

Pinpointing the body's receptor sites for heroin

Last summer the White House Special Action Office for Drug Abuse Prevention and the National Institute of Mental Health announced a \$2 million effort to find an effective, long-lasting heroin antagonist (SN: 7/15/72, p. 38). An antagonist is a substance that blocks the action of a drug. The antagonist has not yet been found, but researchers at Johns Hopkins University School of Medicine have developed a tool that should speed the search.

Scientists have long suspected that opiates operate by chemically attaching or binding themselves to specific sites or receptors in the body. Candace B. Pert and Solomon H. Snyder report in the March 9 *SCIENCE* that such binding has now been demonstrated and that specific receptor sites have been identified. Both opiates and antagonists (such as naloxone and cyclazocine) compete for these sites.

Various opiates and antagonists were radioactively tagged and added to preparations of brain and intestine tissue of rats, guinea pigs and mice. After the tissue was rinsed, the amount of radioactive materials remaining indicated the amount of binding that had taken place. In each case the amount of binding correlated to the narcotic strength of the drug used. Heroin, for instance, had a

greater tendency to form bonds than did codeine.

Opiate binding took place in brain tissue and in any intestine tissue that contained nerves. When nerves were removed from tissue, binding did not take place. This, say the researchers, means the opiate receptor is confined to nervous tissue. By testing with various types of brain tissue the researchers concluded that most binding takes place in the corpus striatum in the forward part of the brain—an area where the neurotransmitter acetylcholine is highly concentrated.

Now that binding has been demonstrated in a specific tissue, it should be a simple matter to test for similar binding ability with a number of drugs. A drug that has a greater affinity for the opiate receptor than heroin could be an antagonist.

Progress toward an effective antagonist, however, is only one outcome of the research. "Identification of the opiate receptor provides new insight into the mechanism of action of opiates," say the researchers. For instance, says Snyder, experiments are under way to see whether animals that are addicted to narcotics have more opiate receptors in their brains than normal animals. If so, this could explain the biochemical nature of addiction.

Suspenseful shaping of a way to protect species

When is an endangered species an endangered species? What are we going to do about it? Who says so?

These are the central questions whose interpretation, part substantive and part, inevitably, semantic, is keeping conservationists, hunters, legislators and others in suspense as they follow the shaping of what could be the country's first really tough legislation to protect the growing list of diminishing populations of wildlife.

There are no fewer than a dozen versions of the Endangered Species Act of 1973 competing for the attention of the House of Representatives, with several more to be resolved later in the Senate. And the controversy begins right on page one, starting with the very meaning of the name.

The existing endangered species act, passed in 1969, defines an endangered species as one threatened with "worldwide extinction." This is a significant phrase because it means that a species that is endangered in most of its ranges but still relatively numerous in even one foreign country is ineligible for the bill's protection. An alternative embodied in most of the proposed new bills covers animals imperiled in all or "a significant portion" of their habitats, which could help stymie international fur traders, for example.

The problem of actually determining whether a given animal belongs to an endangered species—a concern both to conscientious hunters and to enforcement officials—is dealt with in the leading candidate among the house bills (H.R. 37), that of Rep. John Dingell

(D-Mich.), chairman of the House Fisheries and Wildlife Conservation Subcommittee, which will be considering all the proposals. Dingell's bill would allow the Secretary of the Interior to extend the act to cover a non-endangered species that closely resembles an endangered one (such as ocelots and their rare relative, the margay), a provision missing from the bill (H.R. 4758) proposed by the Administration through the Interior Department. This is a difficult section to apply, however, particularly for commercial fisherman who must worry about evaluating their bulk catches. It was one reason that a similar act proposed in 1972 never got out of the House committee.

The source of authority in the act is perhaps its thorniest problem. The balance of power between Federal and state governments is a long-term fencing match, exemplified by such cases as Minnesota's proposed management plan for the eastern timber wolf (see next page; also SN: 2/17/73, p. 109). Most of the proposed bills make some provision for the Federal administrator to act after "appropriate consultation with the states," but the only one which

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really dares to suggest a strong Federal authority over the states is the Administration's version. No state endangered species law shall be voided by the act, it says, *except* to the extent that the state law is less restrictive than the Federal one.

The other power playoff is between the Departments of Interior and Commerce. Conservation groups want Interior to have sole determination of what goes on the endangered species list. In 1970, however, the oceans and their denizens were put in the domain of the Commerce Department's National Oceanic and Atmospheric Administration, which is subjected to schools of whaling lobbies and other commercial pressures. The proposed House bills all keep this divided authority, and the Senate Commerce Committee is expected to do the same, despite pressures for Interior control from members such as Sen. Philip A. Hart (D-Mich.).

Any such bill also includes its exceptions and exemptions, and these are another source of conservationist concern. One House bill (H.R. 1461), that of Rep. C. W. Bill Young (R-Fla.), would allow American Indians, Aleuts and Eskimos to kill endangered species "for their own consumption or ritual purposes." Another exemption is in the form of a hardship clause that would allow the granting of exemptions of up to a year after a given species has been added to the endangered species list, for people who signed contracts involving that species before it was listed. Both exemptions are opposed by conservation groups, although House subcommittee staff members think that at least the hardship clause is likely to stay in the final bill. □