**EUROPEAN INNOVATIVE RESEARCH & TECHNOLOGICAL DEVELOPMENT PROJECTS IN NANOMEDICINE”** EuroNanoMed III JTC2017

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

**Project Investigators:**

**Fundació Hospital Universitari Vall d’ Hebron – Institut de Recerca (VHIR)**

*(Project Coordinator - Professor Anna Rossel)*

Agencia Estatal Consejo Superior de Investigaciones Científicas **(CSIC)**

*(Principal Investigator – Professor Anna Roig)*

**University of Artois, Faculty Jean Perrin** *(Principal Investigator – Professor Fabien Gosselet)*

**Ospedale San Raffaele IRCCS** *(Principal Investigator – Dr. Maria Picchio)*

**Pure Biologics Ltd** *(Principal Investigator – Dr. Filip Jelen)*

***Institute of Experimental Physics SAS*** *(Principal Investigator – Dr. Peter Kopcansky)*

**Slovak research team: Peter Kopčanský, Milan Timko\*, Andrej Musatov, Katarína Šipošová, Jozef Kováč, Michal Rajňak**

Abstract: This project is devoted to new magnetic biomaterials for brain repair. This research is very important as according to the World Health Organization, 15 million persons suffer a stroke worldwide each year. By engineering novel magnetic nano-biomaterials we would like to achieve tissue repair in the context of an ischemic event. In the frame of this project we would like to use the advantages of nanotechnology to deliver therapeutic growth factors, secreted by progenitor cells, into the injured brain. 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. We would like to pass the obtained results to human application by proving the feasibility of secretome production.

Our role in frame of this project was to propose the mathematical model for the special magnet construction. The modelling of magnetic field map of prepared focused magnet was done by using of special software program package QuickFied. On the base of calculations special focused magnet from specially oriented permanent magnet Fe-Nd-B was constructed. The comparison of mapped magnetic field and magnetic field gradient generated by this magnet and classical shape prism magnet was given. The obtained first results have showed that higher induction and higher gradient of magnetic field by prepared magnet enabling larger magnetic forces in deeper position of the body.

**\*Presenting Author: Milan Timko, PhD** received his PhD degree in Physics of Condensed Matter and Acoustics at Pavol Jozef Šafarik University in Košice, 1984. From this time he is working at Department of Magnetism Institute of Experimental Physics, Slovak Academy of Sciences in Kosice. His interest is devoted to study magnetic, magnetodielectric properties and magnetoviscosity of magnetic fluids, hyperthermia effect in various magnetic nanoparticles, magnetosomes, magnetoferritin, magnetic fluids based on transformer oils for the transformer technology, dielectric properties, cooling and heating properties. At present he published 4 chapters in books, more than 250 papers indexed journals in Current contents and he has more than 1500 citations at SCI database.