear night anyone can see the International Space Station as a fast-moving point of light, even without a telescope

When skies are clear, it typically appears as fast-moving point of light.

Spot the Station will calculate the station's proximity to more than 4,600 positions on Earth, updating its information several time per week.

The service will only notify users if the station is easily visible above trees, buildings, and other objects.

You can sign up for the service by visiting http://spotthestation.nasa.gov .