

## Abstract

In mammals, interleukin-6 (IL-6) and interleukin-10 (IL-10) has an important function during the reproductive processes, however, the functions of IL-6 and IL-10 in fish have not been elucidated. In the present study, there was quantification of de novo synthesis of ovarian IL-6, IL-10 and tumor necrosis factor-alpha (TNF $\alpha$ ) in control and hCG treated fish and results were compared with those from an in vitro study where there was evaluation of the regulatory functions of gonadotropins and TNF $\alpha$  of IL-6 and IL-10 secretions. Relatively greater concentrations of ovarian IL-6 at the post-GVBD (post-germinal vesicle breakdown) stage and higher concentration of ovarian IL-10 in post vitellogenic (PV) and post-GVBD stages indicates IL-6 and IL-10 can modulates reproductive processes. The hCG-induced increase in relative abundance of IL-6 and IL-10 (in vitro) mRNA transcript and secretion from the ovary were attenuated when there was administration of the inhibitor of TNF- $\alpha$  secreting enzyme, TAPI-I, which indicates TNF- $\alpha$  modulates IL-6 secretion and facilitate the production of IL-10. Treatments with IL-6 induced a marked increase in ovulation rate but there was no direct involvement of IL-10 during the time of maturation and ovulation. In vitro established that IL-6 induced ovulation by activating matrix metalloproteinase (MMP). Furthermore, treatment with IL-6 resulted in production of prostaglandin as indicated by the IL-6 induced increase in the abundance of *ptgs2* mRNA transcript in the ovary of *Anabas testudineus*. IL-10 during this process mostly play the regulatory role of the cytokine environment in the oocyte the inhibition of IL-6 when treated with IL-10 in PV follicle establish the fact. Furthermore, results indicate the source of IL-6 and IL-10 in the ovary, is the granulosa cells for IL-6 and both theca and granulosa cells for IL-10 with secretion of IL-6 and IL-10 being induced by the additions of hCG and TNF $\alpha$  in the medium. There was also an IL-6-induced increase in abundance of receptors (IL-6 R $\alpha$  and gp130) to which it binds indicating IL-6 autoregulates this population of receptors. There was also marked increase in IL-10 receptor IL-10R1 and IL-10R2 suggesting their involvement during the reproductive processes. Stat-3 activation ensured the involvement of IL-6 during the time of

ovulation. Results from this study, for the first time, elucidate the reproductive functions of IL-6 in a teleost fish.