学位論文抄録

Axon guidance protein,draxin,and neural crest cell migration

(軸索ガイダンス蛋白ドラキシンと神経冠細胞移動)

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Abstract of the Thesis

Background and Purpose: Draxin is an axon guidance molecule that plays very important roles in the formation of spinal cord and all three major commissures of the forebrain (Islam et. al. Science 323, 388-393). Expression of draxin in the roof plate and around the neural crest migration pathway raises the possibility of draxin to play essential role in the modulating of neural crest cell migration. This study was aimed to reveal the role of draxin in chick and mouse trunk neural crest cell migration.

Methods: To explore the role of draxin in trunk neural crest cell migration chick and mouse models were used, respectively. Several methods like in situ hybridizations, immunohistochemistry, *in vivo* overexpression by electroporation, *in vitro* explant cultures, draxin knockout mouse and draxin-AP binding assay were used.

Results: Draxin is distributed around the migration pathway of trunk neural crest cells and migrating chick neural crest cells can bind draxin-AP protein. *In vitro* experiments show that draxin affects chick neural crest cell migration by reducing cell polarization activity. *In vivo* overexpression in chick embryos results in some early-born neural crest cells change from ventromedial to dorsolateral pathway precociously. Mouse draxin is expressed in a comparable pattern and functions similarly to chick draxin. However, there is no detectable neural crest migration phenotype in draxin knockout mice.

Discussion: Expression data, *in vitro* and *in vivo* experiments strongly suggest that draxin might play an important role in the restricting trunk neural crest cell migration. Loss of function analyses of draxin knockout mice might be a result of the redundant function of multiple genes in the spinal cord.

Conclusion: Draxin is an axon guidance molecule that also plays critical roles in the restricting of trunk neural crest cell migration.