loid at Stanford University Medical Center. Once there, he says, it's easy to see how they could block amyloid molecules from sticking together in plaques. "If the amyloid protein is bound to an antibody, there is no way it can form these aggregations," he says. What's more, Sisodia notes that recent studies in mice showed that when amyloid deposition is halted by killing neurons that secrete Aβ, existing deposits diminish over time. "The idea that you can ... get rid of [amyloid] is not inconceivable," he says. Researchers agree they'd like to see the immunization results repeated. They may not have long to wait, as at least one other group is rumored to have similar results.

But will the approach work in humans? Mice aren't a perfect mirror of human physiology, Steinman notes. In particular, he worries whether in humans "there is enough of a breach of the blood-brain barrier to allow this to happen." And St. George-Hyslop cautions that the protein precursor to Aβ is found in many cell types, so immunization might induce a harmful autoimmune response in nonbrain tissues.

Allaying concerns about autoimmune reactions may require further animal testing. But by the end of the year, Elan hopes to start clinical trials of the therapy on Alzheimer's patients. Those trials could yield a verdict not only on this therapeutic approach but also on the importance of plaque in Alzheimer's disease. "The bottom line of this all," says St. George-Hyslop, is that "we will know quite clearly what the true role of extracellular Aβ is in Alzheimer's disease. We will either get a brilliant treatment, or we will get some powerful insights that modify how we think about the disease." **–MARCIA BARINAGA**

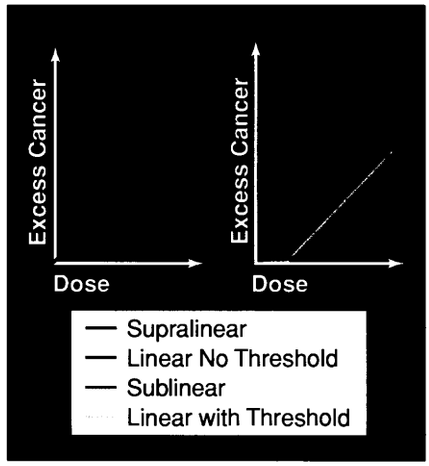
SCIENCE POLICY

NRC Pulled Into Radiation Risk Brawl

A festering feud over possible health risks of low radiation levels has blistered into public view. But instead of assailing each other, two bitter foes are unloading on the National Research Council (NRC) for assembling what they claim is a biased panel to weigh radiation risks. In response, the NRC last month canceled the panel's first meeting and agreed to review its composition. "We're just taking a breather," says radiation biologist Evan Douple, director of the NRC Board on Radiation Effects Research.

The nasty decades-long dispute centers on the risk posed by ionizing radiation from sources such as medical isotopes and spent nuclear fuel. A range of federal agencies have set exposure standards for the general public and for workers—standards based on accepted risk levels that the government tasks the NRC to review every several years. Billions of dollars are at stake: Stricter standards could increase the amount that agencies and industries must spend to clean up radioactive waste and protect workers.

Arriving at safe levels of radiation exposure is hard because little data exist on how low doses—less than 10 Roentgen equivalent man (rem) a year—affect health. (Annual U.S. exposure from all sources is 360 millirem). For years researchers have derived estimates mainly from cancer rates among 50,000 Japanese atom bomb survivors who received



Venomous debate. Groups disagree on which model best fits the data on low-dose radiation and cancer risk.

acute doses of more than 500 millirem. Current exposure regulations are based on the Linear No-Threshold (LNT) model, which uses a straight line to extrapolate the Japanese data to zero: It assumes no safe cutoff, and that doubling the dose doubles the risk.

The bone of contention is whether the LNT reflects reality. Some experts believe that population studies in regions with high background exposure—from radon or uranium deposits—suggest that radiation is harmless below a certain dose. Others point to data—including cellular studies—hinting that low doses may pose an even greater cancer risk, proportionally, than higher doses (see figure). At the request of several agencies, the NRC organized the latest panel on the Biological Effects of Ionizing Radiation to look at what model best fits the data.

