Craft sends Saturn moon pictures

Nasa has released the latest raw images of Saturn's moon Enceladus, from the Cassini spacecraft's extended mission to the planet and its satellites.

The images show the moon's rippling terrain in remarkable clarity.

Cassini started transmitting uncalibrated temperature data and images during a flyby on 21 November.

The data will help scientists create a highly detailed mosaic image of the southern part of the moon's Saturn-facing hemisphere, and a thermal map.

This thermal map will help researchers to study the long fractures in the south polar region of the moon's surface, which have been dubbed "tiger stripes" and are warmer than the rest of the surface.

Scientists are particularly interested in these fissures because they spew out jets of water vapour, and other particles, in plumes that reach hundreds of kilometres above the surface.

One of the "tiger stripes" from a previous Enceladus flyby

This flyby was scientists' last peek at the tiger stripes before the south pole fades into the darkness of winter for many years. Cassini completed its initial four-year mission to explore Saturn in June 2008.

But because the spacecraft is still functioning so well, it was reprogrammed to work overtime on the Cassini Equinox Mission.

The extended mission will last until late 2010. It was named after Saturn's equinox, which occurred in August 2009 - when the sun shone directly on the equator, illuminating the northern hemisphere and the rings' northern face.

Working overtime

Saturn's orbit is so vast that Equinox happens only once every 15 Earth years.

Cassini is now continuing to observe seasonal changes brought about by the changing sun angle on Saturn, its rings and its moons.

"These first raw images are spectacular, and paint an even more fascinating picture of Enceladus," said Bob Pappalardo, Cassini project scientist at Nasa's Jet Propulsion Laboratory in Pasadena, US.

Cassini's data will allow scientists to map the active moon in new detail

"The Cassini teams will be delving into the data to better understand the workings of this bizarre, active moon."

This was the eighth targeted flyby of Enceladus, and brought Cassini to within about 1,600km (1,000 miles) of the moon's surface. Cassini is now cruising toward Rhea, another of the planet's moons.

New computer-developed map shows more extensive valley network on Mars

Findings add to evidence for ancient Martian ocean

DeKalb, IL – New research adds to the growing body of evidence suggesting the Red Planet once had an ocean.

In a new study, scientists from Northern Illinois University and the Lunar and Planetary Institute in Houston used an innovative computer program to produce a new and more detailed global map of the valley networks on Mars. The findings indicate the networks are more than twice as extensive (2.3 times longer in total length) as had been previously depicted in the only other planet-wide map of the valleys.

Further, regions that are most densely dissected by the valley networks roughly form a belt around the planet between the equator and mid-southern latitudes, consistent with a past climate scenario that included precipitation and the presence of an ocean covering a large portion of Mars' northern hemisphere.

Scientists have previously hypothesized that a single ocean existed on ancient Mars, but the issue has been hotly debated.

"All the evidence gathered by analyzing the valley network on the new map points to a particular climate scenario on early Mars," NIU Geography Professor Wei Luo said. "It would have included rainfall and the existence of an ocean covering most of the northern hemisphere, or about one-third of the planet's surface."

Luo and Tomasz Stepinski, a staff scientist at the Lunar and Planetary Institute, publish their findings in the current issue of the Journal of Geophysical Research - Planets.

"The presence of more valleys indicates that it most likely rained on ancient Mars, while the global pattern showing this belt of valleys could be explained if there was a big northern ocean," Stepinski said.

Valley networks on Mars exhibit some resemblance to river systems on Earth, suggesting the Red Planet was once warmer and wetter than present.

But, since the networks were discovered in 1971 by the Mariner 9 spacecraft, scientists have debated whether they were created by erosion from surface water, which would point to a climate with rainfall, or through a process of erosion known as groundwater sapping. Groundwater sapping can occur in cold, dry conditions.

The large disparity between river-network densities on Mars and Earth had provided a major argument against the idea that runoff erosion formed the valley networks. But the new mapping study reduces the disparity, indicating some regions of Mars had valley network densities more comparable to those found on Earth.

"It is now difficult to argue against runoff erosion as the major mechanism of Martian valley network formation," Luo said.

"When you look at the entire planet, the density of valley dissection on Mars is significantly lower than on Earth," he said. "However, the most densely dissected regions of Mars have densities comparable to terrestrial values. "The relatively high values over extended regions indicate the valleys originated by means of precipitation-fed runoff erosion - the same process that is responsible for formation of the bulk of valleys on our planet," he added.

The researchers created an updated planet-wide map of the valley networks by using a computer algorithm that parses topographic data from NASA satellites and recognizes valleys by their U-shaped topographic signature. The computer-generated map was visually inspected and edited with help from NIU graduate students Yi Qi and Bartosz Grudzinski to produce the final updated map.

"The only other global map of the valley networks was produced in the 1990s by looking at images and drawing on top of them, so it was fairly incomplete and it was not correctly registered with current datum," Stepinski said. "Our map was created semi-automatically, with the computer algorithm working from topographical data to extract the valley networks. It is more complete, and shows many more valley networks."

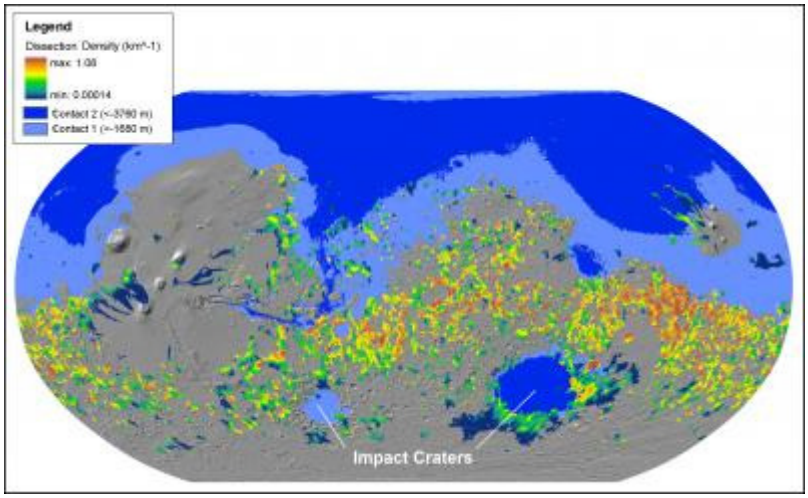
Stepinski developed the algorithms used in the mapping.

"The basic idea behind our method is to flag landforms having a U-shaped structure that is characteristic of the valleys," Stepinski added. "The valleys are mapped only where they are seen by the algorithm."

The Martian surface is characterized by lowlands located mostly in the northern hemisphere and highlands located mostly in the southern hemisphere. Given this topography, water would accumulate in the northern hemisphere, where surface elevations are lower than the rest of the planet, thus forming an ocean, the researchers said. "Such a single-ocean planet would have an arid continental-type climate over most of its land surfaces," Luo said.

The northern-ocean scenario meshes with a number of other characteristics of the valley networks.

"A single ocean in the northern hemisphere would explain why there is a southern limit to the presence of valley networks," Luo added. "The southernmost regions of Mars, located farthest from the water reservoir, would get little rainfall and would develop no valleys. This would also explain why the valleys become shallower as you go from north to south, which is the case.



This is a global map depicting the dissection density of valley networks on Mars, in relation to the hypothesized northern ocean. Two candidate sea levels are shown: contact 1 with mean elevation at -1,680 meters and contact 2 with mean elevation of -3,760 meters.

"Rain would be mostly restricted to the area over the ocean and to the land surfaces in the immediate vicinity, which correlates with the belt-like pattern of valley dissection seen in our new map," Luo said.

The research was funded by NASA.

Flaxseed oil and osteoporosis

Animal studies suggest that adding flaxseed oil to the diet could reduce the risk of osteoporosis in post-menopausal women and women with diabetes, according to a report to be published in the International Journal of Food Safety, Nutrition and Public Health.

Mer Harvi and colleagues at the National Research Center, in Cairo, Egypt, have studied the effect of diabetes on bone health and evaluated how flaxseed oil in the diet might delay the onset of osteoporosis. The researchers studied 70 female albino rats of which 30 had their ovaries removed (ovx) to simulate the post-menopausal state and experimental diabetes was present in one group of rodents.

The researchers then classified the rats as control, sham, diabetic, diabetic received flaxseed oil in the diet, ovx, ovx-diabetic and ovx-diabetic received flaxseed oil in the diet.

After two months, the team collected urine and blood samples from the rats and measured serum insulin-like growth factor 1 (IGF-1) and the bone-creating protein osteocalcin. They found that these two compounds were present at higher levels in the ovx and the diabetic ovx groups, but much lower in the non-ovx diabetic group. The concentrations of IGF-1 and osteocalcin could be raised to normal levels by adding flaxseed oil to the diet. The team also found that the levels of deoxypyridinoline in the urine were raised in the diabetic group. Deoxypyridinoline is normally present in healthy bone and its presence in urine is a specific marker for bone resorption associated with osteoporosis. Levels of this marker compound fell when the rats were given flaxseed oil.

The team concludes that diabetes has a more pronounced effect on bone health than ovariectomy and so may suggest that diabetes in post-menopausal women may also be a greater risk factor for osteoporosis than the decline in sex hormones associated with the menopause. However, their results suggest that flaxseed oil has a beneficial effect on bone mineral density and reduces markers associated with osteoporosis, suggesting that this dietary supplement could be beneficial to women with diabetes in reducing their risk of osteoporosis.
The team explains that the presence of so-called "n-3 fatty acids" in flaxseed oil may play a role in protecting the processes of matrix formation and bone mineralization, which are apparently compromised by diabetes and the menopause. "We recommend further investigations using animals and humans to confirm the effect of using dietary flaxseed oil to improve bone health and to prevent osteoporosis," Harvi and colleagues conclude.
"Impact of feeding flaxseed oil on delaying the development of osteoporosis in ovariectomized diabetic rats" in Int. J. Food Safety, Nutrition and Public Health, 2009, 2, 189-201

Upending Textbook Science on Alzheimer's Disease

TAU finds that a destructive protein is also essential for normal brain function

Alzheimer's disease is caused by the build-up of a brain peptide called amyloid-beta. That's why eliminating the protein has been the focus of almost all drug research pursuing a cure for the devastating neurodegenerative condition.

But that may be counterproductive, says Dr. Inna Slutsky of Tel Aviv University's Department of Physiology and Pharmacology, Sackler Faculty of Medicine. Her recent research demonstrates that amyloid-beta is also necessary to maintain proper brain functioning.

These findings may shake the foundations of Alzheimer’s research.

In a new study published this month in Nature Neuroscience, Dr. Slutsky finds that amyloid-beta is essential for normal day-to-day information transfer through nerve cell networks in the brain. "If this protein is removed from the brain," says Dr. Slutsky, "as some drugs in development attempt to do, it may cause an impairment of neuronal function, as well as a further and faster accumulation of amyloid-beta in Alzheimer's."

