Title: **Medical innovation by non-tumorigenic reparative pluripotent Muse cells**

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Abstract:
Muse cells, collectable as SSEA-3(+) by FACS, are naturally existing, non-tumorigenic reparative endogenous pluripotent stem cells that distribute in the bone marrow, peripheral blood, connective tissue of every organ. When allogenic (donor)-Muse cells were infused intravenously, they are able to selectively home to damaged site by sphingosine-1-phosphate (S1P)-S1PR2 axis with few loss and spontaneously differentiate on-site into multiple tissue-constituent cells and replace damaged/apoptotic cells with functional cells. Intravenous drip is the main rout and do not require surgery for their administration, nor do they require gene introduction or cytokine treatment to be rendered pluripotent and induce differentiation. Muse cells have a specific immunomodulatory system, represented by HLA-G expression, allowing them to be directly administered to patients without HLA-matching or long-term immunosuppressant treatment. Currently, clinical trials using intravenously administered donor-Muse cells have been conducted for myocardial infarction, stroke, epidermolysis bullosa, spinal cord injury, perinatal hypoxic ischemic encephalopathy, and amyotrophic lateral sclerosis.

Muse cells have the potential to break through the limitations of current cell therapies for various kinds of diseases. They may safely provide clinically relevant effects compatible with the 'body's natural repair systems' by a simple cost-effective strategy; collection, expansion and intravenous drip, thus may deliver medical care innovation.