



# What Happens In The Gut Does Not Stay In the Gut - The influence of gut microbiome on dry eye disease

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# Disclosures

- B&L
- BioTissue
- J&J
- Lumenis
- Sight Sciences
- SUN

# Agenda

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Review gut health, the microbiome, and dysbiosis.



Inform on the evidence of the relationship between the gut microbiome and dry eye disease



Discuss how ECPs can educate patients on the importance of gut health and nutritional choices that support their eye health and overall wellbeing.

# Gastrointestinal Environment

Inflammation

Malabsorption

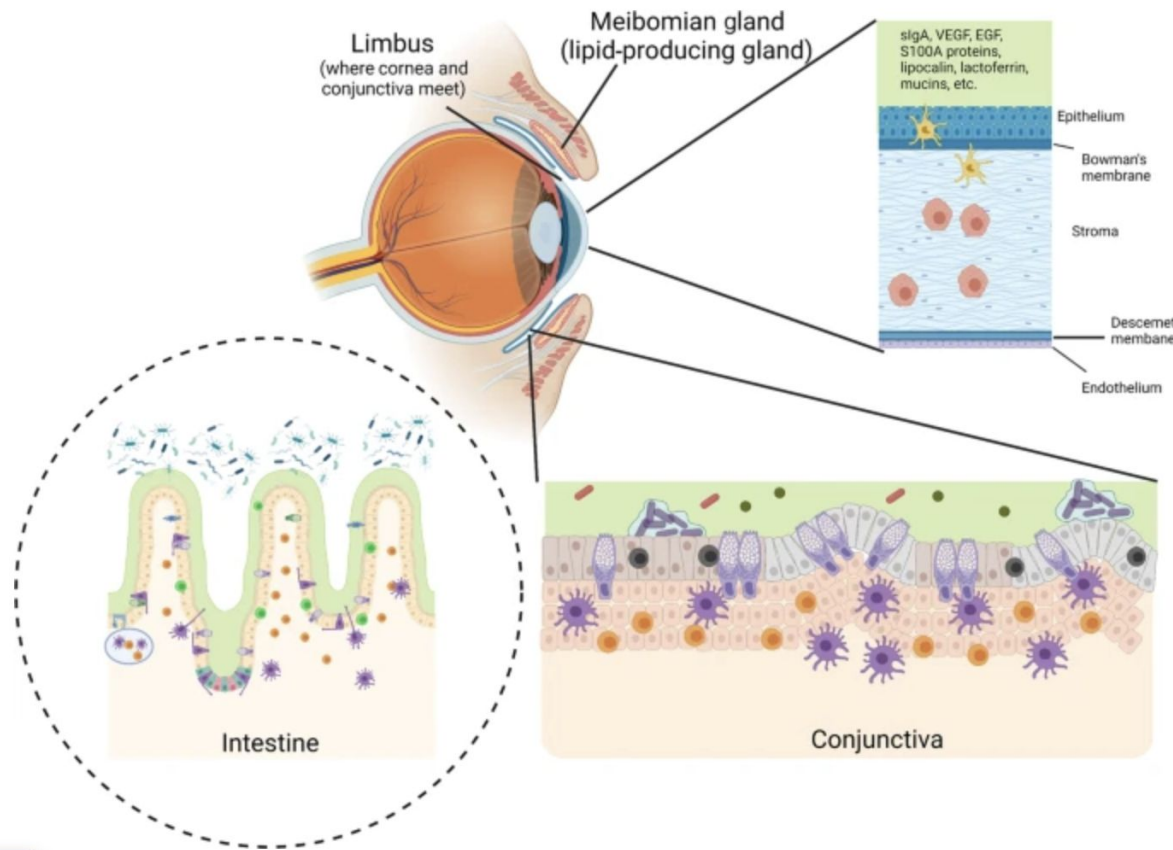
Barrier Breakdown

Pathogens and Biofilm

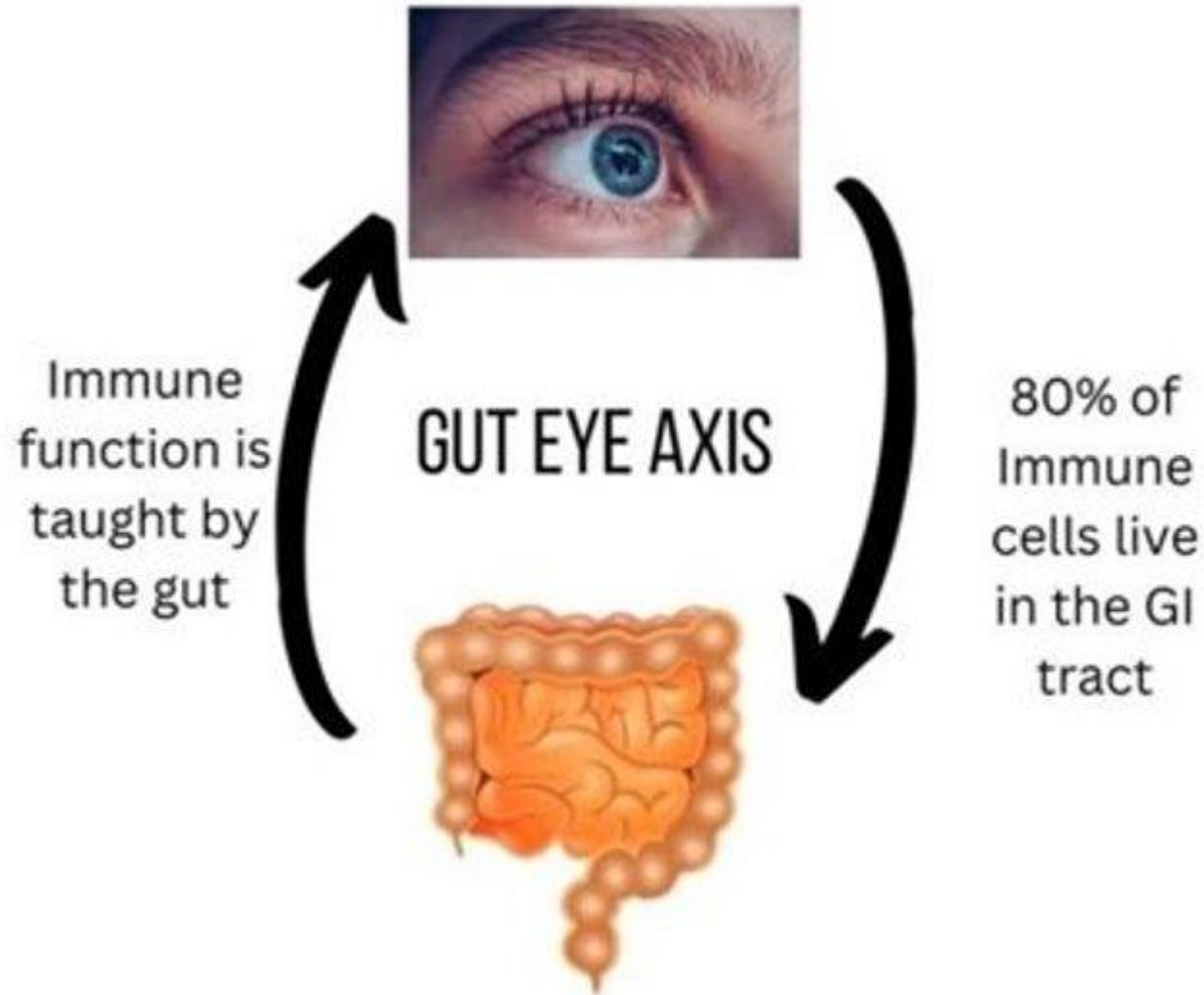
Toxins

Food Reactions

Enteric Nervous System  
Dysfunction

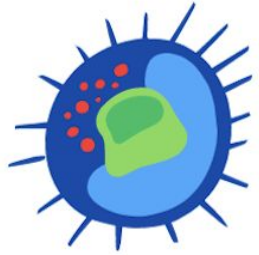


- Similar function of mucins and glycoproteins on the ocular surface and the GI tract.
- They share specialized cells and the signaling cascades evolved to maintain environmental defenses in mucosal layers, an example being innate lymphoid cells (ILC's).



- Chronic inflammation in the gut can lead to release of TNF- $\alpha$ , IL-6, IL-1 $\beta$
- Modulating the gut microbiome has been shown to also modulate the proteins expressed by the lacrimal glands, with IL-1 $\beta$  and IL-6 decreasing, and IL-10 increasing

