

**NEUROPEPTIDE Y AND ITS EFFECT ON FEEDING AND GROWTH
IN CHANNEL CATFISH (*ICTALURUS PUNCTATUS*)**

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EXTENDED ABSTRACT ONLY – DO NOT CITE

Feeding and the behavioral control of feeding and growth by fishes is critical to survival and fitness. While food intake and subsequent growth is controlled by an interacting group of endocrine factors (Silverstein and Plisetskaya, 2000), neuropeptide Y (NPY) has been implicated in these processes in many animals, including some fish. In teleosts, NPY is expressed in response to restricted food availability (Silverstein *et al.*, 1998) and treatment with NPY stimulates feeding (Lopez-Patino *et al.*, 1999). Additionally, NPY is involved in the control of growth hormone action (Peng *et al.*, 1993). Although NPY is ubiquitous in the brain, its involvement in food intake regulation is localized to the hypothalamic areas. We are investigating how NPY mRNA responds to variation in food availability as well as how it differs between different strains of catfish that are known to grow differently. We have detected NPY mRNA in channel catfish brain using both Northern blotting and RT-PCR (fig 1). RT-PCR has detected NPY mRNA in hypothalamus, myelencephalon, optic tectum and telencephalon, but not in the cerebellum or the pituitary. We have now developed a competitive RT-PCR assay to quantify the differences in mRNA levels in catfish brain in large numbers of samples. Using this technique we are able to quantitate differences in expression of this hormone in fish starved for varying periods. Our studies indicate that NPY mRNA expression is affected by food availability and that our methodology will allow us to further examine the affects of other hormones on the NPY system.

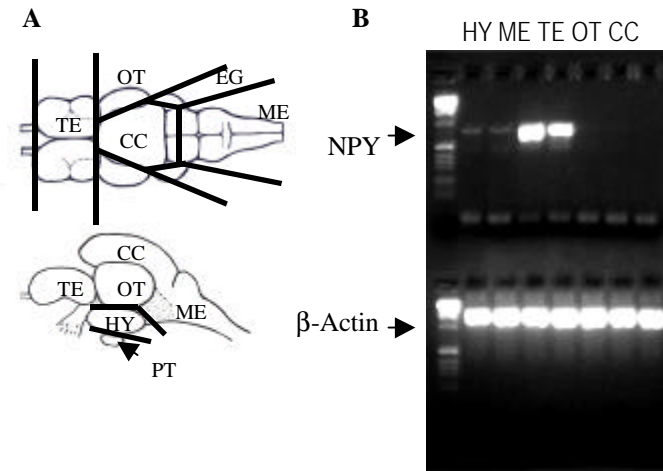


Figure 1. A. Drawing showing brain morphology of channel catfish, *Ictalurus punctatus* as sampled for brain distribution of NPY mRNA. Upper frame is dorsal aspect, lower is lateral aspect. Dark lines indicate lines of dissection. TE (telencephalon), OT (optic tectum), CC (corpus cerebellum), EG (eminentia granularis of the cerebellum), ME (myelencephalon), HY (hypothalamus), PT (pituitary). B. Agarose gel (2% with ethidium bromide) showing UV detection of RT-PCR products from several catfish tissues as indicated. Upper lanes show amplification with NPY primers, lower lanes with β -actin primers.

References

- Lopez-Patino, M.A., Guijarro, A.I., Isorna, E., Delgado, M.J., Alonso-Bedate, M. and de Pedro, N. 1999. Neuropeptide Y has a stimulatory action on feeding behavior in goldfish (*Carassius auratus*). *Eur. J. Pharm.* 377:147-153.
- Peng, C., Humphries, S., Peter, R.E., Rivier, J.E., Blomqvist, A.G. and Larhammar, D. 1993. Actions of goldfish neuropeptide Y on the

secretion of growth hormone and gonadotropin-II in female goldfish.
Gen. Comp. Endocrinol. 90:306-317.

Silverstein, J.T., Breininger, J., Baskin, D.G. and Plisetskaya, E.M. 1998.
Neuropeptide Y-like gene expression in the salmon brain increases with
fasting. Gen. Comp. Endocrinol. 110:157-165.

Silverstein, J.T. and Plisetskaya, E.M. 2000. Study of the effects of NPY and
insulin in food intake regulation in fish. Amer. Zool. 40: in press.

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