



CDB SEMINAR

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13:00~14:00 A7F Conference Room

Analysis of axis formation by observing the cell behaviors during the early mouse development

Summary

In mammalian embryos, there are no substances or gene products known to be localized asymmetrically in the early cleaving stages relating to the specification of the future body axis. It has been controversial whether intrinsic information specifying the future embryonic axis is already present in early cleaving mouse embryos, or the embryonic axis is specified relatively late in development. We designed a series of experiments to analyze the behaviors of cells in early stages of mouse development to address how the embryonic axis is specified in mouse relating to the cell lineage.

We carried lineage tracing using the Cre-loxP system, which allows us to analyze cell fates over a long period of development. We examined the distribution of descendants of a single blastomere in the 8.5 day embryo after labeling at the two-cell and four-cell stages. Cells from different blastomeres intermingled and localized randomly along the body axis. These results suggested that the embryonic body axis is formed independently of early cell lineage. We then examined detailed cell behaviors in preimplantation stages by two approaches. We also examined the shape of the embryo relating to the blastocyst axis. The behaviors of cells were traced after timelapse recording of transgenic embryos expressing EGFP fused to the histone H2B. We also analyzed the cell lineage of embryos developed in the oviduct after labeling of a two-cell blastomere by photo-conversion. From these results, it is suggested that the embryonic-abembryonic axis of the blastocyst is formed independently of the early cell lineage, and the shape of the zona pellucida, which may function as an environmental cue for the embryo proper is a major factor effecting the specification of the blastocyst axis orientation.

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