・Utpal Banerjee (Univ. of California at Los Angeles)

Combinatorial Signaling in the Specification of Cell Fate

Specific neuronal and non-neuronal cell fates are often chosen from an equipotent group of precursor cells. In the Drosophila eye disc, a single population of precursor cells gives rise to a variety of differentiated cell types. Our recent research has shown that this is not achieved through the use of specific intercellular signals. Instead, a group of cells expressing ubiquitously expressed transcription factors interpret a combination of common signals to create cell-specific outputs. The differences in responses by the different cells are due to the different combination of signals that they receive. It is likely that such a combinatorial model for signaling will be important in cell-fate determination in the development of the vertebrate nervous system as well.

・Yoshiki Hotta (National Institute of Genetics)

Cell Fate Switching by gcm; a Novel Transcription Factor

Drosophila glial cells missing (gcm) gene is a binary switch at the asymmetric cell divisions of neuronal stem cells where neuronal and glial cell fate bifurcation takes place. It is a novel transcription factor whose asymmetric expression is the key for the cell fate decision. The protein, GCM, binds to DNA with a distinct 8-base. The sequence is repeated in tandem in the regulatory region of its target gene, repo.

The DNA binding motif of gcm is conserved in the genome of many organisms, including human, mouse and zebrafish. The genes may be functioning as cell fate switches outside nervous system, such as in blood cell differentiation.