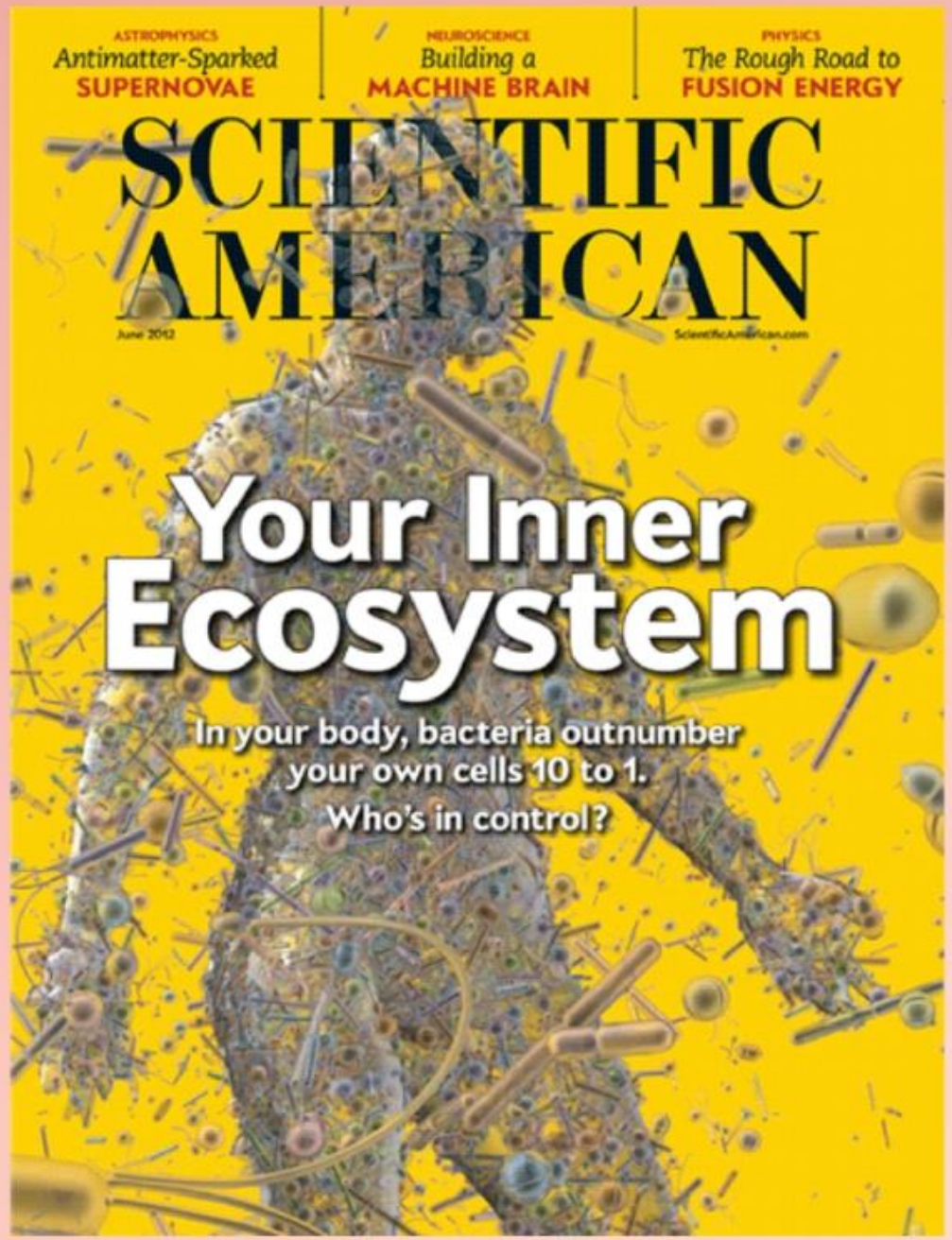
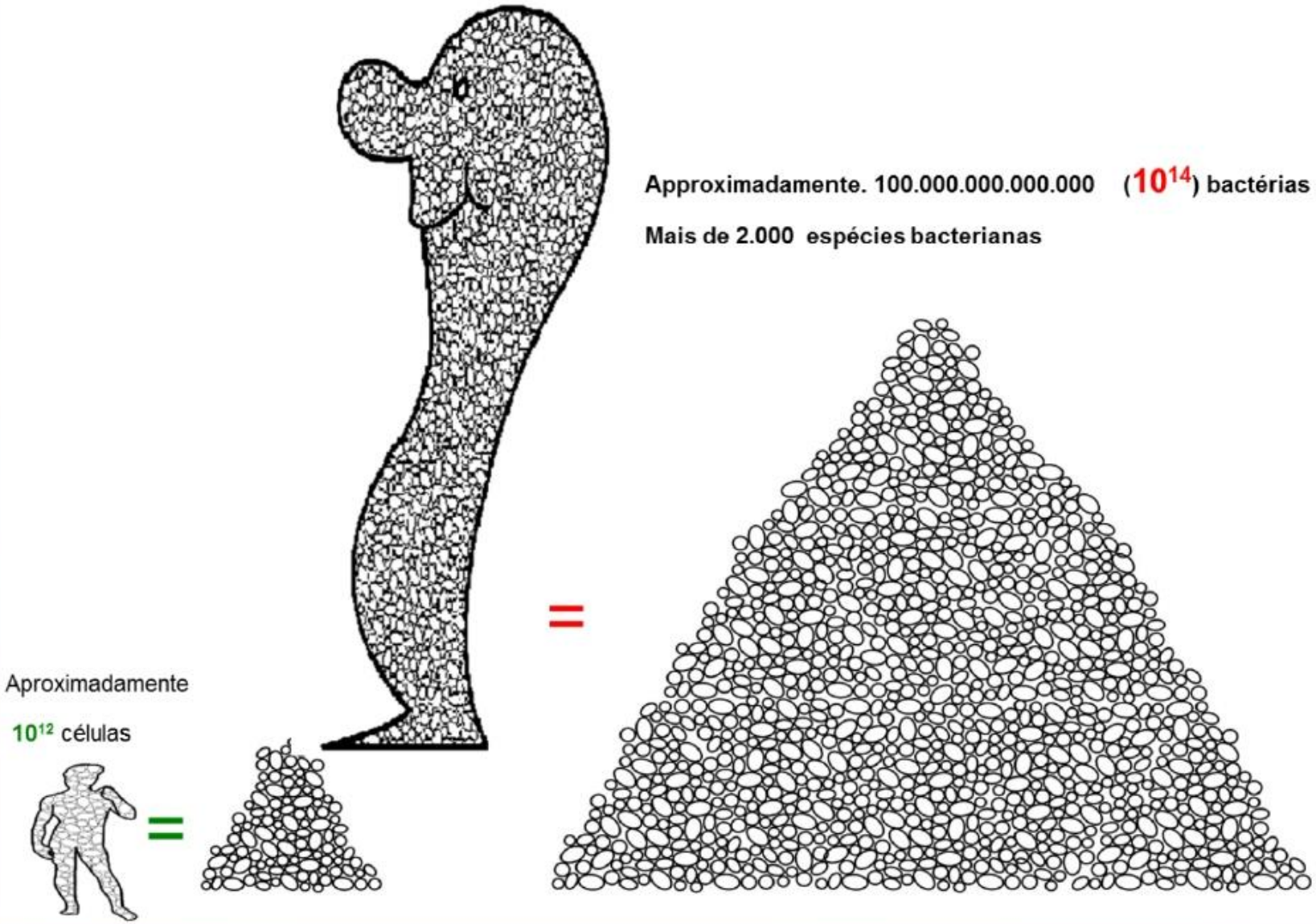
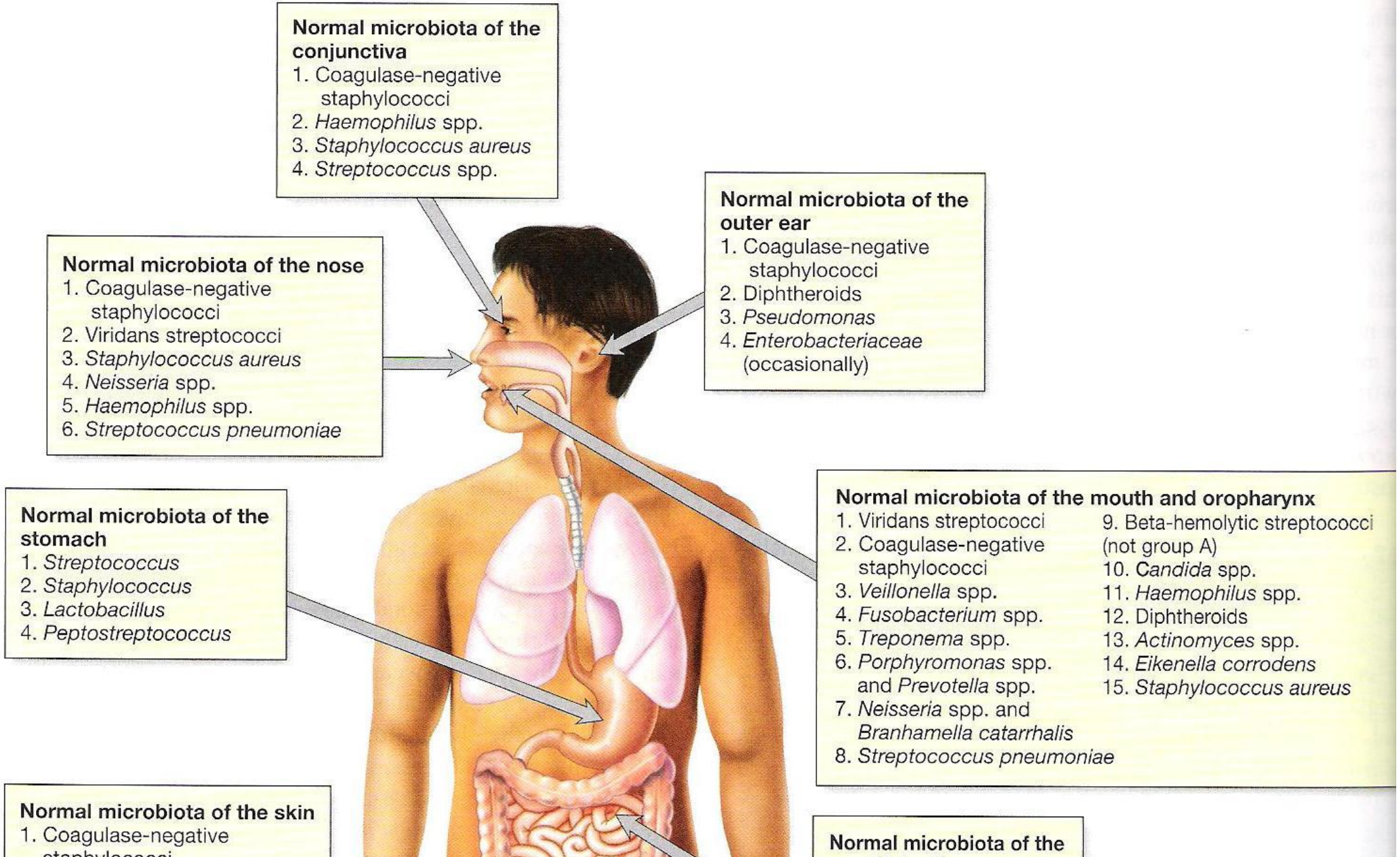
A força imunológica das partículas microbianas


ASTROPHYSICS
Antimatter-Sparked
SUPERNOVAE
NEUROSCIENCE
Building a
MACHINE BRAIN
PHYSICS
The Rough Road to
FUSION ENERGY
SCIENTIFIC AMERICAN
June 2012
ScientificAmerican.com
Your Inner Ecosystem
In your body, bacteria outnumber your own cells 10 to 1.
Who's in control?


