

〈特別講演〉

幹細胞医学：関西での再生医学研究と連携

笹井 芳樹*

Stem Cell Medicine: Regenerative Medicine Studies and Regional Collaborations in the Kansai Area

Yoshiki SASAI*

Abstract

We have identified a stromal cell-derived inducing activity (SDIA) that promotes neural differentiation of mouse ES cells. SDIA accumulates on the surface of PA 6 stromal cells and induces efficient neuronal differentiation of co-cultured ES cells in serum-free conditions without use of either retinoic acid or embryoid bodies. >90% of SDIA-treated mouse ES cells differentiate into neural cells in this method. Nestin-positive neural precursors appear in 3–4 days, while TuJ 1-positive postmitotic neurons begin to form in 5 days. BMP 4, which acts as an anti-neuralizing morphogen in *Xenopus*, suppresses SDIA-induced neuralization and promotes epidermal differentiation. The time course of marker expression and the requirement of factors suggest that SDIA-treated ES cells undergo neural differentiation in a natural manner, comparable to that in the embryo. Neural induction by the SDIA method has been shown to be applicable to not only mouse ES cells, but also primate ES cells. In addition to CNS neurons, PNS neurons and retinal cells are shown to be induced from ES cells with a modification of this method. Neural induction by SDIA thus provides a new powerful tool for basic neuroscience research and for applied medicine including cell therapy and drug screening.

Key words: ES cells, stem cells, induction, Parkinson's disease, neurogenesis.