Injury to the brain or the spinal cord results in long-term functional deficits in affected patients which mainly affect sensation and motor function. Traditionally it was believed that these impairments are solely caused by the initial local brain damage. However, an increasing body of evidence now indicates that in addition to the acute local changes also distant areas of the brain connected to the primarily injured area are also critically involved in this process. The aim of the current project is therefore to unravel the mechanisms resulting in these remote changes and to develop novel therapeutic strategies aimed to prevent long-term functional deficits after CNS injury. This will occur by establishing a consortium of internationally recognized experts in the field of brain and spinal cord injury and using newly developed in vivo and ex vivo CNS imaging technologies together with state-of-the-art treatment and drug development approaches.