Approximadamente. 100.000.000.000.000 (10^{14}) bactérias
Mais de 2.000 espécies bacterianas
Aproximadamente
10^{12} células


Normal microbiota of the conjunctiva
1. Coagulase-negative staphylococci
2. Haemophilus spp.
3. Staphylococcus aureus
4. Streptococcus spp.
Normal microbiota of the outer ear
1. Coagulase-negative staphylococci
2. Diphtheroids
3. Pseudomonas
4. Enterobacteriaceae (occasionally)
Normal microbiota of the nose
1. Coagulase-negative staphylococci
2. Viridans streptococci
3. Staphylococcus aureus
4. Neisseria spp.
5. Haemophilus spp.
6. Streptococcus pneumoniae
Normal microbiota of the stomach
1. Streptococcus
2. Staphylococcus
3. Lactobacillus
4. Peptostreptococcus
Normal microbiota of the mouth and oropharynx
1. Viridans streptococci
2. Coagulase-negative staphylococci
3. Veillonella spp.
4. Fusobacterium spp.
5. Treponema spp.
6. Porphyromonas spp. and Prevotella spp.
7. Neisseria spp. and Branhamella catarrhalis
8. Streptococcus pneumoniae
9. Beta-hemolytic streptococci (not group A)
10. Candida spp.
11. Haemophilus spp.
12. Diphtheroids
13. Actinomyces spp.
14. Eikenella corrodens
15. Staphylococcus aureus
Normal microbiota of the skin
1. Coagulase-negative
Normal microbiota of the

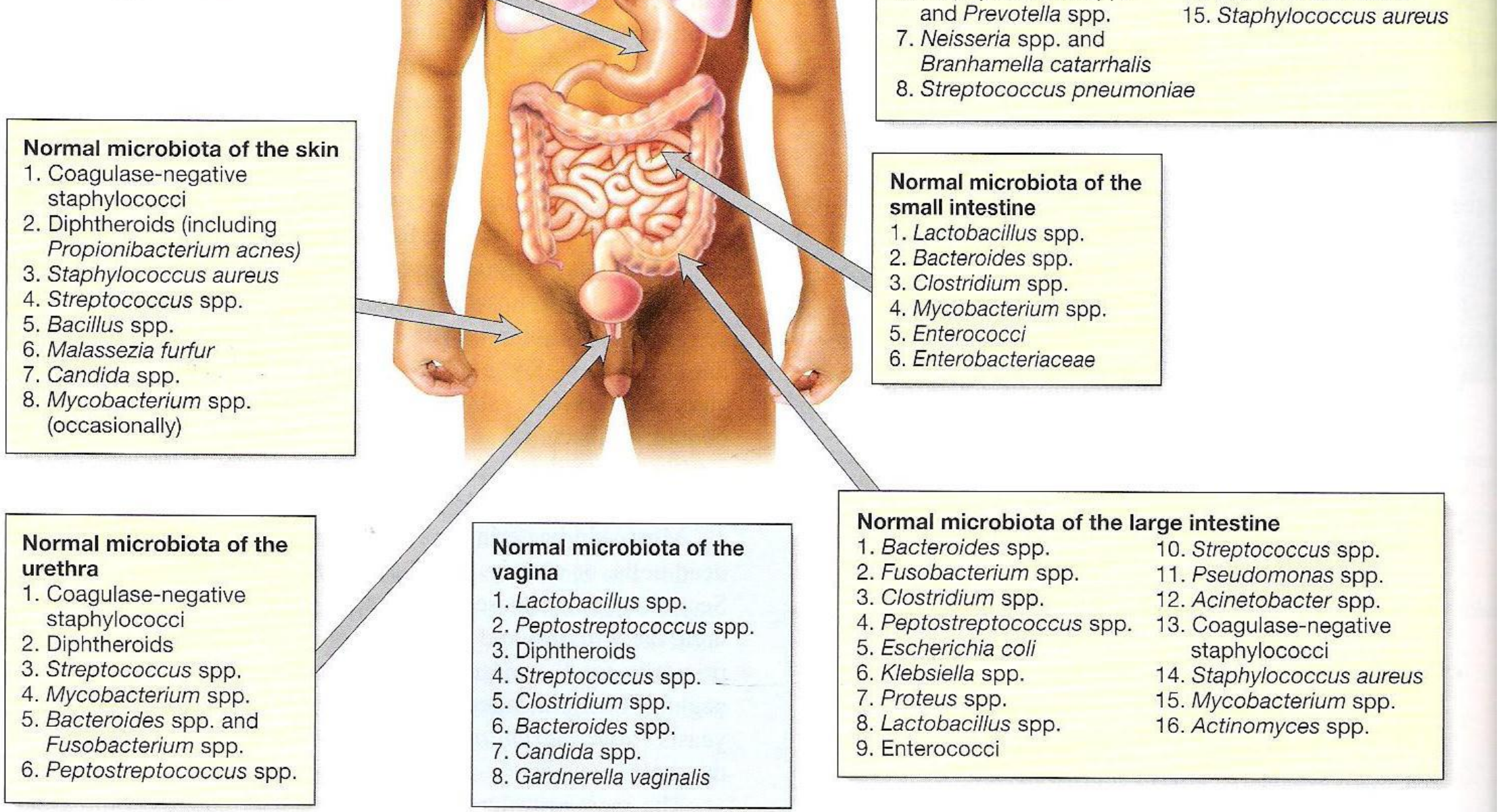
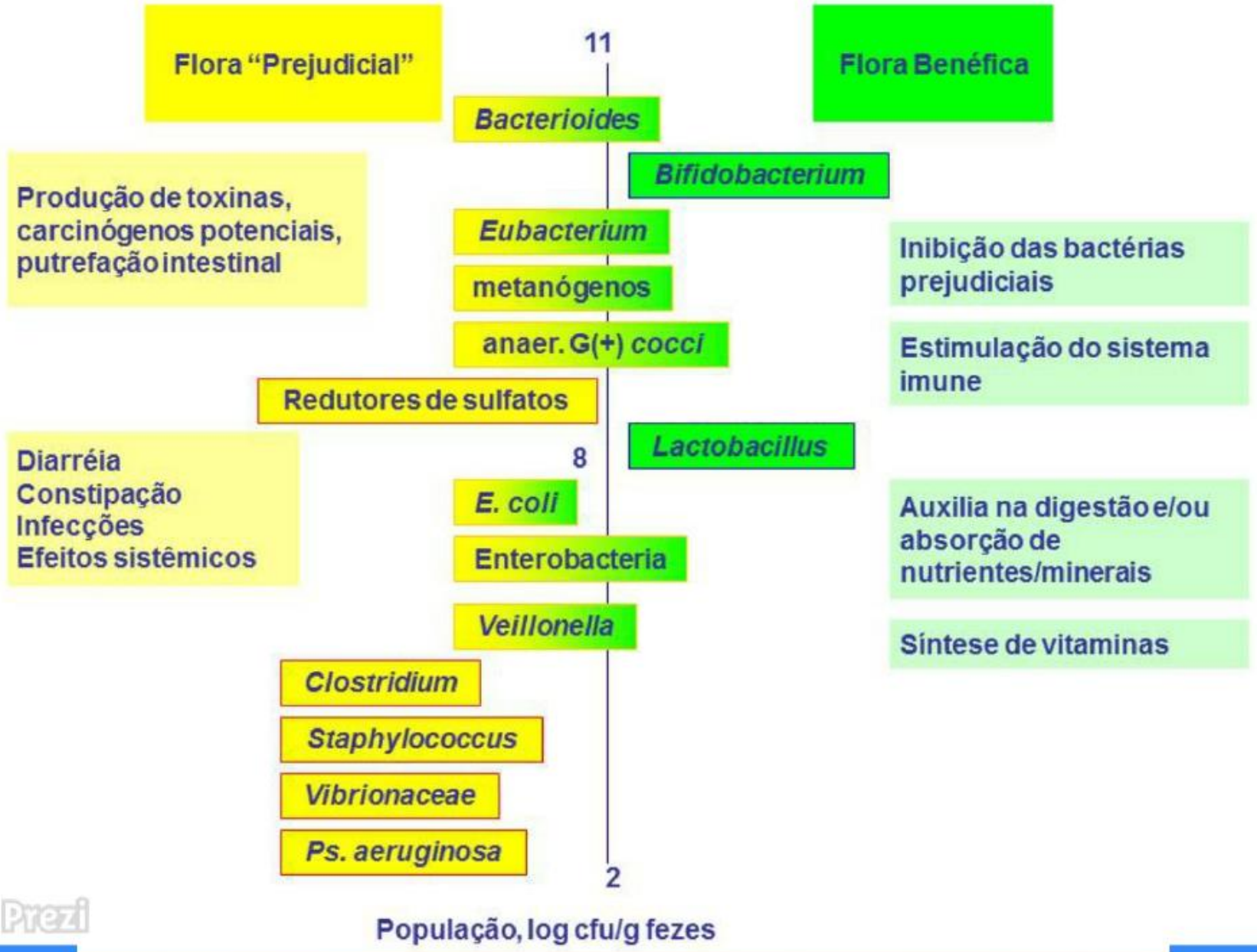
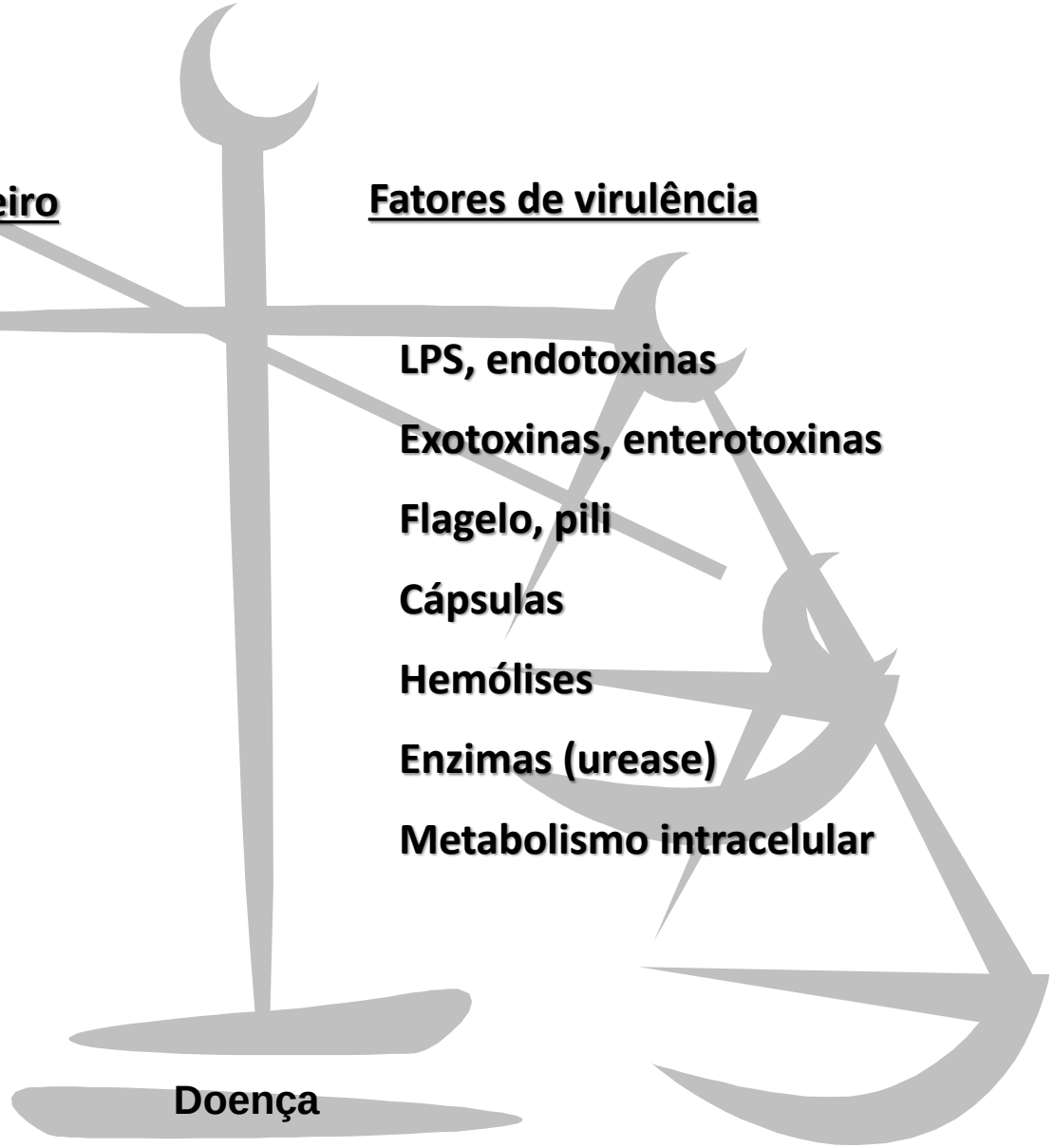


Figure 27.13 **Normal Microbiota of a Human.** A compilation of microorganisms that constitute normal microbiota encountered in variou body sites.


