

سر ارادت ما و آستان حضرت دوست

که هر چه بر سر ما می رود ارادت اوست

نظیر دوست ندیدم اگر چه از مه و مهر

نهادم آینه ها در مقابل رخ دوست

مجموعه اشعار و آثار حضرت عیسی بن  
محمد باقر

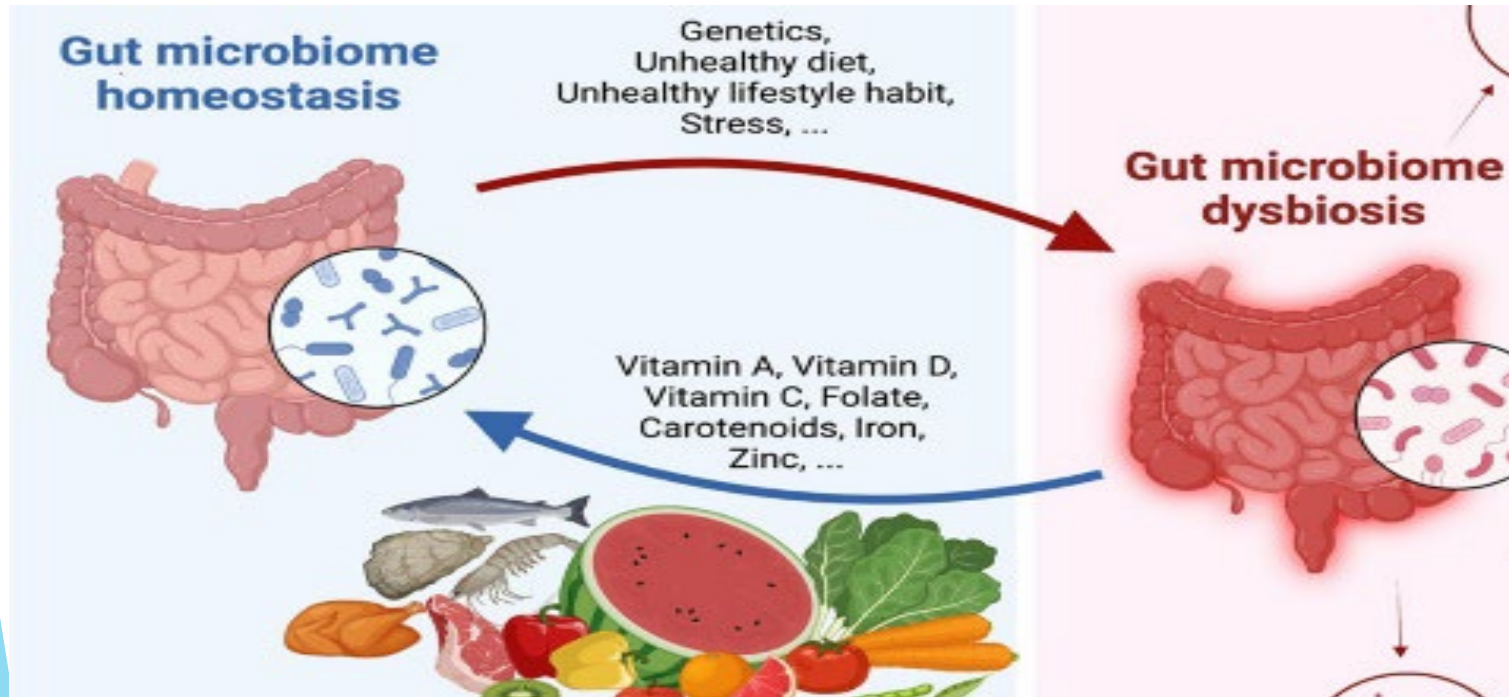


▶ دانشگاه علوم پزشکی اصفهان

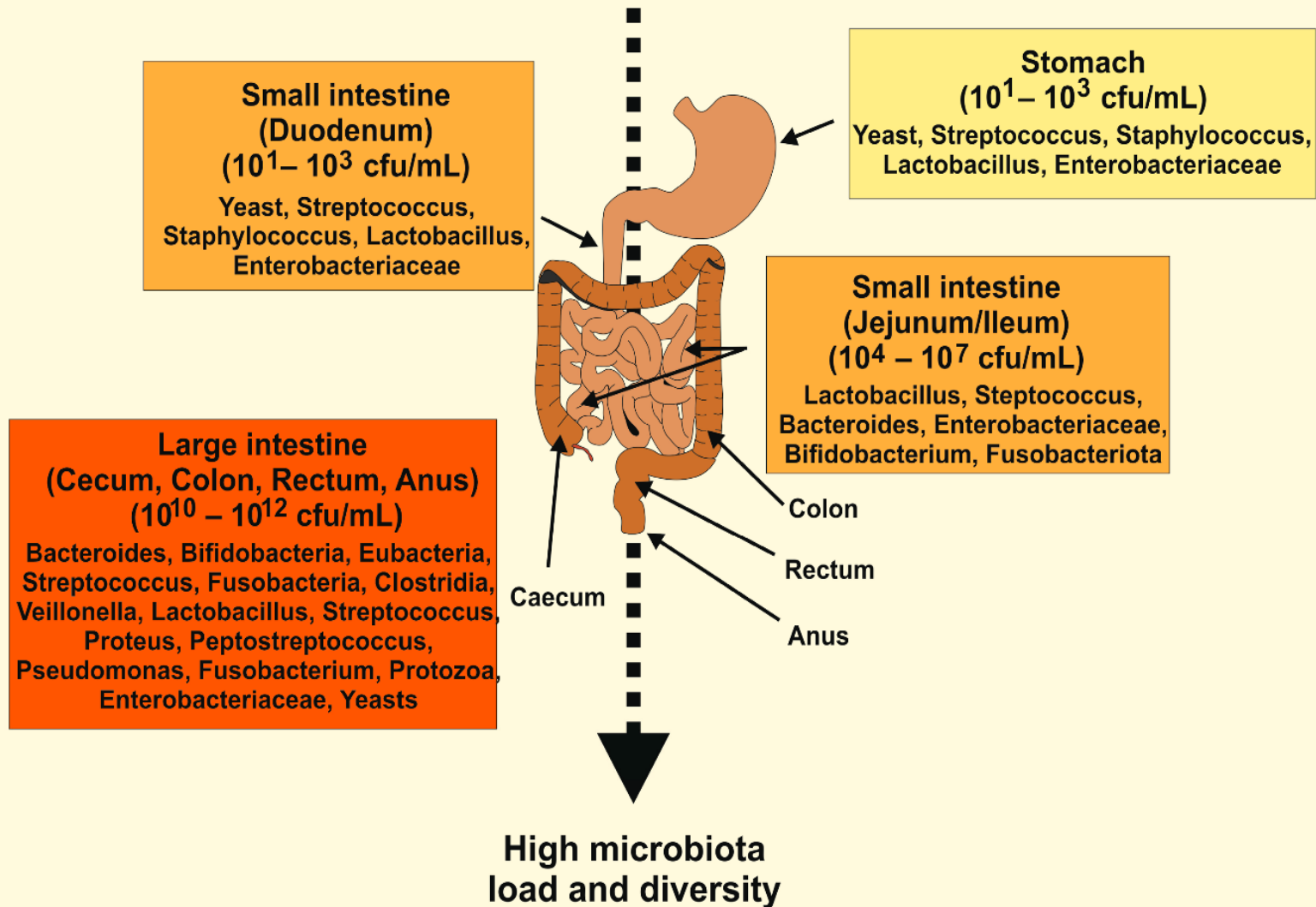
▶ گروه فیزیولوژی پزشکی

▶ الهام اسماعیلی

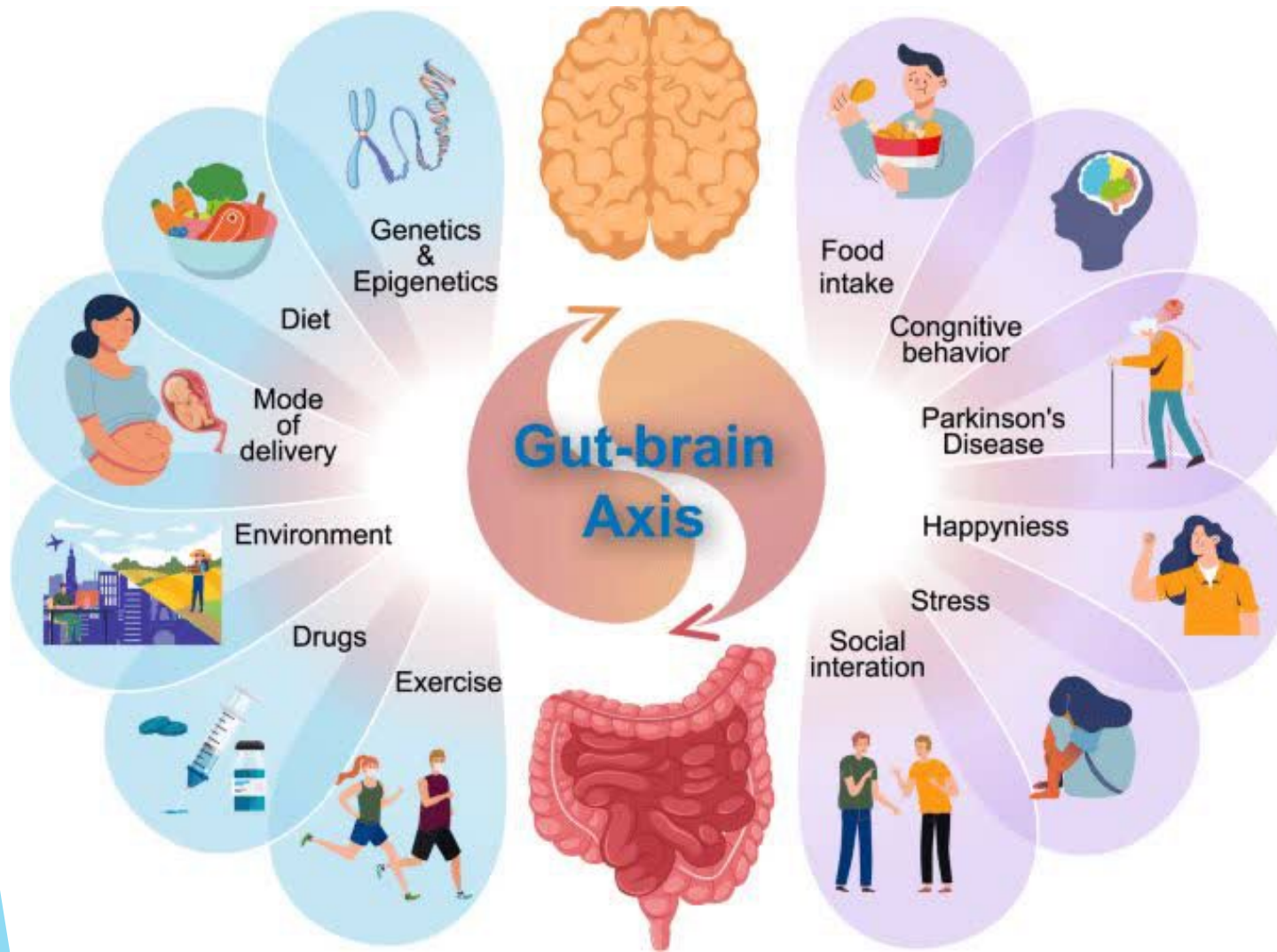
# The Role of microbiota in health and disease



