

Tissue-Specific Distribution of Cytochrome P450 1A1 and 3A in Rainbow Trout (*Oncorhynchus mykiss*)

Authors : Viktoriia Burkina, Vladimir Zlabek, Galia Zamaratskaia

Abstract : Cytochromes P450 (CYP) are important family of enzymes in Phase I metabolism. Environmental pollutants often act as inducers of the gene expression and activities CYP1A1 and CYP3A-like isoforms in fish. The activities are generally measured in the fish liver or gills, and less is known about tissue distribution of expression. In present study, the CYP1A1 and CYP3A-like activities were measured in rainbow trout liver, gill, intestine, heart, brain and gonads. The activities of CYP1A1 and CYP3A-like proteins were estimated as the rates of 7-ethoxyresorufin-O-deethylation (EROD) and benzyloxy-4-trifluoromethylcoumarin-O-debenzyloxylation (BFCOD), respectively. The CYP1A1 and CYP3A-like activities were detectable in all investigated fish tissues, with the highest activity in hepatic tissue followed by heart > brain > gill > intestine > gonads. To confirm the presence of CYP1A1 in different tissues, EROD activity was measured in presence of the selective inhibitors ellipticine (CYP1A1), ketoconazole (CYP3A), 8-methoxypsoralen (human CYP2A) and diallyl sulphide (CYP2E1). It was found that ellipticine, ketoconazole and 8-methoxypsoralen inhibited hepatic EROD activity by 88-98%. Ellipticine inhibited gill, intestine, and gonad EROD activity by 50%. In conclusion, EROD and BFCOD activities were detected in rainbow trout liver, gill, intestine, heart, brain and gonads. Further studies are needed to fully identify all CYP450 isoforms responsible for these activities. Acknowledgement: The study was financially supported by the Ministry of Education, Youth and Sports of the Czech Republic - projects „CENAKVA “(No. CZ.1.05/2.1.00/01.0024), “CENAKVA Center Development “(No. CZ.1.05/2.1.00/19.0380), “CENAKVA II “(No. LO1205 under the NPU I program), and "Development of USB - International mobility (No. CZ.02.2.69/0.0/0.0/16_027/0008364).

Keywords : BFCOD, EROD, fish, phase I metabolism, selective inhibitors

Conference Title : ICAAH 2019 : International Conference on Aquatic Animal Health

Conference Location : Rome, Italy

Conference Dates : January 17-18, 2019