

Molecular Analysis of Gene Regulatory Networks during the Embryonic Development of Zebrafish

Project Leader

KAMACHI, Yusuke, Dr. Sci.

Professor, Environmental Systems Engineering

1. Objective

This project is aimed at improving our understanding of gene regulatory networks in the developmental processes of zebrafish embryos, with an emphasis on transcriptional regulation in the context of cell differentiation and tissue development. The project particularly focuses on the functional roles of the Sox transcription factor family (e.g., Sox2, Sox11) during development of the central nervous system and sensory organs. Successful applicants will work toward uncovering and studying novel regulatory networks involving the Sox transcription factors by combining molecular biology, genomics technologies, bioinformatics and zebrafish genetics.

2. Project Outline

To that end, the project will consist of the following phases:

- (a) Generation of genome-edited zebrafish to investigate the function of the Sox genes
- (b) Analysis of the genome-edited zebrafish embryos
- (c) Analysis of gene regulatory networks

3. Expected Performance

In this project, the successful candidate would be expected to:

- (a) Play a significant role in the research project
- (b) Work actively and collaboratively with other members of the research group
- (c) Contribute to the maintenance of the fish facility

4. Required Skills and Knowledge

The successful candidate for this project will have the following knowledge and skills:

- (a) A solid understanding of molecular and cellular biology
- (b) An understanding of developmental biology (preferred)
- (c) General molecular biology skills

References

- (1) Kamachi, Y., and Kondoh, H. (2013) Sox proteins: regulators of cell fate specification and differentiation. *Development*. 140, 4129-4144.
- (2) Okuda, Y., Ogura, E., Kondoh, H. and Kamachi, Y. (2010) B1 SOX coordinate cell specification with patterning and morphogenesis in the early zebrafish embryo. *PLoS Genet.* 6(5): e1000936.
- (3) Ogura, E., Okuda, Y., Kondoh, H. and Kamachi, Y. (2009) Adaptation of GAL4 activators for GAL4 enhancer trapping in zebrafish. *Dev. Dyn.* 238, 641-655.

See our admission guidelines:

<https://www.kochi-tech.ac.jp/english/admission/ssp/guideline.html>

Contact

E-mail: kamachi.yusuke@kochi-tech.ac.jp