

FULL SPEAKER BIOGRAPHY and ABSTRACT

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Yoshiki Sasai is a group director at the Center for Developmental Biology, RIKEN Kobe. He received a MD degree (1986) and a PhD degree (1993) from Kyoto University School of Medicine. After internship in internal, he studied molecular neurobiology with Dr Shigetada Nakanishi, and identified the mammalian HES gene family as a negative regulator of differentiation. Then, he worked with Dr Eddy De Robertis at UCLA and isolated the neural inducer Chordin in *Xenopus*. He got an associate professor position at Kyoto University in 1996, and a full professor position in 1998. He moved to RIKEN in 2003 and is currently working on early neural patterning of vertebrates and in vitro neural differentiation of ES cells. Editorial board member for *Neuron*, *Developmental Dynamics* etc.

Molecular and cellular control of neuroepithelial differentiation in ES cell culture

Over the last several years, much progress has been made for in vitro culture of mouse and human ES cells. In particular, once directed differentiation are made possible, ES cell-derived CNS tissues would be highly valuable for therapeutics of degenerative diseases in the brain and eye. Our laboratory focuses on the molecular and cellular mechanisms of neural differentiation from pluripotent cells. Pluripotent cells first become committed to the ectodermal fate and subsequently differentiate into uncommitted neuroectodermal cells. Both previous mammalian and amphibian studies on pluripotent cells have indicated that the neural fate is a sort of the basal direction of the differentiation of these cells while mesoendodermal differentiation requires extrinsic inductive signals. We have recently identified a new regulatory molecule that controls ectodermal commitment from pluripotent cells (*Xenopus* and mouse) by acting in the non-Smad pathway. Then, the formed ectodermal cells differentiate into neuroectodermal cells with a rostral-most character (rostral forebrain including telencephalon and hypothalamus) when they are cultured in the absence of strong patterning signals. In this talk, I would like to discuss this issue in detail by referring to our recent data from neural patterning study using serum-free culture of mouse ES cells, particularly focusing on molecular regulators of the early steps of neural determination.

What is the central hypothesis of my presentation?

Neural differentiation needs active transcriptional control.

What is the most important observation I will discuss?

Molecular switches for early neural commitment.

What is the translational significance?

Not directly, but, in the long term, our findings should contribute to the more selective control of neural tissues from ES cells.