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ACS-sorted Tα1-GFP/LacZ ES Cells as Neural Stem Cells[1]

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Neural stem cells (NSCs) can be expanded and differentiated *in vitro*. However, no surface marker for the isolation of pure NSCs is available at present. The present studywas aimed to isolate novel surface markers by screening the genes upregulated in NSCs. By identifying genetic profiles we tried to develop new candidate surface molecules expressed specifically in NSCs. To do this, the gene expressions of both undifferentiated ES cell and ES cell-derived NSC were analyzed with a DNA microarray. To obtain the ES cell-derived NSCs, we used the neurospecific Tα1-GFP-tagged ES cells that expressed GFP-LacZ fusion protein when they are differentiated neural stem cells or early neuronal cells. Analysis of alterations in the gene expressions showed that 6 surface protein genes and 190 transmembrane protein genes were overexpressed in the FACS-sorted NSCs. The RT-PCR analysis of novel candidate genes showed that the temporal expression of the genes during the neural differentiation. Thus, the combined studies of pure isolation of NSCs and DNA microarray should uncover novel surface marker genes for non-invasive purification of NSCs by conventional cell sorting techniques already available.

Keywords: Neurospecific Tα1-GFP, ES cells, Neural stem cell, DNA microarray, Surface marker.

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