

Bush. It also contains several hundred million dollars for improving science and math teaching as part of a successor to the Education Department's Eisenhower program.

A report accompanying the bill urges NIH to move ahead quickly to fund controversial research on human stem cells derived from embryos and adults. In doing so, it sidesteps a potentially bruising fight over existing language that instructs NIH not to fund research involving the destruction of human embryos by explaining that it does not conflict with recent White House rules restricting federally funded researchers to using stem cell lines created before 9 August (*Science*, 17 August, p. 1242). "The language and logic are tortured, but the message is clear: Get on with stem cell research," says one aide to a House Democrat.

Panel members also rejected a White House effort to trim CDC by adding more than \$380 million to the Administration's request. That amount would boost CDC's budget by 5.5%, to \$4 billion. In particular, lawmakers restored nearly \$150 million to the CDC's health promotion budget, which sponsors education and advertising campaigns aimed at preventing disease.

The panel also added \$50 million to a small increase requested by the White House for antibioterrorism programs within the Department of Health and Human Services, for an overall 25% boost to \$300 million. Associated research and public preparedness efforts are expected to get more funds from the \$40 billion emergency spending package that Congress approved in the wake of the 11 September terrorist attacks.

The full House is expected to sign its version of the NIH spending bill within a few weeks, shifting attention to the Senate. Biomedical researchers were hoping for even better news as early as this week from the Senate spending panel that oversees NIH, because its leaders, Senators Tom Harkin (D-IA) and Arlen Specter (R-PA), have already promised a \$3.4 billion increase. Differences between the House and Senate bills will be worked out by negotiators from each body, perhaps before the end of the month.

—DAVID MALAKOFF

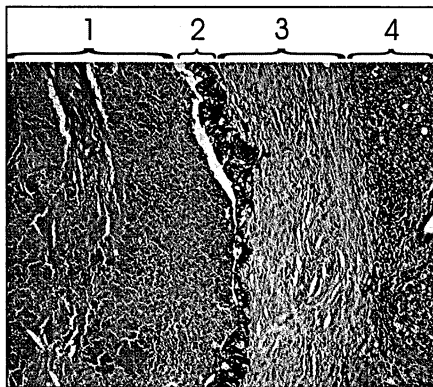
CANCER RESEARCH

New Insights Into Metastasis

The metastatic cell is a tumor's stealth invader: able to slip into foreign territory, set up a beachhead, and grow until it kills. Indeed, it's the metastases, not the primary cancer, that usually defeat oncologists' efforts to cure their patients. Results published online today by *Science* (www.sciencexpress.org) now

pinpoint a genetic change that may help colon cancer cells metastasize to the liver—information that could help researchers develop drugs to stanch the invasion.

The work, which comes from Kenneth Kinzler, Bert Vogelstein, and their colleagues at the Johns Hopkins Medical Institutions in Baltimore, Maryland, shows that a tyrosine



Mixed bag. In addition to living cancer cells (2), this liver metastasis contains dead and dying cancer cells (1) and a capsule of connective tissue (3), all surrounded by liver and inflammatory cells (4).

phosphatase enzyme called PRL-3 is expressed at higher levels in colon cancer cells that have metastasized to the liver than in nonmetastatic colon tumors and normal colon epithelial cells. In at least some cases, this was because of a genetic change, an amplification of the *PRL-3* gene. The finding suggests that an excess of the enzyme, which may normally help control cellular activities, somehow fosters the spread of colon cancer to the liver, its principal site of metastasis.

Although the Johns Hopkins workers do not yet know how *PRL-3* might spur colon cancer metastasis, other researchers are already enthusiastic. They note that although many gene changes have been tied to the early stages of cancer development, few have been linked to metastasis. There's "still remarkably little known about the molecular genetics and signaling pathways responsible for metastasis ... and that's the most lethal aspect of cancer," says Jeffrey Trent of the National Human Genome Research Institute in Bethesda, Maryland. The *PRL-3* discovery may provide an entrée to tracing one of those pathways, Trent and others say.

"Very exciting," is how cancer biologist Lance Liotta of the National Cancer Institute, also in Bethesda, describes the finding. Not only could the enzyme provide a good target for chemotherapeutic drugs, but it may also provide a molecular marker to help clinicians assess tumor aggressiveness.

