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## Effect of delayed post-treatment with adult-sourced adipose-derived mesenchymal stem cells on motor function and striatal medium-spiny projection neurons after neonatal rat hypoxia-ischemia

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**H**ypoxic-ischemic (HI) brain injury can cause disabilities in term-born infants. This study investigated the therapeutic effects of adult-sourced adipose-derived mesenchymal stem cells (MSCs) on motor skills, and on neuronal restoration in the anterior striatum, following HI-induced brain injury. On postnatal day (PN) 7, Sprague-Dawley rat pups were exposed to HI right-sided brain injury, weight-matched and assigned to groups (n=8-10/group)–untreated (HI+Dil), normal controls (Normal+Dil), single stem cell-treated (HI+MSCs×1) and double stem cell-treated (HI+MSCs×2). On PN14 and 16, all groups were treated with either diluent or stem cells. All animals were then tested repeatedly on the cylinder and staircase tests for their motor skill ability and perfused on PN106/107. Serial 5 µm thick frozen sections were cut coronally through the brain using a cryostat and immunohistochemically stained for striatal dopamine- and cAMP-regulated phosphoprotein-32-positive spiny projection neurons. The absolute number of these neurons was estimated using the Cavalieri's, physical dissector and Abercrombie/unfolding methods. HI groups were significantly impaired on left- versus right-sided motor skills on the staircase test (e.g. HI+MSCs×1, repeated ANOVA,  $p < 0.005$ ), but the control animals were not. The absolute number of DARPP-32-positive neurons in the striatum was significantly greater (Student's t-test,  $p < 0.04$ ) in the control group compared to all HI groups. There was no statistically significant rescue of motor skills or striatal spiny projection neurons by delayed single- or double-treatment with adipose-derived MSCs. These results suggest that treatment with this particular type of stem cell has limited therapeutic potential for rescuing striatal neurons and motor deficits after neonatal hypoxia-ischemia.

### Biography

Benjamin E Aghoghovwia has completed his MSc from the University of Lagos, Nigeria. He is currently near the end of the second year of his PhD at the Department of Anatomy and the Brain Health Research Centre, University of Otago, Dunedin, New Zealand. He has published 3 papers in reputed journals, including the *Journal of Anatomy*, and has been serving as a Laboratory Demonstrator in undergraduate courses on neuroscience and health sciences at the University of Otago.

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