

### **3-week radiation therapy as effective as 5 weeks for early-stage breast cancer**

Boston – Early-stage breast cancer patients who receive a more intensive course of radiation to their whole breast over three weeks is as effective as the standard, less intensive five-week whole breast radiation and offers patients more convenience at a lower cost, thereby providing a better quality of life, according to a randomized, long-term study presented September 22, 2008, in the plenary session at the American Society for Therapeutic Radiology and Oncology's 50th Annual Meeting in Boston.

The cost of this shorter treatment, called accelerated hypofractionated whole breast irradiation, is two-thirds of the cost of the standard whole breast radiation. It is also less expensive than other new approaches such as partial breast irradiation.

"There has been renewed interest in hypofractionated whole breast irradiation, due to the potential radiation advantages, patient convenience, quality of life and lower costs. However, long-term effects were a potential concern," Timothy Whelan, M.D., lead author of the study and a radiation oncologist at the Juravinski Cancer Centre at McMaster University in Hamilton, Ontario, Canada, said. "We were surprised that the risk of local recurrence and side effects for women treated with accelerated whole breast irradiation was so low even at 12 years. Our study shows that this treatment should be offered to select women treated with early-stage breast cancer."

Many women with early-stage breast cancer are able to undergo breast conserving therapy to keep their breast after treatment. Typically, this means they first have surgery to remove the cancer (called a lumpectomy) followed by a course of radiation therapy to kill any cancer cells that may remain. The standard whole breast radiation therapy treatment takes approximately 15 minutes every day, Monday through Friday, for five weeks.

Between April 1993 and September 1996, researchers randomly assigned 1,234 women to be treated with either accelerated whole breast irradiation or standard whole breast irradiation. These women were followed for 12 years to determine if accelerated whole breast radiation was as effective as the standard treatment. At 10 years after treatment, cancer returned locally in 6.2 percent of patients treated with the accelerated radiation therapy, compared to 6.7 percent for those patients treated with standard therapy. Both groups of patients also had a good or excellent cosmetic outcome from the radiation treatments.

"This shorter treatment may not be for everyone, however, I would encourage women whose breast cancer is caught early to talk to their oncologist to see if they are a good candidate for this shorter therapy," Dr. Whelan added.

*For more information on radiation therapy for breast cancer, visit [www.ranswers.org](http://www.ranswers.org).*

*The abstract, "Long-Term Results of a Randomized Trial of Accelerated Hypofractionated Whole Breast Irradiation Following Breast Conserving Surgery in Women with Node-negative Breast Cancer," will be presented at the plenary session at 2:00 p.m. on Monday, September 22, 2008. To speak to the lead author of the study, Timothy Whelan, M.D., please call Beth Bukata or Nicole Napoli September 21-24, 2008, in the ASTRO Press Room at the Boston Convention and Exhibition Center at 617-954-3377 or 617-954-3378. You may also e-mail them at [bethb@astro.org](mailto:bethb@astro.org) or [nicolen@astro.org](mailto:nicolen@astro.org).*

### **Shorter Radiation for Cancer of the Breast**

**By DENISE GRADY**

Three weeks of radiation treatment work just as well as the usual course of five weeks or more for women with early-stage breast cancers, Canadian researchers have reported, after monitoring a large group of patients for 12 years. The results, presented Monday at a conference in Boston, provide some of the strongest evidence yet that radiation schedules can safely be shortened to make life easier for patients and to let clinics reduce their waiting lists and treat more women without buying more machines.

Experts say the new findings, from a respected study, could change the standard of care in the United States. The typical schedule now involves five to seven weeks of daily treatments, and most women would welcome a chance to get it over with faster — especially those who work, have small children or live far from the clinic.

About 180,000 women a year develop breast cancer in the United States, and most need radiation. From 30 percent to 40 percent may be candidates for the type of treatment given in the study. Some centers in this country already offer shorter courses of treatment, but they are more widely available in Canada and parts of Europe.

"We've really got to give it serious consideration in the United States," said Dr. Anthony L. Zietman, a radiation oncologist at Harvard Medical School and the Massachusetts General Hospital Cancer Center, and president-elect of the American Society for Therapeutic Radiology and Oncology. He was not involved in the Canadian study.

But Dr. Zietman cautioned that the results applied only to women with early cancers like those in the study, which were removed by lumpectomy and had not spread to the lymph nodes. Often, women with such early cancers do not need chemotherapy.

Other major changes in radiation are also in the works. Doctors are experimenting with ways to treat just part of the breast rather than all of it, and to make the treatment safer, they are trying to avoid exposing the heart and lungs to radiation.

The purpose of radiation is to keep cancer from coming back in the same breast where it first occurred, by killing any tumor cells that may have evaded surgery and chemotherapy. Cancer cells are more vulnerable to radiation than are normal ones, and the treatment has always been a balancing act between giving enough radiation to destroy the tumor cells but not enough to cause serious damage to healthy tissue and organs.

The changes now being made result in part from the overall success in treating early breast cancers, Dr. Zietman said. Survival rates have climbed so high — 98 percent of women with early-stage cancers survive at least five years — that it is now considered reasonable to step back, look at women’s quality of life and try modifying the regimens to make treatment less onerous.

“It’s a bit of a change in our thinking,” Dr. Zietman said.

Researchers also hope that faster treatment will help make radiation available to more women. Currently, about 20 to 30 percent of women in North America who need it skip it. And some women who could have lumpectomy plus radiation choose mastectomy instead, simply to avoid radiation, because they live too far from a clinic to travel back and forth for all the treatments.

Not all medical centers offer the newer techniques, and they are not right for every woman. But for many women, there are choices now where none existed before — though it may take some effort to find out about them. “Patients have to speak up,” Dr. Zietman said.

If the standard regimen is recommended, he said, a woman should ask: “Does it have to be that way? Am I one of the people who could be treated with partial breast irradiation, or, if I need the whole breast treated, could it be done in some more abbreviated fashion?”

He added, “Maybe they can, maybe they can’t.”

Some radiation oncologists may resist change, fearful of giving up the tried and true formulas they were taught, Dr. Zietman said. He noted that the standard treatment had 30 years of evidence to back it up, whereas the newer approach had less than half that. But still, the field is moving ahead.

“You don’t give all women with breast cancer the same treatment,” he said. “You base it on what they have, and who they are.”

Canadian researchers decided to study the shorter courses because doctors there and in England had begun using them without a formal trial, to make the most of a limited number of radiation machines.

The study included 1,234 women who started treatment at one of eight hospitals from 1993 to 1996. Half of the women received the standard regimen of 25 treatments in 35 days (five treatments a week for five weeks). The other half had 16 treatments in 22 days. The shorter course used slightly higher daily doses of radiation, but the total cumulative dose was slightly lower.

There were concerns that the lower overall dose would allow recurrences, or that over time the higher daily doses might damage the breast tissue, heart or lungs. Radiation injuries can take years or even a decade or more to show up.

But after 10 years, there were no significant differences between the groups. Both had recurrence rates of 6 to 7 percent, and about 70 percent in both groups had a “good or excellent cosmetic outcome,” meaning the breast did not have much discoloration, shrinkage or scarring from the radiation.

“Our patients really like it because it’s much more convenient,” said Dr. Timothy Whelan, the first author of the study and director of the supportive cancer care research unit at the Juravinski Cancer Center in Hamilton, Ontario. “It’s preferred because, I think to be fair, in Canada there may be more distance to travel to a radiation facility. Patients really are strong supporters of this approach.”

Fran Dowhaniuk, 71, who lives in Hamilton, received the three-week treatment as part of the study in 1995. She liked the idea of finishing more quickly, especially because her daughter’s wedding was coming up.

“I’m really glad I did it,” she said. “I would recommend it to anybody.”

Dr. Whelan estimated that 60 to 70 percent of women with early-stage breast cancers in Canada were already receiving this type of therapy.

Similar results from studies in England that had fewer years of follow-up were published in medical journals earlier this year.

Dr. Catherine Park, an associate professor of radiation oncology at the University of California, San Francisco, said Dr. Whelan’s approach looked extremely promising. You can’t argue with the results,” she said.

She said she had treated 20 or 30 patients with this method and hoped Dr. Whelan’s findings would satisfy more-conservative doctors who wanted additional data, so that they would offer it to appropriate patients. She said that the shorter courses would probably also be appropriate for women with a condition called D.C.I.S.,

ductal carcinoma in situ, a form of breast cancer even earlier than the stage included in the study. But the technique has not been studied in D.C.I.S.

She had one cautionary note: radiation oncologists give some patients a “boost,” meaning five to eight extra treatments aimed just at the tumor bed. Dr. Whelan’s study did not include a boost, and some doctors think that on top of the higher daily doses, it would deliver too much radiation. So some doctors may be unwilling to offer the shorter treatment to patients who they think could benefit from a boost.

Dr. Silvia Formenti, chairwoman of radiation oncology at New York University and the leader of breast cancer research at its cancer institute, called Dr. Whelan’s study impeccable and extremely solid. She said she had treated more than 1,000 patients using a faster schedule of treatments, often including a boost. The median time since treatment is more than five years, and some patients have had slightly more advanced disease than those in Dr. Whelan’s study. So far, she said, the results have been at least as good as those with conventional treatment.

Dr. Formenti uses a technique that she and some other researchers think is important to make the treatment safer: most of her patients are treated lying on their stomach instead of the usual way, on their back. The women lie on a mattress with openings for the breasts; the idea is to let the breasts drop away from the chest, to minimize the amount of the heart and lungs exposed to radiation.

Radiation oncologists are eager to avoid hitting those organs because there is some evidence that irradiating the heart — most likely to occur when the left breast is treated — may increase the risk of coronary artery disease. And even though lung problems linked to breast radiation are extremely rare, there is a potential for scarring and irritation and even an increased risk of lung cancer, particularly in smokers.

“Why not do what is best for women?” Dr. Formenti said, adding that the prone technique is easy for doctors to learn. She uses CT scans to determine which position is actually safest for each patient.

At Memorial Sloan-Kettering Cancer Center in New York, most women are also treated lying on their stomach, and about half choose the shorter course of treatment, said Dr. Beryl McCormick, the clinical director of radiation oncology. “I see no difference in how the patients are doing,” she said.

The faster treatment should become standard practice for women with early cancers, she continued, but added, “I’m always surprised to see how long it takes for physicians to change their practice patterns.”

Medical centers are also experimenting with techniques that could shorten the treatment to a few days or even just one day for some women. Those techniques involve treating only about a quarter of the breast, the part nearest the tumor, and the radiation can be given with a machine or with radioactive seeds that are temporarily implanted into the cavity left by lumpectomy. In some cases the entire dose of radiation is given before the patient leaves the operating room.

The partial breast treatments are still being studied, and although the results look promising, more time for follow-up is needed to be sure, Dr. Zietman said.

“I doubt we’ll strongly advocate it until more information is in,” he said.

Dr. Park, who is studying partial breast irradiation, said: “We’re learning who we can treat appropriately with these more limited treatments. We may not know exactly right now, but people should watch. In the next 10 years, we’ll really change the number of things we can offer for breast cancer.”

## **Sexism pays: Study finds men who hold traditional views of women earn more than men who don't**

### ***Women with egalitarian views don't earn much more than those with traditional outlooks, researchers conclude***

WASHINGTON – When it comes to sex roles in society, what you think may affect what you earn. A new study has found that men who believe in traditional roles for women earn more money than men who don't, and women with more egalitarian views don't make much more than women with a more traditional outlook.

Timothy Judge, PhD, and Beth Livingston from the University of Florida, analyzed data from a nationally representative study of men and women who were interviewed four times between 1979 and 2005. A total of 12,686 people, ages 14 to 22 at the beginning of the study, participated; there was a 60 percent retention rate over the course of the study. Results were published in the September issue of the *Journal of Applied Psychology*, published by the American Psychological Association.

At each of the four interviews, participants were asked about their views on gender roles in the work force and at home. They answered questions such as whether they believed a woman's place is in the home, whether employing wives leads to more juvenile delinquency, if a man should be the achiever outside the home and if the woman should take care of the home and family. Participants were also asked about their earnings, religious upbringing, education, whether they worked outside the home and their marital status, in addition to other

topics. Prior studies have shown that men tend to hold more traditional gender roles than do women, though this gap has narrowed over time.

The researchers looked specifically at gender role views as a predictor of a person's earnings. They controlled for job complexity, number of hours worked and education. Their analyses showed that men in the study who said they had more traditional gender role attitudes made an average of about \$8,500 more annually than those who had less traditional attitudes.

"More traditional people may be seeking to preserve the historical separation of work and domestic roles. Our results prove that is, in fact, the case," Judge said. "This is happening even in today's work force where men and women are supposedly equal as far as participation."

For women, however, the situation was reversed. Women who held more traditional views about gender roles made an average of \$1,500 less annually than the women with more egalitarian views. Put another way, if a married couple holds traditional gender role attitudes, the husband's earning advantage was predicted to be eight times greater than a married couple where the husband and wife have more egalitarian attitudes.

"These results show that changes in gender role attitudes have substantial effects on pay equity," Judge said. "When workers' attitudes become more traditional, women's earnings relative to men suffer greatly. When attitudes become more egalitarian, the pay gap nearly disappears."

Notably, the results also did not fundamentally change when other factors were controlled, such as industry, occupation, hours worked, and number of children. "These results cannot be explained by the fact that, in traditional couples, women are less likely to work outside the home," Judge said. "Though this plays some role in our findings, our results suggest that even if you control for time worked and labor force participation, traditional women are paid less than traditional men for comparable work."

The researchers also sought to understand why some people hold more traditional or less traditional perceptions of gender roles. Some associations they found were:

- \* People living in Northeastern cities had less traditional views regarding gender roles
- \* People whose parents both worked outside the home had less traditional views regarding gender roles
- \* Married, religious people tended to have more traditional gender role views
- \* Younger people had less traditional views but became more traditional over time

The authors offered suggestions for future research, including investigating the relationship between happiness and job attitudes among people with specific gender role views arguing that more money and happiness doesn't necessarily always go together for some people.

The researchers believe their results show that the gender pay gap is not just an economic phenomenon. "Psychology has an important role to play, too," said Judge. "Our country's policies have been leaning toward gender equality for decades now. But, according to our study, traditional gender role views continue to work against this goal."

Article: "Is the Gap More Than Gender? A Longitudinal Analysis of Gender, Gender Role Orientation, and Earnings," Timothy A. Judge, PhD, and Beth A. Livingston, University of Florida; *Journal of Applied Psychology*, Vol. 93, No. 5. (Full text of the article is available from the APA Public Affairs Office and at <http://www.apa.org/journals/releases/apl935994.pdf>)

## Massive diamond found in Lesotho

### **Miners in Lesotho have discovered a huge gem stone which may become the largest ever polished round diamond.**

The stone weighs 478 carats and is the 20th largest rough diamond ever found, said Gem Diamonds.

The company said the uncut rock was recovered recently from the Letseng mine, owned by the company in Lesotho. The diamond, which is as yet unnamed, has the potential to yield a 150 carat cut stone, and could sell for tens of millions of dollars, the company said.

*The stone would dwarf the Koh-i-Noor diamond in the British Crown Jewels*

### Clarity

"Preliminary examination of this remarkable diamond indicates it will yield a record-breaking polished stone of the very best colour and clarity," said the company's chief executive Clifford Elphick. It would be bigger than the 105 carat round-cut Koh-i-Noor diamond, which is part of the British Crown Jewels.

It would still be dwarfed by the Cullinan diamond discovered in 1905, which was 3,106 carats uncut and yielded a teardrop shaped diamond of 530 carats called the Great Star of Africa.

The Letseng mine is owned by a mining company of which Gem Diamonds controls 70% and the Lesotho government 30%.



## World's common birds 'declining'

By Mark Kinver Science and environment reporter, BBC News

### ***The populations of the world's common birds are declining as a result of continued habitat loss, a global assessment has warned.***

The survey by BirdLife International found that 45% of Europe's common birds had seen numbers fall, as had more than 80% of Australia's wading species.

The study's authors said governments were failing to fund their promises to halt biodiversity loss by 2010.

The findings will be presented at the group's World Conference in Argentina.

The State of the World's Birds 2008 report, the first update since 2004, found that common species - ones considered to be familiar in people's everyday lives - were declining in all parts of the world.

In Europe, an analysis of 124 species over a 26-year period revealed that 56 species had declined in 20 countries.

Farmland birds were worst affected, with the number of European turtle-doves (*Streptopelia turtur*) falling by 79%.

In Africa, birds of prey were experiencing "widespread decline" outside of protected areas. While in Asia, 62% of the continent's migratory water bird species were "declining or already extinct".

Biodiversity barometers

"For decades, people have been focusing their efforts on threatened birds," explained lead editor Ali Stattersfield, BirdLife International's head of science.



*Silent spring: Cuckoo numbers are falling* (Image: John Carey)

"But alongside this, we have been working to try to get a better understanding of what is going on in the countryside as a whole."

By consolidating data from various surveys, the team of researchers were able to identify trends affecting species around the world.

"It tells us that environmental degradation is having a huge impact - not just for birds, but for biodiversity as well," she told BBC News.

While well-known reasons, such as land-use changes and the intensive farming, were causes, Ms Stattersfield said that it was difficult to point the finger of blame at just one activity.

"The reasons are very complex," she explained. "For example, there have been reported declines of migratory species - particularly those on long-distance migrations between Europe and Africa.

"It is not just about understanding what is happening at breeding grounds, but also what is happening at the birds' wintering sites."

She said the findings highlighted the need to tackle conservation in a number of different ways.

"It is not enough to be looking at individual species or individual sites; we need to be looking at some of the policies and practices that affect our wider landscapes."



*A veterinary drug has virtually wiped out Asia's white-rumped vultures* (Image: Marek Jobda)

The global assessment also showed that rare birds were also continuing to be at risk.

One-in-eight of the world's birds - 1,226 species - was listed as being Threatened. Of these, 190 faced an imminent risk of extinction.

The white-rumped vulture, a once common sight in India, has seen its population crash by 99.9% in recent years.

An anti-inflammatory drug for cattle, called diclofenac, has been blamed for poisoning the birds, which eat the carcasses of the dead livestock.

"That has been a really shocking story," Ms Stattersfield said.

"Four years ago, we were not even sure what was responsible for the dramatic declines. It happened so suddenly, people were not prepared for it.

"Since then, the basis for the decline is well understood and measures are being taken to remove diclofenac from veterinary use in India.

"However, it is still available for sale and there still needs to be a lot more work to communicate the problem at a local level.

"But it demonstrates that we can get to the bottom of the reasons behind declines."

