Effect of human amnion epithelial cells on stroke outcome in mice

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Introduction & Aims: Stem cells are reported to be neuroprotective in experimental stroke, but most types of stem cells have limitations associated with their potential clinical use (Luo, 2011). Human amnion epithelial cells (hAECs) appear to have fewer practical limitations than other stem cell lineages, and here we have assessed their efficacy in modifying post-ischemic brain injury.

Methods: Male C57Bl6 mice were anaesthetized with ketamine (80 mg/kg i.p.) plus xylazine (10 mg/kg i.p.), and subjected to 0.5 h middle cerebral artery occlusion. Mice were then injected with 1×10^6 hAECs or saline (vehicle) i.v. at either 1 h (acute treatment) or at 72 h (delayed treatment) post-stroke and brains were removed 3 or 14 days, respectively. Neurological and motor assessments were performed every 3-4 days.

Results & Discussion: Fluorescently-labelled hAECs injected at 1 h post-stroke were evident at 72 h in the infarct region of the brain in association with improved neurological and motor function (both $P<0.05$; n=7-12). Infarct volume tended to be smaller in hAEC-treated mice ($P=0.08$). Immunofluorescence of key markers of apoptosis, cleaved caspase-3 and annexin V, indicated less apoptosis occurred in the infarct core of mice treated with hAECs. Furthermore, mice that received delayed post-stroke hAEC treatment had improved survival to 14 days compared with vehicle-treated mice, but functional outcomes were not different between surviving animals from each treatment group (n=10/group). Thus, early post-stroke i.v. delivery of hAECs appears to ameliorate brain injury and functional deficit, and delayed post-stroke hAEC treatment improves survival to 14 days. These findings suggest that hAECs could be a viable and effective clinical stroke therapy.

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