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Reconstruction of injured spinal cord by epigenetic regulation of transplanted neural stem cells

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The body's capacity to restore damaged neural networks in the injured CNS is severely limited. Although various treatment regimes can partially alleviate spinal cord injury (SCI), the mechanisms responsible for symptomatic improvement remain elusive. Here, using a mouse model of SCI, we show that combined transplantation of neural stem cells (NSCs) and administration of valproic acid (VPA), a known antiepileptic and histone deacetylase inhibitor, synergistically enhances hindlimb functional restoration. Preferential differentiation of transplanted NSCs into neurons, rather than glial cells, was promoted in VPA-treated mice. Anterograde corticospinal tract tracing revealed that transplant-derived neurons reconstructed broken neuronal circuits, thereby allowing them to transmit signals in a relay manner. Ablation of the transplanted cells abolished the recovery of hindlimb motor function, confirming that they contributed directly to restored motor function. These findings raise the possibility that epigenetic status in transplanted NSCs can be manipulated to provide effective treatment for SCI.

Biography

Masahiko Abematsu has completed his PhD from Kagoshima University and Postdoctoral studies from Nara Institute of Science and Technology. He is the Clinical Lecturer of Orthopaedic Surgery, Kagoshima University Medical and Dental Hospital. He has published more than 20 papers in reputed journals and serving as Reviewer Member of *Journal of Neuroscience Research, Cellular* and *Molecular Neurobiology and Journal of Dermatological Science*.

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