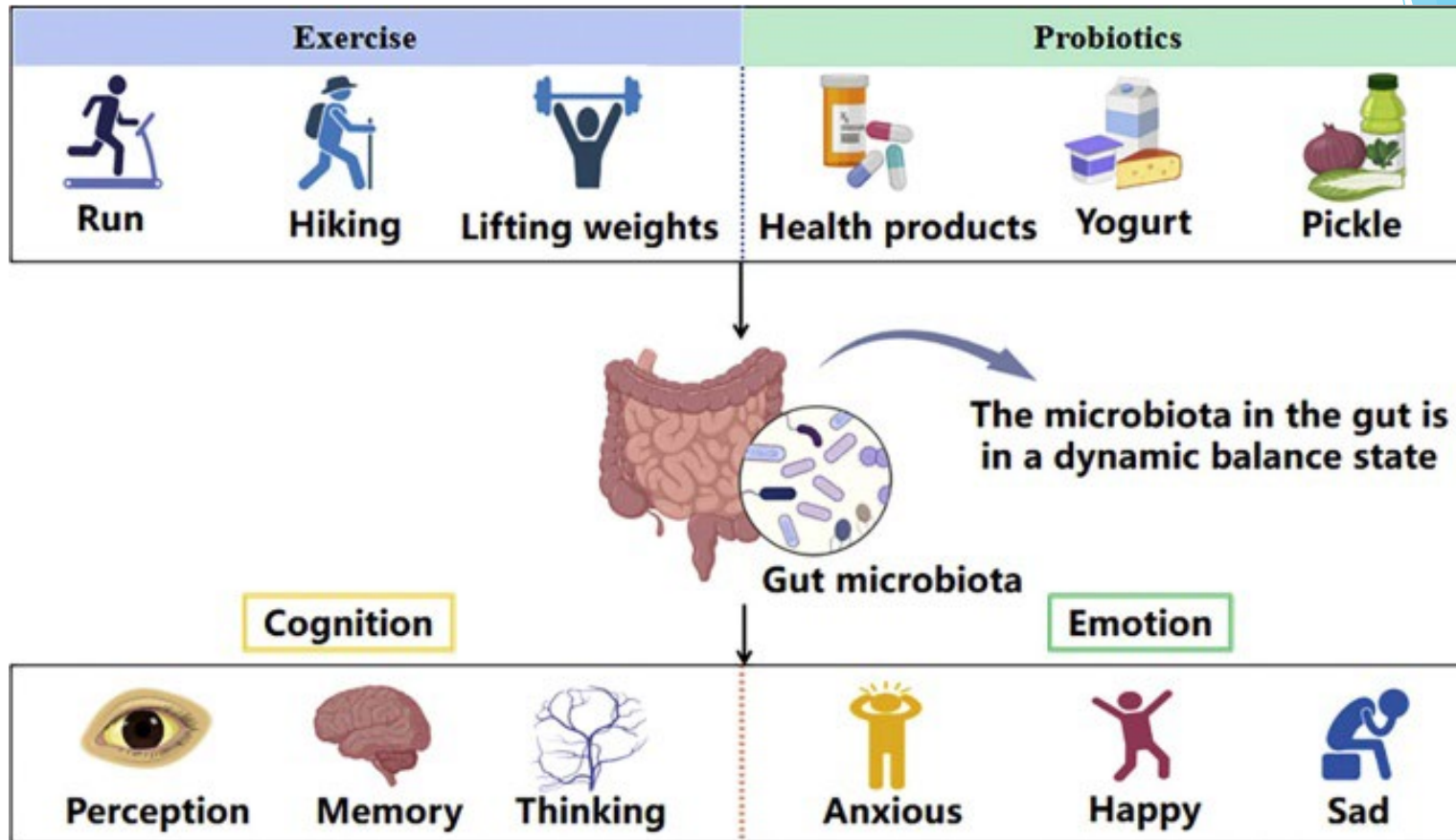
Low microbiota  
load and diversity

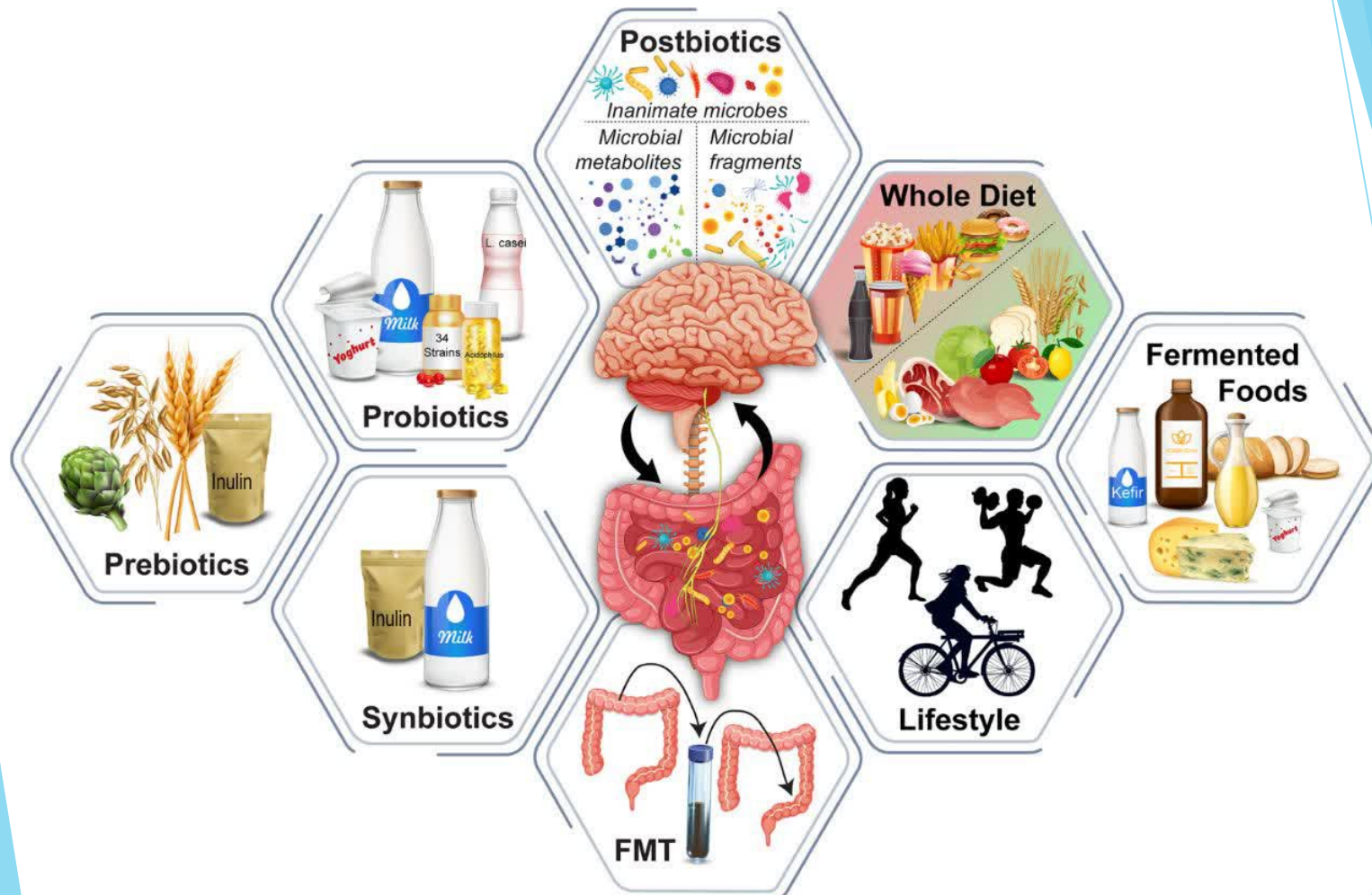


The load and diversity of microbiota  
in different parts of the digestive tract









Factors affecting the health of the gut-brain axis

## Prudent Diet



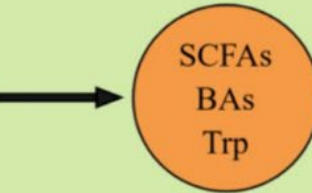
Phytochemicals  
Omega-3 fatty acids  
High dietary fiber  
Microbiota accessible  
carbohydrates  
Prebiotics



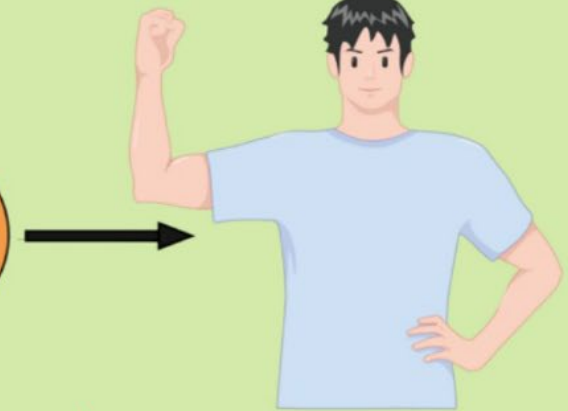
Diversity

Beneficial bacteria

Opportunistic bacteria



Microbiota metabolites



Decreased risk of obesity and  
obesity-related metabolic  
disorders

## Western Diet



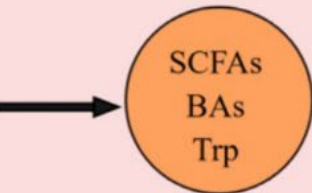
High sugar  
High fat  
High meat protein  
Low dietary fiber



Diversity

Beneficial bacteria

Opportunistic bacteria



Microbiota metabolites

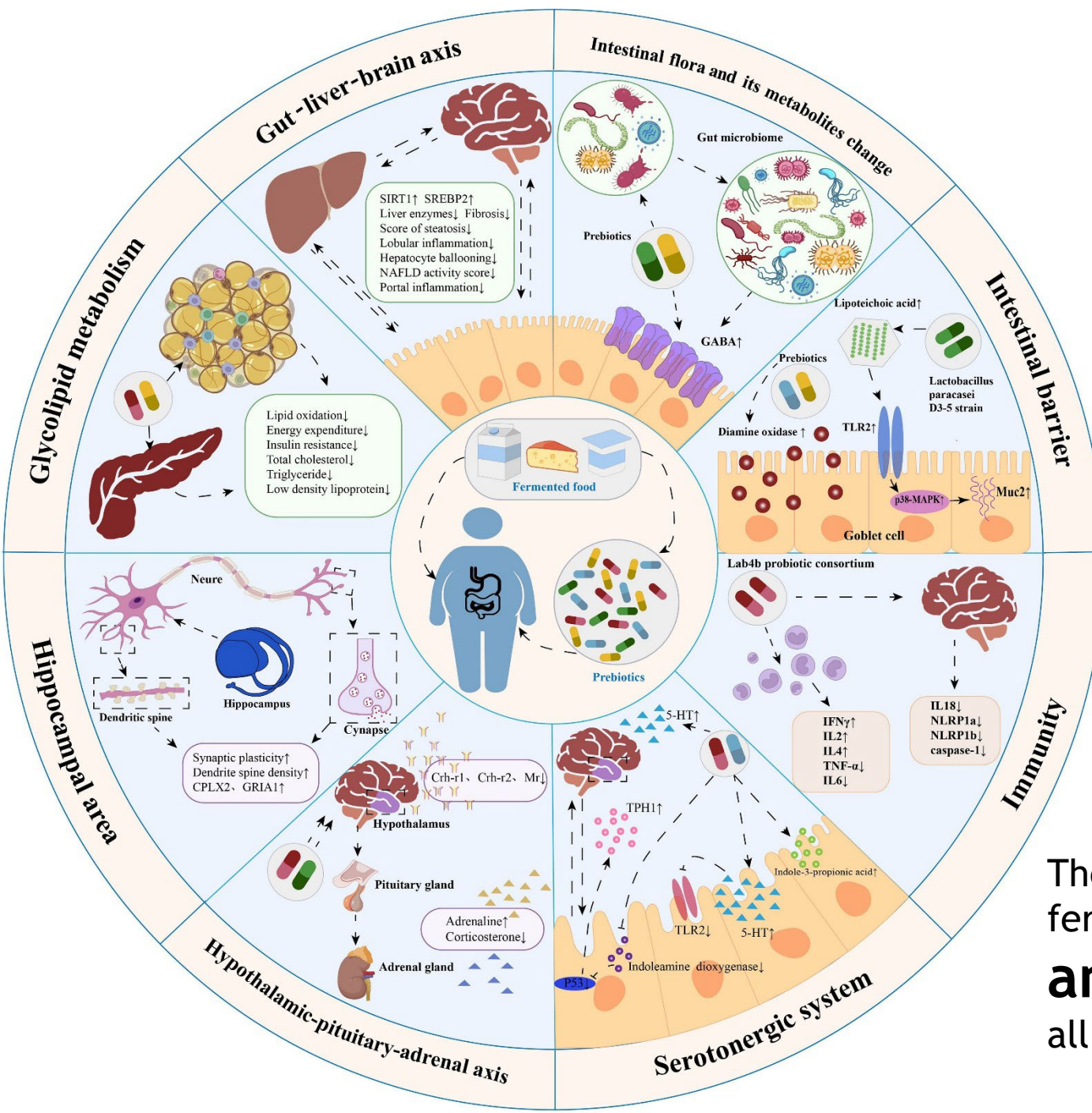


Increased risk of obesity and  
obesity-related metabolic  
disorders

The impact of a healthy diet on microbiota and the modification of obesity and metabolic disorder







The impact of  
fermented foods  
**and probiotics** on  
all body systems

## Prebiotic/probiotic intervention

### Gut microbiota



#### Incretin secretion

- GLP-1 secretion
- Number of enteroendocrine cells
- Enteroendocrine cell differentiation



#### SCFA production

- Intestinal gluconeogenesis
- Gut wall integrity
- GLP-1 secretion
- $\beta$  cell function and insulin secretion



#### Bile acid metabolism

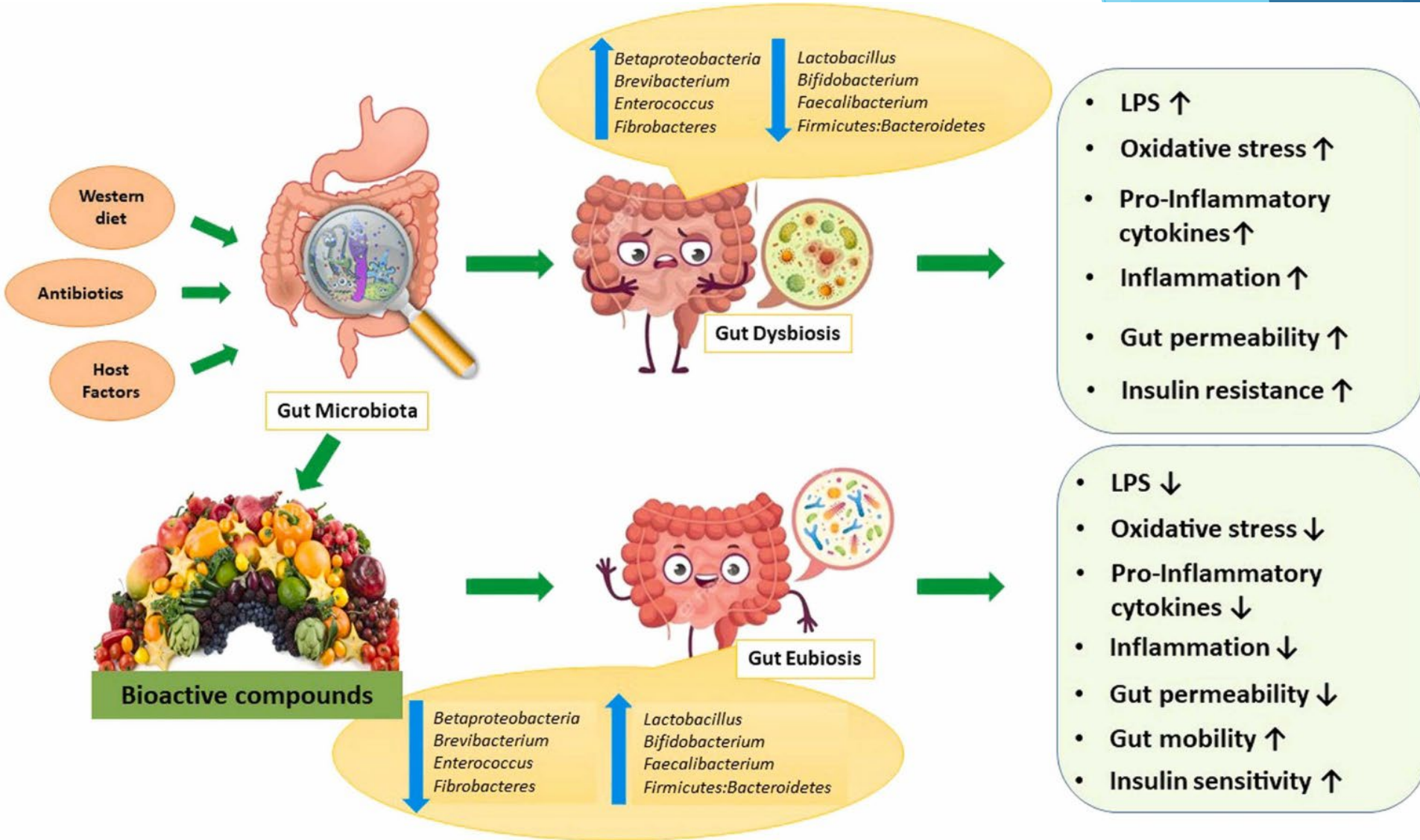
- Chemical diversity of bile acid pool
- FXR and TGR5 metabolic signaling
- FGF19 secretion



