Dr. Stacia Sower

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Expression of GnRH in Lamprey Brain/Hypothalamus

Presented at:
- Advances in Cyclostome Research, Japan 2008
- International Congress on the Biology of Fish, Portland, 2008
- 6th International Symposium on Fish Endocrinology, Calgary, Canada, 2008

Results published in Endocrinology in 2008
Stacia A. Sower, PI of NSF 0618719, Acquisition of A Confocal Microscope
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Intellectual Merit: Expression of GnRH in Lamprey Brain/Hypothalamus. NSF (BNS-0421923) supported researcher Dr. Stacia Sower along with her graduate and undergraduate students at the University of New Hampshire work on comparative molecular and biochemical neuroendocrinology and the evolution of vertebrate brain and pituitary hormones in fish. A novel GnRH, lamprey GnRH-II, was recently cloned from the sea lamprey, a basal vertebrate (Kavanaugh et al., 2008). Similar to GnRH-II expression in gnathostomes, lamprey GnRH-II was shown to be widely distributed and expressed in a number of tissues. Sections from in situ hybridization experiments were analyzed using the confocal facilities at the University of New Hampshire with a Zeiss LSM 510 Meta laser scanning confocal microscope with a 633-nm helium neon laser using the following parameters: 638-799 nm emission collected with Meta detector, 8X signal averaging, unmixed lambda stack, pixel time 3.37 ms, objective 20X/0.8. In the brain, lamprey GnRH-II was shown to be located in POA/hypothalamus. The use of the confocal microscope was critical for this study as well as other ongoing projects on brain hormones/receptors.

In situ hybridization of the adult lamprey brain:

In situ hybridization of lamprey brain and sagittal tissue sections show distinct cell populations expressing lamprey GnRH-II and their relative locations within the lamprey brain. AS, Anterior septum; S, sense probe; V, ventriculai lateralis; SL, sulcus limitans. Scale bar, 100 μm. (Kavanaugh et al., 2008)

Permission Granted
Credit: Dr. Stacia Sower
Graduate Student: Scott I. Kavanaugh
Award: DBI-0618719

Broad Impacts
A Ph.D. candidate, Scott Kavanaugh, was trained on the confocal microscope by Dr. Mark Townley. This allowed Scott to examine the lamprey brain sections for his in situ hybridization studies, which was a critical component of his research on the novel lamprey GnRH-II. Results from the confocal microscope studies were presented at three international meetings: Advances in Cyclostome Research, Japan, 2008; International Congress on the Biology of Fish, Portland, Oregon, 2008; and the 6th International Symposium on Fish Endocrinology, Calgary, Canada, 2008; and at one national meeting, the Annual Meeting of the Society of Integrative and Comparative Biology, 2008, San Antonio, Texas. In addition, the results from these confocal studies were published: Kavanaugh SI, Notzold M, Sower SA. 2008. Origins of gonadotropin-releasing hormone (GnRH) in vertebrates: identification of a novel GnRH in a Basal vertebrate, the sea lamprey. Endocrinology 149:3860-3869