The Importance of Digestive Health Week in Promoting Community Health

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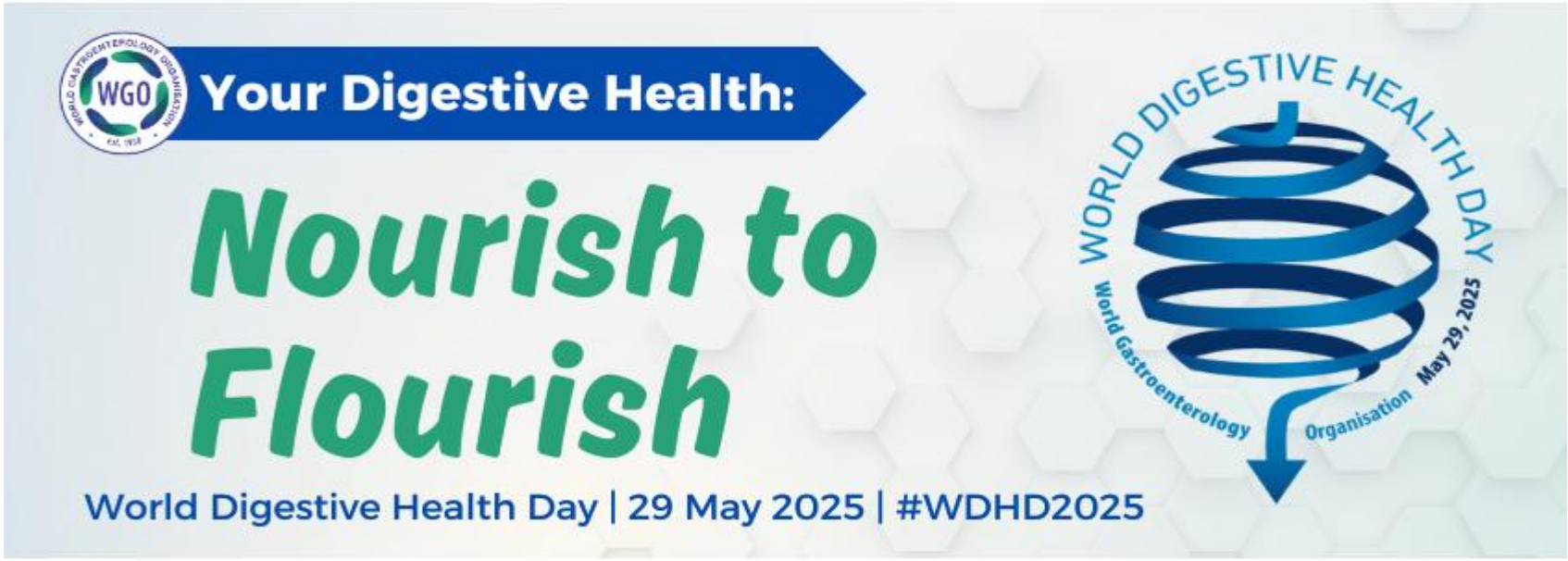
Gastrointestinal and Liver Diseases Research Center

World Digestive Health Day

May 2025





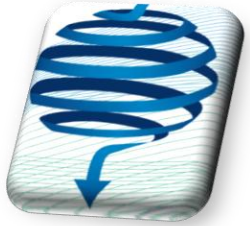
The World Gastroenterology Organization (**WGO**) celebrates World Digestive Health Day (**WDHD**) around the glob to raise awareness about:

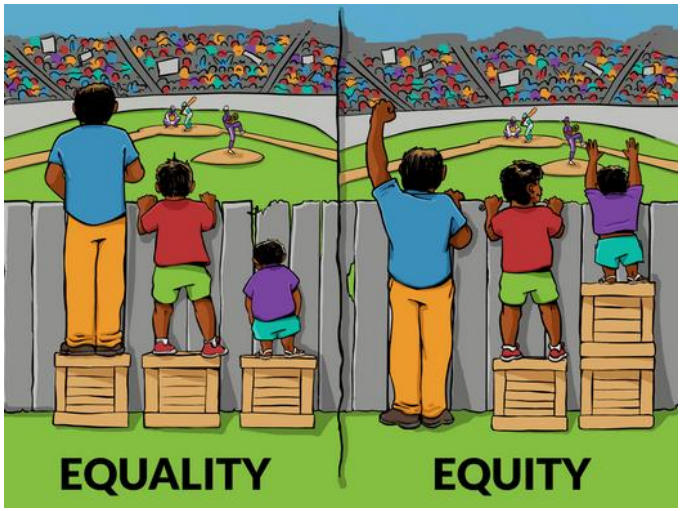
- **prevention**
- **prevalence**
- **diagnosis**
- **management**
- **treatment**

of digestive diseases and disorders.

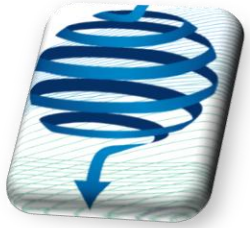
This day serves as a reminder of the significance of digestive wellness



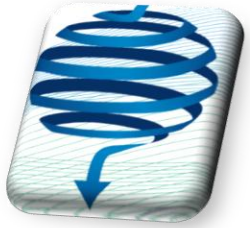




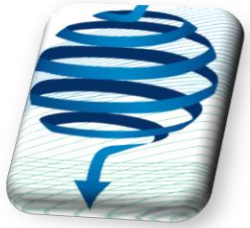
complex interplay of determinants affect digestive health equity.



- **Diet** and **nutrition** are known to play key roles in many chronic GI problems , regarding both pathogenesis and therapeutic possibilities.
- Correlation between symptomatology, disease activity and eating habits has been observed
- Hypersensitivity to some types of food may induce intestinal inflammation and has a role in the increased intestinal permeability
- **Dysbiosis** secondary to diet and its consequents recently is considered

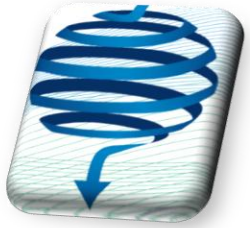


- ✓ **Digestive health plays a vital role in overall well-being and can be supported:**
  - ✓ through public education
  - ✓ healthy lifestyle habits
  - ✓ accessible healthcare services
- ✓ A well-functioning digestive system enhances nutrient absorption and immunity helps prevent chronic diseases, contributing to a healthier population



➢ A healthy digestive system impacts :

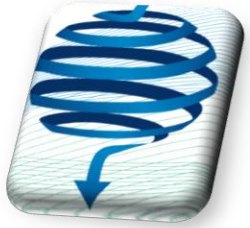
- Efficient nutrient absorption
- Immune system support
- Microbiome balance (gut microbiota influences metabolism, mood, and disease resistance)
- Prevention of disorders (IBS, GERD, CRC)
- Mental well-being



