Title: Effects of Mississippi Delta Sediment Contaminants on CYP1B-Gene Expression in Channel Catfish

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Oral Presentation Preferred

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Sediments in some Mississippi rivers and lakes contain significant concentrations of environmental contaminants including pesticides and industrial by-products. Chemical analysis of sediments collected from three Mississippi Delta waterways (Lake Roebuck, Bee Lake and Sunflower River), suggested that polycyclic aromatic hydrocarbon (PAH) and organochlorine pesticides were highest at Lake Roebuck. Our research has been investigating the potential for sediment associated contaminants to cause physiological effects in channel catfish, specifically on CYP1B gene expression. CYP1B is a P450 gene that in mammals is involved in the metabolism of PAHs and estradiol to potentially toxic intermediates. Quantitating induction of CYP1B mRNA or estrogen metabolism in catfish could potentially be a useful biomarker of exposure. The objectives of our study were to characterize *in vivo* CYP1B mRNA expression and estrogen metabolism in laboratory raised and wild-caught channel catfish (*Ictalurus punctatus*) from Lake Roebuck, Bee Lake and Sunflower River. Initial experiments involved cloning the channel catfish CYP1B gene. Preliminary cloning results suggest that the channel catfish sequence contains 510 amino acids and has a 55 and 50% identity with the human and scup CYP1B genes, respectively. Laboratory fish were exposed *i.p.* to corn oil or 20 mg/kg benzo(a)pyrene (BaP) for 4 days. Using quantitative real time RT-PCR, BaP exposure induced CYP1B mRNA in blood, liver and gonad tissues. CYP1B mRNA levels from Delta catfish were not statistically increased relative to control fish, and CYP1B levels from the livers of these animals were significantly lower than laboratory controls. The relative tissue levels of CYP1B mRNA from Lake Roebuck fish were gill >> blood > liver = gonad. Liver microsomes metabolized estradiol to predominately 2-hydroxyestradiol and estrone, however a statistically higher 4:2-hydroxyestradiol ratio was found in BaP exposed animals (0.17) compared to controls (0.04), suggesting that BaP caused induced formation of the genotoxic 4-hydroxyestradiol metabolite. Liver microsomes from the Delta fish produced statistically more 4-hydroxyestradiol compared to control animals but less than the BaP exposed fish. These results will ultimately help characterize the utility of CYP1B as a marker of environmental contamination and the physiological significance of CYP1B in fish.