Human Technology Research Synopsis
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Public release date: 14-May-2009
Ginger quells cancer patients' nausea from chemotherapy

People with cancer can reduce post-chemotherapy nausea by 40 percent by using ginger supplements, along with standard anti-vomiting drugs, before undergoing treatment, according to scientists at the University of Rochester Medical Center.

About 70 percent of cancer patients who receive chemotherapy complain of nausea and vomiting. "There are effective drugs to control vomiting, but the nausea is often worse because it lingers," said lead author Julie L. Ryan, Ph.D., M.P.H., assistant professor of Dermatology and Radiation Oncology at Rochester's James P. Wilmot Cancer Center. The research will be presented at the American Society of Clinical Oncology meeting in the Patient and Survivor Care Session on Saturday, May 30, in Orlando, Fla.

"Nausea is a major problem for people who undergo chemotherapy and it's been a challenge for scientists and doctors to understand how to control it," said Ryan, a member of Rochester's Community Clinical Oncology Program Research Base at the Wilmot Cancer Center. Her research is the largest randomized study to demonstrate the effectiveness of ginger supplements to ease the nausea. Previous small studies have been inconsistent and never focused on taking the common spice before chemotherapy.

The Phase II/III placebo-controlled, double-blind study included 644 cancer patients who would receive at least three chemotherapy treatments. They were divided into four arms that received placebos, 0.5 gram of ginger, 1 gram of ginger, or 1.5 grams of ginger along with antiemetics (anti-vomiting drugs such as Zofran®, Kytril®, Novaban®, and Anzemet®.)

Patients took the ginger supplements three days prior to chemotherapy and three days following treatment. Patients reported nausea levels at various times of day during following their chemotherapy and those who took the lower doses had a 40 percent reduction.

Ginger is readily absorbed in the body and has long been considered a remedy for stomach aches. "By taking the ginger prior to chemotherapy treatment, the National Cancer Institute-funded study suggests its earlier absorption into the body may have anti-inflammatory properties," Ryan said.

Public release date: 14-May-2009

Surgery may not be necessary for Achilles tendon rupture

The two ends of a ruptured Achilles tendon are often stitched together before the leg is put in plaster, in order to reduce the risk of the tendon rupturing again. However, a thesis from the Sahlgrenska Academy, University of Gothenburg, Sweden, now suggests that surgery may be unnecessary. Patients who do not undergo surgery have just as good a chance of recovery.

The Achilles tendon, which attaches the calf muscle to the heel, is the body's strongest tendon. The tendon may rupture on sudden tensing of the muscle, something that affects middle-aged men in particular, typically when playing badminton or tennis.

"When the Achilles tendon ruptures, it feels like a sudden, violent and intensely painful snap in the calf or tendon above the heel. It is an injury that has become increasingly common in recent years, probably because exercise is increasingly popular. But whether or not one should operate has been the subject of debate for quite some time," says orthopaedic surgeon Katarina Nilsson Helander, the author of the thesis.

When the Achilles tendon has ruptured, the foot is put in plaster with the toes pointing downwards, so that the torn ends of the tendon come into contact and join together as they heal. The torn ends of the tendon are often stitched together before the foot is put in plaster, to make sure they stay in place. In recent times, a removable orthosis has begun to replace plaster casts, making it possible for the patient to start to move the foot sooner. Other studies have shown that early motion stimulates healing.
Surgery increases the risk of infections and sores but is often carried out anyway, as studies have shown that the operation reduces the risk of the tendon rupturing again.

One hundred patients were randomly assigned to surgery with early mobilisation or to early mobilisation alone with the removable orthosis and without prior surgery. In every other respect, all the patients in the study had the same treatment. The thesis shows that there is no difference in the re-rupture rate. A year after the injury, there was no difference in the patients' own impression of symptoms and function, but irrespective of which treatment the patient received, the function tests showed that there remained a substantial difference between the healthy and the injured foot.

"I have concluded that not everybody needs to have surgery, but it is important that those who suffer an Achilles tendon rupture discuss the treatment options with their orthopaedic surgeon," says Katarina Nilsson Helander.

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Public release date: 14-May-2009

**Human nose too cold for bird flu, says new study**

Avian influenza viruses do not thrive in humans because the temperature inside a person's nose is too low, according to research published today in the journal PLoS Pathogens. The authors of the study, from Imperial College London and the University of North Carolina, say this may be one of the reasons why bird flu viruses do not cause pandemics in humans easily.

There are 16 subtypes of avian influenza and some can mutate into forms that can infect humans, by swapping proteins on their surface with proteins from human influenza viruses.

Today's study shows that normal avian influenza viruses do not spread extensively in cells at 32 degrees Celsius, the temperature inside the human nose. The researchers say this is probably because the viruses usually infect the guts of birds, which are warmer, at 40 degrees Celsius. This means that avian flu viruses that have not mutated are less likely to infect people, because the first site of infection in humans is usually the nose. If a normal avian flu virus infected a human nose, the virus would not be able to grow and spread between cells, so it would be less likely to damage cells and cause respiratory illness.

The researchers also found that when they created a mutated human influenza virus by adding a protein from the surface of an avian influenza virus, this mutated virus struggled to thrive at 32 degrees Celsius. This suggests that if a new human influenza strain evolved by adopting proteins from an avian influenza virus, this would need to undergo further changes in order to adapt to the conditions in the human body.

