IMatrix

Theragnostic targeting of extracellular matrix metalloproteinases and blood brain barrier disruption in subacute ischemic stroke

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Stroke kills more than 500,000 people each year in the European Union alone and is also the leading cause of permanent disability. Due to the demographic age shift, these numbers will increase continuously. The clinical management of the acute stroke is nowadays well stablished with both thrombolysis and mechanical thrombectomy. However, the subacute ischemic stroke care has received little attention due to lack of efficient therapies. Thus, there is an urgent medical need for the establishment of novel diagnostic and treatment strategies focused in the subacute ischemic stroke. Based on the observation that matrix metalloproteinases (MMPs) exert control on the secondary ischemic damage after preclinical stroke, we propose these MMPs as promising targets for subacute stroke therapy. In the framework of IMatrix, we want to explore and validate the diagnostic and therapeutic potential of MMPs using smart 19F nanoprobes as theragnostic systems together with the imaging evaluation of the secondary ischemic damage. To this end, magnetic resonance and nuclear imaging techniques with specific radiotracers and microparticles conjugated with antibodies will be used to gain knowledge on the secondary neurovascular damage after preclinical stroke. We will also investigate the clinical subacute ischemic damage using brain imaging and blood biomarkers from patients suffering stroke. Hence, our project proposes a translational research approach with a strong economic potential and interest for clinical neurology.