cine, and the university dismissed some of the staff members who were involved (*Science*, 4 August 2000, p. 706). Milstein filed a complaint on behalf of 19 patients, alleging that the doctors had engaged in "careless, negligent and reckless conduct," violating the patients' dignity and privacy. By invoking international standards, Milstein elevated the case from a local to a national matter, suitable for trial in a federal court.

In throwing out the federal case, Cook reasoned that no "fundamental" constitutional rights were at stake. He said "there is no private right of action for an alleged violation of international law," such as guidelines for the conduct of research. He also argued that the "right to be treated with dignity" enshrined in the Nuremberg Code is too "vague" to serve as the basis for a civil suit.

Milstein says he has already filed an appeal with the federal appeals court in the 10th Circuit. "We believe we can show that the American people believe it is a fundamental right not to be treated as a guinea pig," he says, adding that Cook's opinion "assumes that these people gave their consent when in fact there was no informed consent."

Arthur Caplan, director of the Center for Bioethics at Penn, says he isn't surprised by the decision. He calls the Nuremberg argument "a balloon that would burst anytime it got near a judge." (Caplan himself was named, and later dropped, as a defendant in Milstein's first Penn lawsuit.)

Milstein's three other human-rights lawsuits are still in preliminary stages; no trial dates have been set. Paul Lombardo, associate professor of law and medicine at the University of Virginia in Charlottesville, calls Milstein's argument "creative" but predicts it will be "very tough" for him to prevail.

–ELIOT MARSHALL

FRANCE

CNRS Under Fire From Government Auditors

PARIS—France's mammoth basic research agency has come under blistering attack from the nation's government accounting body. In a report issued last week (www.ccomptes.fr), the Cour des Comptes took the Centre National de la Recherche Scientifique (CNRS) to task for a variety of alleged faults, including a lack of overall research strategy, organizational rigidity, and lackadaisical efforts to recruit young scientists and encourage them to become independent. But CNRS officials argue that the report did not take into account recent initiatives or the organization's prodigious scientific output.

With a $2.2 billion annual budget and 11,400 researchers, CNRS is often a target of the Cour des Comptes' annual scrutiny of government operations. But the report for fiscal year 2001 is particularly harsh. "The recent history of the CNRS is marked by the incapacity of the organization … to get beyond the stage of collective reflection and working group discussions to launch strategic orientations," the auditors declared. They also complained that many labs were pursuing their own research strategies with too little guidance from CNRS administration. The Cour des Comptes was particularly alarmed about the "aging" of CNRS's scientists—nearly 30% of whom are due to retire between 2008 and 2010—and concluded that current recruitment is too slow to fill the looming gap.

Chief defender. CNRS head Geneviève Berger.

CNRS director-general Geneviève Berger dismissed most of these complaints. "Having a strategic vision does not mean stifling the researchers," she says. Others also reject the complaint that labs have too much autonomy. "The Cour des Comptes did not understand that the CNRS can't be run like the post office," says Anne-Marie Duprat of the Center for Developmental Biology in Toulouse. "You can't do whatever you want, but the labs must have a certain amount of freedom." Berger says the agency does think strategically, such as in its efforts to commercialize its research, a primary reason why Berger, a medical researcher, was tapped to run CNRS (*Science*, 8 September 2000, p. 1667). Since 1994, annual license and royalty income from the agency's scientific patents has soared to $26 million, a 10-fold increase.

Berger also argues that the report "hardly mentions" the scientific output of CNRS, whose researchers are authors or co-authors of more than 70% of all scientific papers published in France. She does agree, however, with the auditors' criticisms that CNRS needs to encourage more interdisciplinary research and collaborate more with other European countries.

The Cour des Comptes saved much of its fire for CNRS's treatment of young researchers, who—under the hierarchical French system—often find it difficult to set up their own labs. The auditors complained that most so-called new units were the result of reshuffling old ones and few truly new teams were being created. But Berger and other CNRS researchers counter that this critique does not take into account measures begun last year to set aside funds for young scientists. "That is really starting to work well," says Duprat. "The young teams are starting to take off."

–MICHAEL BALTER

GENETICS

Germany's Elite Tie Knot With Big Pharma

MUNICH—Germany's top research organization, the Max Planck Society, took a leap into the unknown this week when it inked a multimillion dollar deal to form a joint institute with one of the world's largest pharmaceutical companies. GlaxoSmithKline (GSK) will establish a new Genetic Research Center on the campus of the Munich-based Max Planck Institute of Psychiatry, dedicated to finding genetic links to common diseases.

GSK will buy and install the sequencing machines and computers needed to process the genetic data from patients, pay rent for a whole floor of the institute's lab building to house the center, and employ the center's technical staff. The Max Planck Institute, in turn, will provide clinical data and scientific expertise on collaborative projects. Institute scientists will have access to 15% of the center's sequencing and data-crunching capacity for their own projects.

Such a close alliance with big pharma is a first for the organization, but it mirrors a trend in Germany. The society has been aggressively establishing new biotech spin-offs on or near its campuses. In contrast, few academic scientists had any connections to industry 7 years ago, says molecular biologist Axel Ullrich of the Max Planck Institute for Biochemistry in Martinsried, near Munich. Ullrich, who helped found Genentech

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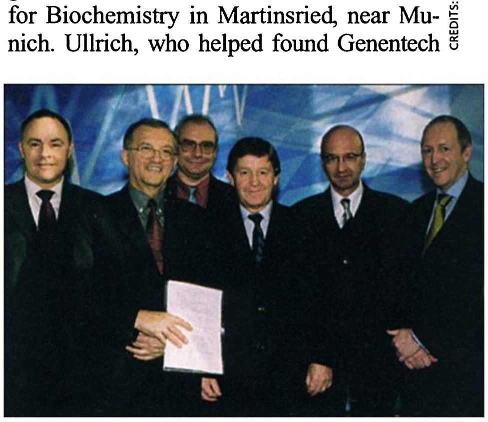

Dealmakers. Officials announce Max Plank–GlaxoSmithKline collaboration.

in the 1970s, calls the new center "a hybrid between a Max Planck Institute and a pharmaceutical company … that promotes the interests of both parties."

