RANDOM SAMPLES

edited by CONSTANCE HOLDEN

A Gene Is Linked to Autism

Autism is a complex and cruel puzzle. Although it is known to be largely genetic in origin, researchers have been unable to pin down its mechanisms, in part because so few people—five to 10 in 10,000—are afflicted.

One chunk of the puzzle now may be falling into place. Researchers have found what appears to be the first link between autism and a specific gene: one that regulates serotonin, a key brain chemical. A team led by child and adolescent psychiatrist Ed Cook, of the University of Chicago Medical Center, has found, from a study of 86 autistic children and their parents, that autistic children are significantly more likely to have a shortened form of the serotonin transporter gene. This gene codes for a protein that reabsorbs serotonin into the neuron that has released it; the shortened version would be expected to make more serotonin available for receptors.

Oddly, it's a shortage of brain serotonin that has long been suspected of playing a role in autism. The most powerful evidence comes from the fact that antidepressant drugs such as fluoxetine (Prozac), which increase the availability of serotonin, often suppress autism symptoms such as repetitive and ritualistic behaviors associated with aggression or anxiety.

Indeed, Cook, whose team reports on the study in the May issue of *Molecular Psychiatry*, acknowledges that the finding is "counterintuitive." Nonetheless, it is "potentially enormously important," says Yale University psychiatric geneticist Joel Gelernter. He notes that the seeming paradox may reflect only the fact that it is hard to predict the effect of such a genetic variation because, in the course of development, "a host of adaptive consequences" could alter or cancel out the original gene effect.

Cook, who cautions that his results are preliminary, says that, in any case, the short version of the gene, which occurs in 16% of the general population, would need to act in concert with others, yet unidentified, to lead to autism.

Japanese Job Fair

Anke Eberhardt, a German research chemist, has been in Japan on a 2-year program that included studying Japanese and working in a patent attorney's office. Now, she's on the lookout for a research job back home. Klaus Neubeck, a German materials scientist, has had a fellowship at the Japan Atomic Energy Research Institute for the past year. He wants to stay in Japan and move into a business career.

Despite their differing objectives, the paths of the two young scientists crossed in a conference hall in Tokyo on 17 April at a job fair for European scientists in Japan. The first-of-a-kind event gave representatives of 10 Europe-based companies—ranging from Philips, the Dutch electronics giant, to the British consulting firm Price Waterhouse—a chance to discuss career opportunities with European scientists working in Japan temporarily.

The fair, which drew 158 job seekers, was the brainchild of a group of European scientists who are current or recent job hunters. One of them, Fadel Samatey, a biophysicist at Matsushita Electric Industrial Corp., says most foreign scientists "are anxious about finding their next jobs"; they feel cut off from scientific networks back home and isolated by language and cultural barriers in Japan.

While no matches were made at the job fair, it served at least as a mixer. "Here, you definitely get a chance to talk to people about what their company is really interested in," says Neubeck. Although most of the openings at the fair were in Japan, it also gave people the chance to locate contacts in their home countries. That's useful, says Samatey, because European lab managers are often unaware of the level of research going on in Japan, and aren't especially impressed by applicants with experience there.

Samatey says his group intends to put on another job fair next year with more firms, possibly including some Japanese ones.

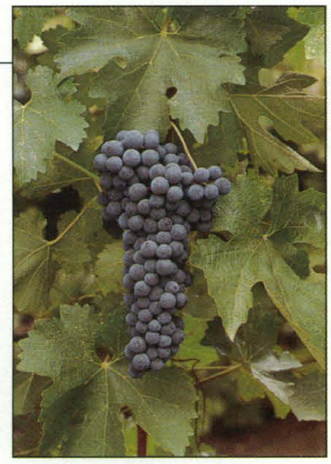
Use It Again, Uncle Sam

Recycling is catching on in the executive branch of the U.S. government. Last month, both the Department of Defense (DOD)—which consumes 65% of the government's copier paper—and the Justice Department announced that their facilities will use copy paper with 20% recycled fibers.