#### Adipose tissue regulation

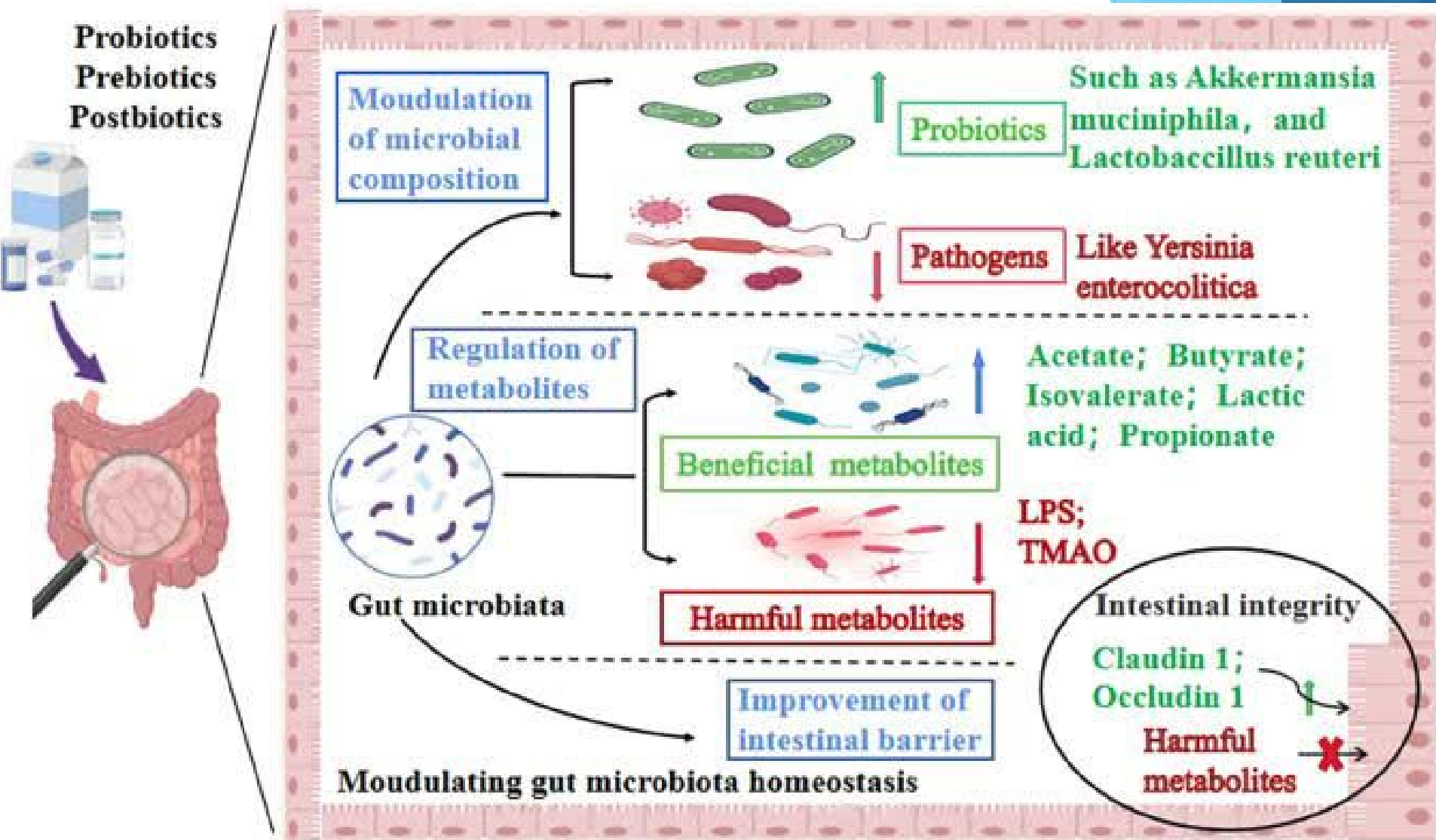
- LPS-induced inflammation
- White adipose tissue browning

Improved host glycemic control

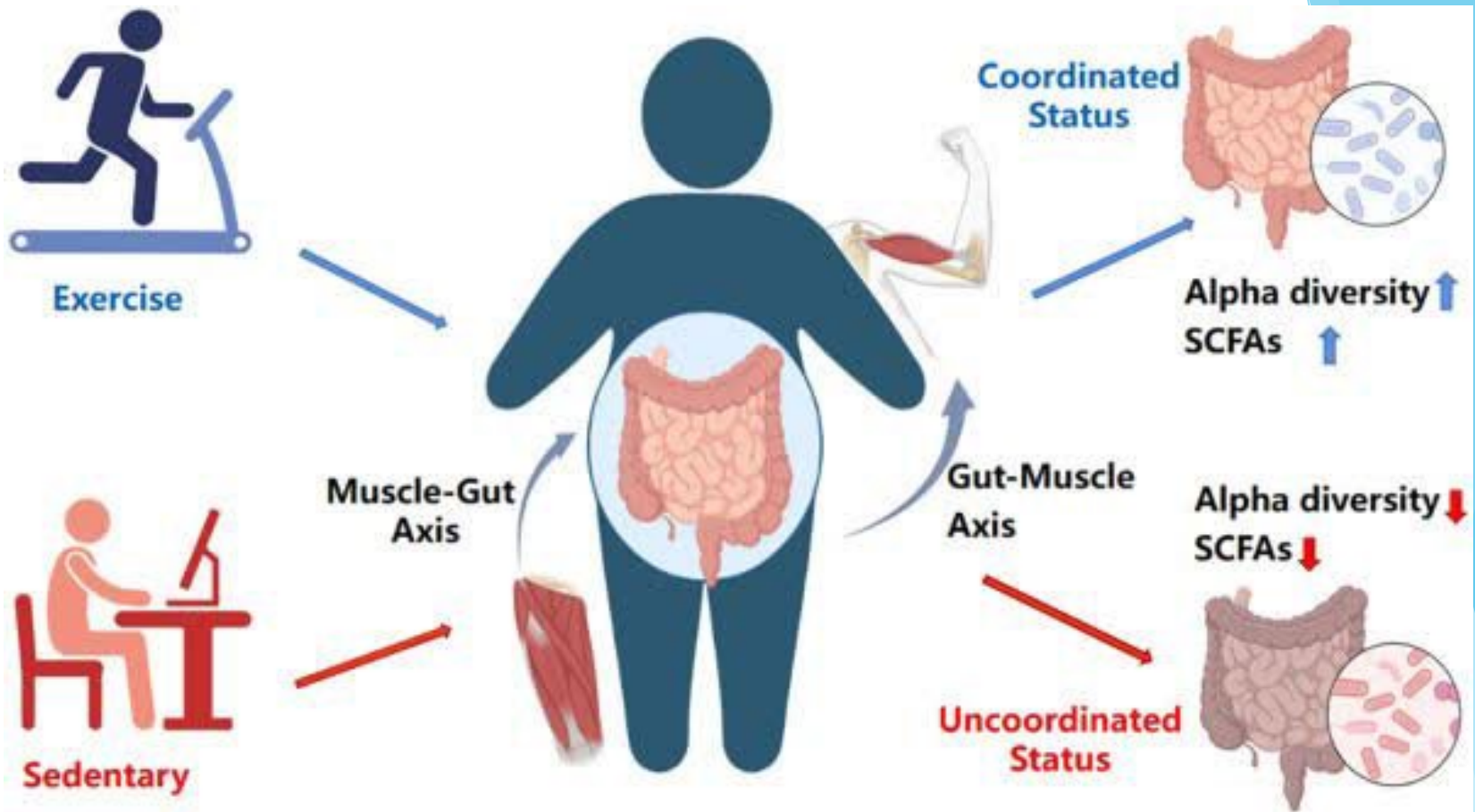


The impact of **dysbiosis** on **inflammatory** and **metabolic factors**





Effects of synbiotics on the gut



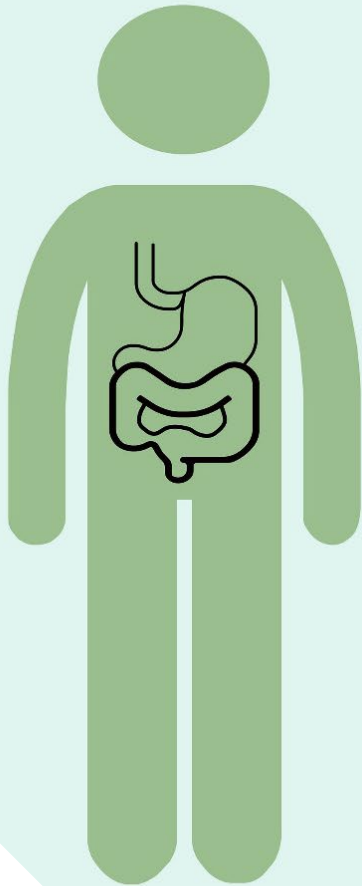
The impact of **exercise** and inactivity on the **gut-muscle axis**



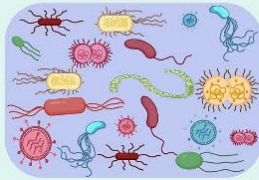
Non-obese

Healthy-»The microbe-gut-brain axis-»Damaged

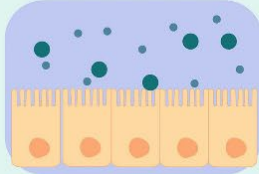
Obese



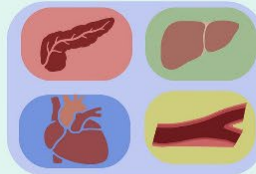
Normal



Gut microbiome



Intestinal barrier



Metabolic outcome



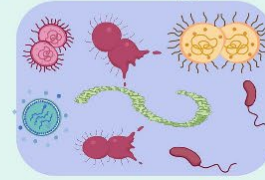
Cognitive functions

↓Diversity + stability  
↑Firmicutes/Bacteroidetes

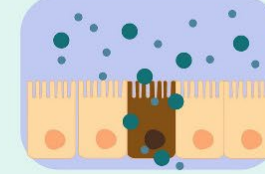
↑Intestinal permeability  
↑Lipopolysaccharide  
↑Inflammation