The researchers reached their conclusions by growing cells from the human airway and infecting them with different human and avian influenza viruses, including H5N1, to see how well the viruses grew and spread. The human influenza viruses grew equally well in the cells whether they were maintained at 37 degrees Celsius, our core body temperature, or at 32 degrees Celsius, the temperature of the nose. In contrast, the four avian influenza viruses tested grew well at 37 degrees Celsius but grew very slowly at 32 degrees Celsius.

When the researchers added proteins from an avian influenza virus to a human influenza virus, the human influenza virus also grew slowly and struggled to replicate at 32 degrees Celsius.

As viruses kill the cells they infect, the researchers also measured the extent of cell death in the model. This
Professor Wendy Barclay, one of the authors of the study from the Division of Investigative Science at Imperial College London, said: "Bird viruses are out there all the time but they can only cause pandemics when they undergo certain changes. Our study gives vital clues about what kinds of changes would be needed in order for them to mutate and infect humans, potentially helping us to identify which viruses could lead to a pandemic.

"It would be impossible to develop vaccines against all 16 subtypes of avian flu, so we need to prioritise. By studying a range of different viruses in systems like this one we can look for warnings that they are already beginning to make the kinds of genetic changes in nature that mean they could be poised to jump into humans; animal viruses that spread well at low temperatures in these cultures could be more likely to cause the next pandemic than those which are restricted," added Professor Barclay.

**Public release date: 14-May-2009**

**Allergy season: Cigarettes to the rescue?**

Everyone knows that smoking can kill you, but did you know that it may help with your allergies? A new study shows that cigarette smoke can prevent allergies by decreasing the reaction of immune cells to allergens.

Smoking can cause lung cancer, pulmonary disease, and can even affect how the body fights infections. Along with many harmful effects, smoking cigarettes has a surprising benefit: cigarettes can protect smokers from certain types of allergies. Now, a study recommended by Neil Thomson, a member of Faculty of 1000 Biology and leading expert in the field of respiratory medicine, demonstrates that cigarette smoke decreases the allergic response by inhibiting the activity of mast cells, the major players in the immune system's response to allergens.

Researchers at Utrecht University in the Netherlands found that treatment of mast cells with a cigarette smoke-infused solution prevented the release of inflammation-inducing proteins in response to allergens, without affecting other mast cell immune functions.

The mast cells used in the study were derived from mice, but it is likely that the same anti-allergy effect will hold true in humans. While taking up smoking to cure allergies is unwise, Thomson concludes that the findings presented in this study are "consistent with a dampening of allergic responses in smokers."

**Public release date: 14-May-2009**

**Vitamin D insufficiency linked to bacterial vaginosis in pregnant women**

Bacterial vaginosis (BV) is the most common vaginal infection in US women of childbearing age, and is common in pregnant women. BV occurs when the normal balance of bacteria in the vagina is disrupted and replaced by an overgrowth of certain bacteria. Because having BV puts a woman at increased risk for a variety of complications, such as preterm delivery, there is great interest in understanding how it can be prevented. Vitamin D may play a role in BV because it exerts influence over a number of aspects of the immune system. This hypothesis is circumstantially supported by the fact that BV is far more common in black than white women, and vitamin D status is substantially lower in black than white women. This relation, however, has not been rigorously studied. To assess whether poor vitamin D status may play a role in predisposing a woman to BV, Bodnar and coworkers at the University of Pittsburgh and the Magee-Womens Research Institute studied 469 pregnant women. The results of their investigation are published in the June 2009 issue of the Journal of Nutrition.
This prospective epidemiologic study investigated the relation between vitamin D status and BV in 209 white and 260 black women at <16 wk of pregnancy with singleton gestations. Blood samples were taken, and serum analyzed for 25-hydroxyvitamin D [25(OH)D], a marker of vitamin D status. 25(OH)D levels below 80 nmol/L are typically considered insufficient. Pelvic examinations were performed, and Gram-stained vaginal smears were assessed to diagnose BV.

The data indicate that 41% of all enrolled women had BV, and that 93% had 25(OH)D levels indicative of vitamin D insufficiency. Overall, women with BV had lower serum 25(OH)D concentrations than those without BV (P < 0.01). The prevalence of BV decreased as vitamin D concentration increased to 80 nmol/L (P < 0.001). Compared with 75 nmol/L, serum 25(OH)D concentrations of 20 nmol/L and 50 nmol/L were associated with 65% and 26% increases, respectively, in the likelihood of BV. In summary, these findings suggest that vitamin D insufficiency is associated with BV in the first 4 mo of pregnancy. Further, poor vitamin D status may contribute to the strong racial disparity in the prevalence of BV in US women. Controlled intervention trials will be needed to confirm this hypothesis.

Public release date: 15-May-2009

Glutamine supplements show promise in treating stomach ulcers

Amino acid helps offset stomach damage caused by H. pylori bacteria; animal study suggests popular supplement could also reduce risk of gastric cancers

BOSTON – Nearly 20 years ago, it was discovered that bacteria known as Helicobacter pylori were responsible for stomach ulcers. Since then, antibiotics have become the primary therapy used to combat the H. pylori infection, which affects approximately six percent of the world population and is also a primary cause of stomach cancer. But today the bacteria is growing increasingly resistant to antibiotics.

Now a study led by scientists at Beth Israel Deaconess Medical Center (BIDMC) and the Massachusetts Institute of Technology demonstrates that the amino acid glutamine, found in many foods as well as in dietary supplements, may prove beneficial in offsetting gastric damage caused by H. pylori infection. Reported in the May 2009 issue of the Journal of Nutrition., the findings offer the possibility of an alternative to antibiotics for the treatment of stomach ulcers.