The plight of albatrosses becoming entangled in long-line fishing tackle has also been the subject of sustained campaigning, attracting high-profile supporters such as Prince Charles and yachtswoman Dame Ellen MacArthur. About 100,000 of the slow-breeding birds are estimated to drown each year as a result of being caught on the lines' fish hooks.

But fisheries in a growing number of regions are now introducing measures to minimise the risk to albatrosses.

Ms Stattersfield said these examples showed that concerted effort could investigate and identify what was adversely affecting bird populations.

But she quickly added that prevention was always better than finding a cure.

"We don't want to have to react to problems that come about from bad practice.

"What we are trying to do with this report is to be as clear as possible about what are the underlying causes, and then present a range of conservation measures that can preserve birds and biodiversity."

BirdLife International will use the report, which is being published at its week-long World Conference in Buenos Aires and on the group's website, to call for governments to make more funds available for global conservation.

"Effective biodiversity conservation is easily affordable, requiring relatively trivial sums at the scale of the global economy," said Dr Mike Rands, BirdLife's chief executive.

He estimated that safeguarding 90% of Africa's biodiversity would cost less than US \$1bn (£500m) a year.

"The world is failing in its 2010 pledge to achieve a significant reduction in the current rate of loss of biodiversity," he warned.

"The challenge is to harness international biodiversity commitments and that concrete actions are taken now."

### **Dig pinpoints Stonehenge origins**

**By James Morgan** Science reporter, BBC News

#### ***Archaeologists have pinpointed the construction of Stonehenge to 2300BC - a key step to discovering how and why the mysterious edifice was built.***

The radiocarbon date is said to be the most accurate yet and means the ring's original bluestones were put up 300 years later than previously thought.

The dating is the major finding from an excavation inside the henge by Profs Tim Darvill and Geoff Wainwright. The duo found evidence suggesting Stonehenge was a centre of healing.

Others have argued that the monument was a shrine to worship ancestors, or a calendar to mark the solstices.

A documentary following the progress of the recent dig has been recorded by the BBC Timewatch series. It will be broadcast on Saturday 27 September.

#### **Date demand**

For centuries, archaeologists have marvelled at the construction of Stonehenge, which lies on Salisbury Plain, Wiltshire.

Mineral analysis indicates that the original circle of bluestones was transported to the plain from a site 240km (150 miles) away, in the Preseli hills, South Wales. This extraordinary feat suggests the stones were thought to harbour great powers.

Professors Darvill and Wainwright believe that Stonehenge was a centre of healing - a "Neolithic Lourdes", to which the sick and injured travelled from far and wide, to be healed by the powers of the bluestones.

They note that "an abnormal number" of the corpses found in tombs nearby Stonehenge display signs of serious physical injury and disease.

And analysis of teeth recovered from graves show that "around half" of the corpses were from people who were "not native to the Stonehenge area".

"Stonehenge would attract not only people who were unwell, but people who were capable of [healing] them," said Professor Darvill, of Bournemouth University. "Therefore, in a sense, Stonehenge becomes 'the A & E' of southern England."

#### **Modern techniques**

But without a reliable carbon date for the construction of Stonehenge, it has been difficult to establish this, or any other, theory.

Until now, the consensus view for the date of the first stone circle was anywhere between 2600BC and 2400BC.

To cement the date once and for all, Professors Darvill and Wainwright were granted permission by English Heritage to excavate a patch of earth just 2.5m x 3.5m, in between the two circles of giant sarsen stones.

The dig unearthed about 100 pieces of organic material from the original bluestone sockets, now buried under the monument. Of these, 14 were selected to be sent for modern carbon dating, at Oxford University.

The result - 2300BC - is the most reliable date yet for the erection of the first bluestones.

Strictly speaking, the result was rounded down to "between 2400BC and 2200BC" - but 2300BC is taken as the average. An even more precise date will be produced in the coming months.

"It's an incredible feeling, a dream come true," said Professor Wainwright, formerly chief archaeologist at English Heritage.

"We told the world we were going to date Stonehenge. That was a risk, but I was always confident," said Professor Darvill.

Intriguingly, the date range ties in closely with the date for the burial of the so-called "Amesbury Archer", whose tomb was discovered three miles from Stonehenge.

Some archaeologists believe the Archer is the key to understanding why Stonehenge was built.

Analyses of his corpse and artefacts from his grave indicate he was a wealthy and powerful man, with knowledge of metal working, who had travelled to Salisbury from Alpine Europe, for reasons unknown.

Post mortem examinations show that he suffered from both a serious knee injury and a potentially fatal dental problem, leading Darvill and Wainwright to conclude that the Archer came to Stonehenge to be healed.

But without an accurate date for Stonehenge, it was not even clear whether the temple existed while the Archer was alive. His remains have been dated between 2500BC and 2300BC - within the same period that the first stone circle was erected.

"It's quite extraordinary that the date of the Amesbury Archer is identical with our new date for the bluestones of Stonehenge," said Professor Darvill.

"These two things happening within living memory of each other for sure is something very, very important."

### **Earliest occupation**

Professor Wainwright added: "Was the Amesbury Archer, as some have suggested, the person responsible for the building of Stonehenge? I think the answer to that is almost certainly 'no'.

"But did he travel there to be healed? Did he limp, or was he carried, all the way from Switzerland to Wiltshire, because he had heard of the miraculous healing properties of Stonehenge? 'Yes, absolutely'.

"Tim and I are quite convinced that people went to Stonehenge to get well. But Stonehenge probably had more than one purpose, so I have no problem with other people's interpretations."

Among other key finds, the team uncovered organic material that indicates people inhabited the Stonehenge site as long ago as 7200BC - more than 3,500 years earlier than anything previously known.

They also found that bluestone chippings outnumbered sarsen stone chippings by three to one - which Wainwright takes to be a sign of their value.

"It could be that people were flaking off pieces of bluestone, in order to create little bits to take away... as lucky amulets," he said.

The duo are preparing to publish an academic report of their excavation, and will announce their findings to their peers next month, in a lecture at London's Society of Antiquaries.

### **Ongoing debate**

Experts on Stonehenge said the new date was a major milestone in understanding Britain's most famous monument.

Dr Andrew Fitzpatrick, of Wessex Archaeology, said: "This is a great result - a very important one.

"The date of Stonehenge had been blowing in the wind. But this anchors it. It helps us to be secure about the chronology of events.

"The theory that it was a centre of healing is certainly a plausible one, but I don't think we can rule out the other main competing theory - that the temple was a meeting point between the land of the living and the dead.

"I am not yet persuaded that the Amesbury Archer came to Stonehenge to be healed. I favour the interpretation that he was one of the earliest metal workers, who travelled to the area to make a living from his skills.

"In any case, it is still not clear if his burial predated Stonehenge."

Dave Batchelor, Stonehenge curator at English Heritage, said: "We are pleased that the professors' precision in targeting that small area of turf and their rigorous standards in archaeological excavations have produced such a rich collection of physical evidence.

"We are looking forward to seeing the results of the full analysis, but from what we understand so far, we believe they have added valuable information to the chronology of Stonehenge."

### **Yale study takes a closer look at safety gaps during patient 'sign out'**

Patients may receive poor or delayed care after sign-out—the transfer of a patient from one doctor to another during a shift change—Yale School of Medicine researchers report in an Archives of Internal Medicine study.

"We spend a great deal of time in medical school teaching students how to present a patient, but no time at all on sign-out, which occurs more frequently and is high risk," said the study's lead author Leora Horwitz,

M.D., assistant professor of internal medicine at Yale School of Medicine. "Closing safety gaps at sign-out could help patients and doctors by reducing duplicative, inefficient care."

Horwitz and co-authors conducted a prospective study of sign-outs involving 319 patients over 12 days. They recorded the oral sign-outs and collected written sign-outs before obtaining reports of subsequent errors. Horwitz said this method allowed them, for the first time, to verify reports of sign-out inadequacies while minimizing bias.

"House staff identified 24 sign-out-related problems, some of which directly affected patients in the form of delayed, inappropriate or redundant care," said Horwitz. "But many of these problems affected doctors, who found themselves duplicating work already done by the primary team or wasting time figuring out what the primary team had already done. These inefficiencies leave doctors less time for direct patient care or rest."

"We were glad to be able to demonstrate, for the first time, the extent of the problem in a systematic fashion," said Horwitz, who also pointed out that these are generally problems that are extremely difficult to identify through chart review or billing data and consequently are often overlooked.

The team found that doctors were often confused about higher-order patient information rather than about factual details. Problems occurred, for example, when doctors did not fully understand the clinical condition of the patient or the rationale behind a test or procedure that had been ordered.

"Sign-out should be about painting a clinical picture of the patient and helping the covering team to act as the primary team would, not about providing long lists of facts that are readily available to the covering team," said Horwitz.

Horwitz maintains that sign-out is a skill that can be taught, assessed and improved, but only if it is a priority in the medical curriculum. The findings have resulted in a new sign-out skills curriculum for Yale medical students and internal medicine house staff.

"We hope that this study will serve as a wake-up call both for training programs and practicing physicians that we need to focus attention on sign-out in order to improve patient safety," said Horwitz.

*Other authors on the study included Tannaz Moin, M.D., Harlan Krumholz, M.D., Lillian Wang, M.D., and Elizabeth Bradley.*  
*Citation: Archives of Internal Medicine, Vol. 168, No. 16 (September 2008)*

### **Study confirms benefit of combination therapy for Alzheimer's disease**

#### **First long-term study finds that treatment slows symptom progression, benefits last for years**

Extended treatment with Alzheimer's disease drugs can significantly slow the rate at which the disorder advances, and combination therapy with two different classes of drugs is even better at helping patients maintain their ability to perform daily activities. Results from the first long-term study of the real-world use of Alzheimer's drugs, published by researchers from Massachusetts General Hospital in the July/September issue of *Alzheimer Disease and Associated Disorders*, support a level of effectiveness that may not be immediately apparent to patients or their family members.

"There has been the impression that these drugs only work for some patients and for a limited amount of time," says Alireza Atri, MD, PhD, of the MGH Department of Neurology, lead author of the current study. "One of the problems in judging these drugs has been that patients naturally continue to decline, which can make them think the drugs have stopped working. But our study, which has some unique strengths, indicates that treatment does have long-term benefit."

Two types of medications have received FDA approval for Alzheimer's treatment. Cholinesterase inhibitors have been available since the mid-1990s and act by inhibiting the breakdown of the neurotransmitter acetylcholine. The drug memantine, which received FDA approval in 2003, is the first of a second class of agents that modulate the actions of the amino acid glutamate and is often used in combination with cholinesterase inhibitors (CIs).

"Clinical trials that drug companies conduct for FDA approval only last six months and enroll patients according to very specific criteria," Atri explains. "Only large-population studies can really tell us how these drugs work for the full range of patients in real-life situations." The researchers were able to conduct such a study by analyzing data on patients treated at the MGH Memory Disorders Unit since 1990, including 144 who did not receive any pharmaceutical treatment, 122 treated with a CI alone and 116 who received both a CI and memantine. As part of their regular treatment, every six months patients received standardized assessments of both cognitive abilities and how well they carried out daily activities.

The results showed significant differences in the rate of symptom progression among all three groups – with the smallest level of decline in those receiving combination therapy. While there was an average of two and a half years' worth of data on the study participants, the researchers analyzed the information with a statistical model that predicted probable outcomes for up to four years. Although the model's projection of future benefits is conservative, it predicted that the longer patients kept receiving combination therapy, the smaller their rate of



decline would become, suggesting that treatment might even protect brain cells from further damage, a possibility needing further investigation.

"Finding something that could actually modify the course of the disease is the Holy Grail of Alzheimer's treatment, but we really don't know if that is happening or what the mechanism behind these effects might be," Atri explains. "What we can say now is that providers should help patients understand that the benefits of these drugs are long term and may not be apparent in the first months of treatment. Even if a patient's symptoms get worse, that doesn't mean the drug isn't working, since the decline probably would have been much greater without therapy." Atri is an instructor in Neurology at Harvard Medical School (HMS) and associate director of the Center for Translational Cognitive Neuroscience at the Veterans Administration Hospital in Bedford, Mass.

John Growdon, MD – director of the MGH Memory Disorders Unit, professor of Neurology at HMS, and senior author of the paper – explains, "The results of this study should change the way we treat patients with Alzheimer's disease. Cholinesterase inhibitors are approved for use in mild to moderate dementia, while memantine has been approved for advanced dementia. But it looks like there is an advantage in prescribing both drugs as initial treatment."

*The study was entirely supported by grants from the National Institute on Aging and the Massachusetts Alzheimer's Disease Research Center; there was no involvement or support from the pharmaceutical industry. Additional co-authors of the report are Lynn Shaughnessy, Massachusetts School of Professional Psychology, and Joseph Locascio, PhD, MGH Neurology.*

### **Patients stay with phone psychotherapy longer than office visits**

CHICAGO -- The problem with psychotherapy has long been that nearly half the patients quit going after a few sessions. Therapy can't work if patients stop coming to the therapist's office.

But a new meta-analysis has found that when patients receive psychotherapy for depression over the phone, most of them continue with the therapy.

Researchers from Northwestern University's Feinberg School of Medicine have taken the first "snapshot" of telephone-administered therapy studies around the country. Telephone therapy is becoming more widely used by health care providers and employee-assistance programs.

The new study found that the average attrition rate in the telephone therapy was only 7.6 percent compared to nearly 50 percent in face-to-face therapy. The telephone therapy also was effective in reducing depressive symptoms with results that appear to be similar to face-to-face treatment.

"The problem with face-to-face treatment has always been very few people who can benefit from it actually receive it because of emotional and structural barriers," said David Mohr, professor of preventive medicine at the Feinberg School and lead author of the study, published in the September issue of *Clinical Psychology: Science and Practice*. "The telephone is a tool that allows the therapists to reach out to patients, rather than requiring that patients reach out to therapists."

Mohr said that of the patients who say they want psychotherapy, only 20 percent actually show up for a referral and half later drop out of treatment.

"One of the symptoms of depression is people lose motivation," Mohr said. "It's hard for them to do the things they are supposed to do. Showing up for appointments is one of those things."

Patients also may not have the transportation or time to travel back and forth to a therapist's office. It may be hard to squeeze an appointment into days already crammed with work, caring for kids or elderly parents or other family obligations.

Telephone therapy seems to transcend all these barriers. Mohr began using telephone-administered therapy because he was working with patients who had multiple sclerosis who could not get to a therapist's office.

Mohr said what's needed is a definitive study with a randomly selected population of patients that directly compares therapy delivered in the traditional face-to-face manner to therapy delivered over the phone. He has already launched such a study in subjects who receive their primary care from Northwestern's Medical Faculty Foundation. He expects to have results in two to three years.

### **Indian spice reduces size of hemorrhagic stroke**

**Amy Connell**

You might want to make curcumin part of your daily diet. This active ingredient of the Indian curry spice, turmeric, not only lowers your chances of getting cancer and Alzheimer's disease, but may reduce the size of a hemorrhagic stroke, say Medical College of Georgia researchers.

Second-year medical student Jay McCracken is working with Dr. Krishnan Dhandapani, neuroscientist in the MCG School of Medicine, using animal models to study curcumin's effect on intracerebral hemorrhages, bleeding in the brain caused by ruptured vessels.

Patients with this type of stroke are often treated for symptoms – such as headache and nausea – with medications, but not the stroke itself. Invasive surgery to remove the clot is usually needed, but some patients

may not be good candidates, says Mr. McCracken. About 17 percent of strokes are hemorrhagic, according to the American Stroke Association, and usually occur in people with high blood pressure.

"We found that curcumin significantly decreases the size of a blood clot, but we're not sure why it happens," says the Alpharetta native. He thinks it may be because curcumin is a potent anti-inflammatory and antioxidant. For the study, he dissolved the yellow powder, which gives turmeric its color, in corn oil and injected it into the abdomen of an animal model of hemorrhagic stroke three times over three hours. He suspects less may work and is trying to establish the optimal dose and timing.

Timing is critical for patients who often don't know they have had a stroke and may not be seen by a physician for several hours.

"Usually, patients can experience other symptoms like seizures, vision or cognitive problems, so they come to the (emergency room) fairly quickly under most circumstances," says Dr. Dhandapani. "Many patients also arrive due to head trauma and are seen within an hour or so. However, treating these injuries, even after an hour, can be tricky."

Patients likely will need to get curcumin intravenously. The researchers believe it may also help prevent strokes; they intend to pursue this line of study with the idea of also making it available in a concentrated tablet form for those at-risk.

Mr. McCracken has worked on this project since May as part of the School of Medicine Dean's Summer Research Fellowship, which enables rising sophomore students to design and participate in cutting-edge basic and/or clinical research. He is among 25 students who presented their findings Sept. 22. School of Medicine Dean D. Douglas Miller recognized students for their work and talked about the importance and role of research.

Mr. McCracken will continue his research through the year. "I like the research, and I think it's good preparation for residency," he says. He hopes to pursue a neurosurgery residency after graduation.

A graduate of the University of Georgia, where he received biochemistry and microbiology degrees, it was a high school football injury that inspired Mr. McCracken to pursue medicine.

"I snapped my ankle, and when I met the orthopedic surgeon, I thought he was so nice and interesting," says Mr. McCracken. "And then, for an anatomy class, we had to interview someone in science or health care, and I chose my surgeon. He let me shadow him, and I thought it was the best thing in the world."

During his first year at MCG, Mr. McCracken found he really enjoyed anatomy, especially neuroanatomy.

"I think it's interesting and challenging," he says. "I've seen patients come in who have terrible tumors or hemorrhages, and neurosurgeons can change their life in a matter of hours. Patients come in expecting three months to live, and surgeons give them years to live. It's amazing."

### **Iron-moving malfunction may underlie neurodegenerative diseases, aging**

ANN ARBOR, Mich.---A glitch in the ability to move iron around in cells may underlie a disease known as Type IV mucopolysaccharidosis (ML4) and the suite of symptoms---mental retardation, poor vision and diminished motor abilities---that accompany it, new research at the University of Michigan shows.

The same deficit also may be involved in aging and neurodegenerative diseases such as Alzheimer's and Parkinson's, says lead author Haoxing Xu, an assistant professor of molecular, cellular and developmental biology.

The findings are scheduled to be published online Sept. 14 in the journal *Nature*.

An interest in iron transport led Xu to investigate ML4, another symptom of which is iron-deficiency anemia. Perhaps, he and his collaborators reasoned, impaired iron transport could explain both the anemia and the other problems that go hand-in-hand with ML4, a genetic disorder that mainly affects Jews of Eastern European background. Children with ML4 begin showing signs of developmental delay and eye problems during the first year of life and typically fail to progress beyond the level of a 15-month-old. Although the disease is rare, recent discovery of some children with milder forms of the condition raises the possibility of additional mild, undiagnosed cases.