↑Insulin resistance  
↑LDL+TG  
↑Weight+Waist

↑Depression+Anxiety  
↑Cognitive impairment  
↑Memory deficits



Gut microbiome



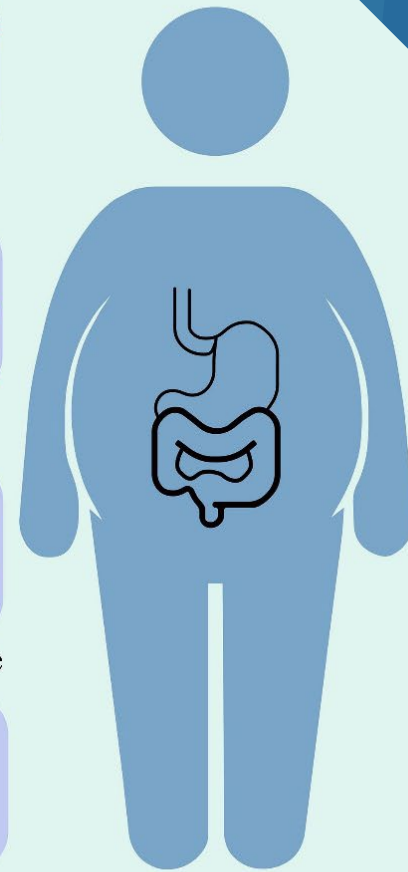
Intestinal barrier



Metabolic outcome

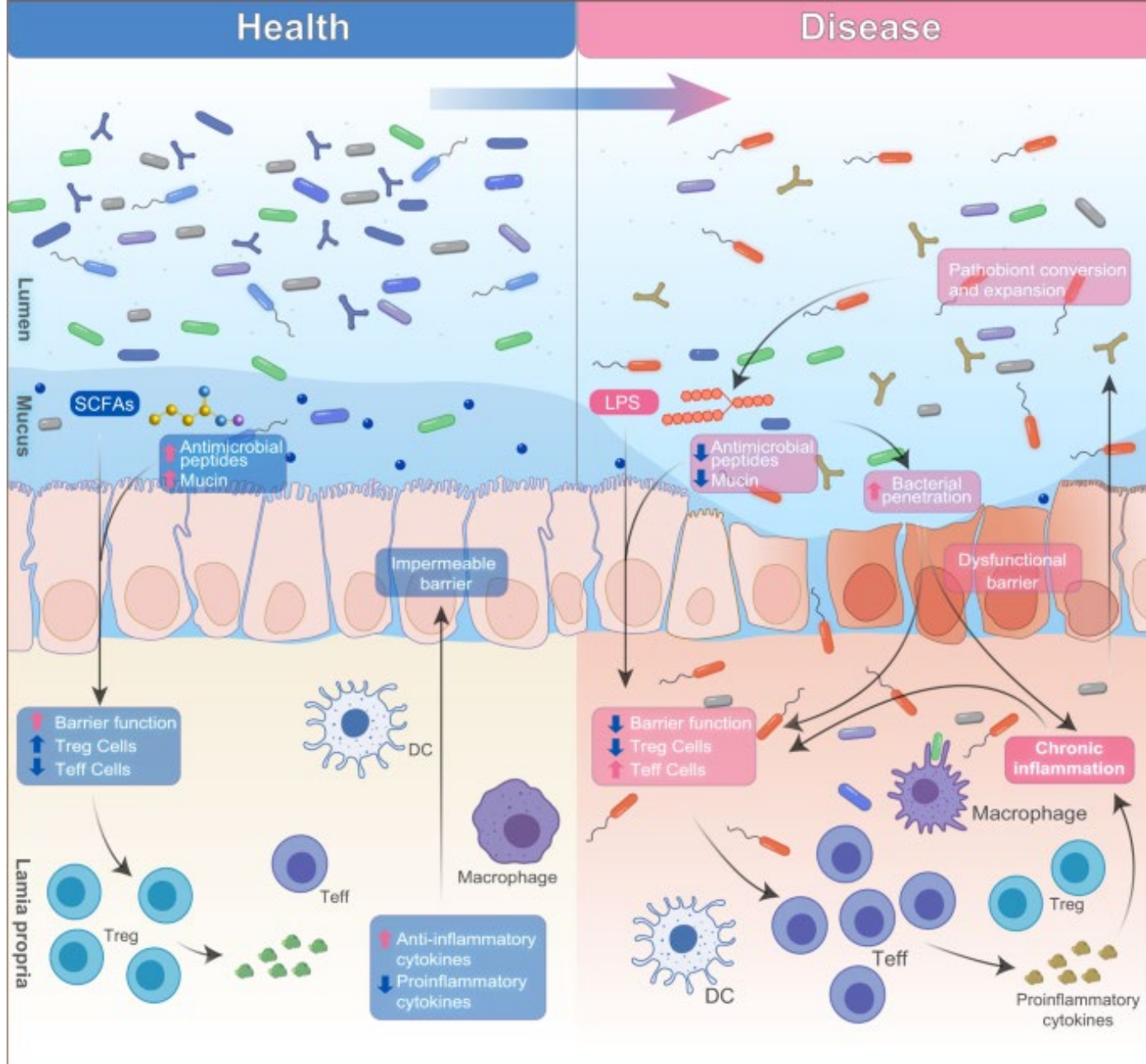


Cognitive functions

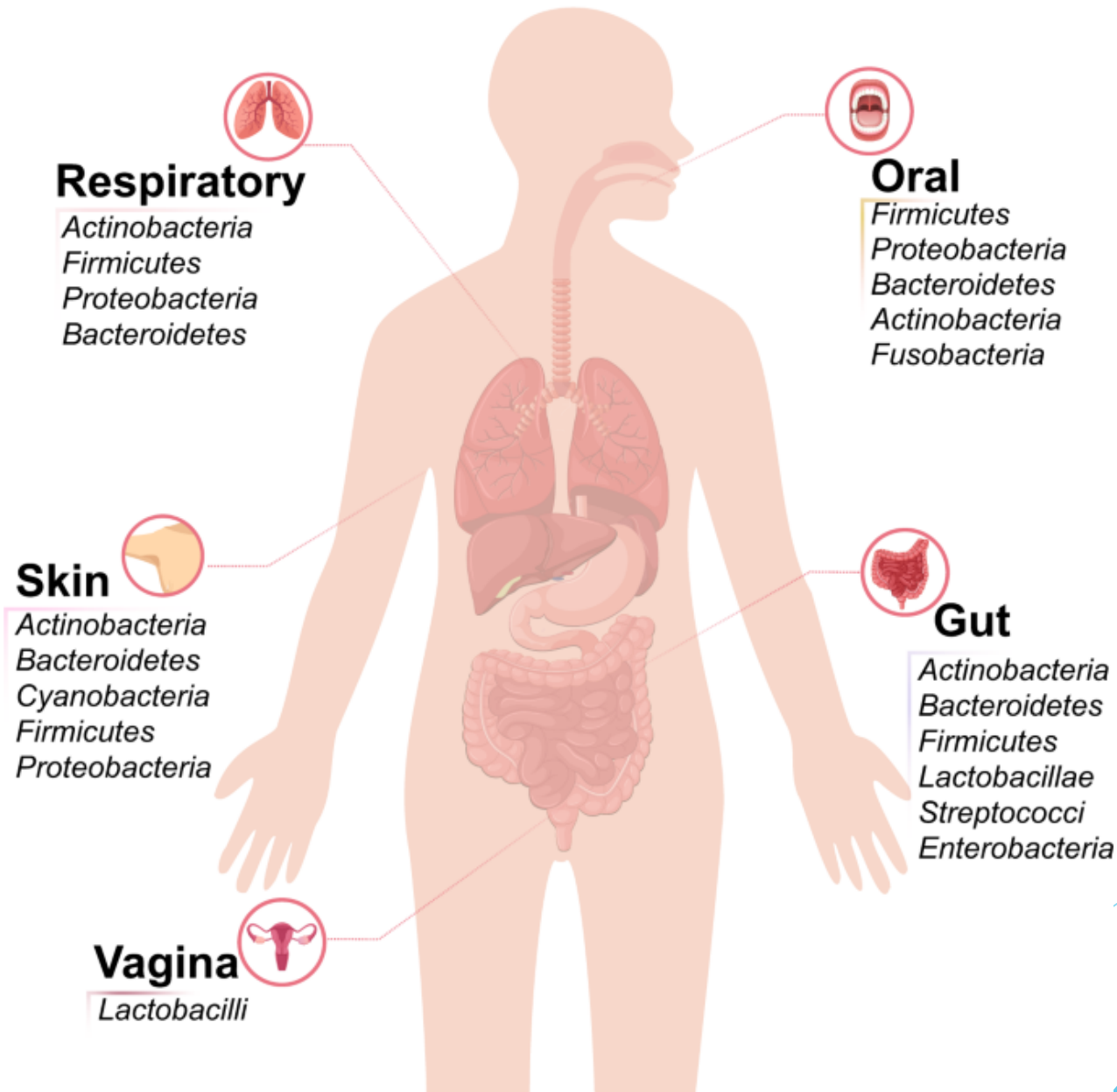


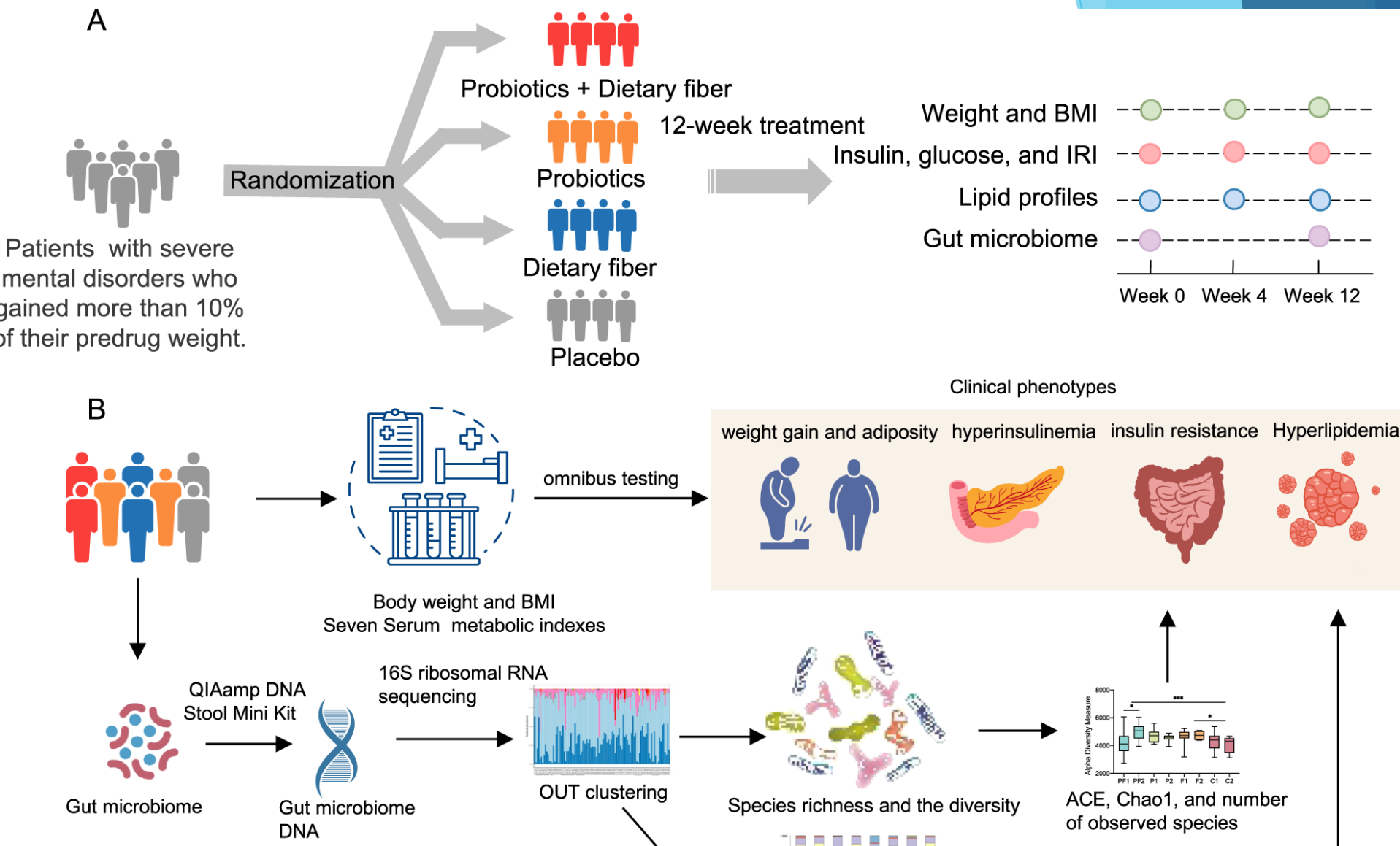
Cognitive impairment

Comparison of obese and normal people



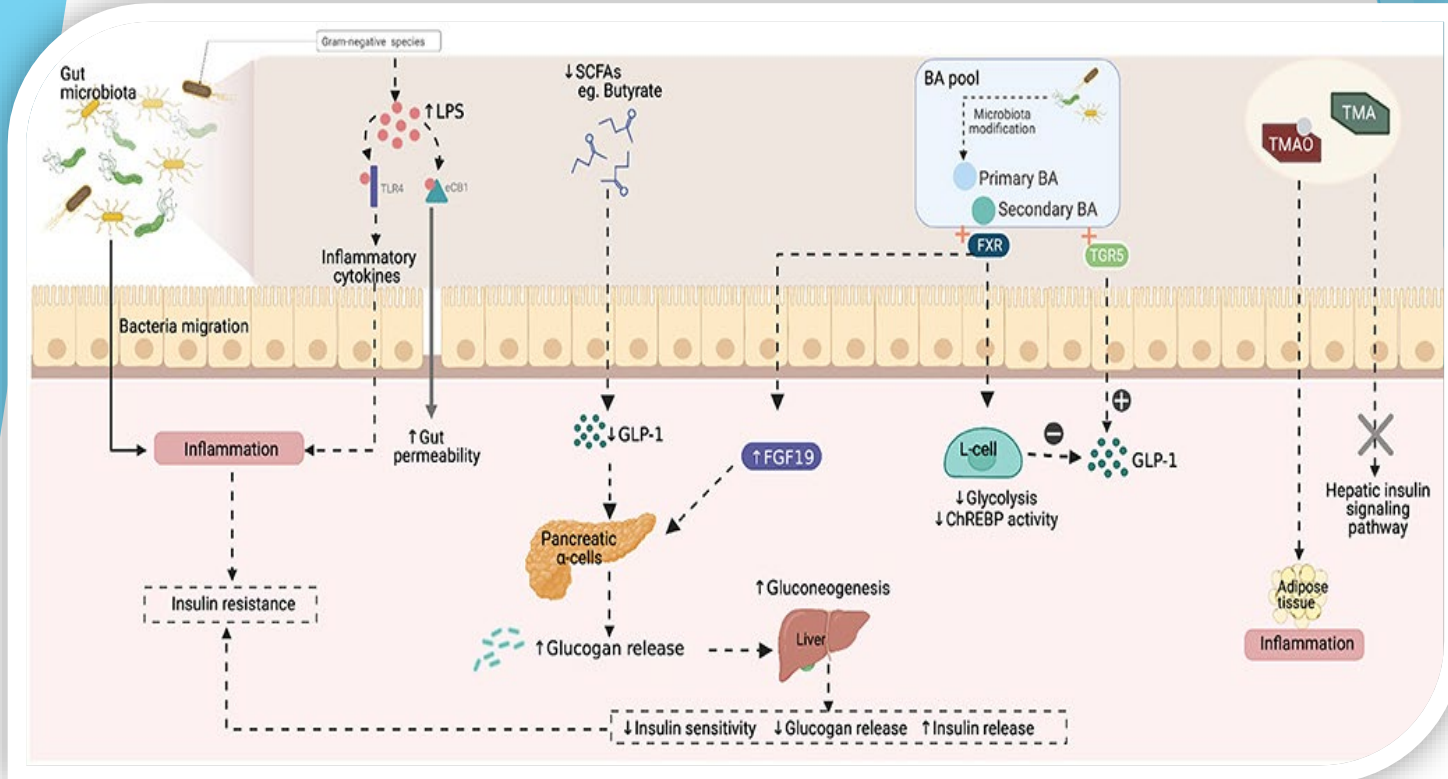
# Microbiota composition in different regions





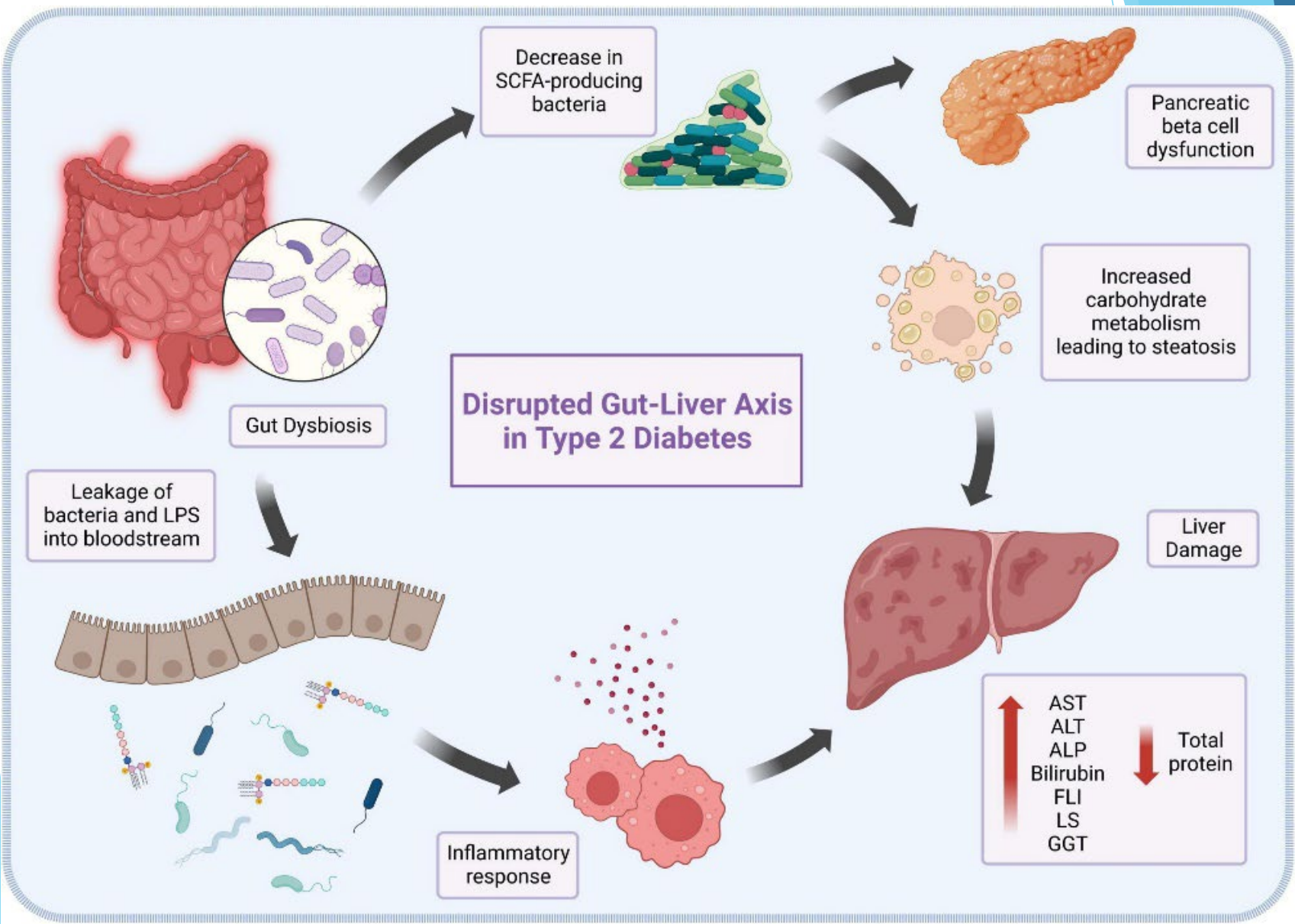
The effect of probiotics on modifying metabolic parameters



