

The Effects of Pharmaceuticals to Fish (*Oryzias latipes*) – modulating on vitellogenin

Hee-Joo Kang, Hyun Soo Kim, Kyung Tae Kim, Jang Woo Lee, Pan Gyi Kim
Dept. of Environmental Health, Yongin University

This study was designed to determine the estrogenic effect of the pharmaceuticals on several measures of endocrine function in adult fish (*Oryzias latipes*) that was induced by residual pharmaceuticals. 17β -estradiol was used positive control that was induced vitellogenin (Vtg) in male fish. Some common pharmaceuticals were used caffeine, ketoconazole, acetaminophen and diltiazem.

Vtg was qualified and quantified through Western blot and ELISA. Following SDS gel electrophoresis, the dominant protein band was identified to molecular weight approximately 205kDa in whole body samples of vitellogenic female. As a exposed 17β -estradiol, female fish didn't showed significant difference, but 3~5 days exposure of 17β -estradiol to male fish induced 63.07% of total protein, the value was elevated than control male fish (0.76%) and was showed a large significant difference $p < 0.01$. In case of general pharmaceuticals, female fish didn't showed significant difference, while male fish did showed significant difference. Vtg was induced significantly at male fish over caffeine 2ppm. Same as ketoconazole 10ppm, acetaminophen 4ppm, diltiazem 1pm induced vtg significantly at male fish.

This study confirmed Vtg by whole body samples of pharmaceutical compounds even at low concentration (ppm). In addition, the result of each chemical tested in sequence of concentration range, each chemical was increased Vtg concentration in fish when increased exposure range of each. Therefore, if residual pharmaceutical chemicals increase in aquatic environment, that will be a serious problem at fish, human and ecosystem.

Key words: pharmaceuticals, endocrine disruption, caffeine, ketoconazole, acetaminophen, diltiazem, *Oryzias latipes*