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The Role of Genetic and Environmental Factors in the Development of Schizophrenia

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Abstract

Schizophrenia is among the most complex and widely studied mental health disorders, characterized by disruptions in cognition, emotion, and behavior. With a global prevalence of approximately 1% and an onset typically occurring in late adolescence or early adulthood, its multifaceted etiology has been the subject of extensive investigation. Despite significant advances in medicine and neuroscience, the exact causes of schizophrenia remain unclear due to the intricate interplay of genetic and environmental factors.

This paper explores the combined impact of genetic and environmental influences on the development of schizophrenia. Genetic research, including twin and family studies, has demonstrated a strong correlation between hereditary predisposition and increased risk. Specific genes such as DISC1, NRG1, and COMT have been implicated in brain development, neuronal communication, and dopamine metabolism, highlighting their importance in the pathophysiology of the disorder. However, genetic predisposition alone cannot fully account for schizophrenia, underscoring the role of environmental contributions. These include prenatal stress, maternal viral infections, malnutrition during critical developmental stages, obstetric complications, and psychosocial stressors in childhood. Additionally, early use of psychoactive substances, particularly cannabis, has been linked to a heightened risk of psychotic symptoms in genetically vulnerable individuals.

Emerging epigenetic research further emphasizes how environmental factors can alter gene expression without modifying DNA structure, shaping neural function and behavior. This dynamic gene–environment interaction underscores the complexity of schizophrenia’s etiology.

In conclusion, schizophrenia arises not from isolated causes but from the interdependence of biological, genetic, and environmental influences. Understanding this interaction is crucial for improving prevention, diagnosis, and treatment strategies. Interdisciplinary approaches integrating genetics, neuroscience, psychology, and social sciences are essential to advancing effective interventions that

enhance patient well-being and social integration.

Keywords: Schizophrenia, Disease, Factors, Genetics, Epigenetics