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Bone Marrow Stromal Stem Cells May Aid in Stroke Recovery

A research study from the Farber Institute for Neurosciences and the Department of Neuroscience at Thomas Jefferson University determines bone marrow stromal stem cells may aid in stroke recovery. The results can be found in Cell Transplantation -- The Regenerative Medicine Journal.

The study examining the effects of a systematic administration of either rat (allogenic) or human (xenogenic) bone marrow stem cells (MSC) administered to laboratory rats one day after their simulated strokes found "significant recovery" of motor behavior on the first day. Early administration was found to be more effective than administration seven days after the simulated strokes.

"The timing of stem cell treatment was critical to the magnitude of the positive effects," said the study's lead author, Lorraine Iacovitti, Ph.D., professor, Department of Neuroscience at Jefferson Medical College of Thomas Jefferson University. "In the host animals we found profound changes and preserved brain structure along with long-lasting motor function improvement."

According to Dr. Iacovitti, there has been little research into just how stem cell transplantation modifies inflammatory and immune effects as well as promotes regenerative effects, such as blood vessel growth. They observed

increased activation of microglia as well as modification of the circulating levels of cytokines and growth factors, including elevated VEGF and new blood vessel formation (angiogenesis) following transplantation.

"The mechanism through which MSCs achieve these remarkable effects remains elusive," said Dr. Iacovitti. "It is possible that activated glia cells (nonneuronal cells that perform a number of tasks in the brain) may play some role in the response, perhaps by partitioning off the infarcted region and limiting the spread of ischemic brain damage without inducing scar formation."

The research team concluded that there was "little doubt" that the administration of stem cells can modify the cellular and molecular landscape of the brain and blood, limiting damage and protecting the stroke-injured brain.

Other Jefferson researchers participating in this study included Robert Rosenwasser, M.D. (Neurological Surgery) and Ming Yang, M.D., Ph.D. (Neuroscience).