CDB SEMINAR

Speaker: Ichiro Nishii

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Title:

" Inversion of *Volvox* as a model for studying morphogenesis "

Date:	**Friday, September 10**
Time:	**16:00 -17:00**
Place:	**7F Conference Room of Building A,CDB**

Summary:

In *Volvox carteri*, large reproductive cells are enclosed within a spherical monolayer of small biflagellate somatic cells. However, embryos must "invert" (turn inside out) to achieve this configuration because, at the end of cleavage, the reproductive cells are on the outside and the flagellar ends of all somatic cells point inward. Generation of a bend region adequate to turn the embryo inside out involves a dramatic change in cell shape, plus cell movements. I use inversion as a model system for studying the genetic and cytological regulation of a multicellular morphogenetic process. With the *Volvox* transposon-tagging system to produce inversionless mutants, I cloned a gene called *invA* that is essential for inversion. The *invA* gene encodes a kinesin localized in the cytoplasmic bridges that link all cells to their neighbors. In *invA* null mutants, cells change shape normally, but are unable to move relative to the cytoplasmic bridges. A normal bend region cannot be formed and inversion stops. This suggests that the InvA kinesin provides the motile force that normally drives inversion to completion by moving cells to relative to the bridges.

I recovered an *invA* homologue, *IAR1* from *Chlamydomonas reinhardtii*, a unicellular relative and an ancestral species of *Volvox*. *IAR1* is able to rescue the InvA mutant by transformation. This indicates that the *IAR1*– which obviously must have some other function in *C. reinhartii* – was co-opted without significant modification for use as the motor to drive inversion. IAR1 protein can be detected at all stages in synchronized *C. reinhardtii* cultures, but is upregulated during mitosis. Immunofluorescence indicates that IAR1 is located near the basal bodies in both interphase and dividing cells, but that in dividing cells it is also found near the division apparatus. This suggests that it might have some role in cytokinesis and evolved to be used for inversion.

Host: **Masatoshi Takeichi** **<Cell Adhesion/Tissue Patterning, CDB >**

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