

Dr. Anna Rosell will be the coordinator of a new H2020 project (EURONANOMED call).

Title: New MAGnetic Biomaterials for Brain Repair and Imaging after Stroke (MAGBBRIS)

By engineering novel magnetic nano-biomaterials we will achieve tissue repair in the context of an ischemic event. We will take advantage of nanotechnology to deliver therapeutic growth factors, secreted by progenitor cells, into the injured brain. According to the World Health Organization, 15 million persons suffer a stroke worldwide each year. However, the only available treatment is the acute thrombolytic therapy (pharmacological or mechanical) which is being administered to less than 10% of stroke patients due to strict selection criteria. In contrast, neuro-repair treatments could offer the opportunity to include most stroke patients by extending the therapeutic time window.

MAGBBRIS will demonstrate that growth factors, secreted by endothelial progenitor cells, with proved potential to induce tissue repair, can be encapsulated in magnetic biomaterials and be successfully and safely transplanted into mouse brains to induce tissue repair. In the ischemic brain, the secretome will be retained by an external magnetic field in the vasculature, improving vascular remodelling and neurogenic tissue regeneration after stroke.

Our approach will provide an advanced therapy that could be translated to a clinical stage as noninvasive, safe and available to most stroke patients. Biomaterials will be fully validated including among others aspects cytotoxicity and therapeutic properties both in vitro and in vivo; advanced imaging techniques (PET, MRI and Optical Imaging) will be used to monitor and guide the delivery of the biomaterials and to assess the therapeutic effect in vivo over time in a mouse model of cerebral ischemia. We will test the potential translation to humans by proving the feasibility of secretome production to industry level in accordance with GMP standards, and by designing a wearable magnetic device prototype for stroke patients.

This consortium is made up by highly multidisciplinary materials-science, biomedical and clinical research with industrial partnership. The project will provide a new medicinal product ready to be tested in a preclinical multicentric study.

MAGBBRIS Partners

Coordinator, Dr. Anna Rosell, Vall d'Hebron Research Institute. Barcelona, Spain.

Partner 1 : Dr. Anna Roig, Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC). Institut de Ciència de Materials de Barcelona (ICMAB). Bellaterra, Spain.

Partner 2 : Pr. Fabien Gosselet, University of Artois, Faculty Jean Perrin. Lens, France.

Partner 3 : Dr. Maria Picchio, Ospedale San Raffaele IRCCS. Milano, Italy.

Partner 4 : Dr. Filip Jelen, Pure Biologics Ltd. Wrocław, Poland.

Partner 5 : Dr. Peter Kopcansky, Institute of experimental physics, Slovak Academy of Sciences, SAS. Kosice, Slovakia.

Kick-off meeting, March 2018.