Double-teaming narcotics addicts

Drug researchers are on the verge of what some of them call a significant step in the treatment and prevention of heroin addiction. The advances involve the development of two drugs — one a long-lasting antagonist that blocks the euphoric effects of heroin and other narcotics and the other a chemical that in effect facilitates symptom-free heroin withdrawal.

"The results are exciting, because previously there has been no really effective, non-addictive treatment" for addiction, says Mark S. Gold of the Yale University psychiatry department and vice president for basic research of the Psychiatric Institutes of America. With Yale colleagues D. E. Redmond Jr. and H. D. Kleber, Gold has experimentally treated withdrawing addicts with clonidine, a drug used primarily to treat high blood pressure. In all 11 patients, he reports, clonidine was found to "block and reverse the effects of opiate withdrawal."

And in separate research, the drug naltrexone is emerging as a clinical preventive treatment after a laboratory trial period. Naltrexone's prophylactic effect lasts for close to three days, about three times longer than current antagonists, according to Philip Portoghese, professor of pharmacy at the University of Minnesota. Portoghese, however, is testing another drug, CNA, which he says appears to be even longer lasting in trials with mice than naltrexone was at the same stage.

The scientists suggest that clonidine and naltrexone may be used in sequence to first effect a nearly painless withdrawal from heroin and then to maintain the ex-addict in a prevention program. Neither of the substances is addictive — giving them a significant advantage over methadone maintenance, say the researchers.

Gold first noticed the anti-opiate effects of clonidine while experimenting with the drugs on monkeys in Yale's primate facility. He relayed the results to Kleber, with whom he also worked in Yale's drug treatment program. The first clinical trials, with five patients, were reported in the April 29 LANCET. The six remaining cases will be reported in a later issue, according to Gold.

"All the [withdrawal] symptoms ended within a two-hour period," Gold told SCIENCE NEWS. It appears to be a "quite effective" treatment for "acute opiate withdrawal," he said. Clonidine, given twice daily over a one-week period, affects the locus ceruleus portion of the brain — the same area affected by morphine. But contrary to the action of morphine and heroin, clonidine works on the non-opiate receptors in that brain region, according to Gold.

Naltrexone and its derivative CNA work on receptor sites in the brain to block the attachment of narcotic molecules. While naltrexone represents a milestone of sorts in long-acting, non-addictive antagonists, Portoghese sees perhaps greater promise in CNA. Even with naltrexone, he says, "the length of time between doses may not be sufficient to break the drug-seeking behavior."

The chemical key is CNA's ability to form a covalent bond with receptor sites. Other narcotic antagonists do not bond, he says, but rather cling for only a relatively short period by chemical attraction before being metabolized or excreted.

CNA blocks narcotic effects in mice for three to six days, compared to only a two-hour effective period in mice treated with naltrexone. If the length of effectiveness in humans increases in as great a proportion with CNA as it did with naltrexone, the result would be a narcotic prophylactic "much longer acting" than anything yet developed, Portoghese says. But he cautions that tests are still in the animal stage and that toxicity studies are "very, very preliminary."

But findings thus far indicate that CNA has "no toxic effect" at its blockage-producing dosage, which is only half the amount needed with naltrexone, he notes. □

Amoco Cadiz: A lasting disaster

It was the worst oil spill in maritime history, dumping more than 67 million gallons off the coast of France. One third of it washed ashore, contaminating beaches, estuaries, marshes and commercial shellfish-breeding beds. Millions of shellfish and thousands of birds were counted among the dead. The full damage will not be known for another year or more, but by anyone's standards, the grounding of the Amoco Cadiz supertanker, March 16, 1978, was an ecological disaster.

Preliminary findings by U.S. scientists appear in a 353-page report issued jointly last week by the National Oceanic and Atmospheric Administration and Environmental Protection Agency. Americans who assisted the French in cleanup and damage assessments plan to use data from this disaster in building a better strategy to combat the thousands of spills annually off U.S. shores.

"We had never seen biological damage of this geographic extent in any previous oil spill," said Wilmot Hess, head of the U.S. team and director of NOAA's environmental research laboratories. Damage varied with the geography, winds and time, Hess said.

For example, "high-energy shores," where waves scour sand and rocks under heavy surf, clean themselves. And at least initially, before the oil turned "sticky," it would wash off fine-sand beaches with tidal activity alone.

NOAA/EPA

Massive urchin kill at St. Efflam.

In contrast, when the "beach boys" — a team of University of South Carolina geologists — visited the Ile Grande salt marsh on March 29, it was buried beneath oil and mousse (a tightly bound emulsion of water in oil containing about 80 percent water). Thousands of dying polycheates, segmented wormlike animals, wriggled in pools of oil. When the beach boys returned April 2, the marsh was dead. Grasses were black. Crabs, polycheates and oil-covered cormorants littered the surface. Scientists are anxious to learn how soon the marsh, probably the most sensitive shore environment, will recover.

Already a cleanup team of 200 workers has removed 80 percent of the oil from the north of the marsh and 90 percent of the oil in an adjacent tidal flat. But in all, the spill has oiled about 200 miles of coastline, half of it heavily.

After a few weeks of "weathering," oil began invading shore and ocean sediments, sometimes to depths of 23 inches and in average concentrations as high as 1,000 parts per million — "an extremely high level," Hess said. It was also after a couple of weeks that massive kills appeared.

One American suspects that photo-oxidation products of the oil, perhaps more toxic than the oil itself, poisoned sediment dwellers. It's one explanation for the sudden appearance of several million dead molluscs and urchins along 1.5 miles of beach at St. Efflam a full 16 days after the spill. Others worry whether dispersants used to break up and sink oil at sea may have proved lethal to the molluscs.

But it was oil that killed birds. The more than 3,200 found are believed to be only 10 to 15 percent of the real kill. Although 30 species were affected, most were cormorants, guillemots, razorbills and puffins; the last three are endangered species in France. Hess says they were very vulnerable; having migrated in to nest, many first spend several weeks swimming offshore in what was now heavily oiled sea. □