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Gut Health: Tool For Mental Wellbeing

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Abstract -It is widely known that food plays a pivotal role in people's physical health. Research has found that nutrients directly impact organ efficiency and chemical reactions in our bodies. If someone is deficient in nutrients, it may reduce organ efficiency and gradually result in the production of biochemical reactions that affect immunity pathways.
Additionally, food can have negative effects on mental health, leading to stress and depression, and can also impact economic well-being (Andrew B..al 2023)
Food have good impact on body but processed food item and sugar pauses negative impact on human health .

***Index Terms* – microbiome, mental disorder, gut-brain axis, neurotransmitters ,**

I. INTRODUCTION

Healthy lifestyle including healthy dietary pattern and active life style can effect mental health and well being through anti inflammatory antioxidan,neurogensis,microbiome and immune system and epigenetic modification .(Marx w.et al.proc soc.2017).

In mental disorders nutrients based nutraceutical and plant based phytoceutical are commonly used as treatment.(Farida Larit and Francisco Leon ,plantbasel2023).

Food and mental health closely related topic gut health direct proportionate to brain health, when individual took balance diet and active lifestyle helps to improve good bacteria in gastrointestinal which is known as" second brain of our bodies" in gut enteric nervous system (ENS) a network of billions of neurons that is similar to the brain and they can function independently (DR.Michael gershon1999).

The human brain is made up of 100 billion neurons and 100 trillion neuronal connection as they require about 20-25% of the body's energy ,deficiency of nutrients elevated the risk of mental disorders, brain health and psychological functioning.(Merlo G.et al.frontiers in nut.2024)

The human body not capable to produce vitamin by their own that's why body depends on food sources or produced by gastrointestinal microbiome The gut microbiome has potential to produced vitamins namely B1 ,B2,B3,B5,B6,B7 ,B9,B12, C and K(Hill 1997).

The vitamins which is produced by gut bacteria is not fulfilling the daily need but for vitamin B,6 B9 ,B12 gut bacteria produce about 30% of Daily need (Rudxuk L.et al.2021)

BRAIN AND GUT MICROBIOTA AXIS

The gut-brain Axis consists of bidirectional communication between the central nervous system linking the emotional and cognitive centers of the brain with peripheral intestinal functions the communication between the two is established through neural and endocrine immune and humoral links clinical evidence of macrobiotic GBA/BGM interaction through the association of this dysbiosis with central nervous disorders and functional gastrointestinal disorder elevated systematic inflammatory cytokine's, active system through secretion of the corticotropic-releasing factor from the hypothalamus, stimulates adrenocorticotropic hormone leads to cortisol release which is a stress hormone that affects many human organs Both clinical and experimental evidence suggests that and trick macrobiotic has an important impact on GBA interacting not

only locally with intestinal cell and ENS but also directly with CNS neuroendocrine and metabolic (m.carabotti et.al 2015)

GASTROINTESTINAL HEALTH IS RELATED TO MENTAL HEALTH

A resource report states that those who have had a history of gastrointestinal issues for decades are more likely to suffer from parkinson's disease. Clinical symptoms suggest that in at least a subset of individuals, parkinson's disease may start in the gut and then affect the central nervous system. Patients with parkinson's disease commonly experience symptoms such as nausea, bloating, constipation, and other gastrointestinal disorder (J.jocelyn etal.2024)

INFLUENCE OF FOOD AND NUTRITION ON THE GUT MICROBIOME

Microbial flora and gastro intestinal tract termed the gut microbiome which interacts with the gut epithelium and mucosal immune system and maintaing homeostasis in a healthy state their of five important phyl of the human gut microbiota namely firmicutes , firmicoidetes ,actinobactoidetes proteobacteria and verrucmicrobe with the two dominating phyl firmicutes and bacteroidetes representing 90% of the gut microbiota .dysbiosis defined as a production reduced diversity and alteration of composition of gut microbiota that is a front line for enhancing human get microbiota composition and function recent studies prove that a diversity gut microflora are essential for maintaining good health . when undigested food reach the colon and serve as substrates for the bacterial metabolism carbohydrate protein and fat are the three major macronutrients they are different and digestibility and their for provide quite different microbiota accessible nutrient and differ different type of select the growth of different bacteria and the generate different metabolites which has positive and negative effect on the gut epithelium and immune system .indigestible carbohydrate specially dietary fiber select fiber degrading bacteria which produce shorts in acid beneficial forgot health and digestible protein rain from 10 to 30% promote the growth of proteolytic bacteria which is produced in scfs and branched chain fatty acid and some toxins Dietary fats select bile acid-tolerant bacteria, which produce toxic compounds like H2s(Rustam I.Aminov Int j Mol science 2022)

EFFECT OF MEDIATERRAN DIET FOR IMPROVE MENTAL AND GUT HEALTH

In current scenario the relationship between food and health have gained popularity ,in epidemiological research has record the evidence that health and Mediterranean dietary pattern in which high consumption of fruits and vegetables (rich sources of vitamins ,minerals and antioxidant and prebiotic),and legumes ;moderate consumption of poultry, eggs fish and milk and milk fermented product (which fulfil the need of probiotics);and lesser or occasional use of red meal is responsible for reduce risk of depression and other non communicable disease .(Lassale c.et al. 2019)
resource also state that plant based proteins sources or more beneficial the animal based protein for cop up from psychological health.(Daniele N.et et,al.,2014)

POSITIVE EFFECTS OF NUTRIENTS ON GUT AND MENTAL

Vitamins serve as co-enzyme which is requires for energy pathways ,availability of vitamins increase the microbiome and mitochondrial function and prebiotic and probiotic helps to improve gut microflora (Bisle E et al.2024).
Amino acid ls have capability to reduce symptoms of depression and other mental disorders amino acids serves as neurotransmitters that can reduce the severity tyrosine reduce environmental stress in humans ,urine is important for normal nervous system serve as precursor for sphingolipids and glycolysis which is crucial for membrane components and myelin constitutes.(Umeda K et al.MDPI nutrients 2022).

DIETARY NUROTRANSMITTERS

Most common neurotransmitters such as acetyl choline ,modified amino acids glutamine and gamma amino butyric acid (GABA) and biomedical amines like dopamine ,serotonin and the well known histamine are found un some animal food, fruits, edible plants and tuber (Roschina ,2001)

Additionally the neurotransmitters levels in the brain aids in the recovery of the brain's motor and non motor function (Iqbal A et al.ACS Omega 2022)

Studies shows that changes in neurotransmitters signaling cause several brain diseases (Filatova et al.,2021)

NEGATIVE IMPACT OF FOOD ON MENTAL AND GUT HEALTH

The Cross section study includes 18,439 adults age of 20 and above from NHANES (2011-2018) finding of this study is 100g/day dietary sugar intake is correlated with 28% higher prevalence of depression (zhang L .et al.2024)

Conclusion

As research studies shows that food provide all the essential nutrients which body can't produce by their own , nutrients like micronutrients which is essential for small amount but performance pivotal role in the body micronutrients works as precuotsor , coenzyme and support biochemical Reaction and also serve as neurotransmitters which is essential for brain signaling ,imbalance in neurotransmitters signaling cause mood swings headache and chronic imbalanced cause brain disease or disorders ,micronutrients also essential for flourish the microbiome and established health link between brain and gut which regulates also biochemical function which make a individual health and give potential to thrive in life .

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