

Rat memory skills boosted by steroid

Injecting fewer than 200 molecules of a common steroid into certain regions of the brain significantly improves some memory skills in rats, investigators report. The finding suggests that the steroid, pregnenolone sulfate, may target a specific receptor in the brain and may also be useful in treating people with memory difficulties.

"Of all the things that have been tested anywhere in the brain, this is by far the most potent," says Eugene Roberts of the Beckman Research Institute of the City of Hope in Duarte, Calif. Roberts, with James F. Flood and John E. Morley of the Veterans Affairs Medical Center in St. Louis, reports the work in the Nov. 7 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

The trio examined the impact of a variety of steroids on a memory skill called fear-conditioned learning. Shortly after sounding a loud buzzer, they would release a rat into a small maze and deliver a continuous mild electric shock to the rodent's feet until it made the correct choice between two goals.

After four such trials, the researchers immediately injected a steroid solution or a control solution into a specific area of the rat's brain. A week later, they documented how many trials it took for the rat to successfully avoid the foot shock in five out of six consecutive attempts.

Roberts' group found that rats injected with pregnenolone sulfate mastered the test more quickly than did rats injected with other steroids or with control solutions. The memory enhancement was strongest when they injected the steroid into the amygdala, a brain region previously implicated in fear-conditioned learning. The investigators discovered that it took only 15 to 145 molecules of pregnenolone sulfate to improve a rat's memory.

That potency suggests that brain cells in the amygdala have specific surface proteins that bind to the steroid, causing changes within the cells. Roberts and others plan to look for those receptors and to see whether the steroid improves other rodent memory skills.

Recent tests show that people with Alzheimer's disease given oral doses of pregnenolone, which the body converts to pregnenolone sulfate, experience no memory improvement, says Roberts. He believes that the patients may have received inappropriately large doses of the steroid, however.

The Food and Drug Administration has approved a test of the steroid in which physicians will administer varying doses to elderly people who are having some memory difficulties but are otherwise healthy.

—J. Travis

Thalidomide heals ulcers

A nationwide study of thalidomide's effectiveness in treating mouth ulcers in people with HIV reveals great benefits from the once-shunned drug.

Researchers changed the trial when early results showed thalidomide could heal the debilitating ulcers. After 4 weeks, the sores of 14 of the 23 patients taking thalidomide had healed, but only 1 of the 22 patients taking an inactive placebo improved. Now, instead of giving thalidomide to new patients at random, researchers will give the drug to all new patients as they enter the trial.

"Mouth ulcers aren't as common in HIV patients as, say, *Pneumocystis* [pneumonia]," explains study leader Jeffrey M. Jacobson of the Mt. Sinai School of Medicine in New York, "but they can be exquisitely painful. The intensity of suffering in many patients makes it important to help them."

The ulcers make eating difficult and cause weight loss, says Anthony S. Fauci, head of the National Institute of Allergy and Infectious Diseases in Bethesda, Md. "Thalidomide is the first treatment shown, in a rigorous study,

to heal these ulcers."

A second phase of the study will look at the drug's long-term effects. "That's important," Jacobson says, "because these ulcers often recur." Long-term use of steroids—the current, less effective treatment—is risky.

Scientists don't know what triggers the ulcers. "No one believes HIV causes ulcers directly," says AIDS clinician Peter C. Belitsos of the Johns Hopkins Medical Institutions in Baltimore. "It's probably an immune disruption, a sort of autoimmune disease peculiar to AIDS." Jacobson suspects that thalidomide's ability to suppress a natural HIV-stimulating cytokine contributes to its good guy role.

Because of this and other newly discovered benefits (SN: 12/24&31/95, p.424), researchers are eyeing thalidomide for a variety of conditions, from easing the weight loss of cancer and AIDS to blunting graft-versus-host disease after transplants.

But because thalidomide can cause fetal malformations, Jacobson and his coworkers have built strict precautions against pregnancy into the study.

—M. Centofanti

Freeloading flies go legless and wingless

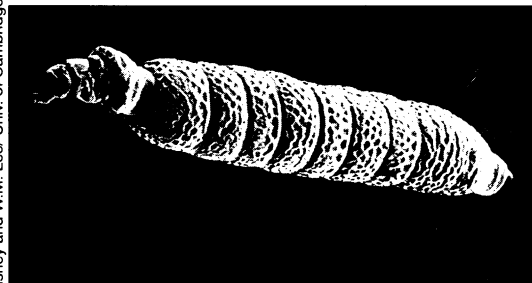
Even moochers must make some sacrifices. Adult children living at home, for example, often must follow their parents' antiquated rules or risk being booted out. But if hosts' regulations seem intolerable, consider the plight of the legless scuttle fly, which scientists recently discovered in Malaysia.

In order to live in the nests of *Aenictus* ants, the female flies develop neither wings nor legs—that way they resemble ant larvae, the researchers report. These flies, members of the Phoridae family, have apparently convinced the normally fierce, predatory ants to feed and care for them, says Andreas Weissflog of the Johann Wolfgang Goethe University in Frankfurt, Germany, and his colleagues.

Male flies, which have wings, probably carry the females to the ant nests after mating, says coauthor R. Henry L. Disney of the University of Cambridge in England.

Until they have completed a detailed study, the researchers can only speculate on the insects' interaction. Disney will assign the fly a scientific name and further describe it in an upcoming *SOCIOBIOLOGY*.

Researchers had known that insects often reside in other species' nests, using unique disguises and survival strategies. A number of species shed their wings, and some flies release a chemical that placates their termite hosts when the



The legless, wingless scuttle fly, as seen through a scanning electron microscope.

termites lick it, explains Disney.

"Many aberrant insects are known from colonies of social insects but few as bizarre as that reported here," the authors assert in the Nov. 9 *NATURE*.

"The reason [the legless scuttle fly] is unusual is the high level of structural modification it has undergone," says Donald H. Feener Jr. of the University of Utah in Salt Lake City. Also, the fly is surprisingly dependent, Disney adds.

The flies were probably born without wings or legs, as they lack the musculature to support either, the authors observe. However, the insects have microscopic wicks that probably disperse a pheromone with an antlike odor.

The discovery of this freeloading fly will help scientists understand how insects get around each other's communication and defense systems, Feener notes.

—T. Adler