causing all the wrong-answer strands to fold over and form hairpins. The researchers then either cut all the hairpins with a single dose of enzyme, or used a standard technique for copying DNA to reproduce just the remaining unfolded strands, which represented the right answer.

The new method obviates several laboratory procedures by exploiting DNA's knack for forming complicated structures, says team member Masami Hagiya, a computer scientist from the University of Tokyo. But the researchers pay a price to avoid the extra chemistry, Smith says. The logic problem reduces to finding one correct solution out of the 64 possible combinations of six statements and their opposites. In restating the problem so that wrong answer strings all have contradictory literals, however, the researchers make it much larger. As a consequence they wade through thousands of redundant wrong answers. The new technique also lets through many more wrong solutions, notes Laura Landweber, a biologist at Princeton University, in Princeton, New Jersey. "I remain intrigued but skeptical," she says, "until they can reduce the large proportion of errors."

–ADRIAN CHO

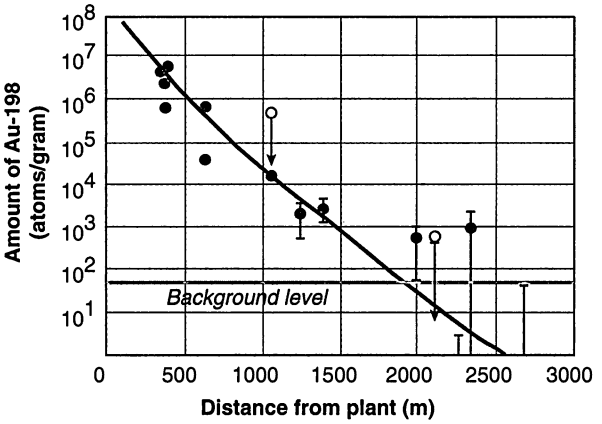
JAPAN

Exposure Levels Tracked Around Nuclear Accident

TOKYO—When workers at a nuclear fuel processing plant inadvertently set off a nuclear chain reaction last fall, more than 6 hours passed before the Japanese government set up radiation monitoring equipment at the scene. The time lag left a critical gap in the record of the amounts and types of radiation released in the accident 110 kilometers northeast of the capital (*Science*, 8 October 1999, p. 207).

That gap has now been filled by a group of Japanese university researchers, whose results appear this week in a special issue of the *Journal of Environmental Radioactivity* (vol. 50, no. 1-2, May 2000). In 21 reports, the team has reconstructed the aftermath of the accident by collecting over 400 samples of irradiated table salt, sugar, stainless steel cutlery, coins, and gold and silver jewelry. This approach, although not new, builds on the cooperation of company officials to offer the most detailed picture ever of the spread of radiation from a nuclear accident.

Ohtsura Niwa, director of Kyoto University's Radiation Biology Center, says the results are particularly important given ongoing controversies over the effects of neutron radiation, the primary type of radiation in the Tokaimura accident. Previous studies have yielded inconsistent results on the relation between distance from the source and radiation dose, and the possible health effects of exposure to neutron radiation. These questions make "this kind of study very necessary," he says.



Golden records. Gold isotopes in household jewelry help scientists measure radiation exposure around the accident site.

The 30 September incident at a nuclear fuel processing facility in Tokaimura was Japan's worst-ever nuclear-related accident. Dozens of residents close to the plant were evacuated, and hundreds of people in the surrounding area were warned to stay indoors for 18 hours after the event. Two employees of the Tokyo-based JCO Company Ltd., the plant operator, eventually died from complications arising from high radiation doses. Kazuhisa Komura, who heads the university group and is director of the Low Level Radioactivity Laboratory at Kanazawa University, says the study provides an independent check of the official governmental investigation and extends its scope.

The researchers use the fact that neutron radiation makes many substances, particularly metals, radioactive. Gold, for example, captures neutrons to produce the isotope Au-198, in proportion to the amount of radiation (see graph). After examining household items loaned by area residents, the group concludes that the level of accumulated radiation at the edge of the JCO property was about 100 millisieverts. A sievert is a measure of the total radioactive dose, factoring in each type of radiation and its energy. Normal background radiation results in an annual dose of about 1 millisievert, and doses of more than 5 sieverts have typically been fatal. The stricken workers suffered dosages of 17 and 10 sieverts, and 50 other people received up to 100 millisieverts.

