

**DOPAMINERGIC REGULATION OF GONADOTROPIN (GtH) AND GROWTH
HORMONE (GH) SECRETION IN COMMON CARP, *CYPRINUS CARPIO*.**

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In many teleosts, dopamine (DA) acts as a gonadotropin-releasing inhibitory factor (GRIF) (Lin et al., 1993). More recently, studies in the goldfish have provided evidence that dopamine also functions as a growth hormone-releasing factor (Wong et al., 1993). The purpose of the present study was to investigate the seasonal variations in the serum level of gonadotropin (GtH) and growth hormone (GH) response to intraperitoneal injection of DA, its non-selective agonist apomorphine (APO), and its antagonist domperidone (DOM) in the yearling female common carp (*Cyprinus carpio*).

DA (10 or 100 µg/g body weight) and APO (20 µg/g body weight) treatment cause significant decreases in serum GtH levels in late stage of gonadal recrudescence (October) and preovulatory (February) common carp; whereas they had no effect on sexually regressed fish (June). These results indicated that seasonal variations of the inhibitory effects of DA and APO on GtH secretion were correlated positively with the basal serum GtH level and gonadosomatic index (GSI), the higher the serum GtH level and GSI, the stronger the inhibitory tone of DA and APO on GtH secretion.

The GtH-releasing action of DOM was seasonal and in correlation with the advancing development and maturation, being the highest in sexually mature (preovulatory) fish, intermediate in recrudescence fish, and the lowest in sexually regressed fish.

DA and APO consistently stimulated GH release in a dose-dependent manner during gonadal development and maturation of common carp, the maximal GH level was observed in fish in late stage of gonadal recrudescence in October; whereas the GH-releasing action of DA was not significant in sexually regressed fish in June. The decreasing effects of DA to induce GH release with the maturation and regression of gonads suggested that the responsiveness of the somatotrophs to DA stimulation may be under a negative modulation gonadal factors.

DOM treatment did not significantly alter serum GH levels in common carp over the course of the gonadal development and maturation; however, in sexually regressed fish, GH secretion was suppressed after DOM injection.

In summary, these results provided further information on the dopaminergic regulation of GtH and GH in common carp, and demonstrated that DA-inhibited GtH release and stimulated GH release exhibits a distinct pattern of seasonality.

REFERENCES

- Lin, H.R. and R.E. Peter, 1993. Hormones and spawning in fishes.
In: "Proceedings of the Third Asian Fisheries Forum." October 26-30, 1993. Singapore
- Wong, A.O.L., J.P. Chang and R.E. Peter. 1993. *In vitro* and *in vivo* evidence that dopamine exerts growth hormone-releasing activity in goldfish.
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