# Immune Branches and Balance



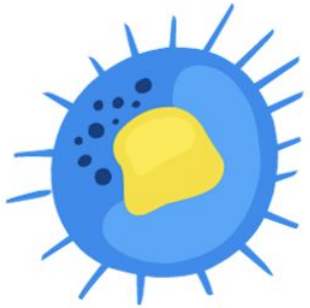
## T Helper Type 1

Bacteria and viruses,  
intracellular



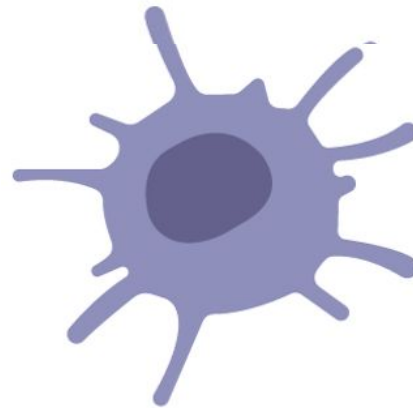
## T Helper Type 2

Parasites, allergens, mast  
cells & histamine



## T Helper Regulatory

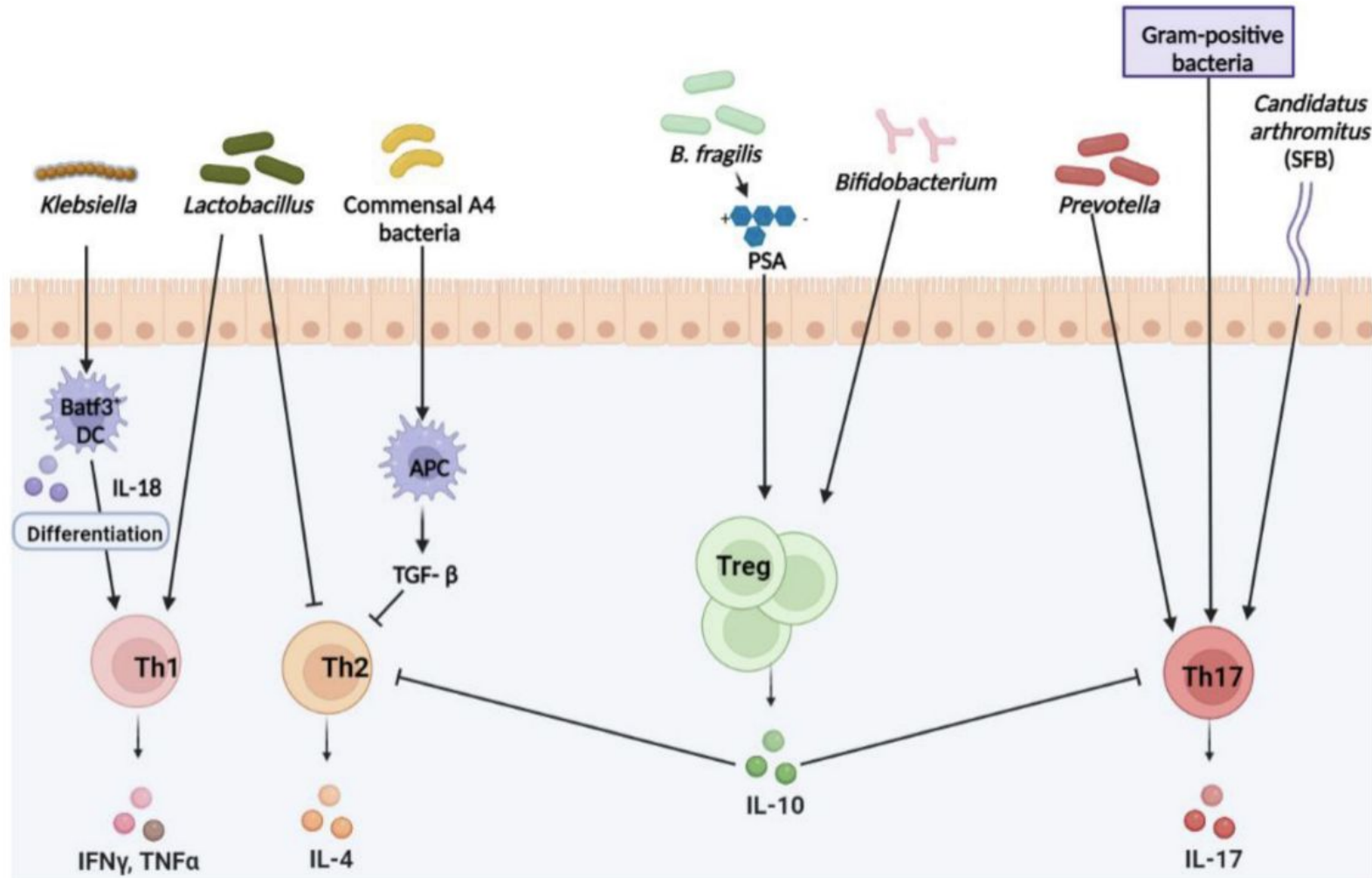
Immune suppression & tolerance



## T Helper Type 17

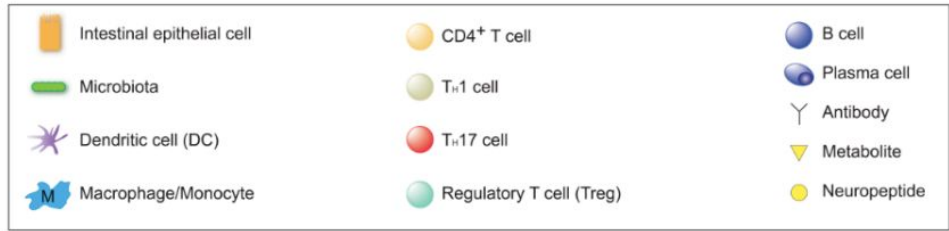
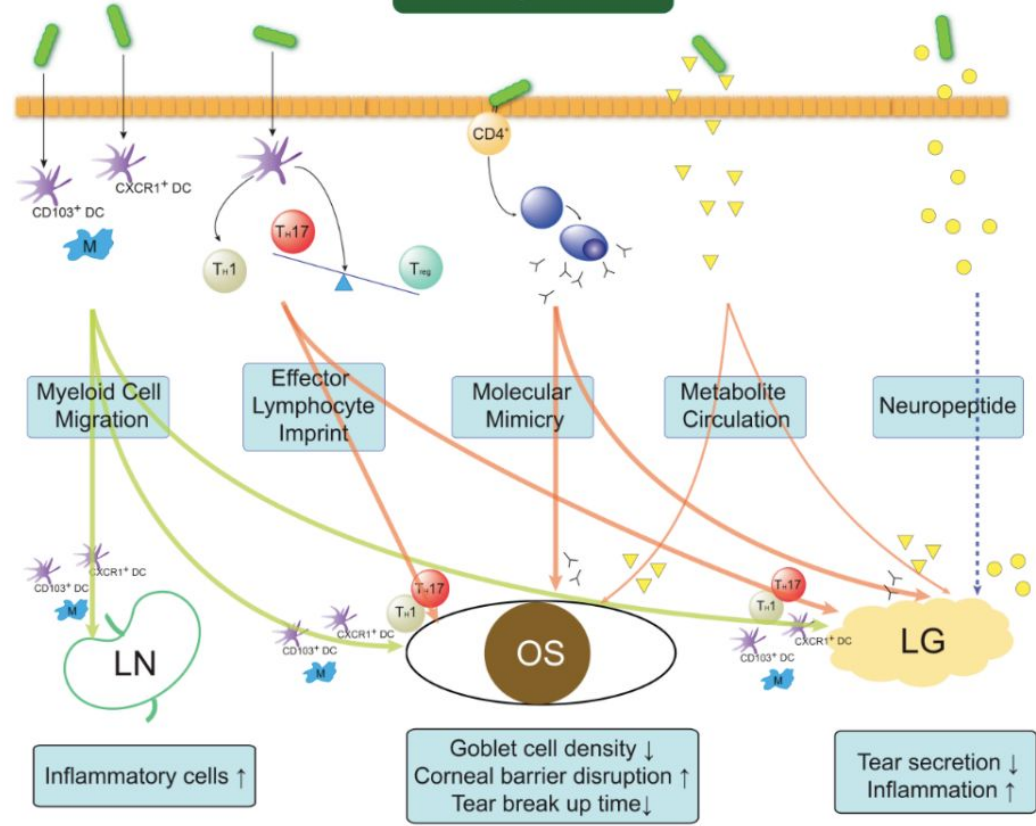
Mucosal immunity,  
autoimmune tissue damage

