Lecture -6
III Semester

Medical Microbiology

Normal Microbial Flora of Human Body

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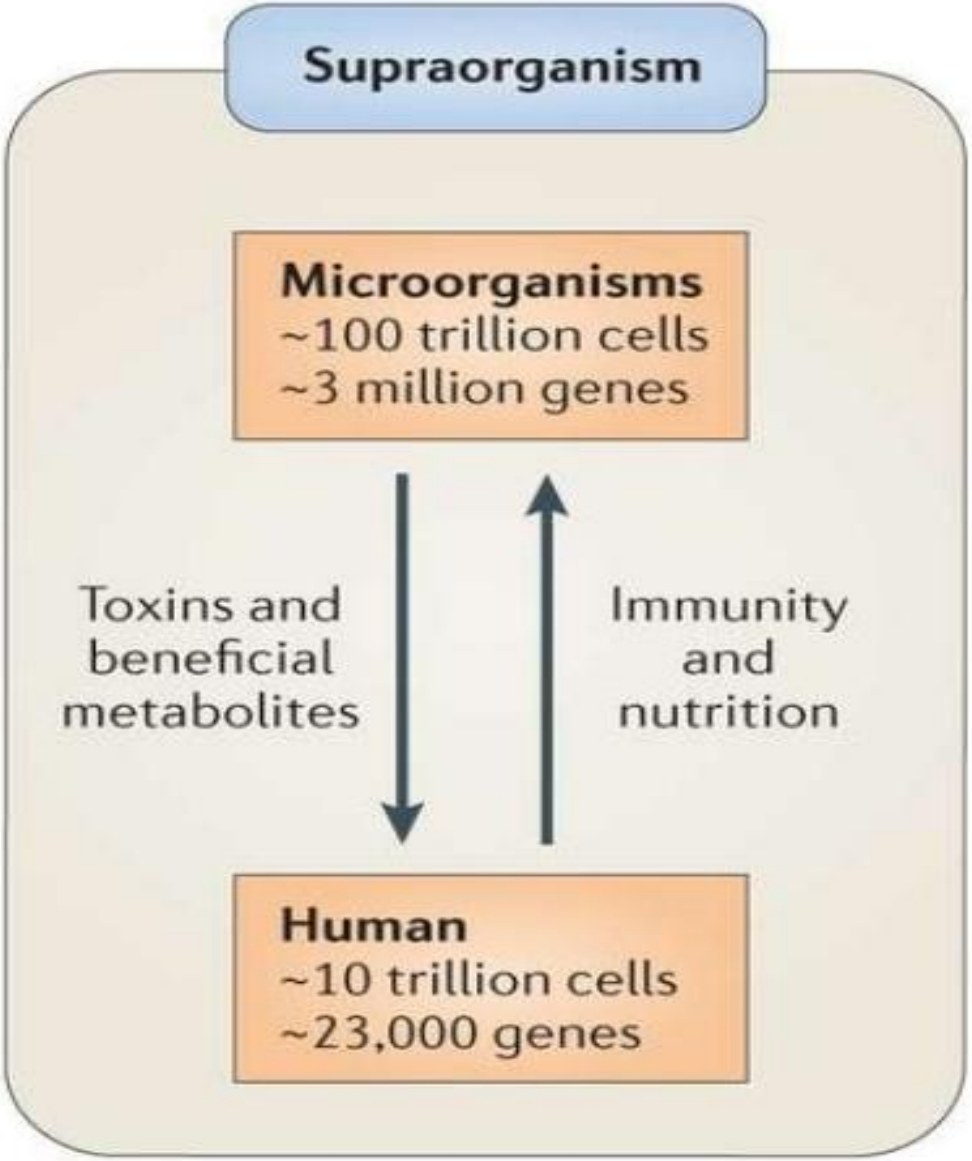