A reset button for drug researchers

Without amyloid-beta, a normal product of cellular metabolism, one's ability to learn and remember could be profoundly damaged, so drugs currently in development to eliminate amyloid-beta could be rendered obsolete. With Dr. Slutsky's research, a leap in understanding the cause and development of Alzheimer's disease, however, new, more effective drug therapies could be developed.

By studying synapses in brain slices of healthy mice and in neuronal networks growing in vitro, Dr. Slutsky and her team determined that there is an optimal amount of amyloid-beta needed to keep the neurons working well. Her students Efrat Abramov and Iftach Dolev found that if this precise balance is even slightly disturbed, the effectiveness of information transfer between neurons is greatly impaired.

"Synapses where neurons meet work as filters of information," says Dr. Slutsky. "What is really exciting for us is the fact that amyloid-beta peptide, believed to be toxic, regulates the type of information that neurons transfer."

A new way to prevent Alzheimer's?

The study of Dr. Slutsky's team suggests that the amyloid-beta protein belongs to endogenous molecules regulating normal synaptic transmission in the hippocampus, a brain region involved in learning and memory function. "There is a long list of neuromodulators that help synapses optimize information transfer," she says. "Intriguingly, amyloid-beta seems to be able to modulate this filter and shape its properties."

The new study is discouraging news for those Alzheimer drugs that attempt to block or remove the amyloid-beta aggregation process currently in clinical trials, Dr. Slutsky believes. "Our data shows that after the release of amyloid-beta, synaptic activity in the neurons is increased through a positive feedback loop. Disrupting this positive feedback loop, I believe, is the key for prevention of the earliest signs of Alzheimer's."

Dr. Slutsky completed her post-doctoral work at MIT four years ago, specializing in cellular mechanisms that maintain memory function. She received an international Young Investigator Award in Alzheimer's disease from the Rosalinde and Arthur Gilbert Foundation of American Federation for Aging Research in 2008.

In addition to Dr. Slutsky, Dolev and Abramov, authors of the paper also include Hilla Fogel and Eyal Ruff of TAU's Sackler Faculty of Medicine, and Giuseppe Ciccotosto of the University of Melbourne in Australia.

10 X '20: ID Experts Call For 10 New Antibiotics By 2020

Infectious Diseases Society of America Urges Development of New Antibiotics to Address Global Drug Resistance Crisis

ARLINGTON, Va. - The Infectious Diseases Society of America (IDSA) has asked for a commitment from the Obama administration and the European Union to further the Society's mission to achieve the development of 10 new antibiotics within the next 10 years, known as the 10 x '20 Initiative. The World Health Organization (WHO) has identified antimicrobial resistance as one of the three greatest threats to human health.

A new European Union report confirms there are just 15 antibacterial drugs in the pipeline with the potential to offer a benefit over existing drugs. Only five of these have progressed to later-stage clinical trials. A 2009 IDSA report, "Bad Bugs, No Drugs, No ESKAPE," arrives at similar findings. From past experience, we know that few of these drugs likely will make it to market. Meanwhile, the antibiotics now in use are in danger of becoming ineffective as bacteria learn to outsmart them. This leaves doctors with fewer and fewer options to treat life-threatening infections. The European Union report is available here. To read the IDSA report, visit http://www.idsociety.org/DrugPipelineReport.htm.

The lack of new antibiotics and the increase of drug-resistant bacteria was addressed during the recent U.S. and European Union summit on Nov. 2-3, when President Barack Obama and Swedish Prime Minister Fredrik Reinfeldt, acting on behalf of the EU Presidency, created a Transatlantic Task Force to encourage global research and development of new antibiotics and address antimicrobial resistance.

"If we can initiate a global commitment to achieve this significant '10 x '20' goal, we'll take a giant step toward safeguarding the health and well-being of patients worldwide," said IDSA President Richard Whitley, MD, FIDSA. "We offer the unique expertise of IDSA's members to assist the research and policy communities and urge the U.S. and EU to establish a specialized 'antibacterial drug pipeline work group,' which would be responsible for identifying strategies to motivate antibiotic drug development."

Because this issue is so critically important, IDSA has also urged that the U.S. and EU activities be carried out at the highest levels of both governments, within the White House—possibly in connection with the President's Advisory Council on Science and Technology—and the European Commission. A full description of the proposed work group and its charge can be found in IDSA's letter to President Obama and Prime Minister Reinfeldt.

Antimicrobial resistance has been a primary concern of IDSA's for many years. In 2004, the organization released a report, "Bad Bugs, No Drugs, As Antibiotic Discovery Stagnates, A Public Health Crisis Brews," which described the antibiotic resistance crisis and detailed the complex mix of factors driving drug makers out of the antibiotics market. The Society also worked with Rep. Jim Matheson (R-UT) in the U.S. House of Representatives and Senators Sherrod Brown (D-OH) and Orrin Hatch (R-UT) to draft the Strategies to Address Antimicrobial Resistance (STAAR) Act, legislation that provides important solutions to contain the spread of antimicrobial-resistant bad bugs. More information about the STAAR Act is available at www.idsociety.org/STAARAct.htm.

"The 10 X '20 Initiative must succeed in creating a stable research infrastructure for antibiotic development, otherwise physicians around the world will be left without the tools they need to effectively treat patients," said Dr. Whitley.

Supervolcano eruption - in Sumatra - deforested India 73,000 years ago

CHAMPAIGN, Ill. — A new study provides "incontrovertible evidence" that the volcanic super-eruption of Toba on the island of Sumatra about 73,000 years ago deforested much of central India, some 3,000 miles from the epicenter, researchers report.

The volcano ejected an estimated 800 cubic kilometers of ash into the atmosphere, leaving a crater (now the world's largest volcanic lake) that is 100 kilometers long and 35 kilometers wide. Ash from the event has been found in India, the Indian Ocean, the Bay of Bengal and the South China Sea.

The bright ash reflected sunlight off the landscape, and volcanic sulfur aerosols impeded solar radiation for six years, initiating an "Instant Ice Age" that – according to evidence in ice cores taken in Greenland – lasted about 1,800 years.

During this instant ice age, temperatures dropped by as much as 16 degrees centigrade (28 degrees Fahrenheit), said University of Illinois anthropology professor Stanley Ambrose, a principal investigator on the new study with professor Martin A.J. Williams, of the University of Adelaide. Williams, who discovered a layer of Toba ash in central India in 1980, led the research. The climactic effects of Toba have been a source of controversy for years, as is its impact on human populations.

In 1998, Ambrose proposed in the Journal of Human Evolution that the effects of the Toba eruption and the Ice Age that followed could explain the apparent bottleneck in human populations that geneticists believe occurred between 50,000 and 100,000 years ago. The lack of genetic diversity among humans alive today suggests that during this time period humans came very close to becoming extinct.

To address the limited evidence of the terrestrial effects of Toba, Ambrose and his colleagues pursued two lines of research: They analyzed pollen from a marine core in the Bay of Bengal that included a layer of ash from the Toba eruption, and they looked at carbon isotope ratios in fossil soil carbonates taken from directly above and below the Toba ash in three locations in central India.

Carbon isotopes reflect the type of vegetation that existed at a given locale and time. Heavily forested regions leave carbon isotope fingerprints that are distinct from those of grasses or grassy woodlands.

Both lines of evidence revealed a distinct change in the type of vegetation in India immediately after the Toba eruption, the researchers report. The pollen analysis indicated a shift to a "more open vegetation cover and reduced representation of ferns, particularly in the first 5 to 7 centimeters above the Toba ash," they wrote in the journal Palaeogeography, Palaeoclimatology, Palaeoecology. The change in vegetation and the loss of ferns, which grow best in humid conditions, they wrote, "would suggest significantly drier conditions in this region for at least one thousand years after the Toba eruption."

The dryness probably also indicates a drop in temperature, Ambrose said, "because when you turn down the temperature you also turn down the rainfall."

The carbon isotope analysis showed that forests covered central India when the eruption occurred, but wooded to open grassland predominated for at least 1,000 years after the eruption.

"This is unambiguous evidence that Toba caused deforestation in the tropics for a long time," Ambrose said. This disaster may have forced the ancestors of modern humans to adopt new cooperative strategies for survival that eventually permitted them to replace Neandertals and other archaic human species, he said.

Factors from common human bacteria may trigger multiple sclerosis

Farmington, CT – Current research suggests that a common oral bacterium may exacerbate autoimmune disease. The related report by Nichols et al, "Unique Lipids from a Common Human Bacterium Represent a New Class of TLR2 Ligands Capable of Enhancing Autoimmunity," appears in the December 2009 issue of The American Journal of Pathology.

Multiple sclerosis (MS), a disease where the immune system attacks the brain and spinal cord, affects nearly 1 in 700 people in the United States. Patients with multiple sclerosis have a variety of neurological symptoms, including muscle weakness, difficulty in moving, and difficulty in speech.

Porphyromas gingivalis, a common oral bacterium in humans, produces a unique type of lipid, phosphorylated dihydroceramides (DHCs), which enhance inflammatory responses. These lipids are also likely produced by bacteria found in other parts of the body including the gastrointestinal tract. To determine if these lipids accentuate immune-mediated damage in autoimmune disease, researchers led by Robert B. Clark and Frank C. Nichols of the University of Connecticut Health Center administered phosphorylated DHCs in a mouse model of MS. The severity of disease was significantly enhanced by the addition of these lipids in a manner that was dependent on activation of the immune system. These data suggest that phosphorylated DHCs from bacteria commonly found in humans may trigger or increase the severity of autoimmune diseases such as multiple sclerosis.

The authors state that "while it is clear that the immune system in most individuals has the potential to attack self-tissues, the "tipping" factors that initiate and propagate autoimmune diseases such as multiple sclerosis in only a subset of individuals remain unknown. Overall, [their] results represent the first description that phosphorylated DHCs derived from common human bacteria are capable of enhancing autoimmune disease." Thus, these lipids may function as "tipping" factors, playing a previously unrecognized role in initiating or exacerbating human autoimmune diseases. In future studies, Dr. Clark and colleagues plan to characterize the effects of phosphorylated DHCs on specific cells of the immune system and to identify how and where these lipids are deposited in tissues throughout the body. In addition to the role of these lipids in triggering and

worsening MS, the authors believe that phosphorylated DHCs may have the potential to serve both as new markers of MS disease activity and as new targets for therapeutic intervention.

This work was supported by grants from the National MS Society (RG4070-A-6) (RBC) and the Patterson Trust Foundation (FN).

There is a provisional patent application pending for the use of bacterial phosphorylated dihydroceramides. This application pertains to Dr. Frank Nichols and Dr. Robert B. Clark.

