



## A New Traumatic Axonal Injury Classification Scheme based on Clinical and Improved MR Imaging Biomarkers, (TAI-MRI)

**Project Coordinator:** Prof. Anne Vik, Norwegian University of Science and Technology, Dept. of Neuroscience, RCN, Trondheim, Norway

**Project Partners:** Prof. Paul Maria Rodolphe Julien Parizel, University of Antwerp, Dept. of Radiology, FWO, Antwerp, Belgium

Prof. Rashindra Manniesing, Radboud University Medical Center, Department of Radiology and Nuclear Medicine, NOW, Nijmegen, The Netherlands

Prof. David ;Menon, University of Cambridge, Department of Medicine, Division of Anaesthesia, MRC, Cambridge, United Kingdom

Traumatic injuries to the head can cause differing degrees of damage to the brain, ranging from none to mild, moderate or severe traumatic brain injury (TBI). The management of patients with TBI depends on the severity of the injury and in the diagnostic work-up the primary imaging modality is still CT (computer tomography) in the acute phase. But today we know that CT may only show the “tip of the iceberg” of the actual injuries to the brain following trauma, and in some instances the scan miss injuries altogether. In particular, traumatic axonal injury (TAI) is difficult to detect by CT. In the last decade, different MRI (magnetic resonance imaging) techniques therefore have been increasingly used in the early time period following TBI. This imaging technique can detect TAI, but also other more subtle brain injuries, with a much higher sensitivity than that observed for CT.

In TAI-MRI, we aim to develop a classification system that can better describe severity of TAI and predict the outcome of injuries. The current classification system is based on neuropathological studies from 1980s (looking at the tissue directly in the microscope) and has been extrapolated to classify also injuries on MRI in surviving patients. This classification system has shown limitation in reflecting the actual burden of axonal injuries, and thus its prognostic value is questionable. A classification system that better reflects the distribution of axonal injuries and that also takes into account the prognostic significance of the different TAI lesions would help both doctors and health care professionals as well as patients and their families to understand the effects of brain injury and also what prognosis can be expected during the first months or year. To develop such an important and reliable classification system, researchers from four different countries will collaborate and data from three different studies including almost 1400 patients will be included and analyzed. MRI methods have been continuously developed during the last couple of decades, and new promising technological advances enable us to analyze MRI data in a more automated way. The results of this project should improve the care of patients with TBI in the near future.