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Multipotential character of nestin-positive cells differentiated from adult mouse pancreatic islets

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We modified previously described method for the generation of nestin-positive cells from adult mouse islets, further to research the characteristic of nestin- positive cells and explore the effect of basic fibroblast growth factor for nestin-positive cells. Nestin- positive cells could be isolate with high purity by using fluorescent–activated cell sorting and generate neural and islet cells .A subset of Pdx-1-positive cells in nestin- positive cells were demonstrated to differentiate into islet cells. Insulin, Glucagons, Somatostatin, Pdx-1, β_3–tubulin, GFAP, nestin, Ngn-1, Ngn-2, Ngn3, Mash-1, Sox-1, Sox-2 and Sox-3 mRNA was detected by real time PCR at different stages during development of nestin- positive cells. Our results suggested that nestin expression might indicate the beginning of differentiation toward neural and islet cells. The similarity in gene expression program might exist in pancreatic and neural precursor cells. Although the absence of bFGF increased the percentage of insulin- positive cells and intracellular insulin level in nestin- positive-derived cells, insulin release in response to glucose was down-regulated compared with the presence of bFGF. bFGF was demonstrated to be an indispensable requirement for nestin-positive cells differentiate into functional insulin-producing cells. A reversibly immortalized nestin- positive cell line was established with adeno-X Tet-On vectors coding with SV40 virus large T-antigen. Establishment of a reversibly immortalized nestin-positive cells line would be a means for further investigating the mechanisms of islet cell development, and they could also provide a potential source of cells for islet engineering.

Keywords**:** islets, nestin, differentiation, insulin, bFGF, immortalization, SV40

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