

Mini-Symposium:

Differentiation in Early Development of Embryo to Placental Formation in Mammalian Species: The Roles of Specific Gene Regulation and Expression in Placental Formation

Preface

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The theme of this symposium is a contemporary overview of gene regulation and expression from the early development of embryo to placental formation in mammalian species. It has been reported that dynamic genome-wide changes could be occurring in the early stage of embryonic development, which are believed to be important for mammalian development. However, the physiological or biological mechanisms of these changes are unclear. This mini-review introduces the recent progress of research into the molecular mechanisms of the early development of the embryo and placental formation by three outstanding Japanese researchers in this field.

Interesting information on trophoctodermal layer formation and its gene regulation has been published, and considering these reports, Dr. Imakawa describes the necessity of supporting and nourishing the conceptus, which must be protected from maternal rejection, which is enabled by specific structures called by placenta, and genomic imprinting controlled by differential methylation of DNA. Dr. Hata describes gene expression by epigenetic regulation in mammalian placentation. Defects in the imprinting mechanism are caused by several genetic disorders. Dr. Ishino describes a retrotransposon-derived imprinted gene that is essential for the formation of the placenta. A recent comprehensive survey of the mammalian genome revealed the presence of a newly acquired gene.

I hope that the new topics we introduce in this symposium stimulate your interest in genetic regulation in the period from implantation to placentation, and will encourage many young researchers to enter this field.