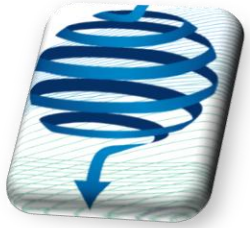
Factors Affecting Digestive Health:

- ✓ **Dietary Habits** (Fiber, probiotics, prebiotics, hydration)
- ✓ **Gut Microbiota** (Dysbiosis linked to obesity, diabetes, and inflammation)
- ✓ **Lifestyle** (Stress, sleep, physical activity)
- ✓ **Infections** & **Toxins** (Foodborne pathogens, antibiotics disrupting flora)

Promoting Community Health Through Digestive Wellness



- **Community-Based Interventions:**
  - ✓ **Nutrition Education Programs**
  - ✓ **High-fiber foods** (whole grains, fruits, vegetables)
  - ✓ **Fermented foods** (yogurt…) for probiotic benefits.
  - ✓ **Access to Clean Water & Sanitation**
  - ✓ **Helicobacter pylori testing**
  - ✓ **Screening & Early Detection CRC**
  - ✓ **Physical Activity Promotion** (Exercise may enhances gut motility and microbiome diversity)
  - ✓ **Optimize the use of Antibiotic**
  - ✓ **Prevents gut dysbiosis**



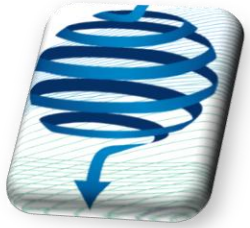
Policy & Environmental Approaches

Regulating Food Additives (Emulsifiers, artificial sweeteners may harm microbiota).

Urban Planning for Green Spaces – Encourages physical activity and stress reduction.

School & Workplace Wellness Programs – Healthy cafeterias and stress management.

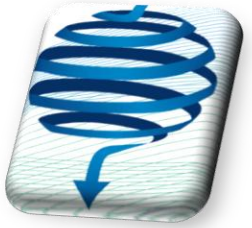
Diet and Nutrients in Chronic Diseases



- Studies showed the influence that different types of nutrition on the onset of chronic diseases via:
  - GI microbiome
  - Gut Inflammation
  - Body inflammation
  - Immune system
  - Intestinal barrier
  - Functions and composition of gut microbiota

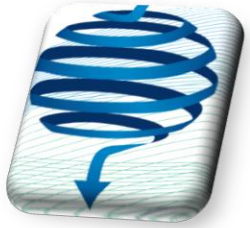
Nutrients 2020, 12, 2693; Front Immunol. 2022 ;5;13:866059

Diet & inflammation



- ✓ In recent years, a growing body of evidence has emerged linking the food and inflammation state
- ✓ Chronic inflammation is a common underlying factor in many major diseases
- ❑ **Anti-inflammatory diets** focused on modifiable life style characterized by :
  - High consumption of fruits, vegetables, whole grains, legumes, fatty fish, nuts, olive oil and phytochemicals
  - Limited consumption of foods potentially pro-inflammatory properties such as red meat, refined carbohydrates and alcohol

Nutrients 2022;14, 1137.;Nutrients 2020;12, 2468



Anti-inflammatory diets:

Dual roles:

- ✓ They provide nutrients that can directly inhibit the inflammatory response
- ✓ They also modulate the body's metabolic processes to fortify against non-communicable diseases.
- ✓ Foods rich in **n-3 fatty acids**, **antioxidants** and **polyphenols** have been shown to reduce the expression of pro-inflammatory genes and decrease circulating levels of inflammatory biomarkers

British Journal of Nutrition (2024), 132, 898–918

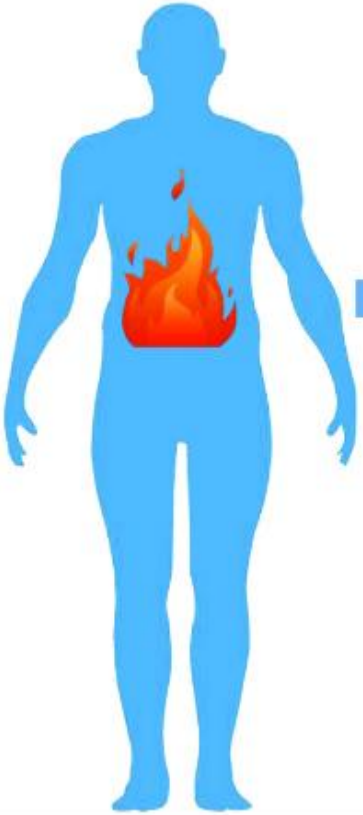
Anti-inflammatory diet



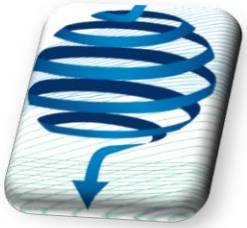
PUFAs MUFAs Probiotics
Antioxidants Polyphenols
Fiber Phytochemicals
Vitamins Minerals

