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A13–GENERAL NEUROBIOLOGY POSTERS

A13.1

Neuropeptide structure and function in sea urchins

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Neuropeptides are important mediators and regulators of neural signalling across all animal phyla. However, the diversity and function of neuropeptides in the phylum Echinodermata remains largely unknown. The first sequenced genome of an echinoderm, the sea urchin *Strongylocentrotus purpuratus* (Science 314, 941–952), has provided a unique opportunity to rapidly identify putative echinoderm neuropeptides. BLAST analysis of sea urchin genome sequence data has led to the identification of genes encoding several neuropeptides, including a vasotocin-like peptide, SALMFamides and NGFFFamide, a peptide related to the holothurian myoactive neuropeptide NGIYWamide (J. Exp. Biol. 208, 4273–4282; Dev. Biol. 300, 434–460). Moreover, analysis of the effects of NGFFFamide has revealed that it causes contraction of oesophagus and tube

foot preparations from the sea urchin *Echinus esculentus*. An alternative strategy for identification of novel echinoderm neuropeptides involved analysis of expressed sequence tags (ESTs) derived from a *Strongylocentrotus* radial nerve cord cDNA library. One thousand EST sequences were analysed and putative neuropeptide precursors were individually identified according to a number of structural criteria, including the presence of a hydrophobic signal peptide sequence and basic residue cleavage sites. Using this strategy a number of putative novel neuropeptides were identified including a sea urchin gonadotropin-releasing hormone (GnRH)-like peptide and several peptides resembling molluscan pedal peptides. The set of putative sea urchin neuropeptides identified provide a basis for investigation of neuropeptide expression and function in the coordination of physiological and behavioural activity in echinoderms as well as providing insights on the evolution of neuropeptides in the animal kingdom.

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