"Our findings suggest that extra glutamine in the diet could protect against gastric damage caused by H. pylori," says senior author Susan Hagen, PhD, Associate Director of Research in the Department of Surgery at BIDMC and Associate Professor of Surgery at Harvard Medical School. "Gastric damage develops when the bacteria weakens the stomach's protective mucous coating, damages cells and elicits a robust immune response that is ineffective at ridding the infection." Eventually, she notes, years of infection result in a combination of persistent gastritis, cell damage and an environment conducive to cancer development.

Glutamine is a nonessential amino acid naturally found in certain foods, including beef, chicken, fish, eggs, dairy products and some fruits and vegetables. L-glutamine – the biologically active isomer of glutamine – is widely used as a dietary supplement by body builders to increase muscle mass.

Hagen and her coauthors had previously shown that glutamine protects against cell death from H. pylori-produced ammonia. "Our work demonstrated that the damaging effects of ammonia on gastric cells could be reversed completely by the administration of L-glutamine," explains Hagen. "The amino acid stimulated ammonia detoxification in the stomach – as it does in the liver – so that the effective concentration of ammonia was reduced, thereby blocking cell damage."

She and her coauthors, therefore, hypothesized that a similar mechanism might be at work in the intact stomach infected with H. pylori. To test this hypothesis, the investigators divided 105 mice into two groups, which were fed either a standardized diet (containing 1.9 percent glutamine) or the same diet with
supplemental L-glutamine (containing 6.9 percent glutamine) replacing carbohydrates for five percent of the total calories. After two weeks, the mice were subdivided into two more groups, with one group receiving a sham (fake) dose and the other group receiving a real dose containing H. pylori. (This resulted in four separate mouse groups: an uninfected control group; an uninfected glutamine group; an infected control group; and an infected glutamine group.)

The mice were then followed for a 20-week period, during which time samples of blood and stomach tissue were removed. Blood was analyzed for antibodies to specific types of T-helper immune cells, which mediate the body's response to H. pylori infection. Stomach tissues were examined for evidence of damage and cancer progression and also chemically analyzed for cytokines (inflammatory substances) which are produced by T-helper cells.

Their results showed that at six-weeks-post infection, the animals exhibited increased expression of three cytokines – interleukin 4, interleukin 10 and transforming growth factor-alpha mRNA. "These all play an important role in the stomach's ability to protect against damaging effects resulting from other responses to H. pylori infection," explains Hagen.

Of even greater significance, by week 20, the study results showed that, among the H. pylori-infected animals, the mice that were fed the L-glutamine diet exhibited lower levels of inflammation than did the mice that received the standard control diet.

"Because many of the stomach pathologies during H. pylori infection [including cancer progression] are linked to high levels of inflammation, this result provides us with preliminary evidence that glutamine supplementation may be an alternative therapy for reducing the severity of infection," explains Hagen, adding that studies in human subjects will be the next step to determine the relevance of this finding in the clinical setting.

"H. pylori bacteria infect more than half of the world's population and were recently identified as a Group 1 carcinogen by the World Health Organization," she adds. "Approximately 5.5 percent of the entire global cancer burden is attributed to H. pylori infection and, worldwide, over 900,000 new cases of gastric cancer develop each year. The possibility that an inexpensive, easy-to-use treatment could be used to modify the damaging effects of H. pylori infection warrants further study in clinical trials."

Public release date: 18-May-2009

**Biological link established between tumors and depression**

**Animal models may help explain mood changes in cancer patients**

In a study that could help explain the connections between depression and cancer, researchers at the University of Chicago have used an animal model to find, for the first time, a biological link between tumors and negative mood changes.

The team determined that substances associated with depression are produced in increased quantities by tumors and are transmitted to the brain.

Additionally, pathways that normally moderate the impact of depression-causing substances are disrupted when a tumor develops.

The research further showed that tumors induce changes in gene expression in the hippocampus, the portion of the brain that regulates emotion. Although researchers have long known that depression is a common outcome for people diagnosed with cancer, they had not known if it was brought on by a patient learning of the diagnosis or the result of treatments such as chemotherapy. Now a third source may have been identified.
"Our research shows that two types of tumor-induced molecules, one secreted by the immune system and another by the stress axis, may be responsible," said Leah Pyter, a postdoctoral fellow and lead author of a paper, "Peripheral Tumors Induce Depressive-like Behaviors and Cytokine Production and Alter Hypothalamic-Pituitary-Andrenal Axis Regulation," which is published in the current issue of the Proceedings of the National Academy of Sciences.

"Both of these substances have been implicated in depression, but neither has been examined over time frames and magnitudes that are characteristic of chronic diseases such as cancer," she said.

For their research, the team conducted a series of tests on about 100 rats, some of whom had cancer to determine their behavioral responses in tests of emotional state.

"Rats are commonly used to test drugs that are being studied for potential human benefits, such as treating depression," said Brian Prendergast, Associate Professor of Psychology at the University of Chicago, and the senior author on the study. "In this case, examining behavioral responses to tumors in non-human animals is particularly useful because the rats have no awareness of the disease, and thus their behavioral changes were likely the result of purely biological factors."

The team used tests commonly used in testing anti-depressants on rats and found that the rats with tumors became less motivated to escape when submitted to a swimming test, a condition that is similar to depression in humans. The rats with tumors also were less eager to drink sugar water, a substance that usually attracts the appetites of healthy rats.