To explore the possible role of iron transport in the disease, Xu's group focused on a protein called TRPML1. A mutation in the gene that produces TRPML1 is known to cause ML4, so the protein seemed like a logical starting point for investigating mechanisms responsible for the disease, even though TRPML1 had never been shown to be involved in iron transport. The only protein with that distinction was DMT1, which facilitates iron uptake in the gut and in cells that will become red blood cells, but not in most other cell types.



"Essentially all cells, including nerve cells and muscle cells, need iron," Xu said. "We wondered what happens in those cells where DMT1 isn't found, and we thought there must be an unidentified iron transporter protein, possibly TRPML1."

Unfortunately, TRPML1 isn't the easiest protein to study. Instead of residing in the cell's easily-accessed outer membrane, where many other proteins nestle, it hides in a tiny, interior pocket called lysosome. To probe the protein, Xu's group had to modify a technique known as the patch clamp, in which a micropipette and electrodes are attached to a cell membrane to record the activity of individual or multiple proteins that serve as channels for charged particles (ions) moving in and out of cells. With their modification, which they call the lysosome patch clamp, Xu's group was able to record TRPML1 activity in the tiny lysosome.

They found that TRPML1 was indeed capable of ferrying iron out of the lysosome. But was there any evidence that interfering with that ability might result in ML4 symptoms? To address that question, Xu's group studied defective TRPML1 proteins bearing the same mutations as those found in ML4 patients. Mutations associated with severe symptoms were the least adept at shuttling iron, while those associated with milder symptoms were more proficient, although still not fully functional.

Further experiments confirmed that when TRPML1 is defective, iron becomes trapped in the lysosome. One result of the buildup is formation of a brownish waste material, lipofuscin, known as the "aging pigment." In skin cells, lipofuscin is the culprit responsible for the dreaded liver spots that appear with increasing age, but in nerve, muscle and other cells, its accumulation has more serious consequences.

"How lipofuscin causes problems in neurons and muscles is not clear, but it's believed that this is garbage that, in time, compromises the normal function of the lysosome," Xu said. "And we know the lysosome is important for all kinds of cell biology, particularly the recycling of intracellular components, so if it's damaged, the cell is going to suffer." Indeed, abnormal accumulation of lipofuscin is associated with a range of disorders including Alzheimer's disease, Parkinson's disease, and macular degeneration (a degenerative disease of the eye) and also contributes to the aging process.

"In a sense we can think of ML4 as really early onset of aging," Xu said.

Now that the connections among TRPML1, iron and lipofuscin are coming into focus, researchers have new avenues to explore for potential treatments, not only for ML4 but also for more common neurodegenerative conditions.

"If we can somehow manipulate the lysosome iron level, we probably can provide a treatment for the patient," Xu said. "We're not far enough along for those kinds of experiments yet, but now we know enough to work toward that goal."

*Xu's coauthors on the Nature paper are postdoctoral fellows Xian-ping Dong and Xiping Cheng and undergraduate Eric Mills of U-M; Markus Delling of Children's Hospital Boston; Fudi Wang of the Chinese Academy of Sciences and Tino Kurz of the University of Linköping, Sweden. The researchers received funding from the U-M Department of Molecular, Cellular and Developmental Biology and Biological Science Scholar Program.*

### **Hidden infections crucial to understanding, controlling disease outbreaks**

ANN ARBOR, Mich.—Scientists and news organizations typically focus on the number of dead and gravely ill during epidemics, but research at the University of Michigan suggests that less dramatic, mild infections lurking in large numbers of people are the key to understanding cycles of at least one potentially fatal infectious disease: cholera.

Using a model developed with new statistical methods, U-M researchers and their collaborators came up with results that challenge longstanding assumptions about the disease and strategies for preventing it.

Their findings appear in the Aug. 14 issue of the journal *Nature*.

The goal of the study was to develop a model that would explain puzzling patterns seen in 50 years of cholera death records from 26 districts in Bengal, cholera's "native habitat."

"In that region, we see two cholera seasons per year, with peaks in spring and fall," said assistant professor of ecology and evolutionary biology Aaron King, the study's lead author. In addition, longer-term ups and downs can be seen over periods of three to five years, with many cholera cases reported during some periods and few during others.

Explanations have been proposed for both the seasonal and multi-year cycles, and King and coworkers wanted to test the validity of those and other possible scenarios. In particular, they wanted to explore the impact of infection-induced immunity on the dynamics of cholera outbreaks.

It's surprisingly hard to get really sick with cholera, an intestinal infection that causes diarrhea, vomiting, and leg cramps. The bacterium that causes the illness, *Vibrio cholerae*, lives in surface waters, and in areas where sanitation is poor, food and water are commonly contaminated with the bug. But it takes 100 billion bacteria to

cause severe illness when ingested with water; 100 million when taken in with food (which protects the bugs from stomach acid). As a result, in areas like Bengal where exposure is high, lots of people are walking around infected, but not ill.

"The consequences of that have not been clear," King said. "Are those mild cases infecting other people? What are the immunological consequences---how long are people with mild infections protected against re-infection?"

To answer these and other questions, King and coworkers developed a series of models that incorporated known or suspected mechanisms of disease transmission and immunity and then looked to see which model best fit the actual data.

"What we found was a real surprise," said King, who has joint appointments in the Department of Mathematics and the Center for the Study of Complex Systems. "Our analysis showed that the best explanation for the patterns seen in the data is that many more people are being exposed to the bacteria than are getting serious infections or dying, and that individuals with mild infections are losing their immunity quite quickly, in a matter of weeks or months."

The model revealed that as an epidemic spreads, many people develop this short-term immunity. Once large numbers of people are immune, the epidemic comes to a halt. "But before the year is out, they're susceptible again," and the cycle starts all over, King said.

The quick waning of immunity found in this study contrasts with the widely-held belief---based only on studies of people with severe cholera, not on those with mild cases---that immunity to reinfection lasts at least three and possibly as long as ten years. The most effective cholera vaccines, by contrast, produce an immunity that lasts only a few months. The new model raises the possibility that current vaccines could be given at the beginning of cholera season to squelch an incipient epidemic.

"In order to understand how to control this disease, we really need to understand what's going on in the bulk of cases, not just what's happening in the most severe," King said.

The researchers are using similar models to explore patterns seen in other infectious diseases, such as malaria and whooping cough.

*In addition to Ionides, who is an assistant professor of statistics, King's collaborators on this work were Mercedes Pascual, associate professor of ecology and evolutionary biology, and Menno Bouma of the London School of Hygiene and Tropical Medicine. The researchers received funding from the National Science Foundation, the National Institutes of Health and the National Oceanic and Atmospheric Administration.*

## **The secret ingredients behind germinated rice**

### **Appearing in the October issue of JLR**

A team of researchers has identified the active compounds that contribute to the health benefits of pre-germinated brown rice; the healthy components are a related set of sterol-like molecules known as acylated steryl-beta-glucosides (ASGs).

Pre-germinated rice (PR) is an emerging health food whereby brown rice is soaked in warm water prior to cooking; the warm bath induces germination, or sprouting, which stimulates rice enzymes to produce more nutrients. One such nutrient is the important brain chemical GABA (PR is thus often referred to as "GABA rice"), and animal studies have shown that a PR-rich diet can improve cognitive function. Other studies have found that PR can also act as an anti-diabetic.

The chemicals behind this effect were unknown, but now Robert Yu and colleagues used mass spectrometry and nuclear magnetic resonance approaches and identified the bioactive compounds as ASGs, a diverse family of molecules that consists of a glucose derivative, fatty acids, and sterols. The ASGs were concentrated in the rice bran (outer layer) and not the seed, so they would not be found in white rice.

The researchers then demonstrated that the ASGs had the ability to activate enzymes related to diabetes, and this activation required the acyl chemical group; regular steryl glucosides (SGs) had no effect. And, although ASGs are found in many plants, soybean derived ASGs had no effect on the diabetic enzymes, indicating the ASG complement specific to rice may be unique in its diabetic benefits.

*This study appears in the October issue of Journal of Lipid Research.*

*From the article: "Structural analysis of novel bioactive acylated steryl glucosides (ASGs) in pre-germinated brown rice bran" by Seigo Usuki, Toshio Ariga, Somsankar Dasgupta, Takeshi Kasama, Keiko Morikawa, Shota Nonaka, Yasuhide Okuhara, Mitsuo Kise, and Robert K. Yu **Article link:** <http://www.jlr.org/cgi/content/full/49/10/2188>*

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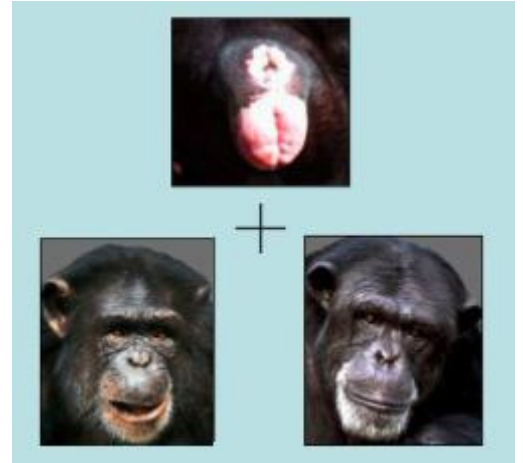
## Chimps can recognise friends by their behinds

\* 16:19 22 September 2008  
\* NewScientist.com news service  
\* **Mark Buchanan**

Chimps can match up the faces of group members with photos of their behinds. The ability, researchers say, shows that chimps carry around mental representations with "whole body" detail of chimps they have encountered.

Primatologists Frans de Waal and Jennifer Pokorny of the Yerkes National Primate Research Centre at Emory University in Atlanta, Georgia, tested how well six adult chimpanzees could link pictures of various chimpanzee behinds, either male or female, with photos of individual chimp faces.

They showed a chimp, first, a photo of a chimp's behind, including genitals, then the faces of two chimps, both of the same sex as that behind. Each of three male and three female chimps were able to make the correct face-with-behind pairing with a probability significantly higher than chance.



*A sex perception task for chimps: The top image shows a generic female rear. The chimp being tested must decide which of the male and female faces presented would have such a backside. Go to the end of the story to find the answer (Image: de Waal and Pokorny)*

### Body knowledge

But the chimps succeeded only if the faces were of chimps they knew. This suggests, the researchers say, that the chimps weren't simply detecting generic visual cues in the faces that would link them to the behind in question. Rather, it seems that the chimps must be capable of what psychologists call "whole body" integration.

"They were not only seeing the photographs as representations of chimps they knew, says de Waal, "but linked the face and behind by drawing upon a mental representation of the whole body of those chimps."

Earlier experiments had hinted that some non-human primates might have this capability, but this is the first time "whole body knowledge" has been convincingly demonstrated.

### Concept of sex?

Primatologist Agnes Lacreuse of the University of Massachusetts in Amherst, says that more experiments are needed before we can conclude that chimps identify other chimps using a "gender construct" method. "We know that macaques are able to categorize faces as males or females, so it would be very surprising if chimpanzees were unable to do so."

In other experiments, de Waal and Pokorny also tested the chimps' ability to recognise the sex of other chimps from photos of their faces alone.

They first presented chimps with a photo of either a generic male or female chimp rear end – a sexually charged stimulus. The chimps were then shown closely cropped photos of two chimps, one male and one female, and encouraged to select the face of the same sex as the rear end. The chimps tended to be successful at this test too, but again only if the faces belonged to chimps familiar to them.

This suggests, de Waal speculates, that chimps may operate with a "gender construct" – that is, the chimps recognise the sex of other chimps based, not just on physical attributes, but on other information from their previous experience with those individuals, such as their roles in the larger group.

This would be similar to how humans recognise gender, de Waal points out. In experiments with sex cues such as facial shape and hair removed, for example, people can identify faces as male or female more rapidly if they are faces of familiar people. *Journal reference: Advanced Science Letters (DOI:10.1166/asl.2008.006)*

**Sex perception task answer:** *For this trial, the correct choice is the left face (a female). The right face is a male chimp.*

## Wasps have a good memory for a face

\* 17:00 22 September 2008  
\* NewScientist.com news service  
\* **Aria Pearson**

Wasps can remember each other after a busy week apart, according to new research. It's a level of social memory never seen before in insects, which were long thought to be too small-brained for such a feat.

Queens of the paper wasp, *Polistes fuscatus*, form cooperative nests after fighting to establish a dominance hierarchy.

When big-brained vertebrates like primates fight to establish dominance, they benefit from their ability to remember previous adversaries. But insects, even those with complex social colonies, were thought to lack that kind of individual social intelligence.

Michael Sheehan and Elizabeth Tibbetts at the University of Michigan in Ann Arbor, tested that idea. Tibbetts knew that wasps can recognise individuals based on colour patterns on their faces. The next step was to see if they could remember individuals over a period of time in which they were distracted by other social interactions.

### **Buzz off, stranger**

The researchers exposed female wasps to a new individual and then placed them in separate cages along with 10 other wasps. After one week, the females acted much more aggressively when placed with another new individual than when placed with the wasp they had met before.



*Would you remember these faces after a week? Paper wasps can*  
(Image: Michael Sheehan) [See video here](#)

"It's about how many new memories and new experiences you can have before the first memory goes out the window," says Sheehan. "In this case the wasps are remembering someone they interacted with at the same time as they're interacting with 10 other wasps."

"This shows how we used to underestimate insect learning and cognition," says Reuven Dukas, an evolutionary biologist at McMaster University in Ontario, Canada, who studies insect learning.

"The biased view that you need a giant brain to be smart is not fully correct. Animals with small brains can do much more than we used to attribute to them." *Journal reference: Current Biology (vol 18, R2)*

### **Honey effective in killing bacteria that cause chronic sinusitis**

#### ***New research released at world's largest ENT meeting***

Chicago, IL – Honey is very effective in killing bacteria in all its forms, especially the drug-resistant biofilms that make treating chronic rhinosinusitis difficult, according to research presented during the 2008 American Academy of Otolaryngology-Head and Neck Surgery Foundation (AAO-HNSF) Annual Meeting & OTO EXPO, in Chicago, IL.

The study, authored by Canadian researchers at the University of Ottawa, found that in eleven isolates of three separate biofilms (*Pseudomonas aeruginosa*, and methicillin-resistant and -susceptible *Staphylococcus aureus*), honey was significantly more effective in killing both planktonic and biofilm-grown forms of the bacteria, compared with the rate of bactericide by antibiotics commonly used against the bacteria.

Given the historical uses of honey in some cultures as a homeopathic treatment for bad wound infections, the authors conclude that their findings may hold important clinical implications in the treatment of refractory chronic rhinosinusitis, with topical treatment a possibility.

Chronic rhinosinusitis affects approximately 31 million people each year in the United States alone, costing over \$4 billion in direct health expenditures and lost workplace productivity. It is among the three most common chronic diseases in all of North America. **Title:** *Effectiveness of Honey on S. aureus and P. aeruginosa Biofilms*  
**Authors:** Talal Alandejani, MD (presenter); Joseph G. Marsan, MD; Wendy Ferris, BSc, MLT, MSc; Robert Slinger; Frank Chan, PhD  
**Date:** Tuesday, September 23, 2008, 8:00-9:30 am (all times CDT)

### **Termination-of-resuscitation rules helps ID cardiac arrest patients with small chance of survival**

Researchers have validated criteria that are used to identify patients with out-of-hospital cardiac arrest who have little or no chance of survival after resuscitation, according to a study in the September 24 issue of JAMA.

"During the past 30 years, several research teams have sought to define objective clinical criteria to identify patients who likely will not benefit from rapid transport to the hospital for further resuscitative efforts. Despite this research, many emergency medical services (EMS) systems still urgently transport patients with refractory [not responding to treatment] cardiac arrest to the hospital for continued resuscitative efforts. Rapid transport with lights and siren may pose hazards for EMS personnel and the public and should occur only when the risks of high-speed transport are justified by the potential benefits to the patient," the authors write.

Comilla Sasson, M.D., M.S., of the University of Michigan, Ann Arbor, and colleagues conducted a study to validate two out-of-hospital termination-of-resuscitation rules developed by the Ontario Prehospital Life Support (OPALS) study group, one rule for use by responders providing basic life support (BLS) and the other rule for those providing advanced life support (ALS). The researchers analyzed surveillance data submitted by emergency medical systems and hospitals in 8 U.S. cities that were part of the Cardiac Arrest Registry to Enhance Survival (CARES). The study included 5,505 adults with out-of-hospital cardiac arrest.

The BLS rules include: event not witnessed by emergency medical services personnel; no automated external defibrillator used or manual shock applied in out-of-hospital setting; and no return of spontaneous circulation in out-of-hospital setting. The ALS rules include the BLS rules plus: arrest not witnessed by bystander; and no bystander-administered cardio-pulmonary resuscitation.

The researchers found that the overall rate of survival to hospital discharge was 7.1 percent (n = 392). Of 2,592 patients (47.1 percent) who met BLS criteria for termination of resuscitation efforts, only 5 (0.2 percent) patients survived to hospital discharge. Of 1,192 patients (21.7 percent) who met ALS criteria, none survived to hospital discharge. The BLS rule had a positive predictive value of 0.998 for predicting lack of survival; the ALS rule had a positive predictive value of 1.000 for predicting lack of survival.

"Widespread implementation of either rule could materially reduce the risk posed to EMS personnel during high-speed transports, decrease pressure on overburdened EMS systems, allow emergency department staff to focus on patients who have greater odds of survival, and decrease admissions to the intensive care unit of patients with out-of-hospital cardiac arrest who have little or no chance of surviving to discharge," the authors write. (*JAMA*. 2008;300[12]:1432-1438. Available pre-embargo to the media at [www.jamamedia.org](http://www.jamamedia.org))

### **Plant antioxidant may protect against radiation exposure**

PITTSBURGH, Sept. 23 – Resveratrol, the natural antioxidant commonly found in red wine and many plants, may offer protection against radiation exposure, according to a study by the University of Pittsburgh School of Medicine. When altered with acetyl, resveratrol administered before radiation exposure proved to protect cells from radiation in mouse models. The results of the research will be presented during the American Society for Therapeutic Radiology and Oncology's (ASTRO) 50th Annual Meeting in Boston.

The study, led by Joel Greenberger, M.D., professor and chairman of the Department of Radiation Oncology at the University of Pittsburgh School of Medicine, is overseen by Pitt's Center for Medical Countermeasures Against Radiation. The center is dedicated to identifying and developing small molecule radiation protectors and mitigators that easily can be accessed and administered in the event of a large-scale radiological or nuclear emergency.

