Singapore Developmental Biology Club

SEMINAR ANNOUNCEMENT

19 September 2012, Wednesday
Aspiration Theatrette, Level 2M, Matrix, Biopolis
5:30PM – 6.30PM

Dr. Clare Baker
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Dept. of Physiology, Development and Neuroscience, University of Cambridge, UK

Seminar Title: The development and evolution of vertebrate electroreceptors: a "sixth sense"

Electrosensory ampullary organs containing modified 'hair cells' that detect changes in weak electric fields in water (primarily used for detecting live prey) are found in all major groups of jawed vertebrates. These hair cells are innervated by neurons in lateral line ganglia that project centrally to specific electrosensory nuclei in the hindbrain. Despite their similarities, the embryonic origin of ampullary organs in different vertebrate groups has been controversial. Using a vital dye lineage-labelling approach for the first time in embryos of a cartilaginous fish, the little skate (*Leucoraja erinacea*), we show that ampullary organs are derived from lateral line placodes, i.e., patches of thickened neurogenic cranial ectoderm that elongate in characteristic lines over the head, and that also give rise to neuromasts containing mechanosensory hair cells. Taken together with previous work on the axolotl (a representative of the lobe-finned clade of bony fishes) and our own recently published work on a basal ray-finned bony fish, the North American paddlefish (*Polyodon spathula*)*, these data confirm experimentally that the ancestor of all jawed vertebrates had a lateral line placode-derived system of electrosensory ampullary organs and mechanosensory neuromasts. We have also used next-generation sequencing and a bioinformatic approach in paddlefish, validated by in situ hybridisation, to identify the first molecular markers (including ion channels) expressed in ampullary organs but not neuromasts. Using these approaches, we are beginning to reveal the developmental and evolutionary basis of electroreception.

No registration required.
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