The Johns Hopkins team looked for the molecular changes underlying colon cancer metastasis by using a technique called serial

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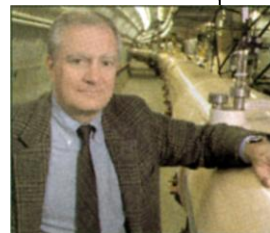
EPA Science Bill Moving A plan to beef up science at the Environmental Protection Agency (EPA) is wending its way through Congress. Last week, the House Science Committee approved HR 64, which would direct the agency to appoint a new deputy administrator for science and technology to oversee all EPA research (*Science*, 21 July 2000, p. 371). The bill would also extend to 5 years the term of the assistant administrator of EPA's Office of Research and Development. (The term is currently undefined.)

The bill's sponsor, Representative Vernon Ehlers (R-MI), hopes for a vote on the House floor before Congress recesses this fall. Eventually he wants to merge his proposal with a companion Senate bill sponsored by Senator George V. Voinovich (R-OH). EPA has not yet officially weighed in on the legislation, but agency officials have reportedly expressed some concerns. Ehlers says he doesn't see that as an obstacle, because he is hearing "favorable signals from the White House."

Is Proximity Power? Physicist John Marburger (right), President George W. Bush's pick to be his science adviser and head of the White House Office of Science and Technology Policy (OSTP), had an easy confirmation hearing this week before a Senate committee. And science lobbyists predict that his nomination will sail through the full Senate by the end of the month. But once officially in place, Marburger may find his office arrangements in flux.

The Secret Service last week confirmed that, due to security concerns, OSTP staff have been moved out of their longtime offices in the Old Executive Office Building next to the White House and into offices outside the White House fence a few blocks away. The ouster apparently is part of a plan to make workers less vulnerable to truck bombs.

Marburger will reportedly retain a workspace near the corridors of power and told senators that he will have access to the president. But lower level OSTP staffers have heard that their transfer could be permanent. The separation, says one former OSTP staffer, will make it harder for science policy advocates to "cultivate the kind of water-cooler contacts that can make a big difference in getting your voice heard in policy debates."



"disturbing regularity," the report states, migrant laborers who frequent sex workers take HIV back to their home states.

Chris Beyrer, an epidemiologist at Johns Hopkins University who specializes in the spread of HIV in Asia, says he applauds the MAP report for emphasizing the connection between injection drug use and sexual risk groups. "They've got it exactly right," says Beyrer, who in 1998 published *War in the Blood: Sex, Politics, and AIDS in Southeast Asia*.

The news, however, isn't all bad. "The MAP network doesn't want to be alarmist ... we see a window of opportunity," says Stanecski. The MAP report emphasizes, for example, that Thailand has used aggressive condom campaigns and education of high-risk groups to curb an epidemic that could have been much worse. According to MAP modelers, if Thailand had not intervened, 10% to 15% of its adult population might now be infected; the actual prevalence is 1% to 2%. That shows what can be accomplished—if the warning signals are heeded.

—JON COHEN

MAGNETORECEPTION

Animal Magnetism Guides Migration

Animals are the ultimate commuters. From butterflies to newts, many creatures roam the neighborhood—or globe—and still manage to find their way home. In this issue, two studies reveal how sea turtles and mole rats tap a basic navigational tool: Earth's magnetic field.

Loggerhead sea turtles migrate around the North Atlantic, encountering different

magnetic fields en route. A team led by marine biologist Kenneth Lohmann of the University of North Carolina (UNC), Chapel Hill, reports on page 364 that the turtles detect these fields, like boundaries, and use them to stay on course. The study suggests a strategy that may guide one of nature's longest migrations.

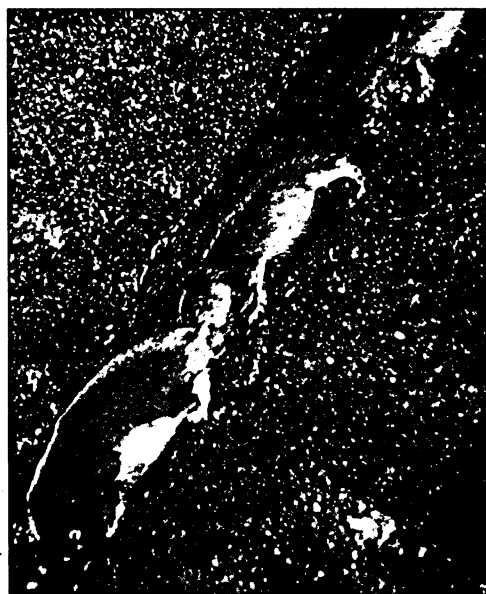
And on page 366, a team led by neuroanatomist Pavel Némec of Charles University in Prague identifies for the first time an area of the mammalian brain that apparently processes magnetic field information. "This opens up a whole new area of research in magnetic sense," says biologist Michael Walker of the University of Auckland in New Zealand.

