flexibility needed to build and advance large international projects in Germany," such as the planned TESLA accelerator.

The dispute is likely to come to a boil next week, when the center directors are expected to take a position on the restructuring plan. Their stance will set the tone for a meeting on 25 May of the Helmholtz Senate, which includes representatives of the Research Ministry, the Science Council, and outside experts. Ganten predicts that both groups will ratify the overhaul, which would begin by changing the Helmholtz's legal status. In principle, individual centers could refuse to join the new entity, but the government could then assert its power to overrule any rebellious centers. Even so, some scientists are hoping to stop the juggernaut. Says DKFZ cell biologist Werner W. Franke: "We are fighting for the most precious thing we possess: the individual scientist's freedom of decision." –ROBERT KOENIG

With reporting by Richard Stone.

DRUG ADDICTION

Zapping Memory Center Triggers Drug Craving

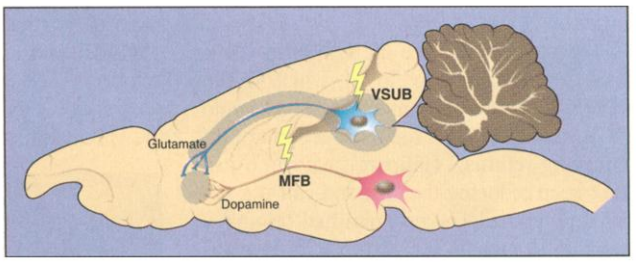
Stimulate a memory area of the brain in a rat that has kicked a cocaine habit, and the animal will desperately try to get another fix. In contrast, stimulation of the area that produces the high itself has little effect. Those findings, reported on page 1175 of this issue, show for the first time that the brain registers the high from cocaine in a separate place from where it retains the memory of, and craving for, the drug. The research opens up the possibility of new targets for anti-craving medications.

Attempts to develop new drugs to treat addiction usually focus on the brain's all-purpose "reward" area—a dopamine-rich pathway called the medial forebrain bundle in the rat. But in recent years, scientists have found indications that the reward function operates independently of craving for a drug. That's now been confirmed by the new study. "We have anatomically located the relapse circuits in the brain," says neuroscientist Stanislav Vorel of the Albert Einstein College of Medicine in New York City. And the main chemical implicated is not dopamine but glutamate, an excitatory neurotransmitter found throughout the brain.

The Einstein team, with Eliot Gardner of the National Institute on Drug Abuse (NIDA) in Baltimore, Maryland, first got rats hooked on cocaine by hitching them to intravenous catheters that delivered a dose of the drug every time they hit one of two levers in the cage. After establishing the rats' drug habit, the researchers made them go cold turkey by substituting a saline solution for the cocaine. Within a week, the rats stopped pressing the levers.

Human cocaine users who are trying to stay clean are often tempted to relapse by what psychologists call triggers, such as an emotion, a social situation, or a visual cue that brings back memories of being high. The researchers found that they could trigger an apparently analogous craving in the rats by juicing up part of their memory circuitry. When the researchers stimulated a glutamate-rich part of the hippocampus called the ventral subiculum, the rats furiously pressed the former cocaine lever for 5 minutes or so, apparently until it became clear that they weren't going to get a fix. Electrical stimulation of the reward center, in contrast, had no such effect, even though rats happily self-administer those jolts when given the opportunity.

Peter Kalivas of the Medical University of South Carolina in Charleston, who does research on how glutamate mediates drugs' effects on neural plasticity, says, "What makes this a wonderful model of craving is that it can trigger craving even with no drug present." He notes that although electrical stimulation of either brain area leads to dopamine release, it's "only when the signal originates in the hippocampus that it triggers the memory that is integral to craving."



Relapse circuit. Stimulation of the ventral subiculum (VSUB), but not the medial forebrain bundle (MFB), spurs drug hunger.

NIDA director Alan Leshner says this experiment adds to a picture that has become clearer over the past decade: that addiction entails two separate processes. One is "passive neuroadaptation"—that is, changes in circuitry that are the direct result of drug-taking; the other is "the laying down of memory traces," which occurs at a higher level of the limbic system, namely the hippocampus.

"A lot of people say the whole thing is dopamine," says Leshner. But in the search for medications to stem drug craving, he points out, substances targeted at glutamate may be more likely to get to the root of the matter.

–CONSTANCE HOLDEN

ILLUSTRATION: MODIFIED FROM S. R. VOREL AND WILLIAM PAREDES

ScienceScope

New Face France's science ministry has chosen a new research director. The government last week named Ketty Schwartz, a geneticist who specializes in the molecular biology of heart diseases, to replace geophysicist Vincent Courtillot, who is returning to his Paris laboratory (*Science*, 5 January, p. 27).

Schwartz told *Science* that it is "too early" to outline her agenda. But the appointment of a biomedical scientist, she says, is in line with the "accent and priority" that research minister Roger-Gérard Schwartzenberg has put on beefing up life sciences research. Courtillot says that Schwartz's biggest challenges will include boosting research at universities—which lag behind France's public research agencies—and increasing the number of scholarships for doctoral students.

Big Gift Malaria research is getting a charitable boost. Johns Hopkins University in Baltimore, Maryland, this week announced that an anonymous donor has given it $100 million to fund a new research center aimed at developing malaria drugs and vaccines. The school will use the money over the next decade to recruit a dozen top scientists from fields including bioinformatics and immunology and to build facilities. The cash infusion is "wonderful," says Myron Levine of the University of Maryland's Center for Vaccine Development in Baltimore. "Malaria research has been starving for serious funds."

On the Dole A coalition of animal-rights groups aiming to expand government regulation of laboratory mice, rats, and birds has recruited a high-profile ally: former Republican politician Bob Dole, who as a senator helped write portions of the federal Animal Welfare Act (AWA), which sets animal care rules.

Biomedical groups fighting the new rules—which are currently blocked by Congress (*Science*, 4 May, p. 830)—have argued that the law doesn't cover rodents. But in his letter, printed as an advertisement from the Working Group to Preserve the AWA in the Washington newspaper *Roll Call*, Dole calls the claim "preposterous. ... We certainly did not intend to exclude [from regulation] 95 percent of the animals used in biomedical research." The letter is sure to be discussed at a 2-day National Academy of Sciences workshop on the issue set to start 21 May in Washington.

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