

The Interplay of Dietary Fibers and Intestinal Microbiota Affects Type 2 Diabetes by Generating Short-Chain Fatty Acids

Authors : Muhammad Mazhar, Yong Zhu, Likang Qin

Abstract : Foods contain endogenous components known as dietary fibers, which are classified into soluble and insoluble forms. Dietary fibers are resistant to gut digestive enzymes, modulating anaerobic intestinal microbiota (AIM) and fabricating short-chain fatty acids (SCFAs). Acetate, butyrate, and propionate dominate in the gut, and different pathways, including Wood-Ljungdahl and acrylate pathways, generate these SCFAs. In pancreatic dysfunction, the release of insulin/glucagon is impaired, which leads to hyperglycemia. SCFAs enhance insulin sensitivity or secretion, beta-cell functions, leptin release, mitochondrial functions, and intestinal gluconeogenesis in human organs, which positively affect type 2 diabetes (T2D). Research models presented that SCFAs either enhance the release of peptide YY (PYY) and glucagon-like peptide-1 (GLP-1) from L-cells (entero-endocrine) or promote the release of leptin hormone satiation in adipose tissues through G-protein receptors, i.e., GPR-41/GPR-43. Dietary fibers are the components of foods that influence AIM and produce SCFAs, which may be offering beneficial effects on T2D. This review addresses the effectiveness of SCFAs in modulating gut AIM in the fermentation of dietary fiber and their worth against T2D.

Keywords : dietary fibers, intestinal microbiota, short-chain fatty acids, fermentation, type 2 diabetes

Conference Title : ICFMR 2024 : International Conference on Food Microbiology and Research

Conference Location : New York, United States

Conference Dates : July 11-12, 2024