Further tests revealed that the rats with tumors had increased levels of cytokines in their blood and in the hippocampus when compared with healthy rats. Cytokines are produced by the immune system, and an increase in cytokines has been linked to depression.

The team also found that stress hormone production also was altered in rats with tumors. The rats with tumors also had dampened production of the stress hormone corticosterone. The hormone helps regulate the impact of cytokines and reducing its production therefore increases the impact of cytokines.

**Public release date: 18-May-2009**

**Turmeric extract suppresses fat tissue growth in rodent models**

BOSTON (May 18, 2009) Curcumin, the major polyphenol found in turmeric, appears to reduce weight gain in mice and suppress the growth of fat tissue in mice and cell models. Researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University (USDA HNRCA) studied mice fed high fat diets supplemented with curcumin and cell cultures incubated with curcumin.

"Weight gain is the result of the growth and expansion of fat tissue, which cannot happen unless new blood vessels form, a process known as angiogenesis." said senior author Mohsen Meydani, DVM, PhD, director of the Vascular Biology Laboratory at the USDA HNRCA. "Based on our data, curcumin appears to suppress angiogenic activity in the fat tissue of mice fed high fat diets."

Meydani continued, "It is important to note, we don't know whether these results can be replicated in humans because, to our knowledge, no studies have been done."

Turmeric is known for providing flavor to curry. One of its components is curcumin, a type of phytochemical known as a polyphenol. Research findings suggest that phytochemicals, which are the chemicals found in plants, appear to help prevent disease. As the bioactive component of turmeric, curcumin is readily absorbed for use by the body.

Meydani and colleagues studied mice fed high fat diets for 12 weeks. The high fat diet of one group was
supplemented with 500 mg of curcumin/ kg diet; the other group consumed no curcumin. Both groups ate
the same amount of food, indicating curcumin did not affect appetite, but mice fed the curcumin
supplemented diet did not gain as much weight as mice that were not fed curcumin.

"Curcumin appeared to be responsible for total lower body fat in the group that received supplementation," said Meydani, who is also a professor at the Friedman School of Nutrition Science and Policy at Tufts. "In those mice, we observed a suppression of microvessel density in fat tissue, a sign of less blood vessel growth and thus less expansion of fat. We also found lower blood cholesterol levels and fat in the liver of those mice. In general, angiogenesis and an accumulation of lipids in fat cells contribute to fat tissue growth."

Writing in the May 2009 issue of the Journal of Nutrition, the authors note similar results in cell cultures. Additionally, curcumin appeared to interfere with expression of two genes, which contributed to angiogenesis progression in both cell and rodent models.

"Again, based on this data, we have no way of telling whether curcumin could prevent fat tissue growth in humans." Meydani said. "The mechanism or mechanisms by which curcumin appears to affect fat tissue must be investigated in a randomized, clinical trial involving humans."

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100 reasons to change the way we think about genetics

Article reviews evidence for epigenetic inheritance in wide range of species

For years, genes have been considered the one and only way biological traits could be passed down through generations of organisms.

Not anymore.

Increasingly, biologists are finding that non-genetic variation acquired during the life of an organism can sometimes be passed on to offspring—a phenomenon known as epigenetic inheritance. An article forthcoming in the July issue of The Quarterly Review of Biology lists over 100 well-documented cases of epigenetic inheritance between generations of organisms, and suggests that non-DNA inheritance happens much more often than scientists previously thought.

Biologists have suspected for years that some kind of epigenetic inheritance occurs at the cellular level. The different kinds of cells in our bodies provide an example. Skin cells and brain cells have different forms and functions, despite having exactly the same DNA. There must be mechanisms—other than DNA—that make sure skin cells stay skin cells when they divide.

Only recently, however, have researchers begun to find molecular evidence of non-DNA inheritance between organisms as well as between cells. The main question now is: How often does it happen?

"The analysis of these data shows that epigenetic inheritance is ubiquitous ....," write Eva Jablonka and Gal Raz, both of Tel-Aviv University in Israel. Their article outlines inherited epigenetic variation in bacteria, protists, fungi, plants, and animals.

These findings "represent the tip of a very large iceberg," the authors say.

For example, Jablonka and Raz cite a study finding that when fruit flies are exposed to certain chemicals, at least
13 generations of their descendants are born with bristly outgrowths on their eyes. Another study found that exposing a pregnant rat to a chemical that alters reproductive hormones leads to generations of sick offspring. Yet another study shows higher rates of heart disease and diabetes in the children and grandchildren of people who were malnourished in adolescence.

In these cases, as well as the rest of the cases Jablonka and Raz cite, the source of the variation in subsequent generations was not DNA. Rather, the new traits were carried on through epigenetic means.

There are four known mechanisms for epigenetic inheritance. According to Jablonka and Raz, the best understood of these is "DNA methylation." Methyls, small chemical groups within cells, latch on to certain areas along the DNA strand. The methyls serve as a kind of switch that renders genes active or inactive.

By turning genes on and off, methyls can have a profound impact on the form and function of cells and organisms, without changing the underlying DNA. If the normal pattern of methyls is altered—by a chemical agent, for example—that new pattern can be passed to future generations.

The result, as in the case of the pregnant rats, can be dramatic and stick around for generations, despite the fact that underlying DNA remains unchanged.

LAMARCK REVISITED

New evidence for epigenetic inheritance has profound implications for the study of evolution, Jablonka and Raz say.

"Incorporating epigenetic inheritance into evolutionary theory extends the scope of evolutionary thinking and leads to notions of heredity and evolution that incorporate development," they write.