"New, small molecules with radioprotective capacity will be required for treatment in case of radiation spills or even as countermeasures against radiological terrorism," said Dr. Greenberger. "Small molecules which can be easily stored, transported and administered are optimal for this, and so far acetylated resveratrol fits these requirements well."

"Currently there are no drugs on the market that protect against or counteract radiation exposure," he added. "Our goal is to develop treatments for the general population that are effective and non-toxic."

Dr. Greenberger and his team are conducting further studies to determine whether acetylated resveratrol eventually can be translated into clinical use as a radioprotective agent. In 2004, this same team of researchers identified the drug JP4-039, which can be delivered directly to the mitochondria, the energy producing areas of cells. When this occurs, the drug assists the mitochondria in combating radiation-induced cell death.

*The abstract, "Acetylated resveratrol: A new small molecule radioprotector," will be presented at a poster discussion session at 5 p.m., Tuesday, Sept. 23.*

*The study was funded by a \$10 million grant from the National Institute of Allergy and Infectious Diseases to establish the Center for Medical Countermeasures Against Radiation at the University of Pittsburgh.*

### **Isoflavone dietary supplement improves the functioning of the arteries in stroke patients**

A dietary supplement containing isoflavone – a chemical found in soybeans, chickpeas, legumes and clovers – can improve artery function in stroke patients according to new research published online in Europe's leading cardiology journal, the *European Heart Journal* [1] today (Wednesday 24 September).

The study is believed to be the first randomised controlled trial to investigate the effects of isoflavone supplement on the way the brachial artery (the main artery in the arm) dilates in response to an increase in blood flow – a phenomenon known as flow-mediated dilation (FMD) – in patients with established cardiovascular disease. Brachial FMD is an indicator of the functioning of the cells that line the inner surfaces of blood vessels (vascular endothelium), and endothelial dysfunction is implicated in cardiovascular disease.

Professor Hung-Fat Tse, William MW Mong Professor in Cardiology and Academic Chief of the Cardiology Division in the Department of Medicine, Queen Mary Hospital, The University of Hong Kong (Hong Kong, China) and his team found that 12 weeks of isoflavone supplement, at a dose of 80 mg a day, significantly improved brachial FMD and, therefore, vascular endothelial dysfunction in patients who had suffered an ischaemic stroke (a stroke caused by blood clots or other obstructions).

"These findings may have important implications for the use of isoflavone for secondary prevention in patients with cardiovascular disease, on top of conventional treatments," the authors wrote in their EHJ paper.

The trial was a double-blind, placebo-controlled trial, involving 50 patients taking the isoflavone supplement, and 52 taking a placebo pill. The researchers measured FMD by using ultrasound to record the performance of the brachial artery as the blood flow returned to normal after having a pneumatic tourniquet on the forearm inflated and then released. FMD was defined as the percentage change in the brachial artery diameter between its normal size (baseline) and one minute after the tourniquet's deflation.

Eighty per cent of the patients had an impaired FMD of less than 3.7% at the start of the study, but after 12 weeks of isoflavone or placebo, there was an improvement of one per cent in the isoflavone-treated patients compared with the controls.

Prof Tse explained: "Although the absolute increase in brachial diameter – one per cent – is small, the relative increase actually amounted to about 50% because the mean average FMD in these stroke patients was about two per cent. In fact, in patients with severe endothelial dysfunction, there might not be dilatation of brachial diameter at all."

In their paper, the authors wrote: "The treatment effect of isoflavone in our study was comparable with lifestyle changes with endurance training or pharmacological interventions with statin therapy."

In addition, the prevalence of impaired FMD after 12 weeks became significantly lower in isoflavone-treated patients than in the controls (isoflavone: 58%, control: 79%). There was also a greater effect in patients with more severe endothelial dysfunction.

"The patients who had a lower initial FMD were found, in general, to respond with a larger absolute increase in FMD after receiving 12 weeks of isoflavone intervention, compared to patients who had a better baseline FMD in the first place," said Prof Tse. "These findings suggest that isoflavone reverses endothelial dysfunction in this group of patients with cardiovascular disease. This has important clinical implications, as the benefit of the treatment is conferred to the group of patients with the highest risks for cardiovascular events, and this effect persists, even at this rather late stage of the cardiovascular continuum."

No improvement from isoflavone treatment was found in diabetic patients compared with non-diabetic patients, but there was an improvement of one per cent in patients who were current smokers or who had smoked in the past compared with non- or never smokers. "Since smoking is known to be associated with more severe endothelial dysfunction, this observation was coherent with our hypothesis that patients with worse baseline endothelial function are, in general, more responsive to isoflavone treatment," said Prof Tse.

The researchers also found that 12 weeks of isoflavone treatment resulted in a significant decrease in levels of high-sensitivity C-reactive protein. This protein increases during systemic inflammation and is an independent predictor of cardiovascular-related events. "These findings suggested that isoflavone treatment alleviated vascular inflammatory stress and was an important component that mediated the reversal of endothelial dysfunction in this group of patients," wrote the authors.

Prof Tse said that the mechanisms by which isoflavone produces these changes in FMD were not completely understood. Other than the anti-inflammatory effect observed in this study, isoflavone is a major class of phytoestrogens – naturally occurring chemicals that mimic the effect of the human hormone oestrogen. Oestrogen is known to protect against heart disease and so this could be a possible mechanism.

He said it was too early to make clinical recommendations about the use of isoflavone supplements for stroke patients. "Our study implied that diets with higher isoflavone contents might be beneficial in reducing cardiovascular risk in ischaemic stroke patients. Since atherosclerosis is a generalised process, it might be reasonable to propose that a similar effect be observed in other kinds of CVD. However, specific response from different CVD-related conditions requires further testing. At this juncture, regular isoflavone supplement might not be advocated since the benefits and side effects of long-term supplementation are still unknown.

"A balanced diet is still the top priority in promoting health. Diets with higher soy content might be beneficial due to the isoflavone contents. These food products also, in general, have higher contents of polyunsaturated fats, fibre, vitamins and less saturated fat."

Prof Tse and his colleagues are continuing with prospective studies of isoflavone to see what effect it has on clinical outcomes such as overall survival and the incidence of cardiovascular events.

*Notes: [1] Reduction of C-reactive protein with isoflavone supplement reverses endothelial dysfunction in patients with ischaemic stroke. European Heart Journal. doi:10.1093/eurheartj/ehn409.*



## 'Chemical equator' protects Antarctica's clean air

\* 15:40 23 September 2008

\* NewScientist.com news service

\* **Catherine Brahic**

Scientists have discovered a "chemical equator" just north of Australia that divides polluted air from South-East Asia from the largely uncontaminated atmosphere of the Southern Ocean that surrounds Antarctica.

The discovery will help researchers create accurate simulations of how pollutants move in the atmosphere and assess their impact on climate.

The polluted air of the northern hemisphere and the clearer air of the southern hemisphere tend not to mix. A mobile cloudy belt known as the Intertropical Convergence Zone that runs around the globe roughly at the level of the equator is thought to form a meteorological barrier between the two.

But a team of researchers have found an additional barrier high up above the Western Pacific that prevents the pollution from forest fires in countries such as Thailand and Sumatra contaminating the pristine skies above the Southern Ocean.

*An invisible barrier separates the carbon-monoxide-rich air of South-East Asia from the pristine air of the Southern Ocean* (Image: Hamilton et al./AGU)

While flying a plane equipped to detect chemicals in the atmosphere, the team led by Jacqueline Hamilton of the University of York, UK, found a 50 kilometre wide "chemical line" north of Australia.

### 'Hidden' barrier

Levels of carbon monoxide – a by-product of burning – were four times higher to the north of the line than they were to the south.

At the time, the Intertropical Convergence Zone lay much further south, over Central Australia. So the researchers concluded that they must have come across another "hidden" barrier.

Hamilton explains that the shallow waters of the Western Pacific may help form the barrier.

The surface waters are amongst the hottest in the world, fuelling strong storm systems. "These powerful storms may act as pumps, lifting highly polluted air from the surface to high in the atmosphere where pollutants will remain longer and may have a global influence," she says.

To the south, cyclones above Australia suck in pristine maritime air. The two systems do not mix, creating an invisible chemical barrier.

Hamilton's study was carried out in January and February 2006, during the Australian-Indonesian monsoon, and the effect may be seasonal, she says.

*Journal reference: Journal of Geophysical Research - Atmospheres (DOI: 10.1029/2008JD009940)*

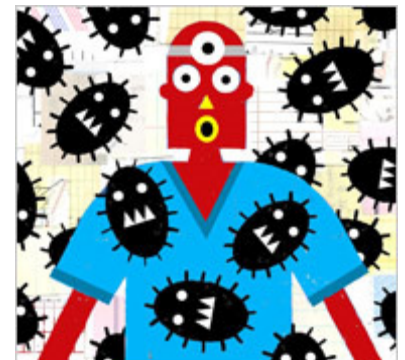
### Well

## The Doctor's Hands Are Germ-Free. The Scrubs Too?

By **TARA PARKER-POPE**

Many hospitals have stepped up efforts to encourage regular hand washing by doctors. But what about their clothes?

Amid growing concerns about hospital infections and a rise in drug-resistant bacteria, the attire of doctors, nurses and other health care workers — worn both inside and outside the hospital — is getting more attention. While infection control experts have published extensive research on the benefits of hand washing and equipment sterilization in hospitals, little is known about the role that ties, white coats, long sleeves and soiled scrubs play in the spread of bacteria.



Noah Woods

The discussion was reignited this year when the British National Health Service imposed a "bare below the elbows" rule barring doctors from wearing ties and long sleeves, both of which are known to accumulate germs as doctors move from patient to patient.

(In the United States, hospitals generally require doctors to wear “professional” dress but have no specific edicts about ties and long sleeves.)

But while some data suggest that doctors’ garments are crawling with germs, there’s no evidence that clothing plays a role in the spread of hospital infections. And some researchers report that patients have less confidence in a doctor whose attire is casual. This month, the medical journal *BJU International* cited the lack of data in questioning the validity of the new British dress code.

Still, experts say the absence of evidence doesn’t mean there is no risk — it just means there is no good research. A handful of reports do suggest that the clothing of health workers can be a reservoir for risky germs.

In 2004, a study from the New York Hospital Medical Center of Queens compared the ties of 40 doctors and medical students with those of 10 security guards. It found that about half the ties worn by medical personnel were a reservoir for germs, compared with just 1 in 10 of the ties taken from the security guards. The doctors’ ties harbored several pathogens, including those that can lead to staph infections or pneumonia.

Another study at a Connecticut hospital sought to gauge the role that clothing plays in the spread of methicillin-resistant *Staphylococcus aureus*, or MRSA. The study found that if a worker entered a room where the patient had MRSA, the bacteria would end up on the worker’s clothes about 70 percent of the time, even if the person never actually touched the patient.

“We know it can live for long periods of time on fabrics,” said Marcia Patrick, an infection control expert in Tacoma, Wash., and co-author of the Association of Professionals in Infection Control and Epidemiology guidelines for eliminating MRSA in hospitals.

Hospital rules typically encourage workers to change out of soiled scrubs before leaving, but infection control experts say enforcement can be lax. Doctors and nurses can often be seen wearing scrubs on subways and in grocery stores.

Ms. Patrick, who is director of infection prevention and control for the MultiCareHealth System in Tacoma, says it’s unlikely that brief contact with a scrub-wearing health care worker on the subway would lead to infection. “The likelihood is that the risk is low, but it’s also probably not zero,” she said.

While the role of clothing in the spread of infection hasn’t been well studied, some hospitals in Denmark and Europe have adopted wide-ranging infection-control practices that include provisions for the clothing that health care workers wear both in and out of the hospital. Workers of both sexes must change into hospital-provided scrubs when they arrive at work and even wear sanitized plastic shoes, also provided by the hospital. At the end of the day, they change back into their street clothes to go home.

The focus on hand washing, sterilization, screening and clothing control appears to have worked: in Denmark, fewer than 1 percent of staph infections involve resistant strains of the bacteria, while in the United States, the numbers have surged to 50 percent in some hospitals.

But American hospitals operate on tight budgets and can’t afford to provide clothes and shoes to every worker. In addition, many hospitals don’t have the extra space for laundry facilities.

Ann Marie Pettis, director of infection prevention for the University of Rochester Medical Center, says most hospitals are focusing on hand washing and equipment sterilization, which are proven methods known to reduce the spread of infection. But she adds that her hospital, like many others, has a policy against wearing scrub attire to and from work, even though there is no real evidence that dirty scrubs pose a risk to people in the community.

“Common sense tells us that the things we are wearing as health care providers should be freshly laundered,” Ms. Pettis said. After all, she went on, the wearing of scrubs in public “raises fear” among consumers.

“I don’t think we should feed into that,” she said. “Scrubs shouldn’t be worn out and about.”

## **Ban Near on Diverting Water From Great Lakes**

**By SUSAN SAULNY**

**Correction Appended**

The House began debate Monday on a sweeping bill that would ban almost any diversion of water from the Great Lakes’ natural basin to places outside the region.

The measure is intended to put to rest longstanding fears that parched states or even foreign countries could do long-term damage to the basin by tapping into its tremendous body of fresh water.

The bill, which would also put in place strict conservation rules for the eight states that border the lakes, is expected to win House approval, perhaps as soon as Tuesday. It has already been passed by the Senate, and the Bush administration has signaled its support.

So House backing for the measure, known as the Great Lakes Compact, is regarded by its many advocates across the Midwest and in New York and Pennsylvania as a long-sought final piece to a complicated puzzle

whose solution started taking shape a decade ago in an effort to give the region control over its water. The fear was that without strict, consistent rules on who is entitled to that water, it might start disappearing.

“People realized that Great Lakes water is a finite resource and that death by a thousand straws is a real threat,” said Jordan Lubetkin, a spokesman for the National Wildlife Federation. “There is a perception that because the Great Lakes are so vast, they are immune from harm. That is not the case.”

Before the legislation even reached Congress, the states bordering the lakes had to approve the compact individually, agreeing — in a contentious process that itself took years — to certain common goals. The last state to approve, Michigan, did so only in July, following Illinois, Indiana, Minnesota, New York, Ohio, Wisconsin and Pennsylvania.

(The Canadian provinces of Ontario, which also borders the lakes, and Quebec, which is connected to the lakes’ ecosystem by the St. Lawrence River, have adopted a nearly identical document.)

Though passage in the House is foreseen, support there is not unanimous. Some members say the pact is not strong enough to protect the lakes, which together account for 20 percent of the world’s fresh surface water.

Among the dissenters is Representative Bart Stupak, Democrat of Michigan, who complained Monday about an exception that would allow bottled water to be shipped outside the basin, among other management issues.

“Because these concerns remain unaddressed,” Mr. Stupak said in a statement, “I regret that I have to urge my colleagues to join me in opposing the compact until proper protections are put in place.”

“I see no reason why we must rush this process when our nation’s most precious natural resource is at stake,” said Mr. Stupak, whose district borders three of the lakes, calling the bottled-water exemption a loophole that could be used for large-scale diversion, exactly what the compact seeks to prevent.

But one of the compact’s drafters, Samuel W. Speck, former chairman of the water management working group of the Council of Great Lakes Governors, said the exemption was “not an issue.”

“By and large, bottled water isn’t shipped that far,” Mr. Speck said. “We found there is more bottled water sent into the Great Lakes Basin than sent out. It wasn’t a matter of us losing water. We actually gain water from the shipping.”

“There are those things that would irritate perfectionists,” he continued, “but it was the only way to get something so comprehensive and with enforcement enacted in all of the states and provinces. That’s an amazing accomplishment, and a very important one as we’re looking at greater demands for water and threats that climate change will bring.”

Under the measure, water generally would not be allowed to be diverted from the basin except under rare circumstances that would require the approval of all eight bordering states. In addition to the bottled-water exemption, an exception has been made for so-called straddling communities that lie on the basin’s borders, among other negotiated concessions based largely on whether diverted water could be restored to the lakes.

As for outlying states, Mr. Speck, among others, said he hoped they realized that guarding the freshwater supply with more vigor was in the long-term interest of the entire country.

“Some people will say, ‘Gosh, that’s discrimination against other states,’ ” Mr. Speck said. “The reality is that in the eight Great Lakes states, the largest parts of those states are outside of the basin. They’re not treating other states different from how they’re treating large areas of their own states.”

Another advocate of the compact, Steve Wieckert, a Republican member of the Wisconsin Assembly, said it had caused a tough fight in his state, because about half of Wisconsin falls outside the Great Lakes Basin. Some residents accused him of creating second-class citizens, but Mr. Wieckert, whose own district falls within the basin, said the compact was fair.

“No one else could come up with a better answer,” he said. “We needed a compact, and this was the best compact we could come up with.”

*Catrin Einhorn contributed reporting.*

***This article has been revised to reflect the following correction:***

*Correction: September 24, 2008*



An article on Tuesday about a House debate on a bill that would limit diversion of water from the Great Lakes' natural basin referred incorrectly to Quebec, which has adopted a document similar to the bill. Quebec adjoins the St. Lawrence River, which is part of the lakes' ecosystem, but it does not border the lakes.

### **Rare genetic disorder gives clues to autism, epilepsy, mental retardation** **Symptoms may stem from structural abnormalities in neurons that lead to excess brain connections**

A rare genetic disorder called tuberous sclerosis complex (TSC) is yielding insight into a possible cause of some neurodevelopmental disorders: structural abnormalities in neurons, or brain cells. Researchers in the F.M. Kirby Neurobiology Center at Children's Hospital Boston, led by Mustafa Sahin, MD, PhD, and Xi He, PhD, also found that normal neuronal structure can potentially be restored.

If this could be done safely in humans, it might be possible to ameliorate the symptoms of epilepsy, mental retardation and autism, which are frequent complications of TSC, say the researchers. Their findings, accompanied by commentary, were the cover article of the September 15 issue of *Genes & Development*.

TSC causes benign tumor-like lesions, which can affect every organ in the body and are called tubers when they occur in the brain. In the study, Sahin, He, lead author Yong-Jin Choi, PhD, and colleagues show in mice that when the two genes linked to the disease, TSC1 and TSC2, are inactivated, neurons grow too many axons (the long nerve fibers that transmit signals). Normal neurons grow just one axon and multiple dendrites (short projections that receive input from other neurons). This specification of axons and dendrites, known as polarity, is crucial for proper information flow.

"We think if initial polarity is not formed properly, the result will be abnormal connectivity in the brain," says Sahin, who also directs the clinical Multi-Disciplinary Tuberous Sclerosis program at Children's.

Since autism occurs in about half of people with TSC, the findings support the idea that such miswiring causes or contributes to autism, Sahin adds. He has received funding from Autism Speaks, the Manton Foundation and the Tuberous Sclerosis Alliance to pursue this idea further.

