Pharmacological Reports
2013, 65, 1479–1488
ISSN 1734-1140

Review

Neurochemical modulation of stress-induced cognitive inflexibility in a rat model of an attentional set-shifting task

Agnieszka Nikiforuk, Piotr Popik

Department of Behavioral Neuroscience and Drug Development, Institute of Pharmacology, Polish Academy of Sciences, Smętna 12, PL 31-343 Kraków, Poland

Correspondence: Agnieszka Nikiforuk, e-mail: nikifor@if-pan.krakow.pl

Abstract:
It is widely accepted that chronic stress, which is considered a risk factor for several neuropsychiatric disorders, may have detrimental effects on prefrontal functions. In animal models, chronic stress produces morphological, physiological and functional alternations in the rat medial prefrontal cortex (mPFC). Specifically, repeated restraint stress results in mPFC dendritic atrophy that is associated with deficits in the prefrontal cortex-dependent attentional set-shifting task (ASST). Thus, restraint-induced cognitive inflexibility may serve as a model for the study of the mechanisms, prevention and treatment of stress-related disorders. The current article provides a summary of the literature on stress-related effects on cortical functions, as assessed in the rodent ASST. The neurochemical substrates underling stress-evoked frontal-like disturbances, as well as pharmacological targets for potential treatment, are briefly discussed.

Key words:
stress, prefrontal cortex, cognition, set-shifting, corticosteroids, depression, monoamines, ketamine