This is a vindication of sorts for 18th century naturalist Jean Baptiste Lamarck. Lamarck, whose writings on evolution predated Charles Darwin's, believed that evolution was driven in part by the inheritance of acquired traits. His classic example was the giraffe. Giraffe ancestors, Lamarck surmised, reached with their necks to munch leaves high in trees. The reaching caused their necks to become slightly longer—a trait that was passed on to descendants. Generation after generation inherited slightly longer necks, and the result is what we see in giraffes today.

With the advent of Mendelian genetics and the later discovery of DNA, Lamarck's ideas fell out of favor entirely. Research on epigenetics, while yet to uncover anything as dramatic as Lamarck's giraffes, does suggest that acquired traits can be heritable, and that Lamarck was not so wrong after all.

Ralph's Note - This is one of the most important articles you can understand...Global Warming is nothing compared to how we are effecting our genetics.

Public release date: 19-May-2009

Excessive cola consumption can lead to super-sized muscle problems warn doctors
Doctors have issued a warning about excessive cola consumption after noticing an increase in the number of patients suffering from muscle problems, according to the June issue of IJCP, the International Journal of Clinical Practice.

"We are consuming more soft drinks than ever before and a number of health issues have already been identified including tooth problems, bone demineralisation and the development of metabolic syndrome and diabetes" says Dr Moses Elisaf from the Department of Internal Medicine at the University of Ioannina, Greece.

"Evidence is increasing to suggest that excessive cola consumption can also lead to hypokalaemia, in which the blood potassium levels fall, causing an adverse effect on vital muscle functions."

A research review carried out by Dr Elisaf and his colleagues has shown that symptoms can range from mild weakness to profound paralysis. Luckily all the patients studied made a rapid and full recovery after they stopped drinking cola and took oral or intravenous potassium.

The case studies looked at patients whose consumption ranged from two to nine litres of cola a day.

They included two pregnant women who were admitted with low potassium levels.

The first, a 21 year-old woman, was consuming up to three litres of cola a day and complained of fatigue, appetite loss and persistent vomiting. An electrocardiagram also revealed she had a heart blockage, while blood tests showed she had low potassium levels.

The second also had low potassium levels and was suffering from increasing muscular weakness. It turned out she had been drinking up to seven litres of cola a day for the last 10 months.

In a commentary on the paper, Dr Clifford Packer from the Louis Stokes Cleveland VA Medical Centre in Ohio relates the strange case of the ostrich farmer who returned from the Australian outback with muscle weakness. He had been drinking four litres of cola a day for the last three years and drank up to 10 litres a day when he was in the outback, causing a rapid reduction in his potassium levels.

He also relates a puzzling case he saw in his own clinical practice, which was solved when the patient turned up at his office with a two-litre bottle of cola in the basket of his electric scooter. It turned out he routinely drank up to four litres a day. He refused to stop drinking cola, but halved his consumption and the muscle weakness he had been complaining of improved.

In 2007 the worldwide annual consumption of soft drinks reached 552 billion litres, the equivalent of just under 83 litres per person per year, and this is projected to increase to 95 litres per person per year by 2012. However the figure has already reached an average of 212 litres per person per year in the United States.

It appears that hypokalaemia can be caused by excessive consumption of three of the most common ingredients in cola drinks – glucose, fructose and caffeine.

"The individual role of each of these ingredients in the pathophysiology of cola-induced hypokalaemia has not been determined and may vary in different patients" says Dr Elisaf.

"However in most of the cases we looked at for our review, caffeine intoxication was thought to play the most important role. This has been borne out by case studies that focus on other products that contain high levels of caffeine but no glucose or fructose.

"Despite this, caffeine free cola products can also cause hypokalaemia because the fructose they contain can cause diarrhoea."

The authors argue that in an era when portion sizes are becoming bigger and bigger, the excessive consumption of cola products has real public health implications.
"Although most patients recover when they stop drinking cola and take potassium supplements, cola-induced chronic hypokalaemia can make them more susceptible to potentially fatal complications, such as an irregular heartbeat" says Dr Elisaf.

"In addition, excessive consumption of any kind of cola can lead to a range of health problems including fatigue, loss of productivity and muscular symptoms that vary from mild weakness to profound paralysis.

"We believe that further studies are needed to establish how much is too much when it comes to the daily consumption of cola drinks."

Dr Packer agrees that the problem needs to be addressed.

"Cola drinks need to be added to the physician's checklist of drugs and substances that can cause hypokalaemia" he says.

"And the soft drink industry needs to promote safe and moderate use of its products for all age groups, reduce serving sizes and pay heed to the rising call for healthier drinks."

Public release date: 20-May-2009

Protein from algae shows promise for stopping SARS

ATS 2009, SAN DIEGO— A protein from algae may have what it takes to stop Severe Acute Respiratory Syndrome (SARS) infections, according to new research. A recent study has found that mice treated with the protein, Griffithsin (GRFT), had a 100 percent survival rate after exposure to the SARS coronavirus (SARS-CoV), as compared to a 30 percent survival for untreated mice.

The research will be presented at the American Thoracic Society's 105th International Conference in San Diego on Wednesday, May 20.

Despite its dramatic entrance into the domain of worldwide public health threats in 2002, little headway has been made therapeutically toward preventing or treating SARS after infection. But GRFT, a lectin protein derived from algae, offers a new possible hope. GRFT is thought to exert its antiviral effects by altering the shape of the sugar molecules that line the virus' envelope, allowing it to attach to and invade human cells, where it takes over the cells' reproductive machinery to replicate itself. Without that crucial ability, the virus is unable to cause disease.

