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Chemokines and autism spectrum disorder: A literature review

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Introduction: Autism Spectrum Disorder (ASD) is characterized for social communication deficits and repetitive behaviors. The pathogenesis of ASD is increasingly being linked to neuroinflammation, as a environmental injury could activate the immune system, augmenting the risk to developing ASD. Chemokines are a large family of cytokines that stimulates the movement of leukocytes and regulates their migration from blood to the tissue, and these molecules are present on every inflammatory disorder.

Objectives: The presenting review looks for the latest studies about the relationship of chemokines and neuroinflammation on autism.

Methodology: This literature review searched for “Autism Spectrum Disorder” and “Chemokines” into the MEDLINE, LILACS, Google Scholar and Science Direct databases, and 22 English original articles were included and selected from 2009 to 2019.

Results: Through the analysis of biological samples collected in different groups of humans with autism spectrum disorder (ASD), it was observed that specific chemokine levels were in imbalance. CCL2, CCL3, CCL4, CCL5, CCL11, CXCL1, CXCL8 exceeded the limits favorable to the regular functioning of the immune response and therefore overactivated the immune system. In contrast, CCL3, CCL4, CCL5, CCL7, CXCL8, CXCL9, CXCL10, CX3CR1 decreases their levels, hypoactivating the pattern of immune response. Both overactivation and hypoactivation interfere with healthy neurodevelopment, providing neuroinflammation, impairment in behavioral functions and damage to some brain structures.

Conclusion: Data from the literature on the main chemokines involved in ASD (CCL2, CCL3, CCL4, CCL5, CCL7, CCL11, CXCL1, CXCL8, CXCL9, CXCL10, CX3CR1) have been compiled. The imbalance in the levels of these circulating proteins in ASD is shown to be related to the typical symptoms of this spectrum.

Biography

Gislei F. Aragão is Graduated in Pharmacy from the Federal University of Ceará (UFC), with a Master's and PhD in Pharmacology. Adjunct Professor of Medicine at the State University of Ceará (UECE) and Coordinator of the Study Group on Neuroinflammation and Neurotoxicology in Autism Spectrum Disorder (GENIT). Coordinator of the Laboratory of Toxicological Analysis of the Drug Discovery and Development Center (NPDM/UFC). Collaborator in the Master in Clinical Pharmacology/UFC and Master in Transplantation/UECE, developing projects in the area of neuropharmacology, neurotoxicology, neuroinflammation and pharmacovigilance.

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