

## A Greek god explains anemic mice

Scientists seeking to understand anemia caused by iron deficiency have netted a gene involved in transporting the metal into the bloodstream. The protein that the gene encodes is named hephaestin, after the Greek god Hephaestus, who wove an iron net to capture Ares and Aphrodite.

Two lines of inquiry converged on the gene, whose discovery may also help explain observations dating back to the 1920s that a lack of copper leads to iron deficiency in the body. One line was the search for the mutation that gives a strain of mice an unusual form of anemia. The animals can't use the iron available in their food to make the blood's hemoglobin molecules.

"If you give them oral iron, they don't get better. But if you give them iron intravenously or through other means that bypass the gut, they do fine," says Christopher D. Vulpe of the University of California, Berkeley.

Studies of the mice have revealed iron sitting uselessly in cells lining the intestine. Those observations suggested that the mice had no problem extracting iron from their diet but couldn't transfer the metal from intestinal cells into their circulatory systems.

As they studied the mice, Vulpe and his colleagues were also looking for relatives of the gene for ceruloplasmin, a copper-containing enzyme that participates in iron transport in organs other than the intestines, such as the liver. When they identified such a gene, they discovered that it was the same one found to be mutated in their anemic mice, the scientists report in the February *NATURE GENETICS*.

The investigators found that the hephaestin gene is active only in gut tissue, the right location to explain the animals' defect in iron transport from the intestines.

Since hephaestin is a relative of ceruloplasmin, it also likely employs copper. This may explain how copper deficiency can lead to anemia. The interplay between copper and iron in human metabolism has never been understood, says Vulpe. "This protein provides a connection. It needs copper to function. So, without copper, iron can't get out of the gut," he says.

Ceruloplasmin and hephaestin may facilitate iron transport by altering chemical properties of the metal, although that remains unproved. In the past few years, scientists have found several other genes involved in iron transport. When mutated, some prevent iron's absorption by the gut (SN: 8/2/97, p. 68). Others cause hemochromatosis, a surprisingly common condition in which too much iron enters the blood (SN: 1/18/97, p. 46). The role of the gene mutated in hemochromatosis is still unknown. Vulpe speculates that it increases hephaestin activity, leading to extra iron transport into blood. —J.T.

## Drugs tackle cancer in unexpected way

A promising class of cancer drugs under development may work through a mechanism far different from the one researchers had initially envisioned. Known as farnesyltransferase inhibitors, the drugs thwart an enzyme that was thought to stimulate cell growth by working with mutant forms of a protein called Ras. Mutant Ras proteins appear in many cancers, which is why the inhibitors have stirred so much excitement (SN: 5/3/97, p. 274).

In the March *MOLECULAR AND CELLULAR BIOLOGY*, however, scientists present evidence suggesting that farnesyltransferase inhibitors check tumor growth by their effects on a protein called RhoB. By preventing farnesyltransferase from modifying RhoB, the drugs allow cells to convert it into a form that somehow limits cell growth, say George C. Prendergast of the Wistar Institute in Philadelphia and his colleagues. The scientists checked this hypothesis by forcing cancer cells to overproduce the growth-limiting form of RhoB. The tumor cells returned to normal, exactly as if they had been treated with farnesyltransferase inhibitors. Understanding the drugs' interactions with RhoB rather than Ras may lead to improved versions, conclude the scientists. —J.T.

## A call for more college science and math

Most Americans are not prepared for the ever-expanding role of science and technology in their daily lives, charges Marye Anne Fox, chancellor of North Carolina State University in Raleigh. Yet the majority of college students take no more than a year of science, math, or engineering. Plenty of students sign up for none of these courses in college, having fulfilled their requirements with classes in high school, notes Fox.

After surveying the situation and its ramifications, a National Research Council expert panel chaired by Fox concludes that colleges need to beef up undergraduate requirements in the scientific and technical fields and mandate that such courses be taken during college.

Too often, the NRC analysis found, students with nontechnical majors lack access to the best science and tech teachers, equipment, and experiences. For colleges to encourage lifelong learning and people's ability to evaluate research findings, nonscience majors need "high-quality, laboratory-rich experiences," the report maintains.

Classes should foster supervised research lasting a minimum of one academic term for as many students as possible, regardless of their career goals, argues the panel.

Finally, the report asks colleges to regularly assess how effectively they're teaching science and technology in light of their ultimate goal: to give all individuals the skills to make technically competent decisions about their health, communities, and economic lives. —J.R.

## Whistle-blower wins back safety job

Four and a half years after Steven W. Jones was fired for reporting safety violations at the nation's first full-scale chemical-weapons incinerator (SN: 12/10/94, p. 394), the whistle-blower will be allowed to resume his post as chief safety officer there. Jones had been dismissed after only 4 months on the job by the contractor that manages the facility, which is inside the Tooele (Utah) Army Depot.

On March 24, a pair of judges of the Court of Appeals for the 10th U.S. Circuit ruled that the contractor had no justification for contesting earlier rulings ordering that Jones be rehired.

Both an administrative law judge and a Department of Labor review board had found insufficient grounds for Jones' dismissal. The Labor Department then ordered EG&G Defense Materials to rehire Jones and give him back pay and \$50,000 in compensatory damages.

The plant was under construction when Jones was fired. His claims that it was vulnerable to leaks of deadly nerve and mustard agents proved accurate. Within the first month of operation, it was shut down twice for leaks to be repaired (SN: 10/5/96, p. 218). —J.R.

## Court puts Yellowstone deal on hold

A federal judge has suspended an unprecedented contract between Yellowstone National Park and a biotechnology firm.

Two years ago, the park had agreed to give Diversa Corp. of San Diego the right to collect water and soil samples for research into extremophiles, microorganisms that thrive in harsh environments. In return for this bioprospecting right, Diversa would pay Yellowstone \$175,000 over 5 years and share up to 10 percent of the profits from any products—such as heat-resistant enzymes—that resulted from the research.

Last year, public-interest groups filed a suit against the Department of the Interior and the National Park Service alleging that the agreement was a hasty, backdoor deal (SN: 5/9/98, p. 297). On March 24, Judge Royce C. Lamberth of the U.S. District Court in the District of Columbia agreed, ruling that the park service must study the environmental impact of the contract since it represents "a dramatic change" from normal policy. —C.W.