http://arstechnica.com/science/2012/08/widespread-vaccine-exemptions-are-messing-with-herd-immunity/

Widespread vaccine exemptions are messing with herd immunity

Falling immunization rates in California are putting students at risk.

by John Timmer

Vaccines have been one of the most important public health interventions ever developed. As a new study notes, past analyses have estimated that the childhood immunization schedule prevents 42,000 deaths and 20 million cases of disease—and that's only for the kids born in a single year. The estimated savings is currently at $14 billion a year.

But, despite the amazing benefits, immunization rates have been falling, driven by a fear that vaccines cause health problems such as autism. The autism risk has been both thoroughly debunked and the paper that originally suggested it turned out to be the product of an unethical, financially motivated individual. Despite this debunking, surveys show that a quarter of US parents think that vaccines can trigger autism, and rates of vaccination have continued to fall in many states. A new study looks at incoming kindergartners in California, and finds that the lack of vaccination is threatening herd immunity in some schools, and that some measures of risk have doubled in just three years.

California, like other states, has a mandatory immunization schedule, set as a requirement for children entering school. But California is also one of 20 states that allows a personal belief exemption, where parents can file notice that they have a personal issue with vaccines, and get their kids into schools despite a lack of vaccination. The rates of people asking for these exemptions has been slowly climbing, rising from half a percent in 1996 to 1.5 percent in 2007.

But the statewide rate only tells part of the story, as the cultural factors that influence vaccine takeup may potentially cluster in certain communities. For example, a measles outbreak occurred in San Diego when an intentionally unvaccinated child picked it up in Europe, and then returned to a school with a high rate of exemptions.

How often is this the case? California health records make it possible to do this sort of analysis, as they include information about the number of exemptions as well as identifying the school the exempted child is attending. The authors of the new analysis combine data on measles vaccinations with some useful statistical tools that were first developed to measure racial segregation within a school system. These include what's called the interaction index, which indicates how often a vaccinated student would encounter someone with an exemption, and the aggregation index, which measures how often exempted students will end up in the same school.

Using data from 2008 to 2010, the authors found some worrying trends. Over just two years, the statewide interaction index increased by 25 percent in this short time. That means far more students are coming in contact with peers who are unvaccinated—a serious risk, since vaccines are not 100 percent effective. Making matters worse, there was also an increase in the clustering of these students. The average exempted student was in a school where 14.7 of 100 students also had exemptions in 2008. By 2010, that number had increased to 15.6.

Herd immunity occurs when a few unvaccinated children are protected by the fact that almost everyone around is vaccinated and therefore cannot infect them. It's important for those for whom vaccines have not worked, those who have immune problems, or those who cannot be vaccinated due to specific health risks. But it requires very high rates of vaccination, typically 80-90 percent. And, in California, it's at risk of breaking down. "The number of kindergartners attending schools in which there were more than 20 exempted kindergartners almost doubled (from 1937 in 2008 to 3675 in 2010)," the authors note.

There were definitely regional issues, as well. In one county in the northern part of the state (Trinity), the average student who started school was in an environment where 13.8 percent of his or her classmates had a vaccination exemption. In Sutter county (just north of Sacramento), the aggregation index was an astonishing 46.3, meaning that every child with an exemption was at a school where nearly half of their classmates would also be exempted.

There are some limits to this study. Some students may be granted an exemption but then ultimately receive all the required vaccinations at a later date, and its authors didn't have access to data like classroom size, which could affect the risk of exposure. But even if these limitations affect the study's precision, the trends it detects are clearly worrisome. About the only bright spot is that the authors note that the tools they have developed can help state officials target educational programs to the communities that need it the most.

American Journal of Public Health, 2012. DOI: 10.2105/AJPH.2012.300821

http://bit.ly/R2qSXU

Disease Maps Pinpoint Origin of Indo-European Languages

Turkey might be the geographic origin of languages from English to Hindi, according to epidemiological tracking techniques

By Alyssa Joyce | Thursday, August 23, 2012 | 18

Languages as diverse as English, Russian and Hindi can trace their roots back more than 8,000 years to Anatolia - now in modern-day Turkey. That's the conclusion of a study that assessed 103 ancient and contemporary languages using a technique normally used to study the evolution and spread of disease. The researchers hope that their findings can settle a long-running debate about the origins of the Indo-European language group.

English, Dutch, Spanish, Russian, Greek and Hindi might all sound very different, but there are many commonalities, such as the Dutch moeder, Spanish madre and Russian mat', all of which mean "mother". On this basis, researchers have concluded that more than a hundred languages across Europe and the Middle East, from Iceland to Sri Lanka, stem from a common ancestor.

Some scholars think that Indo-European languages spread with farming techniques from Turkey across Europe and Asia 8,000–9,500 years ago. Others suggest that nomadic 'Kurgan' horsemen brought the origins of Indo-European language from central Asia about 6,000 years ago. There is archaeological evidence to support both theories, but genetic studies of Indo-Europeans have been inconclusive, leading to an intractable debate among linguists, anthropologists and cultural historians.

Taking sides

In 2003, Russell Gray and his then doctoral student, Quentin Atkinson, at the University of Auckland in New Zealand generated a maelstrom of controversy by claiming to have solved, by computer modeling, what has been described as "the most intensively studied, yet still the most recalcitrant, problem of historical linguistics", coming down on the side of Anatolia[4] (see 'Language tree rooted in Turkey').

Neither Gray nor Atkinson is a linguist. But they believed they could work with the kinds of tools employed in evolutionary ecology to answer important questions about language prehistory.

Genes and words have several similarities, and language evolution has conventionally been mapped using a "family tree" format. Gray and Atkinson theorized that the evolution of words was similar to the evolution of species, and that the 'cognate' of words - how closely their sounds and meanings are related to one another - could be modeled like DNA sequences and used to measure how languages evolved. By extension, the rate at which words changed - or mutated - could be used to determine the age at which Indo-European languages diverged from one another.

Using methods from evolutionary biology, the duo compared common words in 87 Indo-European languages, such as 'mother', 'hunt' and 'sky', to figure out how language 'species' were related to one another. They traced the origins of Indo-European languages to 7,800–9,800 years ago, supporting the Anatolian hypothesis.

Critics were skeptical. Gray and Atkinson had determined when the languages originated, but not where. So, in a paper published today in Science, Atkinson, Gray and their colleagues address this using the type of geography-based computer modeling normally used by epidemiologists to track the spread of disease[1].

The locations of current Indo-European languages are well known, and the geographic origin of older, extinct languages - such as Ancient Greek or Sanskrit - can be inferred from the historical record. In this way, the researchers believed they could track the movement of the Indo-European languages in the same way that epidemiological models trace a disease outbreak to its source. Once again, they conclude that the origin is Anatolia.

A clear spatial picture

"Finally we have a clear spatial picture," says Colin Renfrew at the University of Cambridge, UK, who originally proposed Anatolia as the source of the Indo-European language family. But he predicts that many historical linguists will be slow to accept the evidence. "The structure of 'Indo-European studies' has been founded for so long on the myth of mounted Kurgan warrior horsemen riding down from the Russian steppes that it will take scholars a while to recover," he says.

Indeed, many linguists and archaeologists still favor the Kurgan hypothesis. Andrew Garrett, a linguist at the University of California, Berkeley, considers the new methods innovative, but he remains unconvinced. "There is bias in the underlying data that leads to an erroneous conclusion, and strong evidence that is ignored which still strongly supports the Kurgan hypothesis," he says. David Anthony, an archaeologist at Hartwick College in Oneonta, New York, says this type of model doesn't match the complex linguistic and archaeological evidence.

"The study is an example of retrofitting evidence to a model, but the results of such a model are only as useful as the underlying data and assumptions," he says.
But Atkinson says the new models are slowly becoming more accepted in the field. "Ten years ago, responses to this work were very different. I have noticed a real shift in attitudes towards computational-modeling approaches in historical linguistics, from being just an odd sideshow to a clear focus of attention."

http://www.scientificamerican.com/article.cfm?id=how-to-learn-in-your-sleep

How to Learn in Your Sleep

Subjects trained to sniff pleasant smells while asleep retain the conditioning when they wake up

By Mo Costandi and Nature magazine

It sounds like every student's dream: research published today in Nature Neuroscience shows that we can learn entirely new information while we snooze. Anat Arzi of the Weizmann Institute of Science in Rehovot, Israel, and her colleagues used a simple form of learning called classical conditioning to teach 55 healthy participants to associate odours with sounds as they slept.
They repeatedly exposed the sleeping participants to pleasant odours, such as deodorant and shampoo, and unpleasant odours such as rotting fish and meat, and played a specific sound to accompany each scent.
It is well known that sleep has an important role in strengthening existing memories, and this conditioning was already known to alter sniffing behaviour in people who are awake. The subjects sniff strongly when they hear a tone associated with a pleasant smell, but only weakly in response to a tone associated with an unpleasant one.
But the latest research shows that the sleep conditioning persists even after they wake up, causing them to sniff strongly or weakly on hearing the relevant tone - even if there was no odour. The participants were completely unaware that they had learned the relationship between smells and sounds. The effect was seen regardless of when the conditioning was done during the sleep cycle. However, the sniffing responses were slightly more pronounced in those participants who learned the association during the rapid eye movement (REM) stage, which typically occurs during the second half of a night's sleep.

Pillow power

Arzi thinks that we could probably learn more complex information while we sleep. "This does not imply that you can place your homework under the pillow and know it in the morning," she says. "There will be clear limits on what we can learn in sleep, but I speculate that they will be beyond what we have demonstrated."
In 2009, Tristan Bekinschtein, a neuroscientist at the UK Medical Research Council's Cognition and Brain Sciences Unit in Cambridge, and his colleagues reported that some patients who are minimally conscious or in a vegetative state can be classically conditioned to blink in response to air puffed into their eyes. Conditioned responses such as these could eventually help clinicians to diagnose these neurological conditions, and to predict which patients might subsequently recover. "It remains to be seen if the neural networks involved in sleep learning are similar to the ones recruited during wakefulness," says Bekinschtein.
The findings by Arzi and her colleagues might also be useful for these purposes, and could lead to 'sleep therapies' that help to alter behaviour in conditions such as phobia.
"We are now trying to implement helpful behavioural modification through sleep-learning," says Arzi. "We also want to investigate the brain mechanisms involved, and the type of learning we use in other states of altered consciousness, such as vegetative state and coma."

http://www.sciencedaily.com/releases/2012/08/120826143623.htm

Targeted Oxidation-Blocker Prevents Secondary Damage After Traumatic Brain Injury, Study Suggests

An agent that blocks cardiolipin oxidation protects the brain from cell death.

ScienceDaily - Treatment with an agent that blocks the oxidation of an important component of the mitochondrial membrane prevented the secondary damage of severe traumatic brain injury and preserved function that would otherwise have been impaired, according to a research team from the University of Pittsburgh School of Medicine, Graduate School of Public Health and Department of Chemistry in a report published online August 26 in Nature Neuroscience.
Annually, an estimated 1.7 million Americans sustain a traumatic brain injury (TBI) due to traffic accidents, falls, assaults and sports participation, said the study's senior author Hülya Bayır, M.D., associate professor, Department of Critical Care Medicine, University of Pittsburgh School of Medicine. She added that 52,000 of those injured die, and 85,000 are left with significant disability.
"We don't yet have a specific therapy for TBI, but can provide only supportive care to try to ease symptoms," Dr. Bayır said. "Our study drug shows promise as a neuroprotective agent that might help address this important public health problem."

For the study, the research team conducted a global assessment of all the phospholipids in rat brain cells. This revealed that damage from TBI was nonrandom and mostly involved cardiolipin, a phospholipid that is found in the membranes that form mitochondria, the cell's powerhouse. They noted that in the healthy animal, only 10 of the 190 cardiolipin species were modified by oxygen, but after a brain injury, the number of oxidized species rose many-fold.

The researchers then developed an agent, called XJB-5-131, which can cross the blood-brain barrier and prevent the oxidation of cardiolipin. Using an established research model of severe TBI, the agent or a placebo was injected into the bloodstream of rats five minutes and again 24 hours after head injury.

In the weeks that followed, treated animals performed akin to normal on tests of balance, agility and motor coordination, learning, and object recognition, while placebo-treated animals showed significant impairment. The results indicate that blocking cardiolipin oxidation by XJB-5-131 protected the brain from cell death.

"The primary head injury might not be that serious," Dr. Bayır noted. "But that initial injury can set into motion secondary cellular and molecular events that cause more damage to the brain and that ultimately determine the outcome for the patient."

She added that a targeted oxidation-blocker might also be beneficial in the treatment of other neurological disorders, such as Parkinson's disease, amyotrophic lateral sclerosis, or ALS, and stroke.

Jing Ji, Anthony E Kline, Andrew Amoscato, Alejandro S Arias, Louis J Sparvero, Vladimir A Tyurin, Yulia Y Tyurina, Bruno Fink, Mioara D Manole, Ava M Puccio, David O Okonkwo, Jeffrey P Cheng, Henry Alexander, Robert S B Clark, Patrick M Kochanek, Peter Wipf, Valerian E Kagan, Hülya Bayır. Lipidomics identifies cardiolipin oxidation as a mitochondrial target for redox therapy of brain injury. Nature Neuroscience, 2012; DOI: 10.1038/nn.3195

http://www.eurekalert.org/pub_releases/2012-08/esoc-rci082712.php

Rising cardiovascular incidence after Japanese earthquake 2011

Weekly occurrence of five CVD conditions all increased sharply soon after the earthquake occurred.

Munich, Germany – The Japanese earthquake and tsunami of 11 March 2011, which hit the north-east coast of Japan with a magnitude of 9.0 on the Richter scale, was one of the largest ocean-trench earthquakes ever recorded in Japan. The tsunami caused huge damage, including 15,861 dead and 3018 missing persons, and, as of 6 June 2012, 388,783 destroyed homes.

Following an investigation of the ambulance records made by doctors in the Miyagi prefecture, close to the epicentre of the earthquake and where the damage was greatest, cardiologist Dr Hiroaki Shimokawa and colleagues from the Tohoku University Graduate School of Medicine at Sendai, Japan, found that the weekly occurrence of five conditions - heart failure, acute coronary syndrome (including unstable angina and acute MI), stroke, cardio-pulmonary arrest and pneumonia - all increased sharply soon after the earthquake occurred.

Such reactions - in ACS, stroke and pulmonary embolism - have been reported before, said Dr Shimokawa, in Japan, China and the USA. However, these studies reported only the short-term occurrence of individual CVD events, and the mid-term CVD effects of such great earthquakes remain to be elucidated. To this end, the study examined all ambulance transport records in the Miyagi prefecture from 11 February to 30 June for each year from 2008 to 2011 (ie, four weeks before to 16 weeks after 11 March, a total of 124,152 records). Incidence records from before, during and after the earthquake disaster were compared, the aftershocks counted and recorded according to a seismic intensity of 1 or greater.