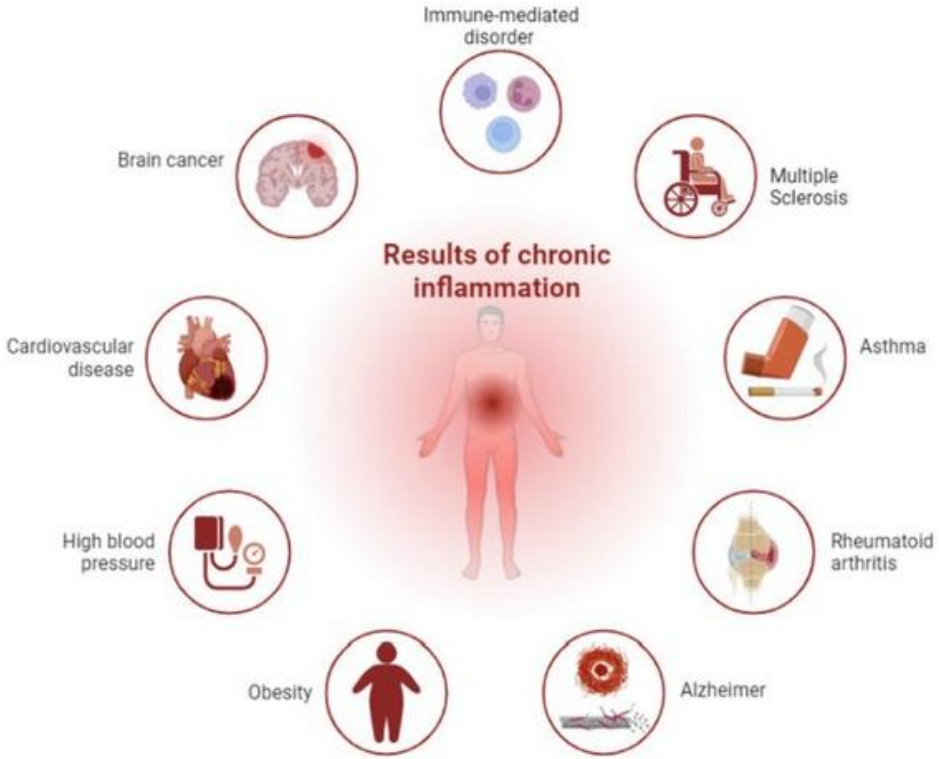
Anti-inflammatory dietary components

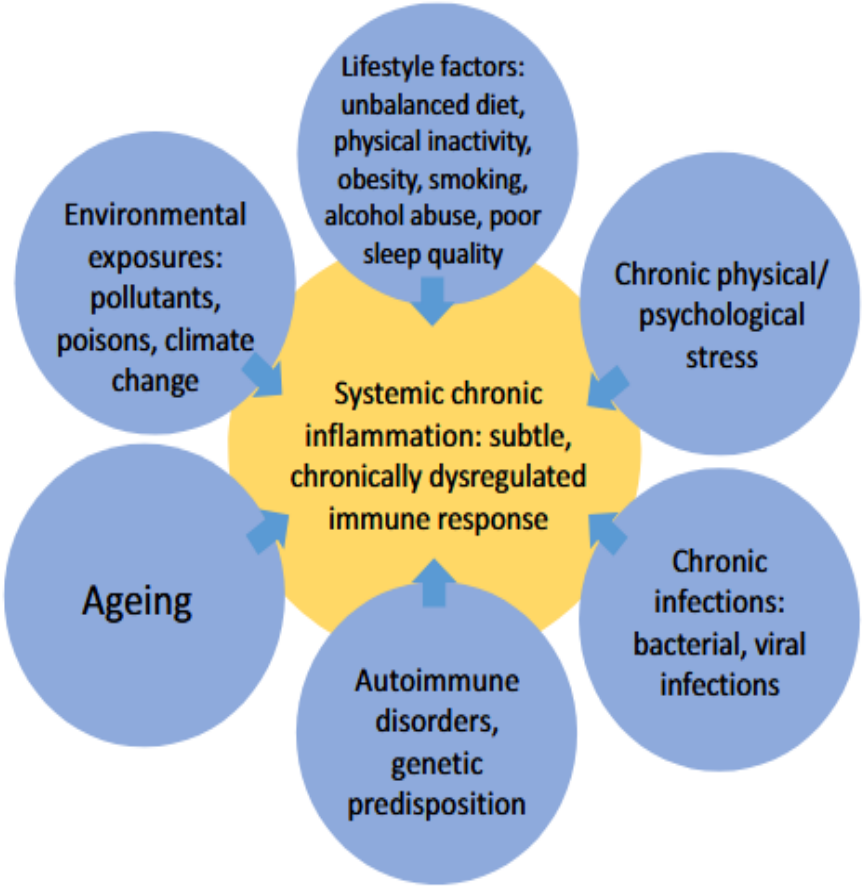
⬇ Systemic chronic inflammation



- Overall health promotion
- Metabolic wellness
- Cognitive health enhancement
- Chronic disease prevention and management

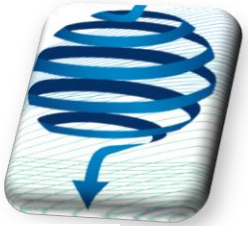






inflammopharmacology (2023) 31:2857–2883;British Journal of Nutrition (2024), 132, 898–918