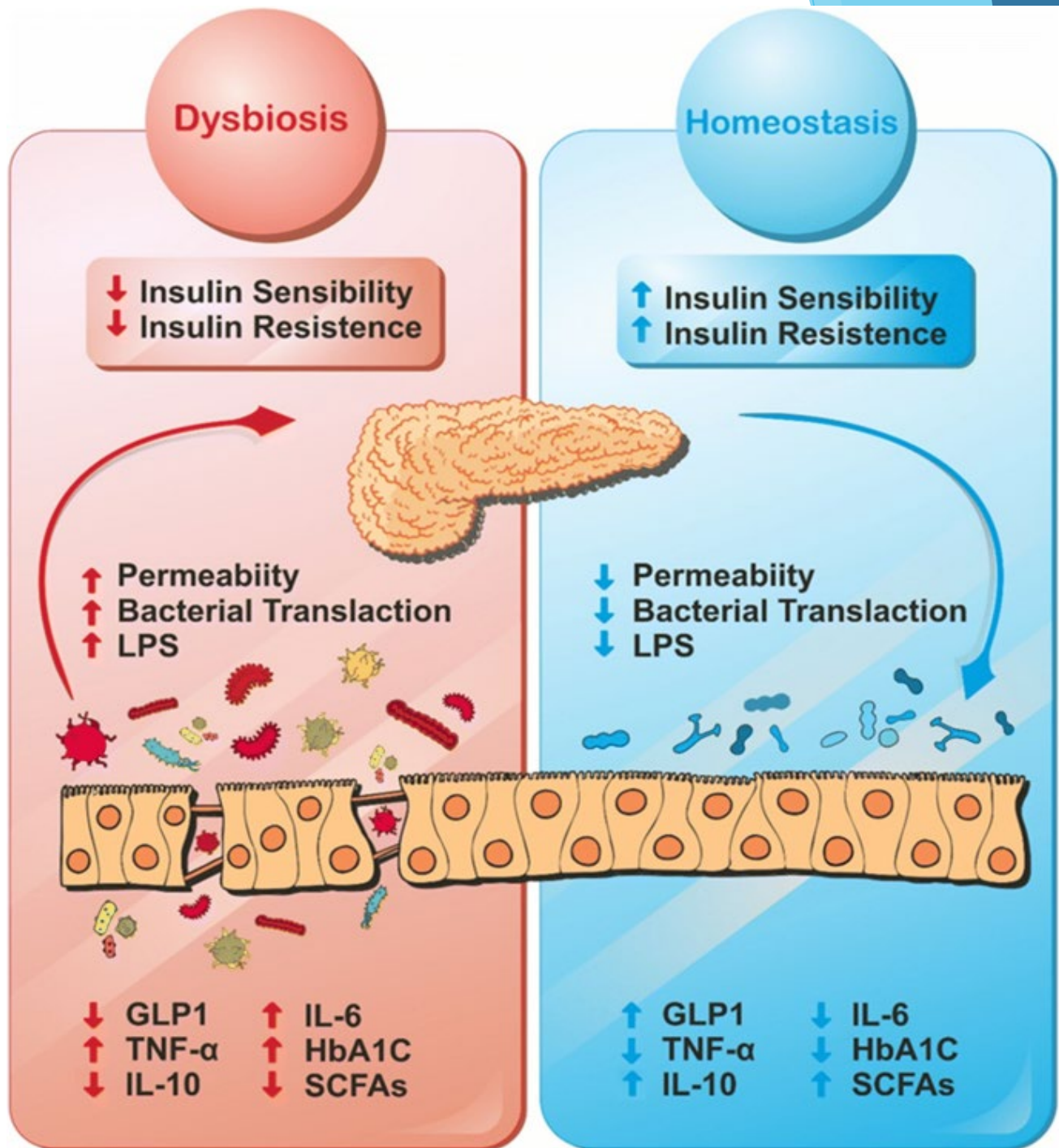


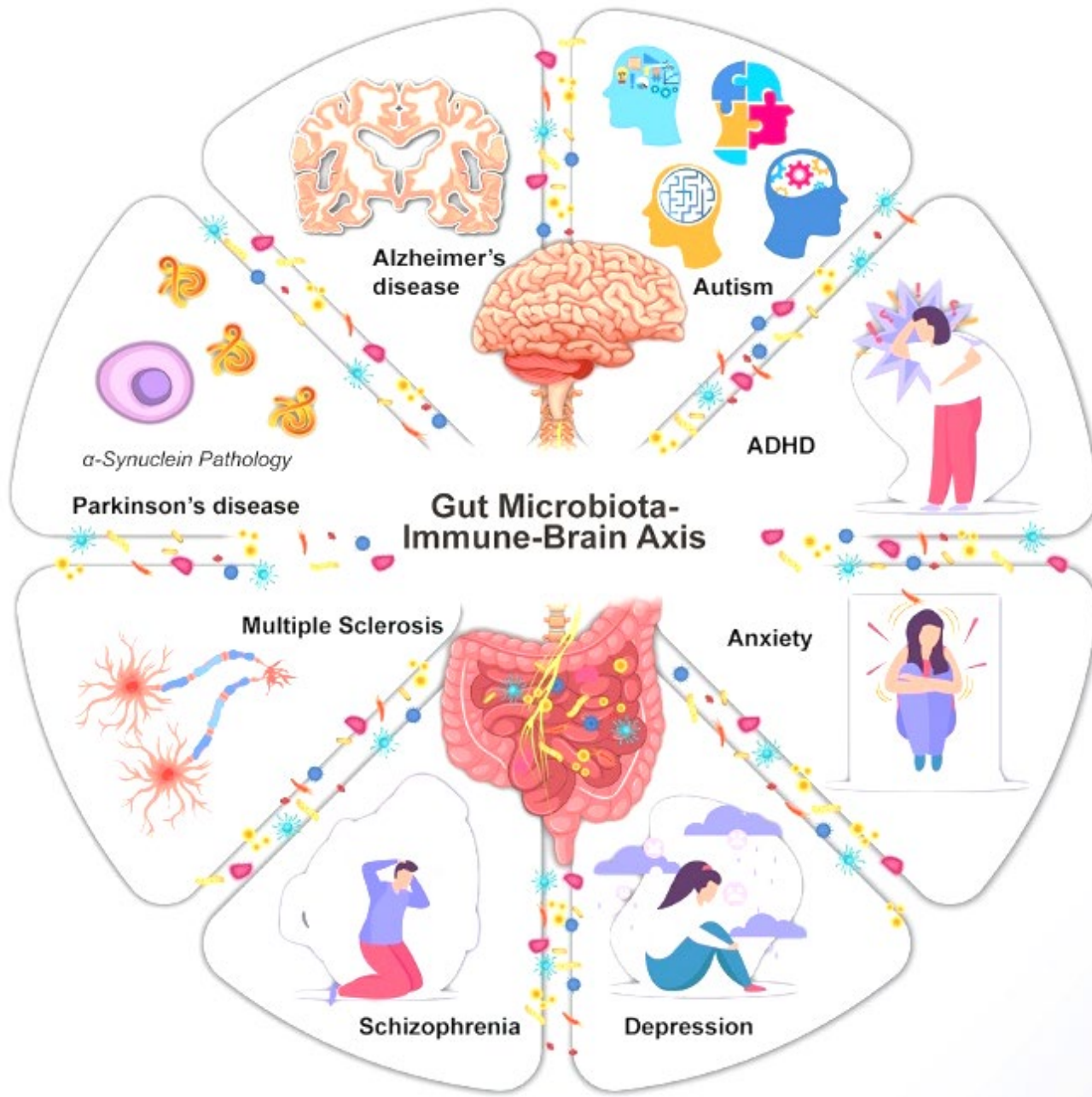
## Mechanism of diabetes caused by intestinal dysbiosis



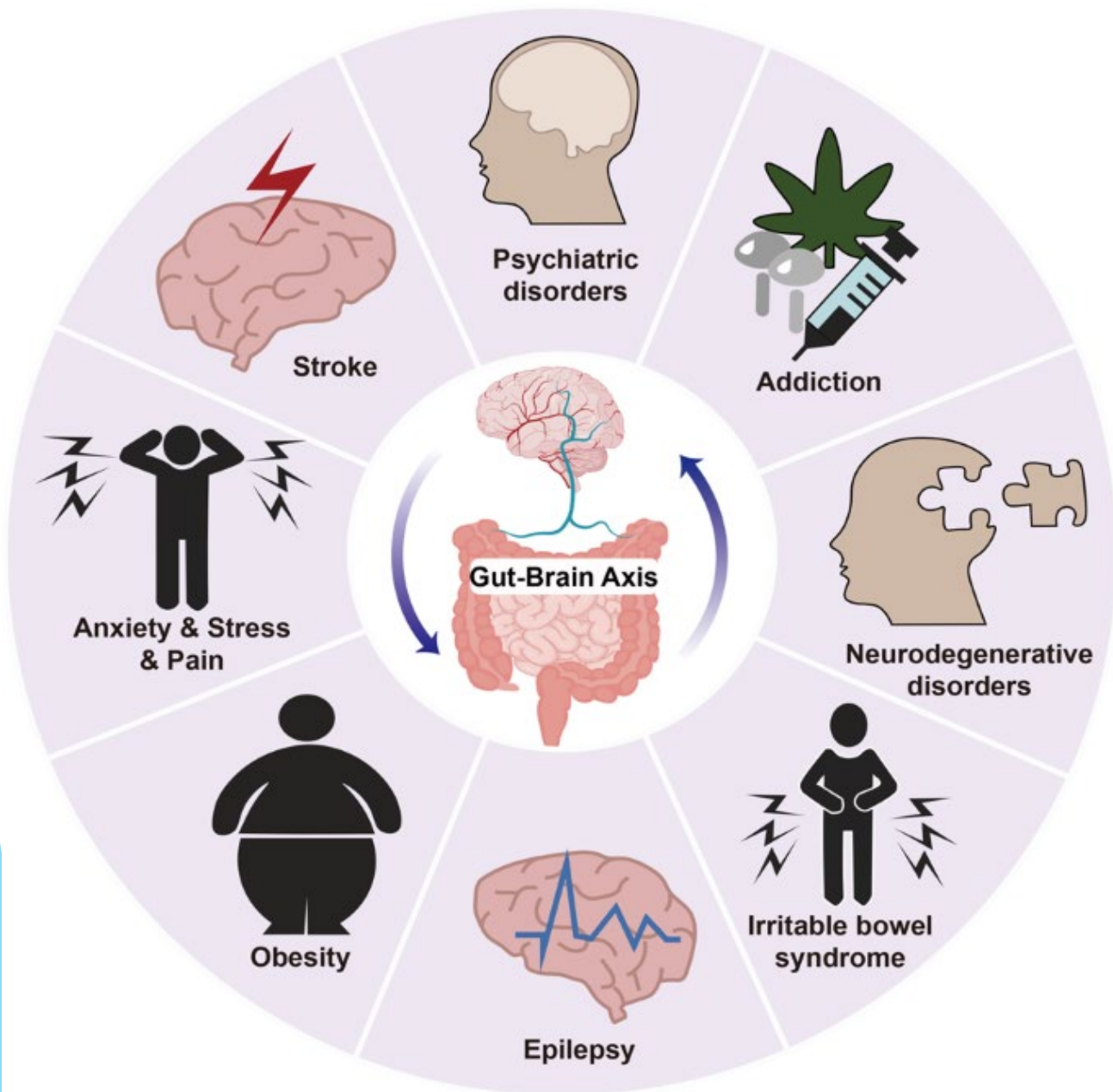


Pancreatic-intestinal axis dysfunction in the development of diabetes









Brain disorders associated with gut-brain axis dysfunction

## Gut microbiome homeostasis

Genetics,  
Unhealthy diet,  
Unhealthy lifestyle habit,  
Stress, ...

Vitamin A, Vitamin D,  
Vitamin C, Folate,  
Carotenoids, Iron,  
Zinc, ...

