Pro- & Synbiotics

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History

- The word *probiotic* (from the latin *pro* and the greek *βιοσ* literally meaning “for life”) was introduced by the German scientist W. Kollath in 1953 to designate “active substances that are essential for a healthy development of life.”
- The history of probiotics is as old as the human history, as it is closely related to the use of fermented food which probably started around 10,000 years ago.
- The modern history of probiotics starts at the beginning of 1900s with the pioneering studies of the future Nobel laureate E. Metchnikoff, a Russian scientist working at the Pasteur Institute in Paris.
  - He was the first investigating the positive effects of bacteria on human health.
  - Metchnikoff also stated that “the dependence of the intestinal microbes on the food makes it possible to adopt measures to modify the flora in our bodies and to replace the harmful microbes by useful microbes.”
- In 1992, R. Fuller defined probiotics as “a live microbial feed supplement which beneficially affects the host by improving its intestinal microbial balance.”
- In 2013, an expert consensus document had been published on the scope and appropriate use of the term probiotic: “live microorganisms which when administered in adequate amounts confer a health benefit on the host”.

Probiotics

Product Category	Active Ingredient(s)	Examples
Probiotics	Probiotic bacteria	**Yeast probiotics** • Saccharomyces boulardii **Bacterial probiotics** • Lactobacilli • Bifidobacteria

Definition

"live microorganisms which when administered in adequate amounts confer a health benefit on the host"

Source: World Health Organization

Prebiotics

Product Category	Active Ingredient(s)	Examples
Prebiotics	Prebiotic	**Prebiotics** • Fructooligosaccharides • Galactooligosaccharides • Inulin

Definition

“a non-digestible food ingredient that promotes the growth of beneficial microorganisms in the intestines.”

Synbiotics

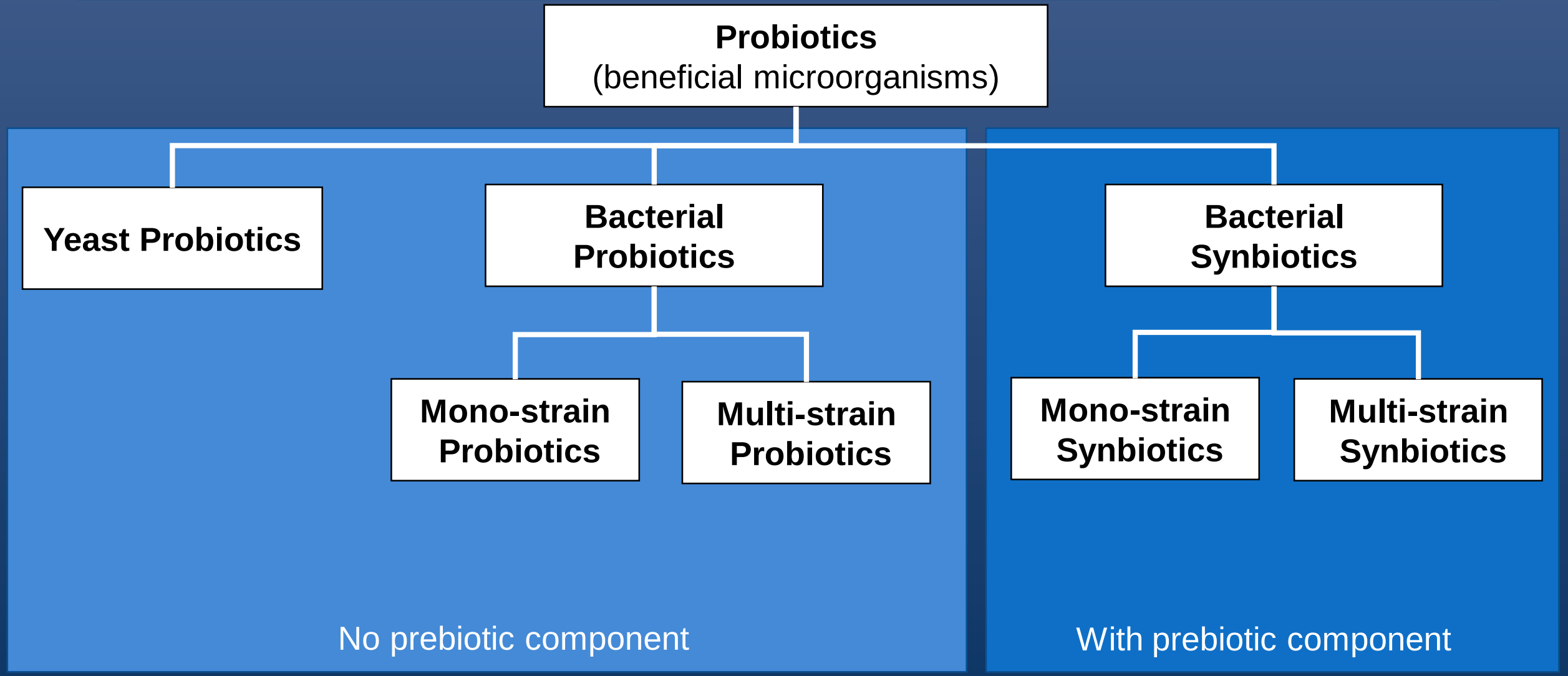
Product Category	Active Ingredient(s)	Examples

Synbiotics	Probiotic
	Prebiotic
		• Probiotic bacteria
		  • e.g. Lactobacilli
		  • e.g., Bifidobacteria
		• Fructooligosaccarides