GSK is eager to tap into the huge repository of patient tissue samples and clinical data available through the institute's scientists and doctors, whereas Max Planck scientists hunger for advanced sequencing and computing power. The Bavarian government will contribute $3.5 million over the next 3 to 5 years. Max Planck scientists will retain the right to patent any discoveries from projects they initiate, but GSK will have first refusal on whether to license them from the Max Planck Society.

The center will focus on finding patterns of genetic variations in patients with a variety of common diseases. These variations, called single-nucleotide polymorphisms (SNPs), represent a change in a single base pair in the human genome that can help scientists home in on disease-related genes.

The first target will be unipolar depression. It's a tall task, says Kenneth Kidd of Yale University School of Medicine, who is not involved in the project. Although having a family member with depression is a risk factor for the disorder, no one has been able to pin down genes that might play a role. Most doctors believe depression has multiple causes that vary among patients. "Diagnosing depression is as precise as diagnosing a headache," agrees Florian Holsboer, director of the psychiatry institute. But he hopes that comparing patterns of tens of thousands of SNPs in 1000 depressed patients with those in healthy controls will provide clues about what triggers the disease and why patients respond differently to treatment.

Whereas psychiatry institute scientists will focus on central nervous system disorders, GSK will join other scientists—each of whom will negotiate intellectual property rights—to investigate a range of diseases. Ullrich, for one, will lead a group developing a large-scale screen for genes related to cancer development.

–GRETCHEN VOGEL

MOLECULAR COMPUTING

DNA-Based Computer Takes Aim at Genes

TOKYO—Olympus Optical Co. surprised computer scientists last week by announcing the development of the "world's first DNA computer for gene analysis." But experts disagree about whether Olympus's machine is really a computer.

"I think they've got a device for genetic analysis," says University of Tokyo biochemist Kensaku Sakamoto, who works on DNA computing. "But to function as a general-purpose computer, it still has a ways to go." Takashi Yokomori, a computer scientist at Waseda University in Tokyo, is more generous. "If you take a broad view of information processing, then what Olympus has developed is a splendid DNA computer," he says.

Researchers around the world have been working on DNA computing since the mid-1990s in hopes of harnessing the molecule's ability to store huge volumes of information and to react in many ways simultaneously for use in massively parallel computations. Efforts have focused on problems in Boolean logic, in which statements are linked by "and" and "or" into formulas, such as ((a = 1) OR (b = 1)) AND ((a = 0) OR (b = 1)). The goal is to find a set of variables that satisfies the formula. Researchers have devised ways of representing such expressions as strings of DNA. They create molecules representing each possible solution to the formula and then, using restriction enzymes and other tricks of DNA manipulation, eliminate the molecules representing unworkable solutions.

Real thing? Akira Suyama says his machine for analyzing gene expression is the first practical DNA computer.

CREDIT: D. NORMILE

DNA computing has solved simple problems in math, logic, and even chess (*Science*, 18 February 2000, p. 1182; 19 May 2000, p. 1152). The technology has remained a laboratory curiosity, however, because creating a molecule for each possible solution can demand literally tons of biochemical material to solve complex problems, and all of the chemical shaking and baking must be done by hand.

University of Tokyo biophysicist Akira Suyama, whose work led to the Olympus machine, says he has found a simpler way. First, he uses an algorithm that solves the problem in steps, building more and more complex DNA "formulas" as it goes and chemically weeding out failed solutions at the end of each round. That approach cuts the number of dead-end molecules by orders of magnitude, but at the cost of more chemistry. So Suyama automated the process, adding an electronic computer to control sample handling and processing. As a "killer application" for his machine, Suyama chose gene-expression profiling, a procedure increasingly used in research and drug development to study which genes are expressed in the course of diseases, among other problems. The work led to a partnership with Olympus, which hopes to both sell DNA computers and offer analytic and diagnostic services.

Sakamoto praises his colleague's work on automating DNA computing as having "big long-term potential." But he thinks gene-expression profiling is so specific a task that the device doesn't qualify as a general-purpose computer. Suyama acknowledges that his pride-and-joy algorithm doesn't come into play in the Olympus machine. But he says that whether it is addressing Boolean logic problems or analyzing gene expression, "it is the same hardware, with just a change in the source program."

Semantics aside, potential users are eager to see what Suyama's machine can do. Sumio Sugano, a molecular biologist at the University of Tokyo's Human Genome Center, says one "extremely important" advantage is that the Olympus machine promises to measure absolute levels of gene expression in a sample. Current technology can only compare whether a particular gene is expressed more or less than other genes. Also, for limited numbers of genes, the Olympus machine returns results in just hours, instead of the day or more required by DNA arrays. And researchers can select a different set of genes for profiling with a bit of reprogramming instead of developing a new array.

Olympus researcher Nobuhiko Morimoto says the machine will be put through its paces at NovusGene Inc., a new Olympus subsidiary gearing up to offer genetic analysis services to research labs and clinics. "Our target is to offer gene-expression profiling for about half of current prices," which run about $5000 to check expression levels of 500 or so genes in a sample. If all goes well, Morimoto says, Olympus may use the machine to offer profiling services or even sell DNA computers in 2003.

–DENNIS NORMILE