Microglial control of synaptic function in stress response and vulnerability to depression (MicroSynDep)

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Major depressive disorder (MDD) is one of the most relevant public health challenges at the clinical, social and economic levels, costing over 120 billion euros in Europe alone. Alteration in the synapses, which are the structures responsible for communication among the principal brain cells, i.e. the neurons, has been hypothesized to underlie the onset of MDD. However, the mechanisms through which synaptic dysfunction contributes to this psychopathology are only scarcely known. Microglia, which are immune cells of the brain, play a key role in regulating synaptic function and neuronal activities in the healthy and diseased brain. We therefore hypothesize that microglia are critically involved in the brain changes underlying both the onset of and the remission from MDD. Consequently, treatments able to modulate microglial function hold the promise of providing novel and more effective therapeutic strategies to treat this psychopathology. The MicroSynDep consortium aims at exploring such hypothesis. To this goal, the consortium brings together a multidisciplinary partnership of European- and Canadian-leading experts, including clinicians and basic scientists, and will combine, in a translational perspective that is from preclinical work to clinical applications, studies on human brain and depressed patients with basic neurobiological research in animal models. We will employ a wide range of cutting-edge technologies to unravel the impairment of microglia-synapse interaction in MDD. Ultimately, the MicroSynDep project will lead to develop and implement in the clinics innovative treatment options for depression.