"People have started to look at autism as a developmental disconnection syndrome – there are either too many connections or too few connections between different parts of the brain," Sahin says. "In mouse models of TSC, we're seeing an exuberance of connections."

In laboratory experiments, the researchers were able to limit multiple axon formation by using the cancer drug rapamycin to suppress production of a protein called SAD-A kinase. This protein is produced in excess when the TSC1 and TSC2 genes are inactivated, and is found in abundance in the abnormally large cells that make up tubers. Because increased SAD-A is associated with increased axon growth, the researchers also speculate that the TSC pathway could be manipulated to regenerate or repair axons lost or damaged in spinal cord or other nerve injuries.

"These findings provide a potential explanation for neurological abnormalities in TSC patients and perhaps in people without TSC," says He. "The challenge remains as to how to treat these conditions. We have some clues but a lot more research needs to be done."

*The study was funded by grants from the Tuberous Sclerosis Alliance, the Manton Foundation, the Hearst Fund and the National Institutes of Health.*

*The paper can be downloaded free of charge at:*

*[http://genesdev.cshlp.org/cgi/content/abstract/22/18/2485?ijkey=949b2a5281a96ef468052b08e52e9cab65db1470&keytype2=f\\_ipsecsha](http://genesdev.cshlp.org/cgi/content/abstract/22/18/2485?ijkey=949b2a5281a96ef468052b08e52e9cab65db1470&keytype2=f_ipsecsha)*

### **Dark chocolate: Half a bar per week to keep at bay the risk of heart attack** **An Italian study, the first outcome of a large epidemiological investigation, finds new beneficial effects of chocolate in the prevention of cardiovascular disease**

Maybe gourmands are not jumping for joy. Probably they would have preferred bigger amounts to support their passion. Though the news is still good for them: 6.7 grams of chocolate per day represent the ideal amount for a protective effect against inflammation and subsequent cardiovascular disease. A new effect, demonstrated for the first time in a population study by the Research Laboratories of the Catholic University in Campobasso, in collaboration with the National Cancer Institute of Milan.

The findings, published in the last issue of the *Journal of Nutrition*, official journal of the American Society of Nutrition, come from one of the largest epidemiological studies ever conducted in Europe, the Moli-sani Project, which has enrolled 20,000 inhabitants of the Molise region so far. By studying the participants recruited, researchers focused on the complex mechanism of inflammation. It is known how a chronic inflammatory state represents a risk factor for the development of cardiovascular disease, from myocardial infarction to stroke, just to mention the major diseases. Keeping the inflammation process under control has become a major issue for prevention programs and C reactive protein turned out to be one of the most promising markers, detectable by a simple blood test.

The Italian team related the levels of this protein in the blood of examined people with their usual chocolate intake. Out of 11,000, researchers identified 4,849 subjects in good health and free of risk factors (normal cholesterol, blood pressure and other parameters). Among them, 1,317 did not use to eat any chocolate, while 824 used to have chocolate regularly, but just the dark one.

"We started from the hypothesis- says Romina di Giuseppe, 33, lead author of the study- that high amounts of antioxidants contained in the cocoa seeds, in particular flavonoids and other kinds of poly-phenols, might have beneficial effects on the inflammatory state. Our results have been absolutely encouraging: people having moderate amounts of dark chocolate regularly have significantly lower levels of C-reactive protein in their blood. In other words, their inflammatory state is considerably reduced." The 17% average reduction observed may appear quite small, but it is enough to decrease the risk of cardio-vascular disease for one third in women and one fourth in men. It is undoubtedly a remarkable outcome".

Chocolate amounts are critical. "We are talking of a moderate consumption. The best effect is obtained by consuming an average amount of 6.7 grams of chocolate per day, corresponding to a small square of chocolate twice or three times a week. Beyond these amounts the beneficial effect tends to disappear".

From a practical point of view, as the common chocolate bar is 100 grams, the study states that less than half a bar of dark chocolate consumed during the week may become a healthy habit. What about the milk chocolate? "Previous studies- the young investigator continues- have demonstrated that milk interferes with the absorption of polyphenols. That is why our study considered just the dark chocolate".

Researchers wanted to sweep all the doubts away. They took into account that chocolate lovers might consume other healthy food too, as wine, fruits and vegetables. Or they might exercise more than others people do. So the observed positive effect might be ascribed to other factors but not to cocoa itself. "In order to avoid this- researcher says- we "adjusted" for all possible "confounding" parameters. But the beneficial effect of chocolate still remained and we do believe it is real".

"This study- says Licia Iacoviello, Head of the Laboratory of Genetic and Environmental Epidemiology at the Catholic University of Campobasso and responsible for the Moli-sani Project- is the first scientific outcome published from the Moli-sani Project. We consider this outcome as the beginning of a large series of data which will give us an innovative view on how making prevention in everyday life, both against cardiovascular disease and tumors".

"Maybe- Giovanni de Gaetano, director of the Research Laboratories of the Catholic University of Campobasso, adds - time has come to reconsider the Mediterranean diet pyramid and take the dark chocolate off the basket of sweets considered to be bad for our health".

*The Moli-sani Project, carried out by the Research Laboratories of the Center for High Technology Research and Education in Biomedical Sciences "John Paul II" at the Catholic University in Campobasso, started in March 2005 –funded by the Pfizer Foundation- aiming at recruiting 25,000 citizens living in the Molise region, in order to investigate environmental and genetic factors responsible for cardiovascular disease and tumors. Until now researchers have recruited more than 20,000 people and the final number is going to be reached by the end of 2008. The Moli-sani study is changing the face of a whole Italian region turning it into a large scientific laboratory. From clinical tests to electrocardiograms, from blood pressure to spirometry, from dietary habits to physical exercise: it is a huge amount of information collected from each participant.*

## **Scientists Detect Cosmic 'Dark Flow' Across Billions of Light Years**

**Francis Reddy / Rob Gutro Goddard** Space Flight Center, Greenbelt, Md.

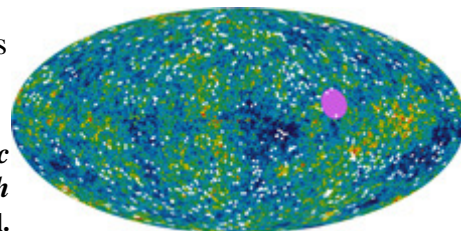
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Release No. 08-83

WASHINGTON -- Using data from NASA's Wilkinson Microwave Anisotropy Probe (WMAP), scientists have identified an unexpected motion in distant galaxy clusters. The cause, they suggest, is the gravitational attraction of matter that lies beyond the observable universe.

"The clusters show a small but measurable velocity that is independent of the universe's expansion and does not change as distances increase," says lead researcher Alexander Kashlinsky at NASA's Goddard Space Flight Center in Greenbelt, Md. "We never expected to find anything like this."

*Hot gas in moving galaxy clusters (white spots) shifts the temperature of cosmic microwaves. Hundreds of distant clusters seem to be moving toward one patch of sky (purple ellipse). Credit: NASA/WMAP/A. Kashlinsky et al.*

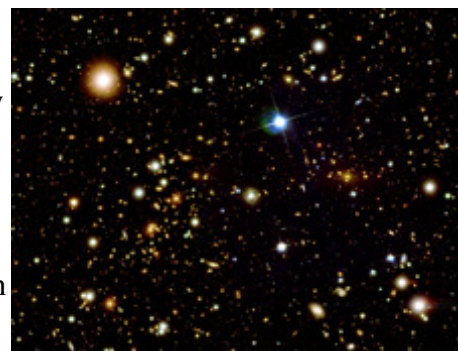


Kashlinsky calls this collective motion a "dark flow" in the vein of more familiar cosmological mysteries: dark energy and dark matter. "The distribution of matter in the observed universe cannot account for this motion," he says.

Hot X-ray-emitting gas in a galaxy cluster scatters photons from the cosmic microwave background. Clusters don't precisely follow the expansion of space, so the wavelengths of scattered photons change in a way that reflects each cluster's individual motion.

This results in a minute shift of the microwave background's temperature in the cluster's direction. Astronomers refer to this change as the kinematic Sunyaev-Zel'dovich (SZ) effect.

A related distortion, known as the thermal SZ effect, has been observed in galaxy clusters since the 1980s. But the kinematic version is less than one-tenth as strong and has not been detected in any cluster.



***Image of the Bullet Cluster of galaxies The galaxy cluster 1E 0657-56 (known as the Bullet Cluster) lies 3.8 billion light-years away. It's one of hundreds that appear to be carried along by a mysterious cosmic flow. Credit: NASA/STScI/Magellan/U.Arizona/D.Clowe et al.***

In 2000, Kashlinsky and Fernando Atrio-Barandela from the University of Salamanca, Spain, showed that astronomers could, in essence, amplify the effect isolating the kinematic SZ term. The trick, they found, is to study large numbers of clusters.

The astronomers teamed up with Dale Kocevski at the University of California, Davis, and Harald Ebeling from the University of Hawaii to identify some 700 X-ray clusters that could be used to find the subtle spectral shift. This sample includes objects up to 6 billion light-years -- or nearly half of the observable universe -- away.

Using the cluster catalog and WMAP's three-year view of the microwave background, the astronomers detected bulk cluster motions of nearly 2 million miles per hour. The clusters are heading toward a 20-degree patch of sky between the constellations of Centaurus and Vela.

What's more, this motion is constant out to at least a billion light-years. "Because the dark flow already extends so far, it likely extends across the visible universe," Kashlinsky says.

The finding flies in the face of predictions from standard cosmological models, which describe such motions as decreasing at ever greater distances.

Cosmologists view the microwave background - a flash of light emitted 380,000 years after the big bang - as the universe's ultimate reference frame. Relative to it, all large-scale motion should show no preferred direction.

Big-bang models that include a feature called inflation offer a possible explanation for the flow. Inflation is a brief hyper-expansion early in the universe's history. If inflation did occur, then the universe we can see is only a small portion of the whole cosmos.

WMAP data released in 2006 support the idea that our universe experienced inflation. Kashlinsky and his team suggest that their clusters are responding to the gravitational attraction of matter that was pushed far beyond the observable universe by inflation. "This measurement may give us a way to explore the state of the cosmos before inflation occurred," he says.

The next step is to narrow down uncertainties in the measurements. "We need a more accurate accounting of how the million-degree gas in these galaxy clusters is distributed," says Atrio-Barandela.

"We're assembling an even larger and deeper catalog of X-ray clusters to better measure the flow," Ebeling adds. The researchers also plan to extend their analysis by using the latest WMAP results, released in March. *The result will appear in the October 20 edition of [Astrophysical Journal Letters](#), [which is available electronically this week](#).*

### **Step back to move forward emotionally, study suggests**

ANN ARBOR, Mich.---When you're upset or depressed, should you analyze your feelings to figure out what's wrong? Or should you just forget about it and move on?

New research suggests a solution to these questions and to a related psychological paradox: Processing emotions is supposed to facilitate coping, but attempts to understand painful feelings often backfire and perpetuate or strengthen negative moods and emotions.

The solution is not denial or distraction. According to University of Michigan psychologist Ethan Kross, the best way to move ahead emotionally is to analyze one's feelings from a psychologically distanced perspective. With University of California, Berkeley, colleague Ozlem Ayduk, Kross has conducted a series of studies that provide the first experimental evidence of the benefits of analyzing depressive feelings from a psychologically distanced perspective. The studies were supported by funding from the National Institutes of Health.

"We aren't very good at trying to analyze our feelings to make ourselves feel better," said Kross, a faculty associate at the U-M Institute for Social Research (ISR) and an assistant professor of psychology. "It's an invaluable human ability to think about what we do, but reviewing our mistakes over and over, re-experiencing the same negative emotions we felt the first time around, tends to keep us stuck in negativity. It can be very helpful to take a sort of mental time-out, to sit back and try to review the situation from a distance."

This approach is widely associated with eastern philosophies such as Buddhism and Taoism, and with practices like Transcendental Meditation. But according to Kross, anyone can do it with a little practice.

"Using a thermostat metaphor is helpful to many people. When negative emotions become overwhelming, simply dial the emotional temperature down a bit in order to think about the problem rationally and clearly," he said.

Kross, who is teaching a class on self-control this fall at U-M, has published two papers on the topic this year. One provides experimental evidence that self-distancing techniques improve cardiovascular recovery from negative emotions. Another shows that the technique helps protect against depression.

In the July 2008 issue of *Personality and Social Psychology Bulletin*, Kross and Ayduk randomly assigned 141 participants to one of three groups that required them to focus (or not focus) on their feelings using different strategies in a guided imagery exercise that led them to recall an experience that made them feel overwhelmed by sadness and depression.

In the immersed-analysis condition, participants were told, "Go back to the time and place of the experience, and relive the situation as if it were happening to you all over again...try to understand the emotions that you felt as the experience unfolded...why did you have those feelings? What were the underlying causes and reasons?"

In the distanced-analysis condition, they were told, "Go back to the time and place of the experience...take a few steps back and move away from your experience...watch the experience unfold as if it were happening all over again to the distant you... try to understand the emotions that the distant you felt as the experience unfolded...why did he (she) have those feelings? What were the underlying causes and reasons?"

In the distraction condition, participants were asked to think about a series of non-emotional facts that were unrelated to their recalled depression experience. Among the statements: "Pencils are made with graphite" and "Scotland is north of England."

After the experience, participants completed a questionnaire asking how they felt at the moment, and wrote a stream-of-thought essay about their thoughts during the memory recall phase of the experiment.

Immediately after the session those who used the distanced-analysis approach reported lower levels of depression than those who used immersed-analysis, but not distraction. Thus distraction and distanced-analysis were found to be equally effective in the short-term. Participants then returned to the lab either one day or one week later. At that time, they were asked to think about the same sad or depressing experience, and their mood was reassessed.

Those who had used the distanced-analysis approach continued to show lower levels of depression than those who had used self-immersed analysis and distraction, providing evidence to support the hypothesis that distanced-analysis not only helps people cope with intense feelings adaptively in the short-term, but critically also helps people work-through negative experiences over time.

In a related study, published earlier this year in *Psychological Science*, Ayduk and Kross showed that participants who adopted a self-distanced perspective while analyzing feelings surrounding a time when they were angry showed smaller increases in blood pressure than those who used a self-immersed approach.

In future research, Kross plans to investigate whether self-distancing is helpful in coping with other types of emotions, including anxiety, and the best ways of teaching people how to engage in self-distanced analysis as they proceed with their lives, not just when they are asked to recall negative experiences in a laboratory setting.

*EDITORS: Listen and link to a podcast with researcher Ethan Kross at: <http://www.ns.umich.edu/podcast/audio.php?id=417>*

### **The dietary supplement genistein can undermine breast cancer treatment**

Diana Yates, Life Sciences Editor  
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CHAMPAIGN, Ill. — Women taking aromatase inhibitors to treat breast cancer or prevent its recurrence should think twice before also taking a soy-based dietary supplement, researchers report.

Genistein, a soy isoflavone that mimics the effects of estrogen in the body, can negate the effectiveness of aromatase inhibitors, which are designed to reduce the levels of estrogens that can promote tumor growth in some types of breast cancer.

The new study, which included researchers from the University of Illinois, Virginia Polytechnic and State University and the National Center for Toxicological Research, appears in the journal *Carcinogenesis*.

Aromatase inhibitors are a mainstay of breast cancer treatment in post-menopausal women. These drugs work by interfering with the enzyme aromatase, which catalyzes a crucial step in converting precursor molecules to estradiol, the main estrogen in the body.

About two-thirds of all cases of breast cancer diagnosed in the U.S. are estrogen dependent or estrogen sensitive, which means that the tumors grow more rapidly in the presence of estrogen.

Most women diagnosed with breast cancer are post-menopausal, so their ovaries are no longer producing normal levels of estrogen. Other tissues, however, produce a steroid hormone, androstenedione (AD), which – with the help of aromatases – is converted to testosterone and estrogens. The estrogens produced from AD can stimulate the growth of some types of breast cancer tumors.

The researchers conducted several trials in a mouse model of estrogen-dependent post-menopausal breast cancer. First, they gave the mice AD, which was converted to estrogen and created a high estrogen environment.

This helped the researchers determine the maximum growth rate of the breast cancer tumors.

Next, they added Letrozole, an aromatase inhibitor widely prescribed to post-menopausal women with estrogen-dependent breast cancer. This treatment (Letrozole) effectively blocked the effects of AD and the breast cancer tumors stopped growing.

***Many supplements sold without a prescription and marketed to post-menopausal women include plant compounds, such as genistein, that can block the effectiveness of Letrozole, a breast cancer drug. Photo by L. Brian Stauffer***

But when they added genistein (a plant estrogen or “phytoestrogen” present in many dietary supplements) to the mix, the researchers observed a dose-dependent reduction in the effectiveness of the breast cancer drug. Specifically, the tumors began to grow again. They grew fastest at the highest dietary doses of genistein.

“To think that a dietary supplement could actually reverse the effects of a very effective drug is contrary to much of the perceived benefits of soy isoflavones, and unsettling,” said William Helferich a professor of food science and human nutrition at Illinois and principal investigator on the study. “You have women who are taking these supplements to ameliorate post-menopausal symptoms and assuming that they are as safe as consuming a calcium pill or a B vitamin.”

Many women take genistein supplements to control hot flashes and other symptoms of menopause. The researchers found that the doses commonly available in dietary supplements were potent enough to negate the effectiveness of aromatase inhibitors.

“These compounds have complex biological activities that are not fully understood,” Helferich said. “Dietary supplements containing soy-based phytoestrogens provide high enough dosages that it could be a significant issue to breast cancer patients and survivors.”

Plant estrogens from soy are not the only ones of concern, Helferich said. In a recent study, he and his colleagues found that certain mixtures of estrogenic botanical components and extracts marketed as supplements to assist “female libido enhancement” and sold without a prescription appeared to spur breast cancer tumor growth at low doses, while having no effect on tumors at high doses.

That study appeared last year in Food and Chemical Toxicology.

“We are just starting to understand the complex effects of the dietary supplements that contain phytoestrogens,” Helferich said. “There is an ongoing human experiment in which the outcome is unknown. These findings raise serious concerns about the potential interaction of the estrogenic dietary supplements with current breast cancer therapies.”

