CDB SEMINAR

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Molekulare Biologle neuronaler Signale

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16:30~17:30 C1F CDB Auditorium

Molecular control of cell fate specification in the cerebral cortex

Summary

During the development of the mammalian neocortex, neuronal progenitors located in the ventricular and subventricular zones of the dorsal telencephalon give rise to multiple projection neurons that are arranged in six cortical layers in the mature brain. Neurons within each layer are generated at similar times and share similar morphology and patterns of connectivity. The molecular determinants of the fate of these cells are still elusive.

In recent years our research was focused on identification and characterization of genes that control cell fate specification in the cerebral cortex. One of the genes we identified, Satb2 is crucial for postmitotic specification of callosaly projecting upper layer cortical neurons. Another transcription factor we identified several, Sip1 was shown to be the cause of Mowat-Wilson syndrome in humans. We showed that in the hippocampus Sip1 controls non-canonical Wnt signaling by suppressing Sfrp1 gene expression. Inactivation of Sip1 in the hippocampus induces Sfrp1 activation, that in turns leads to inactivation of Wnt/JNK signaling, elevated cell death and subsequent degeneration of hippocampal formation. In the neocortex Sip1 inactivation induces premature and excessive production of upper layer neurons at the expense of deep layer neurons. Furthermore, it causes precocious generation of glial cells at late corticogenesis. Molecular basis of Sip1 and Satb2 action will be discussed

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