Nichols FC, Housley W, O'Conor C, Manning T, Wu S, Clark RB: Unique Lipids from a Common Human Bacterium Represent a New Class of TLR2 Ligands Capable of Enhancing Autoimmunity. Am J Pathol 175: 2430-2438

Fish food fight: Fish don't eat trees after all, says new study

Hannah Hickey hickeyh@u.washington.edu

What constitutes fish food is a matter of debate. A high-profile study a few years ago suggested that fish get almost 50 percent of their carbon from trees and leaves, evidence for a very close link between the terrestrial and aquatic ecosystems.

But new research from the University of Washington shows this is not likely to be true. Algae provide a much richer diet for fish and other aquatic life, according to research published this week in the Proceedings of the National Academy of Sciences.

"Are the fish made of maple? Our argument would be no, they're not, they're made of algae," says Michael Brett, a UW professor of civil and environmental engineering. "Other scientists have said that up to 50 percent of the carbon was coming from this terrestrial source. We're saying that's very unlikely."

The results could be important not just to fish but to people seeking to boost fish populations.

"In terms of fishery production this means you've really got to focus on the algae," Brett said. "The terrestrial environment is still important, but for other reasons such as habitat."

The new paper shows that algae are necessary ingredients for healthy zooplankton, the animals at the base of the aquatic food web. Brett's lab studies omega-3 fatty acids, the same ones touted in health studies. Fish can't produce the heart-healthy lipids, they just accumulate them from their diet. Brett's group looks at where exactly the omega-3's are coming from, largely from several groups of phytoplankton that can make these fats.

After reading the fish food study published in 2004 in the journal Nature, "we were furrowing our brows and saying 'This doesn't make sense,'" Brett said, "because the terrestrial plants aren't producing these omega-3 molecules. Those results completely conflicted with the perspective that was coming out of our own area of research."

The earlier study by the Institute for Ecosystem Studies in Millbrook, N.Y., was a large-scale experiment on three lakes in Michigan. Researchers fertilized these lakes with a labeled form of carbon dioxide sprinkled on the lakes' surfaces over more than a month. They then analyzed how much of that labeled carbon showed up in animals at each position in the aquatic food web. Even when terrestrial plant matter was only about 20 percent of the available food, they found, the animals appeared to be composed of about 50 percent land-based carbon.

The UW study took a different approach. Brett and colleagues raised zooplankton in the lab, feeding them a diet of either pure algae, pure land-based carbon, or various mixtures of the two. They found that zooplankton fed a purely land-based diet survived and reproduced but were small and produced relatively few offspring. Zooplankton fed a diet of pure algae were 10 times bigger than their tree-fed twins and produced 20 times more offspring. Zooplankton fed a mixed diet were larger and produced more offspring as the proportion of algae in their diet went up. Even when zooplankton ate almost nothing but land-based carbon, nearly all their lipids came from algae.

"I think we were able to show that the terrestrial source is such low quality that it's inconceivable that it could be nearly as important as what that study suggested," Brett said.

The research was funded by the National Science Foundation. Co-authors are Martin Kainz of the Danube University Krems in Austria and Sami Taipale and Hari Seshan of the UW.

So why did the earlier study suggest that fish were eating land-based food? Brett believes the reason is those researchers discounted the idea of zooplankton migration, the daily movement down to deeper waters during the daytime to hide from predatory fish. Researchers sprinkled tagged food in the upper waters and assumed that any other food source must be land-based.

"The flaw was that there was an alternative source. They could have been getting half of their carbon from the lower depths in the lakes," Brett said.

In recent years the earlier study has had a profound impact on the field of aquatic ecology but few scientists have critically assessed its results, Brett says. "What I would hope our paper would do is to really get people to open their eyes and say 'Does this really add up, and is there a simpler way to look at what is supporting fisheries production?'"

Food, Kin and Tension at Thanksgiving

By TARA PARKER-POPE

For Thanksgiving dinner, what side dish would you prefer to accompany your turkey - a serving of well-marinated conflict over how much or how little you eat, or some nice, fresh criticism of your cooking skills?

As families gather around the country this week to celebrate Thanksgiving, many of them are bracing for the intense emotions of the holiday meal. The combination of food and family often brings out longstanding tensions, criticism and battles for control. Simple issues like cooking with butter or asking for seconds are fraught with family conflict and commentary.

"If we had an audiotape of a lot of families talking together, you would hear so much chatter about what other people are eating, who gained weight, who lost weight, who's eating like a bird, who's having seconds," notes Cynthia M. Bulik, director of the eating disorders program at the University of North Carolina at Chapel Hill.

Dr. Bulik told the story of a patient whose mother scolded her for not eating her homemade cookies. "You don't like my cookies?" she asked. As a result, the daughter relented and took a cookie. But when she then reached for a second, her mother scolded her again. "Do you really think you need another one?" she asked her.

In another family, a mother-in-law agreed to show up for Thanksgiving only if she could be assured none of the foods would be prepared with butter. "I'm not doing butter right now," she said. "If you do butter, I'm not coming."

Many people have an unhealthy preoccupation with body image or have undiagnosed eating problems that they may then try to impose on others, said Dr. Kathryn Zerbe, professor of psychiatry at Oregon Health and Science University and a longtime expert on eating disorders.

A Long Island woman, who like others interviewed for this column didn't want to be named, said she and her family traveled 12 hours by train for a summer vacation gathering with her husband's family. When her husband asked for seconds, the sister-in-law said there wasn't any more food. "There was all this food around, but she had cut us off," the woman said. "We were just really shocked we were being told you can't eat any more after coming all this way. We found out later she really controlled food in the household."

The woman said that in her own family, she faced a different problem: the pressure to eat more. During holiday meals, her son, who has never been a big eater, was constantly pestered about not eating enough. "There was a lot of pressure on him when he would visit my family," she said. "To try to get him to eat, my mother would say this terrible thing to him. She'd say: 'You know you want to be a winner. You want to be a winner.' "

A Boston physician said that in her household, holiday meals would inevitably lead to a food fight. Her father, a headache sufferer, had quit eating chocolate years earlier and became obsessed with stopping others from eating it, blaming chocolate for causing colds and other ills. "Both of my grandmothers liked to cook chocolate cakes," she said. "He would always get angry whenever they would offer him some, and he would not infrequently cause a scene. He would fly into a rage if he thought we had some chocolate."

People who are overweight are particularly vulnerable to family criticism at holiday time. One person told the story of a mother-in-law who would prepare a huge holiday spread and then berate her overweight daughter for eating it.

"Holiday time is an extraordinarily difficult time for anybody with any kind of food issue," Dr. Zerbe said. "There are complex family relationships around eating."

If you know you have a family member with a tendency to criticize what others eat or don't eat, it might help to speak up about it and set some rules before the meal starts, Dr. Zerbe advised. Make a good-natured announcement that comments about how much or how little someone is eating are off limits, she said. "Be prepared that the person won't stop talking about it," Dr. Zerbe said. "They can't; it's a form of control. But you have to battle that intrusiveness by putting up stronger family boundaries. Intervene and intervene again."

Betsy, a high school teacher in Boston, said she had longstanding issues with her mother-in-law, some of which began after she underwent a Caesarean section. After the delivery, her mother-in-law, a slim woman, brought her only light lunches of lettuce salad, even though she was famished after nursing her baby. "Because of the incision, I couldn't go down the stairs to the kitchen," she said. "I called my husband at work, weeping, and asked him to come home and make me a peanut butter and jelly sandwich."

Betsy said her cousin also complained of holiday meal tension with her own family, so the two devised a strategy to help each other cope. Each made bingo cards, but instead of numbers, the squares were filled in with some of the negative phrases they expected to hear during the meal, like "That outfit is interesting" or "Your children won't sit still." As comments were made at the separate family celebrations, each woman would mark her card.

"Whoever fills up a bingo row first," Betsy said, "sneaks off to call the other and say, 'Bingo!'"

Really?

The Claim: Vinegar Can Help Lower Blood Sugar Levels

By ANAHAD O'CONNOR

THE FACTS Thanksgiving marks the start of a season that poses particular hazards for people with diabetes and others who are sensitive to the blood-sugar spikes that can follow big meals.

But several studies have revealed a possible way to reduce the impact of a carb-laden dish: add a little vinegar. Doing so seems to help slow the absorption of sugar from a meal into the bloodstream, apparently because vinegar helps block digestive enzymes that convert carbohydrates into sugar.

One study by Italian researchers showed, for example, that when healthy subjects consumed about 4 teaspoons (20 milliliters) of white vinegar as a salad dressing with a meal that included white bread with a little less than 2 ounces (50 grams) of carbohydrates, there was a 30 percent reduction in their glycemic response, or rise in blood sugar, compared with subjects who had salad with a dressing made from neutralized vinegar.

In 2004, a study published in Diabetes Care, a journal of the American Diabetes Association, found similar effects in people with diabetes or insulin resistance who consumed a vinegar solution or placebo before a carb-heavy meal.

Nothing replaces increased physical activity and portion control, said Sue McLaughlin, a spokeswoman for the diabetes association. But people with diabetes might find it worth a try, she said, to consume two similar meals - one with vinegar, and another without - and compare their effect on blood sugar.

THE BOTTOM LINE Studies suggest that adding vinegar to a meal may reduce its impact on blood sugar.

Personal Health

Exploring a Low-Acid Diet for Bone Health

By JANE E. BRODY

The science of osteoporosis and its resultant fractures has long been plagued by some vexing observations. Why, for example, are osteoporotic fractures relatively rare in Asian countries like Japan, where people live as long or longer than Americans and consume almost no calcium-rich dairy products? Why, in Western countries that consume the most dairy foods, are rates of osteoporotic fractures among the highest in the world? And why has no consistent link been found between the amount of calcium people consume and protection against osteoporosis?

An alternative theory of bone health may — or may not — explain these apparent contradictions. It is the theory of low-acid eating, a diet laden with fruits and vegetables but relatively low in acid-producing protein and moderate in cereal grains. Its proponents suggest that this menu plan could lead to stronger bones than the typical American diet rich in dairy products and animal protein, often enhanced by calcium supplements.

These dietary changes might even prevent or delay other chronic conditions that rob far too many people of a wholesome old age.

The low-acid theory was first fully promulgated in 1968 by two American doctors in the leading medical journal The Lancet and has since been the subject of much debate and confusion among bone specialists.

The science behind low-acid eating and the research findings that do, and do not, support it have been spelled out in a new book, "Building Bone Vitality," by Amy Joy Lanou, an assistant professor of health and wellness at the University of North Carolina at Asheville, and Michael Castleman, a health writer.

At the same time, researchers at the Yale School of Medicine are studying the possible bone benefits of adding protein supplements to the diets of older Americans who habitually consume low levels of protein.

Dr. Karl Insogna, a professor of internal medicine directing the study, said in an interview that the 18-month placebo-controlled study would determine whether raising protein intake to a more normal range could increase bone mineral density and help prevent osteoporosis in people over age 60.

Science of the Skeleton

Bones are not immutable. Rather, they are continually being broken down and rebuilt, and when breakdown exceeds buildup, they get progressively weaker. Vital to the solid framework of the body, bones play an equally important metabolic role hidden from casual observation.