The number of aftershocks in the Miyagi prefecture was frequent during the six weeks after the earthquake, and the second peak was noted as a large aftershock on 7 April 2011 (magnitude of 7.0). Compared with the previous three years, the significant increases in the occurrence of heart failure and pneumonia were steadily prolonged for more than six weeks after the tsunami struck. On the other hand, the incident increases in stroke and cardio-pulmonary arrest followed the pattern of the first and aftershock seismic peaks. The rapid increases in the occurrence of acute coronary syndromes and cardio-pulmonary arrest was followed by a sharp and significant decline. Interestingly, said Dr Shimokawa, age, sex or residence area did not significantly affect the occurrences of CVD during or following the tsunami.

"To the best of our knowledge," he added, "this is the first report to describe the mid-term course of major cardiovascular events and pneumonia after a great earthquake in a large population. In particular, our findings provide the first evidence that the incidence of heart failure was markedly increased over a long period afterwards." Prevalence of pneumonia, a well known risk factor for deteriorating heart failure, was significantly increased.

The Tohoku University study also found - as reflected in self-monitoring measurements - that blood pressure was significantly elevated after the Earthquake. However, transport disruption following the tsunami

interrupted delivery of regular medications, such as antihypertensive or antithrombotic drugs, and this may have contributed to the increased cardiovascular events. There was also an increase in the occurrences of ventricular tachyarrhythmias in patients with implantable cardiac defibrillators.
"Taken together," said Dr Shimokawa, "we consider that discontinuation of drugs, activated sympathetic nervous system, rising blood pressure, and the increased occurrence of tachyarrhythmia and infections were all involved in the increased occurrence of cardiovascular events after the Great Earthquake of Japan."

http://www.eurekalert.org/pub_releases/2012-08/cmc-iww082712.php

In war with 'superbugs,' Cedars-Sinai researchers see new weapon: Immune-boosting vitamin

High doses of vitamin B3 enhance immune system's infection-fighting ability, study shows

LOS ANGELES – Cedars-Sinai researchers have found that a common vitamin may have the potential to provide a powerful weapon to fight certain "superbugs," antibiotic-resistant staph infections that health experts see as a threat to public health.
The research, published in the September 2012 edition of The Journal of Clinical Investigation, found that high doses of the nicotinamide form of vitamin B3 stimulated a specific gene (CEBPE), enhancing white blood cells' ability to combat staph infections, including methicillin-resistant Staphylococcus aureus or MRSA.
With research ongoing, including possible clinical trials in humans, the scientists caution consumers not to treat a suspected infection by taking vitamin B3. Instead, a physician should be consulted.
"It's critical that we find novel antimicrobial approaches to treat infection and not rely so heavily on antibiotics," said George Liu, MD, PhD, a pediatric infectious disease physician at Cedars-Sinai's Maxine Dunitz Children's Health Center and co-senior author of the study. "That's why this discovery is so exciting. Our research indicates this common vitamin is potentially effective in fighting off and protecting against one of today's most concerning public health threats."
Staph infections commonly cause serious, sometimes life-threatening illness. Health officials fear that indiscriminate use of antibiotics has undercut their effectiveness, leading to the rapid rise and threatening spread of resistant germs.
In laboratory tests with mice and human blood, Cedars-Sinai scientists found that vitamin B3 increased by up to 1,000 fold the ability of the immune system to kill staph bacteria. Beyond its findings related to vitamin B3, the study indicates that similar targeting of the CEBPE gene with other compounds may offer a new immune-boosting strategy to fight bacterial infections.
The researchers have been investigating a rare disease called neutrophil-specific granule deficiency, a hematologic disorder afflicting only a handful of people in the world. Due to a mutation of the gene CEBPE, patients with this disease have significantly weakened immune systems, leaving them prone to severe, chronic and life-threatening infections, including staph. The CEBPE gene regulates several antimicrobial factors in the body.
"Our goal in studying a rare disorder is that it may give us broad insight into the immune mechanisms that protect healthy individuals against staph infections," said Pierre Kyme, PhD, a researcher in the Division of Pediatric Infectious Diseases in the Maxine Dunitz Children's Health Center and the Immunobiology Research Institute, and co-first author of the study with Nils Thoennissen, MD, who is now with the Department of Medicine at University of Muenster in Germany. "We found that if you over-express the gene in normal individuals, the body's immune cells do a better job of fighting off infection."
Kyme and Thoennissen turned to vitamin B3, which has been shown to increase the expression of some other genes in the CEBP family. The results: When studied in human blood, clinical doses of the vitamin appeared to virtually wipe out the staph infection in only a few hours.
Formal testing in clinical trials with patients is called for, based on these outcomes in the laboratory and in laboratory mice studies, said Phillip Koeffler, MD, professor of medicine at Cedars-Sinai and co-senior author of the study.
"There's more research to be done, but we believe that vitamin B3, and other compounds that are able to increase the activity of this particular gene, have the potential to be effective against other antibiotic-resistant bacteria in addition to strains of staph," he said.
The study was funded by grants from the National Institutes of Health (R01 AI074832, R01 CA026038-30, U54 CA143930-01 and R01 AI065604-05).

http://www.eurekalert.org/pub_releases/2012-08/afps-stl082712.php

Speaking 2 languages also benefits low-income children

Living in poverty is often accompanied by conditions that can negatively influence cognitive development. Is it possible that being bilingual might counteract these effects?

Although previous research has shown that being bilingual enhances executive functioning in middle-class children, less is known about how it affects lower income populations.

In a study forthcoming in Psychological Science, a journal of the Association for Psychological Science, psychological scientist Pascale Engel de Abreu of the University of Luxembourg and colleagues examine the effects of speaking two languages on the executive functioning of low-income children. "Low-income children represent a vulnerable population," says Engel de Abreu. "Studying cognitive processes in this population is of great societal importance and represents a significant advancement in our understanding of childhood development."

Existing research, conducted with older bilingual children and bilingual adults from middle class backgrounds, suggests that knowing two languages may have different effects on different aspects of executive functioning: while being bilingual seems to have a positive influence on the ability to direct and focus attention (control), researchers have found no such benefit for how people encode and structure knowledge in memory (representation). Engel de Abreu and her colleagues hypothesized that this pattern would also hold for younger bilingual children who were low-income.

A total of 80 second graders from low-income families participated in the study. Half of the children were first or second generation immigrants to Luxembourg, originally from Northern Portugal, who spoke both Luxembourgish and Portuguese on a daily basis. The other half of the children lived in Northern Portugal and spoke only Portuguese.

The researchers first tested the children's vocabularies by asking them to name items presented in pictures. Both groups completed the task in Portuguese and the bilingual children also completed the task in Luxembourgish. To examine how the children represented knowledge in memory, the researchers asked them to find a missing piece that would complete a specific geometric shape. The researchers also measured the children's memory, using two different tasks to see how much visual information the children could keep in mind at a given time.

The children then participated in two tasks that looked at their ability to direct and focus their attention when distractions were present. In the first task, they had to find and match 20 pairs of spacecrafts as quickly as possible, a task that depended on their ability to ignore all the non-matching spacecrafts. In the second task, the children were presented with a row of yellow fish on a computer screen and they had to press a button to indicate which direction the fish in the center was facing. The other fish either pointed in the same or opposite direction of the fish in the middle.

Although the bilingual children knew fewer words than their monolingual peers, and did not show an advantage for representation tasks, they performed better on the control tasks than did the monolingual children, just as the researchers hypothesized.

"This is the first study to show that, although they may face linguistic challenges, minority bilingual children from low-income families demonstrate important strengths in other cognitive domains," says Engel de Abreu. The researchers believe that the findings could inform efforts to reduce the achievement gap between children of different socioeconomic backgrounds. "Our study suggests that intervention programs that are based on second language teaching are a fruitful avenue for future research," says Engel de Abreu. "Teaching a foreign language does not involve costly equipment, it widens children's linguistic and cultural horizons, and it fosters the healthy development of executive control."

http://www.sciencedaily.com/releases/2012/08/120827205738.htm

Reducing the Side Effects of Treatment for Prostate Cancer

Tamoxifen, used to treat breast cancer, is also able to suppress gynecomastia and breast pain in men.

ScienceDaily - New research published in BioMed Central's open access journal BMC Medicine reassessing clinical data from trials, which investigate ways of treating side effects of therapy for prostate cancer, finds that tamoxifen, an anti-estrogen used to treat breast cancer, is also able to suppress gynecomastia and breast pain in men.

Prostate cancer is one of the most common cancers in men and early treatment is usually very successful. Androgen-suppression therapy is often used to slow down progression of advanced disease. However, unwanted side effects of anti-androgen treatment, such as breast enlargement, can stop men from seeking treatment for their cancer.

Testosterone can drive the growth of prostate cancer and anti-androgens are used to inhibit prostate cancer growth by preventing testosterone from binding to androgen receptors. But receptors in cells within the testes are also blocked and start to make more testosterone to compensate. Some of this extra testosterone is converted into estrogen which is responsible for development of breast tissue and other breast events. Anti-estrogens work by jamming the estrogen receptor, while aromatase inhibitors prevent the conversion of testosterone into estrogen.

A collaboration between the German Cochrane Center and University Clinic Erlangen combined data from four independent clinical trials each looking at the management of breast events (during treatment for prostate cancer) with tamoxifen.

A meta-analysis of all four trials showed that tamoxifen reduced the risk of both gynecomastia and breast pain at 3, 6, 9, and 12 months of treatment compared to men who received no treatment. Overall, treatment with tamoxifen was more successful in reducing breast symptoms than treatment with an aromatase inhibitor (anastrazole) or radiotherapy.

Although there is no long term data available, few of the men treated with tamoxifen, either as preventative or therapeutic treatment, stopped taking their medication during their year of treatment. There were also no significant adverse effects.

Dr Frank Kunath, who led this study explained, "Not all men will suffer gynecomastia during anti-androgen therapy. However, if men know that there is a successful option for reducing the breast symptoms associated with treatment for prostate cancer they may be more likely to see their doctor when symptoms of cancer first appear, and consequently reduce the number of unnecessary deaths."

Frank Kunath, Bastian Keck, Gerd Antes, Bernd Wullich and Joerg J Meerpohl. Tamoxifen for the management of breast events induced by non-steroidal antiandrogens in patients with prostate cancer: A systematic review.. BMC Medicine, (in press) August 2012 [link]

http://www.eurekalert.org/pub_releases/2012-08/lsoh-sfs082412.php

Small family size increases the wealth of descendants but reduces evolutionary success

Scientists have taken a step closer to solving one of life's mysteries – why family size generally falls as societies become richer.

Evolutionary biologists have long puzzled over this because natural selection is expected to have selected for organisms that try to maximise their reproduction. But in industrialised societies around the world, increasing wealth coincides with people deliberately limiting their family size – the so-called 'demographic transition'.

In a study published in Proceedings of the Royal Society B: Biological Sciences, researchers from the London School of Hygiene & Tropical Medicine, the Centre for Health Equity Studies (Stockholm University/Karolinska Institutet) and UCL (University College London) reject a popular theory put forward to explain the phenomenon. This 'adaptive' hypothesis proposes that low fertility may boost evolutionary success in the long term by increasing offspring wealth, which in turn eventually increases the number of long-term descendants because richer offspring end up having more children.

The researchers found that having a small number of children increased the economic success and social position of descendants across up to four generations, but reduced the total number of long-term descendants. They conclude that the decision to limit family size can be understood as a strategic choice to improve the socioeconomic success of children and grandchildren in modern societies, but this socioeconomic benefit does not necessarily translate into an evolutionary benefit.

The study indicates a conflict in modern societies between behaviours promoting social and economic benefits versus biological success. This contrasts with traditional populations in the developing world, where behaviours that promote wealth and social status usually lead individuals to leave behind more genetic descendants.

The researchers tested these hypotheses using data from the Uppsala Multigenerational Birth Cohort Study, which tracks 14,000 people born in Sweden in the early 1900s and all their descendants to the present day. They measured the socioeconomic success of each generation by looking at their school marks, at whether they went to university and at their household income across adulthood. Reproductive success was assessed by survival to adulthood, marriage before age 40 (a proxy for 'mating success') and fertility (number of offspring up to 2009).

Among both male and female children in the original cohort, smaller family size and higher parental socioeconomic position were both associated with substantially higher school marks, university entrance and income. These effects were particularly large when low fertility and high socioeconomic status coincided, with the benefits of small family size being particularly marked in wealthier groups. Moreover, these advantages were in turn passed on to the grandchild and great-grandchild generations.

But contrary to the adaptive hypothesis, small family size and high parental wealth either did not affect reproductive success beyond the first generation of offspring or if anything showed a negative effect in subsequent generations.
Lead author Dr Anna Goodman, Research Fellow at the London School of Hygiene & Tropical Medicine, said: "Under natural selection, you would expect organisms to use their resources to produce more genetic descendants, and so increase their Darwinian fitness. The demographic transition is a puzzle because at first sight it doesn't look like people are doing this. One adaptive explanation for the puzzle is that there exists a quantity-quality trade-off, such that having more children leads to those children being less able to reproduce in turn – i.e. higher 'quantity' leads to lower biological 'quality'. However our study found this quantity-quality trade off only applied to descendants' socioeconomic success, not their reproductive success."
Co-author Dr David Lawson, from the Department of Anthropology at UCL, said: "One of our most interesting findings is that being from an initially wealthy household makes the benefits of small family size even bigger. Poorer households in contrast have relatively little to gain by limiting fertility, perhaps because the success of their children is more determined by broader societal factors, rather than investment and inheritance from parents, which is in short supply. This observation suggests a certain economic rationality to fertility patterns in the modern world, since fertility rates often drop first and most substantially in the wealthier sections of society when populations undergo demographic transition."
Professor Ilona Koupil, from the Centre for Health Equity Studies (Stockholm University/Karolinska Institutet) said: "It is important to note the equity implications of these findings. First, this research indicates that differences in family size may have lasting consequences on social inequalities. Second, this research provides evidence for the fact that people's educational levels and wealth not only affect schoolmarks and income in their children but also in their grandchildren and great-grandchildren. From a broader social policy perspective, our findings show that even in a country like Sweden with relatively low levels of inequality, we need policies that seek to equalise children's opportunities across families."
Low fertility increases descendant socioeconomic position but reduces long-term fitness in a modern post-industrial society. A Goodman, I Koupil, D Lawson. Proceedings B. doi: 10.1098/rspb.2012.1415

http://www.eurekalert.org/pub_releases/2012-08/mfmv-ari082812.php

African research identifies strong candidate for possible single-dose malaria cure

Compound discovered by UCT drug discovery programme selected by MMV for its potent activity against multiple points in parasite's lifecycle

A recently discovered compound from the aminopyridine class not only has the potential to become part of a single-dose cure for all strains of malaria, but might also be able to block transmission of the parasite from person to person, according to a research collaboration involving the Medicines for Malaria Venture (MMV), based in Switzerland, and the Drug Discovery and Development Centre (H3-D) at the University of Cape Town, South Africa. On the basis of initial results it was selected by MMV for further development – making it the first compound researched on African soil to enter preclinical development in partnership with MMV.

