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The Healthy Ageing Experts

From Insights to Innovation:

Rebuilding the Gut, The Home of our Microbiome

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Agenda

- Understanding the Crisis: Digestive Health Today
- Impact of Western Diet and Ultra-Processed Foods
- Market Insights: What Consumers Are Seeking
- Intestinal Permeability: Systemic Connections and Clinical Implications
- Science-Backed Gut Restoration: The 4 R's of Gut Restoration

Current State

Over 332 million people in the European region are living with a **digestive disorder**.

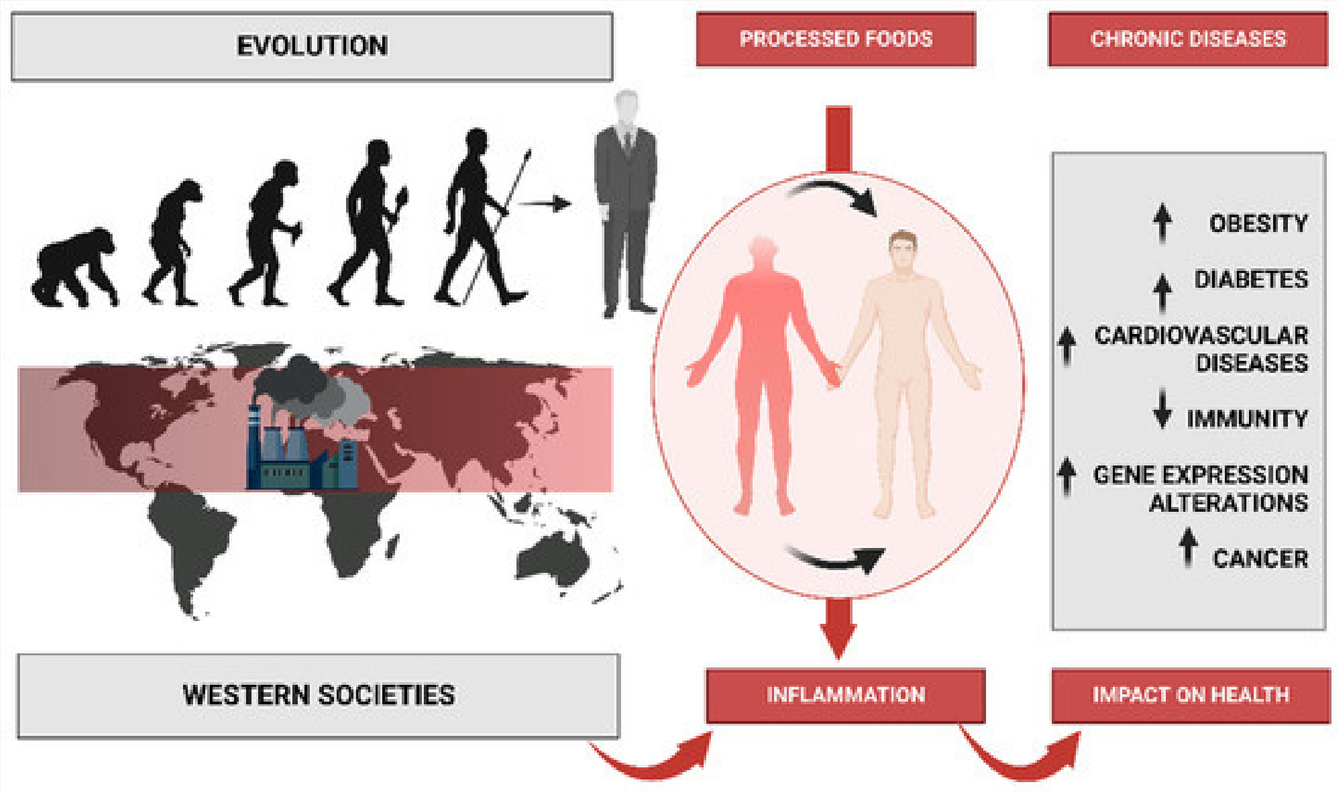
(Enhancing transitional care in digestive health: Addressing challenges and implementing strategies across Europe, 2024)
(The Lancet Gastroenterology & Hepatology, 2023)

How did we get here?

Dietary transitions across history have profoundly reshaped the human gut microbiome.

Key drivers:

- Historical shifts
- Lifestyle changes
- Dietary patterns and processing
- Antibiotic and medication use



(Clemente-Suárez et al., 2023)
(Broussard and Devkota, 2016)

Western Diet, Gut Dysbiosis, and Health

Western diet disrupts gut microbiota:

- Decrease microbial diversity
- Promote low-grade systemic inflammation
- Reduce short-chain fatty acid producing and barrier-protective bacteria
- Increase bile-tolerant and LPS-producing bacteria

Weaken intestinal barrier:

- Tight junction disruption
- Thinning of mucus layer

Contribute to chronic diseases:

- Metabolic disorders such as obesity and insulin resistance
- Gut disorders including inflammatory bowel disease and ulcerative colitis
- Cardiovascular and brain-related disorders

(Severino et al., 2024)

What Are Ultra-Processed Foods (UPFs)?

The **most highly processed category** in the NOVA food classification system.

Defined by **industrial formulations** made largely from refined food substances.

Characterised by **sensory-related additives** (e.g. colours, flavours, texture enhancers).

Engineered to be hyper-palatable, promoting repeated consumption.

(The Lancet, 2025)

Why UPFs Are a Public Health Problem

- **High UPF intake** is linked to **chronic conditions**, such as:
  - **Obesity and cardiovascular disease**
  - **Type 2 diabetes and metabolic syndrome**
  - **Inflammatory bowel conditions**

- **UPFs are widely available,** reinforcing overconsumption and making them a dominant feature of modern diets globally.

- UPFs now account for **~50%** of household food intake in **high-income countries**, with rapid expansion in **low and middle-income countries**.

(The Lancet, 2025)