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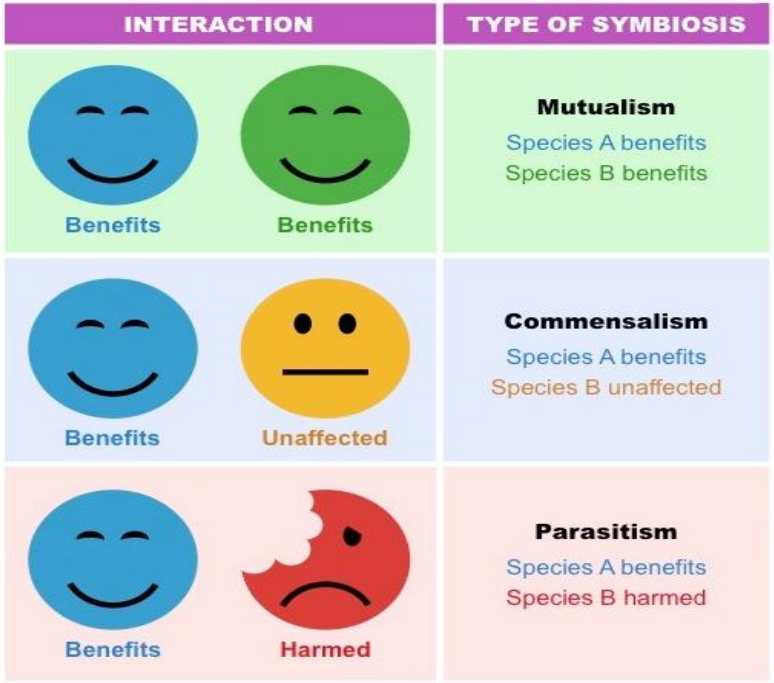
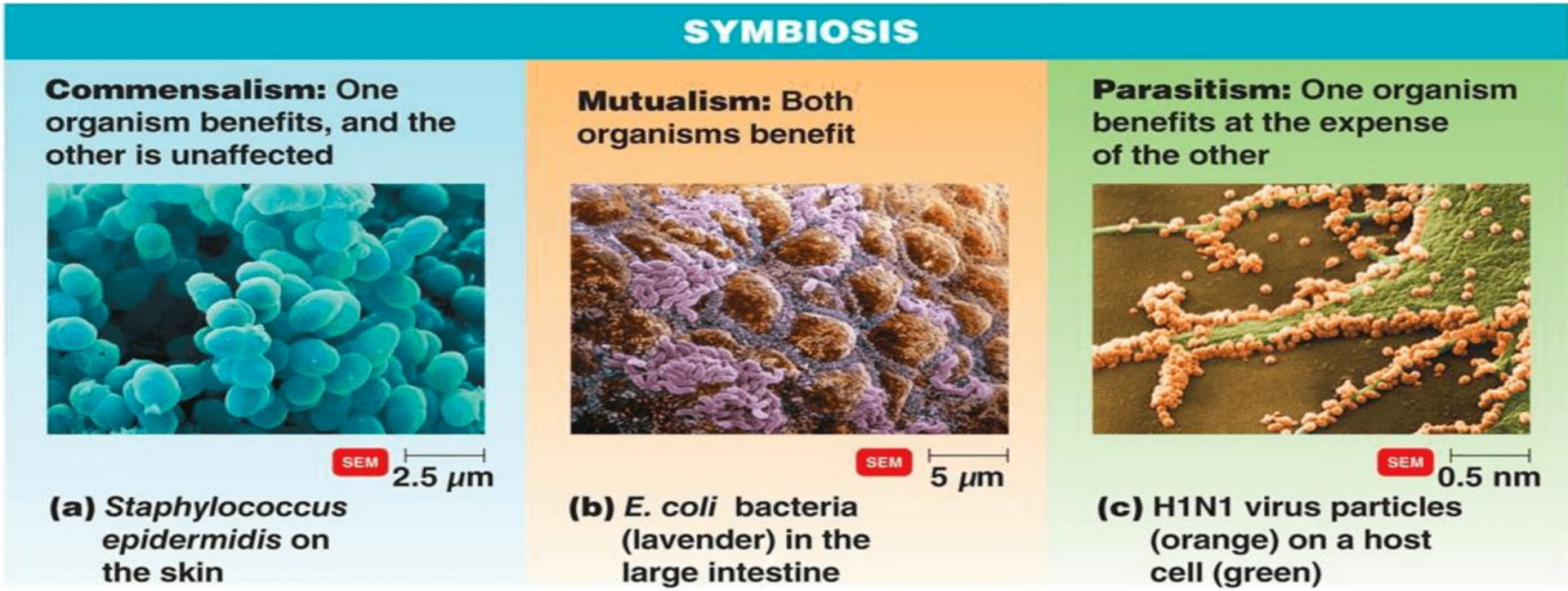
Normal Microbiota of the Human Body

