

ESU 009– Functional role of probiotic foods

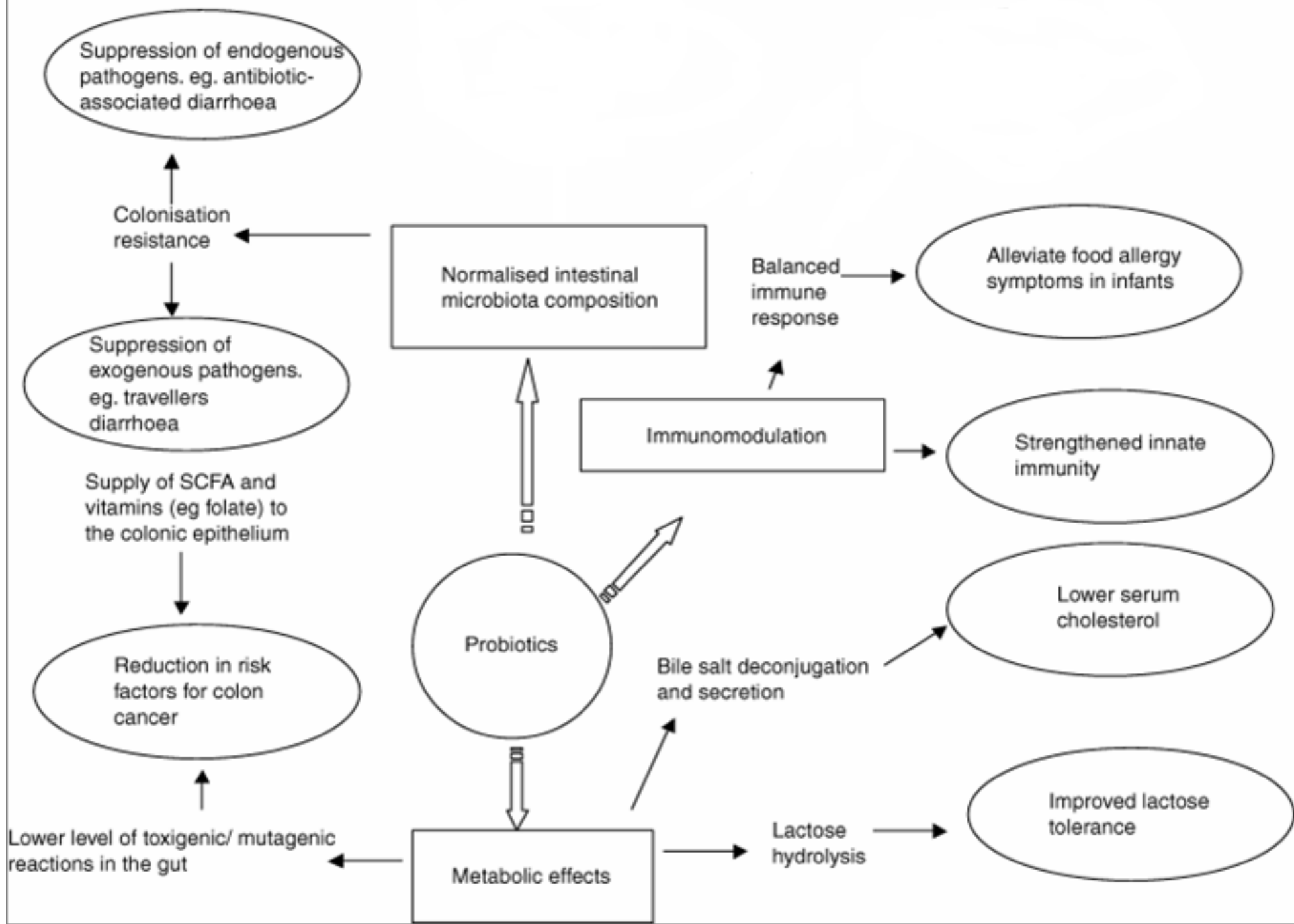
Lecture 22



Mechanism of action of Probiotics

Production of low-molecular-weight antibacterial substance that inhibits both gram-positive and gram-negative enteric bacteria

Also prevent colonization of pathogenic microorganisms by competitive inhibition for microbial adhesion sites



