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Neurology Congress 2019: Chemokines and autism spectrum disorder: A literature review - Gislei F. Aragão - Federal University Fortaleza

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Introduction: Autism Spectrum Disorder (ASD) is portrayed for social correspondence shortages and tedious practices. The pathogenesis of ASD is progressively being connected to neuroinflammation, as a natural physical issue could enact the resistant framework, enlarging the hazard to creating ASD. Chemokines are a huge group of cytokines that invigorates the development of leukocytes and controls their movement from blood to the tissue, and these atoms are available on each incendiary issue. Biologic markers of contamination and irritation have been related with Autism Spectrum Disorders (ASD) yet earlier investigations have to a great extent depended on examples taken after clinical analysis. Research on potential biologic markers right off the bat in neurodevelopment is required to assess conceivable causal pathways and screening profiles.

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 over activated 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 and 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.

Keywords: Autism Spectrum Disorder, Chemokines, Neuroinflammation.

1. Introduction

Autism Spectrum Disorder (ASD) is composed of multiple conditions that affect neurodevelopment, modifying the individual's behavioral and social patterns. Common symptoms include difficulty communicating and interacting socially, obsessive interests, and repetitive behaviors (Meltzer & Van de Water, 2017; Siniscalco, Schultz, Brigida & Antonucci, 2018; Young *et al.*, 2016).

ASD is more prevalent among men than women (4:1 ratio) and is commonly diagnosed between the ages of 2 and 4 years through behavioral testing. It is a challenging public health problem because it has a high prevalence, resulting in increased responsibility of health networks and producing high costs for the public and private system and for society. The components for understanding this disorder, i.e., its biological basis and treatment, still remain unknown (Meltzer & Van de Water, 2017; Hughes, Mills, Rose & Ashwood, 2018; Mead & Ashwood, 2015).

2. Methods

This is a literature review conducted by two independent authors (PIRES ON and ARAGÃO GF) using data from the scientific literature on chemokines involved in autism. The searches were performed in four databases: Pubmed, Science Direct, Google Scholar, and Lilacs. The following descriptors and their combinations were used: autism spectrum disorder and chemokines (Mesh) and autistic disorder and chemokines (DeCS).

Inclusion criteria were original articles indexed in the pre-established period between 2009 and 2019, published in English and performed in humans. Articles in other languages, outside the delimited period and performed with other groups of animals were excluded.

3. Results and Discussion

Studies show that altered levels of some chemokines have been found in individuals with ASD, especially among children and adolescents between 3 and 18 years (Zerbo *et al.*, 2014; Abdallah *et al.*, 2013; Ashwood et al., 2011; Gogolinska &

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Nowak, 2013; Shen *et al.*, 2016; Pecorelli *et al.*, 2016; Tonhajzerova *et al.*, 2015). Next, we will describe these chemokines with their main characteristics and their involvement in ASD.

4. Final Considerations

The relationship between immune system dysregulation and the pathophysiology of ASD has aroused the interest of the scientific community. The evidence connecting these two factors is manifold, so this review purposely addresses only the relationship between ASD and the chemokines present in the immune system.

The records found link altered chemokine levels to ASD; while some chemokine were in high concentrations, others were in low concentrations. These changes may be related to genetic and environmental factors, disorders of the immune system, changes in neurodevelopment, and may be the cause of the cognitive and behavioral deficits linked to ASD.

5. Conclusions

This study shows that the key chemokines involved in ASD are: CCL2, CCL3, CCL4, CCL5, CCL7, CCL11, CXCL1, CXCL8, CXCL9, CXCL10, and CX3CL1, and they directly affect the severity of the symptoms of this disorder. However, the relationship between chemokines and ASD is very complex, with challenging perspectives for the production of new ideas, hypotheses, and theories, leading to the need for more studies on this subject, so that this information can be corroborated and used in clinical practice.

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