# Microbiota mediates T cell differentiation in homeostatic and pathogenic conditions

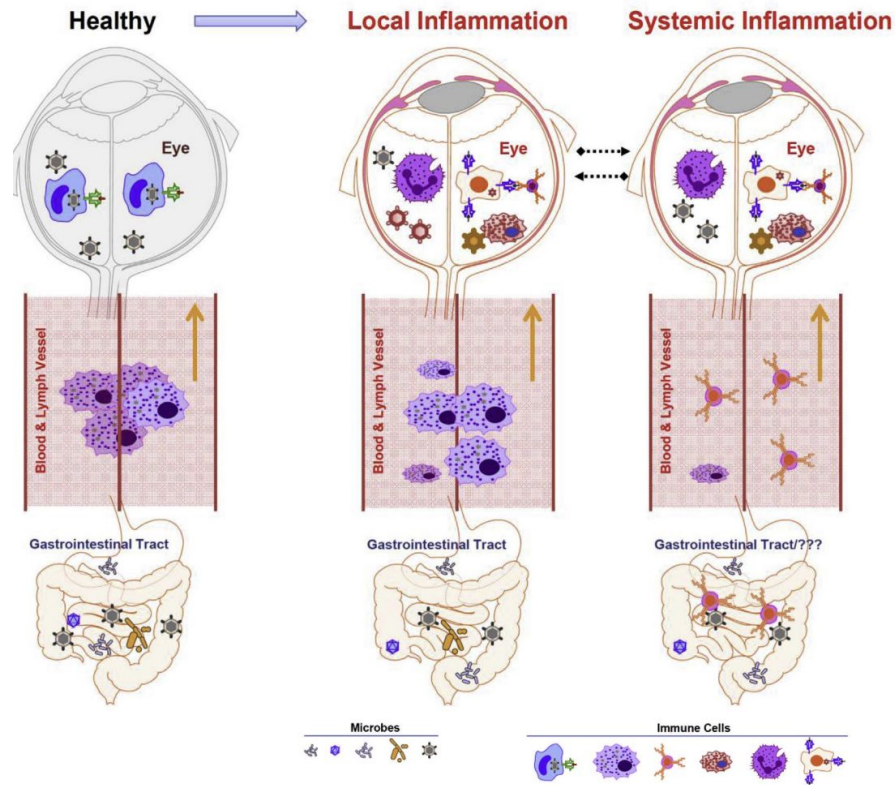




# Gut dysbiosis



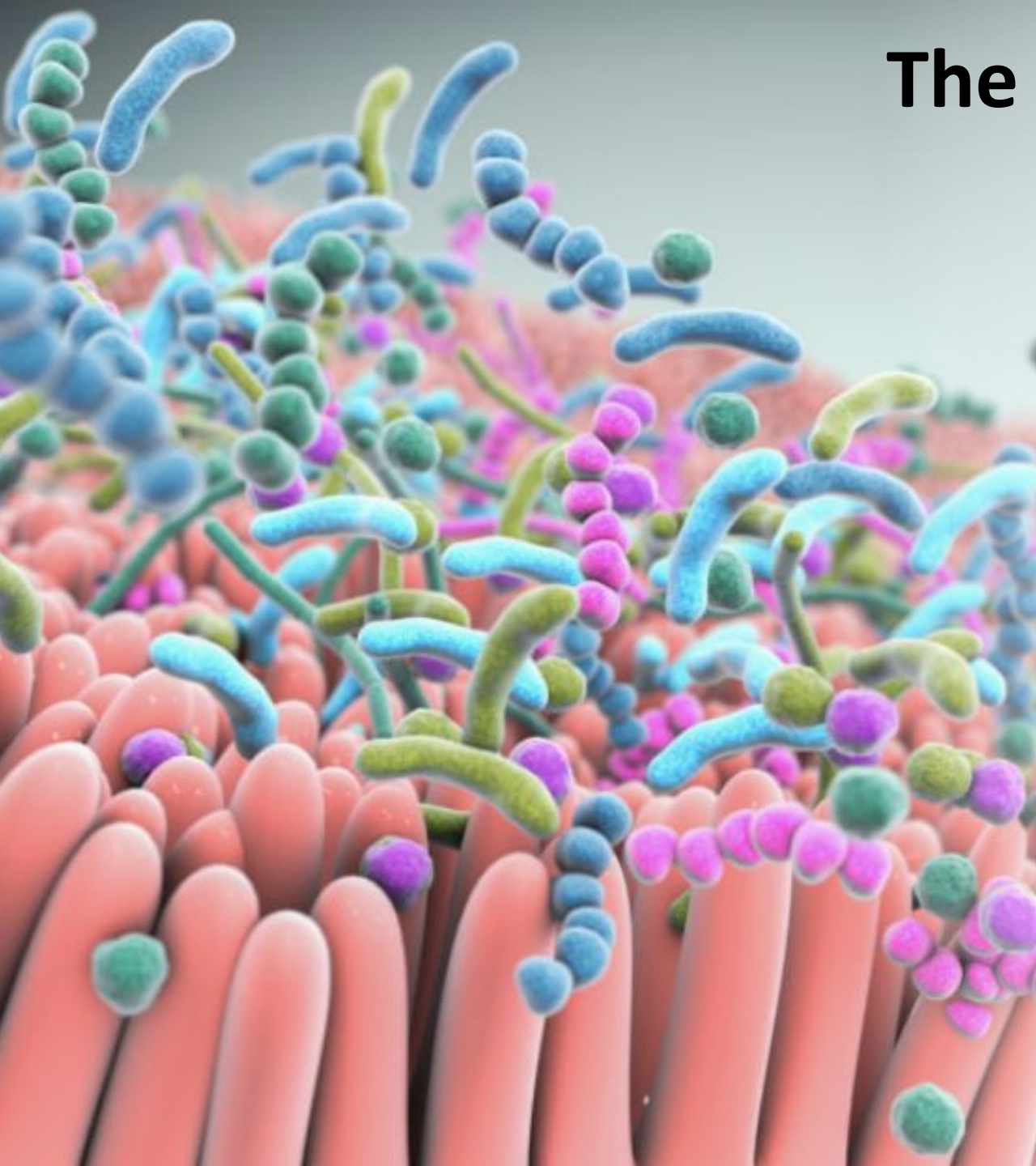
# Intraocular Inflammation



## Gut Dysbiosis and Ocular Disease

- AMD
- Glaucoma
- Diabetic Retinopathy
- Uveitis
- Dry Eye Disease

# The Gut Microbiome



- The microbiota organ weighs 1-2 kg
- Human gut microbiota contains 100 trillion microorganisms (bacteria, viruses, protozoa, and fungi).
- 10 times the number of cells in the human body!
- Over 1000 different species have been isolated.
- We (Westerners) have about 160 different species.
- A mutual beneficial symbiotic relationship.

# The Roles of the Human Microbiota

- Gut motility
- Modulates the immune system
  - IgE ↓
- Impact on inflammation
- Regulates metabolism and glucose regulation
- Mood management
- Improves nutritional status
  - B vitamins
  - Vitamin K
  - Mineral absorption – Ca, Mg, Zn
  - Production of SCFAs

# Short Chain Fatty Acids (SCFAs)

- The most common SCFAs include acetate, propionate, and butyrate
- Group of organic compounds that are produced by the fermentation of dietary fibers by gut bacteria in the colon
- Improve gut barrier function, increase gut motility, and modulate immune function in the gut.
- Regulation of appetite and metabolism
- SCFAs have anti-inflammatory effects
- Butyrate has been shown to have a protective effect against colon cancer by inducing cell differentiation and apoptosis.

# Commensal Microbes

- extract nutrients and energy from our diets,
- maintain gut barrier function,
- produce vitamins (biotin and vitamin K),
- and protect against colonization by potential pathogens

Bifidobacterium species

Lactobacillus species

Faecalibacterium prausnitzii

Akkermansia muciniphila

COMMENSAL BACTERIA	
<i>Bacteroides fragilis</i>	Gram-negative species of the <i>Bacteroidetes</i> phylum. Immune-modulating normal gut species. Believed to be involved in microbial balance, barrier integrity, and neuroimmune health (Hsiao 2013). High levels may result from reduced digestive capacity or constipation. Low levels may contribute to reduced anti-inflammatory activity in the intestine.
<i>Bifidobacterium</i> spp.	Gram-positive genus in the <i>Actinobacteria</i> phylum. Present in breast milk. Colonizes the human GI tract at birth. Common in probiotics. Thrives on a wide variety of prebiotic fibers. Low levels may result from low fiber intake or reduced mucosal health. High levels are more common in children than in adults.
<i>Enterococcus</i> spp.	Gram-positive genus of lactate-producing bacteria in the <i>Firmicutes</i> phylum. High levels may be due to reduced digestive capacity, constipation or small intestinal bacterial overgrowth. Low levels may indicate insufficiency of beneficial bacteria.
<i>Escherichia</i> spp.	Gram-negative genus in the <i>Proteobacteria</i> phylum. Normal gut flora. <i>Escherichia coli</i> ( <i>E. coli</i> ) is the primary species in this genus. Most <i>E. coli</i> are nonpathogenic ( <i>pathogenic E. coli</i> strains are measured separately in "Pathogens" section of the GI-MAP). High levels may be indicative of increased intestinal inflammatory activity. Low levels may indicate reduced mucosal health and decreased protection against pathogenic <i>E. coli</i> .
<i>Lactobacillus</i> spp.	Gram-positive genus of lactate-producing bacteria in the <i>Firmicutes</i> phylum. Many strains used as probiotics. High levels may result from reduced digestive capacity or excessive intake of carbohydrates. Low levels may be due to low carbohydrate intake or high salt intake, and may also indicate reduced mucosal health.
<i>Enterobacter</i> spp.	Gram-negative genus in the <i>Proteobacteria</i> phylum. Closely related to <i>E. coli</i> ( <i>in the same taxonomic family</i> ). High levels may indicate increased intestinal inflammatory activity. Low levels may indicate reduced mucosal health.
<i>Akkermansia muciniphila</i>	Keystone species and primary mucus degrader. Generates mucus-derived sugars and metabolic products that support the growth and energy needs of other gut microbes. Promotes mucosal health and mucus production. Low levels associated with obesity and metabolic dysfunction. High levels linked to multiple sclerosis.
<i>Faecalibacterium prausnitzii</i>	Widely recognized as an important keystone species in the Clostridia class, as well as a major butyrate producer. Promotes anti-inflammatory processes and mucosal homeostasis. Reduced levels have been associated with a wide range of chronic inflammatory and autoimmune diseases.
<i>Roseburia</i> spp.	A genus of Gram-positive anaerobic bacteria in the <i>Clostridia</i> class that inhabit the human colon. The <i>Roseburia</i> genus has five well-characterized species, all of which produce short-chain fatty acids (SCFAs), such as acetate, propionate, and butyrate. <i>Roseburia</i> can also produce butyrate from acetate promoting balance in energy homeostasis. The genus is widely recognized to influence colonic motility, support immunity, and suppress inflammation. Low levels are associated with several disease (including irritable bowel syndrome, obesity, Type 2 diabetes, nervous system conditions and allergies).

