
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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【特殊技術・特殊装置】

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

【英文原著】

1. K. Sawanyawisuth*, G. Sashida* and G. Sheng* *Epithelial Mesenchymal Transition in liver fluke-induced cholangiocarcinoma* **Cancers** 13(4), 791; <https://doi.org/10.3390/cancers13040791>
2. (2021) G. Sheng* *Defining epithelial-Mesenchymal Transitions in animal development* **Development** [review] [in press]
3. (2021) G. Ismagulov, S. Hamidi and G. Sheng* *Epithelial-Mesenchymal Transition drives three-dimensional morphogenesis in mammalian early development* **Frontiers in Cell and Developmental Biology** <https://doi.org/10.3389/fcell.2021.639244>
4. (2021) S. Hamidi, H. Nagai and G. Sheng* *Partial EMT/MET: an army of one* **Methods in Molecular Biology** 2179:29-33. doi: 10.1007/978-1-0716-0779-4_5 [commentary]
5. (2020) T. Alam, S. Agrawal, J. Severin, R. S. Young, R. Andersson, E. Amer, A. Hasegawa, M. Lizio, J. Ramilowski, I. Abugessaisa, M. S. Taylor, T. Lassmann, M. Itoh, T. Kasukawa, H. Kawaji, L. Marchionni, G. Sheng, A. Forrest, L. M. Khachigian, Y. Hayashizaki, P. Carninci, M. de Hoon* *Comparative transcriptomics of primary cells in vertebrates* **Genome Research** [primary research] DOI:10.1101/gr.255679.119
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7. (2020) S. Hamidi, Y. Nakaya, H. Nagai, C. Alev, T. Kasukawa, S. Chhabra, R. Lee, H. Niwa, A. Warmflash, T. Shibata and G. Sheng* *Mesenchymal-epithelial transition regulates initiation of pluripotency exit before gastrulation.* **Development** [primary research] DOI:10.1242/dev.184960 [PMID:32014865]
8. (2020) W. Weng, H. Hagai, S. Hamidi and G. Sheng* *NPAS4L is involved in avian hemangioblast specification.* **Haematologica** [primary research] DOI:10.3324/haematol.2019.239434