*Editor’s note: To reach William Helferich, call 217-244-5414; e-mail: [helferic@illinois.edu](mailto:helferic@illinois.edu).*

## **NTDs burden in Latin America and the Caribbean may exceed that of HIV/AIDS, TB and malaria**

According to a new analysis published September 24th in the open-access journal PLoS Neglected Tropical Diseases, "The Neglected Tropical Diseases of Latin America and the Caribbean: A Review of Disease Burden and Distribution and a Roadmap for Control And Elimination," neglected tropical diseases (NTDs) as a group may have surpassed HIV/AIDS, tuberculosis and malaria as the most prevalent infectious diseases in Latin America and the Caribbean. The analysis found that NTDs are the most common infections of approximately 200 million of the poorest people in the region. They include tens of millions of cases of intestinal worm infections, and almost 10 million cases of Chagas disease, as well as schistosomiasis, trachoma, dengue fever, leishmaniasis, lymphatic filariasis (LF), and onchocerciasis.

NTDs produce extreme poverty by adversely impacting child development, pregnancy outcomes and worker productivity. In some cases in Latin America and the Caribbean, NTDs also represent a living legacy of slavery, because they were first introduced into the region through the global slave trade, and even today they predominantly affect people of African descent and indigenous groups, as well as other vulnerable groups such as women and children.

"Our findings indicate that the combined disease burden of NTDs in Latin America and Caribbean appears to exceed that of HIV/AIDS, tuberculosis, or malaria. Yet, we have the proven effective, low cost tools at our fingertips to eliminate at least three of this devastating diseases," said one of the authors of the analysis Dr. Peter Hotez, M.D., Ph.D., F.A.A.P., President of the Sabin Vaccine Institute, Walter G. Ross Professor and



Chair of Microbiology, Immunology, and Tropical Medicine at George Washington University and co-author of the analysis. "It's time to invest in this region and end the needless suffering."

The analysis states that in the coming years, schistosomiasis transmission could be eliminated in the Caribbean, and that transmission of lymphatic filariasis and onchocerciasis could be eliminated in Latin America and the Caribbean with proven successful, cost effective and low-cost treatments. The most burdensome NTDs, such as Chagas disease, intestinal worm infections, and schistosomiasis may first require scale-up of existing resources and/or the development of new tools in order to achieve wider control and/or elimination. Ultimately, successful wide-scale efforts for NTD elimination will require an inter-sectoral approach that bridges public health with social services and environmental interventions.

"Neglected diseases impose a huge burden on developing countries, constituting a serious obstacle for socioeconomic development and quality of life. They mostly affect people living either in shantytowns, indigenous communities or poor rural and agricultural areas," said one of the authors of the analysis Dr. Mirta Roses, Director of Pan American Health Organization (PAHO).

On Friday, September 26 during the closing session of the Clinton Global Initiative Annual Meeting, Dr. Hotez will discuss this new analysis as well as recent news from the NTD community: on Monday, UK government officials announced that they will be contributing £50 million over the next five years toward the control and elimination of NTDs, including Guinea worm. In addition, the World Health Organization announced that in 2007 alone, 546 million of the world's poorest people received treatment for lymphatic filariasis at a cost of 10 cents per person, enabling them to live healthier more productive lives.

Throughout the CGI Annual Meeting this week, the Global Network will also call upon CGI participants to invest in efforts to help the people of Haiti who were devastated by Hurricane Ike by combating NTDs like lymphatic filariasis and soil-transmitted intestinal worms that are widespread in the country. After rainfall-induced disasters like Hurricane Ike, respiratory and intestinal infections usually increase and there is increased risk of breeding of the mosquito that transmits lymphatic filariasis in Haiti. While around three million people will be treated in Haiti in 2008 for lymphatic filariasis, additional resources are needed to step up and maintain treatment coverage in Haiti with its population of 9.5 million people, particularly in the wake of the Hurricane.

*CITATION: Hotez PJ, Bottazzi ME, Franco-Paredes C, Ault SK, Periago MR (2008) The Neglected Tropical Diseases of Latin America and the Caribbean: A Review of Disease Burden and Distribution and a Roadmap for Control and Elimination. PLoS Negl Trop Dis 2(9): e300. doi:10.1371/journal.pntd.0000300 <http://dx.plos.org/10.1371/journal.pntd.0000300>*

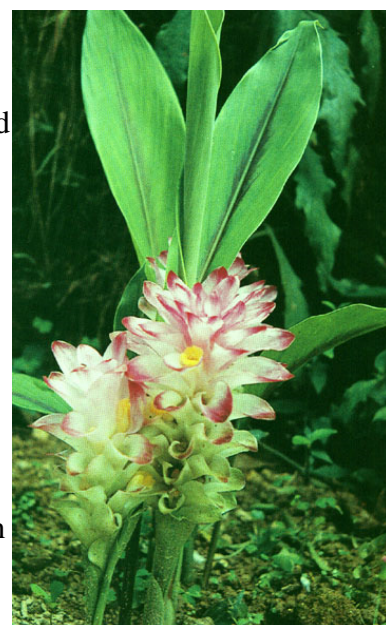
### **The effect of Curcuma wenyujin on human HepG2 cancer cell**

Hepatocellular carcinoma (HCC) is the fifth most common cancer with more than 1 million fatalities occurring annually worldwide. Nowadays in China, the essential oil of Curcuma wenyujin (CWO) has been used as injection to cure paediatric disease such as acute upper respiratory infections, viral myocarditis and acute pneumonia. Inhibitory effects of CWO on SMMC-7721 cell line, cervical cell, L615 cell and K562 cell lines growth have been reported. However, there is no report about inhibitory effect of the essential oil of ezhu in human HepG2 cell growth and the underlying mechanism of action.

A research article to be published on 21 July 2008, in the World Journal of Gastroenterology addresses this question. The research team led by Prof. Simon Ming-Yuen Lee from University of Macau have identified furanodiene, one of ezhu's ingredients, could activate p38 and inhibit of ERK mitogen-activated protein kinase (MAPK) signaling on HepG2 cell and the result suggests the potential value of development of ezhu on treatment of liver diseases. They also attempted to determine the cytotoxicity of CWO, one of species of ezhu in human hepatoma HepG2 cells and the underlying molecular mechanism of action.

They found that CWO exhibits an antiproliferative effect in HepG2 cell by inducing apoptosis which is associated with cell cycle arrest, cytochrome C translocation, caspase 3 activation, PARP degradation, and loss of mitochondrial membrane potential and this process involves mitochondria-caspase dependent apoptosis pathway. As apoptosis has been an important therapeutic target in cancer research, these results suggest the potential values of development of CWO as a chemotherapeutic agent.

This is the first study to report the biological activity and mechanism of action of CWO on HCC cells. CWO induce apoptosis in HepG2 cells through activation of mitochondrial and caspase-3-pathway and the result suggests the potential value of development of ezhu on treatment of liver diseases and further study on anti-



apoptotic effect of CWO may lead to identification of new lead compounds and novel drug targets for treatment of liver cancer and diseases.

**Reference:** Xiao Y, Yang FQ, Li SP, Hu G, Lee SM, Wang YT. Essential oil of *Curcuma wenyujin* inhibits growth and induces apoptosis in human HepG2 hepatoma cells through mitochondria-caspase pathway. *World J Gastroenterol* 2008; 14(27): 4309-4318

<http://www.wjgnet.com/1007-9327/14/4309.asp>

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## Mysterious Neolithic People Made Optical Art

**Rossella Lorenzi**, Discovery News

Sept. 22, 2008 -- An egalitarian Neolithic Eden filled with unique, geometric art flourished some 7,000 years ago in Eastern Europe, according to hundreds of artifacts on display at the Vatican.

Running until the end of October at the Palazzo della Cancelleria in the Vatican, the exhibition, "Cucuteni-Trypillia: A Great Civilization of Old Europe," introduces a mysterious Neolithic people who are now believed to have forged Europe's first civilization.

Little is known about these people -- even their name is wrapped in mystery.

Archaeologists have named them "Cucuteni-Trypillians" after the villages of Cucuteni, near Iasi, Romania and Trypillia, near Kiev, Ukraine, where the first discoveries of this ancient civilization were made more than 100 years ago.

The excavated treasures -- fired clay statuettes and op art-like pottery dating from 5000 to 3000 B.C. -- immediately posed a riddle to archaeologists.

"We do not know the meaning of those painted symbols, and what is the significance of those zoomorphic and anthropomorphic statuettes. Everything seems to be wrapped in mystery.

"Most of all, we do not know how these people treated their dead. Despite recent extensive excavations, no cemetery has ever been found," Lacramioara Stratulat, director of the Moldova National Museum Complex of Iasi, told reporters at a news conference recently at the Vatican.

Before their culture mysteriously faded, the Cucuteni-Trypillians had organized into large settlements. Predating the Sumerians and Egyptian settlements, these were basically proto-cities with buildings often arranged in concentric circles. They extended over 350,000 square kilometers (135,000 square miles) in what is now Romania, Ukraine and Moldova.

The Neolithic buildings often featured walls and ceilings decorated with drawings painted in black and red. Inside, the houses were filled with pottery and statuettes whose quasi-modern design has become the Cucuteni-Trypillians's most identifiable trademark.

This unique artistic production, dominated by repeating lines, circles and spirals, amazingly echoes modern op art, also known as optical art, which is a genre of visual that makes use of geometric shapes and optical illusions. The unusual art offers the best glimpse into this mysterious civilization.

None of the enigmatic statuettes seem fearsome or fearful. The rare male statuettes have faces often covered by masks, while the abundant female statuettes are gracious and mask-free, with tattooed bodies and long feet. There are no chained slaves or sacrificial figures -- a sign of a rather egalitarian culture, according to historians. The pottery's obsessive spiral and circle patterns could also help explain another strange feature of this culture.

"We do not know why, but all of the 4,000 Cucuteni-Trypillians settlements were intentionally burned," said Sergiy Krolevets, director of the National History and Culture Museum of the Republic of Moldova.

One explanation is that the Cucuteni might have seen the world as cyclical -- a concept they might have expressed in the circles they painted on their pottery.

According to this hypothesis, every some 60-80 years they would sacrifice whole cities by intentionally burning thousands of their houses. Then they would move to create another settlement.

Whatever the reason behind it, the practice required an extremely well coordinated, centrally organized society.

"Getting to know more about this civilization is very important to us...We are proud to have brought the world's greatest Neolithic culture," said Romeo Dumitrescu, president of the Cucuteni pentru Mileniul III foundation in Bucharest.



## **An effective strategy for inhibition of cirrhosis**

In China, the incidence of liver cirrhosis is still high, although new therapeutic approaches have recently been proposed, there is no established therapy for liver fibrosis, and Authors investigated the prevention effects of Chinese Medicine Qianggan-Rongxian Soup on liver fibrosis induced by DMN in rat. Chinese Medicine Qianggan-Rongxian decoction can inhibit hepatic fibrosis resulted from chronic liver injure, retard the development of cirrhosis, and notably ameliorate the liver function. It may be a safe and effective therapeutic drug for patients with fibrosis.

A research article to be published on 14 June 2008, in the World Journal of Gastroenterology addresses this question. The research team led by Chun-Hui Li from affiliated Hospital of Chengde Medicine College studied the inhibitory effect of Huangqi Zhechong decoction on liver fibrosis in rat.

Qianggan-Rongxian decoction, especially the medium-dose administration could decrease the area-density percentage of collagen fibrosis. HA, LN, and type IV collagen are good serum markers of hepatic fibrosis. In this study, the serum contents of these 3 markers in the model group were much higher than those of the controls. And the Qianggan-Rongxian decoction groups had significantly low HA, LN, and type IV collagen levels in serum than those in the controls, ALT and AST are indexes to describe liver functions. Most part of ALT is presented in the cytoplasm of liver cell, discharged in blood when degeneration, hyper permeability and necrosis of liver cells occur. So the increase of ALT level in serum reflects the degree of liver cell injury. Our study showed that the Qianggan-Rongxian decoction could decrease serum levels of ALT and AST in rats with hepatic injury caused by DMN. It indicates that Qianggan-Rongxian decoction may work through protecting the liver cells, which indicated that Qianggan-Rongxian decoction could successfully prevent hepatic fibrosis.

The mechanism of DMN-induced liver fibrosis has been shown to be associated with immune function, which is similar to the mechanism of human liver fibrosis. Thus, DMN-induced rat liver fibrosis may be a useful model for determination of liver fibrosis during drug screening. The mechanism of the Qianggan-Rongxian decoction may need further research.

This study may provide a safe and effective strategy for inhibition of cirrhosis in clinic use.

*Reference: Li CH, Pan LH, Yang ZW, Li CY, Xu WX. Experimental study of prevention effect of Qianggan-Rongxian decoction on fibrosis in rat livers. World J Gastroenterol 2008; 14(22): 3569-3573.*

<http://www.wjgnet.com/1007-9327/14/3569.asp>

## **Fishy diet in early infancy cuts eczema risk**

### **Early introduction of fish decreases the risk of eczema in infants**

An infant diet that includes fish before the age of 9 months curbs the risk of developing eczema, indicates research published ahead of print in the Archives of Disease in Childhood.

The prevalence of atopic eczema and other allergic disease has risen sharply in developed countries in recent decades, say the authors. Environmental and dietary factors are thought to play a part.

The researchers quizzed the parents of 6 month old babies born in western Sweden in 2003 about their child's diet and any evidence of allergic eczema. They were quizzed again when the children reached the age of 12 months. The children were all part of an ongoing health study, Infants of Western Sweden, which is tracking the long term health of almost 17000 babies. Complete birth data and two sets of questionnaires were obtained for almost 5000 of the 8000 families contacted.

At six months, 13% of families said that their youngest child had already developed eczema. By the time the children had reached 12 months of age, one in five had the condition.

The average age at which first symptoms appeared was 4 months.

Genes had a significant impact. Children with a sibling or mother who had the condition were almost twice as likely to be affected by the age of 12 months.

But breast feeding, the age at which dairy products were introduced into the diet, and keeping a furry pet in the house had no impact on risk. Around one in five households had a pet.

However, the introduction of fish into the diet before the age of 9 months cut the risk of developing the disease by 25%. And a pet bird was also associated with a significant reduction in risk.

## **Wolves make dog's dinner out of domestication theory**

\* 12:39 24 September 2008

\* NewScientist.com news service

\* **Ewen Callaway**

Dogs are no better than wolves at picking up on human cues. That's the conclusion of animal psychologists who have compared the ability of the wolves and dogs to understand human hand signals.

When tasked with choosing between two paint cans based on a trainer's hand signal, tamed wolves actually proved more adept at picking the right can.

This casts doubt on the idea that domestication some 15,000 years ago imbued dogs with a window into the human mind, says Clive Wynne, an animal psychologist at the University of Florida in Gainesville.

Rather, dogs – and tamed wolves – probably learn to associate human arm movements with treats, play and affection. Researchers who argue for a dog "theory of mind" are overlooking this obvious explanation, Wynne says.

"I think what's going on here is straightforward conditioning," he says. "Have they forgotten about Pavlov?"

### **Clever wolves**

Wynne's study is a rebuttal to a string of headline-grabbing papers that used similar approaches to demonstrate that dogs read humans better than wolves, and even chimpanzees. He says those reports used different environments and conditions for tests on wolves and dogs.

To level the playing field, Wynne – along with UFL colleagues Monique Udell and Nicole Dorey – worked with tame wolves that have received near constant human exposure since birth. The researchers also tested both wolves and dogs under the same conditions: with familiar trainers and in outdoor enclosures.

Standing 2.5 meters from an animal, a trainer signalled one of two sand-filled paint cans placed on either side of the trainer. If the animal moved toward the correct can, it received a treat and heard a click.

Wolves picked the right pail about seven times out of 10, on average, while dogs tested under identical conditions did slightly better than chance.

Dogs that performed the same test in their homes, though, equalled the wolves' performance, while shelter dogs picked the correct pail in only three of every 10 attempts.

### **Learned tricks**

Rather than argue for a wolf theory of mind, Wynne says animal learning explains his team's results.

"These limbs of the human have been useful to pay attention to. In the past they have delivered good things," he says. "Every time you throw a ball for a puppy you are offering your limb as a conditioned stimulus."

While domestication has made dogs more trainable, it hasn't offered them insight into our wants and needs, he says. "Any idiot can tame a dog. If you want to have a tame wolf, you're going to have to invest much, much more energy."

However, Brian Hare, an animal behaviourist at Duke University in Durham North Carolina and author of several studies pointing to a dog theory of mind, isn't yet ready to concede.

"I think there is so much data from other labs pointing to the previous finding of dogs being unusually skilled at using human cues that it will take extraordinary findings to argue against it," he says.

"I would not yet say these are extraordinary in terms of being conclusive, but they do suggest that we need to take another close look." *Journal reference: Animal Behaviour (DOI: 10.1016/j.anabehav.2008.07.028)*

## **Detecting human activities through barriers**

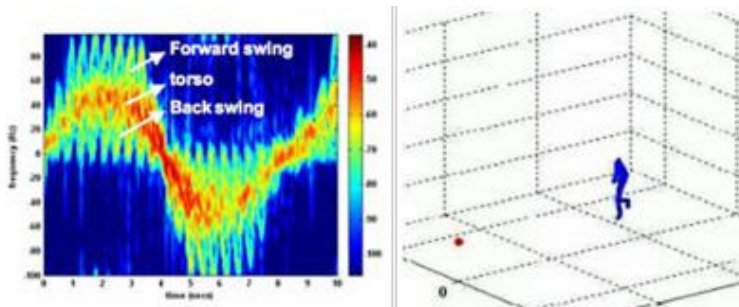
### ***University of Texas researchers turn radar signals into virtual images***

Austin, TX September 24, 2008 — University of Texas professor Hao Ling and Ph.D. candidate, Shobha Ram, are one step closer to making x-ray vision a reality. They are perfecting radar systems that can detect human activities through barriers and convert the signals to virtual renderings similar to that of a video game.

"There are several ongoing research programs in through-wall imaging, but they focus on building hardware sensors with very specific capabilities, says Ling. "That's expensive. What we want to do in this project is to first understand how human movements are manifested in radar data. Then utilize this knowledge to generate an image of a human."

Doppler based radio frequency radar systems are particularly suited for tracking moving humans. They suppress background clutter from stationary objects and provide enough detail to show the dynamic movements of different body parts, in the form of "microDopplers".

"A human has very complex motion dynamics. When walking, the arms and legs move very differently than the torso, and these subtle, minute movements translate into unique microDoppler signatures," Ling says.



***Radar signals, on the left, are turned into an animation of a person walking, on the right. In the radar signals, the torso, which has less movement, is in the thicker orange color. The arms and legs, which move more, are in the thinner yellow color. Hao Ling***

Ling and Ram built a physics-based Doppler radar simulator using computer animation data of human motions. Then they incorporated barrier characteristics into the simulation model. Finally, they validated the

results with a previously developed Doppler radar tested with live human movements in line-of-sight situations and behind barriers. Several former and present graduate students including Youngwook Kim, Craig Christianson, Nick Whiteloni, and Yang Li also contributed to the project.

