

Preimplantation Development and Later Organogenesis in Mammals

포유동물에 있어서 착상전후 배아발달 및 기관형성

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임 정묵

Understanding various biological events during embryogenesis are important for the researches on developing innovative biotechnologies and, through this presentation, several major events during preimplantation development and later organogenesis will be reviewed. Embryo is generated by the penetration of spermatozoon into an ovulated oocyte that completes its final maturation process. After fertilization in the oviduct, called the uterine tube in the human, the blastomere of embryo repeatedly cleaves and embryonic genome is activated from the second to the fourth cell cleavages. Genomically activated embryo then downs into the uterus before or after blastomere compaction at the 16- to 32-cell stage. The first differentiation of cleaving embryo to form blastocoele, inner cell mass and trophoblast is subsequently occurred, and blastocyst consisting of those three embryo tissues subsequently implants to the endometrium of the uterus. There are numerous factors affecting implantation process such as interleukin, nitric oxide and various genes relating embryo development. Further differentiation in implanted embryos is found and the inner cell mass of embryo differentiates into the epiblast and the hypoblast. Some of the epiblast cells subsequently migrate toward the hypoblast and form the mesodermal cells. So, three germinal layers are finally formed; the endoderm from the hypoblast, the ectoderm from the epiblast and the mesoderm from the migrated epiblasts. On the other hand, the trophoblast differentiates into syncytiotrophoblast via cytotrophoblast and the syncytiotrophoblast act as a primordium of the placenta. Numerous primitive organs then form from different germ layers and, among them, the primitive heart first functions in the embryo. Dramatical changes in embryo morphology are subsequently occur and the formation of the notochord before neural tube formation is one of typical characteristics in mammalian embryo development.