Development of Vitellogenin Assay for Endocrine Disruptors Using Medaka (*Oryzias latipes*)

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An enzyme-linked immunosorbotent assay (ELISA) was developed for the detection of the egg yolk precursor vitellogenin (VTG) in the liver of medaka (*Oryzias latipes*) and was employed to establish an *in vivo* testing system for estrogen and estrogenic compounds using liver homogenates. Results of 3-month-old fish exposed to three reference chemicals (ethynylestradiol, methyltestosterone and flutamide) recommended by Organisation for Economic Co-operation and Development (OECD) for the validation showed the induction and decrease of vitellogenic responses, making the assay using the liver VTG of medaka a possible screening method for not only estrogens but also androgens. In addition, 21-day exposure of male fish to 4-*tert*-octylphenol and 4-nonylphenol produced concentration-dependent inductions of liver vitellogenin, with the lowest observed effect concentrations of 64.1 µg/L and 22.5 µg/L, respectively, while no significant VTG responses were observed in male and female fish exposed to tributyltin chloride and dibutyl phthalate. This study demonstrates that the VTG assay using liver homogenates from small fish such as medaka can be used as a screening method for environmental estrogens. This is because the sensitivity of the VTG response in medaka may be almost the same as that of other fish using blood samples.

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