Dose levels outside the plant were much lower, and the health implications for the general public are likely to be negligible, Komura says. Another group studying the biological effects of low-level neutron radiation has yet to publish its results.

The journal reports are consistent with previously released government studies, which stopped at the site boundaries. However, the university researchers also plan to study the level of radiation to buildings and other objects beyond the accident site in hope of understanding the shielding effect of various materials, natural and human-made. The results, says Murdoch Baxter, editor for the special edition of the journal and a former official with the International Atomic Energy Agency in Vienna, could even help scientists looking back at the atomic bombings of Hiroshima and Nagasaki.

–DENNIS NORMILE

JOURNAL PUBLISHING

Harvard Researcher Named *NEJM* Editor

The New England Journal of Medicine (NEJM) has a new editor, its third in less than a year. Jeffrey Drazen, 53, a Harvard asthma researcher and associate chief for research in the Pulmonary Division at Boston's Children's Hospital, takes on the challenge of trying to set the 188-year-old journal on a smooth course following a year of controversy about both its internal policies and its outside activities.

Last summer, conflict over the journal's commercial activities led to the sacking of Editor-in-Chief Jerome Kassirer (*Science*, 30 July 1999, p. 648). Then early this year, *NEJM* confessed to violating its own conflict-of-interest policies (*Science*, 3 March, p. 1573). In its 24 February issue, the journal listed 19 papers in which one or more authors had accepted money from drug companies. Drazen was one of them: He co-

Hot spot. Pulmonary scientist Jeffrey Drazen becomes the third *NEJM* editor in 10 months.

CREDITS: (TOP TO BOTTOM) KOMURA *ET AL.*, *JER*, 50, 3 (2000); AP PHOTO/J. MALAKIE

authored a paper, "Treatment of asthma with drugs modifying the leukotriene pathway," in which he named eight companies that he had advised and from which he had received research funds.

Asked how he would deal with matters involving potential conflicts of interest, Drazen said that he plans to be "as lily-white as possible," keeping hands off all papers or editorials involving any company that he has had recent ties with. "What I'm planning to do is review each of the companies with whom I've worked and start a 2-year clock at my last interaction with them." He says that policy could be reexamined in the future.

Drazen also says he's confident that he'll be able to run the *NEJM* as he sees fit. His predecessor was forced out after disagreements with the owners, the Massachusetts Medical Society, over the use of the journal's name and logo on other products. Marcia Angell, the magazine's longtime executive editor, who has been filling in since Kassirer's departure, says she declined to seek the job on a permanent basis after society officials refused to guarantee her control over the use of the journal's name as well as its content. Although the society says Drazen will have "complete authority" over both elements, Kassirer says he puts no stock in that pledge, because he had been given the same assurances at the start of his 8-year tenure. Angell is not quite so cynical, calling the society's statement "extremely encouraging."

As editor, Drazen says that he hopes to make the journal more accessible to practicing physicians by shortening the articles and highlighting the practical use of findings. He also wants to upgrade the journal's online content—an electronic copy of the print version—which he calls "pretty 1995."

–CONSTANCE HOLDEN

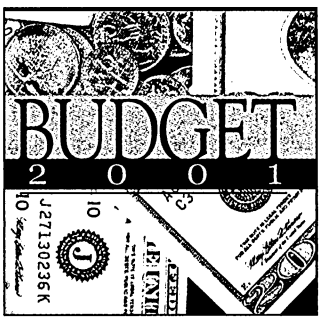
2001 BUDGET

NIH Headed for Big Boost, Others Struggle

For R&D advocates, it's a case of the good, the bad, and the ugly. The National Institutes of Health (NIH) was an early, big winner as Congress last week began the long and bitter fight over funding for the 2001 fiscal year, which starts on 1 October. Military research also got off to a strong start. But the outlook is not so rosy for two other key agencies, NASA and the National Science Foundation (NSF), which in the short run can expect only a fraction of their requested increases.

