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Guest Editorial

Gut Microbiota Link Nutrition with Immune System

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The crippling truth of today's world is the lack of food that is often linked to poverty. A survey showed that about 1 in nine people are chronically undernourished and about 3.1 million children worldwide die due to malnutrition annually. People usually do not understand the two terms properly: malnutrition and undernutrition. Malnutrition is a condition that develops when a person's diet does not contain the right amount of nutrients required for proper body functioning. It includes undernutrition, overnutrition, or an incorrect balance of nutrients. On the other hand, undernutrition is a type of malnutrition when essential nutrients are missing from one's diet. It results in several diseases depending upon the key missing nutrients from the diet. Malnutrition comprises of metabolic and digestive health issues, which may lead to deficiency of vital micronutrients in body. However, undernourishments mean refers to insufficiency of food.

One of the globally serious health problems in children is malnutrition, resulting in increased mortality from infectious diseases. The nutritional status of children less than five years of age is very poor. According to the recent estimates by the United Nations Food and Agriculture Organization (FAO), 37.5 million people in Pakistan are not getting sufficient nourishment, leading to the development of infectious diseases. Thus, diet is critical in shaping one's immune system.

The immune system gives us the strength to fight against diseases. Diet directly affects the mucosal immune system by altering the gut microbiome. Therefore, diet is referred to as the major source in determining the composition of the gut microbiota. On the contrary, malnutrition results in disturbances of the gut microbial ecosystem, leading to the aberrant immune system that results in the onset of diseases. The human gastrointestinal (GI) tract microbiota forms a very complex ecosystem, comprising of diverse varieties of microorganisms that help to regulate normal metabolic functions and mucosal immune homeostasis.

A complex inter-relationship exists between nutrition and the immune system. For example, malnutrition results in the reduction of leptin. Leptin is a pleiotropic cytokine that is important for maintaining a good appetite and helps in the Th1 immune cell responses while maintaining Treg cell responses. On the other hand, neutrophils, dendritic cells, and macrophages are activated to initiate a gut immune response in the presence of leptin. Therefore, leptin deficiency due to malnutrition results in the dysregulation of the mucosal immune system and gut inflammation. Furthermore, malnutrition affects hematopoiesis. Therefore, it is very important to understand the role of gut microbiota in establishing the inter-relationship between nutrition and the immune system.

Given the fact that inter-individual variation of the bacterial species within a population existed, it indicates the differences in dietary intake of the different individuals influence the composition of gut microbiota and thus the immune system. In Pakistan, our diet is totally different than the rest of the world. Therefore, it is plausible to suggest that our gut microbiota should be different and its effect on the immune system. It can be our future direction for research to link the gut microbiota with the nutritional status and the immune system within the Pakistani population.

