



# CDB SEMINAR

## Timm Schroeder

Institute of Stem Cell Research, Helmholtz Zentrum Muenchen  
- German Research Centre for Environmental Health (GmbH)

Wednesday, September 29, 2010

16:00-17:00 A7F Seminar Room

### Tracking stem cells at the single cell level: New tools for old questions

#### Summary

Stem cell driven regenerative systems are highly complex and dynamic, consisting of large number of different cells expressing many molecules controlling their fates. For example, millions of new cells of the more than 10 different blood lineages are being produced from hematopoietic stem cells (HSC) every second throughout lifetime. Despite intensive research, many long-standing questions in stem cell research remain unsolved. One major reason is the fact that stem cell systems are usually followed by analyzing the fate of populations of cells - rather than individual cells - at very few time points of an experiment, and without knowing their individual identities. Real-time tracking of individual cells in culture, tissues or whole organisms would be an extremely powerful approach to fully understand the developmental complexity of stem cell driven regeneration. We therefore develop culture and imaging systems to follow the fate of individual cells over long periods of time. New software is programmed, helping to record and display the divisional history, position, properties etc. of all individual cells in a culture over many generations. Our approaches also allow the continuous long term quantification of protein expression levels in living stem cells. This novel kind of quantitative data of single cell behavior and molecule expression is used as the basis for the improved generation and falsification of models describing stem cell systems. I will discuss how we use these approaches to try to find answers for some long standing questions in stem cell research.

#### Host:

**Shinichi Nishikawa**  
Stem Cell Biology, CDB  
[nishikawa@cdb.riken.jp](mailto:nishikawa@cdb.riken.jp)  
Tel: 078-306-1893  
(ext : 5301)

RIKEN CENTER for DEVELOPMENTAL BIOLOGY (CDB)