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## Derivation of Engraftable Myogenic Precursors from Murine ES/iPS cells and Generation of Disease-specific iPS cells from Patients with Duchenne Muscular dystrophy (DMD) and Other Diseases

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Duchenne muscular dystrophy (DMD), caused by mutations in the X-linked dystrophin gene, is a progressive, lethal muscle disorder with no effective cure despite extensive research efforts in the field. In recent years, many different myogenic cells originating from adult tissues have been reported. However, the establishment of a reliable cell source is required for clinical application.

Embryonic stem (ES) cells and the recently established induced pluripotent stem (iPS) cells are totipotent stem cells that are infinitely expandable and capable of differentiating into all types of somatic cells.

In this study, we established a novel protocol to derive myogenic precursors from murine ES/iPS cells with a monoclonal antibody SM/C-2.6 that recognizes quiescent satellite cells. SM/C-2.6-positive cells are highly myogenic and efficiently differentiate into myofibers both in vitro and in vivo.

Furthermore, the transplanted cells demonstrated extensive muscle regeneration activity in a second injury model without cell transplantation as well as long-term engraftment up to 24 weeks. Both these results indicated that the transplanted cells act as muscle stem cells as well as myogenic precursors. Our data suggest that iPS cells are a new attractive cell source for cell-based therapies.

Recently, we succeeded the generation of disease-specific iPS cells from skin fibroblasts of a DMD patient and his parents by the reprogramming with Oct3/4, Sox2, Klf4 and c-Myc. Generation of patient-specific iPS cells indicates possible strategy of regenerative medicine for DMD with normal or patient iPS cells. Finally, I will talk about other disease-specific iPS cells from the patients with CINCA (Chronic Infantile Neurological Cutaneous and Articular) syndrome with somatic mosaicism

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