



CDB SEMINAR

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(Present address: JST ERATO Miyawaki Project/ RIKEN BSI)

Tuesday, July 22, 2008

16:00~17:00 C1F CDB Auditorium

Regulation and function of Hoxgenes during chick paraxial mesoderm development

Summary

Hox genes are responsible for imparting axial identity to the embryonic precursors of the vertebral column, the somites. These genes are expressed in nested domains along the embryonic antero-posterior axis in an order reflecting their distribution along the chromosomes. To understand how this spatial collinearity of Hox gene expression is established in the somatic mesoderm, we have analysed the fate of Hox expressing cells during axis elongation and segmentation. We find that positioning of Hox gene boundaries in the somites is a two-step process. First, an activation phase takes place in the somitic precursors in epiblast and the primitive streak which are fated to lie at the level of the definitive anterior Hox somitic boundary or slightly anterior to the boundary. This initial phase strictly obeys temporal collinearity and results in the positioning of overlapping Hox gene expression domains along the antero-posterior axis. This phase also involves timing control of the epiblast ingression to the presomitic mesoderm by Hox genes (Iimura and Pourquié, Nature 2006). Moreover, we clarified that Fgf-MAPK signal is essential for this first phase expression of the Hox genes. The second phase is linked to the segmentation process in the anterior presomitic mesoderm resulting in the precise positioning of the anterior expression boundary at its definitive somitic level. Retinoic acid-dependent Hox auto-regulation is participated in the second phase regulation.

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