



Muriel Koehl



ResiPreS

Neurobiological basis of resilience/vulnerability to prenatal stress in mice

Project Coordinator:

Muriel Koehl, Neurocentre Magendie, INSERM U1215, Bordeaux, France

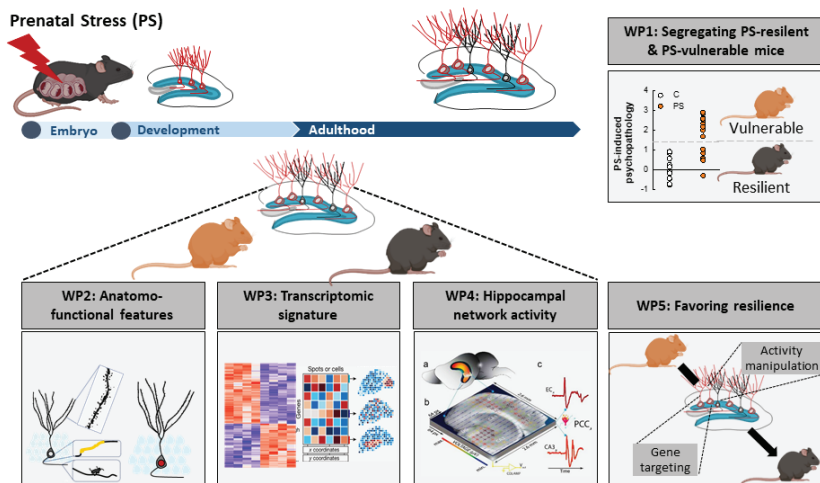
Project Partners:

Jan Rodriguez Parkitna, Dept. of Molecular Neuropharmacology, Maj Institute of Pharmacology of the Polish Academy of Sciences, Krakow, Poland

Hayder Amin, Biohybrid Neuroelectronics Group, German Center for Neurodegenerative Diseases, Dresden, Germany

When mothers experience stress during pregnancy, known as prenatal stress (PS), it may increase their offspring's risk of developing mental health conditions like Post-Traumatic Stress Disorder (PTSD), a devastating stress-related disorder that develops in the aftermath of a traumatic life event. However, not everyone exposed to trauma develops PTSD, pointing to the existence of resilience factors that need exploration. Using a mouse model to analyze these factors, we found that PS can cause PTSD-like memory issues in some, but not all mice. This observation, which mimics the human situation suggests that it constitutes a valuable model for understanding the mechanisms underlying resilience / vulnerability to stress.

Our mechanistic target is a brain region called the dentate gyrus of the hippocampus, which is crucial for emotional memory control. It is characterized by a continuous neurogenic development, leading to the existence of temporally distinct neuronal populations. Our hypothesis is that these distinct neuronal populations may present different responsiveness to PS, thus leading to the establishment of the individual's resilience or vulnerability to stress. In this project, our aim is to investigate these neurons' anatomo-functional properties, their gene expression patterns, and their contribution to hippocampal network activity using cutting edge techniques. Once we have identified specific cells or genes involved, we will test their direct impact in resilience /vulnerability to stress.



Overall, by studying the mechanisms that determine why some people develop PTSD and others do not, we hope to highlight new therapeutic targets and better, more effective, treatments for PTSD and similar conditions that develop in individuals exposed to deleterious life events.