文部科学省特別経費プロジェクト
脳と末梢の機能連関に関する戦略的研究の推進

“脳と末梢”

「脳と末梢プロジェクト」特別講義

「脳と末梢の機能連関に関する戦略的研究の推進プロジェクトの一環として、特別講義を開催します。今回は、ゼブラフィッシュをモデルに視床形成のしくみで成果を挙げられている先生を講師としてお呼びしました。学部学生も考慮した内容を御願いしています。大学院生はもちろん、学部学生も奮ってご参加ください。（本講義は本学正規カリキュラムとは別枠として開催します。）

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Orchestrating the development of the central nervous system : The local brain organizers

【日時】　平成25年3月29日（金）　10:40～12:10

【場所】　理学部　8番教室

The foundation for the anatomical and functional complexity of the vertebrate central nervous system is laid during embryogenesis. After Spemann's organizer and its derivatives have endowed the neural plate with a coarse pattern along its anteroposterior and mediolateral axes, this basis is progressively refined by the activity of local organizers within the neuroepithelium. These organizers release diffusible signaling factors to pattern and regionalize their neighboring tissue. Anteroposterior patterning is controlled by several discrete organizers positioned along the neuroaxis. Here we will focus on the two most prominent organizers during anterior neural plate development: the mid-diencephalic organizer (MDO) and the midbrain-hindbrain-boundary (MHB) organizer.

The thalamus develops in the posterior part of the embryonic forebrain, the diencephalon, where early cell fate decisions are controlled by a local signaling center – the MDO – which forms as a narrow strip of cells at the boundary between prospective prethalamus and thalamus. The development of the midbrain and the anterior hindbrain depends on the function of the MHB organizer, which is located at the isthmus. Recent studies in zebrafish, chick, and mouse embryos reveal that a conserved set of interactions occur between homeodomain transcription factors that position these organizers along the anterior-posterior axis of the neural primordium. Once established, the organizers release several molecular signals, which combine to influence differentiation of the adjacent brain regions. The principal signal of the MDO is Sonic hedgehog, which is necessary for conferring regional identity on the prethalamus and thalamus and for patterning their subsequent differentiation. The main signal of the MHB organizer is Fgf8, which is required for patterning of the tectum and induction of the cerebellum.
We review how these secondary organizers are established and how they exert their signaling functions. Furthermore, we will discuss how the neighboring tissue is able to modulate and regulate organizer output by competence factors and by regulation of the signaling range. Interplay between these tissues is crucial for proper differentiation and neural patterning.

問合せ：　理工学研究科生体制御学コース　弥益恭　内線4349