



CDB SEMINAR

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16:00~17:00 C1F CDB Auditorium

Identification and characterization of molecules directing axonal growth and target field innervations

Summary

Genome-wide screens were performed to identify genes that mediate axonal growth, guidance and target field innervation of distinct populations of developing somatosensory neurons, using dorsal root ganglia (DRG) obtained from *Ngf*⁻, *Nt3*⁻, and *Ngf*;*Bax*-null mice. These screens revealed the presence of a large number of genes, including *Runx1*, *Nav1.8*, *TrkA*, *ER81*, which are expressed exclusively in TrkA⁺ or TrkC⁺ populations of DRG neurons. The screens also identified genes whose expressions are dependent on NGF, such as a *Hox* transcription factor. A novel gene, *Linx*, a member of a large gene family, coding a transmembrane protein, was identified as being highly expressed in TrkA⁺ neurons. *Linx* and its family members are found in unique subsets of sensory and motor neurons where they physically interact with TrkA and Ret tyrosine kinase receptors. Interestingly, *Linx* mutant mice display axonal projection defects, which resemble those observed in mice lacking *Ngf*, *TrkA* and *Ret*. Moreover, motor and sensory neurons obtained from *Linx* mutant mice respond poorly to NGF and GFNF, respectively. These findings show that *Linx* and its family members form complexes with receptor tyrosine kinases in unique populations of developing neurons and modulate their activities to control specific stages of sensory and motor neuron axonal growth, guidance and branching.

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