## Gut microbiome dysbiosis

Gastrointestinal  
diseases

Liver  
diseases

Obesity

Diabetes

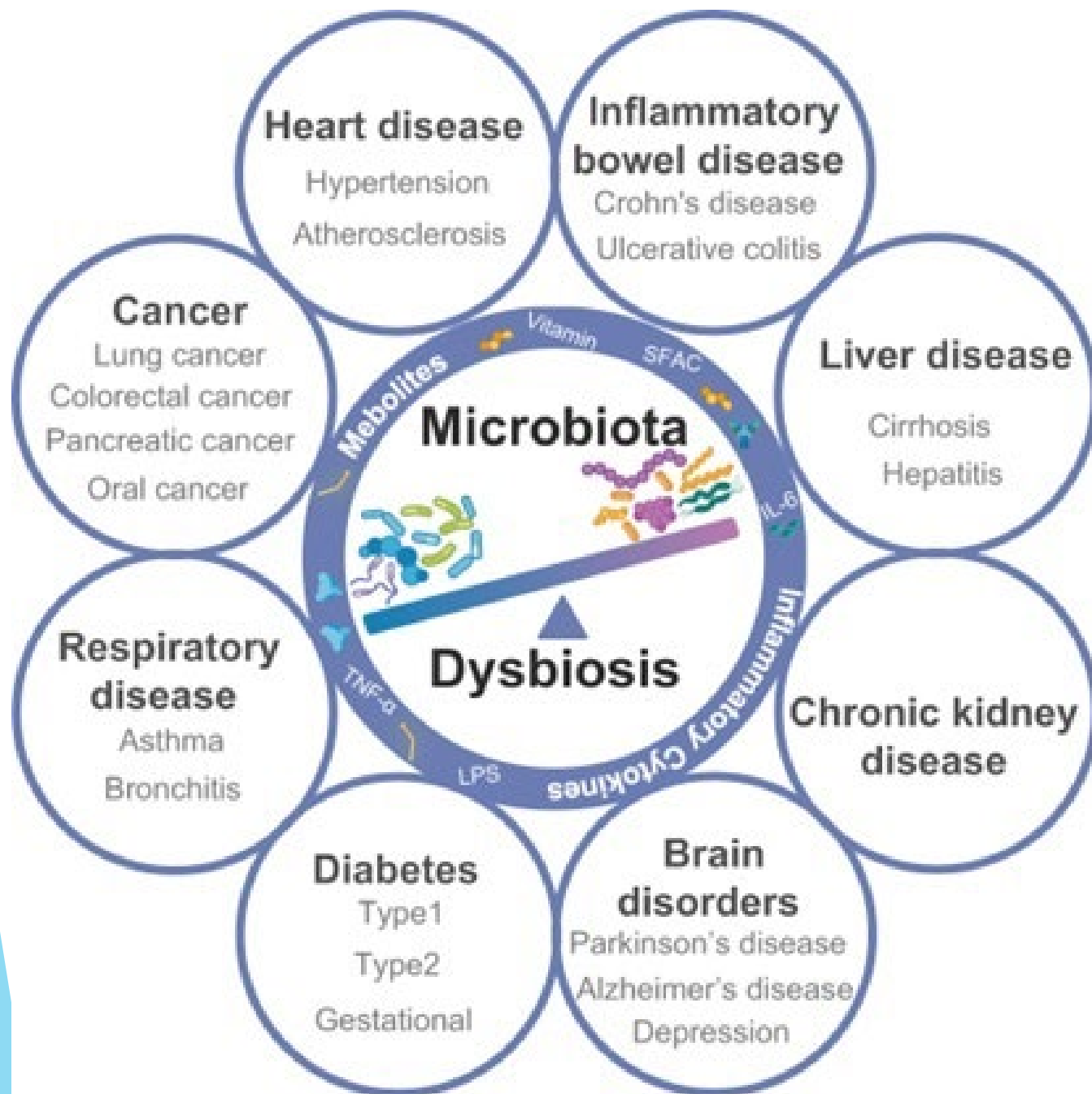
Cardiovascular  
diseases

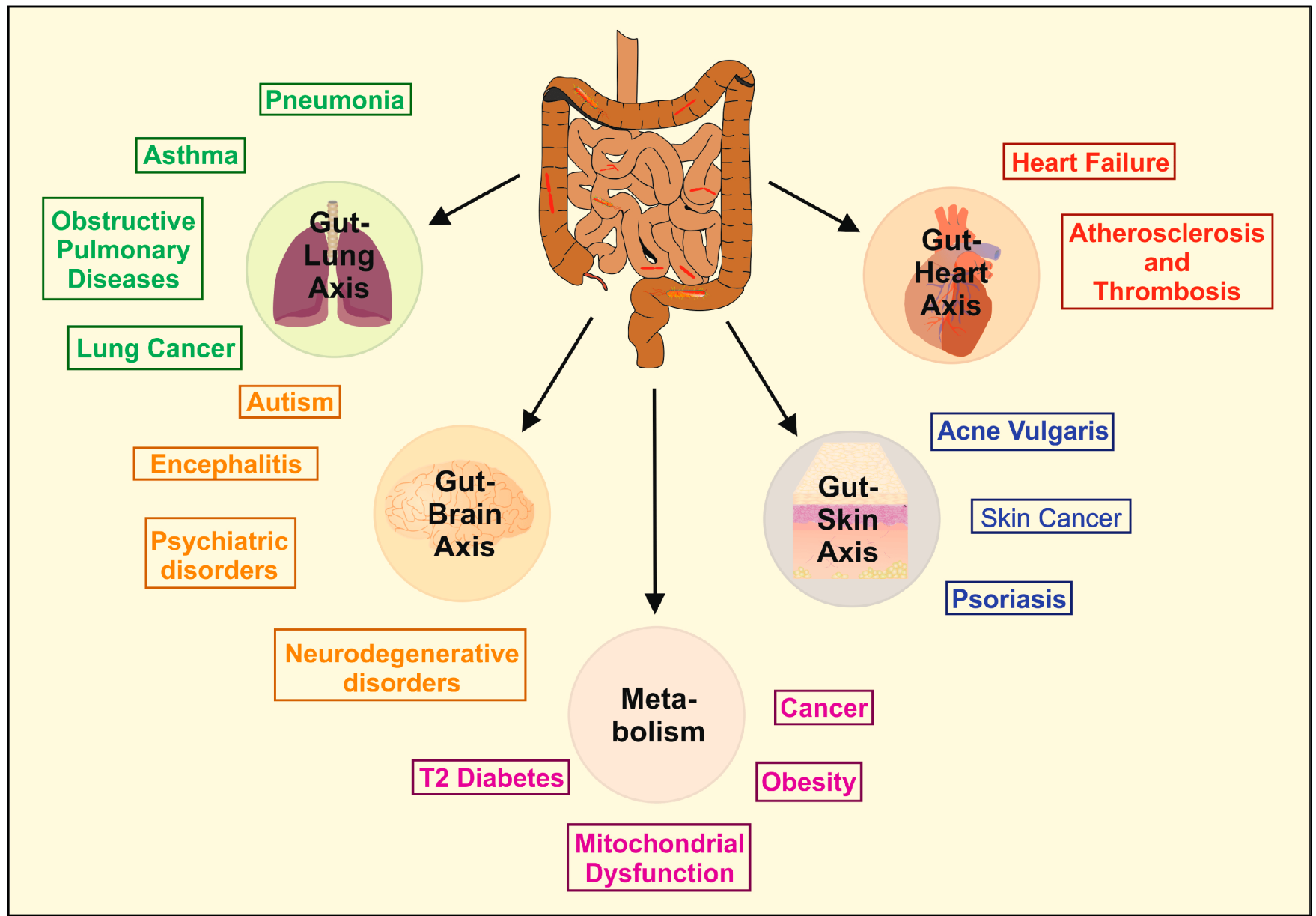
Cancer

Other chronic  
diseases







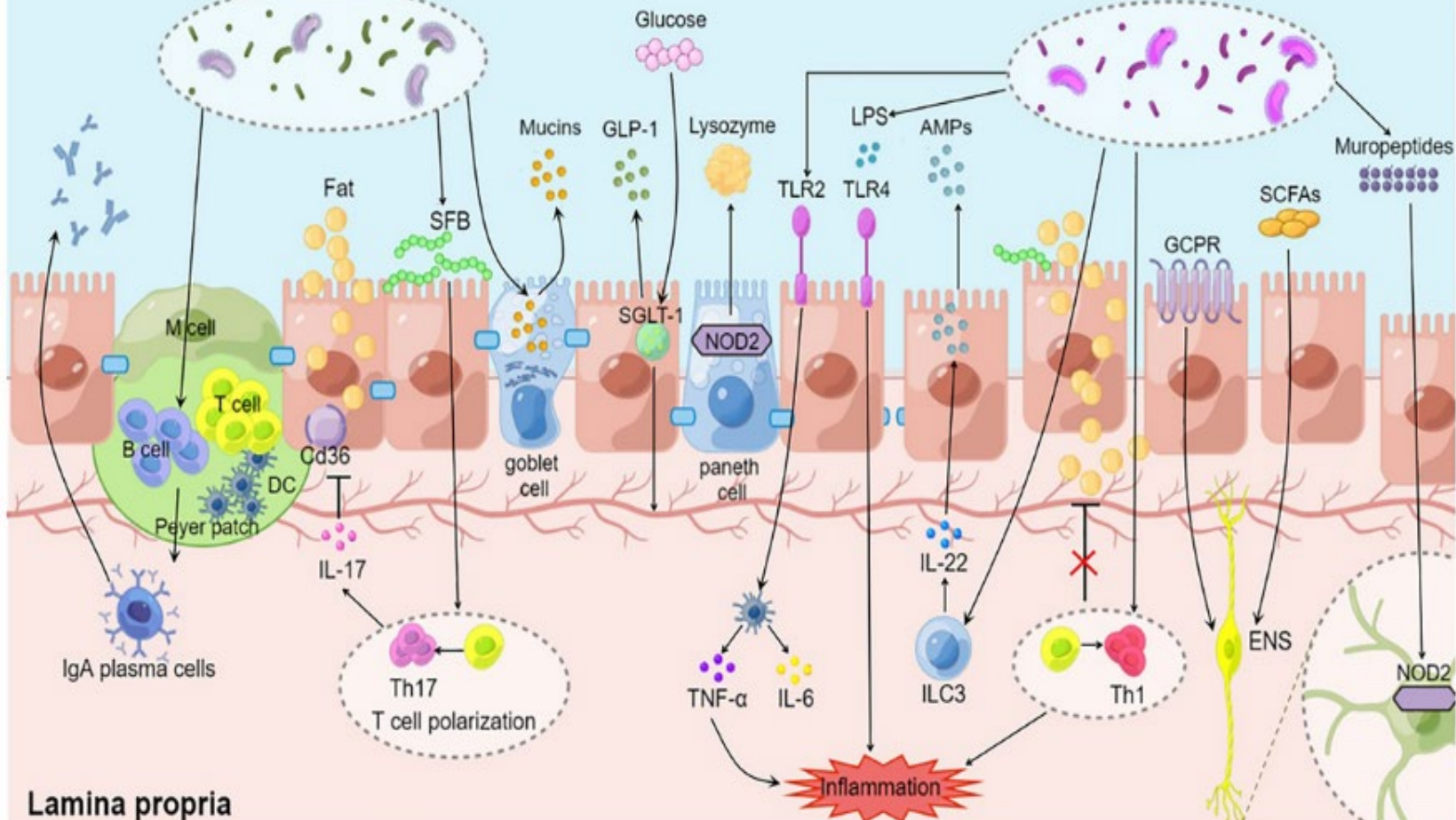