"MicroDoppler signatures could become important tools for monitoring human activities over long durations," says Ram. "The radar simulator, in particular, is a flexible, inexpensive tool we can use to optimize the sensor configurations and signal processing algorithms needed for generating an accurate virtual image of a human behind different types of barriers."

Ultimately, this technology has important applications in search and rescue missions, law enforcement operations, and physical surveillance.

*The Department of Electrical & Computer Engineering at The University of Texas at Austin is a top-10 program devoted to producing high-quality engineers and research. [www.ece.utexas.edu](http://www.ece.utexas.edu)*

*If you'd like more information about this topic or to schedule an interview with Dr. Hao Ling or Shobha Ram, please call Stephanie Peco at 512.328.2967 or email Stephanie at [speco@mail.utexas.edu](mailto:speco@mail.utexas.edu).*

### **Surgery unnecessary for 95 percent of those with asymptomatic carotid stenosis**

Research led by Dr. David Spence of Robarts Research Institute at The University of Western Ontario shows that with more intensive medical therapy, the risk of stroke has become so low that at least 95 per cent of patients with asymptomatic carotid stenosis (ACS) would be better off with medical therapy than with surgery or stenting. ACS is a narrowing in the carotid artery, which supplies blood to the brain, which has not yet resulted in a stroke or transient ischemic attack (TIA). In the United States, one-half to two-thirds of the patients being subjected to surgery for revascularization are asymptomatic.

Spence will present his findings September 25th at the 6th World Stroke Congress being held in Vienna, Austria. He is the Director of the Stroke Prevention & Atherosclerosis Research Centre, a professor of neurology and clinical pharmacology at Western's Schulich School of Medicine & Dentistry and the author of "How to Prevent Your Stroke".

Spence says the less than five per cent of ACS patients who could benefit from revascularization can be identified with a procedure called Transcranial Doppler Embolus Detection: a helmet is placed on the head to hold ultrasound probes in place, and the arteries inside the head are monitored for microemboli, small blood clots or chunks of plaque that break off from the narrowing in the carotid artery and go into the brain arteries.

The historical benefit of revascularization for ACS was based on less intensive medical therapy than is now prevalent. Spence and a team of researchers studied 471 ACS patients. Of those, 199 were seen before 2003 and 272 after January 1, 2003. Microemboli were present in 12.6 per cent of patients before 2003, but in only 3.7 per cent since 2003. The decline in microemboli was associated with better control of plasma lipids and slower progression of carotid plaque. Since 2003, there have been significantly fewer strokes and heart attacks.

"The 96 per cent of patients without microemboli have only a one per cent risk of stroke in the next year, whereas the ones with microemboli have a 14 per cent risk of stroke," says Spence. "Since the risk of surgery is four to five per cent, patients without microemboli are better off with medical therapy including medications and lifestyle modifications. Only the ones with microemboli would benefit from carotid endarterectomy or stenting."

### **Spacing, not size, matters in visual recognition, NYU researchers find**

You might think that the farthest distance at which you can hold a book and still read it quickly is determined by the size of the letters. However, New York University neuroscientists have concluded that it's the spacing between letters, not their size, that matters. In general, objects, such as letters, can be recognized only if they are separated by enough space, the "critical spacing." Objects closer than that spacing are "crowded" and cannot be identified. A broad review of this crowding phenomenon, appearing in the latest issue of the journal *Nature Neuroscience*, shows that this critical spacing is the same for all objects, including letters, animals, and furniture.

According to the authors, NYU Professor of Psychology and Neural Science Denis Pelli and Katharine Tillman, an undergraduate researcher in NYU's College of Arts and Science, the critical spacing is a key parameter in the brain's cortical architecture underlying object recognition.

"The idea that spacing limits object recognition could not be simpler, but it has been very hard to accept because it displaces a firmly held belief that visibility is limited by size, not spacing," Pelli and Tillman wrote.

The human visual system recognizes a simple object by detecting and then combining its features (lines or edges). However, this process is impaired when, in seeking to identify an object in clutter, your brain combines features over too large an area surrounding the object, failing to isolate the object's features from those of the clutter. This usually happens when the cluttered object is in peripheral vision (the corner of your eye), as shown in this demonstration:

R + ARE

Fix your eyes on the plus. It is easy to recognize the letter "R" if it is alone, as on the left. However, if the letter "R" is among other letters, it is much more difficult to recognize. This is "crowding."

"We can easily see a single bird flying in the sky because there is no crowding, but most of our visual world is cluttered, and each object that we identify must be isolated from the clutter," the researchers added. "When an object is not isolated, and therefore crowded, we cannot recognize it."

The critical spacing is greater for objects that are more peripheral (farther from fixation). Objects are crowded when their spacing is less than critical and uncrowded when their spacing is more than critical. This dichotomy defines an "uncrowded window" through which we are able to read and search. The size of the uncrowded window increases through childhood and accounts for the increase in reading speed.

### **Scots anger over discarded fish**

**By Jeremy Cooke** BBC News

Spend any time out in the heaving grey waters of the North Sea and you're likely to develop a deep sense of respect for the trawlermen who brave the elements every day to put fish on our plates.

But around 1m tonnes of fish are dumped back in the North Sea every year - much of it because catches exceed EU fishing quotas.

We had the opportunity to join a Norwegian coastguard ship vessel patrolling the fishing grounds.

It was rough and uncomfortable, but from the bridge we could see much smaller Scottish fishing boats being lashed by the waves as they dragged their nets.

It is certainly a hard life, but one that is made much harder by the fact that EU rules and regulations mean that as much as half of the fish they work so hard to catch is thrown dead, back into the water.

For the Norwegians, who recently filmed a Shetlands-based trawler, dumping some five tonnes of dead fish overboard, it is inexplicable. Norway - which is not part of the EU - has a strict "no discards" policy for its fishing fleet.

But UK and other EU vessels are subject to complex rules.

"Quotas" limit not the amount of fish that's being caught, but the amount that is landed.

As a result, an astonishing amount of fish is being wasted because it is too big, or too small or the skipper is over quota for that particular species.

At Peterhead fishmarket, it's clear that fish is a valuable commodity.

In the early morning chill, hundreds of boxes of cod, hake, haddock and other white fish are bringing good prices.

But the fact is that for every box of, say, cod at the market, another box has been dumped, dead, back into the sea.

The Scottish Government estimates that one million tonnes of fish is being wasted in this way in the North Sea every year.

### **'Golden opportunity'**

And now a united front of Scottish fishermen, policy-makers and environmentalists are demanding an end to discards.

An industry "summit" in Edinburgh heard Scotland's Fisheries Minister Richard Lochhead tell an audience including trawler skippers and environmental groups that the dumping of perfectly good fish was "madness".

He said: "I am appalled and frustrated at the scandalous level of waste and the economic and environmental madness discards represent. In what other industry would it be acceptable to throw away so much of what is produced?"

Trawler skipper John Buchan told colleagues: "This is a golden opportunity to resolve this problem once and for all... It is very frustrating for skipper and their crews to have to discard beautiful, high-quality fish."

Of course the quota system was introduced by the EU to protect threatened fish stocks. But what no-one predicted was that it would result in so much waste of such a valuable resource.

And now environmental groups including the WWF and the RSPB agree that discards are unacceptable and are supporting moves by the Scottish fishing industry to make changes.

The Scots will now hope that their complicated "cocktail" of measures, which include using more sophisticated nets and closing some areas of the sea to fishing boats, will mean that less fish is caught - but more fish is landed.

And that means a reduction in the amount being dumped.

The proposals will be put to the European Union later this year.

## Rocks May Be Oldest on Earth, Scientists Say

By KENNETH CHANG

A swath of bedrock in northern Quebec may be the oldest known piece of the earth's crust.

In an article appearing in Friday's issue of the journal *Science*, scientists report that portions of that bedrock are 4.28 billion years old, formed when the earth was less than 300 million years old.

"These rocks paint this picture of an early earth that looked pretty much like the modern earth," said Richard W. Carlson of the Carnegie Institution of Washington and one of the authors of the paper.

Other scientists are intrigued, but not yet entirely convinced that the rocks are quite that old.



*Some scientists say ancient bedrock found in Canada could turn out to be younger rock formed from much older remnants.* Jonathan O'Neil

"There is a certain amount of healthy skepticism that needs to play a role here," said Stephen J. Mojzsis, a professor of geological sciences at the University of Colorado. Dr. Mojzsis said the new research was well done, but that he thought these were younger sedimentary rocks, pressed together out of the remnants of earlier rocks that were indeed 4.28 billion years old.

"I hope that I'm wrong," Dr. Mojzsis said. "If that happens, I believe there will be a land rush by geologists to northern Quebec."

At present, the oldest dated rocks are in the Canadian Northwest, at 4.03 billion years old. Geologists have also found older bits of the earth: tiny, zircon crystals as old as 4.36 billion years old, embedded within younger rocks in Western Australia. The age of the earth is more than 4.5 billion years.

Radioactive elements trapped within zircons provide precise ages, but Dr. Carlson and his collaborators at McGill University and the University of Quebec have not found any zircons in the Quebec bedrock. Instead, they determined the age of the rocks from the amounts of neodymium and samarium, two rare earth elements.

Dr. Carlson said the skeptics might be correct that the bedrock could be younger rocks formed out of older material. "The age is pretty certain," he said. "The interpretation of the age is less certain."

If the rocks are as old as claimed, the significance would be that "they're not dramatically different from rocks you would find today in Japan or places like that," Dr. Carlson said.

In fact, their chemical signature looks most similar to ocean floor that has been pulled under continents, Dr. Carlson said. That suggests that the process of plate tectonics, reshaping and moving continents, could have already started on the very early earth.

At the very least, the existence of solid rock 4.28 billion years ago would run counter to the traditional image of the young earth as a roiling cauldron of magma oceans, a view that is falling by the wayside among researchers as more geological data is unearthed.



*Researchers report that this rock is 4.28 billion years old and formed when the Earth was less than 300 million years old.* © Science/AAAS

## Lung treatment breathes new life into flu vaccines

\* 14:55 25 September 2008

\* NewScientist.com news service

\* **Reuters and New Scientist**

Delivering flu vaccines straight into the lungs, instead of through routine injections, could trigger a far stronger immune response, a study finds.

The world is expected to be extremely short of vaccines in the event of a flu pandemic, so the search for the best way to deliver vaccines is important as this could reduce the quantity administered in each dose.

The Australian study shows that lower doses of a seasonal flu vaccine delivered into the lungs of sheep gave better protection against flu than a higher standard dose that was injected into another group of sheep.

"Our results suggest that delivery by the lung may allow a much lower dose to be used in the influenza vaccine, while inducing equivalent or perhaps even improved protection," says Philip Sutton of the Centre for

Animal Biotechnology at the University of Melbourne, one of the authors of the study. "This would mean more people would quickly be able to receive the vaccine."

The scientists delivered various doses of flu vaccines into the lungs of three groups of sheep. A fourth group of sheep was injected with standard 15-microgram flu vaccines.

#### Lung antibodies

Sutton says that the lung delivery method produced roughly 1000 times higher levels of antibodies in the lung than injection.

That is significant because influenza virus attacks the lungs directly. "The antibodies produced in the blood and lung were able to block the ability of the virus to stick to the receptor it uses to infect cells, demonstrating they would be effective against infection," Sutton says.

The generation of such huge amounts of antibodies in the lungs is especially important in the case of influenza, because flu is spread mainly through sneezing and coughing.

"The generation of functional antibodies in the lung could potentially help reduce the spread of the infection by neutralising the virus before it can be breathed out by an infected person," adds Sutton.

One drawback is that the vaccine is currently fed into the lung in an uncomfortable procedure using a tube called a bronchoscope. Sutton noted that the team would need to find better ways to deliver vaccine directly into the lungs for the technique to be acceptable for humans.

*Journal reference: Mucosal Immunology (DOI: 10.1038/mi.2008.59)*

### **Pertussis: Adults can fall severely ill too**

Pertussis, also known as whooping cough, is not just a childhood disease. The pathogen *Bordetella pertussis* is highly infectious and an infection may occur at any age. The risk of a pertussis infection can be greatly reduced by vaccination, as Marion Riffelmann of the Krefeld Institute for Infectious Diseases and her colleagues report in the current *Deutsches Ärzteblatt International* (Dtsch Arztebl Int 2008; 105(37): 623-8). <http://www.aerzteblatt.de/v4/archiv/pdf.asp?id=61518>

Pertussis is actually one of the classical diseases of childhood and mainly occurs in unvaccinated babies. The clinical course at this age may be severe; pertussis is the most frequent fatal infectious disease in newborns. Nevertheless, the number of reported attacks of whooping cough in schoolchildren, adolescents and adults has markedly increased in recent years. Roughly 0.2% to 0.5% of adolescents and adults fall ill each year with pertussis and a protracted cough. About 25% of adult patients develop complications, such as seizures, inflammation of the middle ear or circulatory collapse.

Although the standard treatment with macrolide antibiotics interrupts the chain of infection, it does not influence the symptoms. According to Riffelmann et al., the most effective pertussis prophylaxis is vaccination with a combination vaccine. However, regular boosters are needed, as the vaccination protection continuously decreases after five years.

### **Social class dictates cancer risk**

Cervical and lung cancer are more common in poor people while rates of breast cancer and melanoma are higher in the wealthy. A detailed analysis of the incidence of these four different kinds of cancer, carried out on more than 300,000 English cancer patients and published today in the open access journal *BMC Cancer*, describes the effects of socioeconomic group, region and age.

Lorraine Shack at the North West Cancer Intelligence Service and a team of researchers working on behalf of the United Kingdom Association of Cancer Registries used information from all eight English cancer registries from 1998 to 2003. They compared the rates of these four cancers with variations in deprivation. The data were further categorised by the person's age.

As Shack describes, "We looked at all invasive cases of lung cancer, cervical cancer, malignant melanoma of the skin and female breast cancer. The deprivation statistics were based on average levels of socioeconomic status in the patient's local area."

Malignant melanoma and breast cancer were most common in more affluent groups. According to the authors, the variations in breast cancer rates may be because "Women from affluent socioeconomic groups are more likely to have their first child at a later age, have fewer children in their lifetime and take hormone replacement therapy. Each of these factors is associated with a slightly higher incidence of breast cancer."

The higher incidence of melanoma in the more wealthy groups may be partially explained by holidays abroad and the resulting exposure to UV. However, the authors highlight that sun bed use may have an impact across all socioeconomic groups, particularly in the young, "It is difficult to estimate sun bed use as most salons are private and poorly regulated. However, anecdotal evidence suggests that sun bed use is increasing in England, particularly for teenagers and young adults. Sun parlours tend to be clustered in areas of deprivation."



The study also found that the highest rates of lung and cervical cancer occurred in the most deprived groups. The higher incidence of lung cancer in the deprived groups is squarely blamed on smoking, "Smoking is strongly associated with socioeconomic status and over 80% of lung cancer cases can be estimated to be attributable to smoking."

Worryingly, the authors found the greatest difference in lung cancer rates between socioeconomic groups in people under the age of 65, possibly suggesting that the more deprived groups continue to smoke while the wealthier groups have quit smoking.

The study provides further evidence of the link between wealth and cancer risk. Research such as this has a crucial role to play in tailoring government screening programmes, and other preventative measures, to local needs.

#### **Notes to Editors**

*1. Variation in incidence of breast, lung and cervical cancer and malignant melanoma of skin by socioeconomic group in England.*

*Lorraine Shack, Catrina Jordan, Catherine S Thomson, Vivian Mak and Henrik Moller BMC Cancer (in press)*

*During embargo, article available here:*

*[http://www.biomedcentral.com/imedia/1109763169168953\\_article.pdf?random=575818](http://www.biomedcentral.com/imedia/1109763169168953_article.pdf?random=575818)*

*After the embargo, article available at the journal website: <http://www.biomedcentral.com/bmccancer/>*

### **Stem cells created without cancer-causing viruses**

\* 17:51 25 September 2008

\* NewScientist.com news service

\* **Peter Aldhous**

For the first time, biologists have reprogrammed adult mouse cells back to an embryonic state without using viruses that leave dangerous copies of cancer-causing genes in the cells' chromosomes.

The work raises hope that the cells, known as "induced pluripotent stem cells" or iPS cells, can be made safe for transplantation into people.

Shinya Yamanaka of Kyoto University in Japan, who pioneered the reprogramming technique, used retroviruses carrying four separate genes that effectively wipe the developmental slate of an adult cell.

Now researchers led by Konrad Hochedlinger of the Massachusetts General Hospital, Boston, have used the same four genes to create iPS cells, but carried instead by adenoviruses. These don't normally integrate into the genome of cells that they infect and therefore present little risk of cancer.

The researchers initially tried to reprogramme mouse skin cells. "At first, it didn't work at all," says Hochedlinger. Then his team turned to liver cells, which seemed from previous reprogramming experiments to be easier to send back to an embryonic state. It worked, but much less efficiently than the standard iPS cell technique.

Yamanaka's method typically produces one colony of iPS cells from every 1,000 to 10,000 adult cells. With the adenoviruses, the method was between 10 and 100 times less efficient – which will limit its practical use.

"It's an exceptionally inefficient technique," observes Evan Snyder, a stem cell biologist at the Burnham Institute for Medical Research in La Jolla, California.

#### **Proof of principle**

But researchers are encouraged by the basic finding that reprogramming can be achieved without using viruses that jump into the genome. "The most important element is the proof of principle that it can be done," says George Daley, a stem-cell biologist at the Children's Hospital Boston. "The efficiency will improve over time." Other teams are working on different techniques for creating iPS cells, which may turn out to be more efficient.

For instance, a team led by Sheng Ding of the Scripps Research Institute in La Jolla is screening for small-molecule drugs that can substitute for the reprogramming genes.

Other teams are trying to introduce the proteins encoded by the genes directly into cells, while Yamanaka is experimenting with "microRNAs" – snippets of RNA that help regulate gene activity.

Encouragingly, Hochedlinger's cells do seem to be safer than conventional mouse iPS cells. When researchers create "chimeric" mice by injecting iPS cells into early-stage mouse embryos, the resulting animals are unusually prone to cancer.

Although Hochedlinger has so far studied his chimeras only until 13 weeks of age, none have yet developed tumours. "We're still following up," Hochedlinger says.

#### **Mystery chromosomes**

One perplexing problem, however, is that three out of 13 of the iPS cell lines created by Hochedlinger's team had a complete extra set of chromosomes, which has not been seen with iPS cells made using retroviruses. This could indicate that the adenoviruses are causing cells to fuse with one another.

