

MRI-Guided Method Improves Stem Cell Delivery Efficacy



Scientists at the Texas Biomedical Research Institute, San Antonio, have developed a new minimally invasive interventional magnetic resonance imaging (iMRI) approach for delivering neural stem cells (NSCs) to the brain. The new method has the potential to improve outcomes of patients with neurological disorders.

Stem cell-based therapy lights a new hope for the treatment of a variety of diseases and injuries, such as neurological disorders, stroke and traumatic brain injury. Stem cell delivery procedures play a decisive role in the success of the cell therapy approach. Most transplantation laboratories use cannula needles, syringes and catheters for the delivery of the cells. However, flow rate, suspension solution, needle diameter, cell density and tissue mechanics very often negatively affect the survival of the cells during delivery. Evidence shows that more than 80% of grafted cells do not survive the delivery. Other limitations of currently used methods include injection site inaccuracy and puncturing structures such as blood vessels. All these translate into very poor patient outcomes.

A study published in *STEM CELLS Translational Medicine* by Malloy and colleagues now shows that stem cell delivery using iMRI offers an alternative approach, which may improve the safety and efficacy of NSC transplantation therapies. The researchers prelabeled NSCs with a contrast agent and used real-time MRI to guide the injection cannula to the target and to track the delivery of the NSCs into the putamen of baboons. The new technique is non-invasive and highly accurate in the placement of NSCs to the basal ganglia of the brain. The results revealed that effective targeted delivery and pulsatile dispersion of injected cells was achieved. The latter finding demonstrates that injected cells are not released at a steady rate but instead disperse in the brain and thus points towards the need for the preparation of optimal NSC function.

The current study suggests that iMRI is becoming a necessity in clinical applications as it enhances patient safety and significantly improves the efficacy of stem cell transplantation thus increasing the chances of an effective stem cell-based therapy in patients with various neurological disorders and types of brain injury.

Source: [STEM CELLS Translational Medicine](#)

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