



CDB SEMINAR

Toshihiko Ogura

Department of Developmental Neurobiology
Institute of Development, Aging, and Cancer, Tohoku University

Monday, May 19, 2008

16:00~17:00 C1F CDB Auditorium

Physical forces generated by cells and sensed by cells

Summary

Orchestration of differentiation, migration and re-assembly of cells is one of the most fundamental aspects of pattern formation. We thought that these coordinated behaviors of cells are regulated by a genetic program, in which pivotal genes regulate these steps in a tight and precise manner. This also implies that careful dissection of the genetic program and detailed analyses of functions of genes should help us to understand complicated morphogenesis of tissues and organs. Nonetheless, we have just come to a point to re-evaluate our approaches and to proceed to a new field, which has never been explored.

Pattern formation, such as the Benard convection and the Taylor instability, is also extensively studied in physics and chemistry. In these cases, a homogenous group of molecules can form orderly patterns. In another case, oxidative and reductive states repeat in an oscillatory way, known as the Belousov-Zhabotinsky reaction. These indicate that similar autonomous mechanisms do exist in developing embryos, some of which were already studied extensively by Turing and Meinhard.

We have been exploring molecular mechanisms of pattern formation of vertebrate embryos with several key transcription factors. Nonetheless, we have noticed that extensive analyses on the genetic programs are not sufficient for understanding the dynamic pattern formation of developing embryos. Recently, we have found that several proteins respond to physical forces generated by cells, hereby such strains trigger next biochemical responses. We are now studying this novel mechanism to understand functional roles of physical forces generated by cells and sensed by cells. I present our recent data for discussion.

Host:
Masahiko Hibi
Vertebrate Axis
Formation, CDB
hibi@cdb.riken.jp
Tel: 078-306-3135
(1402)

RIKEN CENTER for DEVELOPMENTAL BIOLOGY (CDB)