# Pathogenic Microbes

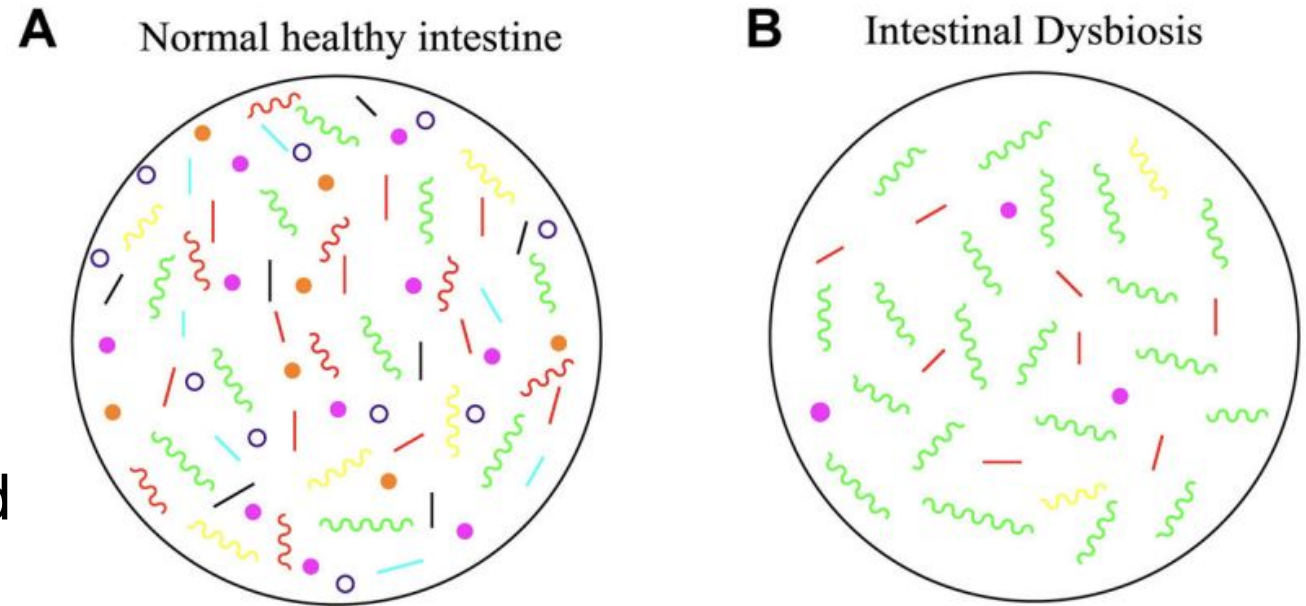
- Salmonella species
- Escherichia coli (some strains)
- Clostridium difficile
- Campylobacter jejuni
- Helicobacter pylori

DYSBIOTIC & OVERGROWTH BACTERIA	
<i>Bacillus</i> spp.	Common group of gram-positive bacteria in the <i>Firmicutes</i> phylum. Some strains are used as probiotics. High levels may result from reduced digestive function, SIBO, or constipation.
<i>Enterococcus faecalis</i> <i>Enterococcus faecium</i>	Gram-positive species in the <i>Firmicutes</i> phylum. High levels may result from reduced stomach acid, PPI use, compromised digestive function, SIBO or constipation. High natural resistance to some antibiotics, which may result in overgrowth.
<i>Morganella</i> spp.	Gram-negative group in the <i>Proteobacteria</i> phylum. May produce histamine. High levels may indicate increased intestinal inflammatory activity. High levels may cause diarrhea, and may also be associated with SIBO.
<i>Pseudomonas</i> spp. <i>Pseudomonas aeruginosa</i>	Gram-negative bacteria in the <i>Proteobacteria</i> phylum. High levels may indicate increased intestinal inflammatory activity and may cause abdominal cramping and loose stools. Some strains of <i>P. aeruginosa</i> may produce toxins that can damage cells.
<i>Staphylococcus</i> spp. <i>Staphylococcus aureus</i>	Gram-positive bacteria in the <i>Firmicutes</i> phylum. High levels may result from reduced digestive capacity, and intestinal inflammatory activity. Some strains may produce toxins and contribute to loose stools or diarrhea.
<i>Streptococcus</i> spp.	Gram-positive bacteria in the <i>Firmicutes</i> phylum. <i>Streptococcus</i> spp. colonize skin and mucous membranes throughout the body; High levels in the intestine may result from low stomach acid, PPI use, reduced digestive capacity, SIBO or constipation; Elevated levels may also be indicative of intestinal inflammatory activity, and may cause loose stools.

INFLAMMATORY & AUTOIMMUNE-RELATED BACTERIA	
<i>Citrobacter</i> spp. <i>Citrobacter freundii</i> .	Gram-negative bacteria in the <i>Proteobacteria</i> phylum. High levels may indicate increased intestinal inflammatory activity.
<i>Klebsiella</i> spp. <i>Klebsiella pneumoniae</i>	Gram-negative bacteria in the <i>Proteobacteria</i> phylum. Common residents of the oral cavity and respiratory tract. May cause diarrhea, gas, abdominal pain, and bloating; Common after long-term antibiotic use; May release histamine in the gut; High levels may indicate increased intestinal inflammatory activity.
<i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i>	Bacterial species in the <i>Actinobacteria</i> phylum. Higher levels have been associated with Crohn's disease and rheumatoid arthritis.
<i>Proteus</i> spp. <i>Proteus mirabilis</i>	Gram-negative bacteria in the <i>Proteobacteria</i> phylum. High levels may indicate increased intestinal inflammatory activity; May contribute to loose stools or diarrhea; Pets or wild animals can be a source.

# Gut Dysbiosis

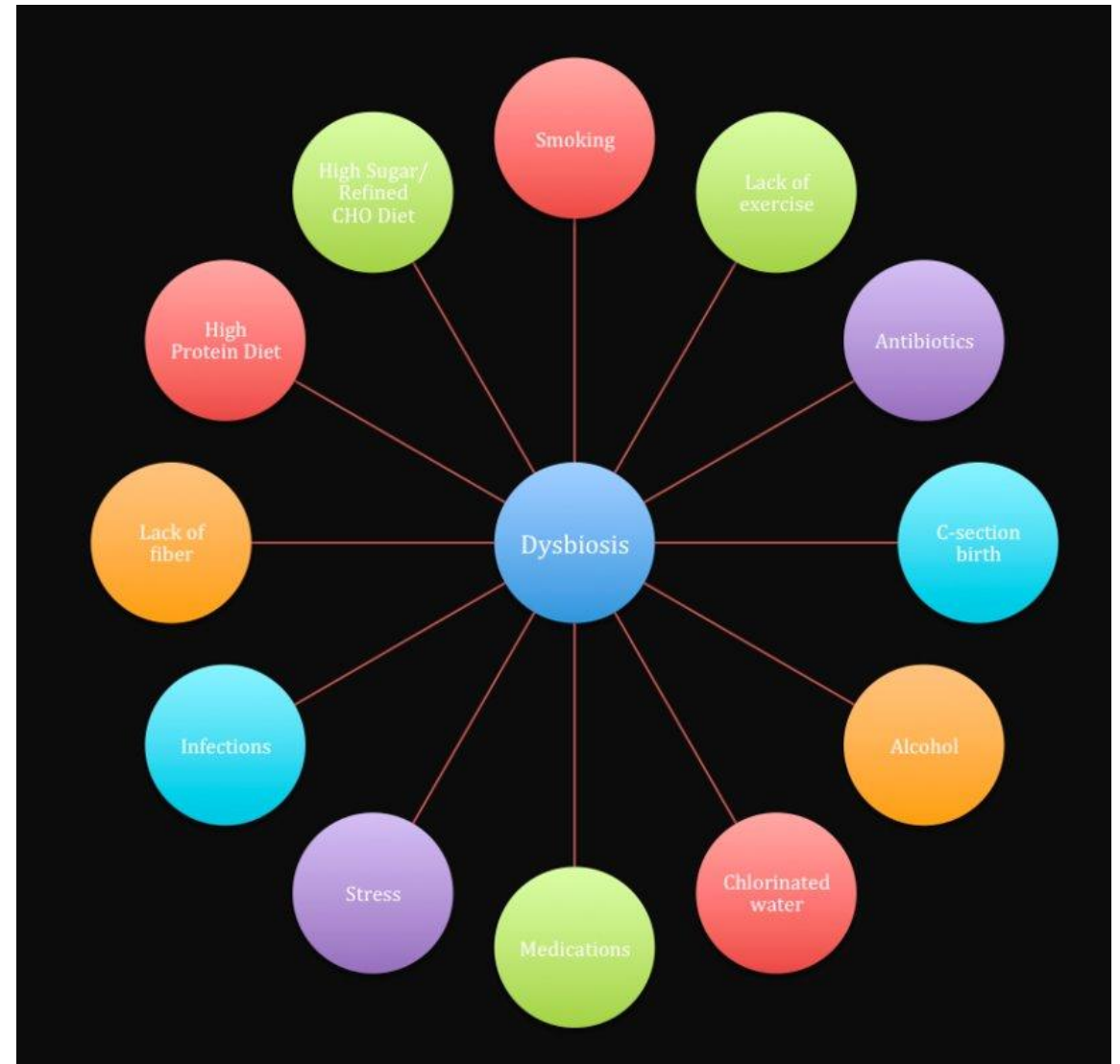
- Disruption to the microbiome resulting in an imbalance in the microbiota.
- Overgrowth of opportunistic colonies to fill the void
- Changes in the functional composition and metabolic activities
- Linked to metabolic, cardiovascular, autoimmune, and inflammatory diseases.





