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Editorial

Food Related Brain Activation in patients with Psychological Disorders

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Food-related brain activation is a term used for the alterations in brain activity that occurs in response to food cues, such as the sight or smell of food. Whenever a person sees, smells, or tastes food, a complex network of neural circuits is stimulated; this releases neurotransmitters such as dopamine and opioids [1]. These neural circuits are interconnections between several areas of the brain that are involved in processing food cues such as the prefrontal cortex, insula, amygdala, hippocampus, and striatum [2].

Recently, nutrition and mental health connections have drawn considerable interest. Sticking to healthy or Mediterranean food habits-high intake of fruits, vegetables, nuts, and legumes; average intake of poultry, eggs, and dairy products; and infrequent intake of red meat-is linked to a lower risk of depression, according to epidemiological research [3]. Clinical trials have indicated potential causal effects of refined carbohydrates on mood as well; experimental exposure to high glycaemic meals in controlled circumstances is associated with a relatively considerable increase in depressive symptoms in healthy volunteers [4].

One theory explaining how the Western diet may have detrimental consequences on brain health, including cognitive decline, hippocampal dysfunction, and blood-brain barrier damage, is the inflammatory effects of a high calorie and saturated-fat diet [5]. This process also implies a route by which a poor diet may raise the depression risk, as elevated inflammation has been associated with several mental health diseases, including mood disorders. This hypothesis is reinforced by observation-based studies which have demonstrated that individuals with depression get a remarkably higher score on tests of "dietary inflammation" [7] defined by a higher intake of foods that are linked to inflammation (e.g., processed and packaged foods, refined carbohydrates) and lower intakes of nutritional foods, which are thought to have anti-inflammatory properties.

Functional magnetic resonance imaging (fMRI) is used to study food-related brain activation in patients with psychological disorders. fMRI works on the principle of measuring changes in the blood flow and oxygenation of the brain using a magnetic field and radio waves [8,9]. fMRI can be used to investigate how different areas of the brain respond to food cues and how these responses differ between individuals with and without psychological disorders [2]. For example, fMRI studies have depicted that individuals with psychological disorders such as addiction, depression, anxiety, and eating disorders have abnormal brain activation patterns in response to food stimuli. In the case of addiction, the reward system of the brain, which comprises the striatum and prefrontal cortex, becomes hypersensitive to food cues, leading to compulsive overeating and addiction-like behaviors [10]. In depressive and anxiety disorders, there is hyper responsiveness of the insula and amygdala to food cues, leading to a heightened perception of negative emotions and a decreased ability to experience pleasure and reward [2]. This usually causes a person to either overeat or not eat anything at all. Decreased blood flow in the striatum and prefrontal cortex and increased activation in the insula and anterior cingulate cortex has been observed in eating disorders such as anorexia and bulimia nervosa. These findings highlight the complex interplay between food, the brain, and psychological well-being [11].

Understanding food-related brain activation is important for studying the neural mechanisms of food intake, appetite regulation, and the development of disorders related to food, such as obesity and eating disorders as well as other psychological disorders. The areas of the brain involved in processing food cues, as shown by fMRI may be implicated in the development and maintenance of psychological disorders related to food, and targeting these brain regions may be a promising avenue for the development of novel interventions. fMRI can also be used to evaluate the effects of interventions designed to modify food-related brain activation. For example, researchers may use fMRI to assess changes in brain activity in response to cognitive-behavioral therapy, medication, or dietary interventions [12]. fMRI has successfully been used for the development of neurofeedback interventions and morphologic processing [13]. These interventions use real-time feedback on brain activity to help train individuals to self-regulating their brain function [14]. Scientists recommended new analysis method based on artificial intelligent in psychiatric disorders using fMRI and structural MR data [15].

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