**Supplementary Material**

**Table 1.** Types of Gut Biotics

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| **Type** | **Definition** | **Examples** |
| Probiotics | Live microorganisms that can provide health benefits, designed to restore beneficial bacteria of the gut [13, 15]. | Yogurt, buttermilk, sauerkraut, tempeh, kimchi, kombucha, kefir, buttermilk, pickles, natto, miso, kombucha, natto, certain fermented cheese (cottage, mozzarella), sourdough bread |
| Prebiotics | Compounds found in food designed to promote the growth of beneficial microorganisms of the human gut [34, 214].  | Bananas, dandelion greens, oats, legumes, beans, peas, asparagus, onion, garlic, berries, Jerusalem antichokes, Leeks |
| Synbiotics | Refers to food or dietary supplements that consist of both probiotics and probiotics [35]. | Bifidobacteria and Fructooligosaccharides, *Lactobacillus rhamnosus* GG and inulins or galactooligosarccharides Yogurt (probiotic) with banana slices (prebiotics)Soybeans (prebiotics) with Miso soup (postbiotics) |
| Paraprobiotics | Inactivated probiotics, which still retain the health benefits associated with probiotic and have the ability to modify the biological response like immunological function and anti-inflammatory effect [50, 215]. | *Lactobacillus gasseri* CP2305 (Heat inactivated) |
| Postbiotics | Functional bioactive compounds, such as SCFAs, EPSs, and microbial cell fractions that are generated within a matrix during fermentation and used to promote health [216]. | Organic acids, bacteriocins, short chain fatty acids, extracellular polymeric substances |
| Proteobiotics  | The natural metabolites, like oligopeptides, produced by certain probiotic strains during fermentation. They play a role in maintaining the balance of beneficial bacteria and improving gut function [24, 217, 218].  | Microbial compounds (peptidoglycan, polysaccharides, lipoteichoic acids, cell surface proteins)Metabolites (lactic acid, peptides/proteins, bacteriocins, enzymes, polysaccharides, organic acids, SCFAs)Products from microbial enzymatic activity |

SCFAs: short-chain fatty acids; EPSs: extracellular polymeric substances.

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