UPF Global Consumption

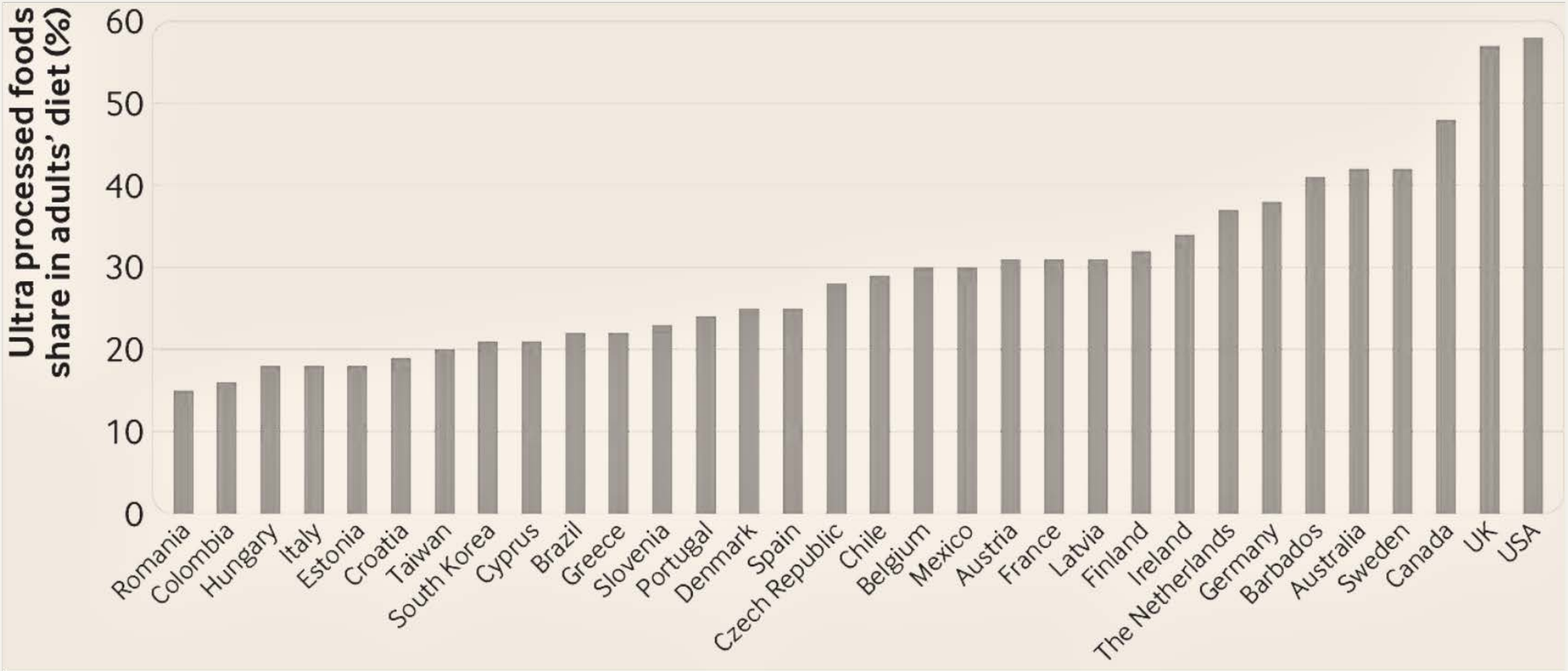


Fig: Mean proportion of ultra-processed foods in adults' diet across countries (% energy intake) from nationally representative surveys

(Touvier et al., 2023)

Growing Consumer Momentum for Healthier Diets

British consumers are actively engaged in health and wellness trends, with **64%** taking action to live healthily.

54% of consumers are reducing their intake of processed foods, showing a shift towards cleaner eating habits.

88% of the public favour regulatory action on ultra-processed foods.

A study published in BMJ Nutrition, Prevention & Health found the nutrient profiling model used to identify HFSS foods captures just **59%** of UPFs in the UK diet.

(Innova Market Insights, 2025)
(Attest, 2026)
(Viktorija Kesaite et al., 2025)

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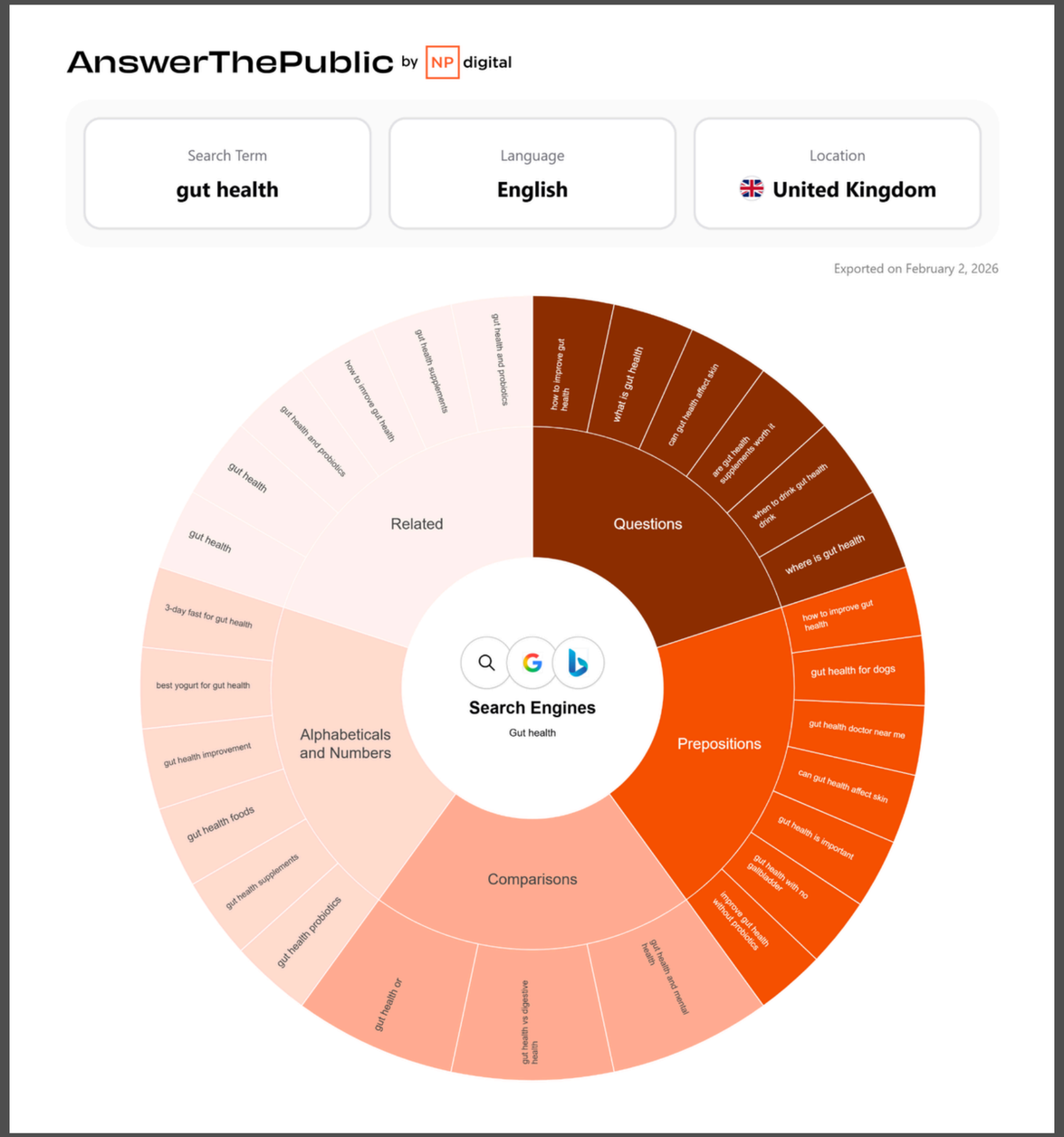
Functional Health: Gut in Focus

One in four British consumers now buy products specifically to **support digestive wellness**.

(Innova Market Insights, 2025)



(AnswerThePublic, 2026)

Key Questions

[Foundational]
Why Is Gut Health Important?

[Practical]
How Can I Improve My Gut Health?

[Diagnostic]
What Are The Three Signs Of A Healthy Gut?

[Curiosity]
What Emotion Is Held In The Gut?