# Causes of Dysbiosis

- Standard American Diet (SAD)
- C-Section
- Formula feeding
- Xenobiotics– drugs, food additives, pesticides, and herbs/supplements
- Mold exposure
- Infections
- Alcohol abuse
- Lack of exercise
- Stress



# Diseases Associated with GI Dysbiosis

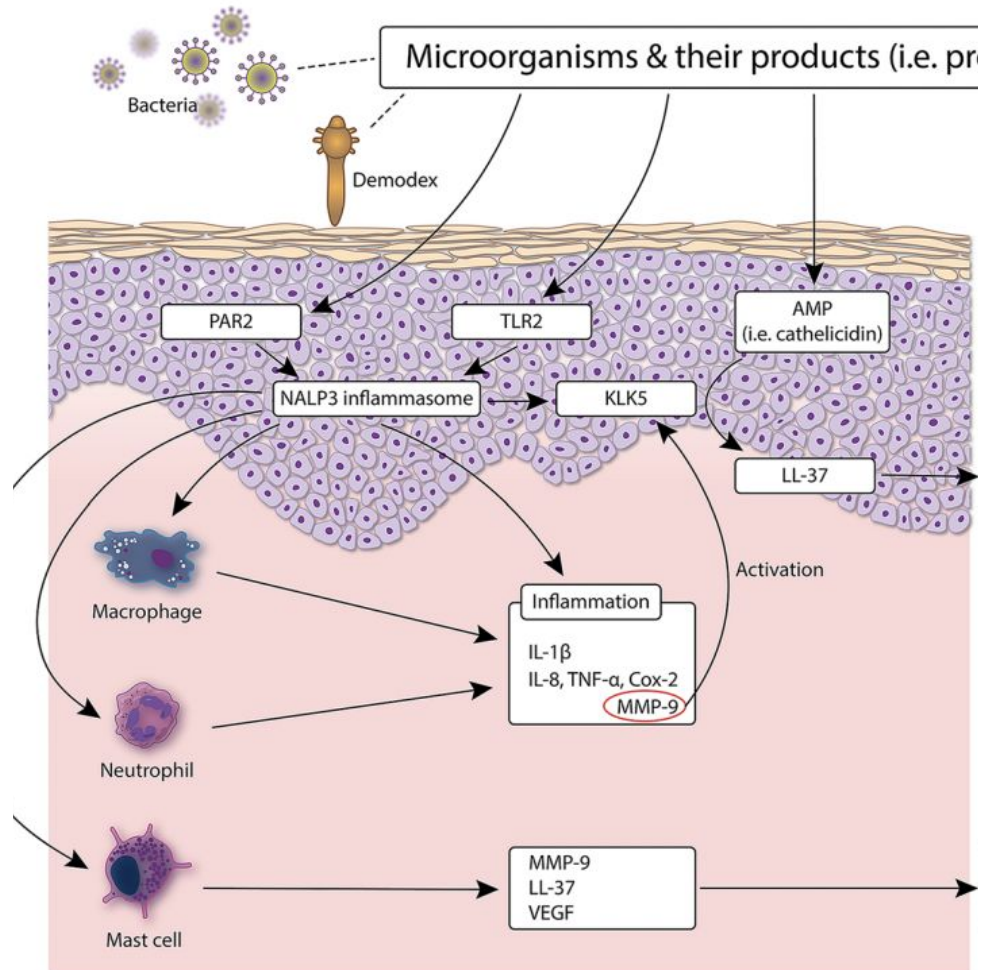
## GI Conditions

- Alcoholic liver disease
- Antibiotic-associated diarrhea
- Chemotherapy-associated diarrhea
- Clostridium difficile-associated disease
- Celiac disease
- Crohn's disease
- Diverticular disease
- Irritable bowel syndrome
- Liver cirrhosis
- Non-alcoholic fatty liver disease
- Radiotherapy-associated diarrhea
- SIBO
- Ulcerative colitis

## Non-GI Condition

- Alzheimer's disease
- Anxiety
- Asthma
- Atopic eczema
- Autism
- Chronic Fatigue Syndrome
- Depression
- Kidney stones
- Metabolic syndrome
- Multiple sclerosis
- Obesity
- Parkinson's disease
- Rheumatoid arthritis
- Type I diabetes
- Type II diabetes

# Rosacea – Cutaneous Microbiome Imbalances



Imbalances in cutaneous organisms: *Cutibacterium acnes*, *Staphylococcus epidermidis*, *Bacillus oleronius*, and *Demodex folliculorum*

Potential cutaneous effects of alterations in the gastrointestinal (GI) microbiome.

Associations with GI pathologies

# Rosacea and the Gut

Inflammatory Bowel Disease (IBD)

Celiac Disease

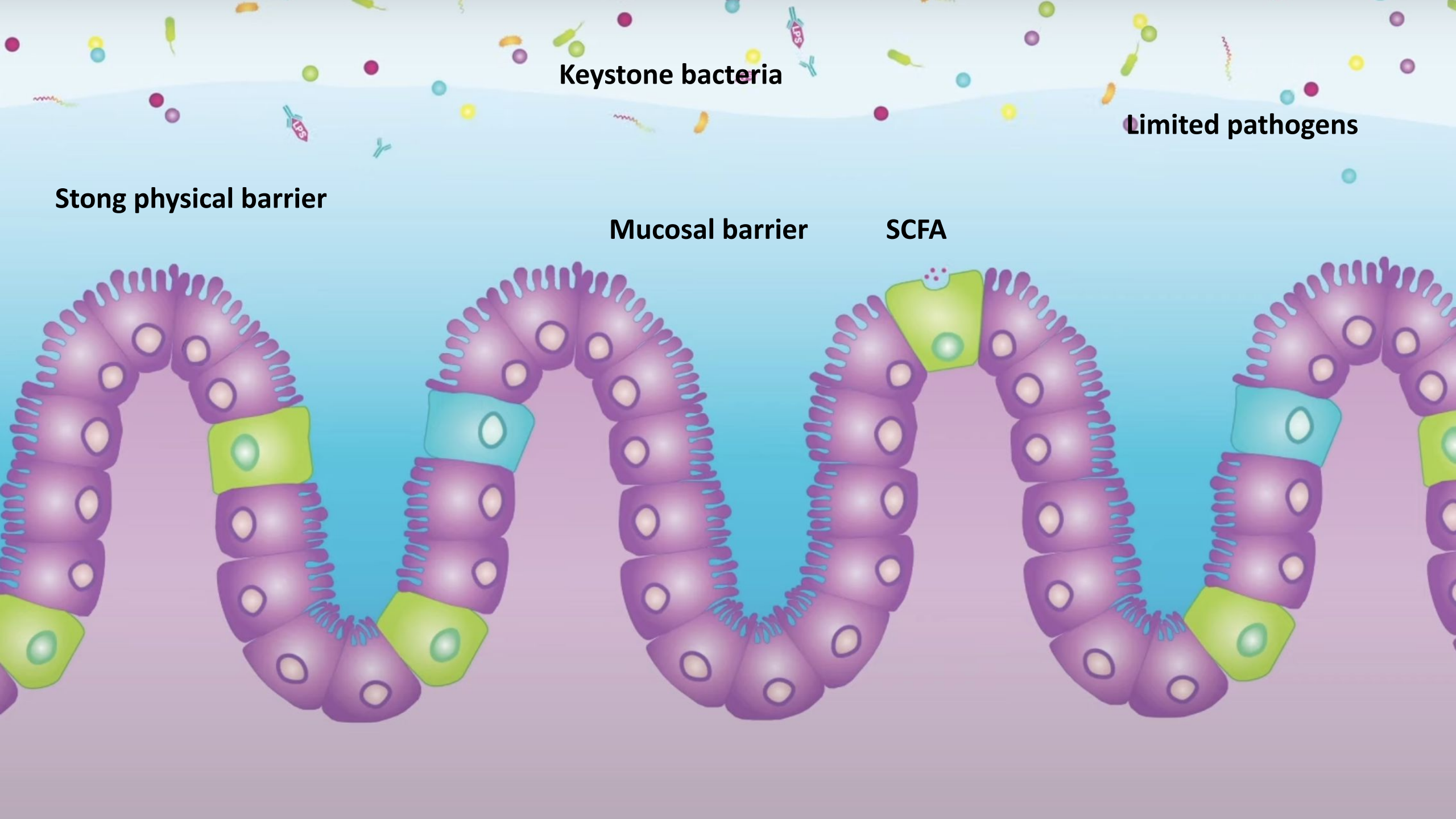
Irritable Bowel Syndrome (IBS)

Gastroesophageal Reflux Disease (GERD)

*Helicobacter Pylori* (HP) infection

Small Intestine Bacterial Overgrowth (SIBO)

