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Short Communication

Gut Microbiome and Nutrition

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The organisms present in the digestive tract of humans surpass the human cells by almost 10 times and are collectively known as gut microbiome [1]. This microbiome may be considered as our other genome which when interacts with environmental factors can have a greater role than the human genome in obesity and disease development [2,3]. Profound changes in gut microbes' mass have been reported in studies related to obesity indicating the microbiome involvement in the pathogenesis of obesity [3]. Gut microbes perform many specific functions in the human body. Synthesis of essential and non-essential amino acids, production of vitamins and biotransformation of bile are carried out by gut bacteria. Besides, the microbiome performs metabolism of polysaccharides, resistant starch, and other substances that skip digestion [1].

It is convincing that the microbiome acts as a virtual organ in our body and has also been named as a metabolic organ [4]. Short-chain fatty acid like acetate produced in the gut by microbes is also required in the human body for cholesterol metabolism, lipogenesis, and central appetite regulation. Increased production of such short-chain fatty acids is correlated with reduced insulin resistance and lower diet-induced obesity. The products of gut microbiota in this manner impact human health [5]. A research study conducted on mice showed that mice that received faecal microbes from obese humans had higher weight gain compared to germ-free mice that received faecal microbes from average humans. Gut microbiota dysbiosis leads to metabolic complications and diet-induced obesity through various mechanisms [5].

Inflammatory diseases like asthma, inflammatory bowel disease (IBD), obesity, allergic disease, and other non-communicable diseases (NCDs) have a predisposition due to the drastic change in the gut microbiome [6,7]. Further, people with low microbiome tend to have more systemic inflammation, adiposity, insulin resistance and dyslipidaemia [7]. Altered gut colonization is implicated in metabolic dysregulation observed in many NCDs [5,6].

As the importance of gut microbiota on health is recognized around the globe, research studies on the dietary pattern, obesity, NCDs, and their management altering gut microbiome is being steered rapidly. A research study conducted on high and low cancer risk population groups found that altering the food content of fat and fibre led to a remarkable effect on colonic microbiome and metabolome in just two weeks. There was a significant change in mucosal inflammation and proliferation as well [8]. The manipulation of gut microbiome using probiotics has been increasingly used for preventing and treating obesity [9]. A meta-analysis also shows that probiotics tend to reduce infections following critical illness and reduce antibiotic-associated diarrhoea [10].

Evidence from studies illustrates the modern-day lifestyle with the adoption of the western diet is reducing the gut microbiome. Studies on mice have also shown sweetener such as sucralose disrupts the microbiota of gut and their diversity [5].

Our diet at present includes fewer wholesome fruits and vegetables but more aseptically produced germ-free processed foods with preservatives. We, on one hand, reduce our immunity while altering gut microbiome function and their environment on the other. Studies conducted in mice suggest that humans have personalized dietary responses based on their gut microbiome [7]. Personalized diet tailoring may be an answer for obese people to maintain weight shortly. Formulating foods with limited bio accessibility can support the gut microbiome as well as help in reducing the burden of obesity in the upcoming future. The food we consume, supplements we rely on and, the antibiotics we take, largely regulate the metabolites produced in our gut and indirectly regulate our health and disease. Current data illustrate dietary fibre as a probable source to increase microbiome diversity and therefore prevent NCDs [11].

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