Diarrhea

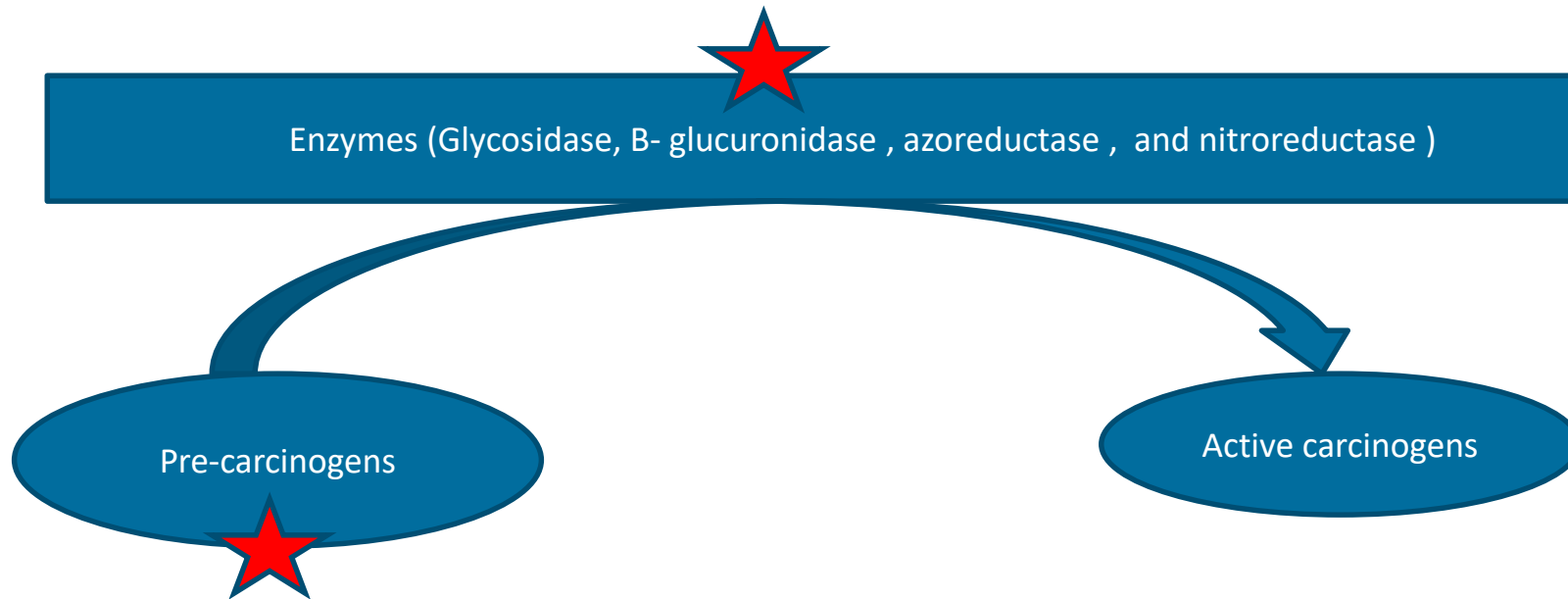
Type of Diarrhea	Pathogen	Probiotic used
<i>Clostridium difficile</i> diarrhea	<i>Clostridium difficile</i>	<i>Lactobacillus</i>
Traveler's diarrhea	<i>Enterotoxigenic Escherichia coli</i>	<i>Saccharomyces boulardii</i>
Pediatric diarrhea	<i>Campylobacter, Salmonellae, Shigellae</i>	<i>Lactobacillus</i> and <i>Bifidobacterium</i>

Anticancer effects

High animal fat and protein Diet

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Increase the susceptibility to colon cancer by conversion of pre-carcinogens to carcinogens by the intestinal micro flora



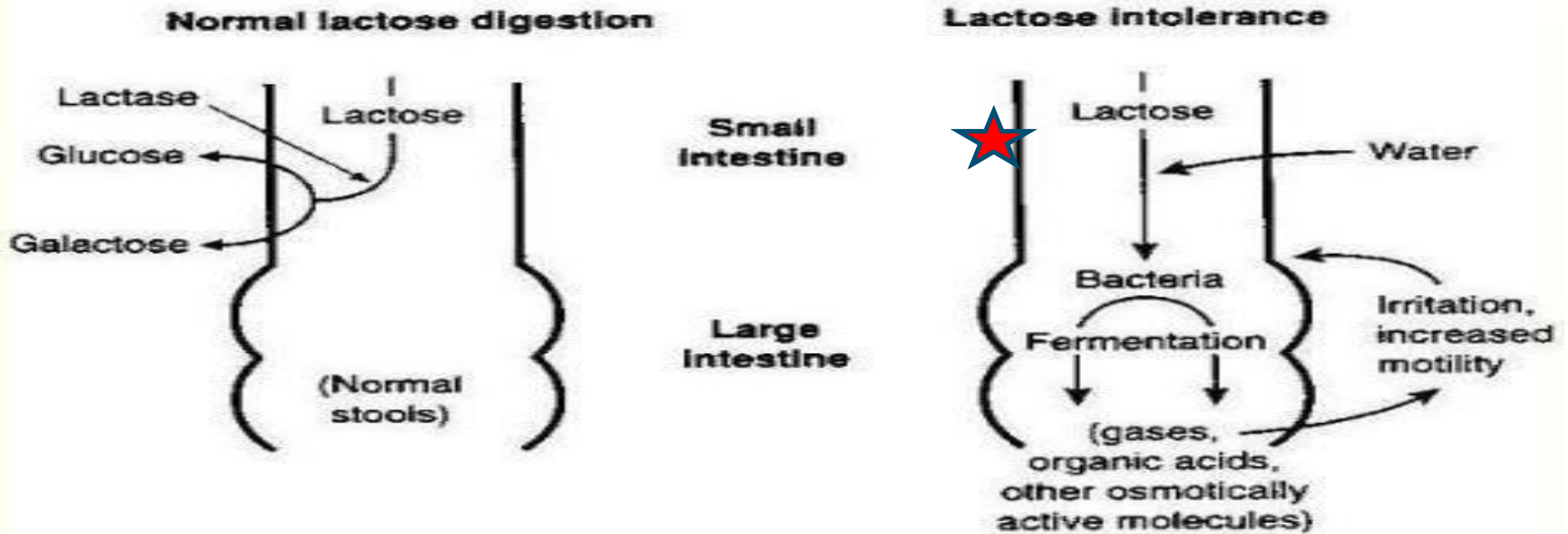
Activity of *L. acidophilus* and *L. casei* supplementation in humans helped to decrease levels of these enzymes.