Key Phrases

[Demographic]
Gut Health For Women

[Connections]
Gut Health And Skin

[Connections]
Gut Health And Mental Wellbeing

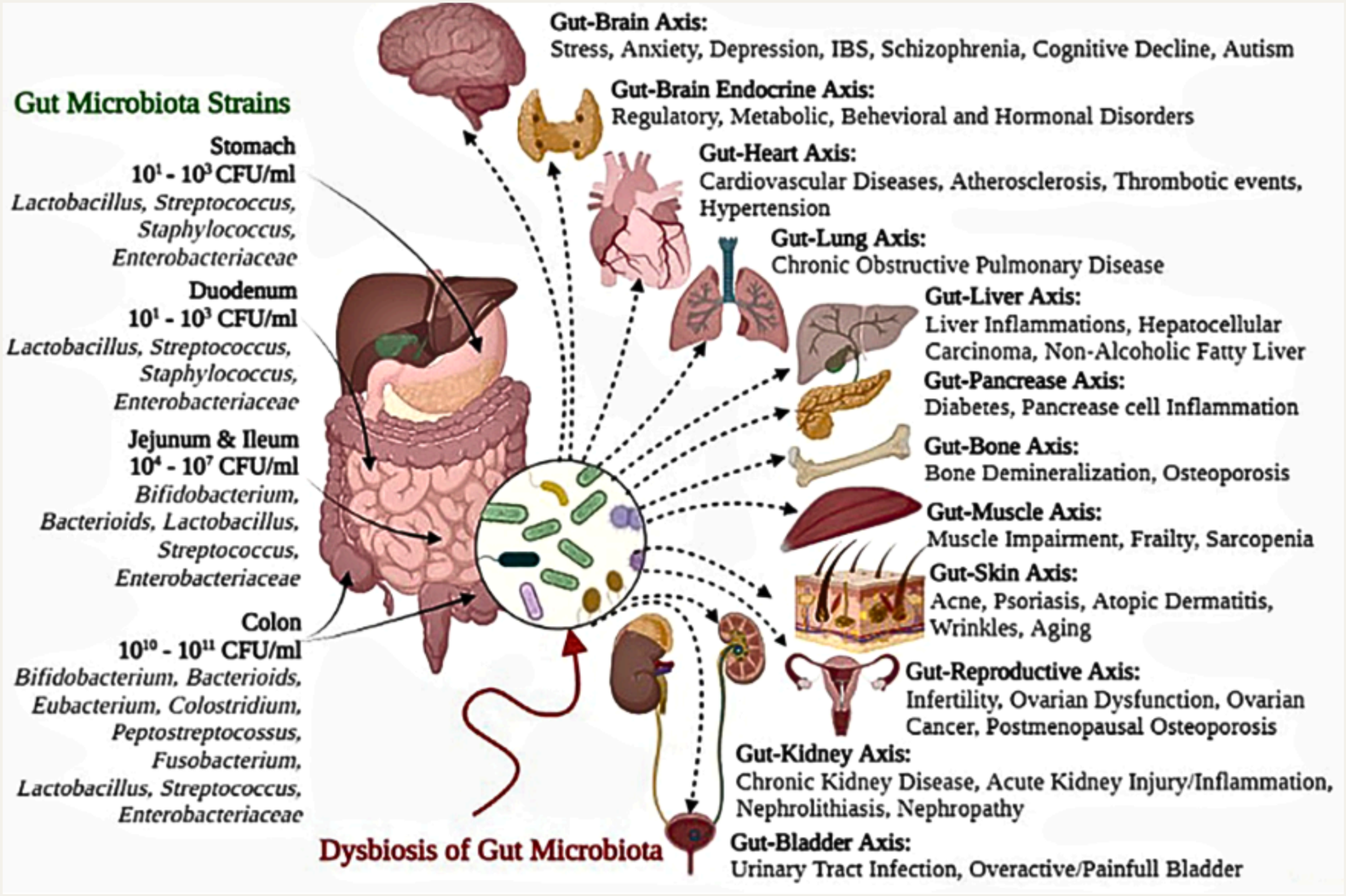
(AnswerThePublic, 2026)

Consumer Search Behaviour

- **Fundamentals of Gut Health**
  - Consumers frequently search for basic gut health knowledge, including its importance and core concepts.
- **Symptom and Health Concerns**
  - Searches focus on symptoms like bloating and IBS, and link gut health with immunity, skin, and mental health.
- **Developing Gut-Brain and Skin-Gut Axis**
  - New topics include gut-brain connections related to anxiety, and gut-skin links with acne and eczema.
- **Life Stage Impact**
  - Queries reveal interest in gender-specific and life-stage gut health concerns, including pregnancy and menopause.

(AnswerThePublic, 2026)

Gut-Everything Axis



(Afzaal et al., 2022)

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Closing the *gut* health gap

Health-forward consumers are driving demand for sophisticated, supplements that **soothe** inflammation, **protect** gut integrity, and **restore** microbiome balance to comprehensively address gut dysbiosis.

