

Public release date: 18-Aug-2009[[Print Article](#) | [E-mail Article](#) | [Close Window](#)][[English \(英文\)](#) | [Chinese \(中文\)](#)]

Contact: PNAS News Office

PNASnews@nas.edu

202-334-1310

[Proceedings of the National Academy of Sciences](#)

Story ideas from the Proceedings of the National Academy of Sciences

ARTICLE HIGHLIGHTS

- A universe without Dark Energy
- Inferring friendships using mobile phone data
- Indoor ozone can react with human skin
- Gene variant increases alcohol intake in macaques
- Origins of aromatic rice

ALSO OF INTEREST

- Florescent virus may help surgeons remove tumors
- Gene mutation linked with mental retardation
- Altering the balance of human drug metabolism

A universe without Dark Energy

Mathematicians have derived a set of equations that describes our ever-expanding universe using a technique that does not rely on the mysterious, hypothetical concept known as Dark Energy. The research could change the way astronomers view the composition of our universe. The Standard Model of Cosmology, which describes the evolution of the universe, begins with the Big Bang. Astronomers have observed that the galaxies are accelerating as they move away from each other, and cosmologists have rectified this anomalous acceleration by introducing the concept of Dark Energy, which permeates space, propels matter, and accounts for nearly 75 percent of the mass-energy in our universe. This explanation, however, requires introducing the speculative "cosmological constant" to Einstein's equations of general relativity. Blake Temple and Joel Smoller derived a family of expanding wave solutions of Einstein's equation, and their solutions could account for the observed anomalous acceleration of the galaxies without Dark Energy or the cosmological constant. The authors suggest that these expanding waves could emerge in time from the initial disturbance of the Big Bang and propel matter in a manner similar to Dark Energy.

Article #09-01627: "Expanding wave solutions of the Einstein equations that induce an anomalous acceleration into the standard model of cosmology," by Blake Temple and Joel Smoller

MEDIA CONTACT: Joel Smoller, Department of Mathematics, University of Michigan, Ann Arbor, MI; tel: 734-764-0325 (day), 734-764-0325 (evening); e-mail:

smoller@umich.edu

MEDIA CONTACT: Blake Temple, Department of Mathematics, University of California, Davis, Davis, CA; tel: 530-219-6704 (day), 705-769-3140 (evening); e-mail: temple@math.ucdavis.edu

Inferring friendships using mobile phone data

Collecting data from mobile phones can provide a powerful--and accurate--tool for assessing friendships and monitoring social and professional networks. Researchers have long depended on self-reporting to study interpersonal relationships, but the method can be time-consuming and unreliable. Nathan Eagle and colleagues provided 95 study participants with mobile phones enhanced with software that recorded and sent the researchers information about calls, text messages, and proximity of the phone user to the people contacted. The mobile phone data provided a significantly greater measure of information than self-reported data, the authors found. The researchers observed a measure of physical proximity and calling patterns, which allowed them to infer who a person's friends were with a 95 percent accuracy rate. The researchers also used the data to examine how socially integrated people felt at work. Having friends near to their work was correlated with a person's job satisfaction, while calling friends while at work was associated with job dissatisfaction, according to the authors, who found that these behavioral data matched the participants' self-reports of job satisfaction. Collecting data on relationships using mobile phones may provide a viable alternative to the traditional use of self-reported data, the researchers conclude.

Article #09-00282: "Inferring friendship network structure using mobile phone data," by Nathan Eagle, Alex Pentland, and David Lazer

MEDIA CONTACT: Nathan Eagle, Santa Fe Institute and Massachusetts Institute of Technology, Santa Fe, NM; tel: 505-204-6637; e-mail: nathan@mit.edu

AN IMAGE ACCOMPANYING THIS ARTICLE IS AVAILABLE

Indoor ozone can react with human skin

Oils in human skin can scavenge enough ozone from the air in a normal indoor office environment to produce chemicals that may irritate the skin and lungs, researchers have found. The result suggests that some chemicals that may be important to human health are not identified by current methods used to assess indoor air quality. Armin Wisthaler and Charles Weschler measured the chemical byproducts of ozone reacting with skin oils in the lab and in a simulated office environment. The researchers found that chemical reactions with squalene, the most common lipid and antioxidant on human skin, reduced the concentration of ozone in the office environment. A single person could decrease ozone concentrations by 10-25 percent in a small room, the researchers found. Some of the reaction products are released into the air, while others stick to skin. Many of the products can be further oxidized into compounds of potential concern to lungs and skin. Similar reactions could also occur on anything touched by people, including clothing, bedding, computer keyboards, chairs, and carpeting. Further study is necessary to evaluate the consequences of human

exposure to these previously overlooked products, according to the authors.