Flora "Prejudicial"
Flora Benéfica
11
Bacterioides
Bifidobacterium
Produção de toxinas, carcinógenos potenciais, putrefação intestinal
Eubacterium
metanógenos
Inibição das bactérias prejudiciais
anaer. G(+) cocci
Estimulação do sistema imune
Redutores de sulfatos
Lactobacillus
Diarréia
Constipação
Infecções
Efeitos sistêmicos
8
E. coli
Enterobacteria
Auxilia na digestão e/ou absorção de nutrientes/minerais
Veillonella
Síntese de vitaminas
Clostridium
Staphylococcus
Vibrionaceae
Ps. aeruginosa
2
População, log cfu/g fezes



Fatores de defesa no hospedeiro

Mucosa epitelial

Formação de muco

Motilidade intestinal

IgA secretora

Microbiota normal

Acidez gástrica

Células fagocitárias

Ambiente anaeróbico

Fatores de virulência

LPS, endotoxinas

Exotoxinas, enterotoxinas

Flagelo, pili

Cápsulas

Hemólises

Enzimas (urease)

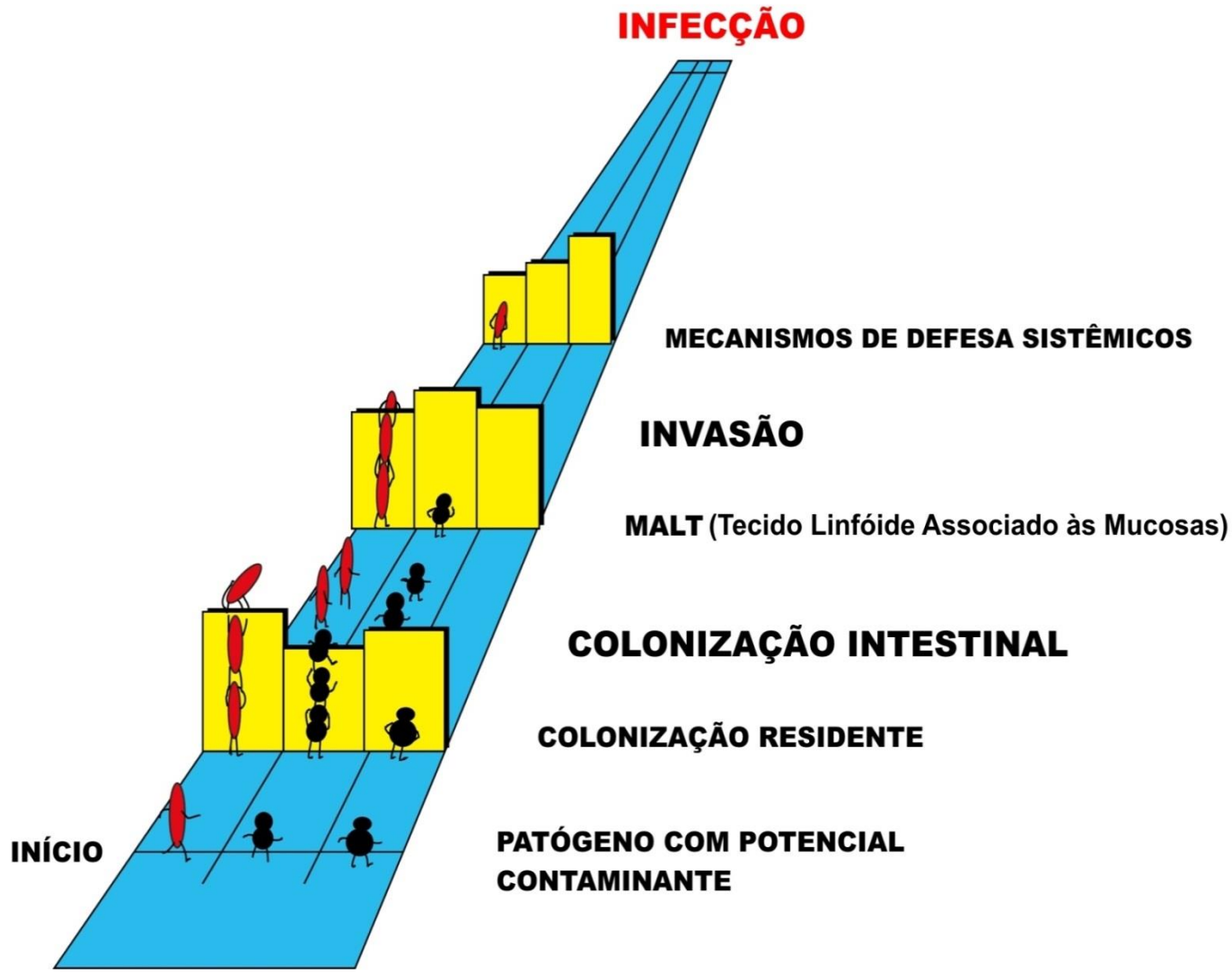
Metabolismo intracelular

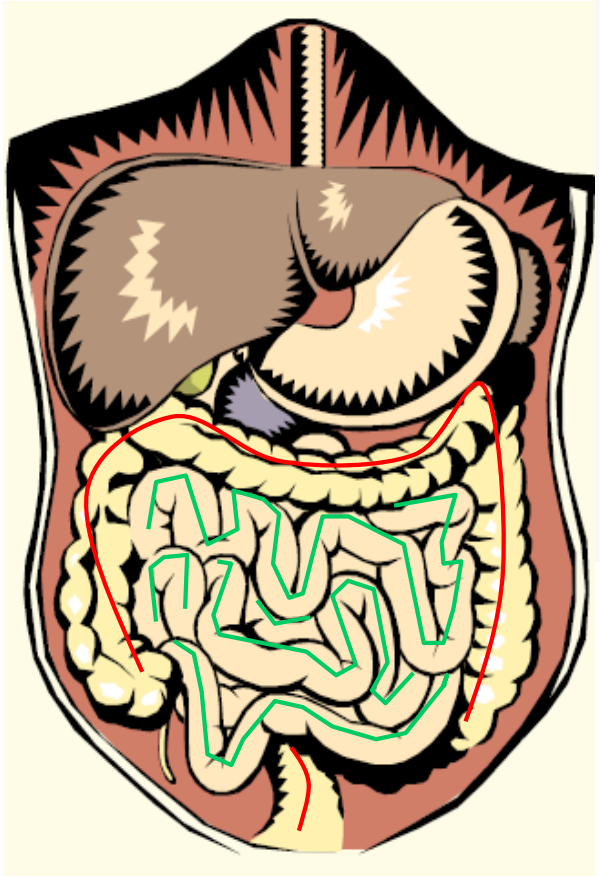
Doença

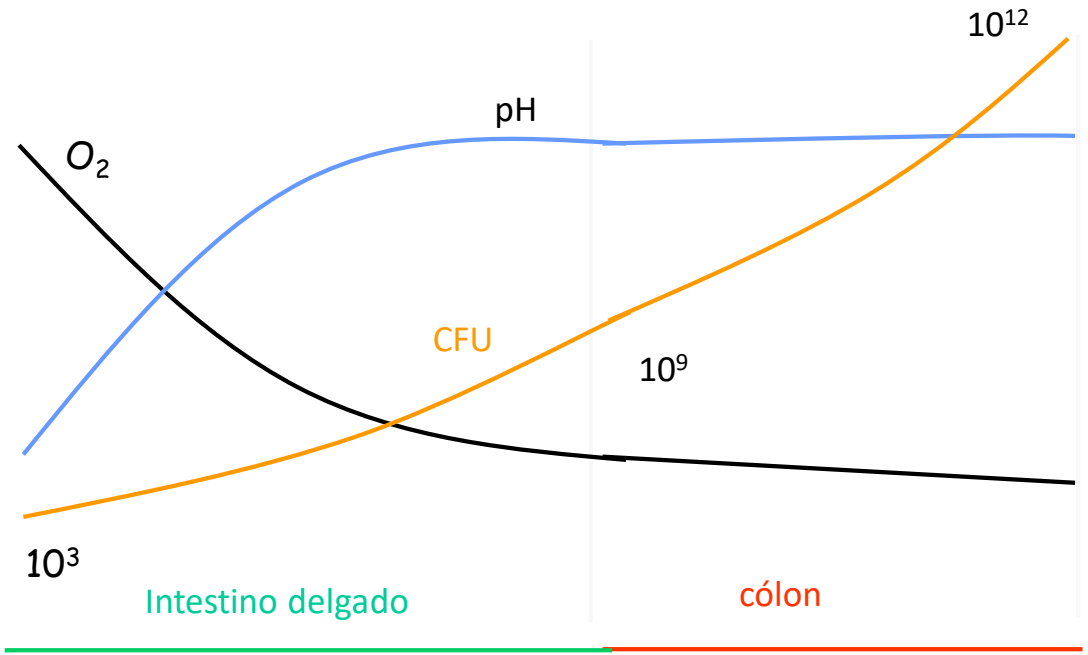
Choque séptico

Infecção de trato urinário

Diarréia


INFECÇÃO
MECANISMOS DE DEFESA SISTÊMICOS
INVASÃO
MALT (Tecido Linfóide Associado às Mucosas)
COLONIZAÇÃO INTESTINAL
COLONIZAÇÃO RESIDENTE
INÍCIO
PATÓGENO COM POTENCIAL CONTAMINANTE





