or MICA/B.

Meanwhile, Phillips and Lanier were also looking for NK cell receptors, but they were taking a different tack. They were searching through DNA databases for proteins that could transmit NK-activation signals the next step of the way—from the cell surface receptor into the cell. Such a molecule would presumably bind to the active receptor and could thus serve as bait to trap it. Lanier had a clue about the kind of protein to look for, because last year, his team had cloned the gene encoding a protein called DAP12 that performs the same job for another receptor that activates NK cells, and Lanier suspected that a related protein might perform the function for other receptors. Feeding the search algorithms with a *DAP12* sequence, Phillips and his colleagues came up with a new gene, *DAP10*, which resides right next to *DAP12* on human chromosome 19. "So we thought this is worth looking at," recalls Lanier.

The researchers then generated antibodies against DAP10, with which they hoped to pull out any putative NK cell receptor associating with DAP10. They fished out a single protein, which turned out to be NKG2D, the same receptor Spies's group had found. Says Lanier: "They had a ligand, and we had an adapter. We met in the middle at the NKG2D receptor."

By identifying DAP10 as a part of the machinery that relays the MICA signal into the cell, Lanier and Phillips's work may also help explain an unusual feature of the NKG2D receptor. Other immunologists have found that NK cells are endowed with receptors that turn down their killer activity when they contact the body's own MHC molecules. This keeps them from attacking normal cells. But MICA binding to NKG2D can override this inhibition. It may be able to do this, Lanier says, because NKG2D's partner, DAP10, feeds into a different intracellular signaling pathway than the inhibitory signals.

A good many questions still remain about NKG2D's functions, however. Because γδ T cells contain both it and a TCR, and both receptors seem to bind MICA, researchers wonder which of the two receptors is more important in activating these killer cells. Then again, says Spies, the answer may be simple. You may "need both receptors to elicit a strong response" in γδ T cells.

Also unclear is how important the MICA system is for controlling tumors. As immunologist Adrian Hayday of the University of London points out, "a lot of NK cells will kill tumor cells in a culture dish, but they won't do a good job in [the body], because tumor cells seem to have a superb capacity to turn off immune cells." He speculates that MICA recognition may serve mainly to ratchet up responses to pathogen-infected cells.

Whatever the physiological role of the MICA/NKG2D/DAP10 complex eventually turns out to be, however, these molecules are clearly not the whole story of NK cell activation. Indeed, researchers expect more NK cell receptors to emerge from test tubes and gene databases. "There's more to come in NK cell activation," predicts Eric Long of the National Institute of Allergy and Infectious Diseases. "This is a young field, and it's moving fast." –MICHAEL HAGMANN

FRENCH RESEARCH

Support Builds for Allègre's Reforms

PARIS—After more than 3 months of hearings, debates, lab visits, and electronic forums, two parliamentary deputies have delivered their diagnosis of France's ailing research effort and a lengthy prescription for reviving it. Their 140-page report, presented personally to French Prime Minister Lionel Jospin on 22 July, broadly echoes controversial reforms previously suggested by France's research minister, Claude Allègre. Like Allègre, deputies Pierre Cohen and Jean-Yves Le Déaut—both of whom are also active researchers—urge that France break down the barriers between universities and public research organizations, as well as boost both the number of young scientists and their research opportunities.

Although many French scientists had resisted what they saw as Allègre's heavy-handed approach to reforming French research (*Science*, 18 December 1998, p. 2162), the initial response to the deputies' report—which contains 60 proposals urging change through mostly voluntary incentives—has been much more positive. Henri-Edouard Audier, a chemist at the Ecole Polytechnique near Paris who had often chided Allègre for trying to ramrod French science reforms, told *Science* that the proposals were "balanced, realistic, and effective." If they are put in place, Audier says, "it will make a profound change in French research." Harry Bernas, a physicist at the Orsay campus of the University of Paris, says that "Cohen and Le Déaut really listened" to the scientific community. Jospin's staff is now reviewing the recommendations, before the prime minister decides whether to put them in place. (Allègre himself is studying the report and has no comment on it yet, according to his spokesperson.)

