A novel type of non-tumorigenic pluripotent stem cell, the Muse cell (multi-lineage, differentiating stress enduring cell), resides in the connective tissue and in cultured mesenchymal stem cells (MSCs) and is reported to differentiate into multiple cell types according to the microenvironment to repair tissue damage. We examined the efficiency of Muse cells in a mouse intracerebral hemorrhage (ICH) model. Seventy µl of cardiac blood was stereotactically injected into the left putamen of immunodeficient mice. Five days later, 2 × 105 of human bone marrow MSC-derived Muse cells (n = 6) or cells other than Muse cells in MSCs (non-Muse, n = 6) or the same volume of PBS (n = 11) was injected into the ICH cavity. Water maze and motor function tests were implemented for 68 days, and immunohistochemistry for NeuN, MAP2 and GFAP was done. The Muse group showed impressive recovery: Recovery was seen in the water maze after day 19, and motor functions after 5 days was compared with the other two groups, with a significant statistical difference (p < 0.05). The survival rate of the engrafted cells in the Muse group was significantly higher than in the non-Muse group (p < p0.05) at day 69, and those cells showed positivity for NeuN ( $\sim$ 57%) and MAP-2 ( $\sim$ 41.6%). Muse cells could remain in the ICH brain, differentiate into neural-lineage cells and restore functions without inducing them into neuronal cells by gene introduction and cytokine treatment prior to transplantation. A simple collection of Muse cells and their supply to the brain in naïve state facilitates regenerative therapy in ICH  $^{1)}$ .

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## 1)

Shimamura N, Kakuta K, Wang L, Naraoka M, Uchida H, Wakao S, Dezawa M, Ohkuma H. Neuroregeneration therapy using human Muse cells is highly effective in a mouse intracerebral hemorrhage model. Exp Brain Res. 2017 Feb;235(2):565-572. doi: 10.1007/s00221-016-4818-y. PubMed PMID: 27817105.

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