Article #09-04498: "Reactions of ozone with human skin lipids: sources of carbonyls, dicarbonyls, and hydroxy-carbonyls in indoor air," by Armin Wisthaler and Charles J. Weschler

MEDIA CONTACT: Charles Weschler, Exposure Division, Environmental and Occupational Health Sciences Institute, Piscataway, NJ; tel: 732-530-0961 (day), 732-856-1050 (evening); e-mail: weschlch@umdnj.edu

Gene variant increases alcohol intake in macaques

Increased stress can cause a convergence of neural signals in the brain, triggering the release of corticotropin-releasing factor (CRF). This, in turn, can initiate the release of molecules that activate the body's critical autonomic and behavioral responses to stress, encoded by the CRF gene. But too much of the CRH neurotransmitter can lead to diseases like depression, posttraumatic stress disorder, and alcohol dependence. In rats, an overactive CRF peptide system leads to higher alcohol consumption. Christina Barr and colleagues investigated whether a variation in the CRH gene would have an impact on alcohol use in adult rhesus macaques that were exposed to stress at an early age. The authors found that monkeys carrying the "T" form of the gene--a single nucleotide polymorphism promoter found in macaques--became more anxious during stress than monkeys carrying the "C" allele of the gene. The authors also showed that animals carrying the T version had higher levels of the stress gene and higher alcohol consumption than animals carrying the variant. The authors suggest that the CRH gene variants could serve as risk factors for alcohol abuse or early-onset alcoholism. Drugs that block the activity of CRH could serve as a treatment for alcohol dependence, according to the researchers.

Article #09-02863: "Functional CRH variation increases stress-induced alcohol consumption in primates," by Christina S. Barr, Rachel L. Dvoskin, Manisha Gupte, Wolfgang Sommera, Hui Suna, Melanie L. Schwandta, Stephen G. Lindella, John W. Kasckowc, Stephen J. Suomid, David Goldmanb, et al.

MEDIA CONTACT: Christina Barr, National Institute of Alcohol Abuse and Alcoholism, National Institutes of Health, Poolesville, MD; tel: 301-496-8127 (day), 301-326-7742 (evening); e-mail: cbarr@mail.nih.gov

Origins of aromatic rice

Research on the genetic origins of fragrance in rice, one of the world's largest staple crops, has uncovered previously unknown genetic variants that could enable researchers to develop fragrant rice varieties that appeal to the tastes of specific cultures. Cultivated rice is a highly diverse species with a long and complex evolutionary history. While fragrant rice varieties, like basmati and jasmine, have significant cultural value and garner considerably higher market prices than their non-fragrant counterparts, the ancestry of the gene underlying fragrance, BADH2, has been unclear. Susan McCouch and colleagues traced the genetic and geographic origins of the allele, or gene variant, of BADH2 responsible for fragrance in most rice varieties. By sequencing the gene and a large flanking region in 242 different rice

types, the researchers determined that, while the allele is present in all major varieties of rice, fragrance likely originated in Japonica, not Indica, as previously thought. The authors also found that two of the fragrant cultivars identified in their study lacked any known mutation in the BADH2 gene, implying that additional genes controlling fragrance may also exist in rice.

Article #09-04077: "The origin and evolution of fragrance in rice (*Oryza sativa* L.)," by Michael J. Kovach, Mariafe N. Calingacion, Melissa A. Fitzgerald, and Susan R. McCouch

MEDIA CONTACT: Susan McCouch, Department of Plant Breeding and Genetics, Cornell University, Ithaca, NY; tel: 607-255-0420 (day), 607-898-4960 (evening); e-mail: srm4@cornell.edu

ALSO OF INTEREST

Florescent virus may help surgeons remove tumors

An engineered fluorescent virus injected into animals can specifically label cancerous tissues and allow physicians to remove malignancies with greater surgical precision compared to existing techniques.

Article # 09-06388: "In vivo internal tumor illumination by telomerase-dependent adenoviral GFP for precise surgical navigation," by Hiroyuki Kishimoto, Ming Zhao, Katsuhiko Hayashi, Yasuo Urata, Noriaki Tanaka, Toshiyoshi Fujiwara, Sheldon Penman, and Robert M. Hoffman

MEDIA CONTACT: Robert Hoffman or Charlene Cooper, AntiCancer Inc., San Diego, CA; tel: 858-654-2555 or 619-85-2284 ; e-mail: all@anticancer.com

Gene mutation linked with mental retardation

Mutations to gene HSD17B10, which is required for normal brain development, can slow the activity of an enzyme that processes many types of steroids and steroid modulators in the human brain.

Article 09-02377: "Mental retardation linked to mutations in the HSD17B10 gene interfering with neurosteroid and isoleucine metabolism," by Song-Yu Yang, Xue-Ying He, Simon E. Olpin, Vernon R. Sutton, Joe McMenamin, Manfred Philipp, Robert B. Denman, and Mazhar Malik

MEDIA CONTACT: Song-Yu Yang, NYS Institute for Basic Research in

Developmental Disabilities, Staten Island, NY; tel: 718-494-5317; e-mail: syang@mail.csi.cuny.edu

An image accompanying this article is available

Antioxidant protects against severe malaria

A pharmacological antioxidant, N-acetylcysteine (NAC), mimics the effects of a

naturally-occurring enzyme and may be able to protect against severe malaria.

Article #09-03419: "Heme oxygenase-1 affords protection against non-cerebral forms of severe malaria," by Elsa Seixas, Raffaella Gozzelino, Ângelo Chora, Ana Ferreira, Gabriela Silva, Rasmus Larsen, Sofia Rebelo, Carmen Penido, R. Neal Smith, Antonio Coutinho, and Miguel P. Soares

MEDIA CONTACT: Miguel P. Soares, Instituto Gulbenkian de Ciência, Oeiras,

PORTUGAL; tel: +35-1-21-440-7900 (day), +35-1-91-461-0617 (evening); e-mail: mpsoares@igc.gulbenkian.pt

###

[[Print Article](#) | [E-mail Article](#) | [Close Window](#)]
[[English \(英文\)](#) | [Chinese \(中文\)](#)]