Bones are the storage tank for calcium compounds that regulate the acid-base balance of the blood, which must be maintained within a very narrow range. When the blood becomes even slightly too acid, alkaline calcium compounds - like calcium carbonate, the acid-neutralizer in Tums - are leached from bones to reduce the acidity.

Studies by Dr. Bess Dawson-Hughes, at the Jean Mayer U.S.D.A. Human Nutrition Research Center on Aging at Tufts University, and collaborators have demonstrated the acid-neutralizing ability of fruits and vegetables and the crucial role they can play in maintaining healthy bones.

The researchers note that fruits and vegetables are predominantly metabolized to alkaline bicarbonate, whereas proteins and cereal grains are metabolized to acids. The more protein people consume beyond the body's true needs, the more acidic their blood can become and the more alkaline compounds are needed to neutralize the acid.

In one study by Dr. Dawson-Hughes and colleagues, published in January in The Journal of Clinical Endocrinology and Metabolism, 171 healthy men and women age 50 and older were treated with either bicarbonate or no bicarbonate. Those receiving bicarbonate, in an amount equivalent to nine servings of fruits and vegetables daily, experienced much lower levels of calcium loss in the urine, as well as a loss of N-telopeptide, the biochemical marker of bone resorption.

(By contrast, Dr. Insogna said that although eating more protein raised the loss of calcium in urine, it also improved intestinal absorption of calcium and thus might not result in bone loss.)

The Dawson-Hughes team concluded that increasing the alkaline content of the diet by eating more fruits and vegetables should be studied as a safe and low-cost approach to preventing osteoporosis and improving bone health in older Americans.

The finding is consistent with current recommendations from several federal health agencies to consume nine servings daily of fruits and vegetables. That amount has been shown to lower blood pressure and has been linked to a reduced risk of developing heart disease, stroke, diabetes, some cancers and Alzheimer's disease. Now prevention of osteoporosis might be added to the list.

As the book authors point out, "animal foods, especially cheeses and meats, don't contain much alkaline material" and hardly enough to "neutralize all the acids they introduce into the bloodstream; the body must draw calcium compounds from bone to restore optimal blood pH," a measure of acidity. On the other hand, the alkaline material in fruits and vegetables, which are low in protein, can buffer that acidity.

Except for hard cheeses, which are acid-producing, most dairy foods, including milk, are "metabolized to compounds that are essentially neutral," Dr. Dawson-Hughes said.

In their exhaustive review of the scientific literature, Dr. Lanou and Mr. Castleman found that "two-thirds of clinical trials show that milk, dairy foods and calcium supplements do not prevent fractures." They conclude that the high fracture rate in countries that consume the most milk and dairy products results from the fact that "these affluent Western countries also consume the most meat, poultry and fish."

Lessons From Research

This does not mean that older people, many of whom chronically consume too little protein, should avoid this essential nutrient, which helps prevent frailty and the falls that result in fractures. Nor must people become vegetarians to maintain strong bones.

But it does suggest that those at the high end of protein consumption may be better off eating less protein in general and less animal protein in particular and replacing it with more fruits and vegetables. Consider adhering to the amount of protein that health experts recommend, which has a built-in safety factor of 45 percent above the minimum daily requirement and is based on ideal (not actual) body weight and age.

For an adult, that amount in grams is 0.36 multiplied by ideal body weight. Thus, a woman who should weigh 120 pounds needs only 44 grams of protein a day, the amount in 3 ounces of flounder, one piece of tofu and a cup of cooked bulgur. A 60-pound 8-year-old (the multiplier is 0.55) would need only 2 ounces of chicken and one-half cup of cottage cheese to get the recommended 32 grams of protein.

Tulane University Surgeon Pioneers 'Scarless' Thyroid Surgery

Tulane University School of Medicine surgeon Dr. Emad Kandil is one of the first in the country to perform a new form of endoscopic surgery that uses a small incision under the arm to remove all or a portion of the thyroid or parathyroid glands without leaving a scar on the neck.

The technique, which was approved by the U.S. Food and Drug Administration this summer, uses the latest Da Vinci® three-dimensional, high-definition robotic equipment to make a two-inch incision below the armpit that allows doctors to maneuver a small camera and specially designed instruments between muscles to access the thyroid. The diseased tissue is removed endoscopically through the armpit incision.

"This is an exciting new treatment option for certain patients who need thyroid surgery but are concerned about having a visible and permanent neck scar," says Kandil, who is chief of the Endocrine Surgery Section, assistant professor of surgery and adjunct assistant professor of otolaryngology at Tulane. "This technique safely removes the thyroid without leaving so much as a scratch on the neck."

Traditional thyroidectomies can involve a long incision at the base of the neck.

Kandil is performing the "scarless" thyroidectomy surgery at Tulane Medical Center and is one of only a few surgeons in the United States trained in the technique. In fact, he chairs an annual symposium at Tulane to

teach surgeons how to perform minimally invasive thyroid surgery and will be teaching the technique to doctors from across the country.

The new technique has benefits that go beyond aesthetics. Unlike other forms of endoscopic thyroid surgery, it doesn't require blowing gas into the neck to create space to perform the operation. Those techniques can risk complications if the gas is retained in the neck or chest after surgery, causing significant discomfort and postoperative complications. Because the robotic camera provides three-dimensional viewing with image magnification up to 10 times normal, the surgery is very precise so there is a reduced likelihood of laryngeal nerve damage and less risk of trauma to the parathyroid glands, which are near the thyroid. Kandil says patients have reported less discomfort and faster recovery times after the new procedure.

Robotic transaxillary thyroid surgery was originally developed in South Korea by Dr. Woong Chaung, associate professor of surgery at Yonsei University College of Medicine in Seoul.

The thyroid is a hormone-producing gland that regulates the body's metabolism and affects critical body functions, such as energy level and heart rate. Thyroid surgery is frequently used to treat thyroid cancer and is sometimes the preferred approach to dealing with goiter, nodules or an overactive thyroid. An estimated 20 million Americans have some form of thyroid disease and women are five to eight times more likely than men to have thyroid problems, according to the American Thyroid Association.

Can you be blamed for sleepwalking crimes?

* 16:17 24 November 2009 **by Linda Geddes**

A man strangles his wife while dreaming about fighting off intruders in his sleep. Does that make him mad, bad or innocent? Recent research is helping to unpick these issues, and may help reveal who, if anyone, bears responsibility in such cases.

Last week, British man Brian Thomas appeared in court on a murder charge after strangling his wife as they slept in their camper van. The prosecution withdrew the charges after three psychiatrists testified that locking him up would serve no useful purpose. The judge said that Thomas bore no responsibility for his actions.

The case has cast a spotlight on the use of such sleepwalking defences in court. "If you look at the media reports there appears to be an upsurge in the use of the sleepwalking defence," says Michel Cramer-Bornemann of the Minnesota Regional Sleep Disorders Center in Minneapolis.

Thomas had a genuine sleep disorder, but Cramer-Bornemann is concerned that in many other cases, the sleepwalking and other sleep-related defences are misused. Studies on the causes of sleepwalking may eventually make it easier to identify who has a genuine sleep disorder that could occasionally result in violence, and who is making it up.

Lucid dreamers

Last month, Ursula Voss of Bonn University in Germany and colleagues reported that even during lucid dreaming – a state in which some people claim to be able to control their dreams – some areas of the brain associated with intent stayed offline, while other areas associated with consciousness were active. "As long as you are in a dream, you have no free rein on your actions and emotions," says Voss (Sleep, vol 32, p 1191).

Although this research didn't look specifically at sleepwalkers, it tallies with a previous study by Claudio Bassetti at the University of Zurich in Switzerland, who once managed to manoeuvre a sleepwalker into a brain scanner during a sleepwalking episode. He found the sleepwalker also showed no activation in the areas of the brain associated with intent, though emotional areas and those associated with movement were active (The Lancet, DOI: 10.1016/S0140-6736(00)02561-7).

"Our judgement is off and our ability to act out emotionally is on," says Rosalind Cartwright of the Sleep Disorder Service and Research Center in Chicago. She believes a confirmed diagnosis of sleepwalking would make a strong defence in court, but says better tests are needed to establish who has a genuine sleep disorder.

Sparking sleepwalking

That might become easier with the recent discovery that auditory stimuli, such as a dog barking, can trigger sleepwalking in those susceptible to it – particularly if they have been suffering from sleep deprivation. Antonio Zadra at the University of Montreal in Quebec, Canada, and his colleagues measured the brain activity of 10 sleepwalkers and 10 control subjects to determine what stage of sleep they were in.

They found that sounding a buzzer during "slow wave" sleep triggered sleepwalking in three of the sleepwalkers under normal circumstances, and all 10 sleepwalkers when they had been kept awake for 25 hours prior to sleeping. None of the control subjects were prompted to sleepwalk when the buzzer was sounded (Neurology, vol 70, p 2284).

The study might eventually enable a test for genuine sleepwalkers. "That's a big breakthrough," says Cartwright. Until recently, defence lawyers used evidence of sleepwalking in childhood or a family history of the activity to back up their claims.

However, Zadra cautions that other factors, like having the motivation to commit a crime, must also be taken into account. "We should not forget that some sleepwalkers can be criminals," he says.

First 'genetic map' of Han Chinese may aid search for disease susceptibility genes

Genome Institute of Singapore researchers compiled map based on genome-wide variations of 6,000 samples

The first genetic historical map of the Han Chinese, the largest ethnic population in the world, as they migrated from south to north over evolutionary time. was published online today by the American Journal of Human Genetics by scientists at the Genome Institute of Singapore (GIS).

Based on genome-wide DNA variation information in over 6,000 Han Chinese samples from 10 provinces in China, this new map provides information about the population structure and evolutionary history of this group of people that can help scientists to identify subtle differences in the genetic diversity of Asian populations.

Understanding these differences may aid in the design and interpretation of studies to identify genes that confer susceptibility to such common diseases as diabetes in ethnic Chinese individuals. Understanding these differences also is crucial in exploring how genes and environment interact to cause diseases.

With the genetic map, the GIS scientists were able to show that the northern inhabitants of China were genetically distinguishable from those in the south, a finding that seems very consistent with the Han Chinese's historical migration pattern.

The genetic map also revealed that the genetic divergence was closely correlated with the geographic map of China. This finding suggests the persistence of local co-ancestry in the country.

"The genome-wide genetic variation study is a powerful tool which may be used to infer a person's ancestral origin and to study population relationships," said Liu Jianjun, Ph.D., GIS Human Genetics Group Leader.

"For example, an ethnic Chinese born and bred in Singapore can still be traced back to his or her ancestral roots in China," Dr. Liu said. "By investigating the genome-wide DNA variation, we can determine whether an anonymous person is a Chinese, what the ancestral origin of this person in China may be, and sometimes which dialect group of the Han Chinese this person may belong to.

"More importantly, our study provides information for a better design of genetic studies in the search for genes that confer susceptibility to various diseases," he added.

