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Emerging role of brain fractalkine signaling in the behavioral and biochemical disturbances in the course of depression

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Current data reveal that early adverse life experiences may affect the developmental processes of the brain and can be involved in the pathogenesis of many psychiatric disorders including depression. It has been highlighted that stress during pregnancy activates the immune response in the offspring's central nervous system. Results also show important role fractalkine (CX3CL1) in the neuron-microglia interactions and consequently in production of pro- and anti-inflammatory factors in the brain. Therefore, the aim of our study was to examine the impact of prenatal stress as well as the role of fractalkine (CX3CL1) on the behavioral and biochemical changes in adult rats. Adult 3-months old rats offspring (control and prenatally stressed), after behavioral verification, received icv injections with exogenous fractalkine. After the treatment, we evaluated time-dependent effects of fractalkine administration on the behavioral parameters. Moreover, we measured the changes in the production of pro-inflammatory cytokines in the two structures: Hippocampus and frontal cortex. The obtained data shows that 7 days after treatment with fractalkine, the behavioral disturbances evoked by prenatal stress procedure were normalized. Moreover, prenatal stress activates production of pro-inflammatory cytokines in the hippocampus and frontal cortex. Interestingly, treatment with fractalkine inhibited the expression of these factors mainly in the frontal cortex. Summing up, our study shows that the changes in fractalkine may play an important role in the pathogenesis of depression. Importantly, the action of the chemokine is connected with its effect on production of inflammatory factors in the brain.

Biography

Basta Kaim Agnieszka has completed her PhD in 1998 in the Institute of Pharmacology Polish Academy of Sciences in Cracow, Poland. Since 2007, she is the Head of PhD program at the Institute of Pharmacology, PAS. Since 2014, she is a Professor of neuropsychopharmacology and an Expert of neuroimmunology. She has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of repute.

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