CDB SEMINAR

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Tuesday, February 1, 2011

16:00~17:00 C1F CDB Auditorium

Towards a gene regulatory network for sense organ progenitors

Summary

In vertebrates, crucial parts of the eye, ear and nose and of cranial sensory ganglia arise from specialised ectoderm outside of the central nervous system, the sensory placodes. Our research focuses on how sensory progenitors are specified and how central and peripheral components of sense organs are assembled into functional organs.

At neural plate stages, a pool of multipotent progenitors is set aside that will give rise to the lens, inner ear, olfactory epithelium and to the cranial ganglia. To uncover the gene regulatory network controlling these processes we have identified some of the signalling pathways that induce sensory fate in naïve ectoderm as well as the transcription factors that mediate their action. Members of the Six and Eya gene families play an important role in this process, and in addition we have recently identified new genes that may act up-stream, down-stream or in parallel to these factors to impart sensory progenitor identity. Using transcriptome analysis we have identified several syn-expression groups that represent different states of cell specification. Currently, experiments are under way to determine their genetic hierarchy and to assemble a preliminary gene regulatory network.

Once progenitor cells are specified morphological placodes form along the developing neural tube in the non-neural ectoderm. To generate functional organs and sensory circuits their peripheral and central circuits must develop in register. We have explored this problem in the eye, where the lens arises from the non-neural ectoderm, while the retina comes from the CNS. We show that neural crest cells play a crucial role in positioning the lens next to the retina through TGFβ and canonical Wnt signalling.

Host:
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