Major components, sources and beneficial effects of an anti-inflammatory diet

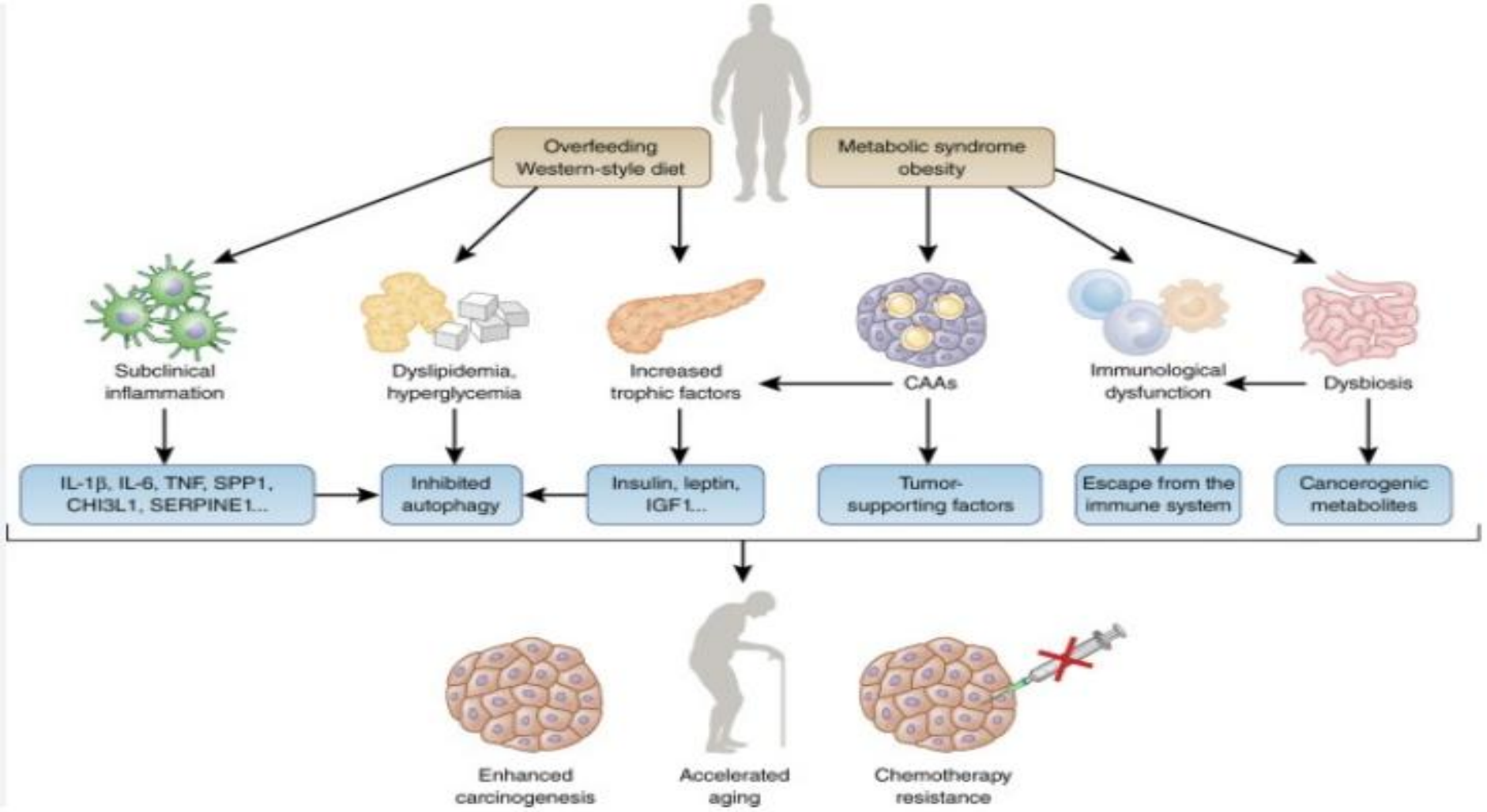


Category	Source	Anti-inflammatory effect
ω-3 fatty acids	Fatty fish (salmon, mackerel), flaxseed, chia seeds, walnuts and fish oil supplements	Inhibit leukocyte chemotaxis, reduce the expression of adhesion molecules and interactions between leukocytes and endothelial cells, decrease the generation of eicosanoids derived from ω-6 fatty acids (e.g. arachidonic acid) and suppress inflammatory cytokines synthesis and T cells reactivity.
MUFA	Olive oil, avocados, nuts and seeds (almonds, cashews, peanuts and sesame), canola oil	Increase adiponectin secretion, improve insulin resistance and reduce proinflammatory cytokines and circulating monocytes.
Antioxidants	Fruits (berries, citrus, etc.), vegetables (spinach, kale, etc.), nuts, seeds, herbs (turmeric, ginger, etc.)	Alleviate oxidative stress, neutralize free radicals and protect against DNA damage brought on by hydroxyl radicals.
Polyphenols	Extra virgin olive oil, black/green tea, nuts, seeds, dark chocolate, legumes, fruits, red wine, vegetables and coffee	Exhibit anti-inflammatory and antioxidant properties and have the potential to mitigate blood pressure, lipid profiles, abdominal obesity, blood glucose and vascular conditions.
Dietary fiber	Whole grains, fruits, vegetables, legumes, nuts and seeds	Increases anti-inflammatory short-chain fatty acids production in the colon, reduces proinflammatory cytokines and helps to maintain a healthy gut microbiome and a balance of proinflammatory and anti-inflammatory compounds.
Phytochemicals	Turmeric (curcumin), ginger, garlic, cinnamon and other herbs and spices	Modulate inflammatory pathways, reduce proinflammatory cytokines and exert antioxidant activities.
Probiotics	Yogurt, kefir, sauerkraut, pickles and other fermented foods	Improve epithelial barrier function, reduce lipopolysaccharide (LPS)-dependent chronic low-grade inflammation and biomarkers associated with metabolism, inflammation and oxidative stress.
Vitamins and minerals	Citrus fruits, berries, vegetables, nuts, seeds, legumes and fish	Exert antioxidant properties; involved in anti-inflammatory processes.
Low glycaemic index (GI) foods	Whole grains, legumes, non-starchy vegetables	Regulate postprandial blood glucose levels, alleviate oxidative stress and reduce inflammatory markers.

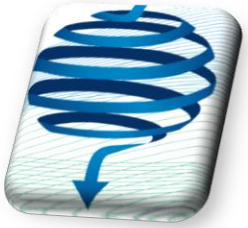
British Journal of Nutrition (2024), 132, 898–918

PUFA stands for polyunsaturated fatty acid, while MUFA stands for monounsaturated fatty acid.

Nutrition, inflammation and cancer



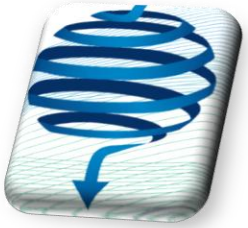
Nature Immunology2017; 18, pages 843–850



The Role of Diet and Gut Microbiota

- ✓ The human gastrointestinal tract hosts a complex and dynamic community of microorganisms
- ✓ Microbiota play a pivotal role in numerous physiological processes the consequential effects on host health
- ✓ There is growing evidence linking the gut microbiota to many chronic diseases
- ✓ Variability of them ,may caused by multiple factors, including genetic predisposition, environmental exposure, diet and lifestyle
- ✓ So gut microbiota composition in the individual may change in response to intrinsic and extrinsic factors many times over the course of a lifetime.

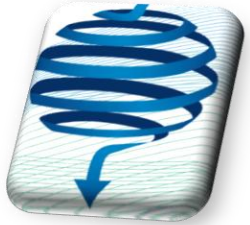
Nutrients 2020, 12, 2693; *Int. J. Mol. Sci.* **2024**, *25*(17), 9366



MICROBIOTA

Inoculate humans for the first time during birth.

The method of delivery (vaginal versus caesarian section), food (breast versus formula feeding), and use of antibiotics, affect the composition of an infant's gut microbiota

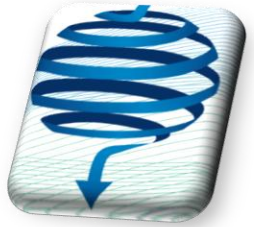


- **The western diet** , characterized by high intakes of processed foods, red meats, sugars, and unhealthy fats, is often associated with a reduced microbial diversity and increased inflammation

- **Mediterranean diet** is rich in fruits, vegetables, whole grains, nuts, and olive oil, promotes a diverse and beneficial gut microbiota composition, contributing to anti-inflammatory effects and improved metabolic health

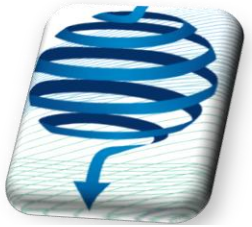
- **VEGETARIAN and vegan diets**, enhance gut health by increasing the abundance of fiber-fermenting bacteria and the production of anti-inflammatory metabolites

Nutrients 2023, 15, 2150; Nutrients **2023**, 15, 2749; Gut **2021**, 70, 1287–1298

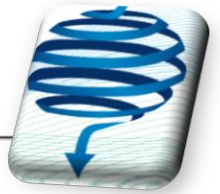


Impact of dietary nutrients on gut microbiota.

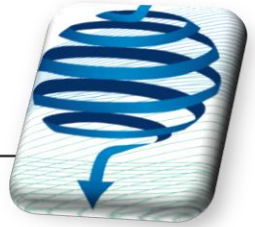
Nutrients	Dose and Treatment Duration/Test Model	Potentially Beneficial Microbiota	Potentially Detrimental Microbiota
Dietary carbohydrates	Model: almond-based low carbohydrate diet as reference/clinical trials (45 T2DM patients) Duration: 3 months Age: >18 years Location: Hospital of Soochow University, Suzhou, China	↑ *Roseburia* sp. ↑ *Ruminococcus* ↑ *Eubacterium*	
	Model: oligofructose-enriched inulin (Synergy 1) (10 g/day), n = 18 and placebo (maltodextrin; 7 g/day), n = 16 as reference/clinical trials (34 pediatric celiac disease patients, 62% females, on a gluten-free diet) Duration: 3 months Age: mean age 10 years Location: University of Warmia and Mazury, Olsztyn, Poland	↑ *Bifidobacterium* sp.	