The impact of intestinal dysbiosis on various body systems and related diseases

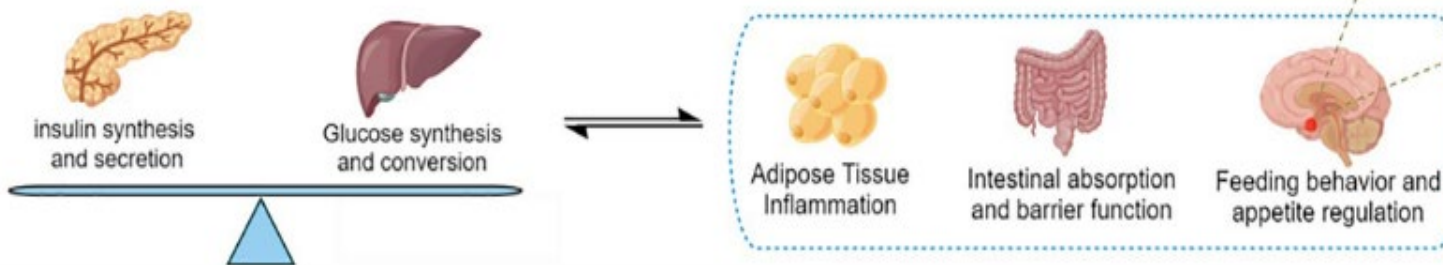
## Lumen

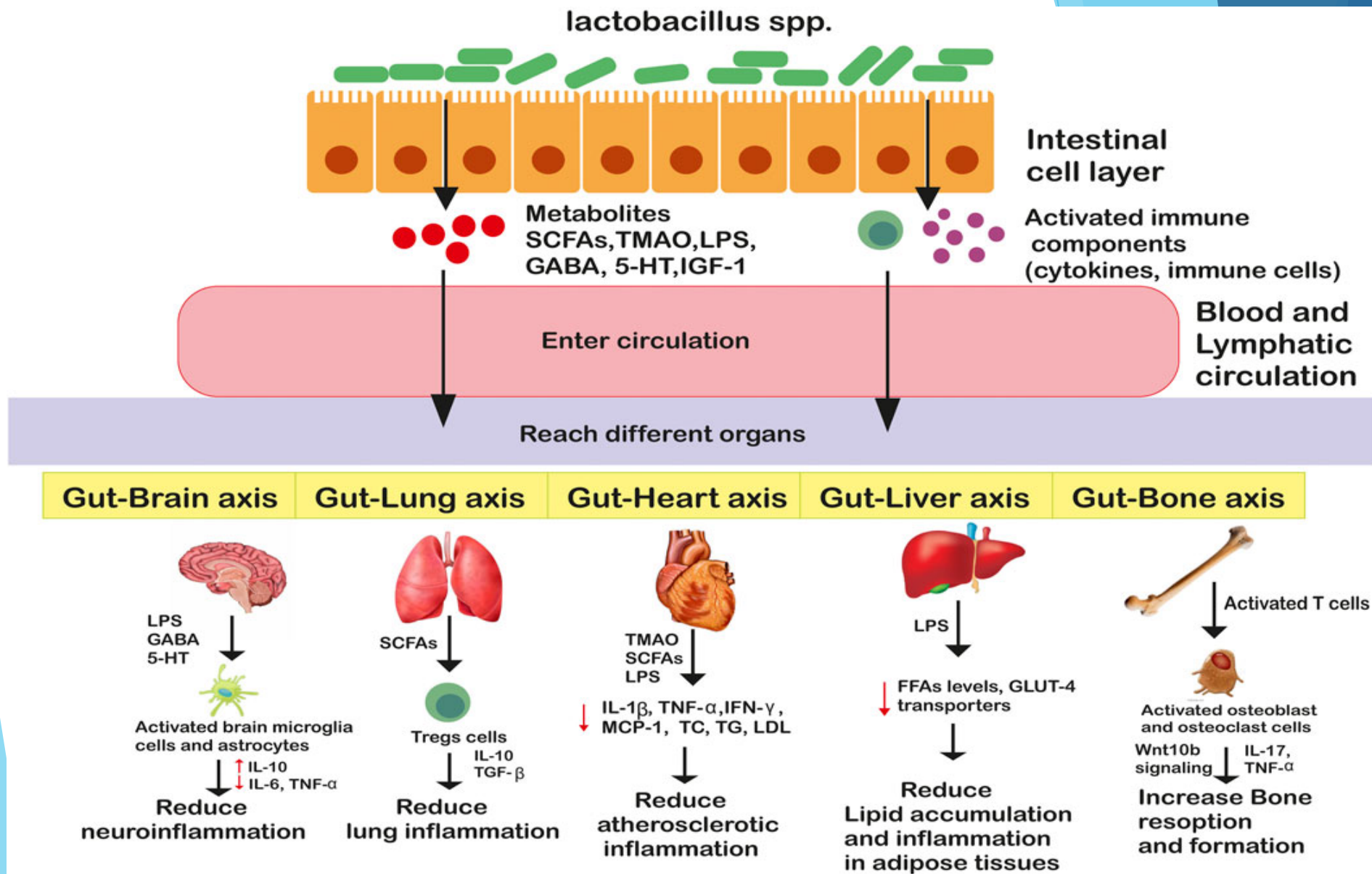
Normal

Disturbed



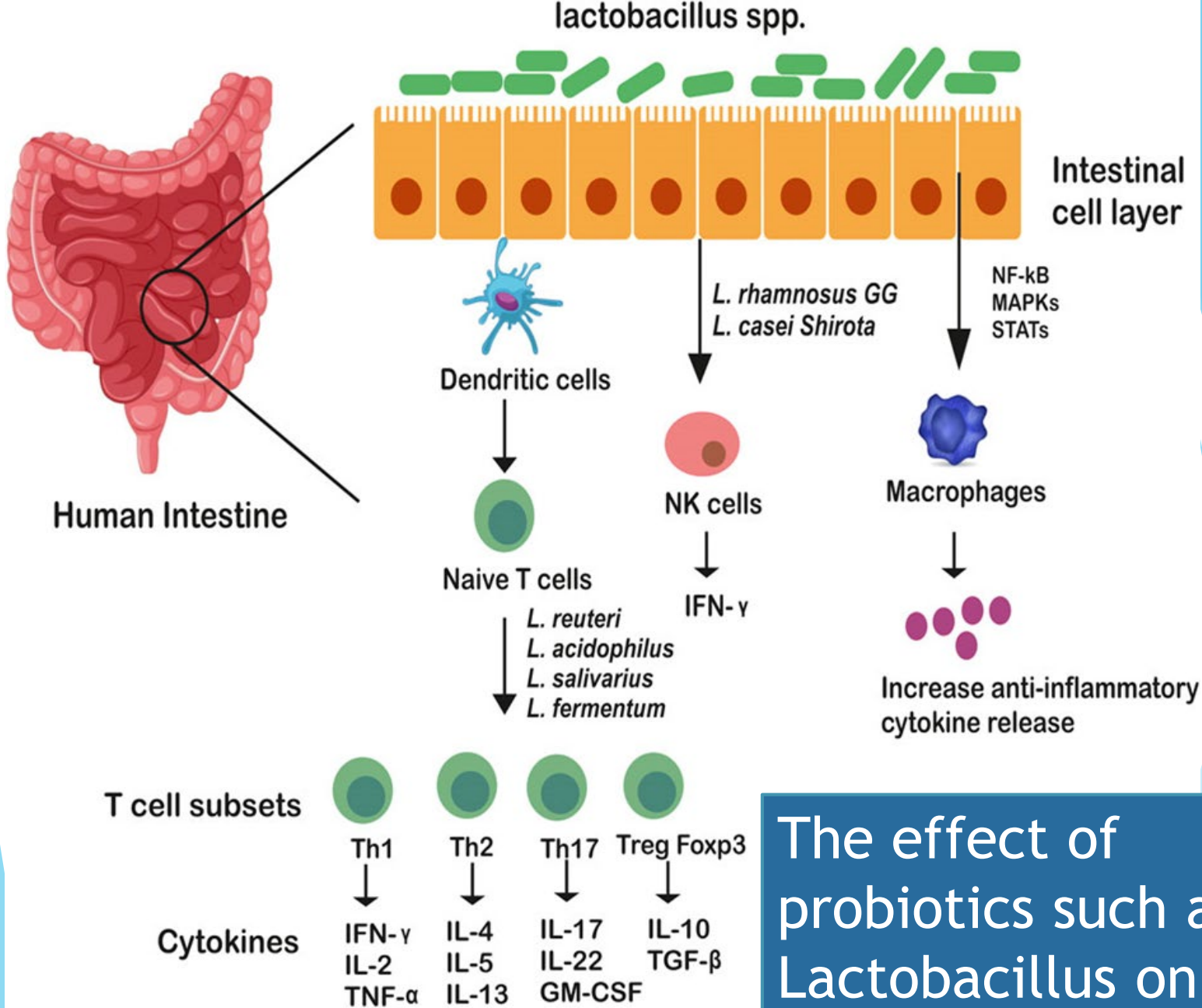
## Lamina propria





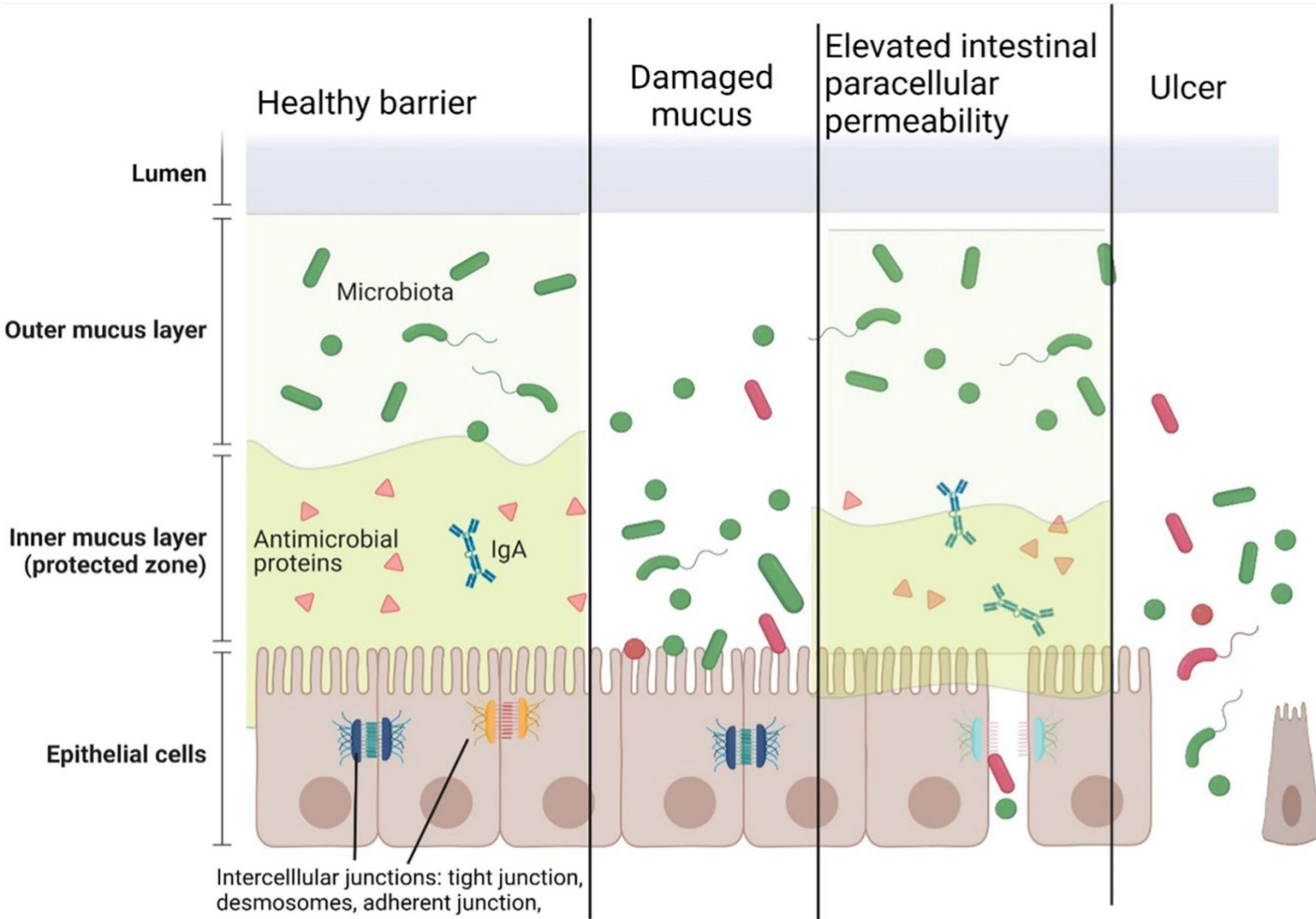
**The effect of Lactobacillus on various axes of the body**