Of particular interest to people in Singapore are the findings that while the majority of Singaporean Chinese hail from Southern China as expected, some have a more northern ancestral origin.

GIS Executive Director Edison Liu, M.D., said, "Genome association studies have provided significant insights into the genes involved in common disorders such as diabetes, high cholesterol, allergies, and neurological disorders, but most of this work has been done on Caucasian populations.

"More recently, Dr. Liu Jianjun from our institute has been working with his Chinese colleagues to define the genetic causes of some of these diseases in Asian populations," the GIS Executive Director added. "This work refined those tools so that the results will not be obscured by subtle differences in the genetic diversity of Asian populations. In the process, Dr. Liu has reconstructed a genetic historical map of the Chinese people as they migrated from south to north over evolutionary time."

"There are definite differences in genetic architecture between populations," noted Chia Kee Seng, M.D., Head, Department of Epidemiology & Public Health, National University of Singapore (NUS), and Director, NUS-GIS Centre for Molecular Epidemiology.

"We have seen this in the Singapore Genome Variation Project, a Joint NUH-GIS effort. Understanding these differences is crucial in exploring how genes and environment interact to cause diseases," he added.

The research results published in American Journal of Human Genetics is part of a larger ongoing project on the genome-wide association study of diseases among the Chinese population. The project is a collaboration between GIS and several institutions and universities in China.

In Jan. 2009, Nature Genetics published the findings of researchers at the GIS and Anhui Medical University, China, on psoriasis, a common chronic skin disease. In that study, led by Dr. Liu Jianjun at the GIS and Dr. Zhang Xuejun at the Anhui Medical University, the scientists discovered a genetic variant that provides protection against the development of psoriasis. The collaboration's recent discovery of over a dozen genetic risk variants for systematic lupus erythematosus (SLE) in the Chinese population was published in Nature Genetics in Oct. 2009.

The American Journal of Human Genetics paper is titled, "Genetic Structure of the Han Chinese Population Revealed by Genome-wide SNP Variation."

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Medical students regularly stuck by needles, often fail to report injuries

Johns Hopkins research suggests least-skilled providers at risk for life-threatening infections

Medical students are commonly stuck by needles — putting them at risk of contracting potentially dangerous blood-borne diseases — and many of them fail to report the injuries to hospital authorities, according to a Johns Hopkins study published in the December issue of the journal Academic Medicine.

Researchers surveyed surgery residents at 17 medical centers and, of 699 respondents, 415 (or 59 percent) said they had sustained a needlestick injury as a medical student. Many said they were stuck more than once. Of the surgeons-in-training whose most recent needlestick occurred in medical school, nearly half of them did not report their injury to an employee health office, thereby avoiding an evaluation as to whether they needed treatment to prevent HIV or hepatitis C.

It is estimated that 600,000 to 800,000 needlesticks and other similar injuries are reported annually among U.S. health care workers and there is evidence of vast underreporting, says Martin A. Makary, M.D., M.P.H., an associate professor of surgery at the Johns Hopkins University School of Medicine and lead researcher for the study. “Medical schools are not doing enough to protect their students and hospitals are not doing enough to make medical school safe," he says. "We, as a medical community, are putting our least skilled people on the front lines in the most high-risk situations. Most trainees are still forced to learn to sew and stitch on patients, which puts both providers and patients at risk."

Makary says medical schools should take advantage of advances in simulation technology and do less training on actual human beings until they are more skilled.

The authors of the study believe that needlesticks go unreported due to cumbersome reporting procedures, fears about poor clinical evaluations by their by their superiors, or embarrassment. The most commonly given reason in the study for why the medical students didn't report needle injuries was the amount of time involved in making a report.

The survey did find, however, that medical students were very likely (92 percent) to report the needlestick if the patient was at high risk for having a virus like HIV or hepatitis, compared with 47 percent of injuries involving low-risk patients. Still, prompt reporting of all needlestick injuries is critical to ensuring proper medical prophylaxis, counseling and legal precautions, Makary says. Very few people who follow proper protocol and seek treatment after a needlestick get sick, he says.

"Hospitals are not creating a culture of speaking up," says Makary, who is also the Mark Ravitch Chair of Gastrointestinal Surgery and director of the Johns Hopkins Center for Surgical Outcomes Research. "If people are not speaking up regarding their own safety concerns, it's probably a surrogate marker of people not speaking up about patient safety concerns."

Most of the needlesticks among medical students were self-inflicted and occurred in the operating room when the student felt rushed.

Makary says that needlestick injuries in surgery can infect patients since the providers' blood can enter the patient's wound. He argues that hospitals need to create a culture of reporting errors and stop placing their newest trainees at the greatest risk for infection. He also says that since medical students are at significant risk of personal injury during clinical training, more needs to be done to educate them about the importance of reporting any needlesticks, the value of post-exposure treatment and on how to prevent future injuries.

At The Johns Hopkins Hospital, for example, a hotline has been instituted for all occupational blood exposures. After such a report is received, a rapid response team is activated to deliver appropriate care while

preserving confidentiality. The study was supported by the Mr. and Mrs. Chad Richison Foundation and the Lotus Global Health Foundation.

Other researchers on the study include Marta M. Gilson, Ph.D., and Hari Nathan, M.D., both of Johns Hopkins, and Giriraj K. Sharma, M.S., a student at George Washington University School of Medicine & Health Sciences.

Study sheds light on brain's fear processing center

Breathing carbon dioxide can trigger panic attacks, but the biological reason for this effect has not been understood. A new study by University of Iowa researchers shows that carbon dioxide increases brain acidity, which in turn activates a brain protein that plays an important role in fear and anxiety behavior.

The study, published in the Nov. 25 issue of the journal Cell, offers new possibilities for understanding the biological basis of panic and anxiety disorders in general and may suggest new approaches for treating these conditions.

The researchers focused on a brain protein known as acid-sensing ion channel 1a (ASIC1a). This protein is abundant in the amygdala - the region deep in the brain that processes fear signals and directs fear behavior. The UI team previously found that blocking or removing ASIC1a reduces innate fear and alters fear memory in mice.

"As long ago as 1918, scientists learned that carbon dioxide triggers abnormal responses in patients with anxiety disorders, but our study provides the first molecular evidence for a mechanism that explains how carbon dioxide can trigger fear and anxiety," said John Wemmie, M.D., Ph.D., associate professor of psychiatry and neurosurgery at the UI Carver College of Medicine and a staff physician and researcher at the Iowa City Veterans Affairs Medical Center. "The findings are a foundation for saying that ASIC proteins in the amygdala might play a key role in sensitivity to carbon dioxide."

In addition to helping explain why breathing carbon dioxide can trigger panic attacks, the study also suggests a new role for the amygdala as a sensor that can detect certain fear signals for itself.

"This is a new finding that the amygdala, which is considered the brain's computer processor for fear, can also function as a sensor for detecting chemical signals - carbon dioxide and acidity (low pH) - that are known to trigger panic attacks in susceptible individuals," Wemmie said.

Carbon dioxide inhalation can be deadly at high doses. The study suggests that evolution may have provided humans with a vital ability to detect and respond rapidly to carbon dioxide by placing within the same brain region the ability to detect the threat posed by carbon dioxide and the ability to initiate a "fight or flight" response.

The new study shows that inhaled carbon dioxide increases brain acidity and evokes fear behavior in mice by activating ASIC1a in the amygdala. Fear memory is also enhanced when carbon dioxide activates the protein.

Conversely, the study team, including first author Adam Ziemann, M.D., Ph.D., found that making brain tissue less acidic (raising brain pH) blunted fear behavior produced by carbon dioxide and reduced learned fear.

"It's been suggested that controlling breathing with breath exercises could have anti-anxiety effects," Wemmie said. "Our results make me wonder if some of those breath exercises to control fear and anxiety might be acting by inhibiting the ASIC channels in the amygdala by raising the pH."

Wemmie and his colleagues are now investigating whether ASIC1a abnormalities contribute to panic and anxiety disorder in people or to carbon dioxide sensitivity in patients with panic disorder.

If ASIC1a plays the same role in people as the studies suggest it does in mice, then drugs that target ASIC channels or strategies that alter brain acidity could hold promise for treating a wide range of panic and anxiety disorders.

In addition to Wemmie and Ziemann, the research team included Jason Allen; Nader Dahdaleh, M.D.; Iuliia Drebot, Ph.D.; Matt Coryell, Ph.D.; Amanda Wunsch; Cynthia Lynch; Frank Faraci, M.D., professor of internal medicine; Matthew Howard, M.D., professor and head of neurosurgery; and Michael Welsh, M.D., who is a Howard Hughes Medical Institute investigator and UI professor of internal medicine and molecular physiology and biophysics.

Cup of mint tea 'can kill pain'

A cup of Brazilian mint tea has pain relieving qualities to match those of commercially available analgesics, a study suggests. Hyptis crenata has been prescribed by Brazilian healers for millennia to treat ailments from headaches and stomach pain to fever and flu.

Working on mice, a Newcastle University team has proved scientifically that the ancient medicine men were right. The study is published in the journal Acta Horticulturae.

In order to mimic the traditional treatment as closely as possible, the Newcastle team carried out a survey in Brazil to find out how the medicine is typically prepared and how much should be consumed.

The most common method was to produce a decoction. This involves boiling the dried leaves in water for 30 minutes and allowing the liquid to cool before drinking it as a tea. The team found that when the mint was

given at a dose similar to that prescribed by traditional healers, the medicine was as effective at relieving pain as a synthetic aspirin-style drug called Indometacin.

They plan to launch clinical trials to find out how effective the mint is as a pain relief for people.

Lead researcher Graciela Rocha said: "Since humans first walked the Earth we have looked to plants to provide a cure for our ailments - in fact it is estimated more than 50,000 plants are used worldwide for medicinal purposes. "Besides traditional use, more than half of all prescription drugs are based on a molecule that occurs naturally in a plant.

"What we have done is to take a plant that is widely used to safely treat pain and scientifically proven that it works as well as some synthetic drugs. "Now the next step is to find out how and why the plant works."

Graciela is Brazilian and remembers being given the tea as a cure for every childhood illness.

'Interesting research'

She said: "The taste isn't what most people here in the UK would recognize as a mint. "In fact it tastes more like sage which is another member of the mint family. "Not that nice, really, but then medicine isn't supposed to be nice, is it?"

Dr Beverly Collett, chair of the Chronic Pain Policy Coalition, said: "Obviously further work needs to be done to identify the molecule involved, but this is interesting research into what may be a new analgesic for the future. "The effects of aspirin-like substances have been known since the ancient Greeks recorded the use of the willow bark as a fever fighter. "The leaves and bark of the willow tree contain a substance called salicin, a naturally occurring compound similar to acetylsalicylic acid, the chemical name for aspirin."

The research is being presented at the International Symposium on Medicinal and Nutraceutical Plants in New Delhi, India.