- Seen in 46-66% of rosacea patients



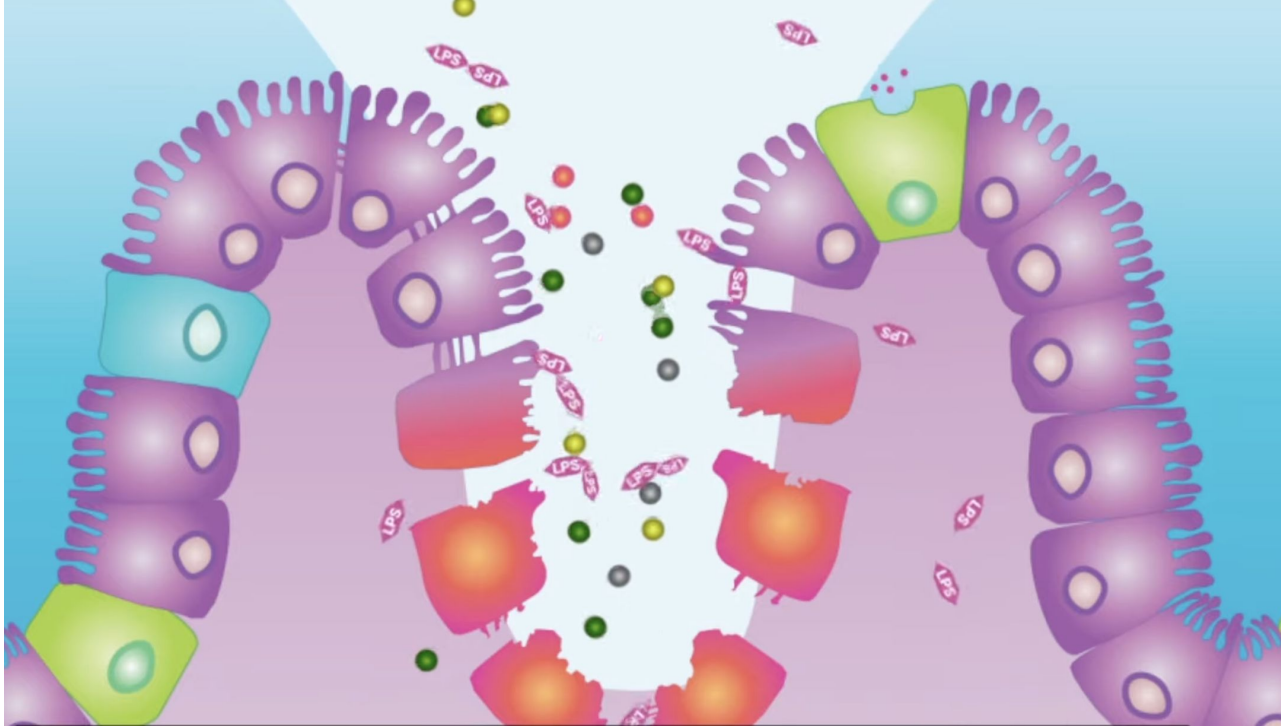
Keystone bacteria

Limited pathogens

Strong physical barrier

Mucosal barrier

SCFA

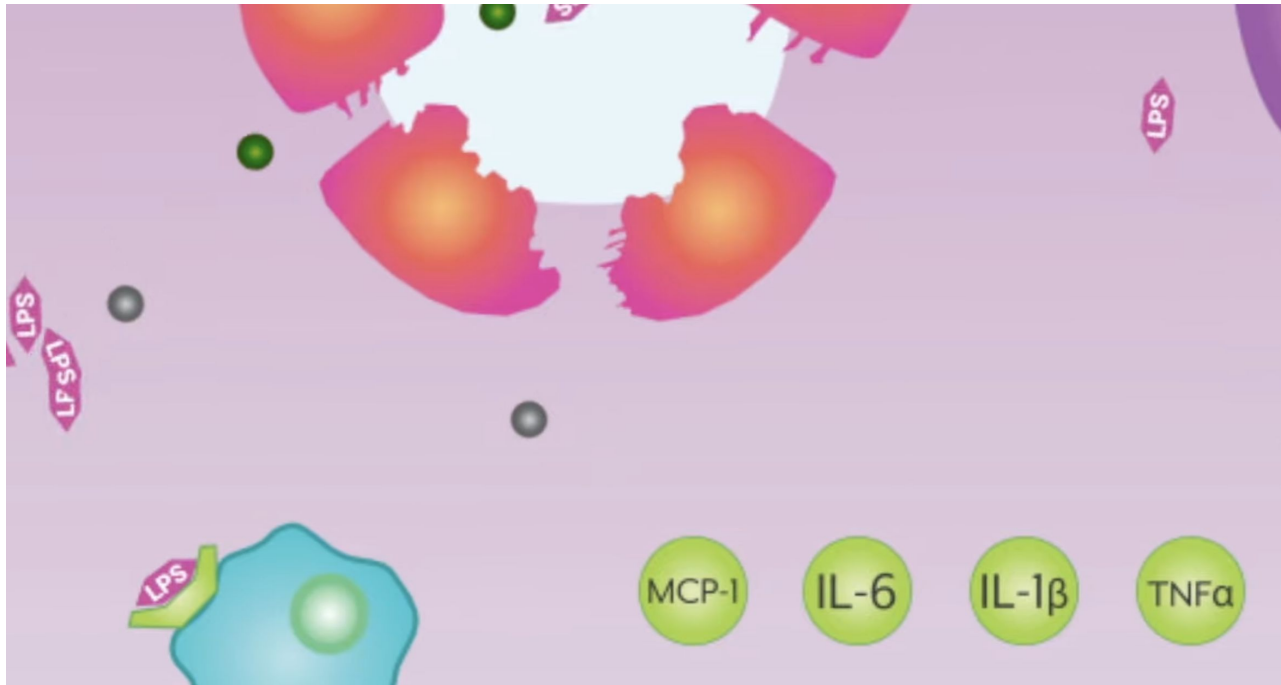
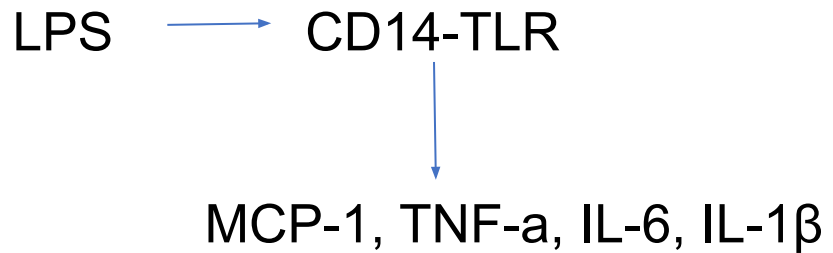


## Unbalanced Microbial Population

Harmful bacteria feed on glycans or polysaccharides, and degrade the mucosal barrier and loosen the tight junctions

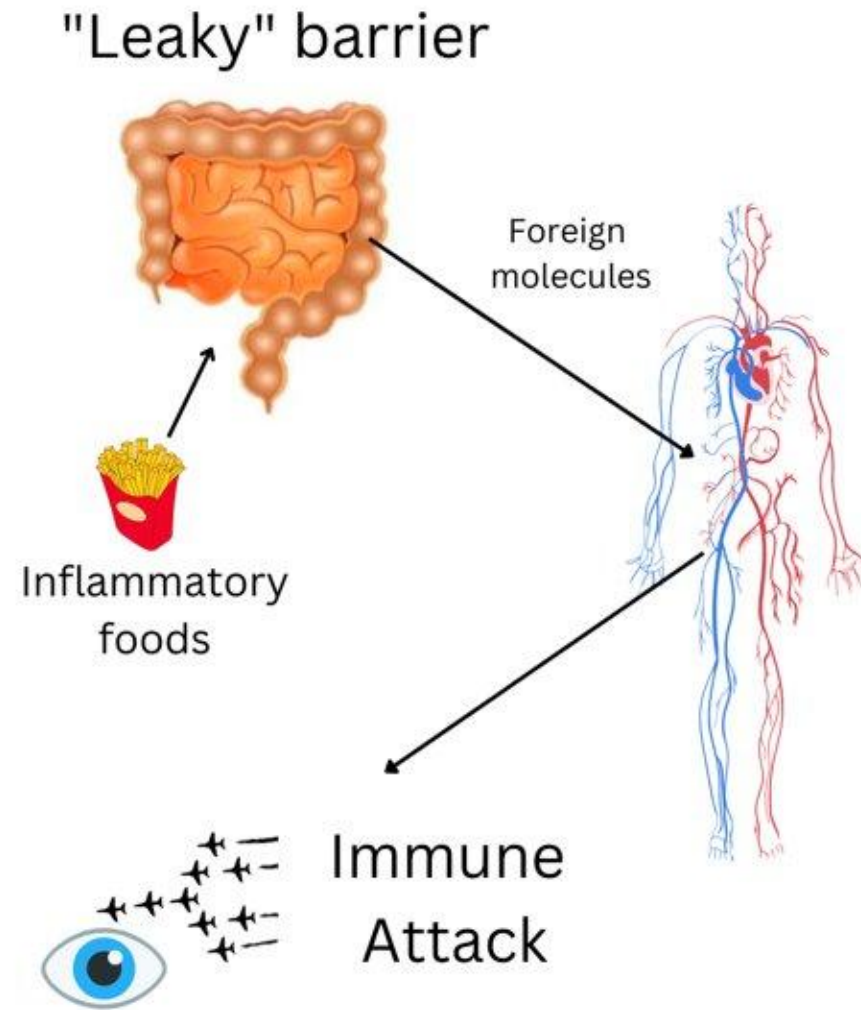
Leaky Gut = migration of toxins from the intestines into circulation

### lipopolysaccharide (LPS)



# Systemic Inflammation

- Brain
- Fat stores
- Nerves
- Joints
- Eyes



# The 5Rs Functional Medicine Approach to Healing the Gut



## Remove

Remove anything irritating the gut



## Replace

Replace any missing digestive elements



## Reinoculate

Reinoculate the gut microbiome with good bacteria



## Repair

Repair intestinal cells



## Rebalance

Rebalance lifestyle elements



Remove allergic foods, parasites, bacteria or yeast (berberine, caprylic acid, garlic oil, oil of oregano, uva ursi, olive leaf extract)



Replace digestive secretions: Digestive support: Betaine hydrochloride, apple cider vinegar, herbal bitters, ox bile, lactase, pancreatic enzymes (amylase, lipase, protease), pepsin.



Reinoculate with good bacterial: Supplementation with probiotics, along with the use of prebiotics helps re-establish the proper microbial balance.