An African solution to save lives

Mrs Naledi Pandor, the Minister of Science & Technology, said: "This is a significant victory in the battle to alleviate the burden of disease in the subcontinent. Clearly the war on this disease is not yet won, but I am excited by the role that our excellent scientists have played in this milestone in finding a potential cure for malaria and possibly preventing its transmission. Congratulations to Professor Kelly Chibale and all involved. This is evidence of the world-class science being done in South Africa and the continent, and of the power of continental and international scientific collaboration in the multidisciplinary approaches that are essential in addressing the societal challenges of our time."
Dr Max Price, the Vice-Chancellor of UCT, said: "H3-D was founded at UCT in 2010 for this very purpose: to develop African expertise towards solving the health problems that beset the developing world. We trust this clinical candidate is the first of many contributions Professor Chibale and his team will be making to the advancement of international medicine."
H3-D identified a molecule, code named MMV390048, which was selected in July 2012 by MMV's Expert Scientific Advisory Committee for further development. The promising new compound shows potent activity against multiple points in the malaria parasite's lifecycle. This means it not only has the potential to become part of a single-dose cure for malaria but might also be able to block transmission of the parasite from person to person.
The aminopyridine series was initially identified by Griffith University scientists in Australia as part of MMV's extensive malaria screening campaign of around 6 million compounds. A team of scientists from H3-D, led by

UCT Professor Kelly Chibale, further scrutinised and explored the antimalarial potential of the series. With parasitological, pharmacological and contract chemistry support from the Swiss Tropical and Public Health Institute (Switzerland), the Centre for Drug Candidate Optimization at Monash University (Australia) and Syngene (India) respectively, the H3-D team selected the most promising compounds from the series to be optimised and retested. In just 18 months the team had identified and developed a candidate suitable for preclinical development.

Equipping the next generation of African scientists

"We are very excited that this promising compound, researched by African scientists, has been selected by MMV for further development," said Professor Chibale, the Founder and Director of H3-D. "This is truly a proud day for African science and African scientists. Our team is hopeful that the compound will emerge from rigorous testing as an extremely effective medicine for malaria – a disease that accounts for 24% of total child deaths in sub-Saharan Africa. What is more, H3-D and MMV achieved MMV390048 as a clinical candidate in record time. In the process we have developed a unique model for successful technology platforms, and generic modern pharmaceutical industry expertise and skills, to discover drugs in potentially any disease area in Africa."

Dr Tim Wells, MMV's Chief Scientific Officer, said: "This is a great achievement and an excellent example of the quality of research that can be fostered in Africa. We look forward to seeing more exciting compounds emerge from Kelly's team and are proud to be collaborating with H3-D; not only is it conducting excellent science today, but it is also providing world-class training for the next generation of African scientists."

What is so unique and exciting about MMV390048

It is very potent: it displayed a complete cure of animals infected with malaria parasites in a single dose given orally, and thus has the potential to cure millions of people.

It is active against a wide panel of resistant strains of the malaria parasite.

Developing the drug has made possible the training of more than 10 local scientists and cemented a strong relationship with an international partner. The clinical candidate is in line to enter clinical trials in late 2013.

http://www.eurekalert.org/pub_releases/2012-08/afps-htm082812.php

Having to make quick decisions helps witnesses identify the bad guy in a lineup

Eyewitness identification evidence is often persuasive in the courtroom and yet current eyewitness identification tests often fail to pick the culprit.

Even worse, these tests sometimes result in wrongfully accusing innocent suspects. Now psychological scientists are proposing a radical alternative to the traditional police lineup that focuses on eyewitnesses' confidence judgments.

In a new article forthcoming in Psychological Science, a journal of the Association for Psychological Science, Neil Brewer of Flinders University and colleagues report a new type of lineup in which witnesses are presented with lineup photos one at a time and are simply asked to rate how confident they are that the person in each photo is the culprit. Importantly, witnesses are not given time to mull over their assessments; they must respond within a few seconds.

Brewer and his colleagues have tested this technique, called "deadline confidence judgments," with more than 900 participants across several experiments conducted over the past three years. In each experiment, volunteers watched short films depicting crimes or a mundane event in which one person was prominent.

Either five minutes later or a full week later, half of the participants were shown a series of individual pictures from a lineup of 12 people and asked to make a confidence decision about each face within three seconds of it appearing on the computer screen. They were asked to choose one of 11 options, ranging from "absolutely confident that this is the culprit" to "absolutely certain this is not the culprit." The other half of the participants were shown the same faces but given as long as they liked to answer whether each face was or was not the culprit (yes or no). Sometimes the photos included the culprit and sometimes they did not.

Using an algorithm to infer a decision from participants' confidence ratings, the researchers found that overall classification accuracy was 20 to 30 percent higher for the new lineup than the conventional one.

Moreover, the researchers were able to identify particular patterns of confidence judgments that showed either a very high or very low likelihood that an individual witness's judgments were accurate.

The finding that eyewitnesses' judgments were more accurate under a deadline fits with previous research, which has shown that accurate eyewitness identifications are made significantly faster than inaccurate ones, and that a number of outside factors are removed with a short deadline.

"A weakness of the traditional test lies in the fact that it requires a witness to make a single 'yes' or 'no' decision about a lineup, with plenty of time to reflect on their decision," says Brewer. "But the time lapse from the initial

viewing to the response often mitigates against witnesses making accurate decisions, as does an array of external factors." These external factors include the conditions under which people view lineup photos, constraints on attention, and social cues that bias the witness towards a positive identification. For example, a witness might think that she should know they answer just because she viewed a photo for a long time. According to Brewer, traditional identification tests often fail because the witness feels pressure to identify a guilty party. This new study suggests that witnesses are more likely to make accurate identifications when they do not have to be so precise.

With plenty of time to reflect on the decision, a witness is more likely to feel pressure related to the potential consequences, thinking 'If I don't pick this person, a dangerous man may go free' or 'If I do pick the suspect, I'd better be right.' With a deadline confidence judgment the pressure is off because the witness doesn't have to provide a 'yes' or 'no' answer. With the rising number of DNA exonerations and the frequent failure of witnesses to identify the true culprit, Brewer believes that there is a compelling case for a new system of lineups.

http://blogs.scientificamerican.com/observations/2012/08/28/why-humans-give-birth-to-helpless-babies/

Why Humans Give Birth to Helpless Babies

Anthropologists have long thought that the size of the pelvis has limited human gestation length. New research may challenge that view.

By Kate Wong | August 28, 2012

Human babies enter the world utterly dependent on caregivers to tend to their every need. Although newborns of other primate species rely on caregivers, too, human infants are especially helpless because their brains are comparatively underdeveloped. Indeed, by one estimation a human fetus would have to undergo a gestation period of 18 to 21 months instead of the usual nine to be born at a neurological and cognitive development stage comparable to that of a chimpanzee newborn. Anthropologists have long thought that the size of the pelvis has limited human gestation length. New research may challenge that view.

The traditional explanation for our nine-month gestation period and helpless newborns is that natural selection favored childbirth at an earlier stage of fetal development to accommodate selection for both large brain size and upright locomotion—defining characteristics of the human lineage. In this view, adaptations to bipedalism restricted the width of the birth canal and, hence, the size of the baby that can pass through it. Human babies are thus born when their brains are less than 30 percent of adult brain size so that they can fit through the narrow passageway. They then continue development outside of the womb, with brain size nearly doubling in the first year.

But when Holly M. Dunsworth of the University of Rhode Island and her colleagues tested this so-called obstetrical dilemma hypothesis, their findings did not match its predictions. For example, the hypothesis predicts that because the female pelvis is broader than the male pelvis, walking and running should be more energetically demanding for women than for men. Yet most studies of the energetics and mechanics of locomotion in women and men found no such penalties for having a wider pelvis, the researchers report. Furthermore, the team asserts, to accommodate an infant at a chimplike stage of brain development—that is, a brain that is 40 percent of adult brain size, or 640 cubic centimeters—the pelvic inlet (the top of the birth canal, which is the narrowest part) would only have to expand by three centimeters on average. Some women today have pelvic inlets that wide, and those larger dimensions have no measurable effect on locomotor cost. The researchers argue that instead of fetal brain expansion being constrained by the dimensions of the pelvis, the dimensions of the human pelvis have evolved to accommodate babies, and some other factor has kept newborn size in check.

That other factor, they contend, is mom's metabolic rate. "Gestation places a heavy metabolic burden (measured in calories consumed) on the mother," Dunsworth and her co-authors explain. Data from a wide range of mammals suggest that there is a limit to how large and energetically expensive a fetus can grow before it has to check out of the womb. Once outside of the womb, the baby's growth slows down to a more sustainable rate for the mother. Building on an idea previously put forth by study co-author Peter T. Ellison of Harvard University known as the metabolic crossover hypothesis, the team proposes that "energetic constraints of both mother and fetus are the primary determinants of gestation length and fetal growth in humans and across mammals." By nine months or so, the metabolic demands of a human fetus threaten to exceed the mother's ability to meet both the baby's energy requirements and her own, so she delivers the baby.

In their report, to be published online this week in the Proceedings of the National Academy of Sciences USA, Dunsworth and her collaborators conclude that "if the human reproductive system poses a dilemma between

competing needs, then fetal energy needs and maternal energy supply are the competitors, rather than [brain expansion] and bipedalism."
When I asked paleoanthropologist Karen Rosenberg of the University of Delaware, an expert on the evolution of human birth, what she thought about the new work, she called it "important and interesting." But "just because there's a metabolic moment when it becomes reasonable to have a baby doesn't mean it isn't also true that the pelvis is a tradeoff between giving birth and walking on two legs," she contends.
Given how difficult human birth is, one would think that if the pelvis could get bigger without compromising locomotion then it would–but it doesn't, Rosenberg observes. "I think it's still the case that the pelvis is adapted to functions that select in opposite directions," she says.
Rosenberg additionally noted—and I found this especially fascinating—that the authors mention the possibility that the timing of birth actually optimizes cognitive and motor neuronal development. That idea, first proposed by Swiss zoologist Adolf Portman in the 1960s, is worth pursuing, she says. "Maybe human newborns are adapted to soaking up all this cultural stuff and maybe being born earlier lets you do this," she muses. "Maybe being born earlier is better if you're a cultural animal." Food for thought.

http://www.sciencedaily.com/releases/2012/08/120828135107.htm

Gene That Predicts Happiness in Women Discovered

A new study has found a gene that appears to make women happy, but it doesn't work for men. The finding may help explain why women are often happier than men.

ScienceDaily - A new study has found a gene that appears to make women happy, but it doesn't work for men. The finding may help explain why women are often happier than men, the research team said.
Scientists at the University of South Florida (USF), the National Institutes of Health (NIH), Columbia University and the New York State Psychiatric Institute reported that the low-expression form of the gene monoamine oxidase A (MAOA) is associated with higher self-reported happiness in women. No such association was found in men.
The findings appear online in the journal Progress in Neuro-Psychopharmacology & Biological Psychiatry.
"This is the first happiness gene for women," said lead author Henian Chen, MD, PhD, associate professor in the Department of Epidemiology and Biostatistics, USF College of Public Health.
"I was surprised by the result, because low expression of MAOA has been related to some negative outcomes like alcoholism, aggressiveness and antisocial behavior," said Chen, who directs the Biostatistics Core at the USF Health Morsani College of Medicine's Clinical and Translational Sciences Institute. "It's even called the warrior gene by some scientists, but, at least for women, our study points to a brighter side of this gene."
While they experience higher rates of mood and anxiety disorders, women tend to report greater overall life happiness than do men. The reason for this remains unclear, Chen said. "This new finding may help us to explain the gender difference and provide more insight into the link between specific genes and human happiness."
The MAOA gene regulates the activity of an enzyme that breaks down serontin, dopamine and other neurotransmitters in the brain -- the same "feel-good" chemicals targeted by many antidepressants. The low-expression version of the MAOA gene promotes higher levels of monoamine, which allows larger amounts of these neurotransmitters to stay in the brain and boost mood.
The researchers analyzed data from a population-based sample of 345 individuals -- 193 women and 152 men -- participating in Children in the Community, a longitudinal mental health study. The DNA of study subjects had been analyzed for MAOA gene variation and their self-reported happiness was scored by a widely used and validated scale.
After controlling for various factors, ranging from age and education to income, the researchers found that women with the low-expression type of MAOA were significantly happier than others. Compared to women with no copies of the low-expression version of the MAOA gene, women with one copy scored higher on the happiness scale and those with two copies increased their score even more.
While a substantial number of men carried a copy of the "happy" version of the MAOA gene, they reported no more happiness than those without it.

So, why the genetic gender gap in feeling good?

The researchers suspect the difference may be explained in part by the hormone testosterone, found in much smaller amounts in women than in men. Chen and his co-authors suggest that testosterone may cancel out the positive effect of MAOA on happiness in men.
The potential benefit of MAOA in boys could wane as testosterone levels rise with puberty, Chen said. "Maybe men are happier before adolescence because their testosterone levels are lower."

Chen emphasizes that more research is needed to identify which specific genes influence resilience and subjective well-being, especially since studies of twins estimate genetic factors account for 35 to 50 percent of the variance in human happiness.

While happiness is not determined by a single gene, there is likely a set of genes that, along with life experiences, shape our individual happiness levels, Chen said. "I think the time is right for more genetic studies that focus on well-being and happiness."

"Certainly it could be argued that how well-being is enhanced deserves at least as much attention as how (mental) disorders arise; however, such knowledge remains limited."

The study by Chen and colleagues was supported by the National Institutes of Health and a USF proposal enhancement grant. Henian Chen, Daniel S. Pine, Monique Ernst, Elena Gorodetsky, Stephanie Kasen, Kathy Gordon, David Goldman, Patricia Cohen. The MAOA gene predicts happiness in women. Progress in Neuro-Psychopharmacology and Biological Psychiatry, 2012; DOI: 10.1016/j.pnpbp.2012.07.018

http://www.sciencedaily.com/releases/2012/08/120828170725.htm

Aspirin May Help Men With Prostate Cancer Live Longer, Study Suggests

Men who have been treated for prostate cancer, either with surgery or radiation, could benefit from taking aspirin regularly, says a new study that includes a researcher at UT Southwestern Medical Center.