- Brain, blood, cerebrospinal fluid, muscles are normally free of microorganisms
- Ectosymbiosis and endosymbiosis
- The possible infections
- The physician investigator understand the causes and consequences
- An increased awareness of the role that these normal microbiota play in stimulating the host immune response can be gained.



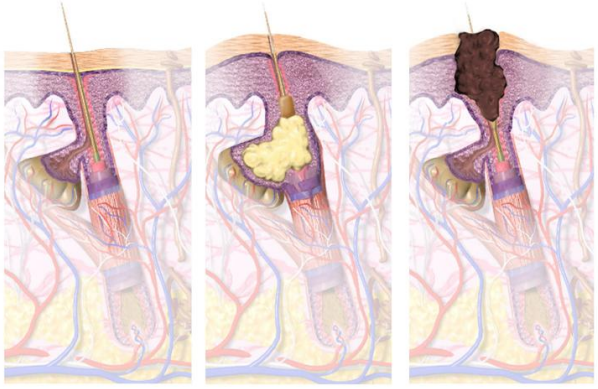


Skin Microbiota

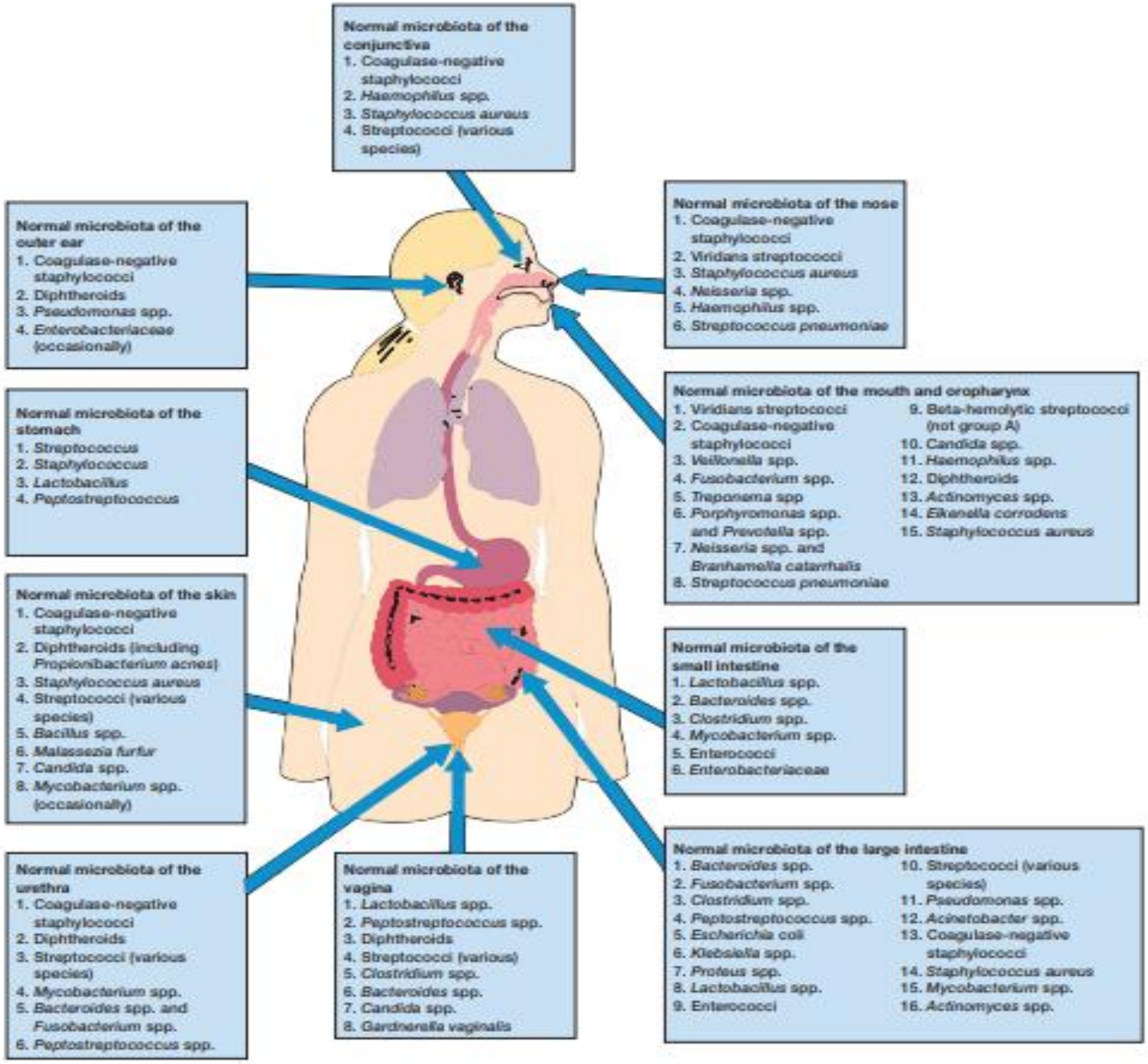
- The adult human is covered with ~ 2 square meters of skin supports about 10^{12} bacteria.
- Either resident (normal) or transient microbiota
- The skin surface or epidermis is not a favorable environment due to periodic drying, slightly acidic pH, sweat contains a high concentration of NaCl, release lysozyme (muramidase) act on *Staphylococcus epidermidis*
- The bacterium in the skin glands is the Gram positive, anaerobic, lipophilic rod *Propionibacterium acnes*
- A large volume of sebum accumulates within the glands

Triggers an inflammatory response and produces a comedo, a plug of sebum and keratin in the duct. Inflammatory lesions (papules, pustules, nodules) commonly called "blackheads" or "pimples" can result.

Acne vulgaris



- *P. acnes* produces lipases that hydrolyse the sebum triglycerides into free fatty acids that are irritating.
- *P. acnes* is extremely sensitive to tetracycline. Accutane, a synthetic form of vitamin A, is also used.