How to 'unlock' the brains of coma patients

Celeste Biever, biomedical news editor

There will be few who didn't shiver when they heard the story of Rom Houben, a 46-year old Belgian man believed to be in a coma for over 20 years, who it has now emerged was conscious the whole time.

How many other people are out there, imprisoned by their own bodies? How might we discover more of them?

Apart from avoiding a repeat of Houben's nightmare, being able to detect full, and residual, consciousness in patients who are apparently comatose is important for other reasons. It can change how someone who is paralysed is treated, whether their relatives continue to try and communicate with them, what medication they are given, and even the biggest decision of all; whether or not to keep them alive.

After a near-fatal car crash in 1983, doctors presumed Houben was in a vegetative state, in which he could feel or hear nothing.

But recently Steven Laureys, a leading coma researcher at the University of Liège in Belgium, discovered using a brain scan that Houben was completely conscious, just paralysed. He has since been provided with a special touchscreen, which he uses to communicate using residual movement in a finger.

"Powerlessness. Utter powerlessness. At first I was angry, then I learned to live with it," Houben tapped out on to the screen during an interview, according to the Associated Press.

Wired is now reporting that "these may not be his words at all" because they are delivered with assistance from an aide who helps guide his finger to the letters on the touchscreen, a technique known as "facilitated communication". However, Wired also says that, even though Houben is not actually constructing these sentences, this "does not alter the fact of his misdiagnosis".

Consciousness, because it is subjective, is extremely difficult to detect.

Earlier this year, Laureys, together with other researchers, made a step towards this goal when he re-diagnosed 44 patients thought to be in a vegetative state and found that 18, or 41 per cent, were in fact "minimally conscious", a kind of twilight zone between consciousness and unconsciousness, in which pain can be felt and recovery to full consciousness is more likely. They concluded that many more people currently presumed to be in a coma, may, like Houben, have residual or even full consciousness.

The tool they used was the Coma Recovery Scale-Revisited (CRSR), a systematic set of behavioural tests and the only tool specifically designed to tell the difference between a vegetative and minimally conscious state.

As well as guarding against missing awareness in someone who pops in and out of consciousness, or mistaking a reflexive response for a response based on consciousness, the CRSR makes use of some new insights, such as using a mirror to see how someone responds to a reflection of themselves.

But in addition to better behavioural tests, another option for avoiding cases like Houben's is to use a brain scan to find some signature of consciousness. This would work like a "consciousness meter" that doesn't rely on a doctor's subjective assessment.

Laureys discovered Houben was conscious when his brain was scanned using functional magnetic resonance (fMRI) imaging, which revealed that it was "functioning almost normally", according to The Guardian.

Brain scans were also used in another study in 2006, when Laureys, together with Adrian Owen of the University of Cambridge showed that some patients in a vegetative state show certain patterns of brain activity that suggest they can understand speech.

The brain of one patient, thought to be in a vegetative state, responded differently when she was asked to imagine playing or moving around her home, indicating that she could understand the task - and was obeying it.

Laureys is also working on finding a consciousness signature using the default mode network, a network of brain regions that is active when we daydream.

In 2008, he reported that activity in this network varied in proportion to the amount of brain damage. Minimally conscious patients had a 10 per cent reduction compared with healthy individuals, activity was reduced by 35 per cent in coma patients and those in a persistent vegetative state (PVS), and there was no activity at all in the default network of a coma patient.

Patients in the minimally conscious state were also shown recently to be capable of learning, a finding that might also help to distinguish them from patients in a vegetative state, and that might even help them recover.

It's never going to be easy to detect consciousness - but by raising awareness of the problem, and exploring a variety of consciousness signatures based on behavioural tests and brain scans - hopefully we can start "unlocking" more people like Houben.

Device spells doom for superbugs

By Jason Palmer Science and technology reporter, BBC News

Researchers have demonstrated a prototype device that can rid hands, feet, or even underarms of bacteria, including the hospital superbug MRSA. The device works by creating something called a plasma, which produces a cocktail of chemicals in air that kill bacteria but are harmless to skin.

A related approach could see the use of plasmas to speed the healing of wounds. Writing in the New Journal of Physics, the authors say plasmas could help solve gum disease or even body odour.

Plasmas are known as the fourth state of matter, after solid, liquid, and gas. They are a soup of atoms that have had their electrons stripped off by, for example, a high voltage. Plasmas are common elsewhere in the cosmos, where high-energy processes produce them, and they are even posited as a potential source of fusion energy. Their properties have recently been harvested for use in plasma televisions.

Deadly cocktail

But the new research focuses on so-called cold atmospheric plasmas. Rather than turning a whole group of atoms into plasma, a more delicate approach strips the electrons off just a few, sending them flying. Collisions with nearby, unchanged atoms slows down the electrons and charged atoms or ions they leave behind.

It has been known for some time that the resulting plasma is harmful to bacteria, viruses, and fungi - the approach is already used to disinfect surgical tools.

"It's actually similar to what our own immune system does," said Gregor Morfill, of the Max Planck Institute for Extraterrestrial Physics, who led the research. "The plasma produces a series of over 200 chemical reactions that involve the oxygen and nitrogen in air plus water vapour - there is a whole concoction of chemical species that can be lethal to bacteria," he told BBC News.

Professor Morfill and his colleagues have worked out the precise details of the plasma production that effectively kills off such bugs without doing harm to skin, and demonstrated a number of prototype devices that do the job efficiently. "To produce plasmas efficiently at low cost so you can really mass produce these things for hospitals, that's the big breakthrough of the last year," Professor Morfill said.

The team says that an exposure to the plasma of only about 12 seconds reduces the incidence of bacteria, viruses, and fungi on hands by a factor of a million - a number that stands in sharp contrast to the several minutes hospital staff can take to wash using traditional soap and water.

More applications

Professor Morfill said that the approach can be used to kill the bacteria that lead to everything from gum disease to body odour. "The idea is scalable to any size, it can be produced in any shape; it's very flexible," he said. "You can even make it battery-operated so you can use small devices - I have one in my hand right now."

A similar approach, using the element argon instead of plain air, has been demonstrated for application directly to wounds, and initial indications are that it speeds healing.

Michael Kong, a bioelectrics engineering researcher at Loughborough University, said it remains unclear whether those effects are through the chemical cocktail that the plasma produces, or simply from the effect of reducing the number of bacteria crowding a wound. "Either way, it is still a very important breakthrough," Professor Kong told BBC News.

"The ideas are not new - but only recently, collectively, has this community of researchers come up with plasma sources that achieve disinfection but also have minimal impact on skin cells."

Professor Morfill said that more testing of the devices is necessary before they end up in widespread use, but he said that there is already significant interest from industry.

HIV infections on the decline

Jessica Hamzelou, reporter

The rate of new infections of HIV is finally on the decline, according to a new report published by the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO).
The 2009 AIDS Epidemic Update (PDF) reports that, globally, new cases of HIV are down by 17 per cent from 2001. While figures are levelling off in eastern Europe, there are 25 per cent fewer new infections in east Asia. These optimistic figures have been put down to increased funding and improved availability of drugs to treat the disease. Antiretroviral therapy coverage rose from 7 per cent to 42 per cent over the last five years, says the report.

However, it's not all good news. Although the number of AIDS-related deaths has fallen by 10 per cent, better survival rates mean more people are living with HIV than ever before. Around 2.7 million people were infected with HIV in 2008, bringing the total number of cases to 33.4 million.

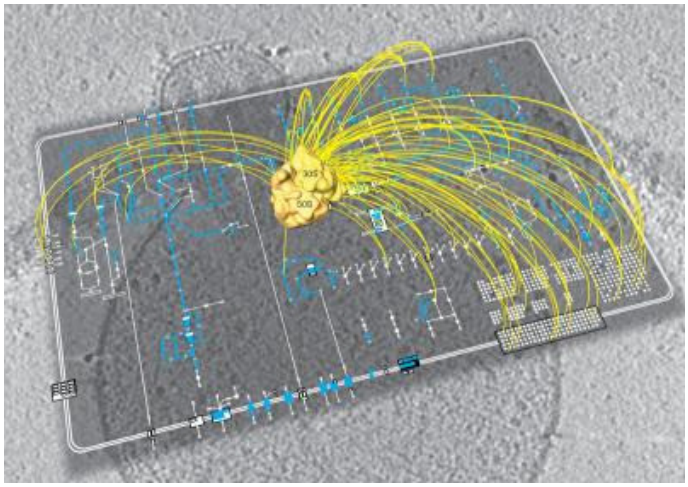
Margaret Chan, director-general of the WHO, said: "We cannot let this momentum wane. Now is the time to redouble our efforts, and save many more lives."

The authors of the report also warn that the AIDS epidemic is evolving, with increasing rates of transmission amongst heterosexual couples. In China, the thriving sex industry is partly to blame for this. The report calls for HIV support programmes to adapt to this changing face of AIDS.

First-ever blueprint of a minimal cell is more complex than expected

EMBL and CRG scientists reveal what a self-sufficient cell can't do without

Heidelberg – What are the bare essentials of life, the indispensable ingredients required to produce a cell that can survive on its own? Can we describe the molecular anatomy of a cell, and understand how an entire organism functions as a system? These are just some of the questions that scientists in a partnership between the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany, and the Centre de Regulacio Genòmica (CRG) in Barcelona, Spain, set out to address. In three papers published back-to-back today in Science, they provide the first comprehensive picture of a minimal cell, based on an extensive quantitative study of the biology of the bacterium that causes atypical pneumonia, Mycoplasma pneumoniae. The study uncovers fascinating novelties relevant to bacterial biology and shows that even the simplest of cells is more complex than expected.



This image represents the integration of genomic, metabolic, proteomic, structural and cellular information about Mycoplasma pneumoniae in this project: one layer of an Electron Tomography scan of a bottle-shaped M. pneumoniae cell (grey) is overlaid with a schematic representation of this bacterium's metabolism, comprising 189 enzymatic reactions, where blue indicates interactions between proteins encoded in genes from the same functional unit. Apart from these expected interactions, the scientists found that, surprisingly, many proteins are multifunctional. For instance, there were various unexpected physical interactions (yellow lines) between proteins and the subunits that form the ribosome, which is depicted as an Electron microscopy image (yellow). **Takuji Yamada /EMBL**

Mycoplasma pneumoniae is a small, single-cell bacterium that causes atypical pneumonia in humans. It is also one of the smallest prokaryotes – organisms whose cells have no nucleus – that don't depend on a host's cellular machinery to reproduce. This is why the six research groups which set out to characterize a minimal cell in a project headed by scientists Peer Bork, Anne-Claude Gavin and Luis Serrano chose M. pneumoniae as a model: it is complex enough to survive on its own, but small and, theoretically, simple enough to represent a minimal cell – and to enable a global analysis.