Rebuilding the Gut, The Home of our Microbiome

Current State

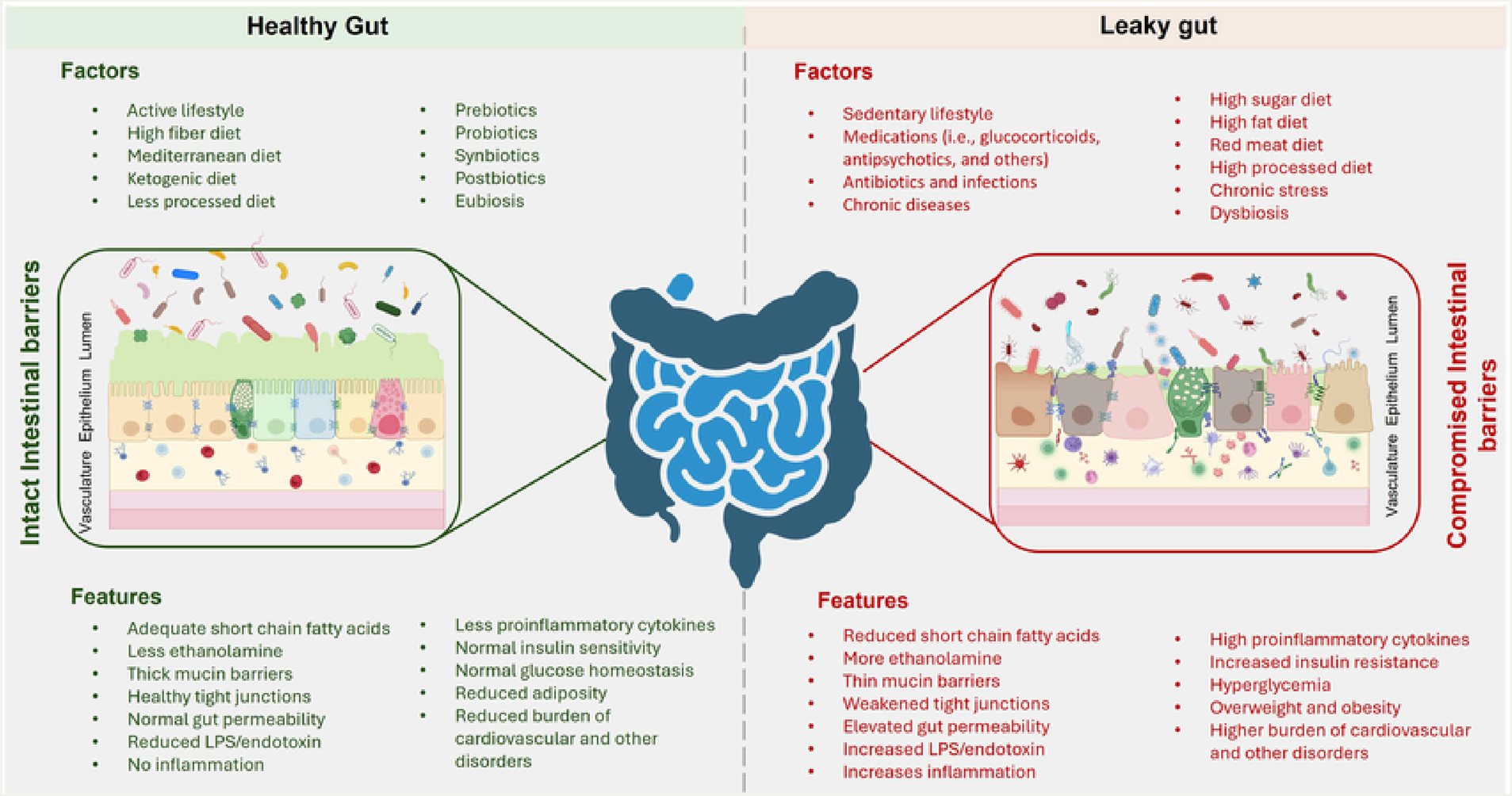
+

Consumer Demand

→

The Perfect Opportunity: Meet demand with science-backed solutions

The Home of our Microbiome



(Mishra et al,. 2025)

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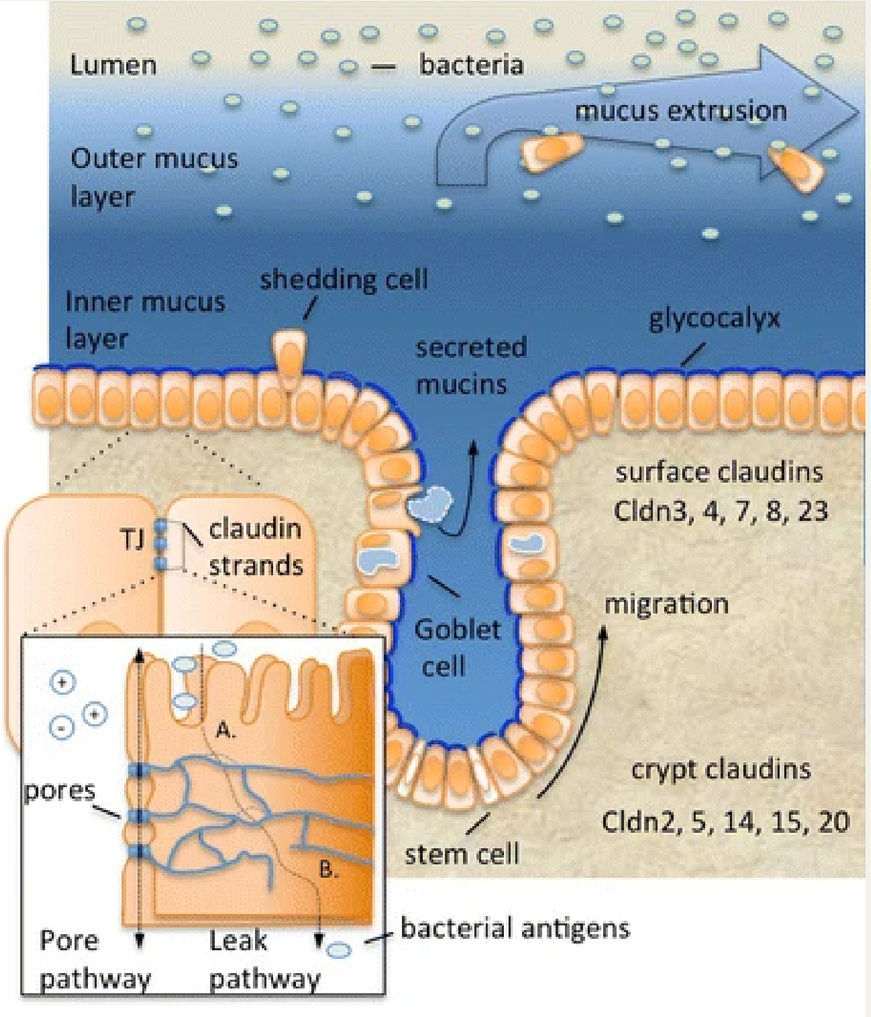
The Gut Mucosa as a Dynamic Barrier System

Four integrated layers:

- **Mucus layer**
  - Primary physical separation from luminal microbes
- **Epithelial monolayer**
  - Absorptive and signalling functions
- **Tight junction complexes**
  - Regulate paracellular permeability
- **Mucosal immune compartment**
  - Maintains immune tolerance under healthy conditions (Capaldo et al., 2017)



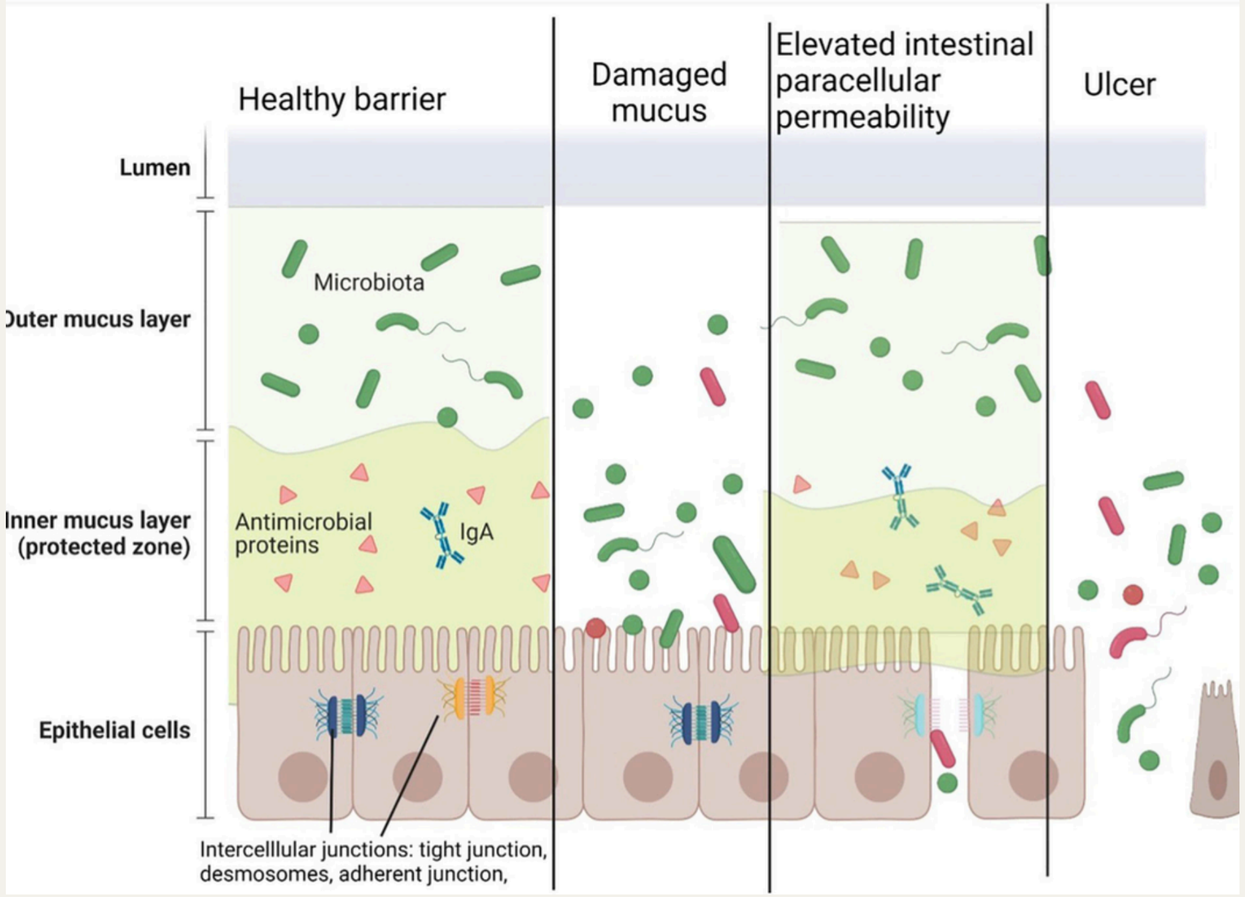
(Capaldo et al., 2017)

Mucus Layer: Ground Zero

Colonic mucus is structured into two functional layers:

- **Inner mucus layer**
  - Dense, compact, firmly adherent
  - Composed of tightly packed MUC2 polymers
  - Highly glycosylated
  - Largely bacteria-free (physically restrictive mesh)

- **Outer mucus layer**
  - Looser, expanded structure
  - Derived from enzymatic and microbial action of inner layer
  - Colonised by commensal microbes
    (Sharma and Riva, 2020)

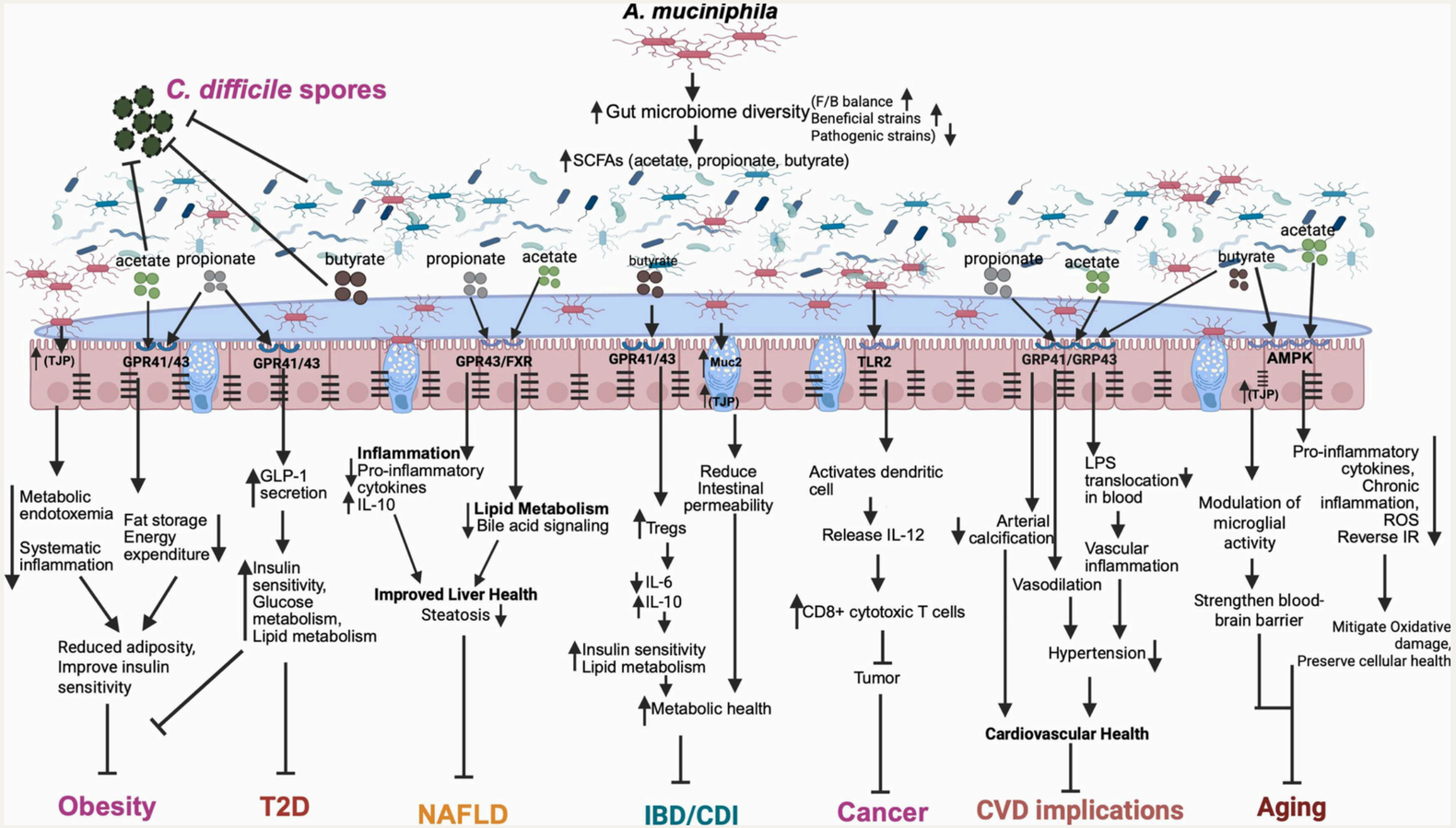


(Inczefi et al., 2022)

Mucus as a Microbial Ecosystem: Akkermansia

- **Positive feedback within the mucosal system**
  - Mucin degradation - stimulates mucus renewal
  - SCFA production - supports goblet cells & epithelial integrity
  - Cross-feeding - supports butyrate-producing keystone species

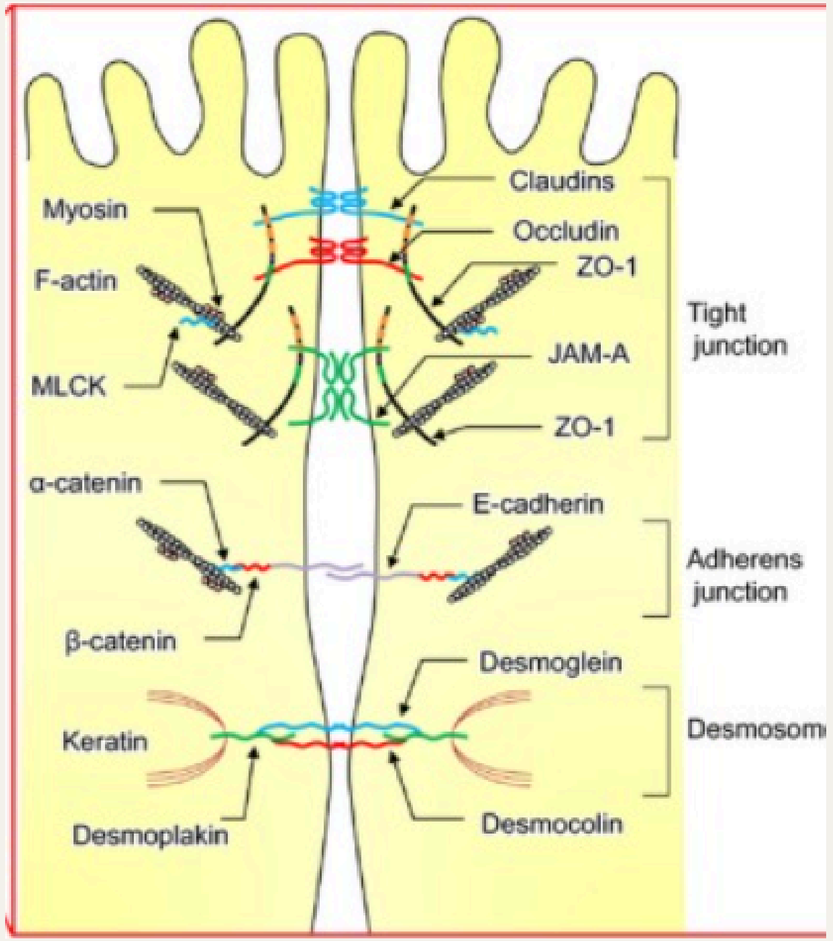
- **Host-level associated effects**
  - Improves insulin sensitivity, GLP-1 secretion & adiposity
  - Modulates immune signalling via TLR2
  - Strengthens barrier function



(Source: Shaheen et al., 2025)

Tight Junctions: The Gatekeepers

- **Claudins**
  - Form charge- and size-selective paracellular pores
  - Define baseline permeability for water and ions
- **Occludin**
  - Regulates junction stability and inflammatory responsiveness
  - Sensitive to oxidative and cytokine stress
- **ZO-proteins (e.g. ZO-1)**
  - Scaffold junctions to actin cytoskeleton
  - Transmit mechanical and metabolic signals



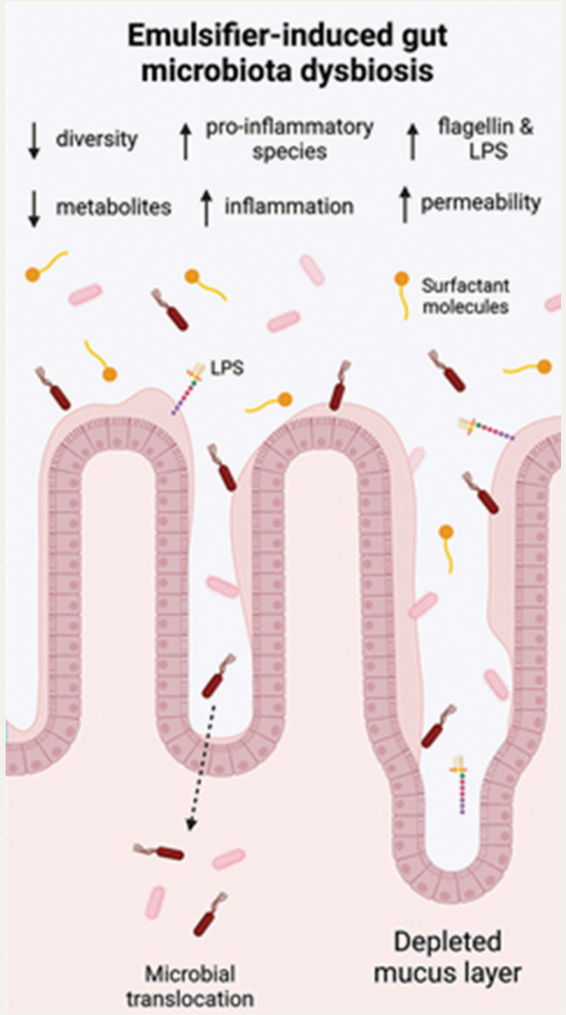
(Suzuki, 2020)

The Dietary Drivers of Intestinal Permeability

Key Dietary Stressors:

- **Ultra-processed foods (UPFs)**
  - **Emulsifiers and additives**
  - **Refined Seed Oils**
  - **Low fibre / low food matrix integrity**
  - **High refined carbohydrate and sugar load**

- **Micronutrient insufficiency** (Zn, Vit A, Vit D)



Mechanistic Impact on Barrier:

- **Mucus layer disruption**
- **Tight junction dysregulation**
  - Reduced claudin/occludin expression (low SCFA)
  - Cytoskeletal contraction via MLCK activation (stress, inflammation)
- **Reduced epithelial energy & renewal**
- **Enhanced permeability & LPS translocation**

(Chassaing et al., 2017; Iczefi et al., 2022; Wang et al., 2021; Deol et al., 2023)

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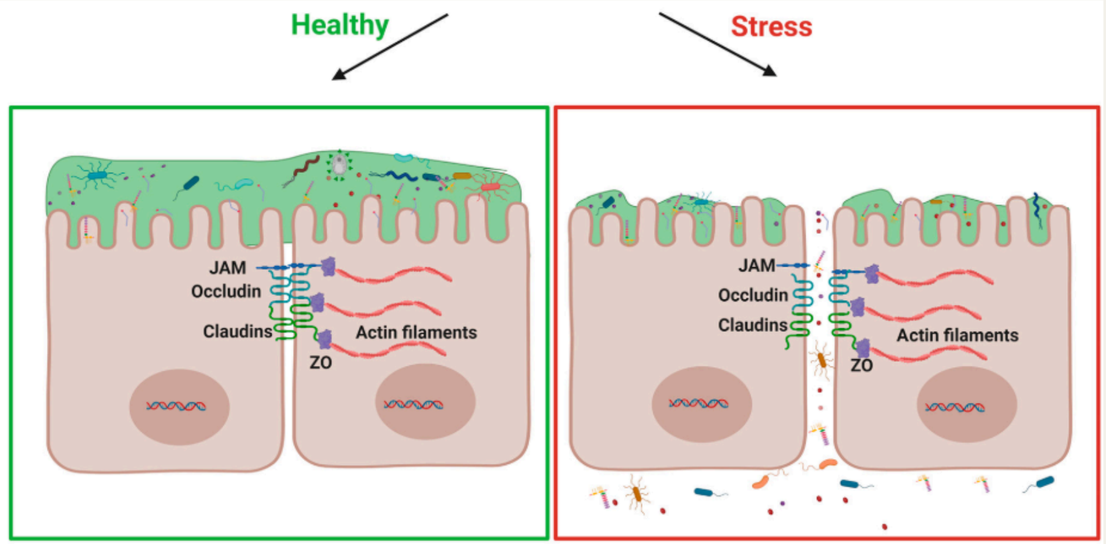
(Subramaniam,. 2023)

The Lifestyle Drivers of Intestinal Permeability

Non-Dietary Amplifiers

- **Chronic stress**
- **Poor sleep / circadian disruption**
- **Alcohol & medications (NSAIDs, antibiotics)**
- **Sedentary behaviour**



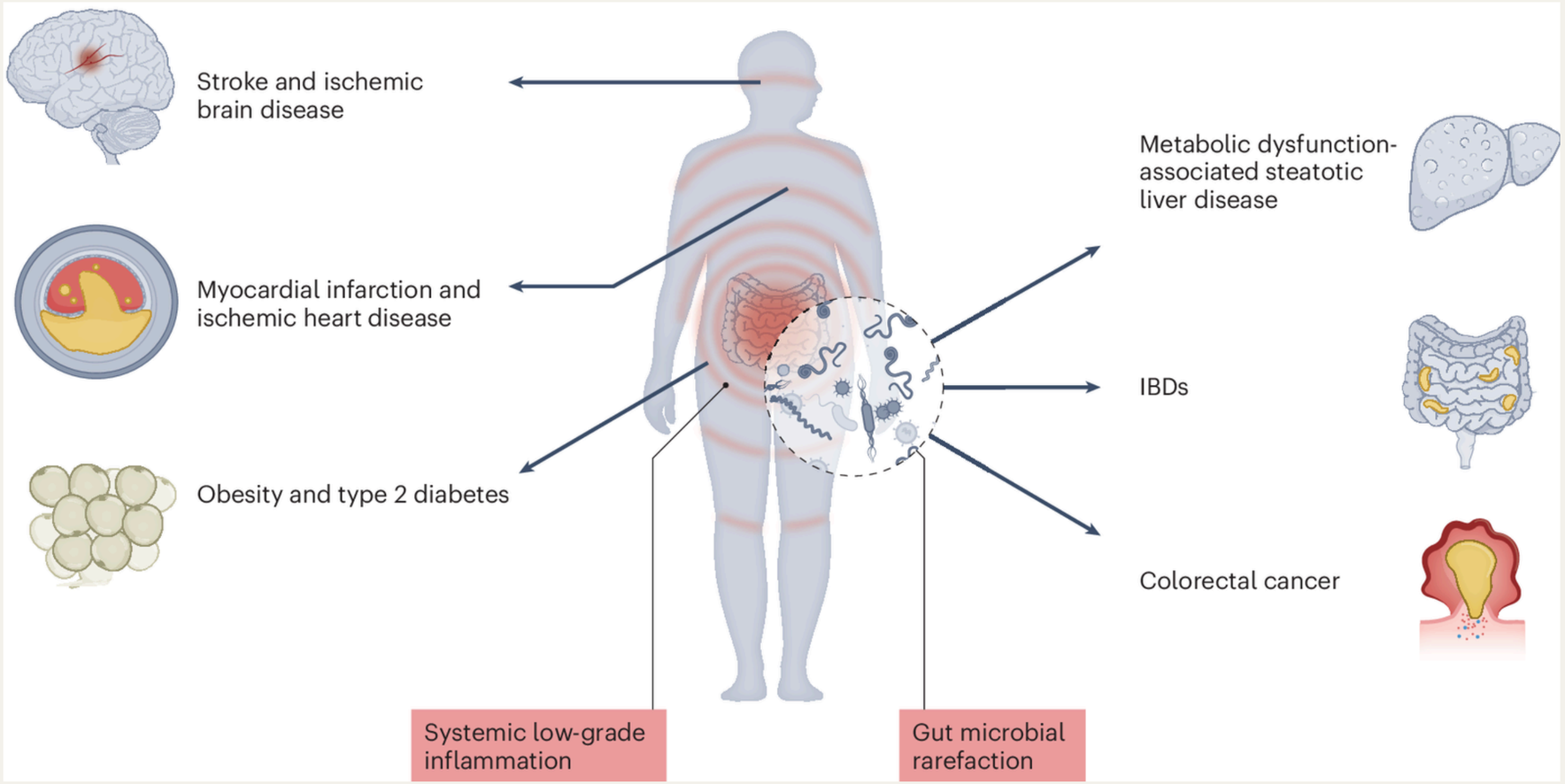
(Molotla-Torres,. 2023)

Mechanistic Pathways

- **HPA-axis activation → MLCK → tight junction contraction**
- **Dysbiosis → reduced SCFAs → impaired tight junction & mucus signalling**
- **Inflammatory cytokines → junction disassembly & increased paracellular leak**
- **Reduced epithelial turnover** (stress, sleep, nutrient insufficiency)
- **Direct epithelial damage** (alcohol, NSAIDs)

(Iczefi et al., 2022; Vanuytsel et al., 2021; Wang et al., 2021)

The Impact: Fight Club



(Gobas *et al.*, 2024)

Conditions Linked to Intestinal Permeability

Heightened intestinal permeability is implicated in a wide range of gastrointestinal and systemic conditions:

Gastrointestinal Disorders

- Irritable Bowel Syndrome (IBS) – particularly IBS-D and IBS-M subtypes
- Inflammatory Bowel Disease (IBD) – Crohn's disease and ulcerative colitis

Metabolic & Systemic Conditions

- Metabolic syndrome and insulin resistance
- Non-alcoholic fatty liver disease
- Type 2 diabetes
- Obesity

Gut-Axis Manifestations

- Skin conditions – acne, rosacea, eczema, perioral dermatitis
- Mental health – anxiety, depression, brain fog
- Autoimmune conditions
- Chronic fatigue and immune dysfunction

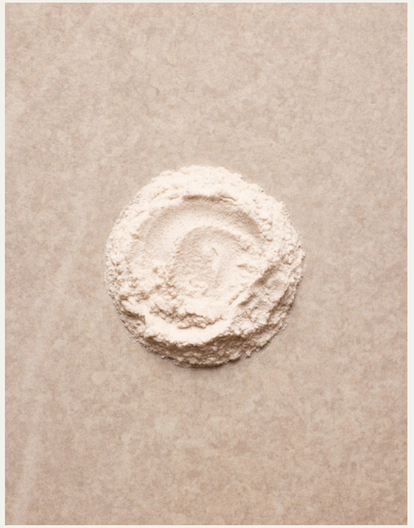
The common thread: a compromised intestinal barrier compromising health.