Colon Cancer



Lactose Intolerance



- Lactose- intolerant individuals **tolerate yogurt** mainly due to the supply of lactase activity from the lactic acid bacteria present in the yogurt itself.
- Lactose deficiency leads to calcium malabsorption
- Acidic condition = Calcium absorption is more
- Production of lactic acid by hydrolysis of milk lactose by Probiotics.

Allergy

Organism	Allergic condition
<i>Lactobacillus rhamnosus GG</i>	Asthma Rhinitis Eczema Food allergy
<i>Bifidobacter lactis</i>	Atopic eczema
<i>Lactobacillus paracasei</i>	Allergic rhinitis
<i>Lactobacillus reuteri</i>	Atopic dermatitis



- Normalization of the properties of indigenous microbiota.
- Regulation of the secretion of inflammatory mediators.
- Stimulating immune response and reduction of serum IgE levels.
- *Lactobacillus* and *Bifidobacterium* improve mucosal barrier function.
- Probiotics have been shown to reduce the incidence of childhood eczema.
- Probiotics have been shown to control lactose intolerance.

Genetically Engineered Probiotics

- Use of genetically modified Probiotics as TMAU Trimethylaminuria
- A genetically modified *Bacteroides ovatus* and Xylan in small amounts to improve as a therapy to animals with colitis.

Benefits of Genetic engineering:

- Strengthen the effects of existing strains
- Create completely new Probiotics. These need not necessarily be composed only of bacterial products but can also include elements of regulatory systems or enzymes derived from a foreign—human—source.
- As vector for vaccines and growth hormones

Commercial Probiotic Strains

Probiotic Strain	Commercial Product
<i>L. acidophilus</i>	LA-5; NCDO 1748
<i>Saccharomyces cerevisiae</i> (boulardii)	Florastor Biocodex (Creswell OR)
<i>L. casei</i> Shirota <i>B. breve</i> strain Yakult	Yakult
<i>L. johnsonii</i> Lj-1 (same as NCC533 and formerly <i>L. acidophilus</i> La-1)	LC-1 Nestlé (Lausanne, Switzerland)
<i>L. reuteri</i> ATCC 55730 ("Protectis")	BioGaia Probiotic chewable tablets or drops
<i>Streptococcus oralis</i> KJ3 <i>Streptococcus rattus</i> JH145	ProBiora3 Oragenics Inc. (Alachua FL)
<i>Lactobacilli rhamnosus</i> PBO1 <i>Lactobacilli gasseri</i> EB01	EcoVag Bifodan (Denmark)

Status of Probiotics in India

- Used as animal feed supplements for cattle, poultry and piggery.
- Yakult Dannone released their Probiotic drink named Yakult.
- The latest and recent addition to the list of probiotics in India is ViBact (which is made up of genetically modified *Bacillus mesentericus*), which acts as an alternate to B-complex capsules launched by US Vitamins.
- Probiotic yogurts have been launched by Mother Dairy.

An advertisement for Yakult featuring a woman with long black hair, wearing a white lab coat over a pink top. She is smiling and holding a small white bottle of Yakult. The background is a solid red color. Text on the left side of the ad reads: "Give your family the kiss of good health everyday", "Yakult", and "World's No.1 probiotic drink". On the right side, there is a small image of a Yakult bottle and text that says: "Improves digestion • Builds Immunity", "Yakult is a delicious probiotic drink from Japan that has over 8.5 billion beneficial bacteria (Lactobacillus casei strain Shirota) in every bottle. These beneficial bacteria reach the intestine alive and suppress the growth of harmful bacteria. Over 28 million people in 32 countries have made Yakult a part of their daily diet. Now, it's time for your family to get the kiss of good health too." At the bottom right, there is a yellow circular badge that says "Now in Mumbai".

Give your family the kiss of good health everyday

Yakult

World's No.1 probiotic drink

Improves digestion • Builds Immunity

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Now in Mumbai

Available at retail stores across Mumbai. 022-43394292
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Dannone Food Services, Mumbai 400032. Tel: 022-33390110, Website: www.yakult.co.in



Thank you

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