ScienceDaily - Taking aspirin is associated with a lower risk of death from prostate cancer, especially in men with high risk disease, according to a multicenter study published in the August 28 issue of the Journal of Clinical Oncology. Dr. Kevin Choe, assistant professor of radiation oncology at UT Southwestern, is first author of the paper.

Preclinical studies have shown that aspirin and other anticoagulation medications may inhibit cancer growth and metastasis, but clinical data have been limited previously. The study looked at almost 6,000 men in the Cancer of the Prostate Strategic Urologic Research Endeavor (CaPSURE) database who had prostate cancer treated with surgery or radiotherapy. About 2,200 of the men involved -- 37 percent -- were receiving anticoagulants (warfarin, clopidogrel, enoxaparin, and/or aspirin). The risk of death from prostate cancer was compared between those taking anticoagulants and those who were not.

The findings demonstrated that 10-year mortality from prostate cancer was significantly lower in the group taking anticoagulants, compared to the non-anticoagulant group -- 3 percent versus 8 percent, respectively. The risks of cancer recurrence and bone metastasis also were significantly lower. Further analysis suggested that this benefit was primarily derived from taking aspirin, as opposed to other types of anticoagulants.

The suggestion that aspirin, a frequently prescribed and relatively well-tolerated medication, may improve outcomes in prostate cancer is of particular interest, Dr. Choe said, since prostate cancer is the most common non-skin cancer among men and the second-leading cancer killer in the U.S.

"The results from this study suggest that aspirin prevents the growth of tumor cells in prostate cancer, especially in high-risk prostate cancer, for which we do not have a very good treatment currently," Dr. Choe said. "But we need to better understand the optimal use of aspirin before routinely recommending it to all prostate cancer patients."

Other scientists involved with the study include Janet Cowan, Drs. June Chan, and Peter Carroll of the University of California, San Francisco; Dr. Anthony D'Amico of Harvard University; and senior author Dr. Stanley Liauw of the University of Chicago. K. S. Choe, J. E. Cowan, J. M. Chan, P. R. Carroll, A. V. D'Amico, S. L. Liauw. Aspirin Use and the Risk of Prostate Cancer Mortality in Men Treated With Prostatectomy or Radiotherapy. Journal of Clinical Oncology, 2012; DOI: 10.1200/JCO.2011.41.0308

http://boingboing.net/2012/08/28/thief-infected-with-ebola-from.html

Man steals phone from Ebola patient, gets infected

Security and medical officials in Kibaale District have registered a case in which a man allegedly went in an isolation ward at Kagadi Hospital and stole a cellular phone from one of the Ebola patients.

By Francis Mugerwa

The 40-year-old resident of Kyakabugahya LCI in Kagadi Town Council travelled about three kilometers to the hospital to apparently obtain a phone estimated to be valued at Shs60,000 more than two weeks ago.

The suspect allegedly broke into the isolation ward on the night of Tuesday August 14, undetected by hospital guards. The patient, who has since succumbed to the deadly hemorrhagic fever, then reported the theft to the hospital security that then embarked on tracing the alleged thief. Police detectives began tracking him after he apparently began communicating to his friends using the phone. But as police zeroed in on him, he developed symptoms similar to those of Ebola and sought medication at the hospital.

While at hospital he reportedly confessed stealing the phone and has handed it to Kagadi police. “Kagadi Police Station received that complaint and investigations are underway,” Mr John Ojokuna Elatu, the district police commander confirmed to Sunday Monitor. He, however, declined to reveal the identities of the suspect.

Confession

In his confession made to the police, the suspect, now patient, claimed he had visited the isolation ward to give them comfort although he confessed to knowing none in person.

The Kibaale District Health Officer, Dr Dan Kyamanywa, said: “The suspect is admitted at Kagadi Hospital with clinical signs of Ebola. He is receiving medication. We have obtained samples from him,” Mr Kyamanywa added. The Uganda Virus Research Institute had by press time not returned results of his tests.

The district Ebola taskforce on Wednesday registered four members of one family with symptoms similar to those of Ebola. The residents of Ngara LCI in Kyanaisoke Sub-county are in an isolation ward at Kagadi Hospital.

The number of patients discharged from hospital stands at 53 and 40 are being followed up. The taskforce vice chairman, Mr Stephen Mfashigabo, said over 380 contacts on Wednesday completed 21 days of follow up and have been declared Ebola negative.

http://www.eurekalert.org/pub_releases/2012-08/osu-nlr082912.php

Nurse leader resistance perceived as a barrier to high-quality, evidence-based patient care

A national survey of over 1,000 nurses suggests that serious barriers prevent nurses from implementing practices that improve patient outcomes.

COLUMBUS, Ohio - A new national survey of more than 1,000 registered nurses suggests that serious barriers - including resistance from nursing leaders - prevent nurses from implementing evidence-based practices that improve patient outcomes.

When survey respondents ranked these barriers, the top five included resistance from nursing leaders and nurse managers - a finding that hasn't been reported in previous similar studies - as well as politics and organizational cultures that avoid change. When asked what would help them implement evidence-based practice, respondents reported education, access to information and organizational support among their top five needs.

Evidence-based practice refers to making decisions about patient care that are based on the best evidence produced by well-designed clinical research. Numerous studies have suggested that evidence-based care of patients can reduce patient complications and decrease health-care costs by as much as 30 percent.

Overall, a little more than half of respondents reported that evidence-based practice was consistently used in their organization, but only about one-third said their colleagues consistently used these practices.

The respondents with more education tended to have more confidence in implementing evidence-based practice. However, the longer nurses had been working in health care, the less interested they were in learning more about evidence-based practice.

"This was a distressing finding," said Bernadette Melnyk, the dean of the College of Nursing and chief wellness officer at Ohio State University as well as lead author of the study. "And it's a huge problem. The average age of nurses is 47, and they were educated at a time when evidence-based practice was not well integrated into educational programs. As a result, many nurses are practicing the way they were taught or steeped in tradition of the health-care system in which they work. When new graduates who have learned to take an evidence-based approach to care are meeting these nurses in real-world settings, they encounter this prevalence of a 'this is the way we do it here' culture."

Melnyk said the findings indicate the need for widespread cultural change in health-care settings and a new direction in nursing education, where many current faculty tend to emphasize teaching rigorous research methods and critique of existing research rather than how to put research findings to use in clinical practice settings. She also said consumers should feel empowered to ask whether they are receiving evidence-based care.

The study is published in the September issue of the Journal of Nursing Administration.

Examples of care that is not based on evidence are not that hard to find, noted Melnyk, a longtime consultant with health systems on implementation of evidence-based practice and a former member of the U.S. Preventive Services Task Force. It's not uncommon for children suffering asthma attacks to receive a drug to open their airways with a nebulizer in an emergency room, when research has shown that using a metered-dose inhaler with a spacer instead leads to fewer side effects, less time in the emergency room and lower likelihood for hospitalization. And patients with depression typically receive an antidepressant prescription and nothing else despite research-based evidence that cognitive behavior therapy is more effective than medicine for mild to moderate depression.

The Institute of Medicine (IOM) issued a report in 2003 calling for health professional education programs to include evidence-based care among five core competencies. The IOM has set a goal that 90 percent of all patient-care decisions be based on evidence by 2020. A survey of nurses in 2005 conducted by a different research group suggested that the profession wasn't ready then to adopt evidence-based care.

"Now, in 2012, they believe in it and they're ready for it," said Melnyk, also associate vice president for health promotion at Ohio State. "But there are so many barriers that continue to exist in our health-care system and our educational system.

"Another disconcerting finding in our survey was that a substantive number of nurses said their leader or manager is resistant to evidence-based practice. What I've seen as a consultant is a lot of leaders and managers will say they want their clinicians to deliver evidence-based care, but they don't walk the talk. If leaders do not role model evidence-based decision-making and they are not providing tools, education and resources for their clinicians to get the knowledge and skills they need to consistently implement this, it's probably not going to happen nor will it be sustained."

Melnyk and colleagues solicited potential participants via emails sent to 20,000 randomly selected members of the American Nurses Association. Of those, 1,015 members completed the survey.

The survey contained questions about the state of evidence-based practice from each respondent's perspective as well as two open-ended questions: what one thing prevents respondents from implementing evidence-based practice in daily clinical care, and what one thing would help them the most to implement this care.

Respondent ages ranged from 21 to 79 years, and 93 percent were female. Nearly 56 percent held master's degrees or higher, and 44 percent had earned a bachelor's, associate degree or diploma. The average number of years in nursing practice was 24, representing a range of zero to 52 years. Almost 47 percent worked in community hospitals and 23 percent practiced in academic medical centers. A quarter of respondents described themselves as nurse educators.

While 46.4 percent of respondents agreed that findings from research studies are routinely implemented to improve patient outcomes at their institution, more than three-quarters, 76.2 percent, indicated that it was important for them to receive more education and skills building in evidence-based practice. Fewer than a third of respondents reported that mentors were available in their health-care settings to help them learn more about how to adopt these practices.

Nurses working in hospitals with Magnet designation, awarded by the American Nurses Credentialing Center for excellence in nursing, were more likely to report the adoption of evidence-based care at their institutions, plenty of educational opportunities to gain skills in this care, and organizational cultures that supported the use of evidence in delivering care.

As for her own educational institution, Melnyk said that when she arrived at Ohio State one year ago, she held workshops on evidence-based practice with faculty "so we made sure we were talking the same language and were committed to integrating this even further throughout our curriculum. It is being strengthened all the time." The college has also launched a Center for Transdisciplinary Evidence-based Practice to facilitate the implementation and sustainability of evidence-based practice throughout Ohio State's health-care system as well as at others across the country.

"Educational programs are behind on this. Many tend to still teach students at the bachelor's and master's levels the rigorous process of how to do research versus how to use the research that's being produced and get it into the real-world setting at a much faster pace," she said. "Unless we have some drastic changes in both our clinical practice environment as well as our education systems, it's going to be a long haul until every clinician in this country consistently delivers evidence-based care."

Co-authors of the study include Ellen Fineout-Overholt of East Texas Baptist University, Lynn Gallagher-Ford of Ohio State's College of Nursing and Louise Kaplan of the American Nurses Association.

http://www.eurekalert.org/pub_releases/2012-08/uom-scn082912.php

Scientist creates new cancer drug that is 10 times more potent

Drug efficiently targets breast, lung and colon cancer; Clinical trials could start within 2 years

COLUMBIA, Mo. - Legend has it that Ralph Waldo Emerson once said, "Build a better mousetrap, and the world will beat a path to your door." University of Missouri researchers are doing just that, but instead of building mousetraps, the scientists are targeting cancer drugs. In a new study, MU medicinal chemists have taken an existing drug that is being developed for use in fighting certain types of cancer, added a special structure to it, and created a more potent, efficient weapon against cancer.

"Over the past decade, we have seen an increasing interest in using carboranes in drug design," said Mark W. Lee Jr., assistant professor of chemistry in College of Arts and Science. "Carboranes are clusters of three

elements — boron, carbon and hydrogen. Carboranes don't fight cancer directly, but they aid in the ability of a drug to bind more tightly to its target, creating a more potent mechanism for destroying the cancer cells."
In the study, Lee and his research team used carboranes to build new drugs designed to shut off a cancer cell's energy production, which is vital for the cell's survival. All cells produce energy through complex, multi-step processes. The key to an effective drug is targeting the process that cancer cells depend on more than healthy cells. By increasing the binding strength of a drug, a smaller dose is required, minimizing side effects and increasing the effectiveness of the therapy. With carboranes, Lee found that the drug is able to bind 10 times more powerfully.
"The reason why these drugs bind stronger to their target is because carboranes exploit a unique and very strong form of hydrogen bonding, the strongest form of interactions for drugs," Lee said.
Lee said that this discovery also will lead to further uses for the drug.
"Too often, after radiation or chemotherapy, cancer cells repair themselves and reinvade the body," Lee said. "This drug not only selectively shuts off the energy production for the cancer cells, but it also inhibits the processes that allow those cancer cells to repair themselves. When we tested our carborane-based drugs, we found that they were unimaginably potent. So far, we have tested this on breast, lung and colon cancer, all with exceptional results."
According to Lee, this is the first study to show systematically how carboranes can improve the activity of a drug. Lee believes this discovery will open additional possibilities of improving drugs that are used to treat other diseases, not just cancer. "The end result is that these new drugs could be many thousands of times more potent than the drugs that are used in the clinics today," Lee said.
While it will be several years before the new drug would be available on the market, Lee said that clinical trials could begin within the next two years. Additionally, further testing on other types of cancer is underway. The study was published in the Journal of Medicinal Chemistry, a publication of the American Chemical Society.

http://www.eurekalert.org/pub_releases/2012-08/aaon-cas082112.php

Chocolate: A sweet method for stroke prevention in men?

Eating a moderate amount of chocolate each week may be associated with a lower risk of stroke in men

MINNEAPOLIS – Eating a moderate amount of chocolate each week may be associated with a lower risk of stroke in men, according to a new study published in the August 29, 2012, online issue of Neurology®, the medical journal of the American Academy of Neurology.
"While other studies have looked at how chocolate may help cardiovascular health, this is the first of its kind study to find that chocolate, may be beneficial for reducing stroke in men," said study author Susanna C. Larsson, PhD, with the Karolinska Institute in Stockholm, Sweden.
For the study, 37,103 Swedish men ages 49 to 75 were given a food questionnaire that assessed how often they consumed various foods and drinks and were asked how often they had chocolate. Researchers then identified stroke cases through a hospital discharge registry. Over 10 years, there were 1,995 cases of first stroke.
Men in the study who ate the largest amount of chocolate, about one-third of a cup of chocolate chips (63 grams), had a lower risk of stroke compared to those who did not consume any chocolate. Those eating the highest amount of chocolate had a 17-percent lower risk of stroke, or 12 fewer strokes per 100,000 person-years compared to those who ate no chocolate. Person-years is the total number of years that each participant was under observation.
In a larger analysis of five studies that included 4,260 stroke cases, the risk of stroke for individuals in the highest category of chocolate consumption was 19 percent lower compared to non-chocolate consumers. For every increase in chocolate consumption of 50 grams per week, or about a quarter cup of chocolate chips, the risk of stroke decreased by about 14 percent.
"The beneficial effect of chocolate consumption on stroke may be related to the flavonoids in chocolate. Flavonoids appear to be protective against cardiovascular disease through antioxidant, anti-clotting and anti-inflammatory properties. It's also possible that flavonoids in chocolate may decrease blood concentrations of bad cholesterol and reduce blood pressure," said Larsson.
"Interestingly, dark chocolate has previously been associated with heart health benefits, but about 90 percent of the chocolate intake in Sweden, including what was consumed during our study, is milk chocolate," Larsson added.
The study was supported by the Swedish Council for Working Life and Social Research, the Swedish Research Council/Committee for Infrastructure and the Karolinska Institute.

http://bit.ly/Rx10Ec

Familiar music could help people with brain damage

Listening to a favourite song might boost the brain's ability to respond to other stimuli in people with disorders of consciousness.