Even if the reforms do go forward, however, not everyone thinks they go far enough. Among those disappointed is Pierre Chambon, director of the Institute of Genetics and Molecular and Cellular Biology near Strasbourg, who had argued for

ScienceScope

Waiting and Worrying Preliminary signs are that biomedical research again will be the big winner in the 2000 budget, while other disciplines fight to keep from losing ground.

Last week, the House appropriations subcommittee for Labor, Health and Human Services, and Education scheduled a vote on a bill to raise the budget of the National Institutes of Health by 8.6% in 2000, to $16.95 billion, according to congressional aides. But the meeting was canceled after battles over tax cuts and domestic programs made it impossible to reach agreement. So Representative John Porter (R–IL), the subcommittee chair, put the plan on indefinite hold. The counterpart subcommittee in the Senate, chaired by Arlen Specter (R–PA), hasn't even set a date for a vote.

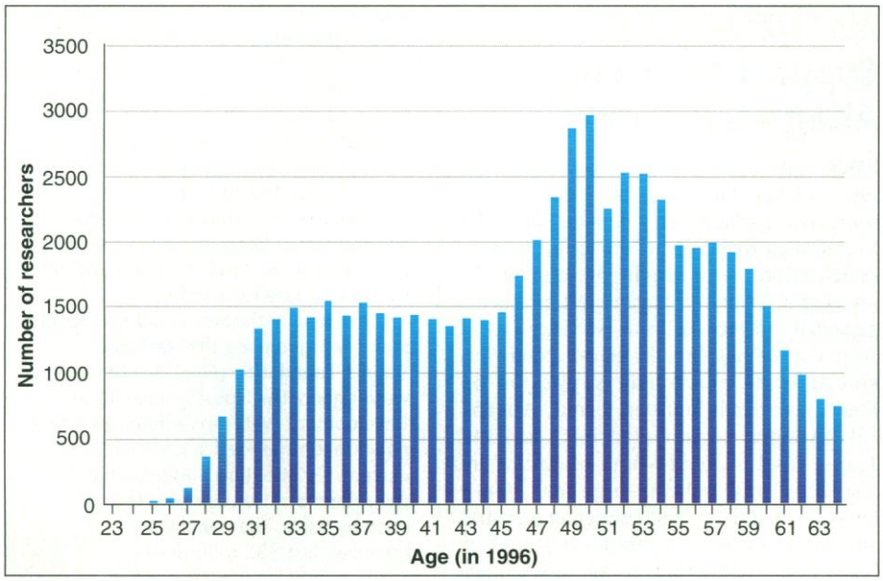
On Monday the House did take its first step toward funding the National Science Foundation (NSF). But the news wasn't good: The Housing and Urban Development–Veterans Affairs spending panel recommended a 1.5% cut in NSF's current $3.74 billion budget, which the Administration had wanted to raise by 5.8%. The panel deferred all but $35 million of a $146 million information technology initiative, including $35 million for a teraflops computer. However, it did approve $35 million of a proposed $50 million biocomplexity effort.

NSF director Rita Colwell didn't try to mask her disappointment. "We're able and ready to do 21st century science and engineering—but we can't do it on a 20th century budget," she said in a prepared statement. At the same time, NSF official Joel Widder says it could have been "a lot worse" had the committee not used an accounting gimmick: Appropriators declared $5.4 billion for veterans' health care and disaster relief "emergency" funding, so that it wouldn't count against the amount the panel can spend.

NASA received even worse news from the same panel, which cut $1.325 billion from its $13.67 billion budget. "These cuts would gut space exploration," says NASA Administrator Dan Goldin. "NASA has always stepped up to budgetary challenges, but this time [we] plan to fight." The full House was kinder to defense-related research, voting a 5.9% boost, to $8.25 billion, in the science and technology portion of the defense budget. That reverses the Administration's proposed cuts and tops the modest 1.1% increase in the Senate.

much more radical changes, such as ending the "researcher for life" status of publicly funded scientists and requiring them to undergo periodic reviews (*Science*, 18 June, p. 1898). While praising measures aimed at young scientists, Chambon says he fears that taken as a whole the reforms "will not change much in France."

