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BROAD RESEARCH INTERESTS are factors affecting the metabolism and toxicity of drugs and other xenobiotics in humans and animal species, including aquatic species. This laboratory studies mechanisms of uptake, biotransformation, excretion and toxicity of xenobiotics, including drugs and environmental chemicals. A related interest is the influence of xenobiotics on the metabolism of hormones.

Techniques used include enzyme assays, analytical chemistry, enzyme purification, molecular biology, radiochemistry.

Specific ongoing research projects are as follows:

II. The metabolism of dichloroacetic acid in vivo and in vitro in humans and animal models.

Dichloroacetic acid is both an orphan drug, used to lower lactic acid, and an environmental pollutant found in chlorinated drinking water. The first step in metabolism of dichloroacetic acid is glutathione-dependent dehalogenation to glyoxylate, catalyzed by an enzyme whose normal function is in the tyrosine catabolic pathway. As well as the studying the biotransformation of dichloroacetate, we are interested in understanding the toxicological effects of exposure to this agent. See publications 93-97, 111, 114, 123, 134, 139, 142, 145, 147-148, 150-151

III. Effects of xenobiotics on estrogen biotransformation and transport. Recent research has shown that several xenobiotics can affect the biotransformation and transport of estradiol, estrone and other hormones. This may result in beneficial or adverse effects on the organism, depending on the pathway affected. See publications 120, 122, 127, 136, 140, 146, 149

I. Biotransformation and bioavailability of ingested xenobiotics. The extent of uptake of ingested xenobiotics into the animal body is influenced by biotransformation in the intestine and liver, as well as transport across the intestinal cells and from liver to bile or blood. Intestinal and hepatic biotransformation may result in either the activation or conversely the detoxication of xenobiotics. Xenobiotics of interest include chemicals such as polycyclic aromatic hydrocarbons, polychlorinated biphenyls, organochlorine pesticides and their metabolites and other environmental chemicals. See publications 102-107, 118, 124-126, 132-133, 137.

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