

10th World Congress and Expo on

Immunology, Immunity, Inflammation & Immunotherapies

October 19-20, 2018 | New York, USA

Circadian control of spatiotemporal neuroimmune functions of brain microglia in CNS development: A proposed link to autism

Sarah Adelaide Crawford
Southern Connecticut State University, USA

An important connection between the immune system (IS) and neurodevelopmental impairment may be the effects of IS activation during critical developmental windows on the morphogenetic transformation of microglia essential to neural development to neuro-inflammatory cells that have lost the capacity for neuro-synaptic modeling. I propose that the morphogenetic switch between the neurodevelopmental versus immunosurveillance programming of brain microglia is controlled by circadian signal mechanisms, and that decreased levels of Bmal1 and other circadian regulators, resulting from infectious disease or autoimmune mechanisms, may signal the genetic reprogramming of microglial cells from neuro-differentiation to neuroprotective immunosurveillance gene expression pathways that disrupt normal patterns of CNS development and maturation as a consequence of their effects on the spatiotemporal programming of CNS development. Evidence suggests that dysregulation of this regulatory interface may represent a primary cause of autism spectrum disorder (ASD). Autism is associated with deficits of CNS development and maturation that produce anatomical/structural differences in both the cortex and the cerebellum. The brains of autistic individuals show evidence of astrocyte and microglial pro-immune activation as well as decreased levels of the circadian regulator Bmal1. Moreover, decreased Bmal1 production has been linked to the hyperactivation of both astrocytes and microglia, suggesting a direct causal link between circadian regulation and disruption of brain pathways consistent with autism. The disruption of circadian regulation of brain development may be initiated by immune system responses to infectious disease or autoimmunity, both of which have epidemiological links to autism.

crawfords2@southernct.edu

Notes: