UW researches PCB poisoning

MADISON, Wis. — Industrial pollutants, called PCBs, have been found to have toxic effects on monkeys, when ingested in a steady diet, at half the level allowed in some human foods, University of Wisconsin researchers report.

James R. Allen, a UW-Madison pathologist, has found that female monkeys fed a diet containing 2.5 parts per million (ppm) of PCBs develop acne, hair loss, swollen eyelids and lips, enlarged livers, stomach ulcers and gastritis within one or two months. They also had lower conception rates than normal, he said.

The U.S. Food and Drug Administration has set tolerance limits for PCBs ranging from 0.1 ppm for infant and junior foods to 5 ppm for poultry and fish.

Allen stressed that "man is not likely to consumer 5 or 2.5 ppm of PCBs on a continuous basis. However, if he were to, there are strong indications that it would be toxic."

Further, he said, it appears that PCBs are deposited in human fatty tissue and "there is a very distinct possibility that even at extremely low levels, PCBs may eventually reach a toxic level in man."

Allen's study is being funded by the U.W. Sea Grant College Program.

PCBs — or polychlorinated biphenyls — are chlorinated hydrocarbons, like the insecticide DDT. They were first introduced as insulating fluids in the 1930s. They are excellent plasticizers for paints and adhesives, and provide fire-resistant electrical and hydraulic fluids. About one million tons of the substance have been manufactured so far.

The sole American manufacturer is Monsanto Chemicals, Ltd., which voluntarily cut back its sales of the substance in 1970. Monsanto says sales are limited to important uses where the chemical can't reach the environment.

However, the chemical is still widely produced and sold in European countries and Japan.

PCBs, which are kown to cause eggshell thinning and weak, abnormal off-spring in many bird species, are found in parts of the world far from their sources, including the mid-Atlantic Ocean.

In 1971, Wisconsin's Governor Patrick Lucey ordered a halt to commercial fishing of some Lake Michigan fish species because they contained high levels of PCBs.

Recently, state department of Natural Resources microbiologist Paul Degurse reported concentrations of up to 50 ppm in Lake Michigan salmon and trout, analyzed after the heads and vicera had been removed.

About 30 percent of Americans tested in one study had detectable levels of PCBs in their bodies.

According to Allen, the PCB effects he observed in monkeys are similar to effects reported in 1969 for a thousand Japanese who had consumed rice oil accidentally contaminated with a PCB mixture.

Allen began his study of monkeys — which have metabolic processes similar to humans — by feeding them 5,000 and 300 ppm of PCBs in their diets.

Toxic effects showed up within one month and all the monkeys were dead in three months, he said.

Later, Allen and graduate student D. A. Barsotti found that monkeys fed 25 ppm still showed toxic effects, and one of six animals died of PCB intoxication in two months.

Surviving animals showed the effects of PCB intoxication for two years following the exposure.

Monkeys fed 5 and 2.5 ppm continued to show the same lingering effects, although males seemed less susceptible than females.

Those on a 5 ppm diet for one year had extreme breeding problems, and those that did conceive young invariably aborted within 45 to 60 days, Allen said.

He said he plans to feed monkeys lower and lower levels of the chemical on an intermittent basis in a meal made from Lake Michigan fish to determine what level — if any — can be considered safe.

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