A network of research groups at EMBL's Structural and Computational Biology Unit and CRG's EMBL-CRG Systems Biology Partnership Unit approached the bacterium at three different levels. One team of scientists described M. pneumoniae's transcriptome, identifying all the RNA molecules, or transcripts, produced from its DNA, under various environmental conditions. Another defined all the metabolic reactions that occurred in it, collectively known as its metabolome, under the same conditions. A third team identified every multi-protein complex the bacterium produced, thus characterising its proteome organisation.

"At all three levels, we found M. pneumoniae was more complex than we expected", says Luis Serrano, co-initiator of the project at EMBL and now head of the Systems Biology Department at CRG.

When studying both its proteome and its metabolome, the scientists found many molecules were multifunctional, with metabolic enzymes catalyzing multiple reactions, and other proteins each taking part in more than one protein complex. They also found that M. pneumoniae couples biological processes in space and time, with the pieces of cellular machinery involved in two consecutive steps in a biological process often being assembled together.

Remarkably, the regulation of this bacterium's transcriptome is much more similar to that of eukaryotes – organisms whose cells have a nucleus – than previously thought. As in eukaryotes, a large proportion of the transcripts produced from M. pneumoniae's DNA are not translated into proteins. And although its genes are arranged in groups as is typical of bacteria, M. pneumoniae doesn't always transcribe all the genes in a group together, but can selectively express or repress individual genes within each group.

Unlike that of other, larger, bacteria, M. pneumoniae's metabolism doesn't appear to be geared towards multiplying as quickly as possible, perhaps because of its pathogenic lifestyle. Another surprise was the fact that, although it has a very small genome, this bacterium is incredibly flexible and readily adjusts its metabolism to drastic changes in environmental conditions. This adaptability and its underlying regulatory mechanisms mean M. pneumoniae has the potential to evolve quickly, and all the above are features it also shares with other, more evolved organisms.

"The key lies in these shared features", explains Anne-Claude Gavin, an EMBL group leader who headed the study of the bacterium's proteome: "Those are the things that not even the simplest organism can do without and that have remained untouched by millions of years of evolution – the bare essentials of life".

This study required a wide range of expertise, to understand M. pneumoniae's molecular organisation at such different scales and integrate all the resulting information into a comprehensive picture of how the whole organism functions as a system – an approach called systems biology.

"Within EMBL's Structural and Computational Biology Unit we have a unique combination of methods, and we pooled them all together for this project", says Peer Bork, joint head of the unit, co-initiator of the project, and responsible for the computational analysis. "In partnership with the CRG group we thus could build a complete overall picture based on detailed studies at very different levels." Bork was recently awarded the Royal Society and Académie des Sciences Microsoft Award for the advancement of science using computational methods. Serrano was recently awarded a European Research Council Senior grant.

How to wind snail shells up the wrong way

* 15:48 26 November 2009 **by Andy Coghlan**

Prod a snail embryo with fine glass rods and you can make its shell coil in the opposite direction to normal.

This gives an insight into how and when bodily symmetry is controlled through a mixture of genetic programming and physical forces. "The onset of left-right symmetry in vertebrates is still unknown, and our work may shed light on this," says Reiko Kuroda, who led the team at the University of Tokyo, Japan, that reversed snail "handedness".

Kuroda and her colleagues worked with a snail species whose cone and bodily symmetry can be either right or left-"handed", depending on the action of a gene in the mother snail called nodal.

By prodding embryos gently with glass rods at the eight-cell stage, they could reverse the genetically determined handedness of each snail.

From that point on, all the symmetry of the snail was completely reversed from what would be expected from its ancestors, including the bodily position of organs such as the heart or anus, and the direction of coiling in the conical shell.

Just getting orientated (Image: Kuroda laboratory)

He's got grandmother's shell

Yet the usual inherited symmetry was restored in descendants of the altered snails, proving that the nodal gene has the ultimate say in handedness unless its programming is physically disrupted at the eight-cell stage.

"We override the function of the handedness gene, but not the gene itself," says Kuroda. "The manipulated snails went on to produce offspring with genetically determined handedness."

Kuroda and her colleagues hope to investigate the genetics and physiology of handedness further. "It's intriguing what the relative orientation of the embryo at the eight-cell stage does to determine the left-right symmetry in the whole developmental pathway," she says. *Journal reference: Nature, DOI: 10.1038/nature08597*

Diabetes cases to double and costs to triple by 2034

In the next 25 years, the number of Americans living with diabetes will nearly double, increasing from 23.7 million in 2009 to 44.1 million in 2034. Over the same period, spending on diabetes will almost triple, rising from $113 billion to $336 billion, even with no increase in the prevalence of obesity, researchers based at the University of Chicago report in the December issue of Diabetes Care.

The number of those with diabetes covered by Medicare will rise from 8.2 million to 14.6 million, the researchers predict. Medicare spending on diabetes will jump from $45 billion to $171 billion.

"If we don't change our diet and exercise habits or find new, more effective and less expensive ways to prevent and treat diabetes, we will find ourselves in a lot of trouble as a population," said the study's lead author Elbert Huang, MD, assistant professor of medicine at the University of Chicago.

"Without significant changes in public or private strategies," the authors wrote, "this population and cost growth are expected to add a significant strain to an overburdened health care system."

The new estimates are far more rigorous, and more troubling, than previous predictions.

* A 1991 study stated that the number of Americans with diabetes would double, from 6.5 million in 1987 to 11.6 million by 2030, which, as it turns out, is less than half the number of cases in 2009. "These projections stress the importance of prevention and education," the authors declare. "The requisite change in life style, exercise, or nutrition habits will be more difficult than if a drug is developed for treatment."
* A 1998 study foretold more cases sooner: 22 million US cases by 2025. "Worldwide surveillance of diabetes is a necessary first step towards its prevention and control, which is now recognized as an urgent priority."
* A 2001 study predicted 29 million cases by 2050. The authors of that study warned that their projection may be "more alarming than previously believed," adding that the "economic cost of diabetes is already staggering."
* A retrospective 2008 study confirmed the predicted trends, showing that the number of Americans diagnosed with diabetes rose steadily from 10 million in 1994, to 14 million in 2000, to 19 million in 2007, and the annual cost--just for drugs--for people affected by diabetes nearly doubled in six years, rising from $6.7 billion in 2001 to $12.5 billion in 2007.

The most recent and alarming prediction may even be a bit conservative. It is based on the assumption that the prevalence of the overweight and obese in the United States will remain relatively stable.

Although obesity levels have gone up steadily for many years, the authors predict that the obesity levels for the non-diabetic population will top out in the next decade, then decline slightly, from 30 percent today to about 27 percent by 2033. "Despite recent trends in obesity rates," Huang explained, "we anticipate that the population will reach an equilibrium in obesity levels, since we cannot all become obese."

The 2009 Diabetes Care study places increased emphasis on changes in demographics, advances in treatment, and the natural history of this disease, including the timing and frequency of its costly complications. Much of the increase in cases and in costs will be driven by aging "baby boomers," the 77 million Americans born between 1946 and 1957 who are approaching the age of retirement, diabetes complications, and federal health insurance.

Various characteristics of the modern natural history of diabetes and its treatments contribute to increasing the costs of diabetes for the population. People with diabetes are now being diagnosed at younger ages. Thanks to better treatments, they are living longer. This leads to a longer history of disease, opportunities for more aggressive therapies, and time to accumulate complications, which are costly to treat. Diabetes is the leading cause of blindness, end-stage kidney disease and amputations.

The study was done to help forecast the impact of alternative policy scenarios as Congress debates changes in the health care system, particularly to Medicare.

"The public policy implications are enormous," said co-author Michael O'Grady, PhD, senior fellow at the National Opinion Research Center at the University of Chicago. "This a serious challenge to Medicare and every other health plan in the country. The cost of doing nothing is the significant increase in the pain and suffering of America's population and a financial burden that will threaten the financial viability of public and private insurers alike."

"We built this model to improve the budgetary and health outcome information available to federal policymakers," the researchers explained. It provides a rigorous assessment of the future burden of diabetes and can also be used to provide estimates of the impact of alternative policy scenarios. They predict that the growth in diabetes costs will exceed current projections of total Medicare spending.

The National Changing Diabetes Program of Novo Nordisk, a maker of insulin, funded the study. The University of Chicago investigators are co-investigators of the NIDDK Diabetes Research and Training Center. Additional authors were Anirban Basu of the University of Chicago and James Capretta, now at Civic Enterprises, LLC, in Washington, DC.

Trying to Explain a Drop in Infant Mortality

By ERIK ECKHOLM

MADISON, Wis. - Seven and a half months into Ta-Shai Pendleton's first pregnancy, her child was stillborn. Then in early 2008, she bore a daughter prematurely.

Soon after, Ms. Pendleton moved from a community in Racine that was thick with poverty to a better neighborhood in Madison. Here, for the first time, she had a full-term pregnancy.

As she cradled her 2-month-old daughter recently, she described the fear and isolation she had experienced during her first two pregnancies, and the more embracing help she found 100 miles away with her third. In Madison, county nurses made frequent home visits, and she got more help from her new church.

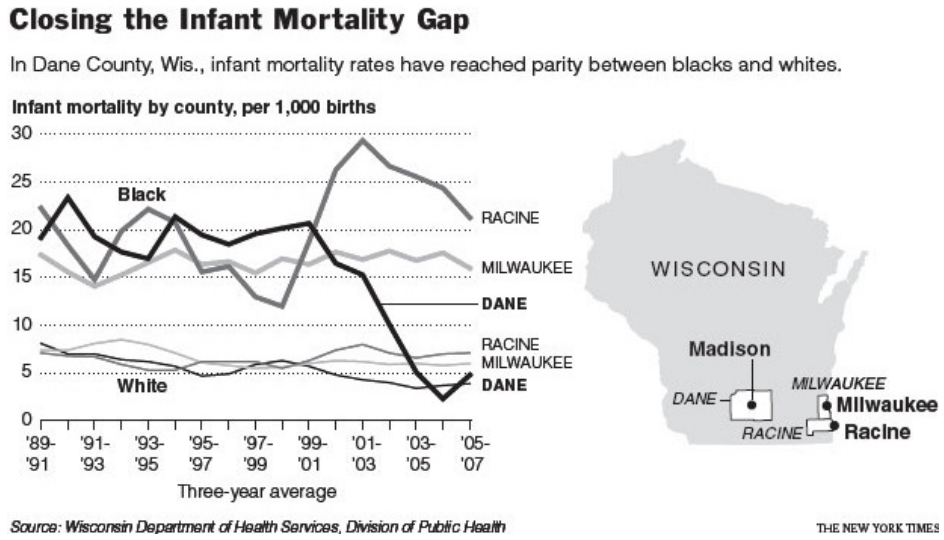
The lives and pregnancies of black mothers like Ms. Pendleton, 21, are now the subject of intense study as researchers confront one of the country's most intractable health problems: the large racial gap in infant deaths, primarily due to a higher incidence among blacks of very premature births.

