



## News in Brief

### Drinking Milk to Ease Milk Allergy?

Giving children with milk allergies increasingly higher doses of milk over time may ease, and even help them completely overcome, their allergic reactions, according to the results of a study led by the Johns Hopkins Children's Center and conducted jointly with Duke University.

Despite the small number of patients in the trial—19—the findings are illuminating and encouraging, investigators say, because this is the first-ever double-blinded and placebo-controlled study of milk immunotherapy. ScienceDaily wrote.

In the study, the researchers compared a group of children receiving milk powder to a group of children receiving placebo identical in appearance and taste to real milk powder. Neither the patients nor the investigators knew which child received which powder, a rigorous research setup that minimizes the chance for error and bias.



### Overuse of Organic Fertilizers Could Poison Soils

Excessive doses of organic residues in agricultural fields could be dangerous for plants, invertebrates and micro-organisms living in the soil.

This is the finding of a study carried out by the Autonomous University of Barcelona (UAB), which has shown that the use of appropriate levels of fertilizers would prevent this toxic impact on the soil biota. ScienceDaily reported.

Although controlled amounts of organic residues, sewage sludge and animal waste are a good choice for soil fertilization, they can have damaging effects on soil biota when applied in excessive doses.

In an effort to prevent these toxic impacts on soil, a team of researchers from the UAB's Center for Ecological Research and Forestry Applications (CREAF) has carried out a test that sets the maximum safe doses for organic fertilizers.

"We based this on bio-trials in the laboratory using soil-based organisms that are representative of agro-ecosystems, and which need to be protected: plants (*Brassica rapa*, *Lolium perenne* and *Trifolium pratense*), earthworms, annelids, collembola and micro-organisms," the study's lead author Xavier Domene told SINC.

The research, which has been published in the magazine Environmental Pollution, shows that the low levels of stability in the residues used is one of the main reasons for their damaging effects on plants and animals.

"The rapid decomposition of the residue in the ground generates substances such as ammonia, which is the main cause of the toxic effects observed," said Domene.



### Diabetes Spice

If you've ever eaten West African cuisine, you may have come across the pungent peppery spice known as grains of paradise or Aframomum melegueta, a member of the ginger family that grows well in the swamps along the coast.

According to NewScientist, the spice has long been known in African folklore as a medicine that aids digestion and now western scientists say it might also be a powerful diabetes treatment.

Ilya Raskin, a plant biologist at Rutgers University in New Jersey, has tested an extract of *A. melegueta* on diabetic mice and says it produces a significant drop in their blood sugar levels.

Raskin says the extract could help prevent the onset of diabetes in people at high risk and could be given prophylactically to individuals who have a family history of diabetes or have other risk factors for developing such disease.

In Africa, the plant seeds are chewed on cold days to 'promote' body warmth and are used extensively as a food spice.

This has suggested a number of novel ways in which the extract could be marketed, perhaps as a food additive, as an 'ethical' drug, a dietary supplement, or even as a cosmetic product having biologically active ingredients.



### Shape Shift Rules Cancer Spread

British scientists have worked out how cancer cells change their shape to spread around the body.

They found that melanoma cells rapidly alternate between a round shape and a more stretchy 'elongated' shape to help them move in different environments, BBC reported.

Two proteins—called Rac and Rho—are responsible for the shape switch, Institute of Cancer researchers said in the journal Cell.

Knowledge of how a cancer spreads could improve treatments, experts said.

The spread of cancer cells from the initial tumor to other sites of the body, a process known as metastasis, is one of the biggest problems in treatment.

Melanoma, the most dangerous form of skin cancer, is particularly aggressive.

Study leader, Professor Chris Marshall, said his team had been able to view cells in live tumors rapidly undergoing these changes in shape.

They discovered that when Rac is switched on, it encourages the cell to become elongated and simultaneously suppresses the activity of the competing Rho protein.

## Hot Nanotube Sheets Produce Music

Sheets made of carbon nanotubes behave like a loudspeaker when zapped with a varying electric current, say Chinese researchers.

The discovery could lead to new generation of cheap, flat speakers.

