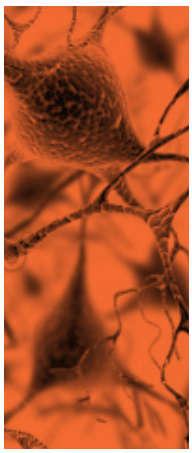
MODDIFSYN: Development of new chemical and optical tools to study and modulate glutamate receptor surface trafficking in synaptic transmission in different models of neurodegenerative diseases

Austria Canada Finland France Germany Italy Israel Luxemburg Poland Romania Spain

Project Description Dysfunction of neurotransmitter trafficking is likely to be at the basis of the abnormal synaptic transmission and plasticity observed in several neurodegenerative and neurological diseases. Surface trafficking has recently emerged to be a key process to regulate ionotropic glutamate receptor numbers at excitatory synapses and to control fast excitatory synaptic transmission. At present no tools are available to specifically modulate receptor surface trafficking in intact tissues. We selected glutamate receptors themselves and extracellular matrix proteins (ECM) as lead targets to achieve this modulation.

We put together an interdisciplinary consortium with a good balance of technology development and application of this technology to the understanding of the molecular mechanisms of brain disease. Aims will be to develop new ways to label and immobilize receptors, new methods to visualize receptor trafficking and new approaches to measure protease activity on the ECM.

We will use these tools to study the fundamental role and modulation of AMPA and NMDA glutamate receptor surface trafficking in normal fast synaptic transmission as well as apply these knowledge and tools to study and correct the defects in receptor trafficking in different neurodegenerative and neurological diseases such as Alzheimer's and Parkinson's disease as well as temporal lobe epilepsy.



Dr. Daniel Choquet (coordinator)

PROJECT**PARTNERS:**

Dr. Daniel Choquet
Physiologie Cellulaire de la Synapse \ University of Bordeaux\ France

Pr. Robert Tampé
Institute of Biochemistry \ Biocenter \ Frankfurt \ Germany

Pr. Bernard Bioulac
Laboratoire Mouvement Adaptation Cognition CNRS \
University of Bordeaux \Bordeaux \ France

Pr. Leszek Kaczmarek
Nencki Institute \ Warsaw \ Poland

Pr. Eckart Gundelfinger
Leibniz Institute for Neurobiology \ Magdeburg \ Germany