Lactobacillus

Streptococcus

Enterococcus

Enterobacteriacae

Bifidobacterium

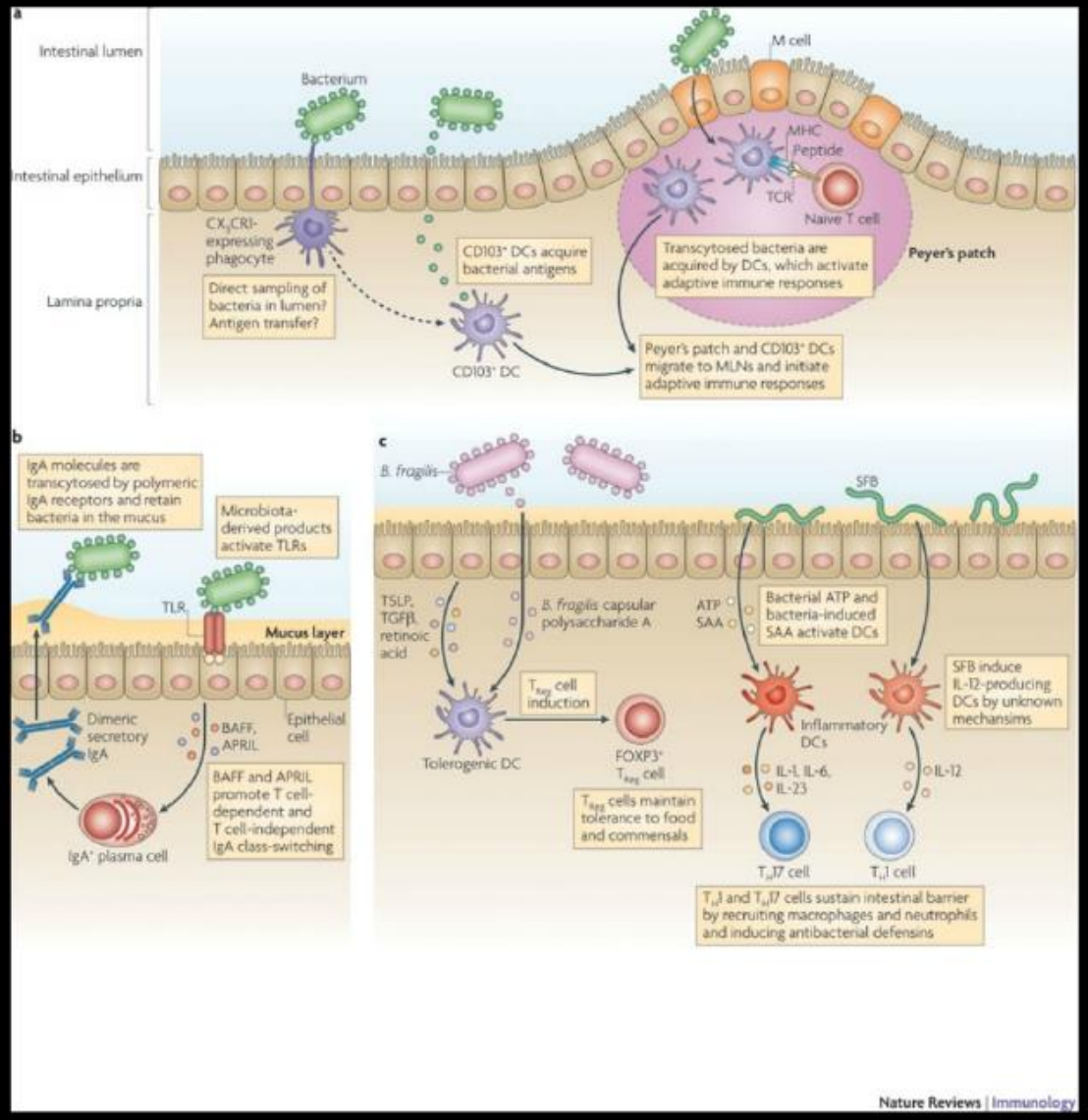
Clostridium

Eubacterium

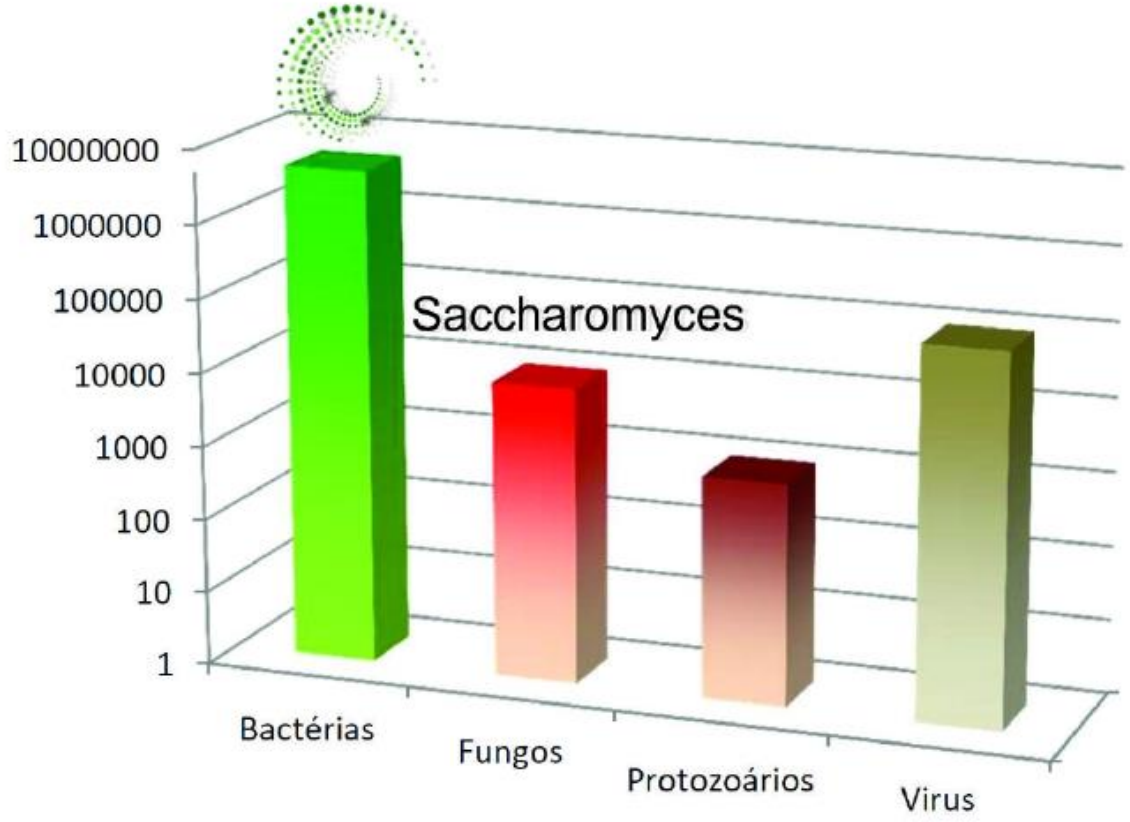
Bacteróides


Prezi

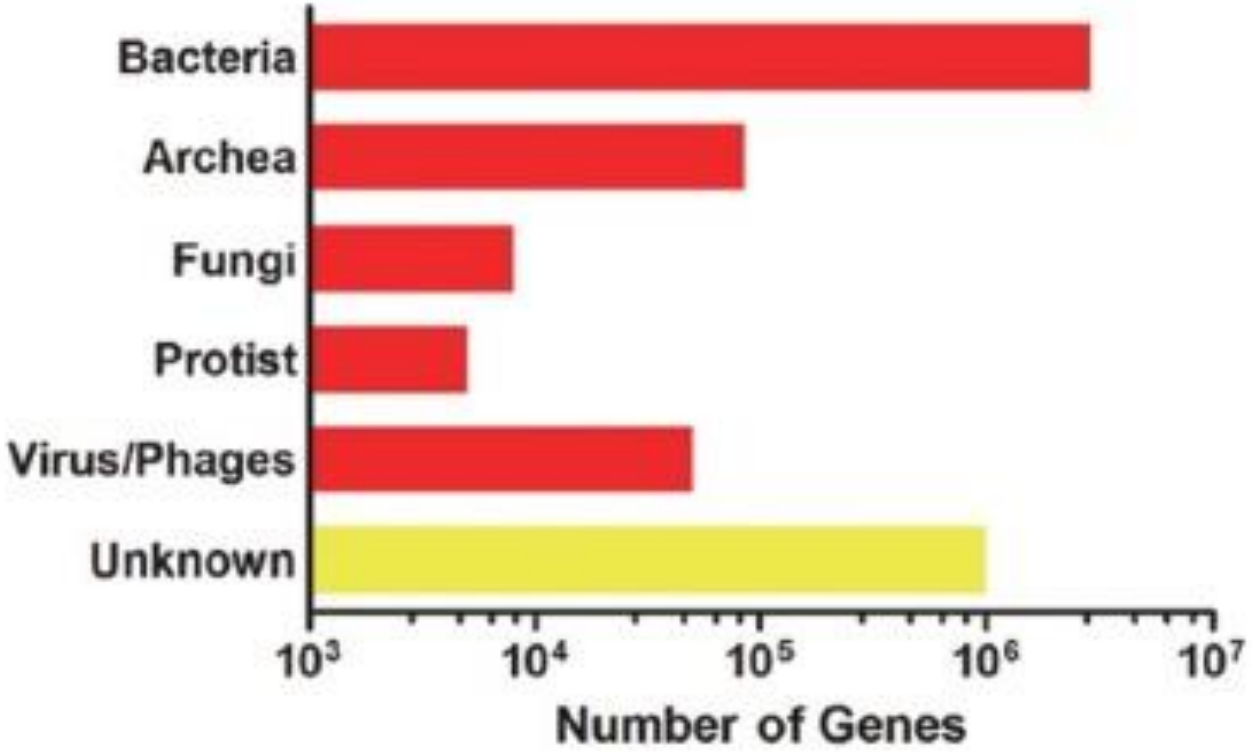
Reconhecimento da microbiota



Distribuição dos microrganismos na Flora intestinal



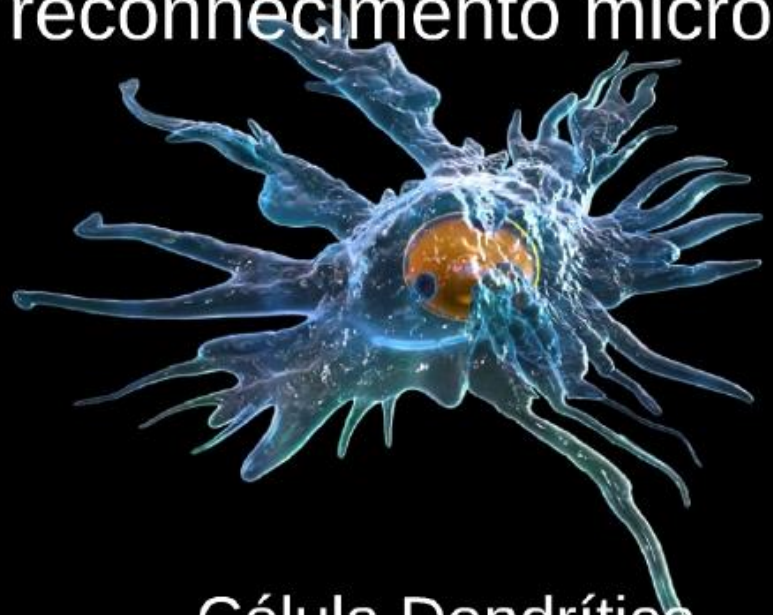
Contribuição Microbiológica ao epigenôma



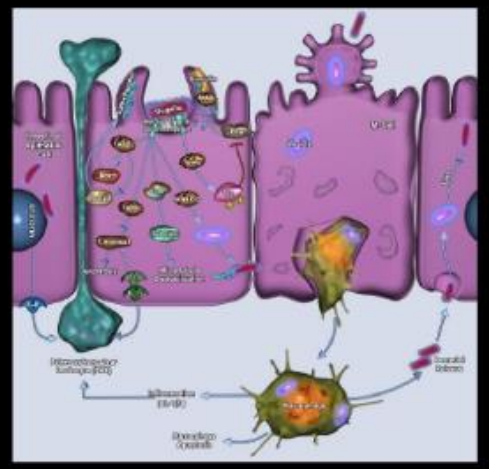
A importância da microbiota na epigenética

- Regulação genética
- Expressão tecido-específica
- Evolução
- Inativação do cromossomo X
- Imprinting genômico
- Manutenção da integridade genética

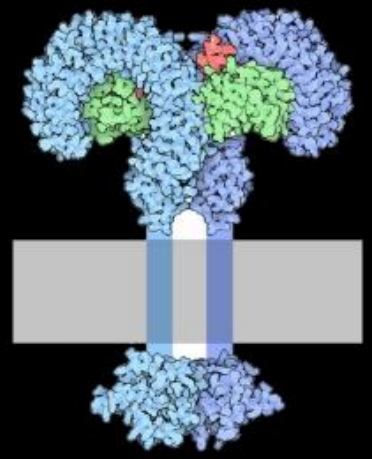
Células e receptores responsáveis pelo reconhecimento microbiológico no intestino.