Updated 15:24 29 August 2012 by Helen Thomson

Music has been shown to have a beneficial influence on cognitive process in healthy people and those who have brain damage. For example, daily music therapy can help to enhance cognitive recovery after a stroke.

Fabien Perrin at the University of Lyon, France, and colleagues recorded brain activity in four patients – two in a coma, one in a minimally conscious state, and one in a vegetative state – while they were read a list of people's names, including the subject's own name. The list was preceded either by the subject's favourite music – chosen by family and friends – or by "musical noise". One patient listened to The Eagles' Hotel California, another was played the Blues Brothers' Everybody Needs Somebody to Love. The team then repeated the experiment with ten healthy volunteers.

In all four patients, playing the music rather than musical noise enhanced the quality of the brain's subsequent response to their own name, bringing it closer to the brain response of the ten healthy volunteers to hearing their own name, whether or not it was preceded by music or musical noise. The work was presented at the Association for the Scientific Study of Consciousness meeting in Brighton, UK, last month.

Consciousness increase

Perrin has two theories about what's going on. "Listening to preferred music activates our autobiographical memory – so it could make it easier for the subsequent perception of another autobiographical stimulus such as your name," he says. "Another hypothesis is that music enhances arousal or awareness, so maybe it temporarily increases consciousness and the discrimination of your name becomes easier."

"The familiar music might be causing an emotional arousal effect, and once [the patient with brain damage is] aroused, there is a small window that opens for increased communication and the brain responds to the name," suggests Carsten Finke, a neurologist at Charité Medical School in Berlin, Germany, who was not involved in the study.

So is Perrin's music sparking some form of consciousness in the people with brain damage? "I've not come across any responses like this to music before and it's way too early to conclude that it has any therapeutic effects in these patients," says Adrian Owen at the University of Western Ontario in London, Canada.

Perrin agrees that it's very early days. "We're showing that we can boost cerebral activity to obtain responses that are very similar to those obtained from healthy participants. It's in favour of enhancement of self-consciousness but we can't be sure." But he says that confirming the results with more people could have direct implications on the sensory environment of patients in intensive care.

http://phys.org/news/2012-08-japan-monster-quake.html

Japan estimates monster quake could kill 320,000

Japan's government unveiled a worst case scenario warning an earthquake in the Pacific Ocean could kill over 320,000 people

A Japanese firefighter looks for bodies next to a grounded fishing boat in Kesennuma, Miyagi prefecture, on March 21, 2011 after the March 11 tsunami and earthquake devastated northeastern Japan. Japan's government on Wednesday unveiled a worst case disaster scenario that warned a monster earthquake in the Pacific Ocean could kill over 320,000 people, dwarfing last year's quake-tsunami disaster.

Japan's government on Wednesday unveiled a worst case disaster scenario that warned a monster earthquake in the Pacific Ocean could kill over 320,000 people, dwarfing last year's quake-tsunami disaster.

Tokyo's casualty toll estimate was based on a catastrophic scenario in which a powerful undersea quake of about 9.0 magnitude sparked a giant tsunami that swamps Japan's coastline south of Tokyo

The Cabinet Office's hypothetical disaster would see the quake strike at nighttime during the winter with strong winds helping unleash waves that reach 34-metre (110 feet), sweeping many victims away as they slept.

Many of the estimated 323,000 victims would be drowned by the tsunami, crushed under falling objects or in fires sparked by the disaster, it said.

On March 11 last year, a 9.0 magnitude quake struck seismically-active Japan in the early afternoon, triggering tsunami waves that reached 20 metres. About 19,000 were killed or remain missing while the tsunami slammed into the Fukushima Daiichi nuclear plant, sending reactors into meltdown and sparking the worst atomic crisis in a generation.

"As long as we live in Japan, we cannot deny the possibility of a huge earthquake and tsunami," Masaharu Nakagawa, state minister for disaster management, told reporters Wednesday.

The report was designed to paint a worst-case scenario and help officials boost their disaster preparedness. An estimate in 2003 assumed casualties of about 25,000 people, but that scenario envisioned a less powerful 8.4 magnitude quake striking a smaller area.
The deadliest quake in Japanese history struck the central Kanto region in 1923, killing at least 100,000 people.

http://www.scientificamerican.com/article.cfm?id=denisovan-genome

New DNA Analysis Shows Ancient Humans Interbred with Denisovans

A new high-coverage DNA sequencing method reconstructs the full genome of Denisovans--relatives to both Neandertals and humans--from genetic fragments in a single finger bone

By Katherine Harmon | Thursday, August 30, 2012 | 14

Tens of thousands of years ago modern humans crossed paths with the group of hominins known as the Neandertals. Researchers now think they also met another, less-known group called the Denisovans. The only trace that we have found, however, is a single finger bone and two teeth, but those fragments have been enough to cradle wisps of Denisovan DNA across thousands of years inside a Siberian cave. Now a team of scientists has been able to reconstruct their entire genome from these meager fragments. The analysis adds new twists to prevailing notions about archaic human history.
"Denisova is a big surprise," says John Hawks, a biological anthropologist at the University of Wisconsin–Madison who was not involved in the new research. On its own, a simple finger bone in a cave would have been assumed to belong to a human, Neandertal or other hominin. But when researchers first sequenced a small section of DNA in 2010—a section that covered about 1.9 percent of the genome—they were able to tell that the specimen was neither. "It was the first time a new group of distinct humans was discovered" via genetic analysis rather than by anatomical description, said Svante Pääbo, a researcher at the Max Planck Institute (M.P.I.) for Evolutionary Anthropology in Germany, in a conference call with reporters.
Now Pääbo and his colleagues have devised a new method of genetic analysis that allowed them to reconstruct the entire Denisovan genome with nearly all of the genome sequenced approximately 30 times over akin to what we can do for modern humans. Within this genome, researchers have found clues into not only this group of mysterious hominins, but also our own evolutionary past. Denisovans appear to have been more closely related to Neandertals than to humans, but the evidence also suggests that Denisovans and humans interbred. The new analysis also suggests new ways that early humans may have spread across the globe. The findings were published online August 30 in Science.

Who were the Denisovans?

Unfortunately, the Denisovan genome doesn't provide many more clues about what this hominin looked like than a pinky bone does. The researchers will only conclude that Denisovans likely had dark skin. They also note that there are alleles "consistent" with those known to call for brown hair and brown eyes. Other than that, they cannot say.
Yet the new genetic analysis does support the hypothesis that Neandertals and Denisovans were more closely related to one another than either was to modern humans. The analysis suggests that the modern human line diverged from what would become the Denisovan line as long as 700,000 years ago—but possibly as recently as 170,000 years ago.
Denisovans also interbred with ancient modern humans, according to Pääbo and his team. Even though the sole fossil specimen was found in the mountains of Siberia, contemporary humans from Melanesia (a region in the South Pacific) seem to be the most likely to harbor Denisovan DNA. The researchers estimate that some 6 percent of contemporary Papuans' genomes come from Denisovans. Australian aborigines and those from Southeast Asian islands also have traces of Denisovan DNA. This suggests that the two groups might have crossed paths in central Asia and then the modern humans continued on to colonize the islands of Oceania.
Yet contemporary residents of mainland Asia do not seem to posses Denisovian traces in their DNA, a "very curious" fact, Hawks says. "We're looking at a very interesting population scenario"—one that does not jibe entirely with what we thought we knew about how waves modern human populations migrated into and through Asia and out to Oceania's islands. This new genetic evidence might indicate that perhaps an early wave of humans moved through Asia, mixed with Denisovans and then relocated to the islands—to be replaced in Asia by later waves of human migrants from Africa. "It's not totally obvious that that works really well with what we know about the diversity of Asians and Australians," Hawks says. But further genetic analysis and study should help to clarify these early migrations.
Just as with modern Homo sapiens, the genome of a single individual cannot tell us exactly what genes and traits are specific to all Denisovans. Yet, just one genome can reveal the genetic diversity of an entire population. Each of our genomes contains information about generations far beyond those of our parents and

grandparents, said David Reich, a researcher at the Massachusetts Institute of Technology–Harvard University Broad Institute and a co-author on the paper. Scientists can compare and contrast the set of genes on each chromosome—passed down from each parent—and extrapolate this process back through the generations. "You contain a multitude of ancestors within you," Reich said, borrowing from Walt Whitman.

The new research reveals that the Denisovans had low genetic diversity—just 26 to 33 percent of the genetic diversity of contemporary European or Asian populations. And for the Denisovans, the population on the whole seems to have been very small for hundreds of thousands of years, with relatively little genetic diversity throughout their history.

Curiously, the researchers noted in their paper, the Denisovan population shows "a drastic decline in size at the time when the modern human population began to expand."

Why were modern humans so successful whereas Denisovans (and Neandertals) went extinct? Pääbo and his co-authors could not resist looking into the genetic factors that might be at work. Some of the key differences, they note, center around brain development and synaptic connectivity. "It makes sense that what pops up is connectivity in the brain," Pääbo noted. Neandertals had a similar brain size–to-body ratio as we do, so rather than cranial capacity, it might have been underlying neurological differences that could explain why we flourished while they died out, he said.

Hawks counters that it might be a little early to begin drawing conclusions about human brain evolution from genetic comparisons with archaic relatives. Decoding the genetic map of the brain and cognition from a genome is still a long way off, he notes—unraveling skin color is still difficult enough given our current technologies and knowledge.

New sequencing for old DNA

The Denisovan results rely on a new method of genetic analysis developed by paper co-author Matthias Meyer, also of M.P.I. The procedure allows the researchers to sequence the full genome by using single strands of genetic material rather than the typical double strands required. The technique, which they are calling a single-stranded library preparation, involves stripping the genetic material down to individual strands to copy and avoids a purification step, which can lose precious genetic material.

The finger bone—just one disklike phalanx—is so small that it does not contain enough usable carbon for dating, the researchers note. But by counting the number of genetic mutations in a genome and comparing them with other living relatives, such as modern humans and chimpanzees, given assumed rates of mutations since breaking with a last common ancestor, "for the first time you can try to estimate this number into a date and provide molecular dating of the fossil," Meyer said. With the new resolution, the researchers estimate the age of the bone to 74,000 to 82,000 years ago. But that is a wide window, and previous archaeological estimates for the bone are a bit younger, ranging from 30,000 to 50,000 years old. These genetic estimations are also still in limbo because of ongoing debate about the average rate of genetic mutations over time, which could skew the age. "Nevertheless," the researchers noted in their paper, "the results suggest that in the future it will be possible to determine dates of fossils based on genome sequences."

This new sequencing approach can be used for any DNA that is too fragmented to be read well through more traditional methods. Meyer noted that it could come in handy for analysis of both ancient DNA and contemporary forensic evidence, which also often contains only fragments of genetic material.

Hawks is excited about the new sequencing technology. It is also helpful to have a technology developed specifically for the evolutionary field, he notes. "We're always using the new techniques from other fields, and this is a case where the new technique is developed just for this."

Hawks himself has heard from the researchers that have worked with the Denisovan samples that "the Denisovan pinky is just extraordinary" in terms of the amount of DNA preserved in it. Most bone fragments would be expected to contain less than 5 percent of the individual's endogenous DNA, but this fortuitous finger had a surprising 70 percent, the researchers noted in the study. And many Neandertal fragments have been preserved in vastly different states—many are far worse off than this Denisovan finger bone.

The new sequencing approach could also improve our understanding of known specimens and the evolutionary landscape as a whole. "It's going to increase the yield from other fossils," Hawks notes. Many of the Neandertal specimens, for example, have only a small fraction of their genome sequenced. "If we can go from 2 percent to the whole genome, that opens up a lot more," Hawks says. "Going back further in time will be exciting," he notes, and this new technique should allow us to do that. "There's a huge race on—it's exciting."

The Denisovans might be the first non-Neandertal archaic human to be sequenced, but they are likely not going to be the last. The researchers behind this new study are already at work using the new single-strand sequencing technique to reexamine older specimens. (Meyer said they were working on reassessing old samples but would

not specify which specimens they were studying—the mysterious "hobbit" H. floresiensis would be a worthy candidate.) Pääbo suggests Asia as a particularly promising location to look for other Denisovan-like groups. "I would be surprised if there were not other groups to be found there in the future," he said.
Taking this technique to specimens from Africa is also likely to yield some exciting results, Hawks says. Africa, with its rich human evolutionary history, holds the greatest genetic diversity. The genomes of contemporary pygmy and hunter–gatherer tribes in Africa, for example, have roughly as many differences as do those of European modern humans and Neandertals. So "any ancient specimen that we find in Africa might be as different from us as Neandertals," Hawks says. "Anything we find from the right place might be another Denisovan."

http://www.sciencedaily.com/releases/2012/08/120830065821.htm

Mechanism Leading from Trichomoniasis to Prostate Cancer Identified

Researchers have identified a way in which men can develop prostate cancer after contracting trichomoniasis, a curable but often overlooked sexually transmitted disease.