"While preliminary, these results are very exciting and indicate a possible therapeutic approach to future SARS or other coronaviral outbreaks," stated Christine Wohlford-Lenane, senior research assistant at the department of pediatrics University of Iowa and the lead author of the study.

Researchers treated experimental mice with GRFT or a sham treatment and then inoculated them with the SARS virus. They analyzed the antiviral activity of GRFT and the extent to which the virus was able to invade and replicate in the mice at two, four and 10 days after infection. They found that mice who had not been treated with GRFT showed 20 times more plaque-forming units of virus than treated mice. They also noted that the lungs of untreated infected mice showed extensive necrotizing bronchitis and prominent edema, while mice treated with GRFT showed evidence of significantly less severe lung damage. Additionally, mice treated with GRFT did not experience the drastic weight loss of untreated mice, which lost 35 percent of their body mass.

"This indicates that not only did the GRFT stop the virus from replicating, but also prevented secondary outcomes, such as weight loss, that are associated with infection," said Ms. Wohlford-Lenane.
"We are planning future studies to investigate prophylaxis, versus treatment interventions with GRFT, in
the SARS mouse model in collaboration with Barry O'Keefe at the National Cancer Institute," she
concluded. "In addition, we want to learn whether mice protected from SARS by GRFT develop protective
immunity against future infection."

**Public release date: 20-May-2009**

**Vitamin D found in fish boosts brain power**

Eating fish – long considered ‘brain food’ – may really be good for the old grey matter, as is a healthy dose of sunshine, new research suggests.

University of Manchester scientists in collaboration with colleagues from other European centres have shown that higher levels of vitamin D – primarily synthesised in the skin following sun exposure but also found in certain foods such as oily fish – are associated with improved cognitive function in middle-aged and older men.

The study, published in the Journal of Neurology, Neurosurgery and Psychiatry, compared the cognitive performance of more than 3,000 men aged 40 to 79 years at eight test centres across Europe.

The researchers found that men with higher levels of vitamin D performed consistently better in a simple and sensitive neuropsychological test that assesses an individual’s attention and speed of information processing.

“Previous studies exploring the relationship between vitamin D and cognitive performance in adults have produced inconsistent findings but we observed a significant, independent association between a slower information processing speed and lower levels of vitamin D,” said lead author Dr David Lee, in Manchester’s School of Translational Medicine.

“The main strengths of our study are that it is based on a large population sample and took into account potential interfering factors, such as depression, season and levels of physical activity.

“Interestingly, the association between increased vitamin D and faster information processing was more significant in men aged over 60 years, although the biological reasons for this remain unclear.”

“The positive effects vitamin D appears to have on the brain need to be explored further but certainly raise questions about its potential benefit for minimising ageing-related declines in cognitive performance.”

**Public release date: 21-May-2009**
BPA, chemical used to make plastics, found to leach from polycarbonate drinking bottles into humans

Exposure to BPA may have harmful health effects

Boston, MA -- A new study from Harvard School of Public Health (HSPH) researchers found that participants who drank for a week from polycarbonate bottles, the popular, hard-plastic drinking bottles and baby bottles, showed a two-thirds increase in their urine of the chemical bisphenol A (BPA). Exposure to BPA, used in the manufacture of polycarbonate and other plastics, has been shown to interfere with reproductive development in animals and has been linked with cardiovascular disease and diabetes in humans. The study is the first to show that drinking from polycarbonate bottles increased the level of urinary BPA, and thus suggests that drinking containers made with BPA release the chemical into the liquid that people drink in sufficient amounts to increase the level of BPA excreted in human urine.

The study appears on the website of the journal Environmental Health Perspectives and is freely available at http://www.ehponline.org/members/2009/0900604/0900604.pdf.

In addition to polycarbonate bottles, which are refillable and a popular container among students, campers and others and are also used as baby bottles, BPA is also found in dentistry composites and sealants and in the lining of aluminum food and beverage cans. (In bottles, polycarbonate can be identified by the recycling number 7.) Numerous studies have shown that it acts as an endocrine-disruptor in animals, including early onset of sexual maturation, altered development and tissue organization of the mammary gland and decreased sperm production in offspring. It may be most harmful in the stages of early development.

"We found that drinking cold liquids from polycarbonate bottles for just one week increased urinary BPA levels by more than two-thirds. If you heat those bottles, as is the case with baby bottles, we would expect the levels to be considerably higher. This would be of concern since infants may be particularly susceptible to BPA's endocrine-disrupting potential," said Karin B. Michels, associate professor of epidemiology at HSPH and Harvard Medical School and senior author of the study.

The researchers, led by first author Jenny Carwile, a doctoral student in the department of epidemiology at HSPH, and Michels, recruited Harvard College students for the study in April 2008. The 77 participants began the study with a seven-day "washout" phase in which they drank all cold beverages from stainless steel bottles in order to minimize BPA exposure. Participants provided urine samples during the washout period. They were then given two polycarbonate bottles and asked to drink all cold beverages from the bottles during the next week; urine samples were also provided during that time.

The results showed that the participants' urinary BPA concentrations increased 69% after drinking from the polycarbonate bottles. (The study authors noted that BPA concentrations in the college population were similar to those reported for the U.S.
general population.) Previous studies had found that BPA could leach from polycarbonate bottles into their contents; this study is the first to show a corresponding increase in urinary BPA concentrations in humans.