Célula Dendrítica



Célula M



Toll Like Receptors

Efeitos diretos e indiretos da microbiota na imunidade

TLRs

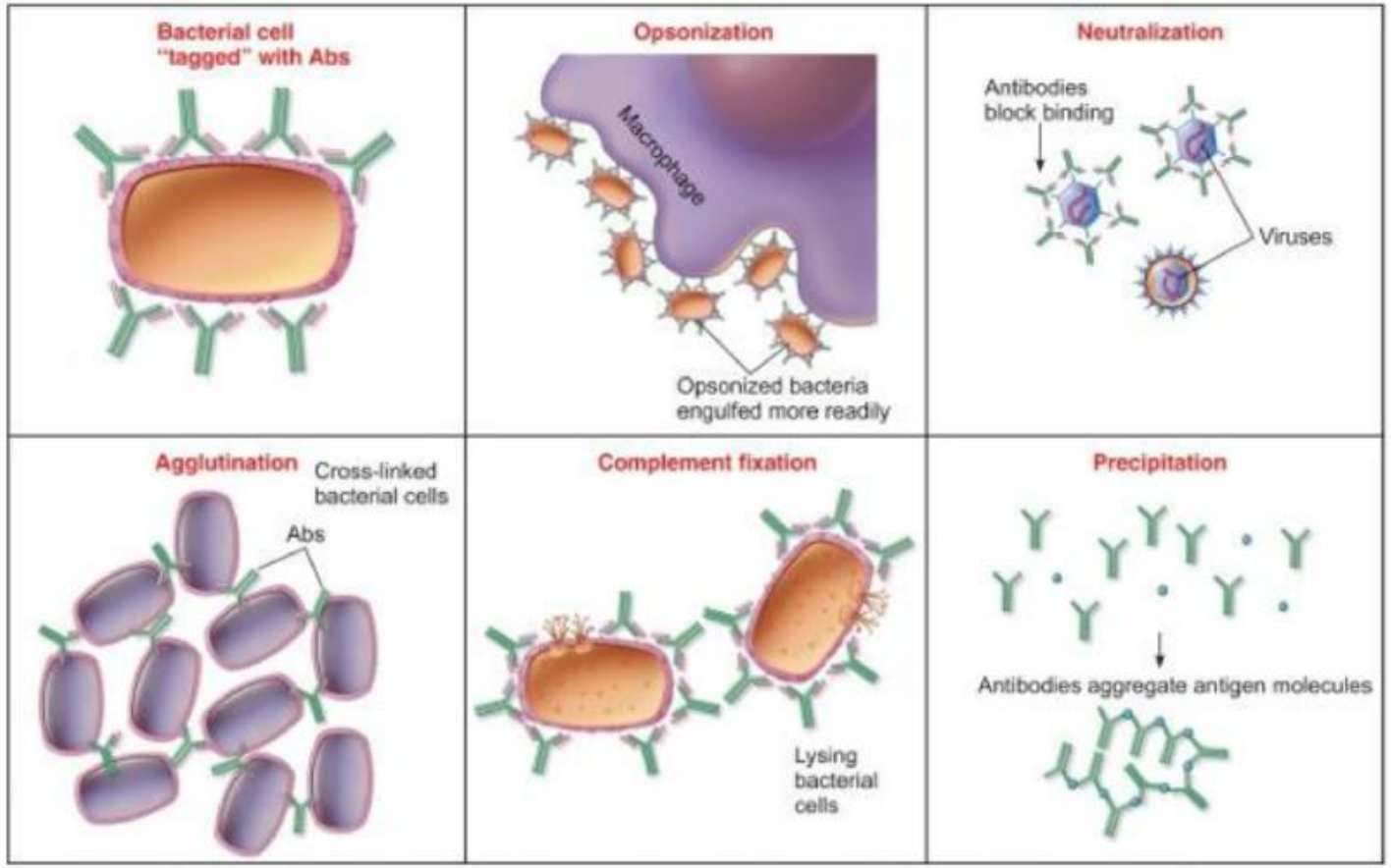
Flagelina,
adjuvantes,
LPS...

Endotoxinas

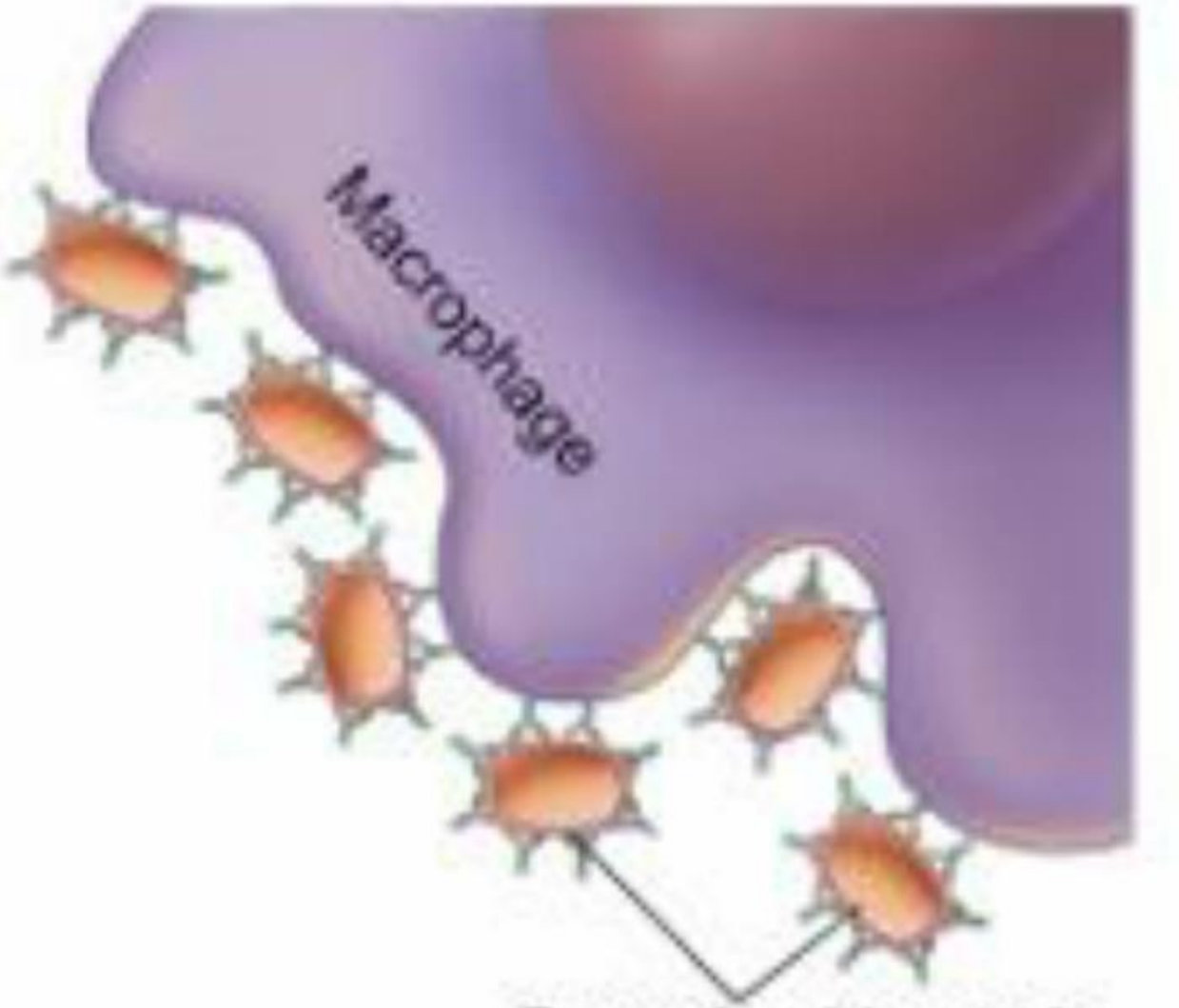
Saccharomyces
Particulas microbianas

Estimulo celular

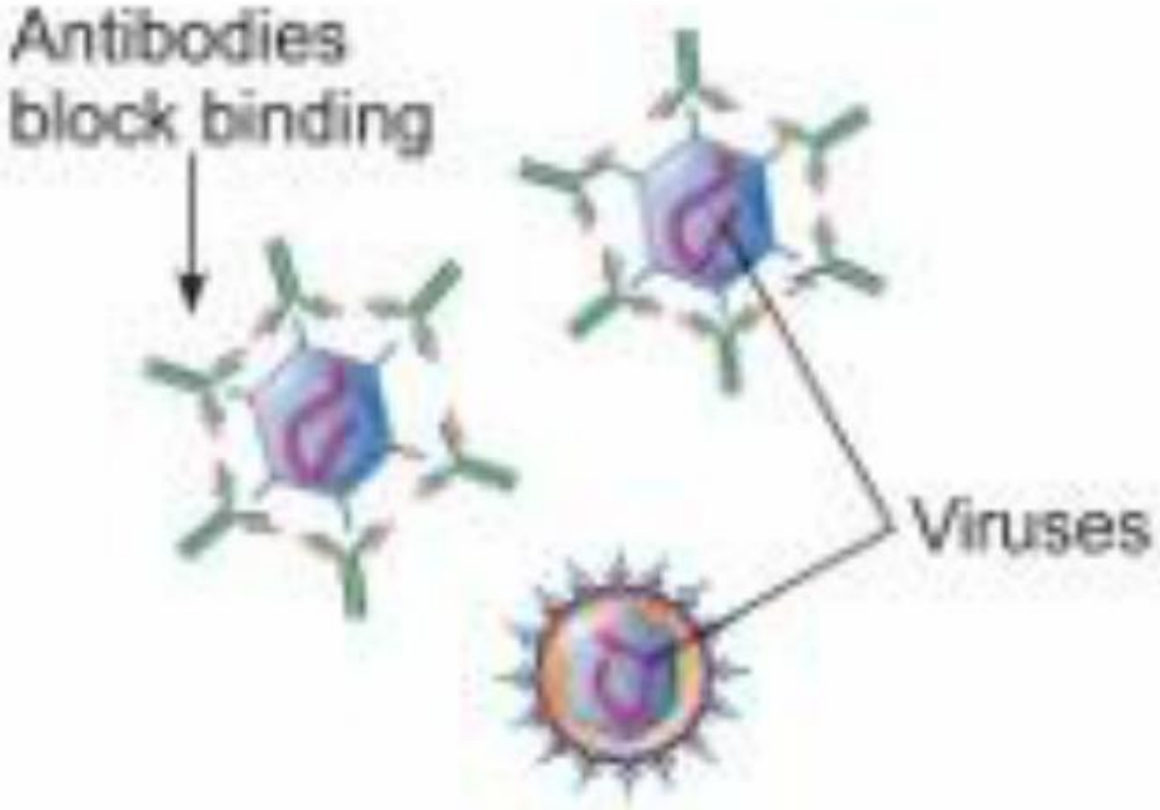
- Produced antibodies bind antigens and stop their destructive behavior in one of several ways