But the 16-person committee that the NRC unveiled on 10 June, chaired by Harvard epidemiologist Richard Monson, drew an angry response. The panel "is completely skewed" toward people who favor relaxed standards, claims Dan Hirsch of the Committee to Bridge the Gap, a nuclear watchdog group in Santa Cruz, California. His organization and 73 other groups and individuals claim in a 22 June letter that most panelists have published studies or opinions

ScienceScope

Dying Flame? The Department of Energy's (DOE's) fusion program is dangerously close to flickering out, says an advisory panel.

In March, Energy Secretary Bill Richardson appointed a task force led by physicist Richard Meserve, a Washington, D.C., attorney, to examine DOE's $230 million fusion portfolio. Battered by budget cuts, DOE's "vibrant and valuable" fusion work "is now subcritical," the panel states in a draft report scheduled for release today. All it would take to get the effort back on track, the panel suggests, is a gentle management shake-up and a budget increase of less than $20 million a year to fund a handful of promising research projects.

The report is "mostly a pat on the back" for DOE, says Stephen Dean of Fusion Power Associates in Virginia. More critical reviews could come later this year, when a National Academy of Sciences committee and another DOE advisory panel offer their advice on fusion's future.

Blood Money Scientists could get an extra $25 million over the next 5 years to study youth violence. In the wake of the Columbine High School shootings, House and Senate lawmakers have passed anticrime bills calling on the National Institutes of Health to spend the funds—which would come on top of more than $50 million the agency already pumps into related work each year.

The American Psychological Society had pushed for a $100 million boost for studies on violence prevention, peer

Columbine High School.

pressure, and other issues. But the lower figure is fine with executive director Alan Kraut, who calls it "a big first step."

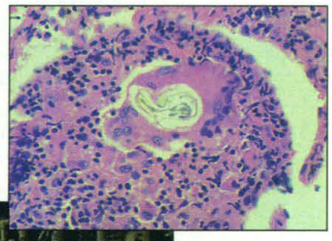
There are still some hurdles to clear before the cash arrives. Later this year, House and Senate negotiators must agree on a final version of the crime bill—but talks could bog down over controversial provisions, including several on gun control. And even if the bill passes, Congress must still come up with the money in the 2000 budget, now under discussion.

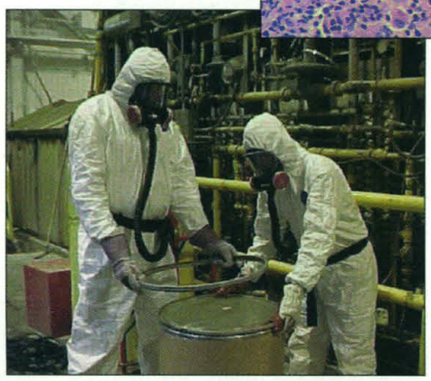
CREDIT: (BOTTOM) JEFF HAYNES/AP

treated until symptoms appear, says Donna Cragle, director of epidemiological studies at the Oak Ridge (Tennessee) Institute for Science and Education. Cragle, who is helping the Department of Energy (DOE) build a registry of workers exposed to beryllium, says the value of a robust database must be weighed against the psychological impact of a positive test, the threat to an individual's health insurance, and the disruption at work.

Durham has spent his career in an area of the Y-12 plant at the Oak Ridge National Laboratory, where beryllium-containing nuclear weapons components are handled. Recently, he received word that a blood test for an immune reaction was positive, which fingers him as at greater risk for developing chronic beryllium disease (CBD), also known as berylliosis. As a consequence, Durham has been banned from certain areas of the factory where he might be exposed to beryllium, although the value of removing such workers is not clear.

He is just one of nearly 10,000 beryllium workers who have been screened by DOE, which sponsored the meeting. The practice is also in use at the Cleveland, Ohio–based Brush Wellman Co., which mines, refines, and sells beryllium for uses that range from electronics to golf clubs. Both organizations are using blood test results, offered on a voluntary basis, to warn employees about their immunogenicity status and to keep "sensitives" away from high-exposure areas. And both are developing sophisticated new molecular assays—including potential genetic tests—to more reliably identify workers who may become ill. DOE researchers say this may be the first major attempt to screen for an employment risk based on genetic susceptibility.





Exposure. Workers handling beryllium ceramic wear respirators to reduce risk of developing granulomatous lung tissue (inset).