Normal Microbiota of a Human

Stomach

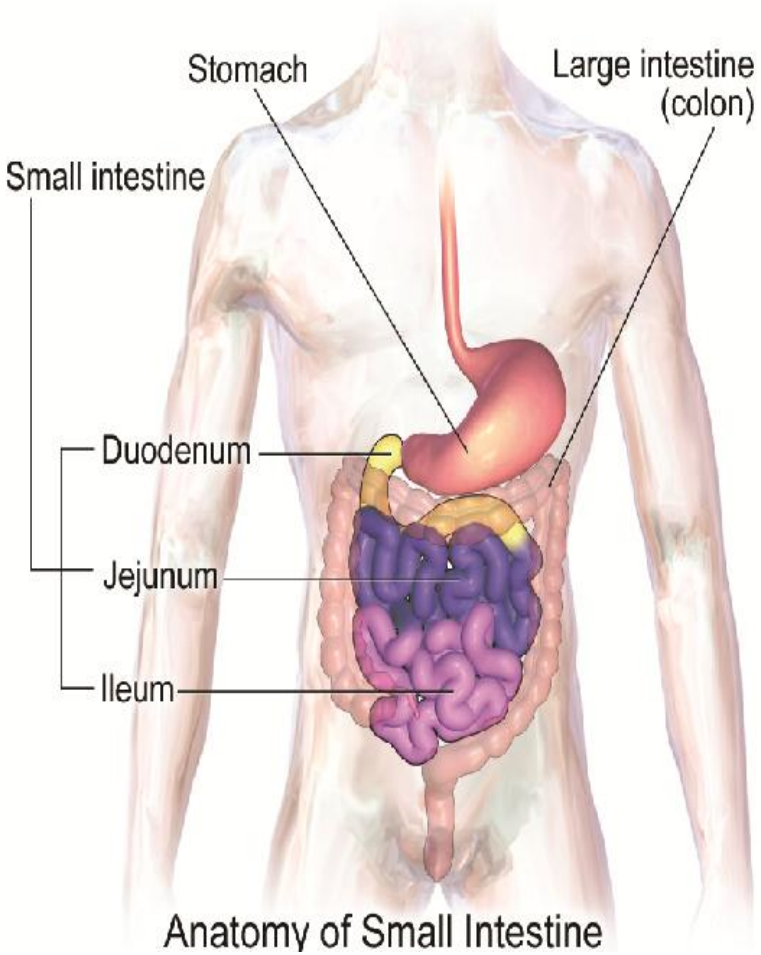
- Owing to the very acidic pH values (2 to 3) of the gastric contents, most microorganisms are killed. As a result the stomach usually contains less than 10 viable bacteria per milliliter of gastric fluid. These are mainly *Sarcina, Streptococcus, Staphylococcus, Lactobacillus, Peptostreptococcus*, and yeasts such as *Candida* spp.
- an adult eliminates about 3 x10^{13} microorganisms daily

Disruptive factors include stress, altitude changes, starvation, parasitic organisms, diarrhea, and use of antibiotics or probiotics

Stomach 10^2
Lactobacillus
Candida
Streptococcus
Heliobacter pylori
Peptostreptococcus

Duodenum 10^2
Streptococcus
Lactobacillus

Jejunm 10^2
Streptococcus
Lactobacillus



Anatomy of Small Intestine

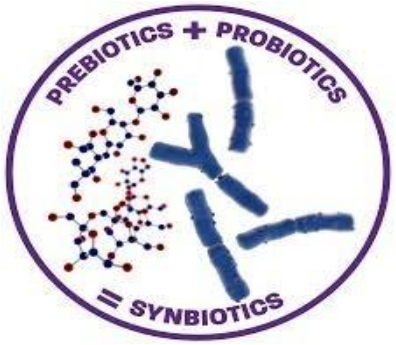
Proximal ileum 10^2
Streptococcus
Lactobacillus

Distal ileum 10^8
Clostridium
Streptococcus
Bacteroides
Actinomycinae
Corneybacteria

Colon 10^{12}
Bacteroides
Clostridium
Bifidobacterium
Enterobacteriacae

Probiotics [Greek *pro*, for, and *bios*, life], the oral administration of either living microorganisms

Probiotic microorganisms are host specific
Adhere to the intestinal mucosa of the host, Be easily cultured, Exert a beneficial effect on the host , Produce useful enzymes , Remain viable for a long time, Withstand HCl and bile salts



Prebiotics vs Probiotics

Prebiotics	Probiotics
Prebiotics are defined as nonliving non-digestible special form of fiber or carbohydrates.	Probiotics are referred to as live active microorganisms that when administered in adequate amount will have beneficial effects to its host.
The powder form of prebiotics can survive heat, cold, acid.	• more fragile. • vulnerable to heat. • may be killed over time.
Prebiotics perform their role by nourishing the bacteria that live in the intestines.	Probiotics fight the harmful bacterial species present in the gut.

- **Anticarcinogenic activity**
- **Control of intestinal pathogens**
- **Improvement of lactose use in individuals who have lactose intolerance**
- **Reduction in the serum cholesterol concentration**

MICROBIAL ECOLOGY

Human gut microbes associated with obesity

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Proportion of Bacteroidetes and Firmicutes in the cecal microbiota of lean vs. obese mice