

MEMS - IRBI \\ MRI NAVIGATED ENHANCEMENT OF MESENCHYMAL STEM CELL (MSC). HOMING TOWARD STROKE LESION – EVALUATING AN IMPACT ON ANIMAL RECOVERY WITH BEHAVIORAL TESTING AND IMAGING.

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FUNDED PROJECTS

Stroke is a major reason of death and the leading cause for permanent disability of patients. Positive effects of mesenchymal stem cell (MSC) transplantation were seen in animal models. However, pilot clinical trials did not result in functional improvement in patients. Low efficiency of MSC therapy could be increased by facilitating MSC homing towards the brain lesion. Our project aims to develop such an approach, to investigate its feasibility and efficacy in relevant cell culture and animal models and to collect the information for safe translation into a clinical testing. In a first phase, MSC will be engineered to overexpress VLA-4 protein, which enhances cell homing to the lesioned brain. In a second phase, MSC will be labeled with iron particles and tracked by means of magnetic resonance imaging (MRI) in animals. This reveals data on MSC distribution in the brain at high resolution and confirms safety of the approach. Behavioral tests will be used to reveal efficacy of the approach in rodent models of stroke. In a third phase, the approach will be verified in a close-to-practice large animal model offering anatomical conditions being comparable to humans. In case of success, the modified MSC would be in case of success, the modified MSC would be ready to be produced for early patient studies.



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