New biomaterials promote neuroregeneration after a brain injury

November 29 2012

Professor Jose Miguel Soria, a member of the Institute of Biomedical Sciences, Universidad CEU Cardenal Herrera, has co-directed with Professor Manuel Monleón of the Universitat Politecnica de Valencia a study on the compatibility of polymeric biomaterials in the brain and its effectiveness to favour neuroregeneration in areas with some kind of damage or brain injury.

The research carried out has shown that these types of implants, made of a biocompatible synthetic material, are colonized within two months by neural progenitor cells and irrigated by new blood vessels. This allows the generation, within these structures, of new neurons and glia, capable of repairing injured brain tissue caused by trauma, stroke or neurodegenerative disease, among other causes.

The synthetic structures used in this study are made with a porous and biocompatible polymeric material called acrylate copolymer. In the first phase of the project, the structures have been studied in vitro by implanting them into neural tissue, and subsequently also in vivo, when implanted in two areas of the adult rat brain: the cerebral cortex and the subventricular zone, the most important source of generation of adult neural stem cells.

The study has confirmed the high biocompatibility of polymeric materials, such as acrylate copolymer, with brain tissue and opens new possibilities of the effectiveness of the implementation of these structures in the brain, seeking optimum location for developing

regenerative strategies of the central nervous system.

Furthermore, the results are particularly relevant when one considers that in the adult brain neuroregeneration capacity is more limited than in younger individuals and that the main impediment for this is the lack of revascularization of damaged tissue, something that the biomaterial studied has shown to favour.

The study, entitled "Channeled scaffolds implanted in adult rat brain", has been published in the *Journal of Biomedical Materials Research*.

More information: Martínez-Ramos, C. et al., Channeled scaffolds implanted in adult rat brain, *J Biomed Mater Res Part A*, 2012:100A:3276–3286. onlinelibrary.wiley.com/doi/10 … jbm.a.34273/abstract

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