Human umbilical cord blood

Although human umbilical cord blood (hUCB) stem/progenitor cells present with no or minimal capacity of differentiation into mature dopaminergic neurons, their transplantation significantly attenuates parkinsonian symptoms likely via bystander effects, specifically stem cell graft-mediated secretion of growth factors, anti-inflammatory cytokines, or synaptic function altogether promoting brain repair. Recognizing this non-cell replacement mechanism, Lee et al., examined the effects of intravenously transplanted combination of hUCB-derived plasma into the 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP)-induced rat model of Parkinson's disease. Animals received repeated dosing of either hUCB-derived plasma or vehicle at 3, 5 and 10 days after induction into MPTP lesion, then behaviourally and immunohistochemically evaluated over 56 days post-lesion. Compared to vehicle treatment, transplantation with hUCB-derived plasma significantly improved motor function, gut motility and dopaminergic neuronal survival in the substantia nigra pars compacta (SNpc), which coincided with reduced pro-inflammatory cytokines in both the SNpc and the intestinal mucosa and dampened inflammation-associated gut microbiota. These novel data directly implicate a key pathological crosstalk between gut and brain ushering a new avenue of therapeutically targeting the gut microbiome with hUCB-derived stem cells and plasma for PD [1)].

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