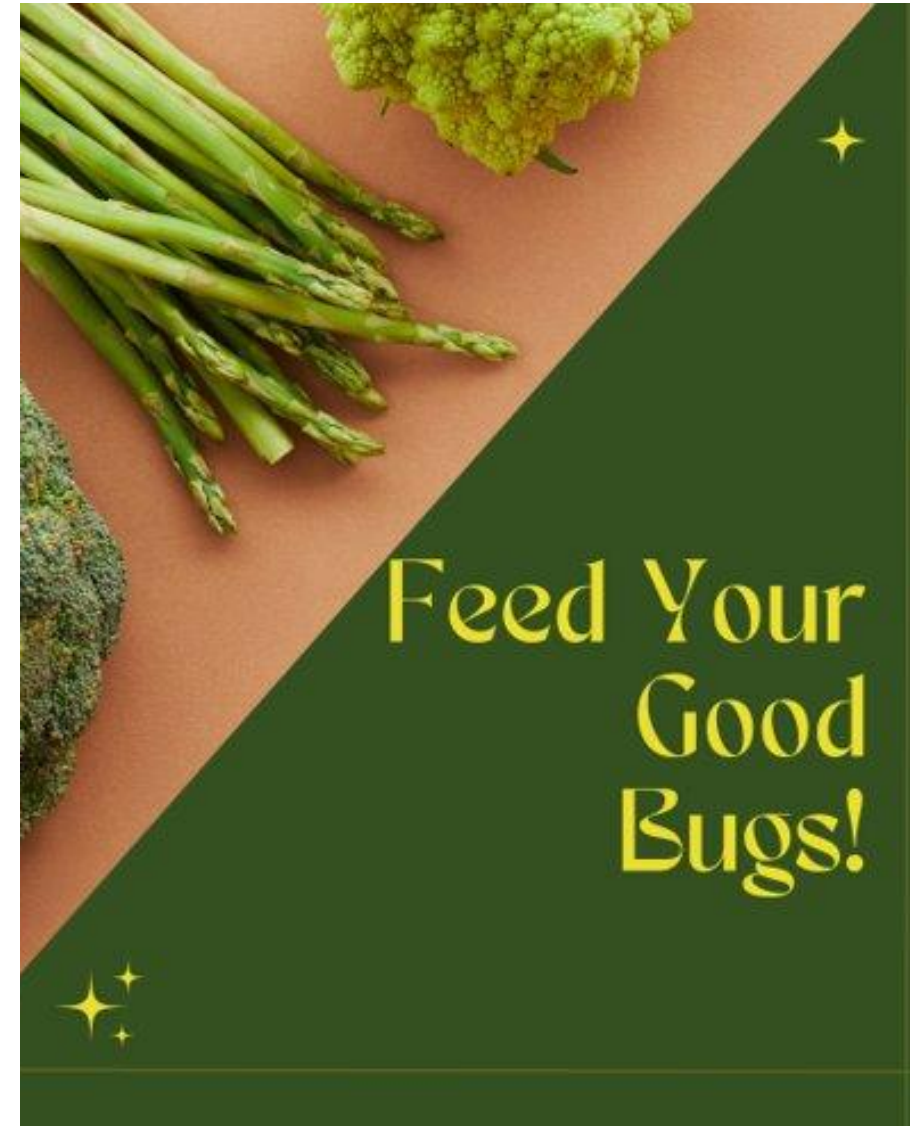
Repair the lining of the GI tract: Restore the integrity of the gut mucosa by giving support to healthy mucosal cells, as well as immune support.



Rebalance – lifestyle choices: Sleep, diet, exercise, and stress management



- Probiotics – **Live** microorganisms with **beneficial** health effects on the host. Help digest food, support immune cells and produce vitamins.
- Prebiotics - What your bugs eat
- Postbiotics are the metabolites (acetate, propionate, and butyrate) of the beneficial bacteria, and these bioactive compounds help fight infections, reduce inflammation, and have anti-cancer effects.





# Probiotic Nomenclature

**Lactobacillus acidophilus M23**  
**Genus**                      **Species**                      **Strain**

The **strain** of the bacteria determines the quality and clinical efficacy.

Match the action of specific probiotic strains to the condition or an imbalance being treated.

Strains	Origin
<i>Lactobacillus</i> sp. JNU 8829	Infant feces
<i>Lactobacillus acidophilus</i> KU41	Infant feces
<i>Lactobacillus acidophilus</i> M23	Infant feces
<i>Lactobacillus brevis</i> CH7	Kimchi
<i>Lactobacillus casei</i> MB3	Kimchi
<i>Lactobacillus fermentum</i> NS2	Kimchi
<i>Lactobacillus plantarum</i> M13	Kimchi
<i>Lactobacillus plantarum</i> NS3	Kimchi
<i>Lactobacillus sakei</i> CH8	Fermented olive
<i>Lactobacillus sakei</i> MA9	Fermented olive

# Probiotics Prescribing

## Upregulation of non-specific Immunity

- *Lactobacillus acidophilus* NCFM + *Bifidobacterium lactis* Bi07

## Upregulating GIT production of sIgA:

- *Saccharomyces cerevisiae* var *bouardii* CNCM I-745, *Lactobacillus rhamnosus* GG, *Lactobacillus acidophilus* La5

## Down regulation of pathogens

- *L.reuteri* (DMS 17938) has been shown to eradicate *H.pylori*

## Dry Eye Disease

- *E. faecium* LMG S-28935 and *Saccharomyces bouardii* MUCL 53837
- *S. bouardii* MUCL 53837 & *E. faecium* LMG S-28935
- *B. lactis* and *B. bifido*
- *E. faecium* WB2000
- MULTIBIOTIC™ probiotic contains 21.075 billion CFU of bacteria per capsule, including *Streptococcus*, *Lactobacillus*, and *Bifidobacterium* species



### APPLE CIDER VINEGAR

contain healthy acids that encourage a pH in your body that supports the growth of probiotics.



### FERMENTED DAIRY

is probiotic-rich and helps improve gut health.



### SAUERKRAUT

is rich in *Lactobacillus*. It's high in vitamin C and in digestive enzymes.



### KIMCHI

the Korean cousin to sauerkraut, made with Chinese cabbage and some other food and spices.



### NATTO

is a Japanese dish of fermented soybeans high in *Bacillus subtilis*.



### KVASS

is a common beverage in Eastern Europe made from fermented barley or rye.



### MISO

is a major component of Japanese medicine.



### KOMBUCHA

is black tea fermented using a symbiotic colony of bacteria and yeast.

## Probiotic Supplementation

Use a broad-spectrum, diverse probiotic formula, 50–450 billion CFUs/day containing *Lactobacillus acidophilus*, *Bifidobacterium bifidum*, *Bifidobacterium longum*, *Lactobacillus rhamnosus*, *Bifidobacterium breve*, *Lactobacillus casei*, *Streptococcus thermophilus*

- ***Lactobacillus rhamnosus* GG**
- ***Saccharomyces boulardii* (probiotic yeast)**
- ***Akkermansia muciniphila***



Banana



Barley



Leeks



Garlic



Jerusalem  
Artichoke



Legumes



Apples



Wheat  
Bran



Chicory  
Root



Mushrooms



Dandelion  
Greens



Oats



Onions



Rye



Asparagus

# It's Not Just What We Eat

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- Sunlight exposure
- Exercise
- Stress
- Sleep

**Your bugs are listening to your thoughts!**

## Healthy Gut



# Case Report

- 30 yr old Caucasian male
- Ocular history- Dry eye, ocular rosacea, blepharitis. On maintenance IPL treatments
- Medical history
  - GERD (dx 8/2013), Gallstones, Gallbladder removed in 2015
  - Migraines, Allergies, Rosacea
- Medications
  - Omeprazole – daily since 2015
  - Antibiotics – frequently for strep



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- GI symptoms - stomach pain, bloating, and nausea
- Food aversion – acidic foods, red meat, eggs, and fish
- No food allergies

# GI- Map

pylori			
	Result	Normal	
<i>elicobacter pylori</i>	5.4e2	<1.0e3	
irulence Factor, babA	Negative	Negative	
irulence Factor, cagA	Negative	Negative	
irulence Factor, dupA	Negative	Negative	
irulence Factor, iceA	Negative	Negative	
irulence Factor, oipA	Negative	Negative	
irulence Factor, vacA	Negative	Negative	
irulence Factor, virB	Negative	Negative	
irulence Factor, virD	Negative	Negative	
Normal Bacterial Flora			
	Result	Normal	
<i>acteroides fragilis</i>	7.30e9	1.6e9 - 2.5e11	
<i>ifidobacterium</i> spp.	1.28e10	>6.7e7	
<i>nterococcus</i> spp.	2.47e7	1.9e5 - 2.0e8	
<i>scherichia</i> spp.	2.07e8	3.7e6 - 3.8e9	
<i>ctobacillus</i> spp.	3.98e7	8.6e5 - 6.2e8	
<i>lostridia</i> (class)	3.41e7	5.0e6 - 5.0e7	
<i>nterobacter</i> spp.	7.00e7	High	1.0e6 - 5.0e7
<i>kkermansia muciniphila</i>	<dl	1.0e1 - 5.0e4	
<i>ecalibacterium prausnitzii</i>	6.14e5	1.0e3 - 5.0e8	
Alpha Microbiota			
	Result	Normal	
<i>acteroidetes</i>	3.31e13	High	8.6e11 - 3.3e12
<i>irmicutes</i>	1.56e12	High	5.7e10 - 3.0e11
<i>irmicutes:Bacteroidetes Ratio</i>	0.05	<1.0	

**Enterobacter spp. - High**  
Gram-negative genus in the Proteobacteria phylum. Closely related to *E. coli* (in the same taxonomic family). High levels may indicate increased intestinal inflammatory activity. Low levels may indicate reduced mucosal health.