"It raises the question of the mechanism and whether the cells are safe and normal," says Snyder.

Hochedlinger argues that cells with an extra set of chromosomes can be quickly identified and discarded. "So far, in the characterisation we've done of these cells, we did not see any other abnormalities," he says.

In addition to further investigating the safety issues, Hochedlinger's team still has to show whether adenoviruses will be able to reprogram human cells, as well as those from mice.

*Journal reference: Science (DOI: 10.1126/science.1162494)*

### **New research finds workers more prone to lie in E-mail**

#### ***Studies show more frequent and calculated abuse of the truth online than traditional pen and paper communications***

BETHLEHEM, PA—A pair of recent studies suggest that e-mail is the most deceptive form of communications in the workplace—even more so than more traditional kinds of written communications, like pen-and-paper.

More surprising is that people actually feel justified when lying using e-mail, the studies show.

"There is a growing concern in the workplace over e-mail communications, and it comes down to trust," says Liuba Belkin, co-author of the studies and an assistant professor of management at Lehigh University. "You're not afforded the luxury of seeing non-verbal and behavioral cues over e-mail. And in an organizational context, that leaves a lot of room for misinterpretation and, as we saw in our study, intentional deception."

The results of the studies are reported in the paper, "Being Honest Online: The Finer Points of Lying in Online Ultimatum Bargaining." Belkin co-authored the paper along with Terri Kurtzberg of Rutgers University and Charles Naquin of DePaul University.

In one study, the researchers handed 48 full-time MBA students \$89 to divide between themselves and another fictional party, who only knew the dollar amount fell somewhere between \$5 and \$100. There was one pre-condition: the other party had to accept whatever offer was made to them.

Using either e-mail or pen-and-paper communications, the MBA students reported the size of the pot—truthful or not—and how much the other party would get. Students using e-mail lied about the amount of money to be divided over 92% of the time, while less than 64% lied about the pot size in the pen-and-paper condition. The rate of lying was almost 50% greater between the two groups.

E-mailers also said they felt more justified in awarding the other party just \$29 out of a total pot of about \$56. Pen-and-paper students were a little friendlier, however; on average, they passed along almost \$34 out of a misrepresented pot of about \$67.

"Keep in mind that both of these media—e-mail and pen-and-paper—are text only. Neither has greater 'communication bandwidth' than the other," says Naquin. "Yet we still see a dramatic difference."

Looking for an opportunity to explain whether a shared sense of identity reduces an e-mailer's impulse to lie, the researchers set up a second, related study of 69 full-time MBA students. The results of that study indicated the more familiar e-mailers are with each other, the less deceptive their lies would be.

But they would still lie, regardless of how well they identified with each other.

"These findings are consistent with our other work that shows that e-mail communication decreases the amount of trust and cooperation we see in professional group-work, and increases the negativity in performance evaluations, all as opposed to pen-and-paper systems," explains Kurtzberg. "People seem to feel more justified in acting in self-serving ways when typing as opposed to writing."

Most researchers agree that e-mail is a recent phenomenon and was first widely used in workplace communications beginning in 1994. Since then, organizational norms regarding e-mail use have evolved and are still murky.

"The study of industrial psychology and the evolving use of e-mail are presenting some interesting challenges for organizations across the board," says Belkin, who has studied organizational communications over the past few years. "We know it's a socially acceptable way to communicate, but how that translates in the workplace is a different story entirely."

### **Discovered: World's Largest Tsunami Debris**

Boulder, CO, USA – A line of massive boulders on the western shore of Tonga may be evidence of the most powerful volcano-triggered tsunami found to date. Up to 9 meters (30 feet) high and weighing up to 1.6 million kilograms (3.5 million pounds), the seven coral boulders are located 100 to 400 meters (300 to 1,300 feet) from the coast. The house-sized boulders were likely flung ashore by a wave rivaling the 1883 Krakatau tsunami, which is estimated to have towered 35 meters (115 feet) high.

"These could be the largest boulders displaced by a tsunami, worldwide," says Matthew Hornbach of the University of Texas Institute for Geophysics. "Krakatau's tsunami was probably not a one-off event." Hornbach and his colleagues will discuss these findings on Sunday, 5 October 2008, at the Joint Annual Meeting of the Geological Society of America (GSA), Soil Science Society of America (SSSA), American Society of

Agronomy (ASA), Crop Science Society of America (CSSA), and the Gulf Coast Association of Geological Societies (GCAGS), in Houston, Texas, USA.

Called erratic boulders, these giant coral rocks did not form at their present location on Tongatapu, Tonga's main island. Because the island is flat, the boulders could not have rolled downhill from elsewhere. The boulders are made of the same reef material found just offshore, which is quite distinct from the island's volcanic soil. In fact, satellite photos show a clear break in the reef opposite one of the biggest boulders. And some of the boulders' coral animals are oriented upside down or sideways instead of toward the sun, as they are on the reef.

Hornbach says the Tongatapu boulders may have reached dry land within the past few thousand years. Though their corals formed roughly 122,000 years ago, they are capped by a sparse layer of soil. And the thick volcanic soils that cover most of western Tongatapu are quite thin near the boulders. This suggests the area was scoured clean by waves in the recent past. Finally, there is no limestone pedestal at the base of the boulders, which should have formed as rain dissolved the coral if the boulders were much older.

Many tsunamis, like the one that struck the Indian Ocean in 2004, are caused by earthquakes. But the boulders' location makes an underwater eruption or submarine slide a more likely culprit. A chain of sunken volcanoes lies just 30 kilometers (20 miles) west of Tongatapu. An explosion or the collapse of the side of a volcano such as that seen at the famous Krakatau eruption in 1883 could trigger a tremendous tsunami.

Another possibility is that a storm surge could have brought the boulders ashore. But that scenario isn't likely. No storms on record have moved rocks this big. Another possibility is that a monster undersea landslide caused the tsunami. But Hornbach's analyses of adjacent seafloor topography point to a volcanic flank collapse as the most probable source of such a wave.

"We think studying erratic boulders is one way of getting better statistics on mega-tsunamis," Hornbach says. "There are a lot of places that have similar underwater volcanoes and people haven't paid much attention to the threat." The researchers have already received reports of more erratic boulders from islands around the Pacific. Future study could indicate how frequently these monster waves occur and which areas are at risk for future tsunamis.

The boulders are such an unusual part of the Tongan landscape that tales of their origins appear in local folklore. According to one legend, the god Maui hurled the boulders ashore in an attempt to kill a giant man-eating fowl.

And though many other Pacific islanders follow the custom of heading uphill after earthquakes, Tongans have no such teachings. Such lore may be useless for near-shore volcanically-generated tsunamis, which arrive too quickly for people to evacuate. Instead, most of Tongatapu's settlements are huddled together on the northern side of the island—away from the brunt of the tsunami threat.

### **Just in time for school: Free Adeona service tracks stolen laptops**

**Rachel Tompa** [rtompa@u.washington.edu](mailto:rtompa@u.washington.edu)

As college students head back to school with gleaming new laptops, some will, unfortunately, see the last of their machine in a library, cafeteria or dorm room. And it's not just college campuses that are hot spots for computer theft, or just students who are the targets. Newspapers recently reported that airports in the United States record hundreds of thousands of laptop thefts annually. Such thefts are not only expensive, they also often mean losing sensitive data.

Researchers at the University of Washington and at the University of California, San Diego have created a new laptop theft-protection tool. The software not only provides a virtual watchdog on your precious machine -- reporting the laptop's location when it connects to the Internet -- but does so without letting anybody but you monitor your whereabouts.

The tool is named Adeona, after the Roman goddess of safe returns, and is posted at <http://adeona.cs.washington.edu/>. It works by using the Internet as a homing beacon. Once Adeona is installed, the machine will occasionally send its Internet protocol address and related information to OpenDHT, a free online storage network. This information can be used to establish the computer's general location.

On a Macintosh computer, Adeona also uses the computer's internal camera to take a photo that it sends to the same server.

Adeona was initially released for free under an open source license in June, and further work will be presented at the ToorCon computer security conference in San Diego Sept. 28. The authors are Thomas Ristenpart, a doctoral student at UC San Diego, who was a UW visiting student in summer 2007; Gabriel Maganis, who recently received his UW undergraduate degree in computer engineering; Tadayoshi Kohno, a UW assistant professor of computer science and engineering; and Arvind Krishnamurthy, a UW research assistant professor of computer science and engineering.

Unlike commercial systems, in which users surrender their location information to a company, Adeona scrambles the information so it must be deciphered using a password known only by the person who set up the account. If the laptop is stolen, only the original owner can access the location data (and, for Macintosh users, a photo). The owner can then bring this information to the police to aid in tracking down the stolen machine. Even if the free OpenDHT storage network was hacked, the information would remain private.

"Adeona is free and easy to install, so anyone who owns a laptop, or even a small company, can use it to track their assets," Maganis said. "We're really hoping laptop users all over the world will install it on their machines."

The tool resulted from an experiment in privacy protection that began two years ago.

"We wanted to build a tool that allows you to track the location of your laptop but at the same time doesn't allow someone else to track you," Kohno said. "Typically when you create a forensics trail, you leave breadcrumbs that you can see, but so can everyone else. We've created a private forensics trail where only you can see those breadcrumbs."

More broadly, the research investigates ways to maintain privacy in a world where geographic tracking is becoming increasingly common.



"Platforms such as the iPhone enable development of more and more software programs that use geographic information in fun and useful ways. Many of these applications could benefit from mechanisms for preserving user location privacy," Ristenpart said.

Since Adeona's public release, more than 50,000 people have downloaded the software under the open source license. The current version works on desktop and laptop machines running Windows, Macintosh or Linux. Researchers say they have already received numerous requests for an iPhone version.

"People like it because it's open source," Maganis said. "That's what we're hearing."

Companies offer features that might justify paying a fee, but they too can learn from Adeona to ensure clients' privacy, Maganis said. "Companies can adapt our techniques to provide high levels of privacy for their own services."

*For more information, contact Kohno at (206) 685-4853 or [yoshi@cs.washington.edu](mailto:yoshi@cs.washington.edu)*

*For more information on Adeona, go to <http://adeona.cs.washington.edu/>*

### **An ethical argument: Include pregnant women in research**

DURHAM, N.C. -- Why aren't pregnant women included in most clinical trials?

That's the question posed by leading bioethicists at Duke University Medical Center, Johns Hopkins and Georgetown Universities, who say it's time to confront the challenges that have led to the exclusion of pregnant women from important research that could positively impact maternal and fetal health.

"Only in the last two decades did people recognize that women were being excluded not just from the risks, but from the benefits of research -- primarily because of their potential to become pregnant or because of concerns that female physiology - such as menstrual cycles - might complicate study results," says Anne Drapkin Lyerly, MD, an obstetrician/gynecologist and medical ethicist at Duke.

She is the lead author of a paper appearing online and then in print in the November 2008 edition of the *International Journal of Feminist Approaches to Bioethics* detailing the justifications for responsibly including pregnant women in research. "While we've made significant progress in correcting the gender imbalance, we have a long way to go in protecting the health and safety of pregnant women and the fetuses they carry."

The Institute of Medicine has recommended that pregnant women be "presumed eligible" for participation in research since 1994. However, the authors say the "delicate condition" continues to be grounds for near-automatic exclusion from research, despite the need for more effective treatment for women during pregnancy. More than four million women give birth in the U.S. each year, and many face medical conditions during their pregnancies that require clinical treatment. In fact, Lyerly says chronic diseases occurring during pregnancy are common: chronic hypertension and diabetes complicate nearly four percent of pregnancies each year; and an estimated 500,000 pregnant women experience psychiatric illness, cancers, autoimmune diseases and other conditions that require treatment. But in the absence of research on how medications work in pregnant women, doctors are often left guessing about how to safely and effectively treat patients through pregnancy.

"Our best predictions when it comes to dosing medications can be disastrously wrong," says Lyerly. "This conservative stance doesn't help anybody. Without adequate research on how drugs are metabolized during pregnancy, how they are absorbed, distributed in and excreted by the body, whether they cross the placenta or affect the fetus, we have little to no evidence on how to optimize the health of pregnant women or the fetuses they carry."

Lyerly and her colleagues at Johns Hopkins University's Berman Institute of Bioethics and Georgetown University clearly recognize the many challenges that need to be addressed in order to safely include pregnant

women in clinical research. In fact, they are convening a meeting with officials from the FDA, NIH and leading experts in obstetrics, gynecology and maternal/fetal medicine next year to address these issues and come up with practical, public policy and moral solutions.

"It's not simply a matter of including pregnant women in studies," Lyerly explains. "We need to address what we need to do to ensure maternal and fetal safety, which diseases we should study first, and what we should do when pharmaceutical companies or institutions say no."

*Lyerly's co-authors on this paper are Margaret Little, a senior research fellow at Georgetown University's Kennedy Institute of Ethics, and Ruth Faden, executive director of the Johns Hopkins Berman Institute of Bioethics.*

### **Engineer: Head-first slide is quicker**

#### ***Baseball diamond as playground of math and physics***

**By Tony Fitzpatrick**

Base running and base stealing would appear to be arts driven solely by a runner's speed, but there's more than mere gristle, bone and lung power to this facet of baseball — lots of mathematics and physics are at play. [Dave Peters discusses the physics of sliding and compares sliding head first versus feet first.](#) [\[large\]](#) [\[small\]](#)

With baseball playoffs heating up and the World Series right around the corner, it's guaranteed that fans will see daring slides, both feet-first and head-first, and even slides on bang-bang plays at first.

Who gets there faster, the head-first slider or the feet-first?

The head-first player, says David A. Peters, Ph.D., the McDonnell Douglas Professor of Engineering at Washington University in St. Louis, and big-time baseball fan. He says it's a matter of the player's center of gravity.

Peters is a mechanical engineer who specializes in aircraft and helicopter engineering. He sees "fields of dreams" a bit differently than most — he sees them as playgrounds of math and physics.

Peters says that dynamics equations can determine which slide gets you there more quickly, and that there are three important mathematical issues at play.

"There's momentum — mass of the body times how fast the player is moving," he says. "There's angular momentum (mass movement of inertia times the rotational rate). If it's feet-first and you're starting to slide, your feet are going out from you and you're rotating clockwise; if it's head-first, as your hands go down, you're rotating counterclockwise."

"On top of this is Newton's Law," Peters explains. "Force is mass times acceleration. Then moments of inertia times your angular acceleration."

So, who gets there faster?

"It turns out your center of gravity is where the momentum is," Peters says. "This is found half way from the tips of your fingers to the tips of your toes. In the headfirst slide, the center of gravity is lower than halfway between your feet and hands, so your feet don't get there as fast. It's faster head-first."

For a long time — until roughly the Pete Rose era of the '60s and '70s — players shunned the headfirst slide to protect their hands and faces. Spikes, evoking the Ty Cobb days, were weapons on the diamond. In the past few decades, players who prefer the head-first slide have taken to running while holding onto their batter's gloves to prevent their hands from opening up and being exposed to injury. While the percentage of players who slide one way or the other is not actually known, Peters estimates it's about 50-50.

Peters notes a growing number of players who will slide into first base, despite conventional wisdom that running through first is the faster way.

"Mathematically, you might think there's an advantage, but leaving your feet is actually a detriment because you're no longer pulsing (pumping your legs) and you start to decelerate," he says. "When you're running, your get your feet out in front of the center of gravity, so you're getting maybe three or four steps of an advantage."

Peters says the only advantage of any slide into first base is to avoid the first baseman's tag when he has to come off the base to spear an errant throw.

"In general, most agree to run through first, but you'll find people who will swear it's better to do it the other way."

### **Horny goat weed could be better than Viagra**

\* 17:00 26 September 2008

\* NewScientist.com news service

\* **Catherine Brahic**

The soft green heart-shaped leaf of the horny goat weed could hold the key to a new drug for treating erectile dysfunction. Researchers say the Viagra alternative could be as effective as the famous blue pill, but have fewer side-effects.

Mario Dell'Agli of the University of Milan, Italy, and colleagues tested four plants which are used as natural aphrodisiacs in traditional cultures to establish their potential as alternatives to Viagra.

Viagra's active compound, sildenafil, works by inhibiting an enzyme called phosphodiesterase-5 (PDE5). Because PDE5 helps control blood flow to the penis, inhibiting PDE5 promotes male erection.

Dell'Agli and his colleagues tested the four plants in vitro to see how efficient they were at inhibiting PDE5. Just one – *Epimedium brevicornum*, also known as horny goat weed and Bishop's Hat – had an effect. This confirmed previous studies showing that icariin, a compound found inside the horny goat weed, is a PDE5 inhibitor.



*Horny goat weed, Epimedium brevicornum* (Image: Sphl, Wikimedia Commons)

### The fifth compound

Sildenafil, however, is 80 times more effective at inhibiting PDE5 than icariin. Dell'Agli and his team extracted icariin from the plants, and produced six modified versions of it, which they also tested on PDE5. The most efficient of these, compound 5, "works as well as Viagra", says Dell'Agli.

A drug made from compound 5 could also cause fewer side effects than Viagra.

In addition to PDE5, sildenafil affects other phosphodiesterases, including some that are essential to sight and heart function. As a result, people who have heart problems are not advised to take Viagra and patients who do take the drug sometimes suffer disturbances to their eyesight.

Preliminary tests suggest that compound 5 does not affect other phosphodiesterases, meaning it may not have the same side effects as Viagra.

### Eat your weeds

Compound 5 will now have to go through lengthy clinical trials before it can be approved as a drug. It could be 10 years before it reaches the market.

In the meantime, "if people eat horny goat weed, I think it can be beneficial because it contains icariin," says Dell'Agli. "But it will not be as effective as Viagra."

Horny goat weed is found in the wild in China, Asia and Europe.

The research was supported by private funds, but Dell'Agli declined to provide details.

*Journal reference: Journal of Natural Products, DOI: 10.1021/np800049y*

### **Mars iron is ideal for building future bases**

**FUTURE** colonisers of Mars needn't worry about lugging materials from Earth to build their bases - the most widely used building material on Earth, steel, could be manufactured on the Red Planet.

The rover Opportunity has found elemental iron - a key ingredient of steel - peppered across the Martian surface as a result of collisions with iron-rich meteorites. The dry conditions and lack of atmospheric oxygen mean that the stuff has not rusted, says Geoffrey Landis of NASA's Glenn Research Center in Cleveland, Ohio.

On Earth, any natural metallic iron rusts in our wet, oxygenated environment, so we rely on iron oxides such as haematite to make steel. Yet these oxides must be stripped of oxygen molecules in the steel-making process, which requires vast amounts of energy (*Acta Astronomica, DOI: 10.1016/j.actaastro.2008.07.011*).