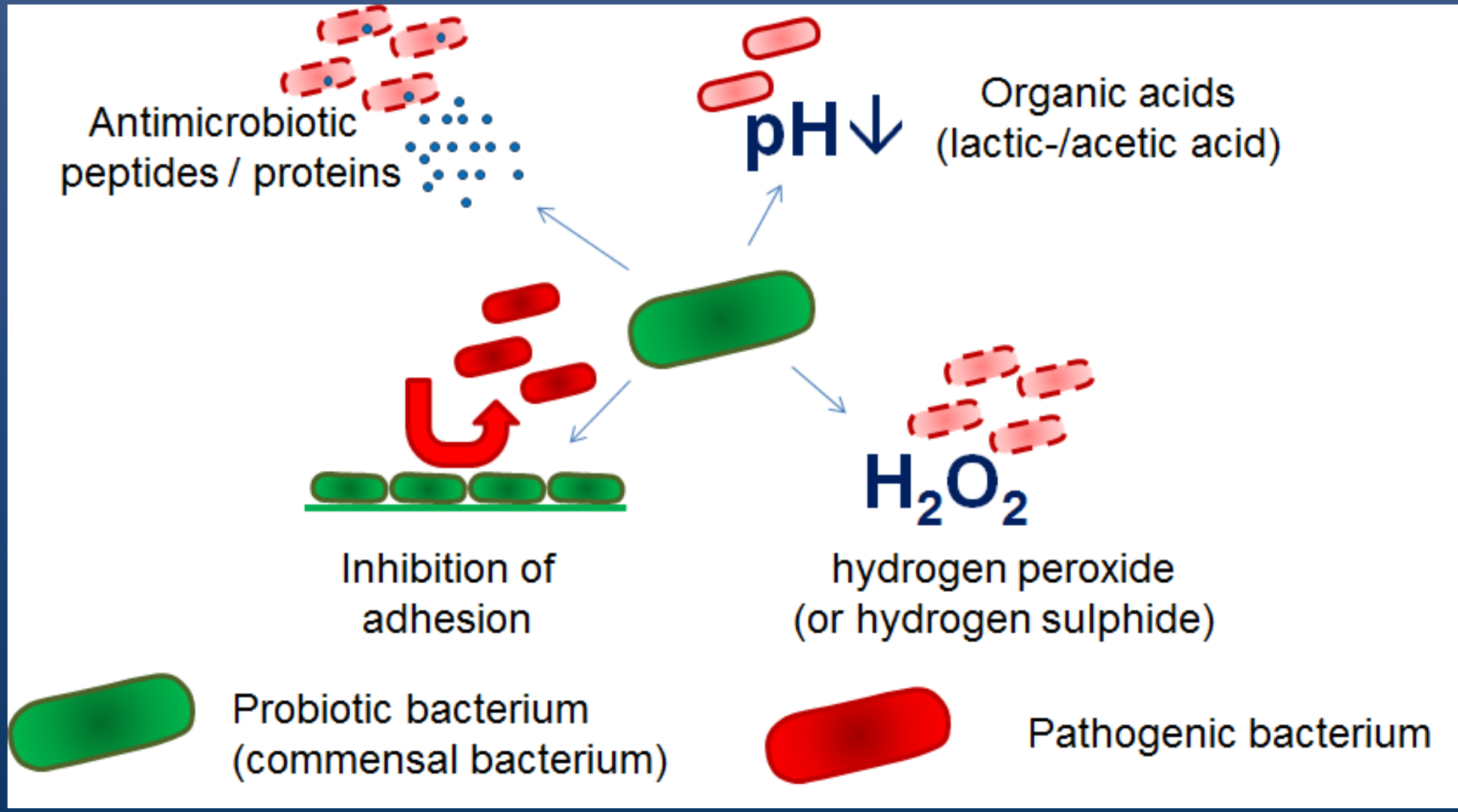
Definition

“a product containing one or several probiotic microorganisms combined with a prebiotic component”

Categories of Products Containing Probiotic Microorganisms



Mechanisms Used by Probiotics Against Pathogens



Our Checklist for Assessment of Products Containing Probiotic Microorganisms

Product Feature	Recommended property	Reason(s)
Number of different probiotics bacterial strains	5-10	Larger number of different probiotic strains contribute a variety of mechanisms to contain pathogen growth in the gut, some of which might even act synergistically
Sufficient number of colony forming units (CFU)	≥1 x 10^9	Sufficient amount of CFU is needed to result in gut colonization. However, colonization depends also on product features and probiotic strain characteristics
Protection against inactivation by stomach acid	enteric coating	Enteric coating of capsules or powders will allow living bacteria to travel through low pH environment of the stomach
Symbiotic	probiotic combined with prebiotic	The prebiotic component will provide a source of energy for the probiotic strains, thereby supporting the colonization of the gut by the probiotic bacteria
Allergens	free of allergens	Product should be free of allergens, especially, lactose-free and gluten-free
Capsule	vegetarian capsule	Gelatin-free and are acceptable for users, who have to avoid products containing components sourced from pigs
Packaging	blister or stick pack	Blister packaging or one-dose stick packs provide convenient administration
Dosing	once daily	Once-daily dosing is supporting compliance of intake
Storage	room temperature	Storage without refrigeration simplifies logistics and storage by users
Acceptable price	acceptable	Must be low enough to allow out-of-pocket payment by patients

Questions, Comments & Suggestions

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