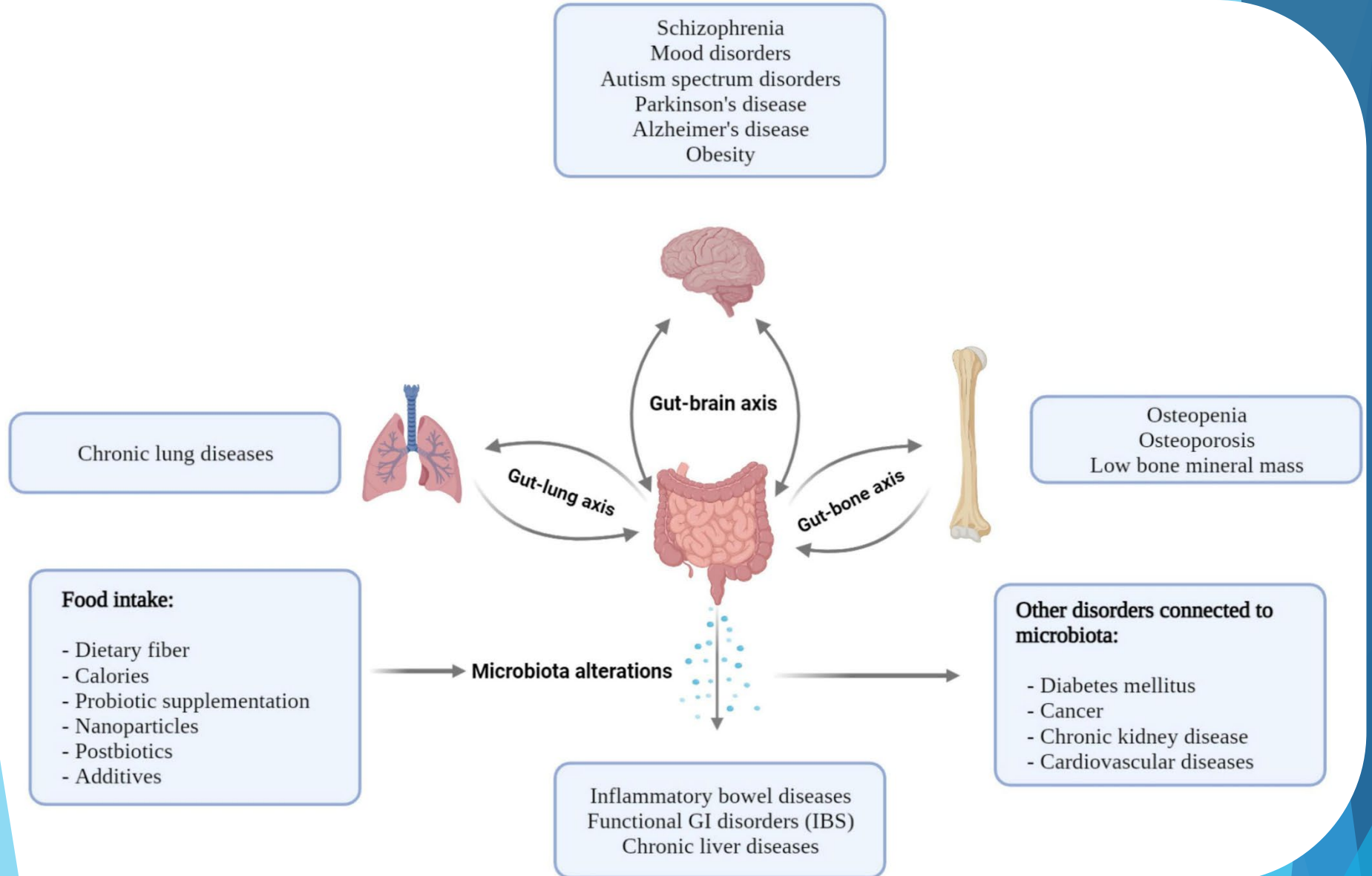




The effect of probiotics such as *Lactobacillus* on intestinal factors







## Nutritional factors affecting microbiota and dysbiosis-related disorders



## Probiotics

&



## Prebiotics



# PROBIOTIC SOURCES



Yoghurt



Kefir



Kombucha



Sauerkraut



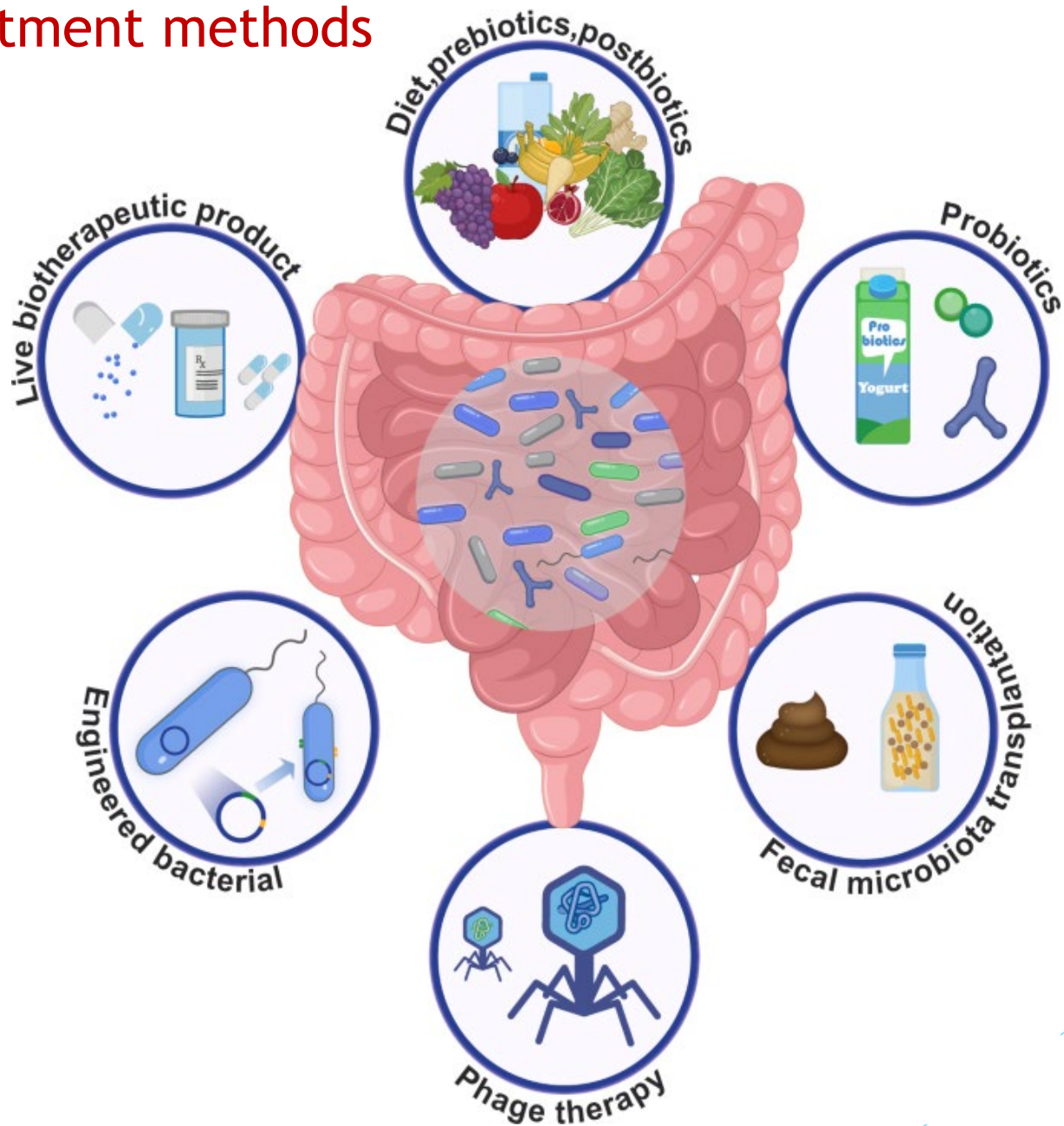
Kimchi

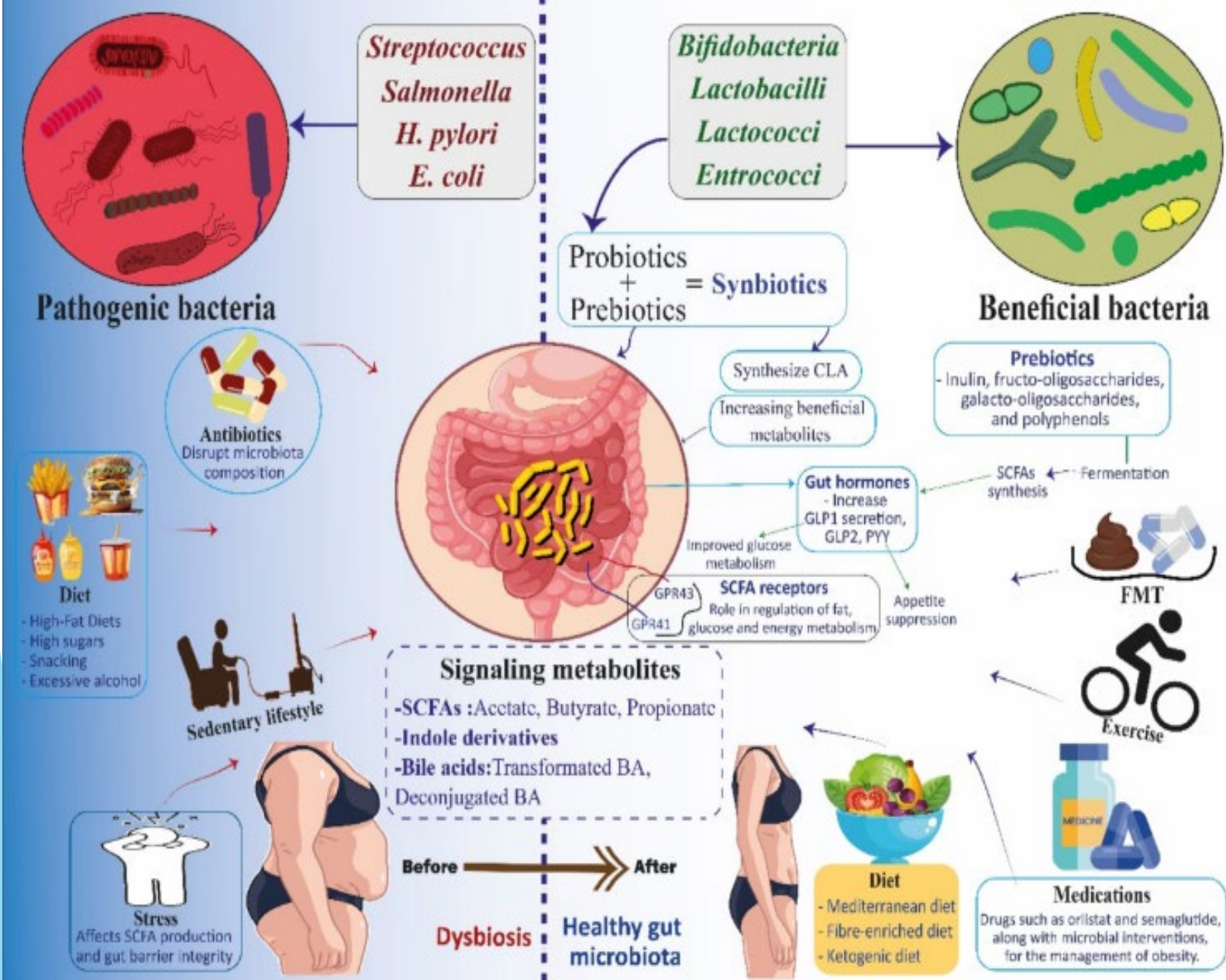


# PREBIOTICS



## Treatment methods



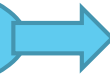


weight reduction was intensified by using probiotic preparations with prebiotics (synbiotic), diet, and physical activity



# Effective bacteria for treating obesity

Lactobacillus  
gasseri



Effect on reducing  
belly fat

Lactobacillus  
rhamnosus



Decreased appetite and  
improved digestion

Bifidobacterium  
brevi



Reduce inflammation  
and increase  
metabolism

Saccharomyces  
boulardii



Improve digestive health  
and reduce bloating





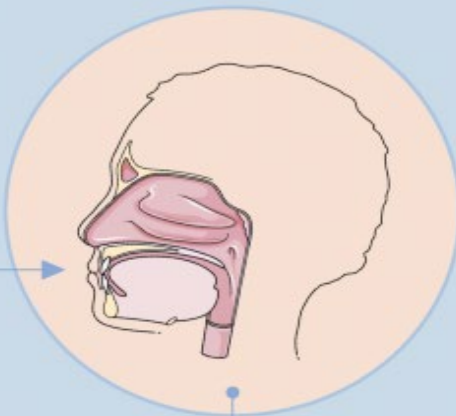
Probiotics



Prebiotics



Synbiotics



### MULTIPLE EFFECTS



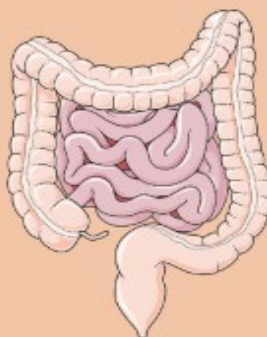
▲ Glucose uptake



▼ Glucose secretion

▼ Lipoprotein secretion

### MICROBIOTA CHANGES



This meta-analysis of 2086 randomised participants with diabetes

▲ HDL-cholesterol

◄ LDL-cholesterol

◄ HbA<sub>1c</sub>

▼ Fasting blood glucose

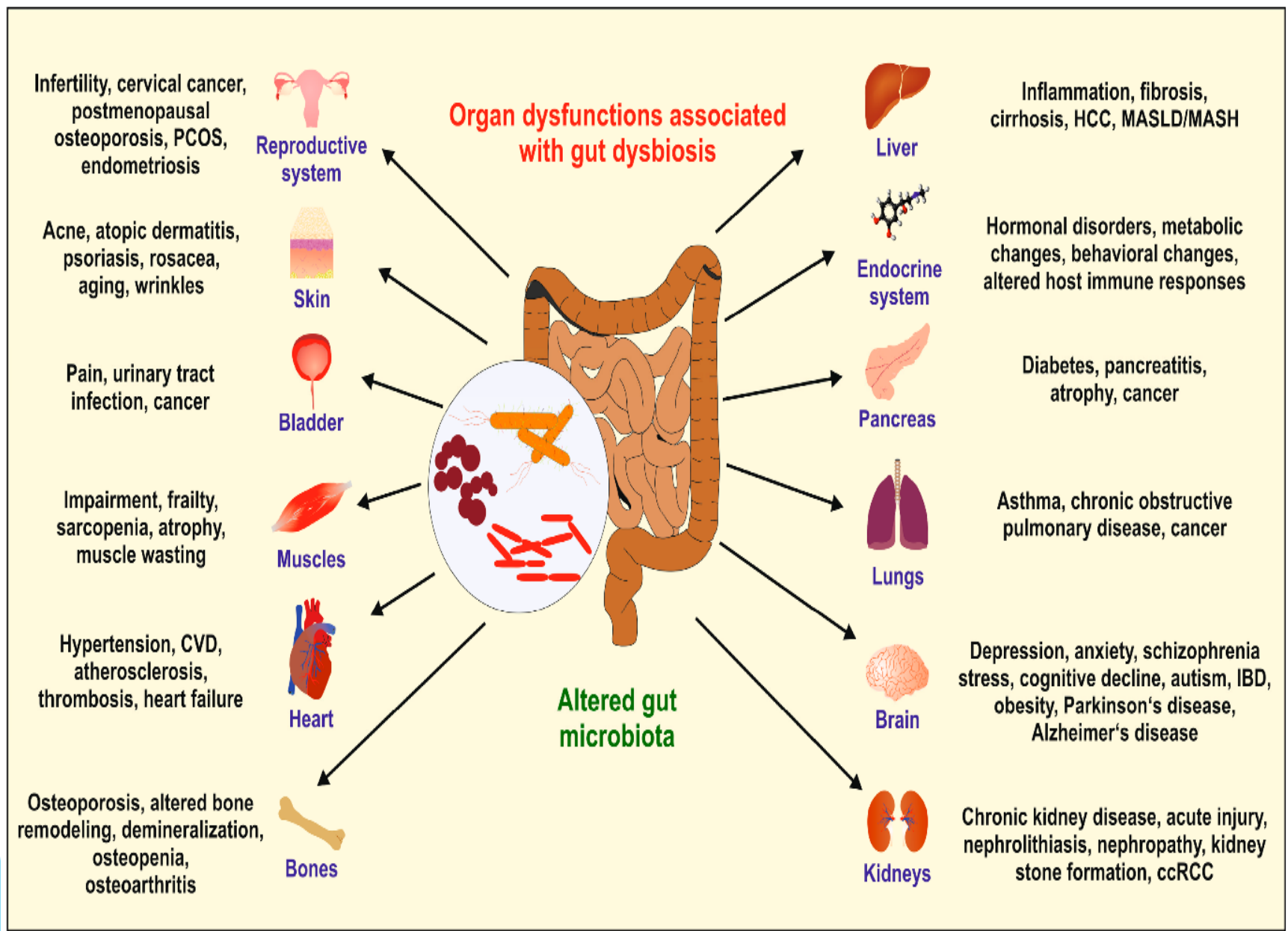
▼ Total cholesterol

▼ Triacylglycerols

▼ Insulinaemia



The connection between synbiotics and diabetes



# Intestinal dysbiosis and various disorders

# Reference articles :

- The role of probiotics on microvascular complications of type-2 diabetes: Nephropathy and retinopathy
- ✓ Gut microbiota in health and disease: clinical implications.
- ✓ The effect of probiotics, prebiotics, or synbiotics on metabolic outcomes in people with diabetes
- ✓ The role of probiotics, prebiotics, and synbiotics in the treatment of inflammatory bowel diseases: A review of clinical trials.
- ✓ Health-promoting components and selected quality parameters of different types of kimchi: fermented vegetable products.
- ✓ The microbiota-gut-brain axis in mental and neurological disorders: opportunities for prevention and intervention

❖ Gut microbiome and human health: Exploring how the probiotic genus *Lactobacillus* modulate immune responses

- ✓ The gut microbiome and human health: Exploring how the probiotic genus *Lactobacillus* modulates immune responses
- ✓ Immunomodulatory role of gut microbiota in autoimmune disorders and the advancement of gut microbiota based therapeutic strategies
- ✓ Regulation of the gut microbiota by diet and exercise: Improvements in cognition and emotion
- ✓ Human gut microbiota in health and disease: Unraveling the relationship.
- ✓ Investigating the potential of probiotics in cancer prevention and treatment - mechanism



## ➤ Whole-body microbiome optimization

- ✓ Short and composition of gut microbiota in healthy adults
- ✓ Short-chain fatty acids in the human gut and metabolic health.
- ✓ Gut, liver, and brain in diseases: implications for therapeutic interventions.
- ✓ The impact of gut microbiota on host blood sugar control
- ✓ Modulation of gut microbiota by bioactive compounds for prevention and management of type 2 diabetes
- ✓ Gut microbiota dysbiosis and its impact on type 2 diabetes: from pathogenesis to therapeutic strategies
- ✓ Relationship between gut microbiota, probiotics, and type 2 diabetes mellitus
- ✓ The gut-liver-brain axis in disease: implications for therapeutic interventions

## ❑ Inflammation regulation and the intestinal epithelial barrier microbiota

- ✓ The health benefits come from the live microbes that grow in foods like yogurt, kimchi, and sauerkraut.
- ✓ The intestinal barrier: a fundamental role in health and disease
- ✓ The gut microbiota-immune-brain axis: Therapeutic implications
- ✓ Microbiota in health and disease



با سپاس از  
حسن توجه شما عزیزان