



# CDB SEMINAR

## Yuichi Tsukada

Department of Molecular and Cellular Biology, Medical Institute of Bioregulation, Kyushu University

Tuesday, February 8, 2011

16:00 - 17:00 A7F Seminar Room

## Hydroxylation regulates chromatin demethylation

### Summary

Covalent modifications of chromatin play an important role in regulating chromatin dynamics and function. One such modification, methylation, occurs on both histone and DNA of chromatin, and its status defines the epigenetic program of a cell by determining chromatin structure and thereby regulating DNA-dependent processes such as transcription. However, the reversibility of chromatin methylation remains elusive, thereby it has been one of the major topics in epigenetics research.

We have been studying the effect of hydroxylation of the methyl-group on the reversibility of chromatin methylation. Regarding histone methylation, we have demonstrated that hydroxylation of methylated histone mediates demethylation by the identification of histone demethylase family composed of JmjC-domain containing proteins. Further study of JmjC-domain containing histone demethylases revealed that histone methylation is a more dynamic process than previously recognized and that histone demethylases participate in diverse range of biological processes. I will introduce recently identified histone demethylase that is highly expressed in oocyte. On the other hand, hydroxylation of methylated DNA also occurs in cells. We have discovered that hydroxymethylated DNA appears in paternal pronuclei but not in maternal pronuclei of one cell mouse embryo in parallel with demethylation of paternal DNA. This finding suggested that hydroxylation of methylated DNA might be involved in DNA demethylation process. I will report potential roles of hydroxylation of methylated DNA. These findings will contribute to understanding the programming and reprogramming of gene expression that are substantially regulated by epigenetics.

### Host:

**Shigeo Hayashi**

Morphogenetic  
Signaling, CDB  
[shayashi@cdb.riken.jp](mailto:shayashi@cdb.riken.jp)  
Tel:078-306-3185  
(ext:1523)