Hearing restoration may be possible with cochlear repair after transplant of human cord blood cells

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According to an Italian research team publishing their findings in the current issue of *Cell Transplantation* (17:6), hearing loss due to cochlear damage may be repaired by transplantation of human umbilical cord hematopoietic stem cells (HSC) since they show that a small number migrated to the damaged cochlea and repaired sensory hair cells and neurons.

For their study, the team used animal models in which permanent hearing loss had been induced by intense noise, chemical toxicity or both. Cochlear regeneration was only observed in animal groups that received HSC transplants.

Researchers used sensitive tracing methods to determine if the transplanted cells were capable of migrating to the cochlea and evaluated whether the cells could contribute to regenerating neurons and sensory tissue in the cochlea.

"Our findings show dramatic repair of damage with surprisingly few human-derived cells having migrated to the cochlea," said Roberto P. Revoltella, MD, PhD, lead author of the study. "A fraction of circulating HSC fused with resident cells, generating hybrids, yet the administration of HSC appeared to be correlated with tissue regeneration and repair as the cochlea in non-transplanted mice remained seriously damaged."

Results also showed that cochlear regeneration was less in the transplanted group deafened by noise rather than chemicals, implying that damage was more severe when induced by noise. Regenerative effects were greater in mice injected with a higher number of HSC. They also found that regeneration of cochlear tissues improved as time passed.

According to Revoltella, their results suggest the possibility of an "emerging strategy for inner ear rehabilitation….providing conditions for the resumption of deafened cochlea."

"This study provides hope for a potential treatment for the repair of hearing impairments, particularly those arising as a consequence of cochlear damage," said David Eve, PhD, at the University of South Florida Health, and associate editor of Cell Transplantation.

Source: Cell Transplantation Center