Lipopolysaccharide does not affect sucrose intake in stress-resilient rats: potential contribution of microglia.

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Stressful events during life may expose a subject to the development or the exacerbation of major depression, however even if this disease occurs in a significant percentage of stress-exposed subjects, most of them are able to successfully cope with the adverse situation and avoid such psychopathology. In addition, stress exposure strongly influences inflammatory events in the periphery and in the central nervous system (CNS), with an impact on behavioral alterations. In the CNS, microglia -brain tissue-resident macrophages- display stress-responsive properties; in particular, the detrimental effects caused by chronic stress may be driven by a dysregulation of this cellular population through the production of pro-inflammatory mediators.
On these bases, the purpose of our study was to deepen our knowledge on the molecular mechanisms underpinning stress resilience. We exposed adult male rats to two weeks of chronic mild stress, before being challenged with Lipopolysaccharide (LPS, i.p. 250μg/kg) and sacrificed 24h or 6 days after the immune challenge. Behavioural alterations were monitored through the sucrose consumption test to evaluate the insurgence of anhedonic-like phenotype and to identify stress resilient rats. We measured the expression of pro-inflammatory cytokines (IL1β, IL6, TNFα), toll-like receptor 4 and markers of microglia activation (CD11b, Iba1, CX_3CR1 and its ligand CX_3CL1) in the rat prefrontal cortex, dorsal and ventral hippocampus (brain area involved in stress response and in the aetiology of depression). Interestingly, LPS worsened the sucrose intake in sham animals, but not in non-anhedonic rats; moreover, these behavioural effects seemed to be related to alterations in the expression of inflammatory mediators and markers of microglia activation, thus suggesting a potential role of these cells in the mechanisms of stress resilience.