Yet the ugly truth is that the ultimate decisions on the 2001 budget almost certainly won't be made until this fall, at closed-door meetings between Administration and congressional leaders. Those meetings will pit the president's ambitious list of new initiatives, from nanotechnology to education, against a pledge by Republican lawmakers to hold the line on government spending. "The numbers that we see now have no bearing on the final outcome," says one bemused science agency official. "The whole situation has an unreal quality to it."

The uncertainty, however, has worried research advocates and added urgency to their efforts. The problem, they say, is that while a newly estimated $40 billion budget surplus for next year should provide enough money for everyone, the House and Senate panels that appropriate funds are laboring under tough constraints imposed by the GOP leadership. Most of those panels have received about the same or even less funding than last year. And it is those levels, and unpredictable election-year politics, that are shaping the bills now moving through Congress. Research supporters fear that science spending could suffer from the squeeze. On 1 May a bipartisan group of lawmakers led by Senators Joe Lieberman (D–CT) and Bill Frist (R–TN) wrote to colleagues about their "responsibility to ensure our nation's continued prosperity through investment and research." The letter urged members to back increased R&D funding across all disciplines. The senators also praised a 22 March letter from a high-powered group of technology executives to Senate Majority Leader Trent Lott (R–MS) urging greater federal R&D funding for the sake of economic competitiveness.



Those urgings are hardly needed in the case of NIH. The Senate Appropriations Committee last week recommended a whopping $2.7 billion boost to its $17.8 billion 2000 level—$1.7 billion more than Clinton requested for 2001 and the third straight 15% hike. The House subcommittee took a more modest approach, providing only the president's request for a 6% boost to $18.8 billion. Even so, aides to Representative John Porter (R–IL), who chairs the House panel, say he is still determined to match the Senate level and keep NIH on track for a doubled budget by 2003.

Both panels, however, ignored many of the president's priorities in other programs covered by the bill. For example, they made significant cuts to education, health care, and job training programs. As a result, Clinton immediately vowed to veto the bill unless those programs received additional funds.

The House subcommittee that handles the budgets for NASA and NSF, chaired by Representative James Walsh (R–NY), is slated to make its recommendations on 23 May, and the advance news is not good. House aides say that NSF will have to make do with a hike of approximately $150 million. That translates into less than a 4% increase for the $3.9 billion agency, a far cry from the 17% boost the Administration requested. NSF Director Rita Colwell argues that the requested increase is needed to ensure the health of the core disciplines at the same time the country invests in such hot new areas as nanotechnology, information technology, and biocomplexity.

NASA would fare even worse. The House subcommittee is expected to approve a boost in the neighborhood of $100 million for the entire $13.6 billion agency—about one-quarter of the increase the president requested. Most of the additional funding likely would go toward salaries and a space launch initiative, rather than to the series of proposed new space science initiatives, such as one to study the sun using multiple spacecraft. The House is not opposed to the president's request, explains one staffer. But simple arithmetic ties its hands.

"The Administration went hog wild" in its budget request, he says, seeking more than $85 billion for all the agencies funded by Walsh's panel. The subcommittee has been allotted only $76.9 billion—slightly less than last year. Given that situation, any increase is a victory for science, say congressional aides. "They are not going to get the Administration's request," says the staffer adamantly.

Even so, committee members are clearly frustrated with their piece of the funding pie. Walsh's panel intends to write a bill containing no earmarks, or pork-barrel projects, say sources close to the committee. "It would be hard to take the bill to the floor with a straight face" if the legislation slashes programs while adding $200 million in NASA earmarks, says one aide about what would be an unprecedented step. However, resistance may prove futile: The panel has already received more than 2000 specific requests for pork-barrel spending by members of Congress, and election-year pressure is likely to drive that number higher.

Meanwhile, defense appropriators in the House have added to the president's requested increase for research, development, testing, and evaluation in a bill whose levels are not yet public. And both the House and Senate Armed Services panels, responsible for authorizing military spending, proposed boosts of $1.4 billion, lifting military R&D accounts by 3.7% over the president's 2001 request and by 2.6% over this year's level. –ANDREW LAWLER