
形態発生学分野

【研究プロジェクト名および概要】

I. Research on Molecular regulation of chorioallantoic membrane formation and maturation

II. Research on Molecular specification of blood and vascular development

III. Research on Roles of EMT in pluripotency maintenance and iPSC differentiation

IV. Research on embryonic stem cell (ESC)-based modeling of early development

Our lab is interested in understanding relationship between cellular morphology and cellular differentiation and function during vertebrate development (PMID: 34855481). At the center of our studies is the concept of Epithelial-Mesenchymal Transition (EMT) (PMID: 33913481; PMID: 32300252; Development. 2020), which describes cell shape changes during morphogenesis of multicellular systems. EMT is important both in normal animal development and in disease (e.g., cancer and fibrosis). We use two developmental models in our research: germ layer specification during gastrulation (using both avian embryo and human/avian pluripotent stem cells) and mesoderm differentiation during formation of blood and vascular systems (PMID: 38570190) and of the chorioallantoic membrane (which is the forerunner of placenta in mammals) (PMID: 36252211).

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【研究プロジェクト】

研究の統括

II

I, III, IV

I, II, III

I

III, IV

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【特殊技術・特殊装置】

1. Embryo extraction and ex ovo culture
2. In vitro culture of pluripotent cells
3. Immunohistochemistry and RNA in situ analysis
4. Molecular cloning and in vivo perturbation
5. RNA-seq and CAGE-seq
6. Time-lapse imaging
7. Bio-informatics analysis
8. Epithelial and mesenchymal analysis

【英文原著】

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Recent advances in artificial-intelligence enhanced additive manufacturing of heat exchangers for thermal management: a review
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