The announcements were tied to the 22 April Earth Day celebrations, but there is more at work here than a burgeoning green spirit among bureaucrats. Three years ago, President Clinton signed an order requiring federal agencies to set up recycling programs and purchase environmentally friendly products when economically feasible. To encourage compliance with the order, the General Services Administration (GSA)—which supplies paper to federal offices—last fall decided to subsidize recycled paper, says a GSA spokesperson. Although the GSA pays its suppliers slightly more for recycled paper, federal agencies can purchase a box of 5000 sheets for $19.94—5 cents less per box than virgin paper.

The DOD claims the switch will save 150,000 mature trees per year, as well as the water and electricity used in papermaking and landfill space for paper disposal. The Justice Department estimates that it will save 20,000 trees annually.

John Ruston of the Environmental Defense Fund in Washington, D.C., says that "Recycled paper is becoming a part of the mainstream," and the government's moves "will speed the process."



JACK KELLY CLARK

Hybrid. Cabernet Sauvignon.

Sleuthing Wine Pedigrees

Wine lovers sampling a Cabernet Sauvignon may be able to sniff out the vineyard that made it, but they haven't been able to pierce the hazy origins of one of the world's more coveted wine grapes. That was left to two geneticists, who report in the May *Nature Genetics* that they have solved the centuries-old mystery of Cabernet Sauvignon's pedigree.

Experts had thought this deep-red grape, which made Bordeaux famous in the 1800s, came not from France but from Spain, the Adriatic, or even Central Asia, and dated to the Roman Empire. But it turns out the grape has more homely roots: a relatively recent alliance between two well-known French grapes, report geneticists John Bowers and Carole Meredith from the University of California, Davis.

For the effort, the scientists looked at short strands of DNA from 30 discrete locations in the genomes of 50 grape varieties. Bowers found that all the Cabernet Sauvignon sequences were identical to sequences either in the white grape Sauvignon blanc or the red grape Cabernet franc. That shows, says Meredith, that Cabernet Sauvignon arose in France as a cross between the two.

"The genetic [data] are pretty convincing," comments Cornell

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University grape geneticist Bruce Reisch of the New York Agricultural Experiment Station in Geneva. This ancestry also would explain why Cabernet Sauvignon, when self-pollinated, sometimes produces vines with white instead of red grapes.

Bowers and Meredith are building up a database of genetic signatures for California's common grape varieties, so they can be identified through DNA fingerprinting. Such precise identification may one day be required by wine-importing countries.

DNA fingerprinting also can help wine growers. Meredith is hot on the ancestral trail of Zinfandel grapes, and is sampling grapes from Italy and Croatia. The most widely grown red grape in the United States, Zinfandel's European counterpart is unknown. Finding its parent stock would "allow us to bring some new diversity to our Zinfandel [grapes]," says Meredith.

Science and Technology Medalists

Winners of both the National Medal of Science and the National Medal of Technology were announced on 30 April.

The science medal, the nation's highest scientific honor, is administered by the National Science Foundation. One science medal winner, Princeton University astronomer emeritus Martin Schwarzschild, died on 10 April and so is being honored posthumously.

The others are:

William K. Estes, cognitive scientist and professor emeritus of psychology at Harvard University

Darleane C. Hoffman, nuclear chemist, director of the Glenn T. Seaborg Institute for Transactinium Science at the Lawrence Berkeley National Laboratory, University of California (UC), Berkeley

Harold S. Johnston, professor emeritus of chemistry at UC Berkeley

Marshall N. Rosenbluth, physicist at UC San Diego

James D. Watson, molecular biologist and president of Cold Spring Harbor Laboratory in New York

Robert A. Weinberg, cancer geneticist at the Whitehead Institute for Biomedical Research, Massachusetts Institute of Technology

George W. Wetherill, planetary dynamicist at the Carnegie Institution in Washington, D.C.

