THE RELATIONSHIP BETWEEN GENETIC VARIANTS AND CLINICAL OUTCOME RELATED TO *TOXOPLASMA GONDII:* A NARRATIVE REVIEW

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Introduction

Toxoplasma gondii is a parasite that causes persistent infection, forming cysts in the brain or other regions. Some studies have linked neurobehavioral alterations to this parasite, such as schizophrenia (a complex and severe psychiatric disorder)[1] and bipolar affective disorder (BAD)[2]. It remains challenging to determine which genetic variants are responsible and how they interact with environmental factors such as toxoplasmosis.

This narrative review is justified by the need to understand how genetic polymorphisms in humans, associated with the immune response to Toxoplasma gondii, interact with the risk of schizophrenia, offering potential for personalized prevention strategies in individuals carrying risk variants. The objective of this review is to synthesize existing evidence on the interaction between Toxoplasma gondii infection and psychiatric risk polymorphisms in humans. The research question is: What is the relationship between Toxoplasma gondii and psychiatric risk polymorphisms in humans?

Methodology

The construction of this narrative review was guided by the SANRA scale (Scale for the Assessment of Narrative Review Articles)[3]. The bibliographic search methodology in the traditional literature involved two PubMed search commands: (toxoplasma) AND (genetic polymorphisms) AND (outcome), and (toxoplasma) AND (genetic polymorphisms) AND (schizophrenia risk), analyzing up to the first 30 results. In the gray literature, the GWAS Catalog was searched for toxoplasma-related studies. Inclusion criteria were relevance to the research topic and the level of evidence, based on the scientific evidence pyramid, with priority given to systematic reviews and meta-analyses.

Results and Discussion

Of the 36 articles identified, 5 met the inclusion criteria, and the highlighted genes were CHIA (Acidic Chitinase), GSTT1 (Glutathione S-transferase Theta 1), and GSTM1 (Glutathione S-transferase Mu 1). The CHIA gene region (chitinase)[1] was most significantly associated with toxoplasmosis, as chitinase production by brain macrophages in response to infection is crucial for controlling *T. gondii* cyst burden, indicating that any alterations in this gene may significantly affect the organism's ability to manage cyst load [1].

When *T. gondii* infection occurred alongside GST polymorphisms, an increased risk of schizophrenia was observed in *T. gondii*–positive patients with GSTT1 null genotype, compared to the absence of both factors[4]. In *T. gondii*–positive individuals with an active GSTT1 genotype, a linear increase in risk was observed. The association with the GSTM1 gene was considered similar for both the active and null genotypes [4].

Conclusion

Therefore, it is evident that genetic polymorphisms and variants can influence susceptibility and clinical severity, acting as modulators of the host response and being associated with the development of psychiatric disorders. Consequently, further studies are needed to enable the mapping of potential cases.

References

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