ScienceDaily - Previous studies have teased out a casual, epidemiological correlation between the two diseases, but this latest study suggests a more tangible biological mechanism.
John Alderete, a professor at Washington State University's School of Molecular Biosciences, says the trichomoniasis parasite activates a suite of proteins, the last of which makes sure the proteins stay active.
"It's like switching a light switch on," he says. "Then, if you don't control the brightness of that light, you can go blind. That's the problem." Alderete and colleagues at WSU and Washington University in St. Louis report their findings in the recent PLoS Pathogens.
Caused by a protozoan parasite, trichomoniasis is often referred to as the most common curable sexually transmitted infection. However, most infected people have no symptoms, so it often goes untreated.
"Most women, it's the Number One sexually transmitted infection," says Alderete. "We're going to have at least 10 million women infected this year and an equal number of men because they all get infected if they come into contact with an infected partner."
Infected women have a greater risk of pregnancy complications and HIV. Infected men have a 40 percent greater chance of developing prostate cancer, according to a 2006 study led by Siobhan Sutcliffe, a Washington University epidemiologist and co-author of the recent PLoS Pathogens paper.
Sutcliffe cautions that the epidemiological link she found is not conclusive and compares the science to the early connections drawn between smoking and lung cancer. "It's still in a really exploratory phase," she says.
A study after her 2006 research found no connection between trichomoniasis and prostate cancer, while a third out of Harvard found an even greater likelihood of cancer in infected men.
This latest study, she says, "is providing a molecular mechanism that might explain that association."
Much of the study was done in a single building, WSU's Biotechnology and Life Sciences Building, and involved two of the more accomplished researchers on the Pullman campus.
"This is just coincidence. I've only been here five years," says Alderete. "And when I arrived here five years ago, I had no clue that we would be going in this kind of direction. But the more I read and the more we talked in the hallways, the more it became clear that, wait a minute, we may have something here between us."
WSU cancer researcher Nancy Magnuson is an expert on the protein PIM1, a promoter of cancer cell growth, and identified the protein in the cascade of proteins leading from trichomoniasis to prostate cancer. WSU molecular biologist Ray Reeves brought to bear his expertise in HMGA1. The protein turns genes on and off and ended up being the actor making sure other proteins in the trichomoniasis-to-cancer sequence stay on.
Alderete hopes knowledge of the mechanism will lead to better diagnosis and treatment.
"What this is also doing is telling the world, 'People, this is a latent infection,'" he says. "'You guys out there, if you've been exposed to it, you've got it in there, and we need now a diagnostic for you.'"
Siobhan Sutcliffe, Calvin Neace, Nancy S. Magnuson, Raymond Reeves, J. F. Alderete. Trichomonosis, a Common Curable STI, and Prostate Carcinogenesis—A Proposed Molecular Mechanism. PLoS Pathogens, 2012; 8 (8): e1002801 DOI: 10.1371/journal.ppat.1002801

http://news.discovery.com/human/heartland-virus-120830.html#mkcpgn=rssnws1

'Heartland' Virus Discovered in Sick Missouri Farmers

Two men in Missouri fall seriously ill to a disease wrought by a new species of virus.

Content provided by Rachael Rettner, MyHealthNewsDaily Staff Writer

Two men in Missouri who became severely ill after sustaining tick bites were found to be infected with a new type of virus, according to a study from the Centers of Disease Control and Prevention (CDC). Both men were admitted to hospitals after experiencing high fevers, fatigue, diarrhea and loss of appetite. They were originally

thought to be suffering from a bacterial infection, but doubts arose when they didn't improve after being treated with antibiotics. Further tests revealed their blood contained a new virus, which the researchers dubbed the Heartland virus. It belongs to a group called phleboviruses, which are carried by flies, mosquitoes or ticks, and can cause disease in humans.

While the genetic material of Heartland virus appears similar to that of other phleboviruses, the particular proteins it produces are different enough to call it a new species, said study researcher Laura McMullan, a senior scientist at the CDC. Because the Heartland virus causes such general symptoms, it could be "a more common cause of human illness than is currently recognized," the researchers wrote in the Aug. 30 issue of the New England Journal of Medicine. More studies are needed to identify the natural hosts of the virus, learn how many people are infected with it and find risk factors for infection, McMullan said.

A new virus, dubbed the Heartland virus, is transmitted by ticks, like this lonestar tick. Wikipedia

Because both men experienced tick bites shortly before they became ill -- one man, a farmer, reported receiving an average of 20 tick bites a day -- the researchers said it's likely that the Heartland virus is spread by ticks, although more research is needed to confirm this. The new virus's closest relative is another tick-borne phlebovirus, called SFTS virus, which was identified last year in China, and causes death in 12 percent of cases. The Missouri men, who were both infected in 2009, recovered after 10 to 12 days in the hospital, although one of the men has reported recurrent headaches and fatigue in the two years since his hospitalization.

The researchers suspect a species of tick commonly found in Missouri, called Amblyomma americanum, is one of the hosts of the Heartland virus.

For now, taking precautions to prevent tick bites is the best way to avoid the virus, McMullan said. To prevent tick bites, the CDC recommends using repellents that contain 20 percent or more DEET, as well as avoiding wooded areas or areas with high grass.

Pass it on: *The Heartland virus is a new species of virus that can cause severe illness in people, and appears to be carried by ticks.*

http://www.wired.com/wiredscience/2012/08/signature-honesty/

Signing Forms at the Top Makes People More Honest

Simply by signing documents at the start rather than end, people might be encouraged to behave more honestly.

By Brandon Keim

The effect was demonstrated in a series of staged and real-world experiments, which included moving signature lines from bottom to top on car insurance reports. On average, that small tweak resulted in a 2,400-mile difference in mileage claimed on new policy forms, hinting at what's possible with just a slight nudge to be ethical. "Many people want to be good. Most people care about being good. But they need a reminder to help them sometimes," said Lisa Shu, a Northwestern University psychologist and lead author of the new study, published August 27 in Proceedings of the National Academy of Sciences.

Other research suggests that signing one's name — not merely printing it, but inscribing your unique, personal autograph — acts, in the words of University of Alberta psychologists Keri Kettle and Gerald Haubl, as "a general self-identity prime." It reminds you of who you are and want to be. As a result, you live up to your ideals, at least for a little while.

To see whether this signature effect could be harnessed to reduce cheating, Shu's team enrolled 101 college students and employees in performing two self-reported tasks: solving math problems correctly in exchange for money, and claiming reimbursements for expenses on a library trip. For each task, test participants filled out a claims form. Some signed at the bottom, others at the top, and others didn't sign at all. Top-signers reported solving fewer problems, and claimed fewer expenses, than the other groups. "Signing before reporting promoted honesty, whereas signing afterward was the same as not signing at all," the researchers wrote.

The scientists then collaborated with an unnamed southeastern U.S. car insurance company, randomly allotting 13,488 new customers to receive policy forms that would be signed at either the top or bottom.

On the forms, customers were asked to report the number of miles on their cars' odometers. For those customers signing at the top, the average reported mileage was over 2,400 miles higher than for bottom-signers. While actual mileage couldn't be verified, variance of that magnitude in such a large, randomly divided group suggests a difference in reporting ethics, not driving habits, especially given the incentive — lower insurance premiums — of under-reporting mileage.

According to Shu, some people never cheat, and some will do so routinely, while others are tempted and need only a gentle reminder of their better selves to stay ethical.
Signing forms at the top could have great benefits in curbing cheating on tax forms and insurance claims, said Shu, but could also apply to institutional signers. “On the institutional side, this could be effective as well, reminding financial advisors of their fiduciary duty and doctors of their Hippocratic oaths,” she said.
Citation: “Signing at the beginning makes ethics salient and decreases dishonest self-reports in comparison to signing at the end.” By Lisa L. Shu, Nina Mazar, Francesca Gino, Dan Ariely, and Max H. Bazerman. Proceedings of the National Academy of Sciences, 27 August 2012.

http://www.sciencedaily.com/releases/2012/08/120830135314.htm

Lyme Retreatment Guidance May Be Flawed

Accepted medical practice discourages antibiotic retreatment in cases where Lyme disease symptoms persist. A review of studies behind current medical advice says those studies prove nothing.

ScienceDaily - A new statistical review calls into question studies that have been taken as proof that antibiotic retreatment for chronic Lyme disease is futile. That misunderstanding has led to medical guidance that discourages retreatment and insurance coverage for it. Instead, the authors of the review suggest, the proper reading of the studies and their data is that they prove nothing.
Most doctors treat Lyme disease with antibiotics for two to four weeks after diagnosis, but if symptoms persist after that, medical guidelines recommend against antibiotic retreatment. That recommendation may not be warranted. A newly published statistical review of the four studies upon which those guidelines are based reports flaws in design, analysis, and interpretation that call into question the strength of the evidence against retreatment.
Allison DeLong, a biostatistician at Brown University's Center for Statistical Sciences and lead author of the study published online Aug. 19, 2012, in Contemporary Clinical Trials, said the four studies do not prove that retreatment does not work. That questionable interpretation, however, has led doctors to forgo treatment and insurance companies to withhold reimbursement.
"The goal of the paper is to clarify what was actually found from these clinical trials and what could be said and what couldn't be said," DeLong said. "A lack of evidence should not be used to deny treatment when the studies have serious flaws." Evidence in the trials is most often inconclusive, she and three co-authors found. Two studies even found some statistically significant benefits from antibiotics.
DeLong has been curious about Lyme disease retreatment for more than a decade since a friend of hers seemed to benefit from therapy. Her friend paid for the treatment out-of-pocket. Statisticians would call that anecdote an "n of 1," but the example stuck with DeLong as more people, including journalists, began to question whether retreatment really was ineffective.
In 2009 and 2010, DeLong and her colleagues decided to look into the matter with full statistical rigor. Their analysis started by scanning the medical literature for any randomized clinical trials offering evidence of the efficacy of antibiotic retreatment for Lyme disease. Careful review of more than 100 studies ultimately whittled the field down to the four studies on which the Infectious Diseases Society of America and the American Academy of Neurology are based their guidelines.
The most influential studies were conducted by Klempner et al., and published together in the New England Journal of Medicine in 2001. The multicenter trials enrolled chronic Lyme sufferers with positive or negative blood serum results for Immunoglobulin G, an antibody that might indicate active infection. In each of the IgG positive and negative groups, patients either received IV antibiotics followed by oral antibiotics or IV placebo followed by oral placebo. Their symptoms were measured along the way using a subjective set of health quality-of-life measures called the SF-36.
Although Klempner et al. found no significant benefit to retreatment, findings from subsequent SF-36 studies in chronic illnesses provide evidence that the Klempner study was looking for unrealistically large differences.
"The trials, as designed, called for treatment effects considerably larger than the minimum clinically important differences (MCID) identified in other chronic illnesses, suggesting that the sample sizes were inadequate and the trials were very likely underpowered to detect the true underlying MCIDs," DeLong and her co-authors wrote in the journal. Klempner's statistics showed that treatment might or might not have been effective given the broad range of a statistical measure known as the confidence interval, DeLong said.
In another of the four trials conducted by Krupp et al., researchers found that retreatment produced a significant benefit for fatigue, but the authors of the study mistakenly discounted that result, DeLong said.

The authors became concerned that their results were tainted by too many subjects realizing that they were receiving real treatment instead of the placebo. The measure of fatigue is subjective and could be influenced by that realization. But DeLong found that the subjects weren't likely to have realized anything. Here's why: If the members of each group have a blindly optimistic seven in 10 chance of believing that they received real medicine, then the people who really were would be right seven out of 10 times and the people receiving the placebo would only be right 3 out of 10 times. The people receiving the medicine would seem like they had discovered their status, but in reality they were only making a lucky, optimistic guess.

While the Krupp study was adequately powered to measure a significant benefit from fatigue, it had less power to measure the two other treatment effects it considered: improvements in cognitive processing and clearance of a potential Lyme disease biomarker, DeLong said.

The last of the four studies, by Fallon et al., had a very small sample size. It found hints of some benefits from retreatment but nothing definitive either positively or negatively.

Ultimately, DeLong said, the best evidence to support or refute antibiotic retreatment will come when scientists develop a definitive test for active Lyme disease infection. In the interim, it is possible that chronic Lyme disease patients harbor an ongoing infection that antibiotics could treat.

"The interpretation of the trials goes too far," she said. "You can't say it's been shown that retreatment is not beneficial. You can't then jump to the conclusion that this shows there is no persistence of infection."

In addition to DeLong, the paper's other authors are statistics graduate student Barbara Blossom of Colorado State University, Dr. Elizabeth Maloney of Wyoming, Minn., and Dr. Steven Phillips of Greenwich Hospital in Connecticut.

Allison K. DeLong, Barbara Blossom, Elizabeth Maloney, Steven E. Phillips. Antibiotic retreatment of Lyme disease in patients with persistent symptoms: A biostatistical review of randomized, placebo-controlled, clinical trials. Contemporary Clinical Trials, 2012; DOI: 10.1016/j.cct.2012.08.009

http://www.bbc.co.uk/news/health-19421818

Active pensioners 'add six years'

Being active and living a healthy lifestyle into your seventies can make a huge difference to your life expectancy, a Swedish study suggests.

Academics at Sweden's Karolinska Institute analysed the lifestyles of 1,810 people over 75.

The findings, on the British Medical Journal website, said men with the healthiest lifestyles lived six years longer, women had five extra years.

Experts said it was never too late to start looking after your health.

Being sedentary, overweight, a smoker or heavy drinker is bad for health and shortens life expectancy.

The researchers said they did not know how big the effect would be after 75, so they followed a group of people for 18 years.

Extra years

They showed that smokers died a year earlier, but people who quit in middle age were almost as long-lived as those who had never smoked.

Swimming, walking and gymnastics increased life expectancy by around two years. People with a rich social circle lived a year and a half longer than those without.

Combining figures for healthy, low risk, lifestyles showed men could extend their lives by six years, and women by five years, by adopting the most healthy options.

Even after the age of 85, low risk lifestyles prolonged life by four years.

Many of these lifestyle decisions will have been made before the 75th birthday so it is unclear how big a difference changes in later years could make.

The report's authors said: "Our results suggest that encouraging favourable lifestyle behaviours even at advanced ages may enhance life expectancy."

Figures from the Office for National Statistics showed men in the UK could expect to live until the age of 78 and women until 82.

Professor of public health at King's College London, Alan Maryon-Davis, said: "These results should put an extra spring in the step of everyone in later life.

"They provide good evidence that even in your seventies it's not too late to gain an extra few years to enjoy life by keeping active, living healthily and being involved in family and community."

Meanwhile Michelle Mitchell, from the charity Age UK, said there was "no doubt" that being active and having a healthy lifestyle would help people to live longer.

"It's never too early and never too late to make those small changes that can make a big difference," she added.

http://news.discovery.com/animals/dogs-empathy-humans-120831.html#mkcpgn=rssnws1

Why Dogs Really Do Feel Your Pain

Comforting distressed humans may be hardwired in dogs' brains.

By Jennifer Viegas

Dogs may empathize with humans more than any other animal, including humans themselves, several new studies suggest. The latest research, published in the journal Animal Cognition, found that pet dogs may truly be man (or woman's) best friend if a person is in distress. That distressed individual does not even have to be someone the dog knows.

"I think there is good reason to suspect dogs would be more sensitive to human emotion than other species," co-author Deborah Custance told Discovery News. "We have domesticated dogs over a long period of time. We have selectively bred them to act as our companions." "Thus," she added," those dogs that responded sensitively to our emotional cues may have been the individuals that we would be more likely to keep as pets and breed from."

Custance and colleague Jennifer Mayer, both from the Department of Psychology at the University of London Goldsmiths College, exposed 18 pet dogs -- representing different ages and breeds -- to four separate 20-second human encounters. The human participants included the dogs' owners as well as strangers.

During one experimental condition, the people hummed in a weird way. For that one, the scientists were trying to see if unusual behavior itself could trigger canine concern. The people also talked and pretended to cry.

