

Estimation of the baseline choriogenin level in masu salmon male serum

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[Introduction]

Recently, choriogenins (Chg H and Chg L), precursor proteins to a fish vitelline envelope, has been proved as a biomarker for monitoring an estrogenic endocrine disruptors in the aquatic environment. In salmonid fish, Chg is thought to be more responsive than vitellogenin (Vg), egg yolk precursor, to estrogen stimulation. In several reports, however, Chg was detected in the control male serum, which has not received any estrogenic compounds. It is important to observe a change of Chg levels in normal-maturing male fish for using Chg as a biomarker to estrogenic effects. This study aimed to define the basal concentration of serum Chgs during maturation using a pond-cultured male masu salmon (*Oncorhynchus masou*).

[Materials and Methods]

The 2-year-old male masu salmon was sampled monthly from January to September (ovulating month), while 1-year-old fish were collected monthly from January to December. The Serum Vg and Chgs levels were measured by previously reported chemiluminescent immunoassay and enzyme-linked immunosorbent assay, respectively. The estradiol enzyme immunoassay kit (Cayman chemical) was used to measure the serum estradiol-17 β (E2) levels.

[Results and Discussion]

In 1- and 2-year-old male fish, less than 10 μ g/ml of Chg H and L were detected in all fish. However, Vg was detected in only 3 fish (2-year-old, 7.3-16.23 ng/ml) sampled in August. Serum E2 levels in a 1-year-old male kept a lower concentration of around 100 pg/ml, while it changed in the region between 100 and 500 pg/ml in 2-year-old fish. The peak of serum E2 level in 2-year-old fish was observed in August and its maximum level was reached at 869.39 pg/ml. It may be inferred from these results that Chgs were more responsible than Vg for estrogen stimulation. However, the results also suggested that there is a risk on screening the endocrine disruptors by the "detection" of Chgs in male serum, since they were detected through the year in normal-maturing male fish under a culturing condition. Some possible inducers of male Chgs are detected to be endogenous estrogen in males, phytoestrogen in fish food and/or the effects from co-cultured females rather than water pollution. It could be concluded that a level of 10 μ g/ml is a possible base line of Chg concentrations for the normal control fish when we use salmonid Chgs for monitoring an aquatic environment.