Shing-Tung Yau, mathematician at Harvard

The technology medal, administered by the Department of Commerce, goes to:

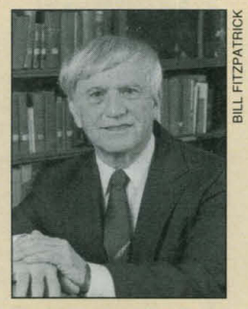
Norman R. Augustine, CEO of Lockheed Martin in Bethesda, Maryland, for "technology management" in the aerospace industry

Ray M. Dolby, founder of Dolby Laboratories Inc. in San Francisco, for inventing new sound-recording technologies

Robert S. Ledley, professor of radiology at Georgetown University Medical School in Washington, D.C., for contributions to biomedical computing.

Vinton Gray Cerf, of MCI, and **Robert E. Kahn**, president of the Corporation for National Research Initiatives, Reston, Virginia. The two are honored for developing Internet protocols.

All medalists will be recognized at a White House ceremony later this year.



BILL FITZPATRICK

Planetary medalist. Carnegie's Wetherill.

Little Lenses ...

Researchers at Sandia National Laboratory in Albuquerque, New Mexico, have found a new way to examine cells with lasers. The technique, which incorporates the cells as de facto lenses, will potentially allow scientists to do lightning-fast screening of cells—as well as monitor what goes on inside them, says the system's developer, physicist Paul Gourley.

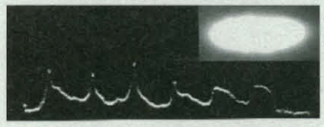
The technique is different from laser spectroscopy, in which cells reveal themselves by the ways they absorb or reflect light. In Gourley's system, cells are sandwiched between two reflective surfaces that form an "optical cavity." Here, the cells act as lenses that change the laser's output according to their shapes and refractivity.

Because the data files consist of one-dimensional light spectra and not images, they are small enough to be analyzed rapidly. In initial experiments, the system has successfully distinguished normal from sickled red blood cells (see photo), and cancerous from noncancerous cells. "It's really an innovative technology," says Princeton University physicist Robert Austin. Automated, it could potentially analyze tens of thousands of cells per second, says Gourley.

Researchers also can observe cellular activity in real time with the aid of a camera that records the effect as patterns in the laser beam, rather than as spectra. Gourley's collaborator and brother, physician Mark Gourley of Washington Hospital Center in Washington, D.C., says the system could allow scientists to watch what's going on in the nuclei of cells involved in diseases such as cancer and lupus, where programmed cell death (apoptosis) fails to take place. And, he says, because cell death can be watched in real time, rather than observed after growing a culture, the time it takes to do a toxicity assay could be reduced from "days to minutes."

Normal red blood cells

Sickled red blood cells



SANDIA NATIONAL LABORATORIES

Different wavelengths. Laser spectra produced by sickled cells are clearly different from those of normal cells.

... and a Big One

With the help of a lens consisting of warped space, scientists have found the most distant objects ever observed: a pair of galaxies at the edge of the known universe. They are so far off that their light began its journey to Earth as much as 12 billion years ago, when the universe was just 7% of its present age.

A team led by Marijn Franx of the Kapteyn Astronomical Institute in Groningen, the Netherlands, was looking at a cluster of galaxies with the Hubble Space Telescope when a prominent red arc caught the team members' attention. Such arcs are the handiwork of gravitational lenses, distortions in the fabric of space produced by the gravity of a massive group of galaxies, which can enlarge and deform the image of a more distant, individual galaxy. Usually, the arcs are blue, the color of hot young stars found in early galaxies. The cooler red color of this arc suggested to the astronomers that the lensed galaxy was so far away that its light had been drastically stretched and reddened by the universe's expansion.

To check their suspicion, Franx and his colleagues used the 10-meter Keck telescope in Hawaii to measure how much the galaxy's light had been shifted toward the red end of the spectrum. It turned out to have a redshift of 4.92. That could put it more than 12 billion light-years away, further than astronomy's current distance champion, a quasar (an object probably powered by a giant black hole) at a redshift of 4.89. "Hooray!" exults Mark Dickinson of Johns Hopkins University. "Galaxies are leading over quasars in the cosmic horserace for the first time in 20-some years!" The observations have been submitted for publication in *Astrophysical Journal Letters*.

Franx says the fact that this galaxy, and a companion, were discovered by accident suggests there may be "many more ... at even greater distances" for scientists to hunt down.