Here in Dane County, Wis., which includes Madison, the implausible has happened: the rate of infant deaths among blacks plummeted between the 1990s and the current decade, from an average of 19 deaths per thousand births to, in recent years, fewer than 5.

The steep decline, reaching parity with whites, is particularly intriguing, experts say, because obstetrical services for low-income women in the county have not changed that much.

Finding out what went right in Dane County has become an urgent quest — one that might guide similar progress in other cities. In other parts of the state, including Milwaukee, Racine and two other counties, black infant death rates remain among the nation's highest, surpassing 20 deaths per thousand in some areas.

Nationwide for 2007, according to the latest federal data, infant mortality was 6 per 1,000 for whites and 13 for blacks.



"This kind of dramatic elimination of the black-white gap in a short period has never been seen," Dr. Philip M. Farrell, professor of pediatrics and former dean of the University of Wisconsin School of Medicine and Public Health, said of the progress in Dane County.

"We don't have a medical model to explain it," Dr. Farrell added, explaining that no significant changes had occurred in the extent of prenatal care or in medical technology.

Without a simple medical explanation, health officials say, the decline appears to support the theory that links infant mortality to the well-being of mothers from the time they were in the womb themselves, including physical and mental health; personal behaviors; exposure to stresses, like racism; and their social ties.

Those factors could in turn affect how well young women take care of themselves and their pregnancies.

Karen Timberlake, the Wisconsin secretary of health services, said that in Dane County, the likely explanation lay in "the interaction among a variety of interrelated factors."

"Our challenge is," Ms. Timberlake said, "how can we distill this and take it to other counties?"

Only about 5 percent of Dane County's population is black, and the sharp drop in the mortality rate also tracked larger declines in the numbers of very premature and underweight births for blacks, said Dr. Thomas L. Schlenker, the county director of public health.

A three-year study, led by Dr. Gloria E. Sarto of the University of Wisconsin, is using tools including focus groups and research on pollution to compare the experiences of black mothers here with those in Racine County, which has the highest black infant mortality in the state.

It is not hard to imagine why death rates would be lower in Dane County than in Racine, which is more segregated and violent, or in Milwaukee, a larger city. Dane County has a greater array of public and private services, but pinpointing how they may have changed over the decade in ways that made a difference is the challenge.

Dr. Schlenker, the county health director, credits heightened outreach to young women by health workers and private groups. "I think it's a community effect," he said. "Pregnant women need to feel safe, cared for and

valued. I believe that when they don't, that contributes to premature birth and fetal loss in the sixth or seventh month."

He pointed to services that started in the mid-90s and have gathered steam. For instance, a law center, ABC for Health, has increasingly connected poor women with insurance and medical services. He said local health maintenance organizations were now acting far more assertively to promote the health of prospective mothers.

And a federally supported clinic, Access Community Health Center, which serves the uninsured and others, has cared for a growing number of women using nurse-midwives, who tend to bond with pregnant women, spending more time on appointments and staying with them through childbirth.

County nurses visit low-income women at high risk of premature birth, providing transportation to appointments and referrals to antismoking programs or antidepression therapies. Another program sends social workers into some homes. The programs exist statewide, but in Milwaukee, Racine and other areas they do not appear to have achieved the same broad coverage, said Ms. Timberlake, the state health leader.

And community leaders in Dane County, shocked by high mortality rates, started keeping closer watch on young pregnant women. "The African-American community in Madison is close-knit," said Carola Gaines, a black leader and coordinator of Medicaid services for a private insurance plan.

Similar community efforts are now being promoted in other struggling cities.

Brandice Hatcher, 26, who recently moved into a new, subsidized apartment in Madison, spent her first 18 years in foster care in Chicago before moving two years ago.

When she learned last June that she was pregnant, Ms. Hatcher said, "I didn't know how to be a parent and I didn't know what services could help me."

Over the summer she started receiving monthly visits from Laura Berger, a county nurse, who put her in touch with a dentist. That was not just a matter of comfort; periodontal disease elevates the risk of premature birth, increasing the levels of a labor-inducing chemical.

Ms. Hatcher had been living in a rooming house, but she was able to get help from a program that provided a security deposit for her apartment. She attained certification as a nursing assistant while awaiting childbirth. Under a state program, a social worker visits weekly and helps her look for jobs. And she receives her prenatal care from the community center's nurse-midwives. A church gave her baby clothes and a changing table.

Ms. Hatcher said she would not do anything to jeopardize her unborn baby's prospects. She has named her Zaria and is collecting coins and bills in a glass jar, the start, she said, of Zaria's personal savings account.

MS 'blood blockage theory' tested

By Michelle Roberts Health reporter, BBC News

US scientists are testing a radical new theory that multiple sclerosis (MS) is caused by blockages in the veins that drain the brain. The University of Buffalo team were intrigued by the work of Italian researcher Dr Paolo Zamboni who claims 90% of MS is caused by narrowed veins. He says the restricted drainage, visible on scans, injures the brain leading to MS. He has already widened the blockages in a handful of patients.

The US team want to replicate his earlier work before treating patients. Experts welcomed the research saying it was important to confirm the basic science before evaluating any therapy.

MS is a long-term inflammatory condition of the central nervous system which affects the transfer of messages from the nervous system to the rest of the body.

The Buffalo team, led by Dr Robert Zivadinov, plan to recruit 1,100 patients with MS and 600 other volunteers as controls who are either healthy or have neurological diseases other than MS. Using Doppler ultrasound, they will scan the patients to see if they can find any blockages within the veins of the neck and brain.

If they can prove Dr Zamboni's theory of "chronic cerebrospinal venous insufficiency", they say it will change our understanding of MS.

The answer may lie with blood flow

Rewriting science

Margaret Paroski, who is chief medical officer at Kaleida Health, where the Buffalo researchers are based, said the work could overturn prevailing wisdom that the damage in MS is predominantly the result of abnormal immune responses. "When I was in medical school, we thought peptic ulcer disease was due to stress. We now know that 80% of cases are due to a bacterial infection.

"Dr Zivadinov's work may lead to a whole different way of thinking about MS."

Dr Zamboni, of the University of Ferrara, believes the blockages are the cause rather than the consequence of MS and that they allow iron from the blood to leak into the brain tissue, where it causes damage.

He has performed procedures similar to angioplasty to unblock the veins and get the blood flowing normally again. He claims this "liberation procedure" can alleviate many of the symptoms of MS and is due to publish his findings in the Journal of Vascular Surgery.

In an interview with CTV News in Canada he said: "I found the evidence of narrowing - narrowing of the veins just in MS patients. "I'm fully convinced that this is very, very important for people."

Early days

Kevin Lipp, an MS patient from the US, has been symptom-free since being treated by Dr Zamboni. He said: "It's only been 10 months. If nothing happens in the next two to three years, we'll know it's working."

The BBC has heard anecdotally of other surgeons in Europe testing out the same treatment.

The MS Society said more research was needed to see if this was an avenue that should be explored further.

"This is not something patients can expect as a treatment now. This is experimental work and is being tested. We need to know more about its safety and effectiveness."

Helen Yates, of the MS Resource Centre, said: "There is no doubt that this area warrants a great deal more study. "This could represent a completely novel approach to MS research which, if proven to be relevant, could be a "sea change" in the understanding of the mechanisms involved in the condition."

Observatory

People Hear With Skin as Well as Their Ears

By HENRY FOUNTAIN

We hear with our ears, right? Yes, but scientists have known for years that we also hear with our eyes. In a landmark study published in 1976, researchers found that people integrated both auditory cues and visual ones, like mouth and face movements, when they heard speech.

That study, and many that followed, raised this fundamental question about speech perception: If humans can integrate different sensory cues, do they do so through experience (through seeing countless speaking faces over time), or has evolution hard-wired them to do it?

A new study that looks at a different set of sensory cues adds to a growing body of evidence that suggests such integration is innate. In a paper in Nature, Bryan Gick and Donald Derrick of the University of British Columbia report that people can hear with their skin.

The researchers had subjects listen to spoken syllables while hooked up to a device that would simultaneously blow a tiny puff of air onto the skin of their hand or neck. The syllables included “ba” and “pa,” which produce a brief puff from the mouth when spoken, and “da” and “ta,” which do not produce puffs. They found that when listeners heard “da” or “ta” while a puff of air was blown onto their skin, they perceived the sound as “ba” or “pa.”

Dr. Gick said the findings were similar to those from the 1976 study, in which visual cues trumped auditory ones - subjects listened to one syllable but perceived another because they were watching video of mouth movements corresponding to the second syllable. In his study, he said, cues from sensory receptors on the skin trumped the ears as well. “Our skin is doing the hearing for us,” he said.

Dr. Gick noted that it would normally be rare that someone actually sensed a puff of air produced by another, although people might occasionally sense their own puffs. Either way, he said, the stimulus is very subtle, “which suggests it is very powerful.”

”What’s so persuasive about this particular effect,” he added, “is that people are picking up on this information that they don’t know they are using.” That supports the idea that integrating different sensory cues is innate.

Dr. Gick said the finding also suggested that other sensory cues might be at work in speech perception - that, as he put it, “we are these fantastic perception machines that take in all the information available to us and integrate it seamlessly.”

Correction: *An earlier version of this article misstated which two of the syllables used in an experiment by researchers produce a brief puff from the mouth when spoken. They are “pa” and “ta,” not “ba” and “pa.”*

Fresh claim for fossil life in Mars rock

Richard Fisher, deputy news editor

It's arguably the most scrutinised piece of rock ever. Now an even closer look at a meteorite from Mars suggests it may show signs of life after all.

In 1996, David McKay of NASA's Johnson Space Center in Houston, Texas, and colleagues proposed that that a chunk of Mars rock found in Antarctica, called ALH 84001, contained possible signs of past life on the Red Planet, such as complex carbon-based molecules and microscopic objects shaped like bacteria

Many researchers doubt the claim, however, and various suggestions have been made for how the structures could have been created without life.

One area of disagreement centred around nanocrystal magnetites in the rock, some of which appear to have chemical and physical features identical to those produced by contemporary bacteria. Sceptics of the biological explanation suggested that the magnetites were created when carbonate decomposed under high pressures and temperatures, perhaps in the heat of the impact that ejected the meteorite 15 million years ago or deep beneath the Martian surface.

Now a fresh analysis by McKay and colleagues rules out the carbonate decomposition explanation. The researchers have used high-resolution electron microscopy not available 13 years ago to study the physical and chemical make-up of the magnetites in detail, and found that no plausible geological scenario could explain the carbonate decomposition origin.

Dennis Bazylinski at the University of Nevada in Las Vegas told British newspaper The Times: "Until now I was on the fence, but this paper has really thrown out the non-biological explanation."

The possibility that the rock contains fossilised microbes received another boost in August when a team led by Paul Niles, also of NASA Johnson, showed that carbon in the meteorite was deposited in balmy water conducive to life, rather than a scorching temperature above 150 °C as had been proposed previously.