Introduction to the gut microbiome
• Microbiome: all the genes in the microbial community
• Microbiota: all community members, including Bacteria, Archaea, and Eukarya
• At least 10 different phyla of bacteria found in human gut, Bacteroidetes and Firmicutes being the most dominate, and hundreds of species

Diet’s effect on the gut microbiome
• Gut microbes obtain energy and nutrients from the diet leftovers to live and reproduce, and carry out reactions that human gut enzymes cannot
• Microbial metabolism of carbohydrates, proteins, dietary fats, and other dietary constituents are linked to different compositions of the gut microbiota
• Evidence from long-term food pattern consumption studies (observational) as well as short term dietary interventions reveal differences in gut microbiome based on dietary patterns

Gut microbiome’s effect on diet
• The gut microbiome alters exposure to nutrients and bioactives, and generates new compounds that:
  • Serve as energy sources
  • Regulate metabolism
  • Increase or reduce inflammation
  • Cause or reduce oxidative stress
  • Are genotoxic/carcinogenic

Pro-, pre- and synbiotics
• The use of probiotics has shown efficacy for treating several gastrointestinal conditions
• Research also indicates positive results for the use of probiotics for treating obesity in rodents, but lacks consistent data for treatment in humans

Potential contributions of fermented foods
• Benefits of fermentation include food safety, enrichment of diet through diverse flavors, aromas, and textures, and enhancement of nutritional qualities
• Fermented milk products deliver many live active cultures to the GI tract
  • The most common probiotics found in fermented dairy are Lactobacillus and Bifidobacterium
  • Yogurt consumption is positively associated with improved glucose metabolism and inversely associated with risk of Type 2 diabetes; however, more research is needed to prove it can prevent the onset of diabetes

Impact of the gut microbiome on human health
• Research shows low-fat and Mediterranean diets restore microbiota in obese patients with metabolic syndrome, but do not substantially alter microbiota in non-obese groups
• Microbial production of bioactive substances varies greatly across individuals
• Substantial work is needed to establish causal relationships and therapeutic potential in humans

Consumer takeaways
• Gut microbiome health remains a young field of research
• General recommendations to consumers include:
  • Avoiding indiscriminant use of antibiotics
  • Make food choices to maintain gut microbiome diversity and function
  • To this end, choose a healthy eating pattern, such as the Dietary Guidelines for Americans
gut microbiome, diet, and human health

References