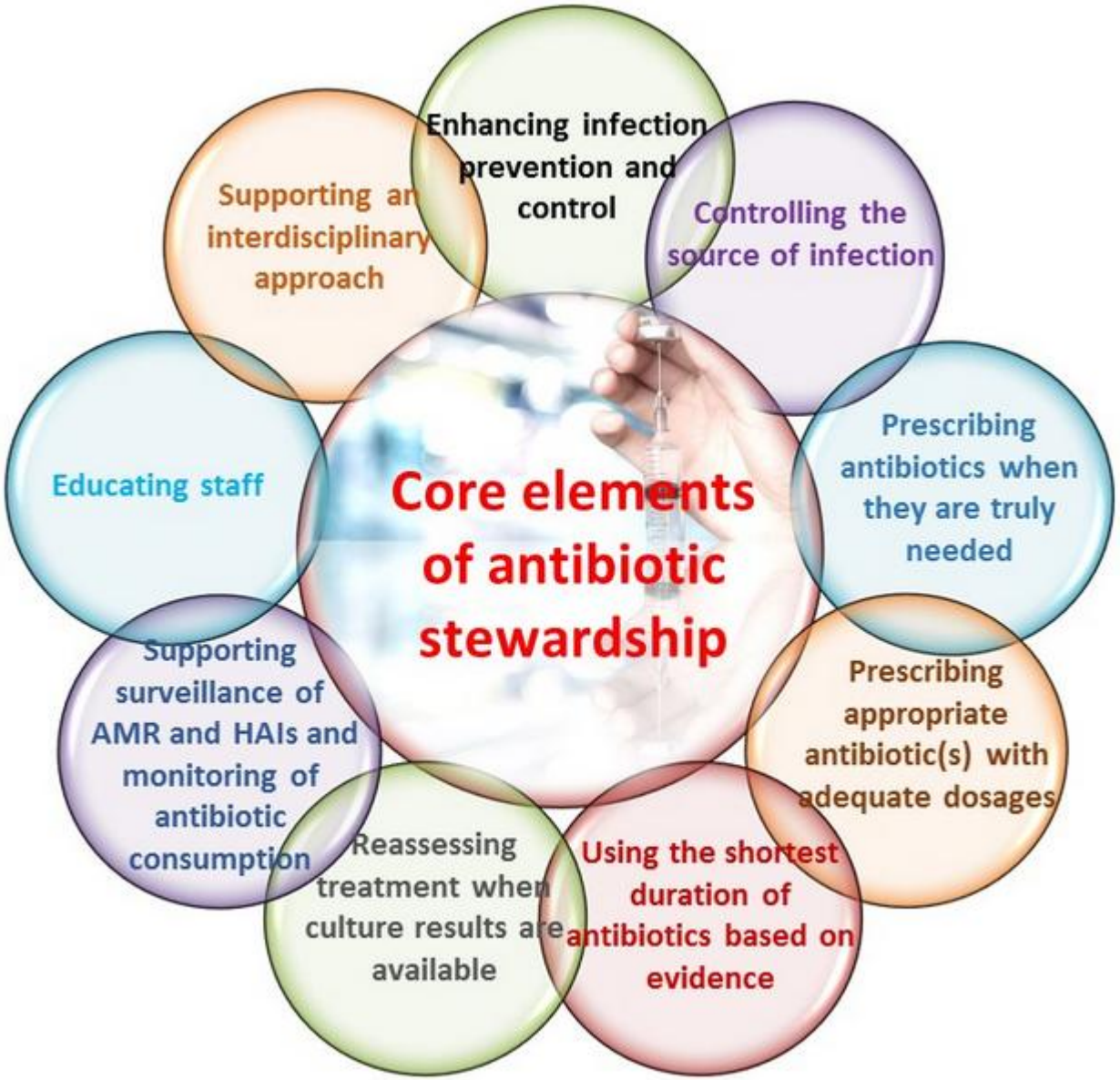
Nutrients	Dose and Treatment Duration/Test Model	Potentially Beneficial Microbiota	Potentially Detrimental Microbiota
Dietary fat	Model: HFD (60% fat) and baseline as reference/mice model, n = 8 Duration: 14 weeks Age: 4 to 5 weeks Location: Jiangnan University, Wuxi, China	↓ *Bifidobacterium* sp. ↓ *Lactobacillus* sp. ↓ *Faecalibaculum*, sp. ↓ *Akkermansia*. sp.	↑ *Desulfovibrionaceae* sp. ↑ *Mucispirillum* sp.
	Model: fat diet (20%) and the baseline as reference/clinical trial (52% women) n = 217 Duration: 6 months Age: 18 to 35 years Location: Army General Hospital, north China and Zhejiang University, south China	↑ *Fecalibacterium* sp. ↑ *Parabacteroides* sp.	
	Model: moderate-fat diet (30%) and the baseline as reference/clinical trial (52% women) n = 217 Duration: 6 months Age: 18 to 35 years Location: Army General Hospital, north China and Zhejiang University, south China	↓ F/B	
	Model: HFD (40%) and the baseline as reference/clinical trial (52% women) n = 217 Duration: 6 months Age: 18 to 35 years Location: Army General Hospital, north China and Zhejiang University, south China	↓ F/B ↓ *Fecalibacterium* sp.	↑ *Alistipes* sp. ↑ *Bacteroides* sp.



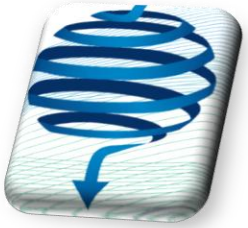
Dietary protein	Model: high-animal-protein-based diet (514 g/kg) and baseline as reference/mice model Duration: 3 weeks Age: shortly after weaning Location: Czech academy of sciences, Prague		↑ *Escherichia* sp. ↑ *Staphylococcus* sp. ↑ *Enterococcus* sp.
	Model: plant-protein-based control diet (176 g/kg) and baseline as reference/mice model Duration: 3 weeks Age: shortly after weaning Location: Czech academy of sciences, Prague		↑ *Enterococcus* sp.
	Model: C57BL/6 DSS-treated mice with isocaloric diets with 53% protein and the diets with 30% protein as reference/DDS-treated mice model, n = 132 Duration: 3 days Age: 7 weeks Location: Université Paris-Saclay, France	↑ *Desulfovibrio* sp. ↑ *Bacteroides* sp.	↑ *Alloprevotella* sp. ↑ *Haemophilus* sp. ↑ *Klebsiella* sp.
Minerals	Model: supplementation of 1000 mg calcium + 1000 mg phosphorus/day and the supplementation of 1000 mg phosphorus/day as reference/clinical trials (men n = 30, women n = 32), Duration: 8 weeks Age: 29 ± 7 years Location: University Jena, Germany	↑ *Clostridium* sp.	
	Model: high-iron-fortified formula (6.4 mg Fe/day) and iron drops (no-added-iron formula with liquid ferrous sulfate supplementation (5.7 mg Fe/day) as reference/clinical trials, n = 53	↑ *Lactobacillus* sp.	↓ *Ruminococcus* sp.