Since the early 1990s, nanotubes have been intensively studied by researchers across the globe, NewScientist wrote.

The tiny structures are widely touted as potential drug delivery devices but might also be useful in more exotic gadgets, including artificial photosynthesis devices and space elevators. But no one has thought to test their acoustic properties until now.

Shoushan Fan and his research team at Tsinghua University in Beijing, China, working with colleagues at Beijing Normal University, created a thin sheet by roughly aligning many 10-nanometer-diameter carbon nanotubes. When they sent an audio frequency current through the sheet, they discovered it acted as a loudspeaker.

They used a laser vibrometer to look for vibrations in their nanotube speaker as it produced sound, but the sheet remained resolutely static throughout. Instead, they think that the nanotube speaker functions as a thermoacoustic device.

When an alternating current passes through the nanotube sheet, the sheet alternates between room temperature and 80 °C. Those rapid temperature oscillations lead to pressure oscillations in the air next to the film. It is those thermally induced pressure oscillations that are responsible for the sound, rather than any physical movement of the nanotube sheet itself.

## Breakthrough In Child Brain Tumors

Scientists at Cambridge University have made a major breakthrough researching brain tumors in children.

For the first time, a sequence of DNA present in around two-thirds of the most common tumor has been pinpointed, BBC said.

Pilocytic astrocytomas is diagnosed in 145 children from 5 to 19 every year, with nearly 40 cases untreatable.

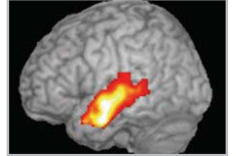
As little is known about the causes and genetics of brain tumors, it is hoped the findings could lead to better treatment.

Professor Peter Collins, who led the research at Cambridge University, carried out genetic scans on 44 pilocytic astrocytoma and found a DNA sequence rearranged on a chromosome in the majority of the samples.

The rearrangement creates a fusion gene, a hybrid created from two separate genes. It is the first time fusion activity has been associated with a brain tumor.

Professor Collins said, "If we can diagnose exactly which type of brain tumor a child has as early as possible, the tumor is more likely to be treated successfully."

"We also hope the findings will mean it is possible to create therapies in the future that block the activity of the fusion gene and halt the growth of tumor cells."



# Iranian Named One of "Brilliant 10"

Popular Science magazine has named Princeton's Ali Yazdani, an Iran-born professor of physics, one of its "Brilliant 10" in its seventh annual listing of top young scientists.

"The Brilliant 10 are the brightest researchers of 2008, making the breakthroughs of tomorrow," said Mark Janot, editor-in-chief of Popular Science, Princeton reported.

"PopSci is paying homage to these young scientists who explore the world with an altogether original eye," he said.

Described as "The Atomic Visionary" by the magazine, Yazdani gained attention for his work using a desk-size scanning-tunneling microscope to study high-temperature superconductors. The device can cool a sample to just above absolute zero, seal it in a near-perfect vacuum and block the faintest noise. "As a result," the magazine said, "he can continuously track single atoms for months at a time."

#### > Starting Point

Yazdani's fascination with science began as a teen in Iran when he signed up for class on how to repair television sets. After he immigrated to the United States, a course in quantum mechanics at the

University of California-Berkeley pulled him into science.

He earned his Ph.D. from Stanford University in 1995 and then conducted postdoctoral research at the IBM Almaden Research Center. He served on the physics faculty of the University of Illinois-Urbana from 1997 until 2005, when he came to Princeton.

Recently, he has overturned the accepted thinking on high-temperature superconductors with provocative results reported in Science and Nature magazines, based on two years of experiments he led with his research group at Princeton.

In one experiment, he and his group have shown that high-temperature superconductivity does not hinge on a magical glue binding electrons together. The secret to superconductivity may rest instead on the ability of electrons to take advantage of their natural repulsion in a complex situation.

#### > Complicated Phenomena

Yazdani conducts his research in the Princeton Nanoscale Microscopy Labo-



Ali Yazdani

ratory, a state-of-the-art, ultra-low-noise lab constructed at the site of an old cyclotron in the basement of Jadwin Hall. His group studies condensed matter physics, searching for simple, unifying explanations for complicated phenomena observed in liquids and solids.