CREDITS: (LEFT TO RIGHT) BRUSH WELLMAN; M. ROSSMAN/UNIVERSITY OF PENNSYLVANIA; ELAINE THOMPSON/AP

The current screening program is based on a relatively straightforward blood test validated 7 years ago by researchers at the National Jewish Medical Research Center in Denver, Colorado, who demonstrated that lymphocytes from certain workers exposed to beryllium proliferated rapidly in the presence of beryllium salts. That indicated their immune systems had become "hypersensitized" to the metal and were attacking the lungs. Patients with full-blown CBD test positive on this assay, and recent studies have shown it is predictive as well: About 45% of the people with positive results also develop CBD.

These findings, plus health surveillance results based on the blood test, point to the disheartening conclusion that the rate of CBD among exposed workers, despite a decades-long effort to reduce ambient beryllium dust in the workplace, is "about the same as it was in the 1930s and 1940s," says Paul Wambach, an occupational medicine officer at DOE's office in Germantown, Maryland. The new research also turned up an alarming incidence of CBD among clerical staff and workers outside the beryllium work zones—raising the possibility that very small amounts of dust might trigger the disease process in "sensitives." As a result, DOE and Brush Wellman have expanded their screening programs and introduced new measures to reduce dust, including protective gear for those subject to greatest exposure.

Now researchers are seeking a genetic marker more predictive than the lymphocyte proliferation test. Babbetta Marrone and colleagues at the Los Alamos National Laboratory in New Mexico have built upon work on the major histocompatibility complex gene to identify a rare allele and a pattern of homozygous inheritance of a common allele that appear to be strong predictors of disease risk. About 85% of CBD patients in a small study were positive for one of these markers, Marrone says, compared with only 16% of beryllium-exposed workers without CBD.

Genetic information like this may soon make possible more accurate predictions of which prospective employees would be harmed by exposure to beryllium. Officials at both DOE and Brush Wellman say that genetic tests are not being used in the work place today because they are not yet considered good enough predictors of health and because they have been denounced as discriminatory. Of course, the whole point of diagnostic testing is to discriminate. Reed Durham has learned that lesson firsthand, and his reaction suggests that the issue is likely to remain controversial. "I cannot recommend that anyone ever take that test," he says. "If they'd ask me again, I'd say no."

–ELIOT MARSHALL

ScienceScope

Tax Relief A move to give companies a permanent tax break for R&D investments is gaining momentum. Over the last decade, the White House and Congress have backed only temporary renewals of the $2 billion-a-year R&D tax credit. But last month a congressional panel said the projected budget surplus makes it a good time to put the subsidy on firmer footing, and last week—just as the rebate expired—the White House changed its tune, endorsing legislation for a permanent credit.

Company officials claim the incentive may loosen up an extra $40 billion for R&D by 2010. Congress could vote on the issue as early as next week.

Bone Tired The Kennewick Man drama seems set for a long engagement. Last week, the Interior Department announced that a scientific panel appointed in February has been unable to conclusively date the controversial remains. The government now must negotiate with five Native American tribes that lay claim to the remains for permission to destroy a bit of bone for radiocarbon tests.

Casting of Kennewick Man's skull.

Scientists believe Kennewick Man, found 3 years ago in the bank of Washington's Columbia River, could offer insights into the peopling of the Americas. After extensive legal wrangling, Interior set up a panel to decide whether the bones qualify as Native American—defined by the government as anyone in the United States before the Europeans (*Science*, 26 February, p. 1239).

Scientists earlier had got an age of 9300 years after carbon dating a finger fragment. But with only nondestructive testing now allowed, the Interior panel had to try to date organic matter in sediment adhering to the bones. They failed to find any scraps bearing carbon-14.

Even if tribes assent to a new test on the bones, a firm date won't settle the dispute: Assuming the remains are ancient, Interior must still try to figure out if Kennewick Man has any biological or cultural link to a modern tribe.

Meanwhile, scientists who have filed suit to gain access to the bones aren't optimistic about getting a look. Says plaintiff Robson Bonnichsen of Oregon State University in Corvallis: "This one's going to drag on a long time."

Contributors: David Malakoff, Michael Hagmann, and Constance Holden