

Oral presentation

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Brain-Immune Interactions: the role of cytokines in depression and substance use disorders

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The role of the immune system in the neurobiological and pathophysiological mechanisms mediating psychiatric symptomatology and cognitive functioning has attracted increasing attention in recent years. This role is exemplified in the case of patients with chronic viral infections secondary to substance use disorders and in the use of cytokines as antiviral therapies [e.g., interferon-alpha therapy for hepatitis C viral (HCV) infection]. In particular, the recent methamphetamine epidemic in the United States has highlighted the risk of contracting human immunodeficiency viral (HIV) and HCV infections. Not only do substance use disorders increase the risk of contracting HIV or HCV, they have also been associated with decreased antiviral therapy utilization and virological suppression.

Cytokines are involved in signaling that activates the central nervous system in brain region-specific and cell type-specific ways. Emerging pre-clinical and clinical evidence show that cytokines can interact with different neurotransmitter and neuroendocrine systems resulting in cognitive dysfunction (e.g., deficits in memory, attention, vigilance and learning efficiency) and mood disturbances (e.g., depression, anxiety, and irritability). There are several key questions to address in understanding communication between the immune system and the brain. For example, how does the central nervous system recognize the degree of immune activation taking place in the periphery and when and how do these immune responses become pathologic, as in the case of interferon-induced depression or in HIV-related neurocognitive impairments.

Antidepressants are commonly prescribed for interferon-induced depression; however, these medications lack efficacy in treating a number of the common side effects associated with antiviral therapy, such as fatigue, irritability

and loss of concentration. Other potential treatment strategies for these symptoms could include targeting key components of the signaling pathways that underlie the production or action of cytokines.

The goal of this presentation is to integrate current research findings in the fields of immunology, neuroscience and psychiatry to improve care for patients with substance use disorders and comorbid HIV and/or HCV infections by identifying critical areas for future study and interdisciplinary collaborations.