Vitamins	Model: one dose of 50,000 IU vitamin A and placebo as reference/clinical trial, Duration: 15 weeks Age: 48 h of birth for IU treatment, placebo–early (6–15 week) or late (2 year) infancy Location: Dhaka, Bangladesh	↑ *Bifidobacterium* sp. ↑ *Akkermansia* sp.	
	Model: a dose of 40,000 IU vitamin D once weekly using two capsules of 20,000 IU (Plenachol, Encap) and baseline as reference/clinical trial (patients with vitamin D deficiency: 25[OH] vitamin D < 50 nmol/L) Duration: 1 month Age: NA Location: St Mark's Hospital, London, UK	↑ *Enterobacteria* sp.	
Polyphenols	Model: HFD with blackberry anthocyanin rich extract (25 mg/kg body weight per day) and HFD as reference/rat model n = 6 Duration: 17 weeks Age: NA Location: NA	↑ *Akkermansia* sp.	↓ *Ruminococcus* sp.
	Model: tart cherry juice consumption (8 oz/day) and baseline as reference/clinical trials, n = 10 Duration: 5 days Age: 23–30 years Location: NA	↑ *Bifidobacterium* sp. ↑ *Prevotella* sp. ↑ *Bacteroides* sp.	↓ *Ruminococcus* sp.
	Model: different concentrations of grape phenolic compounds (2.5 and 5 mg/kg/day diluted in 0.1% Dimethyl Sulfoxide) and the control group (0.1% Dimethyl Sulfoxide alone) as reference/rat,	↑ *Bifidobacterium* sp.	



Optimize the use of Antibiotic

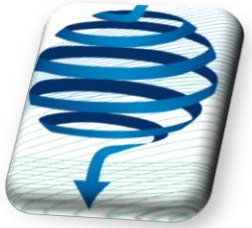


- ✓ **Good bacteria help to maintain:**
  - ✓ gut barrier integrity
  - ✓ preventing the translocation of harmful pathogens
  - ✓ preventing the translocation toxins
  - ✓ produce metabolites, such as short-chain fatty acids (SCFAs), which have anti-inflammatory effects and support immune homeostasis

- ✓ **Dysbiosis, Bad bacteria,** In contrast can disrupt these protective mechanisms, leading to:
  - ❑ increased gut permeability
  - ❑ systemic inflammation
  - ❑ impaired intestinal barrier structure and function

Front. Immunol. 2022, 13, 953196. Biomedicines **2022**, 10, 289

Gut Microbiota and Inflammation



Gut Barrier Function and Permeability

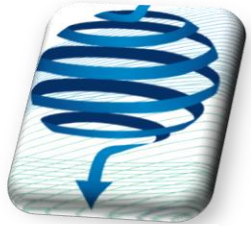
The intestinal barrier is a dynamic structure

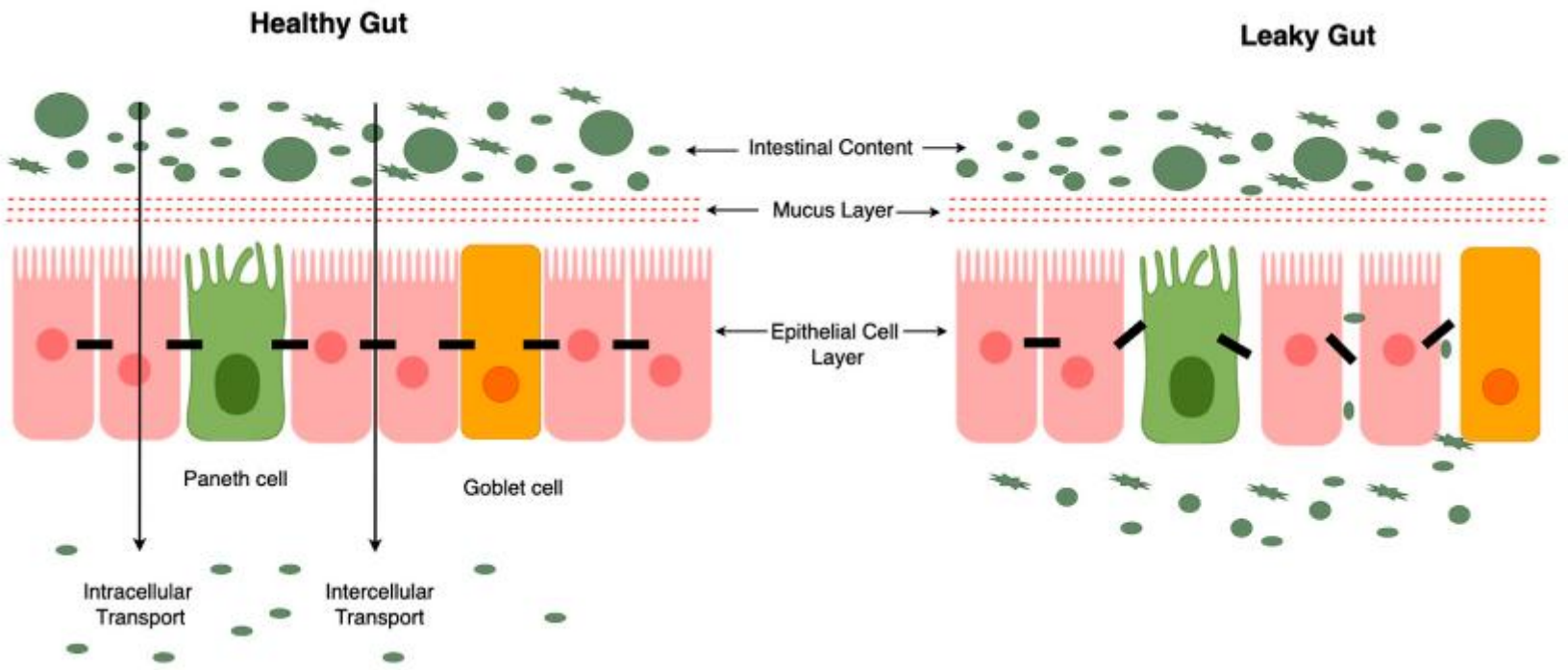
The gut barrier comprises several layers that work together