Opsonization

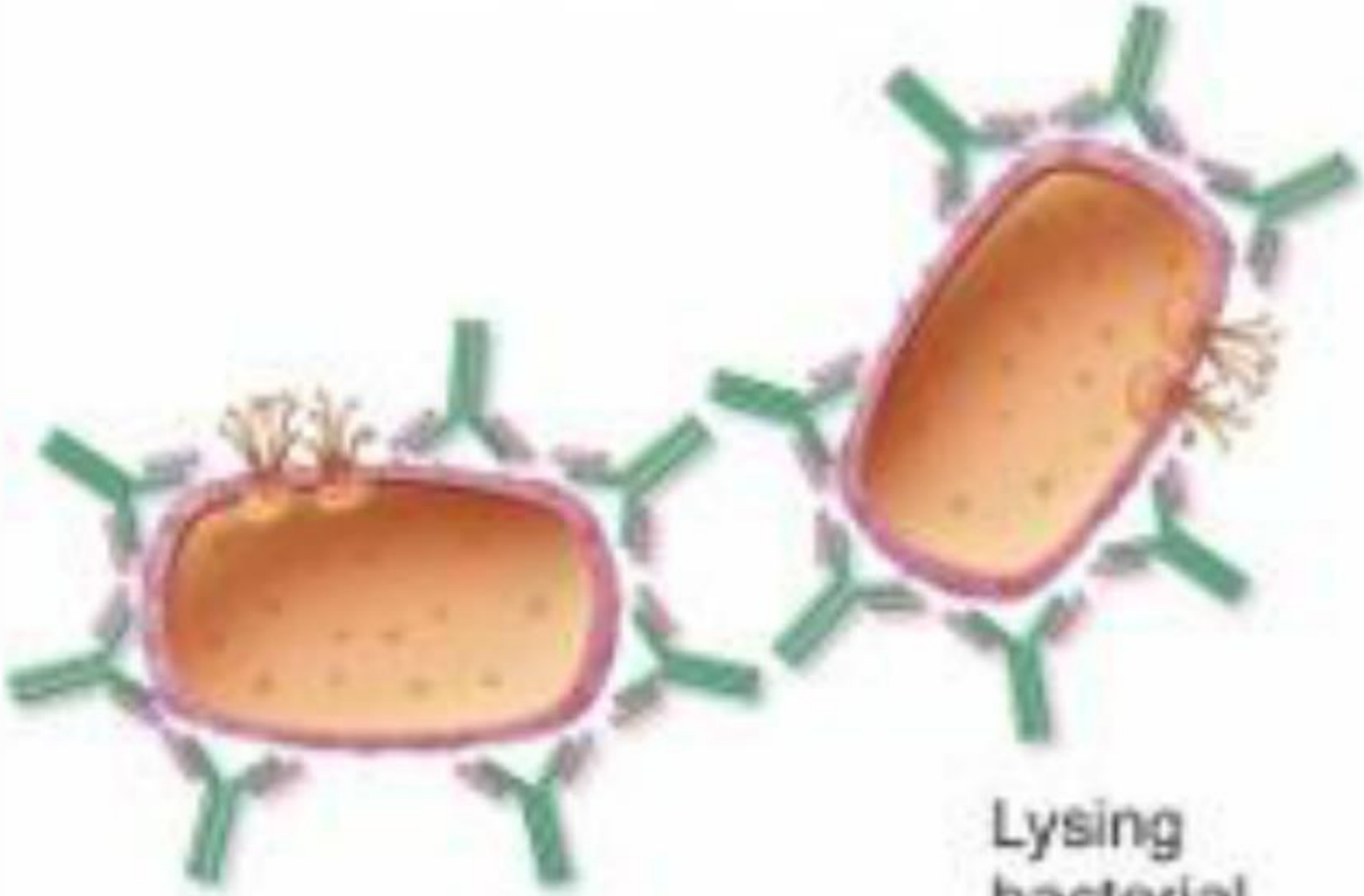


Neutralization



ed
ells

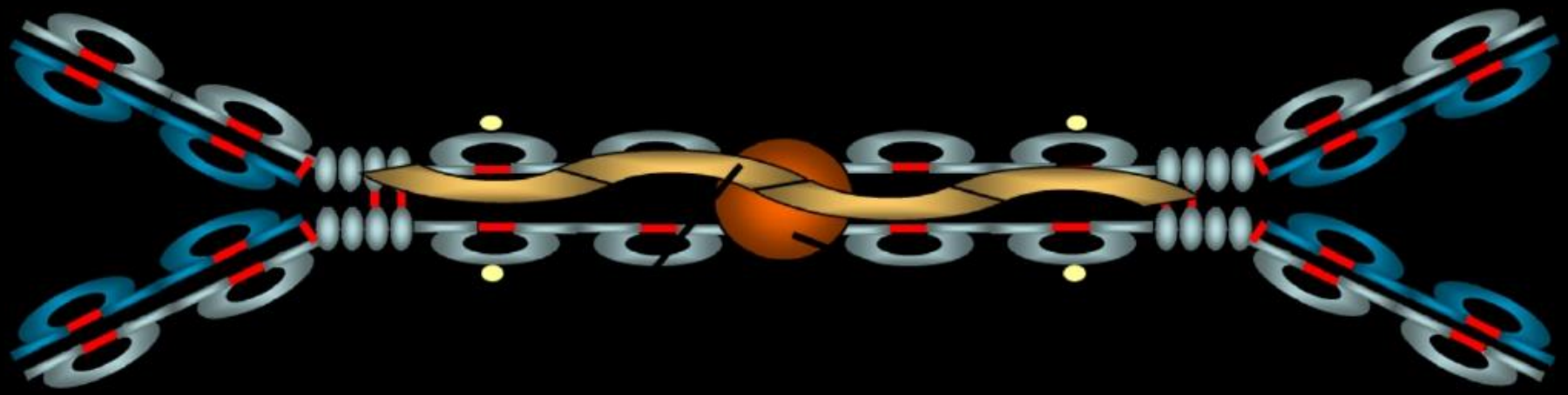
Complement fixation



Lysing bacterial cells

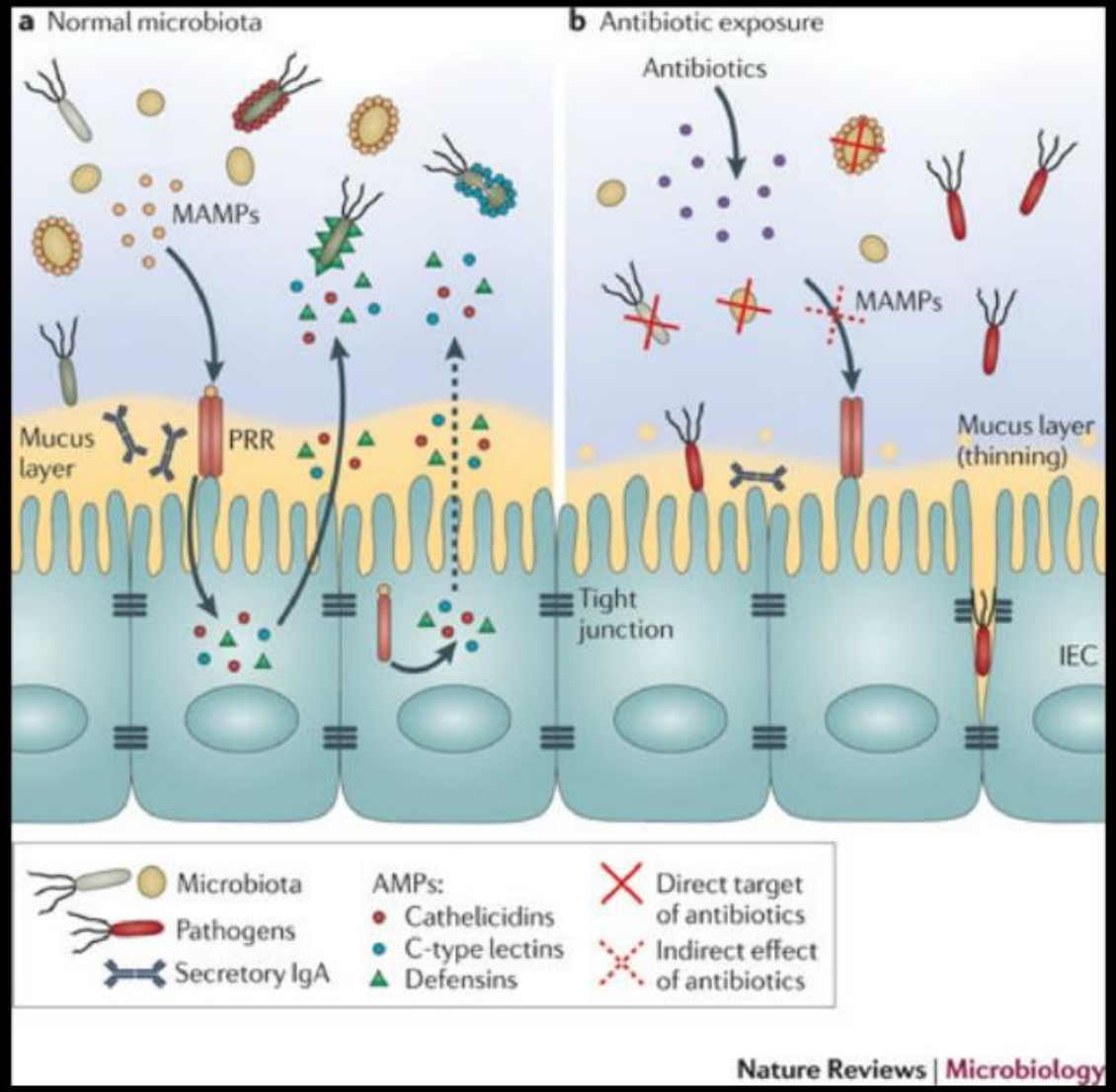
IgAs

80% de origem enteral

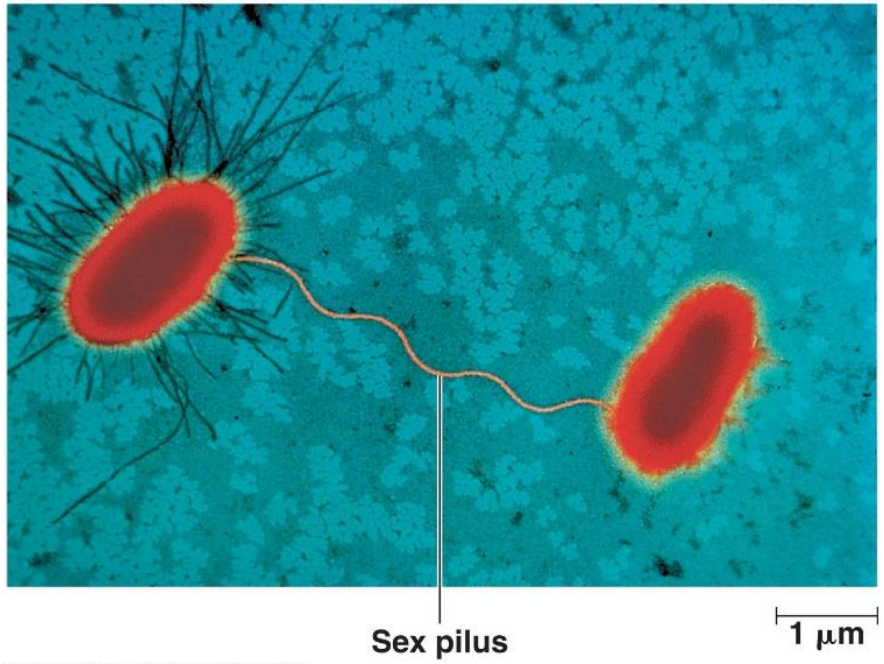


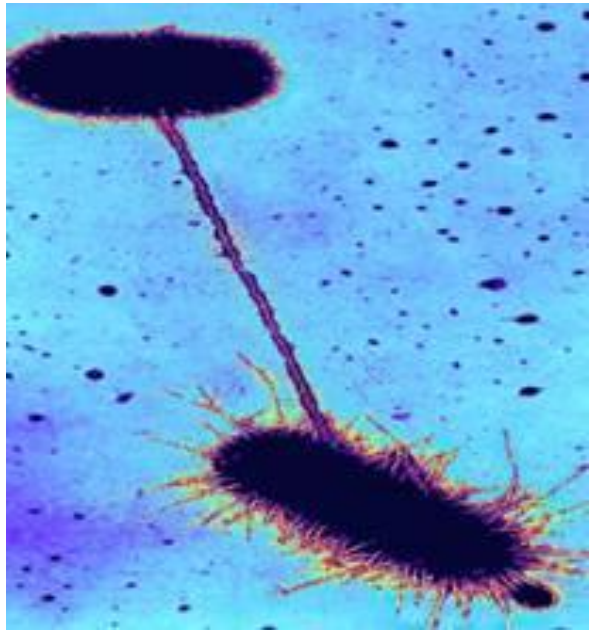
O Anticorpo das mucosas

Efeito do antibiótico na microbiota

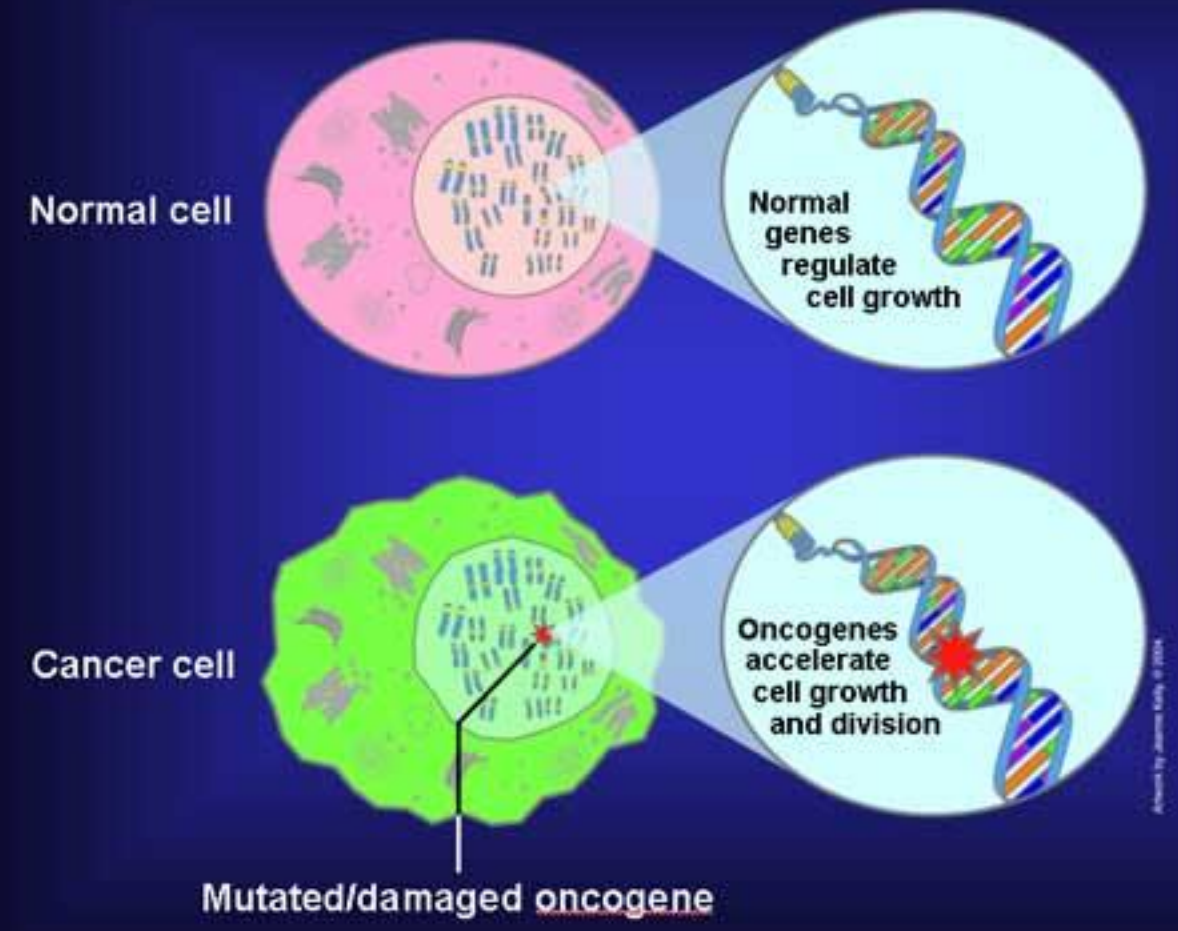


Prezi

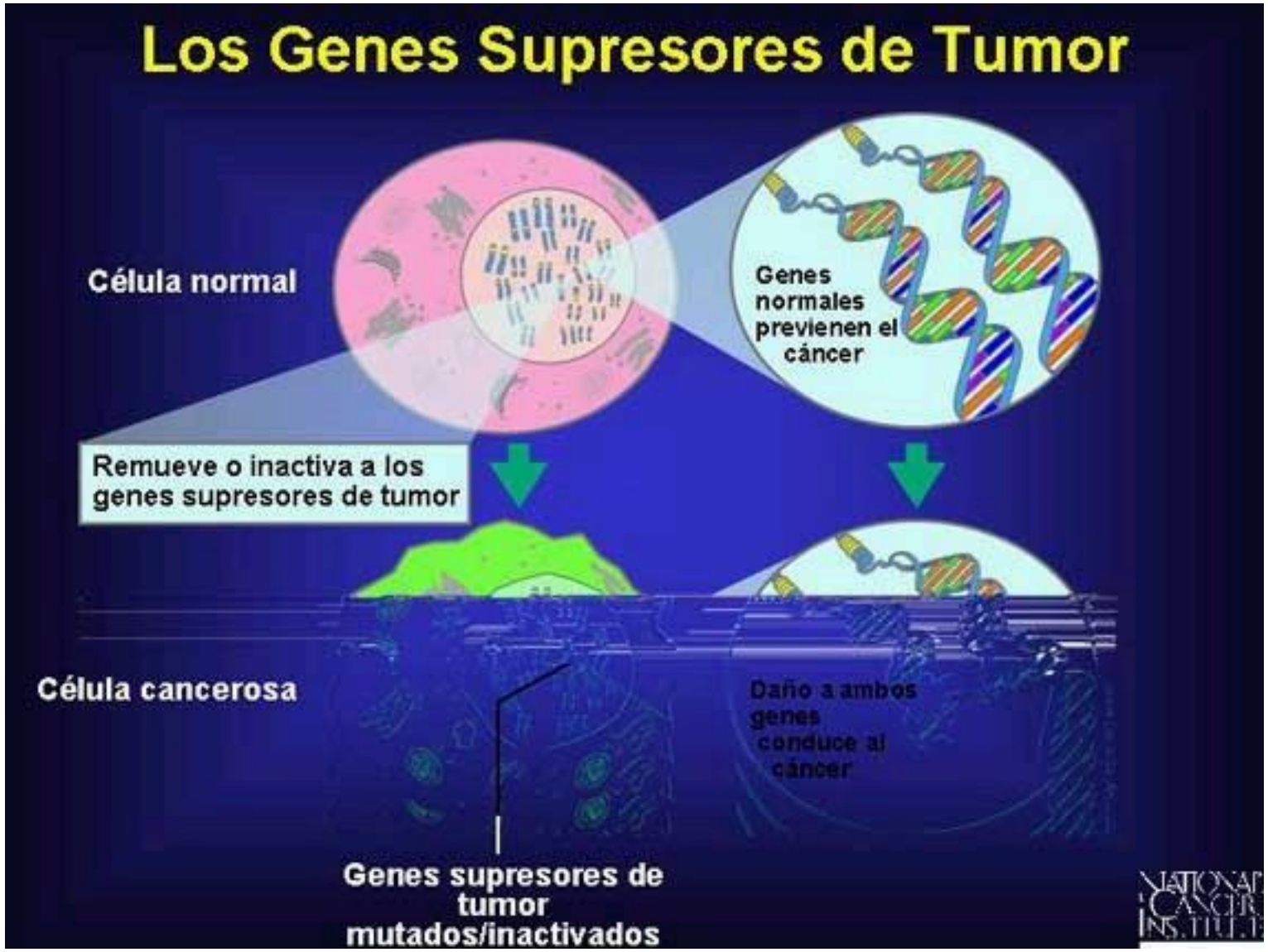




Oncogenes



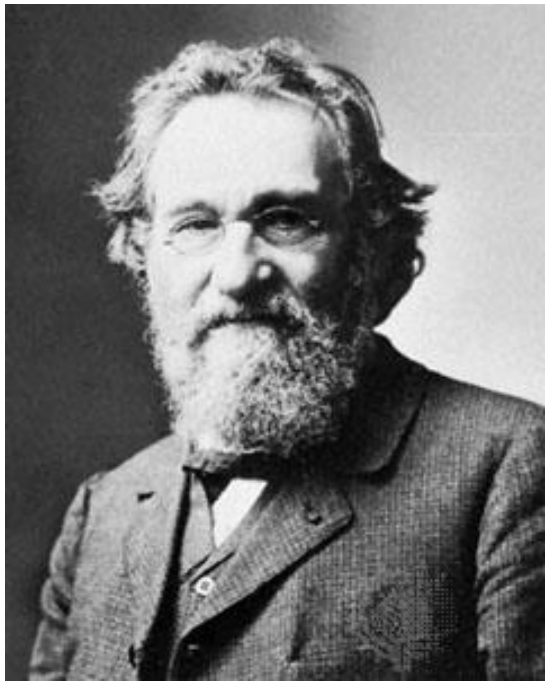
NATIONAL CANCER INSTITUTE


Los Genes Supresores de Tumor
Célula normal
Genes normales previenen el cáncer
Remueve o inactiva a los genes supresores de tumor
Célula cancerosa
Daño a ambos genes conduce al cáncer
Genes supresores de tumor mutados/inactivados

Definição científica:

‘A live microbial feed supplement which beneficially affects the host animal by improving its intestinal microbial balance’.

“Microrganismo VIVO que administrado na dose correta cause benefício ao hospedeiro”
Roy Fuller 1989



Eli Metchnikoff

Definição popular:

“Qualquer bactéria benéfica ao organismo”

- Prébioticos

“Qualquer fibra solúvel que promova o crescimento de probioticos”

- Fibra solúvel

Qualquer carboidrato não digerível e fermentável.

Fibras solúveis

Amilopectina

Inulina

Goma Guar

Polidextrose

GOS

Os Paraprobióticos:

MUMPs

Bactérias autolisadas

Bactérias amenizadas

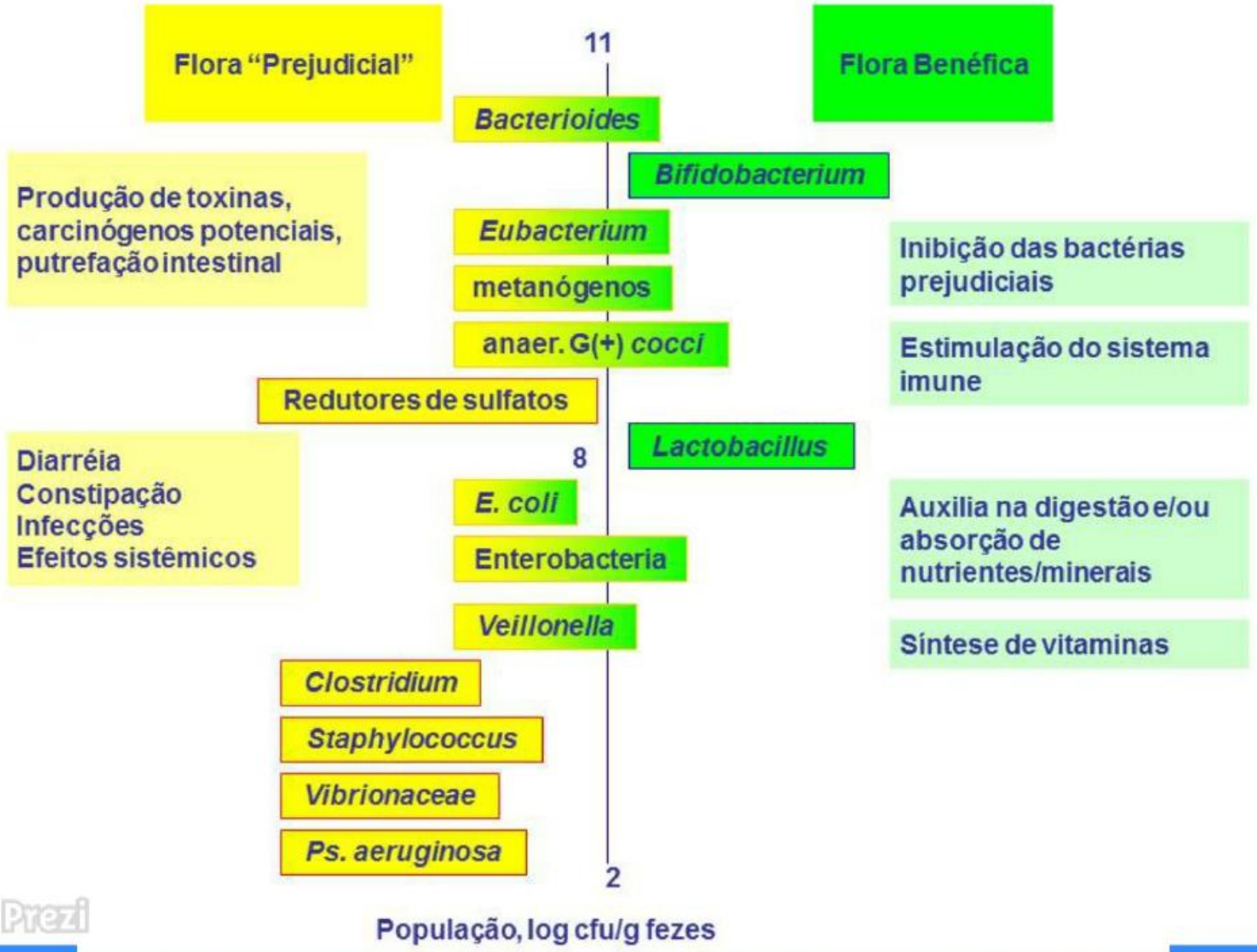
Bactérias transformadas

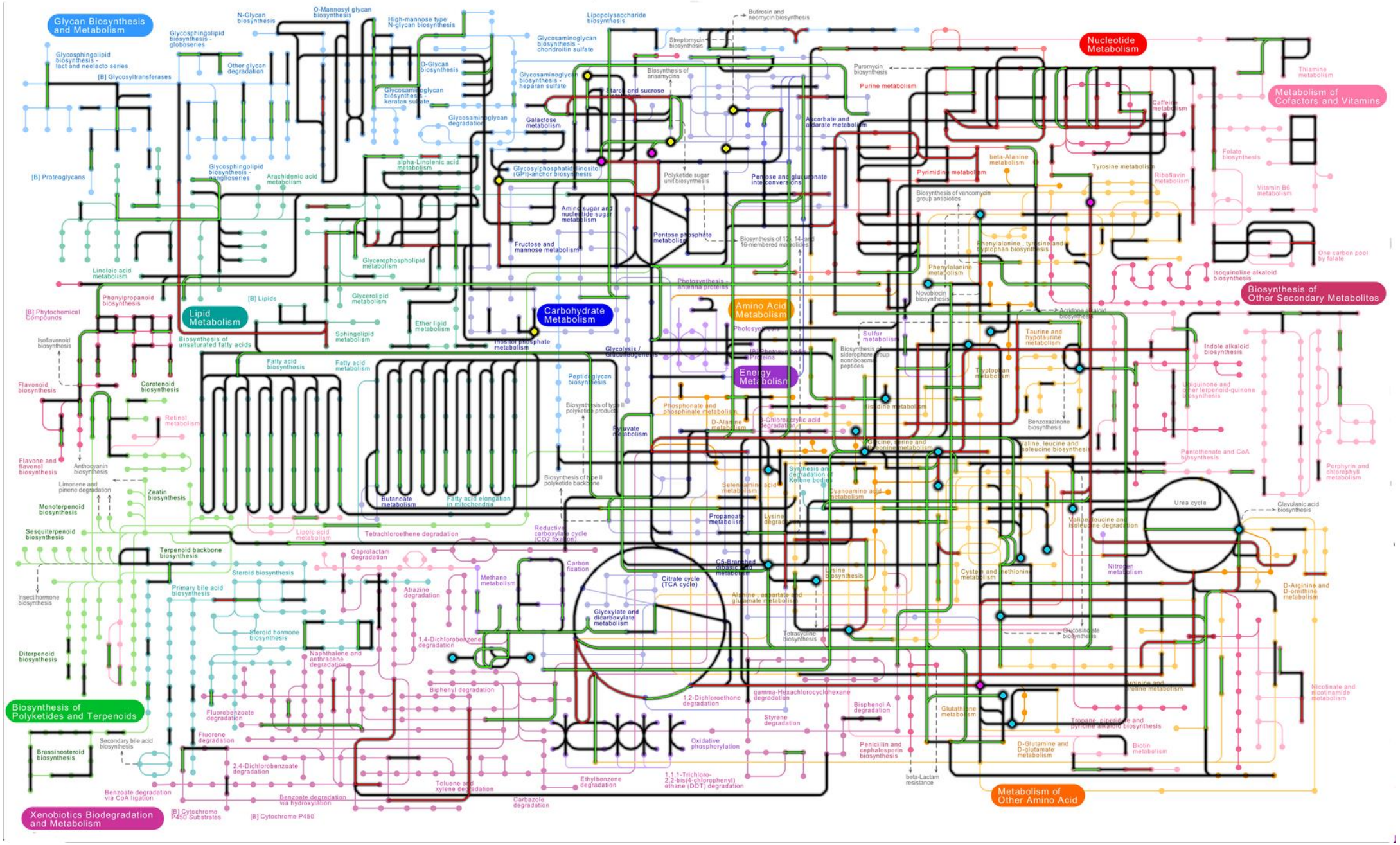
Derivados de leveduras

PARAPROBIÓTICOS PARA AUMENTO DA IMUNIDADE REDUÇÃO DA INFLAMAÇÃO

Bio-MAMPs

Bio MAMPs L. acidophilus Anti-inflamatório	*Bio MAMPs L. rhamnosus* Antialérgico e anti-inflamatório	*Bio MAMPs L. paracasei* Antialérgico	*Bio MAMPs L. helveticus* Reduz risco de infecções
Bio MAMPs L. gasseri Antimicrobiano e anti-inflamatório	*Bio MAMPs B. lactis* Aumento da imunidade	*Bio MAMPs S. thermophilus* Anti-alérgico	*Bio MAMPs* LEMMA Dosagem: 50 -100mg


Flora "Prejudicial"
Flora Benéfica
11
Bacterioides
Bifidobacterium
Produção de toxinas, carcinógenos potenciais, putrefação intestinal
Eubacterium
metanógenos
Inibição das bactérias prejudiciais
anaer. G(+) cocci
Estimulação do sistema imune
Redutores de sulfatos
Lactobacillus
Diarréia
Constipação
Infecções
Efeitos sistêmicos
8
E. coli
Enterobacteria
Auxilia na digestão e/ou absorção de nutrientes/minerais
Veillonella
Síntese de vitaminas
Clostridium
Staphylococcus
Vibrionaceae
Ps. aeruginosa
2
População, log cfu/g fezes


Glycan Biosynthesis and Metabolism
Lipid Metabolism
Carbohydrate Metabolism
Amino Acid Metabolism
Energy Metabolism
Nucleotide Metabolism
Metabolism of Cofactors and Vitamins
Biosynthesis of Other Secondary Metabolites
Metabolism of Other Amino Acid
Biosynthesis of Polyketides and Terpenoids
Xenobiotics Biodegradation and Metabolism
Citrate cycle (TCA cycle)
Urea cycle
Glycolysis / Gluconeogenesis
Pentose phosphate metabolism
Pentose and glucuronate interconversions
Fructose and mannose metabolism
Galactose metabolism
Starch and sucrose metabolism
Glycerolipid metabolism
Glycerophospholipid metabolism
Sphingolipid metabolism
Fatty acid biosynthesis
Fatty acid metabolism
Butanoate metabolism
Propanoate metabolism
Pyruvate metabolism
Glyoxylate and dicarboxylate metabolism
Carbon fixation
Methane metabolism
Purine metabolism
Pyrimidine metabolism
Phenylalanine metabolism
Tyrosine metabolism
Tryptophan metabolism
Histidine metabolism
Cysteine and methionine metabolism
Valine, leucine and isoleucine degradation
Valine, leucine and isoleucine biosynthesis
Lysine biosynthesis
Lysine degradation
Nitrogen metabolism
Glutathione metabolism
Ascorbate and aldarate metabolism
Pantothenate and CoA biosynthesis
Porphyrin and chlorophyll metabolism
Folate biosynthesis
Vitamin B6 metabolism
Riboflavin metabolism
Thiamine metabolism
Caffeine metabolism
One carbon pool by folate
Isoquinoline alkaloid biosynthesis
Indole alkaloid biosynthesis
Ubiquinone and other terpenoid-quinone biosynthesis
Benzoxazinone biosynthesis
Taurine and hypotaurine metabolism
Novobiocin biosynthesis
Phenylalanine, tyrosine and tryptophan biosynthesis
Biosynthesis of vancomycin group antibiotics
Puromycin biosynthesis
Streptomycin biosynthesis
Butirosin and neomycin biosynthesis
Lipopolysaccharide biosynthesis
Glycosaminoglycan biosynthesis - chondroitin sulfate
Glycosaminoglycan biosynthesis - heparan sulfate
Glycosaminoglycan biosynthesis - keratan sulfate
Glycosaminoglycan degradation
O-Glycan biosynthesis
N-Glycan biosynthesis
O-Mannosyl glycan biosynthesis
High-mannose type N-glycan biosynthesis
Glycosphingolipid biosynthesis - globo series
Glycosphingolipid biosynthesis - lacto and neolacto series
Glycosphingolipid biosynthesis - ganglio series
Other glycan degradation
[B] Glycosyltransferases
[B] Proteoglycans
Glycosylphosphatidylinositol (GPI)-anchor biosynthesis
Inositol phosphate metabolism
Ether lipid metabolism
Sphingolipid metabolism
Glycerolipid metabolism
Glycerophospholipid metabolism
[B] Lipids
Biosynthesis of unsaturated fatty acids
alpha-Linolenic acid metabolism
Arachidonic acid metabolism
Linoleic acid metabolism
Phenylpropanoid biosynthesis
[B] Phytochemical Compounds
Isoflavonoid biosynthesis
Flavonoid biosynthesis
Flavone and flavonol biosynthesis
Anthocyanin biosynthesis
Carotenoid biosynthesis
Retinol metabolism
Limonene and pinene degradation
Zeatin biosynthesis
Monoterpenoid biosynthesis
Sesquiterpenoid biosynthesis
Terpenoid backbone biosynthesis
Steroid biosynthesis
Primary bile acid biosynthesis
Insect hormone biosynthesis
Steroid hormone biosynthesis
Diterpenoid biosynthesis
Secondary bile acid biosynthesis
Brassinosteroid biosynthesis
Lipoic acid metabolism
Tetrachloroethene degradation
Reductive carboxylate cycle (CO2 fixation)
Caprolactam degradation
Atrazine degradation
1,4-Dichlorobenzene degradation
Naphthalene and anthracene degradation
Biphenyl degradation
Fluorobenzoate degradation
Fluorene degradation
2,4-Dichlorobenzoate degradation
Toluene and xylene degradation
Benzoate degradation via CoA ligation
Benzoate degradation via hydroxylation
[B] Cytochrome P450 Substrates
[B] Cytochrome P450
Carbazole degradation
Ethylbenzene degradation
1,1,1-Trichloro-2,2-bis(4-chlorophenyl) ethane (DDT) degradation
Oxidative phosphorylation
Styrene degradation
1,2-Dichloroethane degradation
gamma-Hexachlorocyclohexane degradation
Bisphenol A degradation
Penicillin and cephalosporin biosynthesis
beta-Lactam resistance
Tetracycline biosynthesis
Glycosaminoglycan biosynthesis
Biosynthesis of ansamycins
Biosynthesis of 12-, 14- and 16-membered macrolides
Polyketide sugar unit biosynthesis
Amino sugar and nucleotide sugar metabolism
Photosynthesis - antenna proteins
Photosynthesis
Sulfur metabolism
Biosynthesis of siderophore group nonribosomal peptides
Phosphonate and phosphinate metabolism
D-Alanine metabolism
3-Chloroacrylic acid degradation
Glycine, serine and threonine metabolism
Selenoamino acid metabolism
Cyanoamino acid metabolism
Synthesis and degradation of ketone bodies
Alanine, aspartate and glutamate metabolism
C5-Branched dibasic acid metabolism
Peptidoglycan biosynthesis
Biosynthesis of type II polyketide backbone
Biosynthesis of type II polyketide products
Clavulanic acid biosynthesis
D-Arginine and D-ornithine metabolism
Nicotinate and nicotinamide metabolism
Purine and pyrimidine metabolism
Tropane, piperidine and pyridine alkaloid biosynthesis
Biotin metabolism
D-Glutamine and D-glutamate metabolism
Glucosinolate biosynthesis

Bacterial Culture

OBRIGADO PELA ATENÇÃO