The majority of the dogs comforted the person, owner or not, when that individual was pretending to cry. The dogs acted submissive as they nuzzled and licked the person, the canine version of "there there." Custance and Mayer say this behavior is consistent with empathic concern and the offering of comfort.

As for what could be going on in the dog's head, yet another recent study, published in PLoS ONE, showed how the brains of dogs react as the canines view humans. In this case, the researchers trained dogs to respond to hand signals that meant the pups would receive a hot dog treat. Another signal meant no such treat was coming. The caudate region of the dogs' brains, an area associated with rewards in humans, showed activation when the canines knew a tasty food treat was coming.

"These results indicate that dogs pay very close attention to human signals," lead researcher Gregory Berns, director of the Emory Center for Neuropolicy, explained. "And these signals may have a direct line to the dog's reward system." In that study, the reward was food, but Custance and Mayer think canines over the thousands of years of domestication have been rewarded so much for approaching distressed human companions that this may somehow be hardwired into today's dogs.

The phenomenon in some cases could even have a subconscious element. Consider what happens when a person yawns and a dog is in the room. "Dogs show contagious yawning to human yawns," Matthew Campbell, an assistant professor in Georgia State University's Department of Psychology, told Discovery News.

He said that "we have selected dogs to be in tune with us emotionally." Custance and Mayer next hope to determine how empathetic wolves may be.

"It would be interesting to see how wolves who have been raised in human households would respond if they took part in our experiment," Custance said. "Would they behave like domestic dogs or show less response to a crying human? It would be fascinating to find out."

http://news.discovery.com/earth/carbon-capture-antarctica-south-pole-120831.html#mkcpgn=rssnws1

Let It Snow, Let It Snow … CO_2

Could giant chillers at the South Pole freeze our way out of global warming? Some scientists think so.

By Eric Niiler

What if you could build a giant refrigeration unit near the South Pole, pulling harmful carbon dioxide out of the Earth's atmosphere, turning it into snow and burying it underground. Wind turbines would power the chiller plants, converting CO2 from a heat-trapping atmospheric gas to a solid as a way of slowing down climate change. Of all the greenhouse gases, CO2 is the "control knob" of climate change. There's currently too much of it in our atmosphere, and the more of it that there is, the greater the effects of warming.

It sounds far-fetched, but researchers at Purdue University have put together a plan on how such a device would work. "It's kind of a novel idea and it's going to take a lot of refrigeration units and a lot of cost," said Ernest Agee, professor earth and planetary sciences at Purdue and author of the paper appearing in the Journal of Applied Meteorology and Climatology.

Water vapor turns to snow around 32 degrees Fahrenheit, but CO2 doesn't switch from gas to solid until it gets down to a chilly -220 degrees Fahrenheit (133 Kelvin). The ambient air temperature in Antarctica can often

reach -100 F, which gives the chilling process a head start. But to transform the planet's atmospheric CO2 into snow, it would take an estimated 446 individual refrigeration units that use a closed-loop liquid nitrogen process. The units would be powered by 16 1,200-megawatt wind turbines. That's a lot of power.
Agee says the idea came to him during a discussion about Mars' south polar ice cap, which was found to consist of CO2 by the Mars Global Surveyor and Odyssey missions.
He says Antarctica's coastline would be the best place to put the chiller plants and the turbines since the coast gets blasts of high-powered winds that cascade down from the higher South Polar ice cap toward the ocean. The CO2 snow would be stored in insulated landfills. The winds can power the turbines, while excess heat from the chillers and electricity from the turbines can be harnessed to keep Antarctic research stations warm and dry.
Russell Donnelly, a University of Oregon physicist, is intrigued with Agee's idea."It's quite exciting," Donnelly said. "It's certainly thinking big."
Donnelly is pushing his own, slightly different idea of chilling carbon dioxide. He wants to install chillers at coal-burning power plants to remove C02 from smokestacks. "You look at the hot gases of a stack, it would look impossible," Donnelly said. "But you can cool them off with water sprays and down to room temperature without spending much money. Then if you start to refrigerate, you need to put just enough refrigeration to get the job done."
Donnelly and colleagues published a paper in the July 12 issue of the journal Physical Review E that spells out how he would build such a device. He said the electricity would cost 25 percent more to produce, "but you would have an environmentally-friendly power plant."
Carbon sequestration schemes are not new. Utilities have been looking at burying excess CO2 beneath the ground or in deep wells or algae ponds for years, but efforts have not paid off because of the high associated costs. Richard Branson's Virgin Earth Challenge is offering $25 million to any company or group that can sequester a billion tons of CO2 from the atmosphere per year. That's the same amount that Agee says he can pull using his Antarctic chiller system, although he did not enter the contest. Eleven finalists were chosen in November 2011, but no winners yet.

http://phys.org/news/2012-08-glass-consumption-lager.html

Researchers find glass shape influences consumption rate of lager

A team of researchers found that drinking from a fluted glass caused drinkers to drink faster

Phys.org - When times get tough, people quite often turn to alcohol to numb themselves to the world around them, and more often than not, their drink of choice is beer, or in Britain, lager. What many who imbibe may not realize though, is that their choice of drinking glass may be impacting the rate at which they consume. A team of researchers from the University of Bristol, thought so, and devised a study to determine if they were right; they enlisted a group of volunteers and as they report in their paper published in PLoS One, found that drinking from a fluted glass caused drinkers to drink faster.
The team notes that they undertook their study because they've grown alarmed, like many in the UK, over the rising levels of binge drinking in that country, which has of course led to societal problems. They note also that such binge drinking appears to be most prevalent in young people who haven't yet learned of the true consequences of doing so or how to meter their drinking as they carry on. Believing that more knowledge is always better, they devised an experiment to find out if the shape of a drinking glass has an impact on how quickly people consume their alcoholic beverage.
The experiment consisted of enlisting the aid of 160 undergraduate volunteers from the university, half male, half female to engage in drinking either lager or non-alcoholic lemonade. Some were given glasses with straight edges, others glasses that were fluted; also some were presented with glasses that were full while others received glasses that were only half so. The volunteers were shown a non-emotional film about animals as they drank and were told beforehand that the experiment was meant to test language.
In observing and timing the rate at which the volunteers consumed their beverages, the team found that those that drank from the full fluted glasses finished in about an average of seven minutes, whereas those drinking from full straight sided glasses did so in about eleven minutes, clearly indicating that glass shape was making an impact on consumption rate. They also noted that those drinking lemonade drank at approximately the same rate as those drinking from the fluted glasses regardless of glass shape. Curiously, they also found that those who received a glass just half full drank at the same pace regardless of glass shape and finished on average in five minutes.
The researchers suggest that the reason people might drink faster from a fluted glass is because they incorrectly gauge consumption rate. Because of the wide top, an illusion is created that makes it difficult to discern pace; what looks like a half full glass for example, is more likely one that is closer to just one quarter full, meaning

they've already consumed three quarters of it while thinking they've consumed just half. The end result is faster consumption, which could lead to binge drinking.

More information: Attwood AS, Scott-Samuel NE, Stothart G, Munafò MR (2012) Glass Shape Influences Consumption Rate for Alcoholic Beverages. PLoS ONE 7(8): e43007. doi:10.1371/journal.pone.0043007

Abstract

Background

High levels of alcohol consumption and increases in heavy episodic drinking (binge drinking) are a growing public concern, due to their association with increased risk of personal and societal harm. Alcohol consumption has been shown to be sensitive to factors such as price and availability. The aim of this study was to explore the influence of glass shape on the rate of consumption of alcoholic and non-alcoholic beverages.

Methods

This was an experimental design with beverage (lager, soft drink), glass (straight, curved) and quantity (6 fl oz, 12 fl oz) as between-subjects factors. Social male and female alcohol consumers (n = 159) attended two experimental sessions, and were randomised to drink either lager or a soft drink from either a curved or straight-sided glass, and complete a computerised task identifying perceived midpoint of the two glasses (order counterbalanced). Ethical approval was granted by the Faculty of Science Research Ethics Committee at the University of Bristol. The primary outcome measures were total drinking time of an alcoholic or non-alcoholic beverage, and perceptual judgement of the half-way point of a straight and curved glass.

Results

Participants were 60% slower to consume an alcoholic beverage from a straight glass compared to a curved glass. This effect was only observed for a full glass and not a half-full glass, and was not observed for a non-alcoholic beverage. Participants also misjudged the half-way point of a curved glass to a greater degree than that of a straight glass, and there was a trend towards a positive association between the degree of error and total drinking time.

Conclusions

Glass shape appears to influence the rate of drinking of alcoholic beverages. This may represent a modifiable target for public health interventions.

http://bit.ly/QUtTPv

DNA could have existed long before life itself

THE latest twist in the origin-of-life tale is double helical.

24 August 2012 by Michael Marshall

Chemists are close to demonstrating that the building blocks of DNA can form spontaneously from chemicals thought to be present on the primordial Earth. If they succeed, their work would suggest that DNA could have predated the birth of life.

DNA is essential to almost all life on Earth, yet most biologists think that life began with RNA. Just like DNA, it stores genetic information. What's more, RNA can fold into complex shapes that can clamp onto other molecules and speed up chemical reactions, just like a protein, and it is structurally simpler than DNA, so might be easier to make.

After decades of trying, in 2009 researchers finally managed to generate RNA using chemicals that probably existed on the early Earth. Matthew Powner, now at University College London, and his colleagues synthesised two of the four nucleotides that make up RNA. Their achievement suggested that RNA may have formed spontaneously - powerful support for the idea that life began in an "RNA world".

Powner's latest work suggests that a rethink might be in order. He is trying to make DNA nucleotides through similar methods to those he used to make RNA nucleotides in 2009. And he's getting closer.

Nucleotides consist of a sugar attached to a phosphate and a nitrogen-containing base molecule - these bases are the familiar letters of the genetic code. DNA nucleotides, which link together to form DNA, are harder to make than RNA nucleotides, because DNA uses a different sugar that is tougher to work with.

Starting with a mix of chemicals, many of them thought to have been present on the early Earth, Powner has now created a sugar like that in DNA, linked to a molecule called AICA, which is similar to a base (Journal of the American Chemical Society, doi.org/h6q).

There is plenty still to do. Powner needs to turn AICA into a base, and add the phosphate. His molecule also has an unwanted sulphur atom, which helped the reactions along but now must be removed. Nevertheless, a DNA nucleotide is just a few years away, says Christopher Switzer of the University of California, Riverside. "It's practically a fait accompli at this point."

That could have important implications for our understanding of life's origins. Prebiotic chemists have so far largely ignored DNA, because its complexity suggests it cannot possibly form spontaneously. "Everybody and his brother has been saying 'RNA, RNA, RNA'," says Steven Benner of the Foundation for Applied Molecular Evolution in Gainesville, Florida.

Conventional wisdom is that RNA-based life eventually switched to DNA because DNA is better at storing information. In other words, RNA organisms made the first DNA.
If that is true, how did life make the switch? Modern organisms can convert RNA nucleotides into DNA nucleotides, but only using special enzymes that are costly to produce in terms of energy and materials. "You have to know that DNA does something good for you before you invent something like that," Switzer says.
He says the story makes more sense if DNA nucleotides were naturally present in the environment. Organisms could have taken up and used them, later developing the tools to make their own DNA once it became clear how advantageous the molecule was - and once natural supplies began to run low.
Early organisms must have scavenged for materials in this way, says Matthew Levy of the Albert Einstein College of Medicine in New York City. "The early Earth was probably a bloody mess," he says, with all manner of rich pickings on offer.
Powner suggests another alternative. Life may have begun with an "RNA and DNA world", in which the two types of nucleotides were intermingled. Powner's co-author Jack Szostak, of the Harvard Medical School, has shown that "mongrel" molecules containing a mix of DNA and RNA nucleotides can perform some of the functions of pure RNA (Proceedings of the National Academy of Sciences, doi.org/bj8r97). Powner suggests that life started out using these hybrid molecules, gradually purifying them into DNA and RNA.
Benner says it makes more sense for the first life to have used pure DNA and RNA as early as possible. Both work better than the mongrel molecules. Right now, though, there's nothing to tell us exactly how and when life first used DNA. "It almost becomes a choose-your-own-adventure game," says Levy.

http://www.eurekalert.org/pub_releases/2012-08/bumc-brf083112.php

BUSM researchers find potential key to halt progression, reverse damage from emphysema

A compound in some skin creams may halt the progression of emphysema and reverse some of the damage caused by the disease

Boston – A study led by researchers at Boston University School of Medicine (BUSM) has shown that a compound used in some skin creams may halt the progression of emphysema and reverse some of the damage caused by the disease. When the compound Gly-His-Lys (GHK) was applied to lung cells from patients with emphysema, normal gene activity in altered cells was restored and damaged aspects of cellular function were repaired. The study, which is published in BioMed Central's open access journal Genome Medicine, also demonstrates the potential impact of using genomic technologies to identify new possible treatments for diseases using existing drugs and compounds.
Chronic obstructive pulmonary disease (COPD) is a chronic, progressive lung disease that comprises emphysema, small airway obstruction and/or chronic bronchitis leading to the loss of lung function. Tobacco smoke and other irritants cause oxidative stress and chronic inflammation, which over time destroys lung alveolar cells and results in emphysema. Without these cells, the lungs are not able to efficiently exchange oxygen for carbon dioxide, causing shortness of breath and low blood oxygen levels. According to the National Institutes of Health's National Heart, Lung and Blood Institute (NHLBI), COPD is the third leading cause of death in the United States and results in approximately 120,000 deaths each year. While there are treatments and lifestyle changes that can help people cope with COPD, there currently is no cure and there are no effective therapies to reduce the rate of lung function decline that occurs as the disease progresses.
"Given the high costs, both direct and indirect, associated with COPD, there is an urgent need to identify novel approaches to treat the disease," said Avrum Spira, MD, MSc, Alexander Graham Bell professor of medicine and chief of the division of computational biomedicine at BUSM, who was one of the study's senior leaders. Spira also is a physician in the pulmonary, critical care and allergy department at Boston Medical Center.
Researchers took cells from lungs donated by patients undergoing a double lung transplant because their lungs were irrevocably damaged by COPD and found 127 genes had changes in activity as disease severity increased within the lung. The genes that showed increased activity included several that are associated with inflammation, such as those involved in signalling to B-cells (the immune system cells that make antibodies). In contrast, the genes involved in maintaining cellular structure and normal cellular function, along with the growth factors TGFβ and VEGF, were down-regulated and showed decreased activity. Genes that control the ability of the cells to stick together (cell adhesion), produce the protein matrix that normally surrounds the cells and promote the normal association between lung cells and blood vessels were among the genes in this category.
Using genomic technologies and computational methods, the researchers identified genetic activity defects that occur as emphysema progresses and matched these defects with compounds that could reverse the damage.
"Our study results showed that the way genes were affected by the compound GHK, a drug identified in the