**Firmicutes/Bacteroidetes - High**  
Poor diet, Dysbiosis, Maldigestion or hypochlorhydria



Additional Dysbiotic/Overgrowth Bacteria	Result		Normal
<i>Bacillus</i> spp.	2.72e6	High	<1.50e5
<i>Enterococcus faecalis</i>	<dl		<1.00e4
<i>Enterococcus faecium</i>	<dl		<1.00e4
<i>Morganella</i> spp.	<dl		<1.00e3
<i>Pseudomonas</i> spp.	<dl		<1.00e4
<i>Pseudomonas aeruginosa</i>	<dl		<5.00e2
<i>Staphylococcus</i> spp.	<dl		<1.00e4
<i>Staphylococcus aureus</i>	2.39e2		<5.00e2
<i>Streptococcus</i> spp.	9.57e4	High	<1.00e3
<i>Methanobacteriaceae</i> (family)	2.84e8		<5.00e9
Potential Autoimmune Triggers	Result		Normal
<i>Citrobacter</i> spp.	1.70e4		<5.00e6
<i>Citrobacter freundii</i>	<dl		<5.00e5
<i>Klebsiella</i> spp.	<dl		<5.00e3
<i>Klebsiella pneumoniae</i>	<dl		<5.00e4
<i>M. avium</i> subsp. <i>paratuberculosis</i>	<dl		<5.00e3
<i>Proteus</i> spp.	<dl		<5.00e4
<i>Proteus mirabilis</i>	<dl		<1.00e3
<i>Fusobacterium</i> spp.	8.82e7		<1.00e8
<i>Prevotella</i> spp.	2.26e8	High	<1.00e8
Fungi/Yeast	Result		Normal
<i>Candida</i> spp.	<dl		<5.00e3
<i>Candida albicans</i>	<dl		<5.00e2
<i>Geotrichum</i> spp.	<dl		<3.00e2
<i>Microsporidium</i> spp.	<dl		<5.00e3
<i>Rhodotorula</i> spp.	<dl		<1.00e3
Viruses	Result		Normal
Cytomegalovirus	<dl		<1.00e5
Epstein-Barr Virus	<dl		<1.00e7

## Bacillus spp. - High

Common group of gram-positive bacteria in the Firmicutes phylum. High levels may result from reduced digestive function, SIBO, or constipation.

## Streptococcus spp. - High

Gram-positive bacteria in the Firmicutes phylum. *Streptococcus* spp. colonize skin and mucous membranes throughout the body; High levels in the intestine may result from low stomach acid, PPI use, reduced digestive capacity, SIBO or constipation; Elevated levels may also be indicative of intestinal inflammatory activity, and may cause loose stools.

## Prevotella spp.- High

Gram-negative species in the Bacteroidetes phylum. Associated with rheumatoid arthritis. High levels may result from reduced digestive capacity, or a high-starch diet.

Parasites		
<b>Protozoa</b>	Result	Normal
<i>Blastocystis hominis</i>	<dl	<2.00e3
<i>Chilomastix mesnili</i>	<dl	<1.00e5
<i>Cyclospora</i> spp.	<dl	<5.00e4
<i>Dientamoeba fragilis</i>	<dl	<1.00e5
<i>Endolimax nana</i>	<dl	<1.00e4
<i>Entamoeba coli</i>	<dl	<5.00e6
<i>Pentatrichomonas hominis</i>	<dl	<1.00e2
<b>Worms</b>	Result	Normal
<i>Ancylostoma duodenale</i>	Not Detected	Not Detected
<i>Ascaris lumbricoides</i>	Not Detected	Not Detected
<i>Necator americanus</i>	Not Detected	Not Detected
<i>Trichuris trichiura</i>	Not Detected	Not Detected
<i>Taenia</i> spp.	Not Detected	Not Detected
Intestinal Health		
<b>Digestion</b>	Result	Normal
Steatocrit	<dl	<15 %
Elastase-1	724	>200 ug/g
<b>GI Markers</b>	Result	Normal
β-Glucuronidase	1334	<2486 U/mL
Occult Blood - FIT	0	<10 ug/g
<b>Immune Response</b>	Result	Normal
Secretory IgA	255	510 - 2010 ug/g
Anti-gliadin IgA	20	<175 U/L
<b>Inflammation</b>	Result	Normal
Calprotectin	66	<173 ug/g
<b>Add-on Test</b>	Result	Normal
Zonulin	80.8	<175 ng/g

## Low Fecal SIgA –

The gut immune system is suppressed. Possible underlying causes: chronic dysbiosis, antigen exposure, chronic stress, immunocompromised patient, or even protein malnutrition.

# Dietary and supplement recommendations

## Remove

- refined carbohydrates, sugar, processed foods and saturated fats
- Avoid eating out (meal plan for lunch and dinner)



## Replace

- Bio-Gest Digestive Enzymes Thorne (Betaine Hydrochloride, L-Glutamic Acid Hydrochloride, Ox Bile, Pancreatin, Pepsin)

## Reinoculate

Ortho Biotic, Ortho Molecular Products

- **Proprietary Blend** ... 50 Billion CFU  
Lactobacillus acidophilus (La-14)  
Lactobacillus paracasei (Lpc-37)  
Bifidobacterium lactis (BI-04)  
Bifidobacterium bifidum (Bb-06)  
Lactobacillus plantarum (Lp-115)  
Lactobacillus rhamnosus (GG)  
Saccharomyces boulardii ... 3 Billion CFU



## Repair

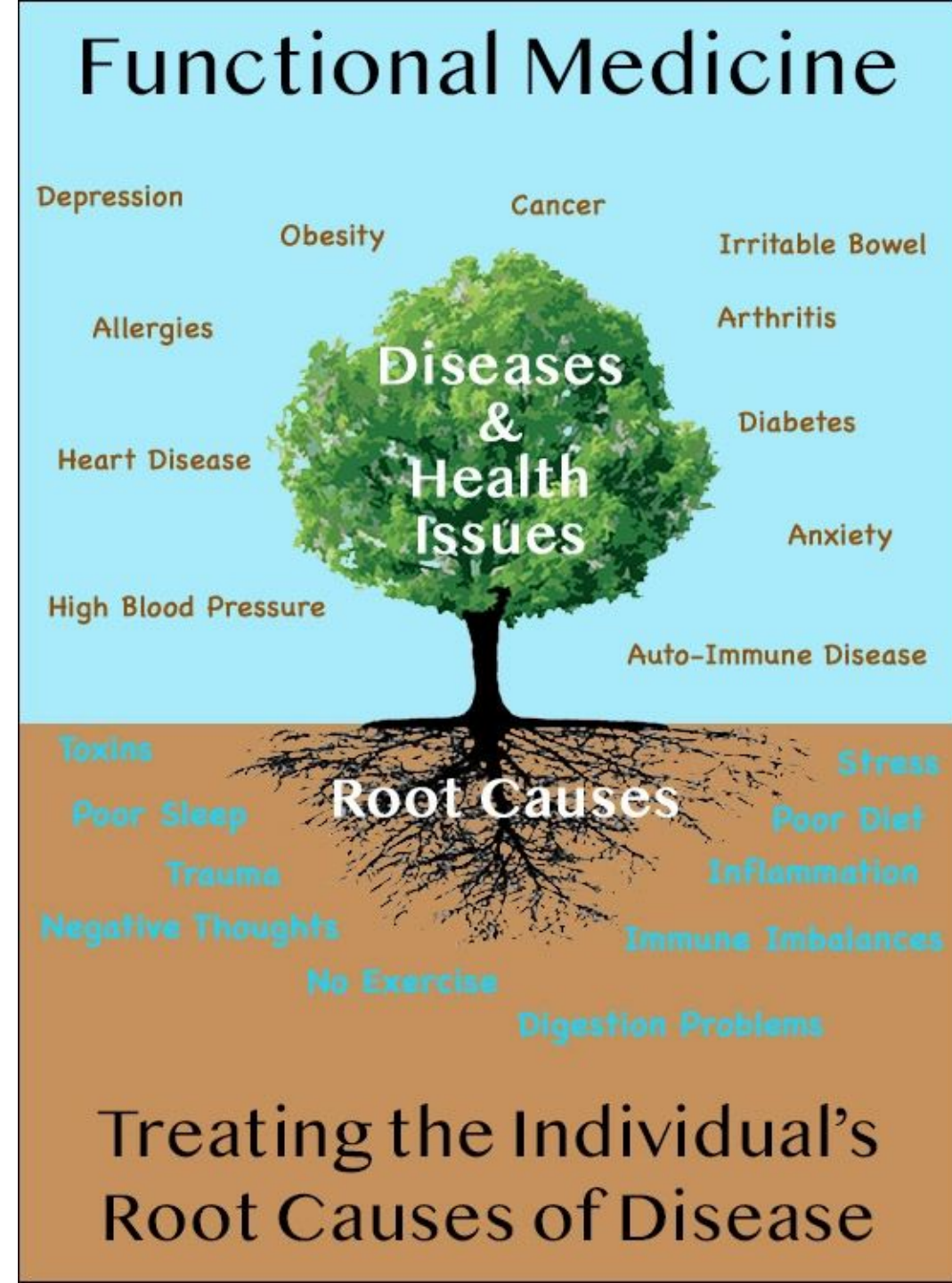
- GI-Revive - L-Glutamine: N-Acetyl Glucosamine: Citrus Pectin: Deglycyrrhinated Licorice: Aloe Vera: Slippery Elm: Mucin: Marshmallow: Chamomile: Okra: Cat's Claw: Methylsulfonylmethane: Quercetin: Prunus: Zinc-Carnosine
- Fish oil, Mg

## Rebalance

- Diet: Increase phytonutrients – 9 servings of fruits and vegetables a day, eliminate alcohol and increase water intake (double)
- Physical activity: 3-4 times a week and add weight training. Walk the dog after meals
- Stress management and sleep: 10- minutes of meditation or journaling a day. Prioritizing 7-8 hours of sleep a day

# Follow up

- Patient reports
  - Improved GI symptoms
  - Less food intolerances
  - Rarely uses Prilosec
  - Reduced allergy symptoms
  - Improved skin
  - Less rosacea and dry eye flareups



# Thank you

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The logo features a large, teal, cursive letter 'e' on the left. A thin teal line starts from the top of the 'e' and extends diagonally upwards to the right, passing through the text. The text 'E Y E T H R I V E' is written in a teal, serif, all-caps font, with wide letter spacing. Below it, the word 'Wellness' is written in a teal, lowercase, serif font, also with wide letter spacing.

E Y E T H R I V E  
Wellness