Dysfunction of the gut barrier, often referred to as **"leaky gut"** is characterized by increased intestinal permeability, allowing for the translocation of pathogens or toxins

This can trigger systemic inflammation and contribute to the development of various diseases gut permeability is a hall-mark of IBD

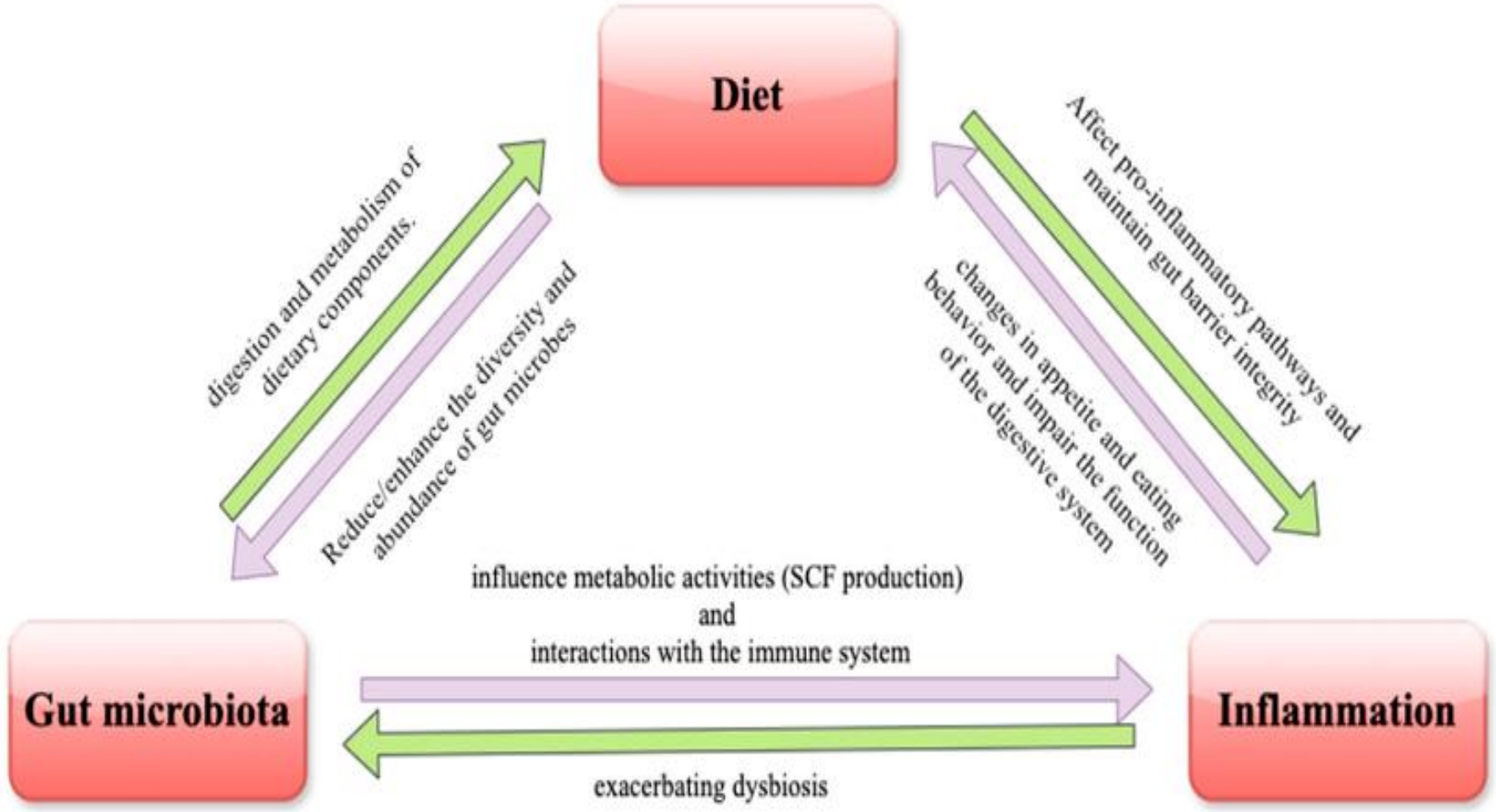
Cells 2020, 9, 1909; Animals 2022, 12, 145