Cohen and Le Déaut conclude that although French research has "remarkable" potential, it faces serious problems in three areas. First, echoing Allègre, the deputies say that researchers rarely move between universities, industry, and public research agencies such as the basic science agency CNRS. Second, young scientists have great difficulty finding research jobs and achieving scientific independence. Third—a problem critics say Allègre did not fully address, and one most troubling in the deputies' view—is what they call the "age pyramid," the alarmingly high percentage of older researchers among France's scientific corps (see graph).



France's age pyramid. The graying of university and public agency researchers means that nearly half will retire by 2010.

To address the first problem, Cohen and Le Déaut wholeheartedly adopt one of Allègre's main—and controversial—aims: a major rapprochement between the public agencies and the universities. "We must try to demolish the watertight partition" between the two sectors, Le Déaut told a press conference right after the meeting with Jospin. To induce researchers to cross the barrier, the deputies propose such measures as linking promotion and salary increases to mobility. Thus, a CNRS scientist who takes on a serious teaching load, collaborates with industry, or explores new research themes would move up the ladder faster.

This idea sparked considerable resistance when Allègre first proposed it last year, but the deputies' many consultations with researchers seem to have softened opposition and allayed suspicions that Allègre planned to weaken the CNRS in favor of the universities. And Allègre's critics note that the new proposals stress voluntary inducements rather than top-down fiats. "Everyone will have double nationality in the public research agencies and the universities," says Audier. "This is better than enforcing reforms by decree."

In addition to urging closer ties between the CNRS and the universities, the report documents that both sectors face a graying workforce. Almost half of France's university and public agency scientists will retire in the next 10 years, and in some fields, such as physics, 30% will retire by 2005. That leaves a dangerous gap both in numbers of scientists as well as in their level of experience. "We must avoid this catastrophe," Cohen told the press conference. Allègre's critics had long complained that he was neglecting this problem: The presidents of the CNRS's 40 scientific committees recently published an editorial on their Web site declaring that the current 3% recruitment rate, mandated by the ministry for the agency, would "simply mean the death of the CNRS."

To forestall this scenario, the deputies propose a number of measures, including a law mandating the recruitment of a minimum number of researchers each year to replace those who retire; they also suggest that newly minted Ph.D.s be hired even before their postdoctoral training. Unlike some of the other recommendations, such a recruitment drive would not require extra funds; indeed, if anything the new hires would command lower salaries than the senior scientists they are to replace. "It's about time," says Bernas of the recruitment push, although he criticizes the report for not giving specific numbers of researchers to be recruited. And Chambon takes issue with the idea of hiring researchers before they have done postdocs. "This is nonsense," he says. "You cannot judge people right after their thesis." Chambon's own proposal—to create a corps of temporary postdocs, currently almost nonexistent in France—was rejected by the deputies.

Another proposal to boost young university researchers did meet with unanimous acclaim, however. Cohen and Le Déaut want to create a flexible system of "time credits" that would allow assistant professors in their first 3 years on the job to cast off one-third of their heavy teaching loads, which amount to 192 hours of classroom time per year. Doctoral students would then take on these teaching duties. As might be imagined, this scheme, which would cost about $20 million per year, is being greeted enthusiastically by young university teachers. "To recognize the need to lighten the load of young researchers is an essential advance," says physicist Isabelle Kraus, an assistant professor at the Louis Pasteur University in Strasbourg, who says this would also provide doctoral students with valuable teaching experience.

The deputies seem confident that Jospin will realize the urgency of the situation and take swift action on their recommendations. "We are at a crossroads," said Cohen, a point seconded by Le Déaut: "If we don't do something now … we will have our backs against the wall in the years ahead."

—MICHAEL BALTER

PUBLISHING

Kassirer Forced Out at *New England Journal*

In the second big shake-up in scientific publishing this year, the editor of *The New England Journal of Medicine* (*NEJM*) has been asked to step down following a management dispute with the owner, the Massachusetts Medical Society. Editor Jerome Kassirer, 66, will go on sabbatical leave beginning 1 September, and his editorship will end with the expiration of his contract on 31 March. Kassirer confirmed the news in a phone interview but declined to comment other than to say that he felt "terrible" about what is happening.

The Boston Globe learned about the shake-up last week and reported that Kassirer had been "fired." But the medical society quickly issued a joint statement with Kassirer suggesting that the parting took place by mutual agreement because there

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