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Poster Presentation Review

The Prefrontal Cortex and Stress-Related Psychopathologies

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Abstract

The prefrontal cortex (PFC) plays a central role in processing both normal and pathological affective states and it is among the brain regions most closely associated with stress-related psychopathology in humans. The ventromedial PFC (vmPFC) in particular has been shown to be required for healthy emotional regulation, social function and risk assessment and decision-making. Also this region exhibits cerebral asymmetries on measures of this sort, which appear to be sex-dependent. In these and other studies, it has been suggested that emotional processing is more strongly lateralized to right brain structures in men, while women tend to be more left-biased. In the rat, the medial PFC has long been known to be very sensitive to stress and many of these studies have focused on the mesocortical dopaminergic (DA) system, which has been shown in numerous studies to exhibit functional and neurochemical hemispheric asymmetries. Excitotoxic lesions of the right, but not left, vmPFC suppress the autonomic, neuroendocrine and behavioral responses to stressful situations, suggesting that this region normally activates physiological and behavioral responses in times of challenge. In contrast, DAergic depletion or receptor blockade of the right vmPFC results in sensitivity to stressful challenges, implying that mesocortical DA plays a protective or adaptive role in coping with stress. Behaviors improved preferentially by the left cortex thus showed less evidence of sex differences than those modulated by the right. While mesocortical DA discharge effects are lateralized, the nature of these effects can vary with sex and specific behavior. More knowledge about the relation between PFC and stress can help us to manage stress related disorders.

Keywords: Prefrontal Cortex, Stress, Dopamine, Psychopathology.

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