# Epigenetics

## 1. Staffs and Students (April 2009)

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## 2. Purpose of Education

"Epigenetics" coupled with "Genetics" enables us to elucidate several 'genomic functions' in inheritance, development and evolution of organisms including our human beings. Genomic imprinting is one of the mammalian specific gene regulation mechanisms that gives rise to functional differences between paternally- and maternally-derived genomes in development, behavior and growth. Somatic cloned animals give us unique chances to examine 'genetically identical but epigenetically diverged animals'. These studies show us how Epigenetics is important in mammalian biology. Our department focuses these mammalian specific genomic functions to elucidate how these genomic functions work and how new genomic functions have been evolved during evolution. Our final goal is to contribute to the 21th's medicine and human biology by novel understanding of genomic functions.

## 3. Research Subjects

1) Genomic imprinting in human and mammalian development.
2) Placenta function and its evolution in mammals.
3) Somatic cloning: its epigenetic effects and application to regenerative medicine.
4) Assisted reproductive technology: its epigenetic effects and safer application.
5) Role of retrotransposon-derived genes in mammalian specific genomic functions.

## 4. Publications

### Original Article

1. Miki, H., Hirose, M., Ogonuki, N., Inoue, K., Kezuka, F., Honda, A., Mekada, K., Hanaki, K. I., Iwafune, H., Yoshiki, A., Ishino, F. and Ogura, A. Efficient production of androgenetic embryos by round spermatid injection. Genesis 47(3), 155-160 (2009).
2. Shiura, H., Nakamura, K., Hikichi, T,. Hino, T., Oda, K., Suzuki-Migishima, R., Kohda, T., Kaneko-Ishino, T., Ishino, F. Paternal deletion of *Meg1/Grb10* DMR causes maternalization of the *Meg1/Grb10* cluster in mouse proximal Chromosome 11 leading to severe pre- and postnatal growth retardation. Hum. Mol. Genet. 18(8), 1424-1438 (2009).
3. Sato, N., Amino, T., Kobayashi, K., Asakawa, S., Ishiguro, T., Tsunemi, T., Takahashi, M., Matsuura, T., Flanigan, K. M., Iwasaki, I., Ishino, F., Saito, Y., Murayama, S., Yoshida, M., Hashizume, Y., Takahashi, Y., Tsuji, S., Shimizu, N., Toda, T., Ishikawa, K. and Mizusawa, H. Spinocerebellar Ataxia Type 31 Is Associated with "Inserted" Penta-Nucleotide Repeats Containing (TGGAA)n. Am. J. Hum. Genet. 85(5), 544-557 (2009).