One of the study's strengths, the authors note, is that the students drank from the bottles in a normal use setting. Additionally, the students did not wash their bottles in dishwashers nor put hot liquids in them; heating has been shown to increase the leaching of BPA from polycarbonate, so BPA levels might have been higher had students drunk hot liquids from the bottles.

Canada banned the use of BPA in polycarbonate baby bottles in 2008 and some polycarbonate bottle manufacturers have voluntarily eliminated BPA from their products. With increasing evidence of the potential harmful effects of BPA in humans, the authors believe further research is needed on the effect of BPA on infants and on reproductive disorders and on breast cancer in adults.

"This study is coming at an important time because many states are deciding whether to ban the use of BPA in baby bottles and sippy cups. While previous studies have demonstrated that BPA is linked to adverse health effects, this study fills in a missing piece of the puzzle—whether or not polycarbonate plastic bottles are an important contributor to the amount of BPA in the body," said Carwile.

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New model suggests role of low vitamin D in cancer development

In studying the preventive effects of vitamin D, researchers at the Moores Cancer Center at the University of California, San Diego, have proposed a new model of cancer development that hinges on a loss of cancer cells' ability to stick together. The model, dubbed DINOMIT, differs substantially from the current model of cancer development, which suggests genetic mutations as the earliest driving forces behind cancer.

"The first event in cancer is loss of communication among cells due to, among other things, low vitamin D and calcium levels," said epidemiologist Cedric Garland, DrPH, professor of family and preventive medicine at the UC San Diego School of Medicine, who led the work. "In this new model, we propose that this loss may play a key role in cancer by disrupting the communication between cells that is essential to healthy cell turnover, allowing more aggressive cancer cells to take over."

Reporting online May 22, 2009 in the Annals of Epidemiology, Garland suggests that such cellular disruption could account for the earliest stages of many cancers. He said that previous theories linking vitamin D to certain cancers have been tested and confirmed in more than 200 epidemiological studies, and understanding of its physiological basis stems from more than 2,500 laboratory studies.

"Competition and natural selection among disjoined cells within a tissue compartment,
such as might occur in the breast’s terminal ductal lobular unit, for example, are the engine of cancer,” Garland said. "The DINOMIT model provides new avenues for preventing and improving the success of cancer treatment."

Garland went on to explain that each letter in DINOMIT stands for a different phase of cancer development. "D" stands for disjunction, or loss of intercellular communication; "I," for initiation, where genetic mutations begin to play a role; "N" for natural selection of the fastest-reproducing cancer cells; "O" for overgrowth of cells; "M" for metastasis, when cancer cells migrate to other tissues, where cancer can kill; "I" refers to involution, and "T" for transition, both dormant states that may occur in cancer and potentially be driven by replacing vitamin D.

While there is not yet definitive scientific proof, Garland suggests that much of the evolutionary process in cancer could be arrested at the outset by maintaining vitamin D adequacy. "Vitamin D may halt the first stage of the cancer process by re-establishing intercellular junctions in malignancies having an intact vitamin D receptor," he said.

According to Garland, other scientists have found that the cells adhere to one another in tissue with adequate vitamin D, acting as mature epithelial cells. Without enough vitamin D, they may lose this stickiness along with their identity as differentiated cells, and revert to a stem cell-like state.

Garland said that diet and supplements can restore appropriate vitamin D levels, and perhaps help in preventing cancer development. "Vitamin D levels can be increased by modest supplementation with vitamin D3 in the range of 2000 IU/day," he noted. The researchers noted that many studies show an apparent beneficial effect of vitamin D and calcium on cancer risk and survival of patients with breast, colorectal and prostate cancer. However, there are some studies that have not found such benefit, especially when taking smoking, alcohol and viruses into account. While more research needs to be done, Garland recommends that individuals should have their vitamin D level tested during an annual check up.

Garland and his colleagues have published epidemiological studies about the potential preventive effects of vitamin D for some two decades. Last year, his team showed an association between deficiency in sunlight exposure, low vitamin D and breast cancer. In previous work, they showed associations between increased levels of vitamin D3 or markers of vitamin D and a lower risk for breast, colon, ovarian and kidney cancers.

Public release date: 26-May-2009

Caffeic acid inhibits colitis in a mouse model -- is a drug-metabolizing gene crucial?

Researchers at Iowa State University have found that increased expression of a form of
cytochrome P-450 (CYP4B1) is a key marker of inhibition of colitis in mice by caffeic acid, an anti-inflammatory antioxidant compound widely distributed in foods. The results, which appear in the June 2009 issue of Experimental Biology and Medicine, implicate CYP4B1, a form of cytochrome P450 previously found to be associated with resolution of allergic inflammation in another model. The normalization of CYP4B1 by caffeic acid treatment was associated with significant lessening of colitic damage, assessed by examining colon histopathology. In comparison with rutin, an anti-inflammatory flavonoid and hypoxoside extract, a botanical known as African potato previously shown to protect against colitis, all three compounds had anti-inflammatory effects, suppressing myeloperoxidase, IL-17 and iNOS and increasing IL-4, known factors associated with inflammation responses. But only caffeic acid protected against the dextran sulfate sodium induced colitis. Its novel mechanism related to CYP4B1 is being studied further. The research team, Zhong Ye, a graduate student in Toxicology, along with Microbiology graduate students Zhiping Liu and Abigail Henderson, Visiting Scientist Kwangwon Lee, Korea University, Dr. Michael Wannemuehler, Veterinary Microbiology, Dr. Jesse Hostetter, a veterinary pathologist, and Dr. Suzanne Hendrich, Toxicologist and Nutritionist, performed studies in 8 week old mice fed the various dietary components and then exposed to dextran sulfate sodium in a mildly irritating dose to induce colitis. Dr. Hendrich noted that "this study of caffeic acid will help us to advance studies of botanicals and plant foods with respect to their ability and mechanisms of inhibiting colitis, and perhaps colon cancer, because colitis increases risk for this disease".