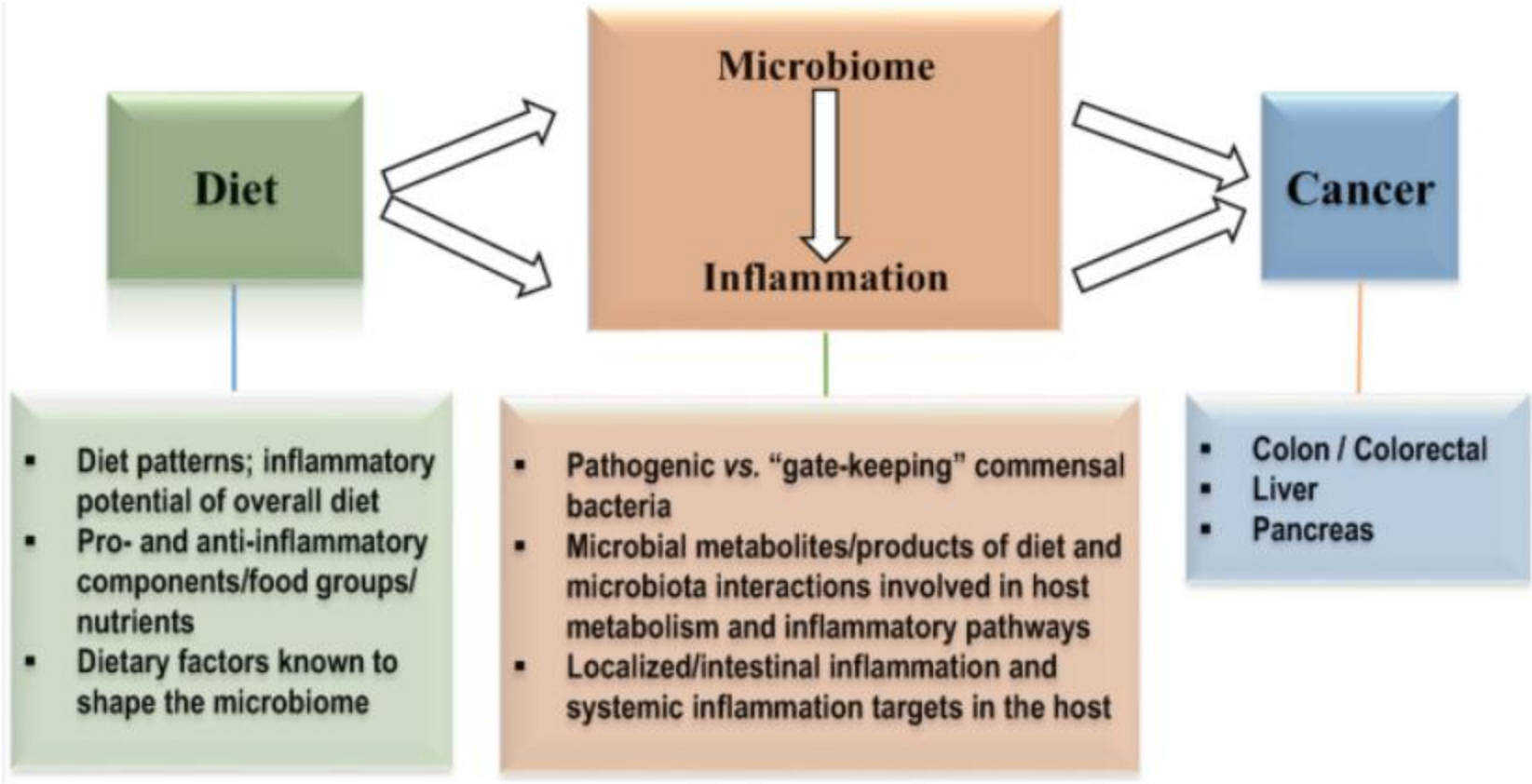




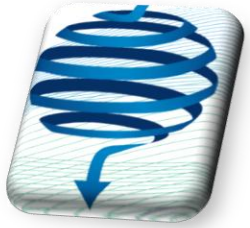
Gut barrier function and permeability (leaky gut situation).
In a healthy gut, intestinal contents selectively pass through epithelial cells into the bloodstream, primarily via transcellular transport.

The interconnected triangle: diet, gut microbiota, and inflammation.





Diet, Microbiome, Inflammation, and Cancer

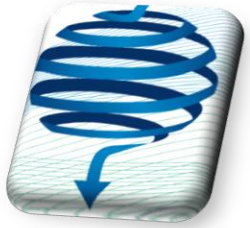


Get Enough Sleep

Sleep impacts many areas of your overall well-being, including your gut health.

As circadian rhythms guide the activity of gut bacteria, inflammation ,well being and GHQ

it is recommended you follow a regular sleep schedule.
It is recommended to get seven hours of sleep per night.



Exercise Regularly

Exercise helps to enrich the diversity of your gut microflora.

Recommended exercise a minimum of 30 minutes per day.

This can include walking around the block or on a treadmill, lifting weights, practicing yoga, or any other form of full-body movement.

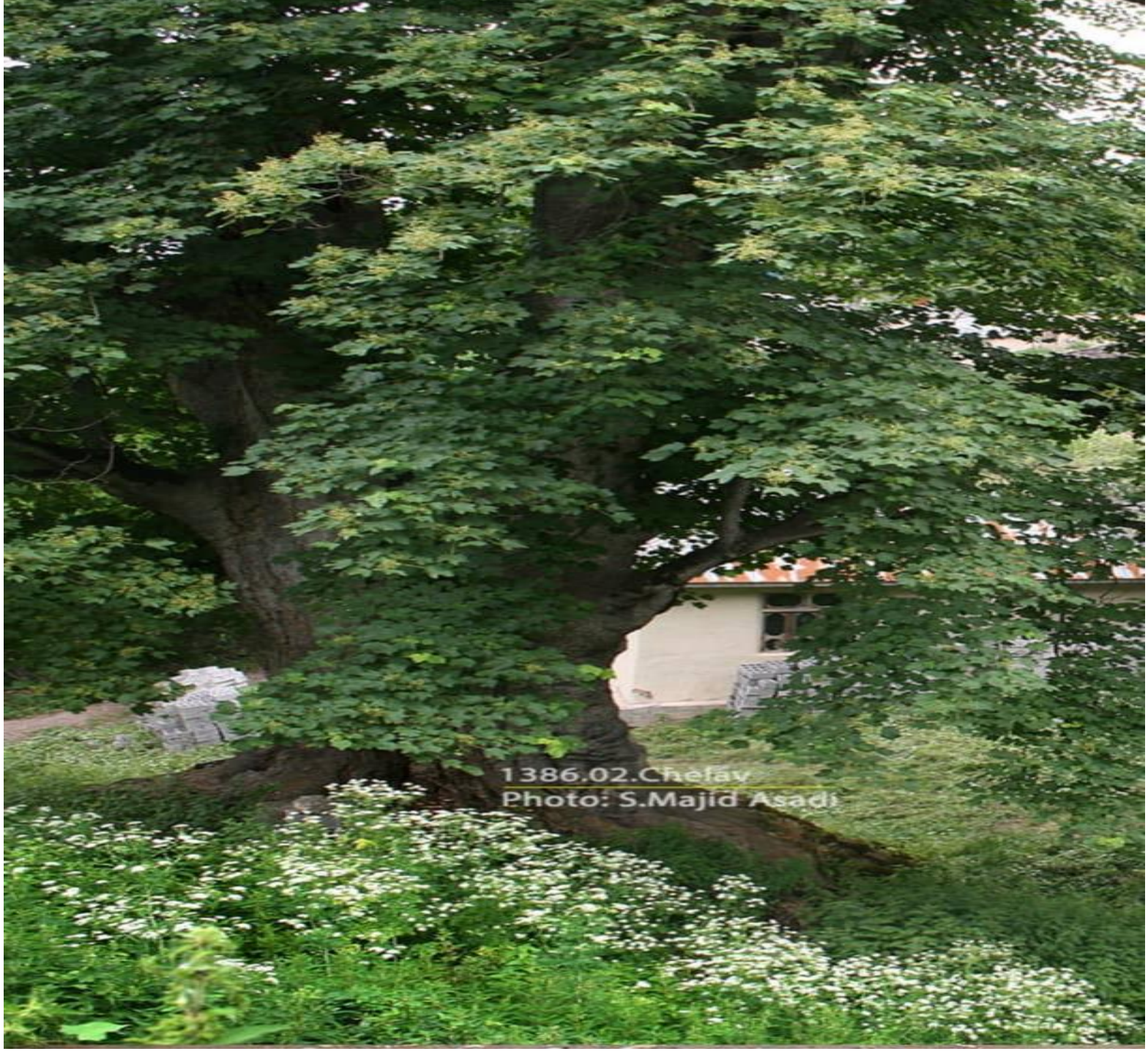

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Photo: S.Majid Asadi