

**Isolation, Differentiation and In Vivo Application of Pluripotent Stem Cells**

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Stem cells provide the great hope for the future medicine, as well as basic science. With the isolation of human pluripotent stem cell lines, the significance of stem cell research and its applications will continuously increase. We are interested in various aspects of stem cell biology, especially using embryonic stem (ES) cells and embryonic germ (EG) cells. We here report the establishment and characterization of new human ES and EG cell lines, with a particular emphasis on the differentiation into specific cell types and the transplantation into disease animal models. We believe that our results will provide an important basis for the future research direction and applications.

**Current trends in stem cell biology and cell replacement therapy**

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Stem cells have been regarded as undifferentiated cells capable of self renewal, proliferation, production of undifferentiated progeny and regeneration of tissues. Generally, it has been thought that only embryonic stem cells (ES) are pluripotent. However, this view of stem cell potential has been challenged lately. Bone Marrow (BM)-derived cells have been shown not only to reconstitute the blood, but also to contribute to muscle, brain, liver, heart and the vascular endothelium. Stromal cells in the BM, which are distinct from hematopoietic stem cells (HSC), have also been shown to yield a multitude of cell types. Therefore, these recent findings suggest that stem cell biology maybe more complex than originally expected. In this presentation, all these current concepts and trends in stem cell biology and possible cell replacement therapy using bone marrow derived cells will be reviewed. And the isolation & characterization of HSC for cell replacement therapy will be discussed.