In summary, normalization of expression of CYP4B1, a drug metabolizing enzyme possibly related to reversal of inflammatory damage was a hallmark of the efficacy of caffeic acid, a component found widely in plant foods in the human diet, to inhibit intestinal tissue damage in a mouse model commonly used to simulate colitis. Dr. Steven R. Goodman, Editor-in-Chief of Experimental Biology and Medicine said "The article by Hendrich and colleagues may help in the future design of more effective treatments to prevent or diminish colitis".

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Is vitamin D deficiency linked to Alzheimer's disease and vascular dementia?

Hypothesis explored in the current issue of the Journal of Alzheimer's Disease Amsterdam, The Netherlands, May 26, 2009 – There are several risk factors for the development of Alzheimer's disease and vascular dementia. Based on an increasing number of studies linking these risk factors with Vitamin D deficiency, an article in the current issue of the Journal of Alzheimer's Disease (May 2009) by William B. Grant, PhD of the Sunlight, Nutrition, and Health Research Center (SUNARC) suggests that further investigation of possible direct or indirect linkages between Vitamin D and these dementias is needed.

Low serum levels of 25-hydroxyvitamin D [25(OH)D] have been associated with
increased risk for cardiovascular diseases, diabetes mellitus, depression, dental caries, osteoporosis, and periodontal disease, all of which are either considered risk factors for dementia or have preceded incidence of dementia. In 2008, a number of studies reported that those with higher serum 25(OH)D levels had greatly reduced risk of incidence or death from cardiovascular diseases.

Several studies have correlated tooth loss with development of cognitive impairment and Alzheimer's disease or vascular dementia. There are two primary ways that people lose teeth: dental caries and periodontal disease. Both conditions are linked to low vitamin D levels, with induction of human cathelicidin by 1,25-dihydroxyvitamin D being the mechanism.

There is also laboratory evidence for the role of vitamin D in neuroprotection and reducing inflammation, and ample biological evidence to suggest an important role for vitamin D in brain development and function.

Given these supportive lines of evidence, Dr. Grant suggests that studies of incidence of dementia with respect to prediagnostic serum 25(OH)D or vitamin D supplementation are warranted. In addition, since the elderly are generally vitamin D deficient and since vitamin D has so many health benefits, those over the age of 60 years should consider having their serum 25(OH)D tested, looking for a level of at least 30 ng/mL but preferably over 40 ng/mL, and supplementing with 1000-2000 IU/day of vitamin D3 or increased time in the sun spring, summer, and fall if below those values.

Writing in the article, Dr. Grant states, "There are established criteria for causality in a biological system. The important criteria include strength of association, consistency of findings, determination of the dose-response relation, an understanding of the mechanisms, and experimental verification. To date, the evidence includes observational studies supporting a beneficial role of vitamin D in reducing the risk of diseases linked to dementia such as vascular and metabolic diseases, as well as an understanding of the role of vitamin D in reducing the risk of several mechanisms that lead to dementia."

**Public release date: 26-May-2009**

**Cream with green tea extract hinders HIV transmission: study**

WASHINGTON (AFP) – A chemical found in green tea helps inhibit sexual transmission of the virus which causes AIDS, said a study Tuesday that recommends using the compound in vaginal creams to supplement antiretrovirals.

Medical experts at Germany's University of Heidelberg said the compound could be a low-cost arrow in the quiver of medical weapons to fight the spread of HIV in research-poor countries.

The researchers said they determined that the green tea polyphenol, or vegetable tannin,
called epigallocatechin-3-gallate (EGCG) is capable of neutralizing a protein in sperm which serves as a vector for viral transmission during sex.

EGCG degrades what is known as a semen-derived enhancer of virus infection, or SEVI, described in the study as "an important infectivity factor of HIV."

Writing in the online edition of the Proceedings of the National Academy of Sciences, the researchers said they "recently identified a peptide fraction in human semen that consistently enhanced HIV-1 infection."

SEVIs capture viral elements and attach them to the surface of target cells, enhancing cell fusion and decreasing a cell's ability to repel viral threats.

EGCG "targets SEVI for degradation" and "abrogates semen-mediated enhancement of HIV-1 infection in the absence of cellular toxicity," said the researchers, some of whom work at the university's Heinrich-Pette-Institute for Experimental Virology and Immunology.

Because of its effects on semen-based HIV transmission threats, the study's authors said "EGCG appears to be a promising supplement to antiretroviral microbicides to reduce sexual transmission of HIV-1."

With the vast majority of the world's 33 million people with HIV infected through heterosexual sex, and as 96 percent of new infections occur in poor and developing nations, researchers said the use of green tea EGCG in topical creams would "provide a simple and affordable prevention method" to guard against HIV transmission.

Green tea, which originated in China and is widely consumed in Asia, the Middle East and growing numbers of western countries, is already popular for its antioxidant qualities.

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These reports are done with the appreciation of all the Doctors, Scientist, and other Medical Researchers who sacrificed their time and effort. In order to give people the ability to empower themselves. Without the base aspirations for fame, or fortune. Just honorable people, doing honorable things.