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Mini Review

Nutrigenomics and Psychological Disorders

Simmi Kharb* and Urvashi

Department of Biochemistry, Nodal Officer (MRU), PGIMS, Rohtak, Chandigarh, India

***Corresponding Author:** Simmi Kharb, Department of Biochemistry, Nodal Officer (MRU), PGIMS, Rohtak, Chandigarh, India.

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Abstract

Nutrigenomics is a rapidly emerging multidisciplinary science that aims to explore the effects of nutrients on the genome, proteome, and metabolome, and elucidate effect of genetic variation on the interaction between diet and disease. In coming year, significant advances are anticipated in nutritional genomics in order to understand psychological disorders, their prevention and treatment.

Keywords: Nutrigenomics; Psychological Disorders; genomics

Introduction

Phenotype of each individual results from complex interactions between genetic and environmental factors such as nutrition over their lifetime. Nutrition- gene interactions have a key role in the etiopathogenesis of cardiometabolic diseases and neuroscience such as neuropsychiatric, neurodevelopmental, and neurodegenerative disorders.

Nutrigenomics is an emerging science, that focuses on impact of nutrition on the genotype of the person. Nutrition and lifestyle changes remain at core of healthy ageing and disease prevention. Genetically- guided nutrition is opening the way to a new era of more effective healthcare services for increased well-being across all ages, as well as improved management of psychological disorders. Nutrition- gene response has major effect on brain health, and this can be a significant breakthrough in future. Optimal brain function results from complex interactions between genetic and environmental factors [1]. Nutritional psychiatry focus on nutritional approach to the prevention and treatment of mental disorders. The epigenome is central to interactions between diet and genome in determining brain disorder [1].

A literature search was conducted to retrieve systemic views regarding the role of nutrition on psychological disorders to propose a scope of integrative research in nutrigenomics and psychological disorders.

Tools available to study nutrigenomics

Nutrigenomic studies employ techniques such as genomics, microarrays and bioinformatics to explore how nutrients influence gene expression and identify nutritional regimens and natural agents.

Role in major psychological disorders

Role of nutrigenomics on psychological disorders plays important role in understanding the dynamics of emerging field of science [2]. Several studies demonstrate that nutritional abnormalities increase the intensity of psychological distress.

Depression

Serotonin transporter gene (SLC6A4/5HTT), serotonin-transporter-linked promoter region (5-HTTLPR), and serotonin receptor gene 5-hydroxy- tryptamine receptor 2A (HTR2A), and brain-derived neurotrophic factor (BDNF) gene have been documented as the most important genes involved in depression and anxiety disorders. Tryptophan (TRP) being an essential amino acid and is required for serotonin synthesis must be obtained from dietary sources [2], and administration of foods containing high concentrations of TRP and those with serotonin-boosting properties may aid in alleviating depression and enhancing mood cognition [2].

Patients with depression lack vitamin B consumption, especially vitamin B_{12}, vitamin B_9, vitamin B_6. Vitamin D levels are also associated with it [3].

Eating disorders

Tryptophan supplementation is beneficial in bulimia nervosa and Patients suffering from anorexia. [2]

Anxiety and mood disorders

Serum brain-derived neurotrophic factor (BDNF) levels have been found deficient in people suffering from these disorders. It has been reported that foods with high antioxidants properties increase serum brain-derived neurotrophic factor (BDNF) levels.

Schizophrenia

Vitamin B_3, vitamin B_6, zinc, vitamin D levels have been reported to be associated with schizophrenia [2].

Low intake of PUFA, increase the risk of mental issues, besides depression, suicidal ideation, bipolar disorder, autism, ADHD [3]. Omega-3 PUFAs, alpha-tocopherol, magnesium and folic acid are important in mental health and well-being [4].

Knowledge of genetic variability among individuals, regulation of gene expression by nutrition at the level of brain is likely to facilitate nutrigenomic- based innovation in technologies to support preventive, diagnostic, and therapeutic measures in brain disorders associated with adverse genetic and environmental factors.

Conclusion

Newer discoveries in nutrigenomics would be of help in maintaining positive mental health paving way for personalized nutrition solutions and lifestyle modifications, wellness regimens, and other futuristic revolutionary treatment methods.

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