1970s, was the complete opposite of the pattern we had seen in the cells damaged by emphysema," said Marc Lenburg, PhD, associate professor in computational biomedicine and bioinformatics at BUSM and one of the study's senior authors.
"What got us especially excited was that previous studies had shown that GHK could accelerate wound repair when applied to the skin," said Joshua Campbell, PhD, a post-doctoral fellow working with Spira and Lenburg who served as the study's first author. "This made us think that GHK could have potential as a therapy for COPD."
"When we tested GHK on cells from the damaged lungs of smokers with COPD, we saw an improvement in the structure of their actin cytoskeleton and in cell adhesion, especially to collagen," said James Hogg, MD, from the University of British Columbia and one of the study's senior authors. "GHK also restored the ability of cells to reorganize themselves to repair wounds and construct the contractile filaments essential for alveolar tissue repair."
GHK is a natural peptide found in human plasma, but the amount present decreases with age. While more testing needs to be done on its effects in COPD, these early results are very promising. Therapeutic studies with GHK in animal models of COPD are now underway with the ultimate goal of moving this compound into clinical trials. As more gene activity signatures are discovered, this method of matching drug to disease may provide a rapid method for discovering potential uses for existing drugs and compounds.
"Beyond the identification of a potential new COPD drug, the research team developed a cost-effective approach to study COPD at the molecular level across the entire lung, and then screen potential drug candidates," said James Kiley, PhD, director of the NHLBI's Division of Lung Diseases, who supported this work. "This work demonstrates the potential of using genomics data to drive clinical research."
Research reported in this published article was supported by the NHLBI under award number R01 HL095388 and through the National Institutes of Health under award number UL1 TR000157 (Boston University Clinical and Translational Science Institute). Researchers from the University of British Columbia, the University Medical Center Groningen and the University of Pennsylvania also collaborated on this study.
**Some material included in this press release was excerpted from Genome Medicine's press release: http://www.biomedcentral.com/presscenter/pressreleases/20120831a*

http://www.sciencedaily.com/releases/2012/08/120831083309.htm

Immune System Protein Could Explain Pancreatitis

There is now a clear target for treatment. A well-known protein plays a central role in the development of acute pancreatitis

ScienceDaily - There is now a clear target for the treatment of acute pancreatitis, according to researchers at Lund University in Sweden, who have discovered that a well-known protein plays a central role in the development of the disease. It is likely that the protein is also highly significant for other inflammatory diseases. The research results have been published in the American journal Gastroenterology.
Excessive alcohol intake and gall stones are known risk factors for acute pancreatitis. However, as yet no explanation has been found for what actually happens in the body in cases of acute pancreatitis. Current research shows that calcium-sensitive proteins found in the body, for example calcineurin, promote inflammation, but it is not known exactly how.
Henrik Thorlacius and Maria Gomez at the University's Department of Clinical Sciences in Malmö have investigated this in more detail. The focus is on a family of proteins linked to calcineurin, called NFAT, the role of which in acute pancreatitis has not previously been studied. "The protein has an unexpectedly major role in the development of inflammation in the pancreas. Now there is a clear target for the development of drugs and treatments," says Henrik Thorlacius, Professor of Surgery at Lund University and a doctor at Skåne University Hospital.
In experiments on mice, the researchers found a number of links between NFAT and acute pancreatitis. NFAT, and especially the variant NFATc3, were found to regulate the activity of trypsinogen (a precursor form of the digestive enzyme trypsin), which can affect the risk of acute pancreatitis. The activation of NFATc3 was also found to encourage inflammation and tissue damage in the pancreas in various other ways. "In our study, we saw that the aorta, spleen and lungs were also affected. The results therefore suggest that the NFAT protein plays a part in the development of inflammatory diseases on a more general level," says Henrik Thorlacius.
The findings open up new opportunities for research on treatment and drugs, both for acute pancreatitis and for other acute inflammatory diseases, such as blood poisoning and inflammatory bowel disease.
"An effective drug needs to contain a substance that stops the activation of NFATc3 without producing serious side-effects," says Professor Thorlacius.

The NFAT proteins function as transcription factors, which means that they can be bound to the body's DNA and regulate the expression of specific genes in different cells. They have so far primarily been associated with immune cells.

Darbaz Awla, Anna V. Zetterqvist, Aree Abdulla, Cristina Camello, Lisa M. Berglund, Peter Spégel, Maria J. Pozo, Pedro J. Camello, Sara Regnér, Maria F. Gomez, Henrik Thorlacius. NFATc3 Regulates Trypsinogen Activation, Neutrophil Recruitment, and Tissue Damage in Acute Pancreatitis in Mice. Gastroenterology, 2012; DOI: 10.1053/j.gastro.2012.07.098

http://arstechnica.com/tech-policy/2012/08/robot-cars-on-public-roads-california-says-yes/

Robot cars on public roads? California says yes

Legislators pass new law that would set safety and performance standards.

by Cyrus Farivar - Aug 30 2012, 11:45pm TST

California legislators have sent a bill to the governor's desk that could push forward the development of autonomous cars in the Golden State. The new bill requires the state's Department of Motor Vehicles to adopt new regulations, including safety standards and "performance requirements" for new autonomous vehicles. Once those new rules are put in place, the bill "would permit autonomous vehicles to be operated or tested on the public roads in this state."

The bill, known as SB 1298, unanimously passed the state senate on Wednesday, following a 72-4 approval from the state legislature earlier in the week. The text of the legislation says that autonomous vehicles "offer significant potential safety, mobility, and commercial benefits for individuals and businesses in the state and elsewhere."

The lack of regulations certainly hasn't stopped Google from testing its autonomous cars in California—the company said in 2010 that it had even allowed such a vehicle to drive down the famous Lombard Street hill, which the New York Times described as "one of the steepest and curviest streets in the nation."

Earlier this year, Nevada became the first US state to pass new rules dictating safety requirements for autonomous vehicles. The Silver State issued its first special license plate for autonomous cars to Google back in May.

http://www.bbc.co.uk/nature/19421217

Birds hold 'funerals' for dead

Some birds, it seems, hold funerals for their dead.

Matt Walker By Matt Walker Editor, BBC Nature

When western scrub jays encounter a dead bird, they call out to one another and stop foraging. The jays then often fly down to the dead body and gather around it, scientists have discovered.

The behaviour may have evolved to warn other birds of nearby danger, report researchers in California, who have published the findings in the journal Animal Behaviour.

The revelation comes from a study by Teresa Iglesias and colleagues at the University of California, Davis, US. They conducted experiments, placing a series of objects into residential back yards and observing how western scrub jays in the area reacted. The objects included different coloured pieces of wood, dead jays, as well as mounted, stuffed jays and great horned owls, simulating the presence of live jays and predators.

Alarming reaction

The jays reacted indifferently to the wooden objects. But when they spied a dead bird, they started making alarm calls, warning others long distances away. The jays then gathered around the dead body, forming large cacophonous aggregations. The calls they made, known as "zeeps", "scolds" and "zeep-scolds", encouraged new jays to attend to the dead. The jays also stopped foraging for food, a change in behaviour that lasted for over a day.

When the birds were fooled into thinking a predator had arrived, by being exposed to a mounted owl, they also gathered together and made a series of alarm calls. They also swooped down at the supposed predator, to scare it off. But the jays never swooped at the body of a dead bird.

The birds also occasionally mobbed the stuffed jays; a behaviour they are known to do in the wild when they attack competitors or sick birds. The fact that the jays didn't react to the wooden objects shows that it is not the novelty of a dead bird appearing that triggers the reaction.

The results show that "without witnessing the struggle and manner of death", the researchers write, the jays see the presence of a dead bird as information to be publicly shared, just as they do the presence of a predator.

Spreading the message that a dead bird is in the area helps safeguard other birds, alerting them to danger, and lowering their risk from whatever killed the original bird in the first place, the researchers say.
Other animals are known to take notice of their dead. Giraffes and elephants, for example, have been recorded loitering around the body of a recently deceased close relative, raising the idea that animals have a mental concept of death, and may even mourn those that have passed.

http://www.sciencedaily.com/releases/2012/09/120902113554.htm

Why Children With Asthma Are More Likely to Be Bullied

New research has uncovered several factors which could explain why children with asthma are at an increased risk of being bullied.

ScienceDaily - The study, presented today (2 September 2012) at the European Respiratory Society's Annual Congress in Vienna, highlights the need for doctors to talk to children with asthma about bullying, as well as the impact the disease could be having in other areas of their life.
Bullying or teasing of children with any chronic medical condition is common, yet it is not always clear what factors contribute to this. Researchers from the Derbyshire Children's Hospital, in the UK, used data from the large six-country "Room to Breathe" survey of childhood asthma, to look at the factors associated with an increased risk of bullying.
Parents and children aged 7 years and above were interviewed as part of the study. Data was collected from 943 questionnaires which asked questions about conditions at home, lifestyle of parents and children and their overall experience of their condition.
The results revealed a number of factors associated with an increased risk of bullying. Factors such as a reduced participation with sport and feelings of sadness were significantly associated with an increased risk of bullying. Additionally, factors that could be improved, such as poor asthma control, parental smoking and parents' on-going worries about their child's health, were also associated with bullying.
Dr Will Carroll, from the Derbyshire Children's Hospital, said: "Our findings emphasise the need for doctors and nurses to speak to their patients about the effects their condition has on all aspects of their life. We know that bullying is associated with asthma and these findings can help us understand why this is case.
"A number of the factors identified are things that can be changed, such as participation in sport, asthma control and parental worry over their child's health. As doctors, we must work with families to ensure these risk factors are removed and work with schools and teachers to ensure children with asthma are able to participate in sports at a level that is safe for them."
David Supple, the parent of an asthma sufferer, said: ""When you have a child with exercise-induced asthma it can be really hard to get them to participate. You can be scared to push them -- but the health and social benefits far outweigh the fear, and can help build a lifetime of confidence against bullying. We have made a real effort to include our son, Alex in as much sport as we can to ensure that he isn't excluded from different groups and to keep a wide balance of friends."

http://www.eurekalert.org/pub_releases/2012-09/sfgm-coc083012.php

Coconut oil could combat tooth decay

Digested coconut oil is able to attack the bacteria that cause tooth decay.

It is a natural antibiotic that could be incorporated into commercial dental care products, say scientists presenting their work at the Society for General Microbiology's Autumn Conference at the University of Warwick.
The team from the Athlone Institute of Technology in Ireland tested the antibacterial action of coconut oil in its natural state and coconut oil that had been treated with enzymes, in a process similar to digestion. The oils were tested against strains of Streptococcus bacteria which are common inhabitants of the mouth. They found that enzyme-modified coconut oil strongly inhibited the growth of most strains of Streptococcus bacteria including Streptococcus mutans – an acid-producing bacterium that is a major cause of tooth decay.
Many previous studies have shown that partially digested foodstuffs are active against micro-organisms. Earlier work on enzyme-modified milk showed that it was able to reduce the binding of S. mutans to tooth enamel, which prompted the group to investigate the effect of other enzyme-modified foods on bacteria.
Further work will examine how coconut oil interacts with Streptococcus bacteria at the molecular level and which other strains of harmful bacteria and yeasts it is active against. Additional testing by the group at the Athlone Institute of Technology found that enzyme-modified coconut oil was also harmful to the yeast Candida albicans that can cause thrush.
The researchers suggest that enzyme-modified coconut oil has potential as a marketable antimicrobial which could be of particular interest to the oral healthcare industry. Dr Damien Brady who is leading the research said,

"Dental caries is a commonly overlooked health problem affecting 60-90% of children and the majority of adults in industrialized countries. Incorporating enzyme-modified coconut oil into dental hygiene products would be an attractive alternative to chemical additives, particularly as it works at relatively low concentrations. Also, with increasing antibiotic resistance, it is important that we turn our attention to new ways to combat microbial infection."

The work also contributes to our understanding of antibacterial activity in the human gut. "Our data suggests that products of human digestion show antimicrobial activity. This could have implications for how bacteria colonize the cells lining the digestive tract and for overall gut health," explained Dr Brady. "Our research has shown that digested milk protein not only reduced the adherence of harmful bacteria to human intestinal cells but also prevented some of them from gaining entrance into the cell. We are currently researching coconut oil and other enzyme-modified foodstuffs to identify how they interfere with the way bacteria cause illness and disease," he said.

http://www.sciencedaily.com/releases/2012/09/120902184922.htm

Study Sheds Light On Lung Cancers That Are Undetected by Radiograph

Research reveals why some lung cancers are undetected by radiograph and helps to identify the people who may be at risk

ScienceDaily - New research has revealed why some lung cancers are undetected by radiograph and helped to identify the type of people who may be at risk of this form of the disease.

The findings will be presented Monday (Sept. 3, 2012) at the European Respiratory Society's Annual Congress in Vienna.

There has been no significant reduction in lung cancer mortality rates in recent years. Chest radiographs can be used to screen for lung cancer. However, these aren't always effective and it appears that some cancers are later diagnosed even though individuals have received a negative chest radiograph within the previous 12 months. The reason for this could be due to human error with the cancer being missed on the review of the radiograph, due to the cancer being undetectable by this form of screening technique, or because the cancer developed so rapidly that it both initiates and becomes evident in the time interval between screening tests.

Little is known about this form of lung cancer that is not detected by screening chest radiograph, which is referred to as an interval cancer. To improve the understanding of this type of the disease, researchers aimed to analyse the type of people who developed this cancer and the characteristics of the disease.

The research used data from a national screening trial in the USA. It followed 77,445 participants who were screened at the start of the study and then annually for either 2 or 3 years depending on their smoking status. A total of 450 people were diagnosed with lung cancer during the years of chest radiograph screening, of which 152 were initially not spotted by the radiograph. Out of this group, 35% of lung cancers not initially identified on the radiograph were spotted when it was re-reviewed. The remaining 65% of this group therefore had 'true interval cancer' which was not detected on the initial screening, or the second review.

The results revealed that these cancers were at a more advanced stage when diagnosed, were more often small cell lung cancers and less often adenocarcinoma. The analysis also showed that this type of cancer was more common among males and those with a history of smoking.

Lead author, Dr. Paul Kvale from the Henry Ford Hospital in the USA, said: "These findings have helped us to understand the characteristics of this type of lung cancer, pointing out features which make them different from lung cancers that can be detected by a chest x-ray screening programme. The results add to the evidence that a screening programme using x-rays is not suitable for lung cancer, as this this more aggressive form of the disease will be missed.

"By increasing our understanding of true interval cancers, we can help to improve screening techniques in the future."