Earth's churning liquid core casts a magnetic field across the planet's surface. Birds, fish, crustaceans, and a host of other animals appear to use regional variations in the magnetic field, along with sensory cues such as sight and sound, to navigate. "We're faced with all these animals who go from place to place, sometimes over thousands of miles, with remarkable precision," says marine biologist Michael Salmon of Florida Atlantic University in Boca Raton. "But very few people have been able to figure out just how they do it."

Lohmann and his spouse, UNC biologist Catherine Lohmann, study loggerhead sea turtles that hatch on the eastern coast of Florida and immediately crawl into the moonlit ocean. The hatchlings head into the North Atlantic gyre: a circular ocean current that flows clockwise around the Sargasso Sea. Loggerheads loop the gyre, heading northeast toward Europe and then south, spending 5 to 10 years in the gyre's warm, rich waters before heading back to the North American coast.

In previous lab experiments, the Lohmanns and their colleagues found that loggerheads can sense magnetic field intensity and inclination angle. In the new study, they posed a broader question: Do the turtles use the regional magnetic fields they encounter to stay on their migratory path?

To find out, the researchers collected 79 hatchlings. Each hatchling was fitted with a tiny bathing suit, tethered to a computer-linked tracking system, and placed in a shallow lab tank. Outside the tank, a



Charging along. The Zambian mole rat reportedly taps the magnetic field to position nests (above), while some loggerhead sea turtles use it to navigate the North Atlantic (right).



ScienceScope

Patent Challenge Grows The battle against a European patent for a breast cancer test went continent-wide this week. As *Science* went to press, researchers and clinicians from six European countries were poised to file formal opposition to a patent awarded last January to Myriad Genetics of Salt Lake City, Utah. It covers a test that detects mutations in the *BRCA1* gene that researchers believe are responsible for more than half of all hereditary breast cancers. Opponents say the patent gives Myriad an unfair monopoly on breast cancer testing.

The Institut Curie in Paris had already announced that it would oppose the patent (*Science*, 14 September, p. 1971). Now weighing in are human and medical genetics societies from five other European countries: Belgium, Denmark, Germany, the Netherlands, and the United Kingdom. In addition, on 4 October the European Parliament adopted a resolution opposing the patent.

Patent opponents, says human geneticist Gert Matthijs of the University of Leuven in Belgium, want to "make sure ... that the social medicine we practice [in Europe] does not become exceedingly expensive because of patent rights." Myriad officials predict that their patent will stand.

Howling at Earmarks Critics and supporters of congressional pork-barrel spending on academic science projects found little common ground at a 1-day workshop on the issue in Washington, D.C., last week. Lawmakers last year "earmarked" a record \$1.7 billion to universities for buildings and research projects that had not been requested by the White House. The meeting was held in the wake of a White House effort to persuade university and science groups to publicly oppose such practices (*Science*, 28 September, p. 2364).

Critics, including House Science Committee aide Dan Pearson, said that earmarking leads to taxpayer funding for questionable science. But one prominent ex-earmarker, former Louisiana Senator J. Bennett Johnston—now a lobbyist—noted that earmarks account for just a few percent of the government's \$43 billion civilian R&D budget. He advised earmarking opponents to "put your efforts elsewhere, because you are not going to win." He also accused some universities of hypocrisy, publicly decrying earmarks but privately hiring lobbyists—such as himself—to win cash from Congress. Some schools, he charged, "want to bark with the dogs and howl with the coons."

ing soil moisture and temperature from space. Although BARC has a small emergency fund, the money needed to recover from the tornado must come from Congress, now completing work on the agriculture department's 2002 budget. —ROBERT KOENIG

SCIENTIFIC PRIZES

Researchers Accept Not-So-Nobel Awards

BOSTON—While eminent scientists were heading to Sweden to accept their coveted awards (see p. 288), lesser known colleagues were celebrating a very different honor: the Ig Nobel Prize. For boldly tackling research topics such as why shower curtains billow inward, a select group from six countries and four continents was inducted into the scientific pantheon of ignominy at a raucous 4 October ceremony at Harvard University.

