



Induction of Reactive Neural Stem Cells by Traumatic Brain Injury in the Adult Hippocampus, (REACT NSCs)

Project Coordinator: Juan M Encinas, Achucarro Basque Center for Neuroscience Fundazioa, MINECO, Zamudio, Spain

Project Partners: Djoher Nora Abrous, INSERM, Neurocentre Magendie, Bordeaux, France
Veerle Baekelandt, Katholieke Universiteit Leuven, KU Leuven, Dept. of Neuroscience, Leuven, Belgium
Carlos P Fitzsimons, Universiteit von Amsterdam, Swammerdam Institute for Life Sciences, Amsterdam, The Netherlands

Traumatic brain injury (TBI) is a major health problem affecting more than 8 million European and becoming a challenge for the health systems. Patients affected by TBI show serious neurological disorders such as decision-making and memory deficits, depression or aggressive behavior. Several of the important brain functions affected by TBI depend on the hippocampus, a brain structure very important for memory and learning that is highly vulnerable to this kind of injury. After an episode of TBI, the hippocampus suffers atrophy and alterations in synaptic transmissions. In addition, adult hippocampal neurogenesis, the generation of new neurons from neural stem cells (NSCs), a process involved in memory, learning and control of anxiety, is impaired. We hypothesize that TBI induces long-term changes in both NSCs and newborn neurons subsequently impairing hippocampal and brain functioning. This project highlights the importance of considering NSCs and new neurons as novel targets in developing innovative strategic therapies against brain damage. We aim to understand what particular changes are induced in NSCs and newborn neurons by TBI, and what is the actual impact on brain functioning and behavior of these changes. Then, we will be able to preserve the properties of NSCs and newborn neurons to fight against the neurogenesis-related symptoms of TBI, and thus contributing to improve the quality of life of millions of TBI patients worldwide.