Another member of this year's list, Caltech bioengineer John Dabiri, earned his bachelor's degree in mechanical and aerospace engineering from Princeton in 2001.

In selecting the 10 recipients, the edi-

tors at Popular Science contacted hundreds of individuals, including heads of departments at universities around the country, professional associations and award-giving institutions.

In the past, several other Princeton researchers have made the list. In 2007, Popular Science selected physicist Frans Pretorius for the "Brilliant 10." Mathematician Maria Chudnovsky and electrical engineer Claire Gmachl were chosen in 2004. And in 2002, mathematician Manjul Bhargava was similarly named.

## 9 Compatriots Helping Write Immunology Textbook

Nine Iranian immunologists have been invited by the Springer publishing company to help Notary Angelo write a textbook on immunology.

These include Nima Rezaei and Asghar Agha-Mohammadi from Tehran University of Medical Sciences, who have been invited by Springer to write the book in cooperation with Notary Angelo, Presstv reported.

"Primary immunodeficiency disease" consists of 11 chapters and is written with the help of 49 eminent

professors and PhD and specialty students from 10 countries. Nine of these authors are from Iran.

Agha-Mohammadi, sub-specialist in immunodeficiency, is a TUMS faculty member who has published three articles in Nature and the New England Journal of Medicine.

Rezaei is a TUMS researcher.

Immunology is a broad branch of biomedical science that covers the study of all aspects of the immune system in all organisms.

It deals with, among other things, the physiological functioning of the immune system in states of both health and disease; malfunctions of the immune system in immunological disorders (autoimmune diseases, hypersensitivities, immune deficiency, transplant rejection); the physical, chemical and physiological characteristics of the components of the immune system in vitro, in situ and in vivo.

Immunology has applications in several disciplines of science.

## Sabertooth 'Tigers' Were Social Beasts

Leopards and tigers today are fairly solitary beasts, but the extinct sabertooth cat was likely a social animal that lived and hunted like today's lions, a new study suggests.

The sabertooth cat (*Smilodon fatalis*) is famous for its extremely long canine teeth, which reached up to seven inches in length and extended below the lower jaw, LiveScience said.

Although commonly called the "sabertoothed tiger," the species is actually not closely related to the tiger, which is part of a different subfamily. However, the sabertooth was large and muscular, similar in size to a modern-day tiger.

Scientists from UCLA and the Zoological Society of London concluded that the sabertooth cat was social by using a novel technique: They compared numbers of present-day carnivores competing for kills in Africa with those of mainly extinct species found in a North American fossil deposit.

#### > Tar Pits Records

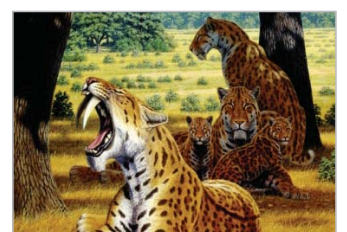
Smilodon lived in North and South America between 1.8 million and 10,000 years ago and is one of the most

common species preserved at the Rancho La Brea tar pits of Los Angeles, a fossil deposit in which dying herbivores trapped in sticky asphalt attracted numerous dire wolves and sabertooth cats, some of which also died there.

Because most living cats are solitary, controversy has persisted over the social life of Smilodon.

The study, detailed in the Oct. 30 issue of the journal Biology Letters, involved comparing data from the La Brea fossil record and data obtained from 'playbacks' used in Africa, in which the recorded calls of distressed prey and the sounds of lions and hyenas are used to attract carnivores. This technique has been used by scientists to estimate carnivore densities in eastern and southern Africa.

The playback results showed that large social species made up a far larger proportion of the animals attracted than one would expect, considering their population size compared to other carnivores. Large social carnivores were, in fact, found to attend about 60 times more often



than expected on the basis of relative abundance.

When these results were compared with the records at the tar pits, the scientists found that the proportion of Smilodon records matched the proportion of the large social carnivores in the playbacks.