Four genuine Nobel laureates were on hand to present the awards—in the form of a plaque framed by a cell phone and two cans connected by string. The 11th annual send-up of the more staid Stockholm event featured a brief opera as well as what organizer Marc Abrahams described as “the world’s most scientific wedding ceremony.” Senior researchers also were invited to describe their field in 24 seconds and then in seven words. For her discipline, Smith College professor Dany Adams summarized: “If it can get infected, it’s biology.” Among the so-called winners:

Medicine. Peter Barss of Montreal’s McGill University for his report on injuries due to falling coconuts. Barss explained that his Papua New Guinea research concluded that the worst injuries occur to individuals asleep beneath coconut trees.

Physics. David Schmidt of the University of Massachusetts, Amherst, for his work on why shower curtains billow inward. He told the audience that the value of such research, for which he received no outside support, lies in its immediacy to anyone who showers.

Biology. Inventor Buck Weimer of Pueblo, Colorado, for Under-Ease, airtight underwear that includes a replaceable charcoal filter to remove gases. He presented samples to the wedding couple and the Nobel laureates.

Economics. Joel Slemrod of the University of Michigan Business School in Ann Arbor and Wojciech Kopczuk of the University of British Columbia in Vancouver, for their research on the way estate taxes influence a person’s time of death. Their work, said Slemrod, proves that “the pursuit of science, even social science, can be fun.”

Psychology. Lawrence Sherman of Miami University of Ohio for his ecological study of glee in small groups of preschool children. Sherman noted that the paper published in *Child Development* in 1975 has garnered 120 citations. “And it’s better to be used than not used at all,” he added.

Astrophysics. MIT physicist Walter Lewin accepted the award on behalf of Michigan evangelists Jack and Rexella Van Impe, for their discovery that black holes fit all the technical characteristics of hell. Lewin demurred, however, noting that for astrophysicists, “black holes are heaven.”

Technology. John Keogh of Hawthorn, Australia, for his successful patenting of

the wheel in that country earlier this year. By audiotape, Keogh explained that he wanted to expose the absurdity of Australia’s patent system; his patent indeed won worldwide attention.

The event, presided over by the king and queen of Swedish meatballs, included a win-a-date-with-a-Nobel contest; the lucky winner gets to go out with Harvard chemist Dudley Herschbach, described as enjoying “collision theory and football.” The ceremony concluded with the 60-second no-nonsense wedding of Lisa Danielson and Will Stefanov, two geologists from Arizona State University in Tempe. Abrahams, who edits the *Annals of Improbable Research*, then thanked participants, noting that “if you didn’t win an Ig Nobel prize tonight—and especially if you did—better luck next year.”

—ANDREW LAWLER



The Un Laurel. Harvard chemist and Nobelist Dudley Herschbach displays an Ig Nobel Prize before awarding it at last week’s ceremony.

ScienceScope

Science Posts The White House is said to be close to naming nominees for top posts at two federal science agencies. Veterinarian and pharmacologist Lester Crawford is rumored to be in line to head the Food and Drug Administration (FDA). Crawford has held posts at FDA and the U.S. Department of Agriculture and currently runs a food policy center at Virginia Polytechnic Institute and State University in Blacksburg. His nomination may draw opposition from some consumer activists because his center has received funding from industry groups.

Less controversial is the apparent pick to head the Office of Research and Development (ORD) at the Environmental Protection Agency. Paul Gilman, now policy director at Celera Genomics in Rockville, Maryland, is an ecologist and evolutionary biologist by training whose career path includes a stint as an aide to Senator Pete Domenici (R-NM) and posts at the Department of Energy, the White House Office of Management and Budget, and the National Academy of Sciences. With that wealth of experience, Gilman would make “an excellent choice,” says Robert Huggett, a former ORD head who is now vice president for research at Michigan State University in East Lansing.

Conflict Crackdown Leaders of the top U.S. research universities have recommended some tough new rules for managing conflicts of interest. Noting that academia is facing a “substantial” risk of seeing its integrity questioned due to entanglements with industry, the Association of American Universities (AAU) on 9 October called on its 63 members to require researchers to make financial disclosures that go far beyond current legal requirements.

An AAU task force, co-chaired by presidents Steven Sample of the University of Southern California in Los Angeles and L. Dennis Smith of the University of Nebraska, Lincoln, says that all members of the faculty doing research—not just biomedical scientists—should disclose to university managers any financial holdings that could be “related” to their studies. Academics should also open their books to journal editors, the panel says, while the “publications should print this information so that it can become available to the public.” At medical centers, the AAU says that the Institutional Review Boards that approve human subjects research should have authority to “prohibit the research” if a conflict is not properly managed.

Contributors: Jocelyn Kaiser, David Malakoff, Michael Balter