Effects of Estrogen on Neuronal Trans-Differentiation of CD34 Negative Human Umbilical Cord Blood Cells in the Ischemic Ovariectomized Rat Brain

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Intravenously delivered human umbilical cord blood cells(HUCBC) have been previously shown to improve functional recovery of stroked rats. And estrogen has the wide range of effects on the neuronal development, structure, fuction of a variety of brain regions. To extend these findings, we examined the potential use of CD34 negative HUCBC as donor cells for transplantation-based therapy in brain ischemia and tested whether estrogen mediates intravenously infused CD34- HUCBC enter, survive, differentiate in ischemic brain. PKH26 labeled CD34- HUCBC were injected into the tail vein of ischemic OVX rat with or without 17β-estradiol valerate(EV). Then behavioral tests(mNSS) were performed by weekly. After 35 days, immunohistochemical staining was used to identify neural cells derived from CD34- HUCBC in the brain sections. Under fluorescence microscopy, pKH labeled and immuno-stained cells were observed in the brain section. At 35 days after infusion, there was a significant recovery in behavioral performance when CD34- HUCBC were delivered. CD34- HUCBC transplanted into ischemic brain could migrate and survive. Transplanted cells were immunopositive for the neuronal marker β-tubulin III, the astrocyte marker GFAP and oligodendrocyte marker Gal-C. Significantly more cells were foundand differentiated to neuronal cells at the brain in the EV injection group than non-EV injected group. These result suggest that estrogen reduces ischemic damage and increases the migration and neural trans-differentiation of CD34- HUCBC.

Key words) *CD34-, Estrogen, Human umbilical cord blood cell, Ischemia, Neuronal trans-differentiation*