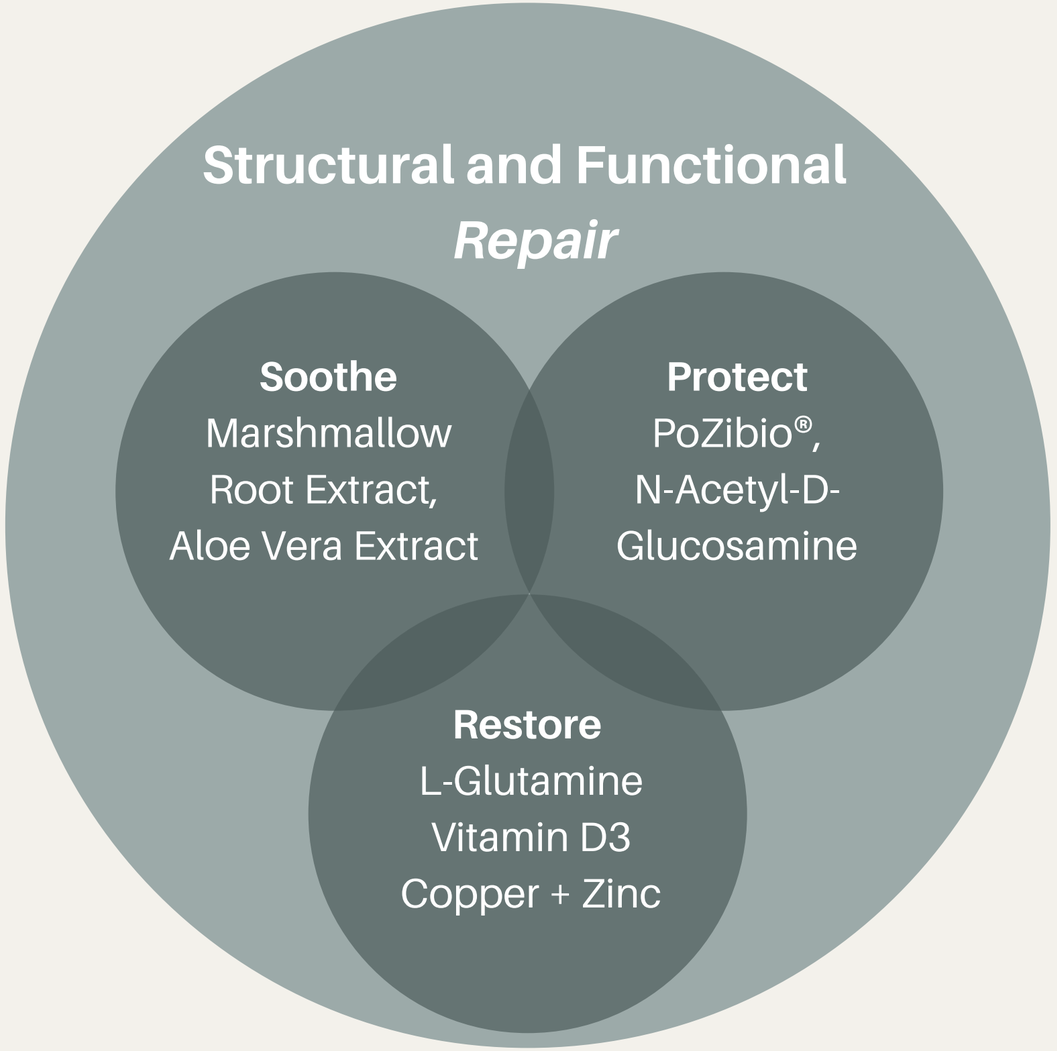
(Hanning et al., 2021)
(Michielan and D'Incà, 2015)
(Federica Di Vincenzo et al., 2023)
(Munteanu, Turti and Sorin Marian Marza, 2025)
(Safadi et al., 2021)

The 4 R's of Gut Restoration

	Key Actions	Mechanistic Rationale
Remove	Consider the **Mediterranean diet** (**The LIBRE study**): Limit ultra-processed foods, refined sugars & seed oils; Promote **Stress** and **Sleep** management.	Reduces inflammatory signals, reduces mucous erosion, prevents tight junction destabilisation. (Seethaler et al., 2022)
Replace	Restore **digestive capacity**: adequate gastric acid, bile flow, pancreatic and brush-border enzymes, and sufficient macronutrient intake.	Supporting digestion reduces antigenic load and normalises luminal signalling upstream of the epithelium. (Vanuytsel et al., 2021)
Repair	Support **intestinal barrier integrity** through nutrients and metabolites that strengthen tight junctions, the mucus layer, epithelial turnover, and immune regulation (e.g. glutamine, zinc, omega-3s, polyphenols).	Enhances tight junctions, mucus secretion, anti-inflammatory signalling. (Wang et al., 2021)
Reinoculate	Promote microbiome friendly fermented foods, prebiotics, probiotics	Restores a stable community of SCFA-producing microbiota, microbial diversity, immune tolerance (Suzuki 2020; Seethaler et al., 2022)

Introducing elénzia FIX® - Repair Phase Optimisation





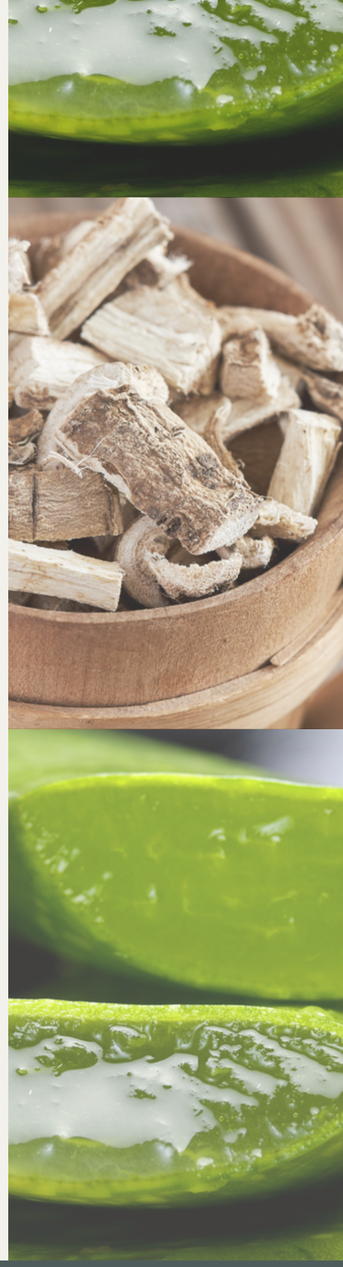
elénzia FIX® - Soothe

Marshmallow Root Extract + Aloe Vera extract

Soothing polysaccharides coat the GI tract and promote tissue regeneration.

Marshmallow Root (*Althea officinalis L.*) Contains demulcent polysaccharides (arabinogalactans, rhamnogalacturonans) that form abio-protective gel on GI mucosa, stabilising mucilage throughout the entire digestive tract, from oesophagus to colon, maintaining hydration and preventing epithelial friction (Deters et al., 2009).

Aloe Vera (*Aloe barbadensis*) is uniquely rich in acemannan, which has been shown to stimulate tissue regeneration, particularly epithelial cell repair by promoting cell proliferation, migration, and wound healing (Bai et al., 2023).



elénzia FIX® - Protect

(PoZibio® + N-Acetyl-D-Glucosamine)
Nutraceutical synergy provides the stimuli and raw material for mucin restoration.

PoZibio® (*Lactobacillus paracasei D3.5*) postbiotic that delivers lipoteichoic acid (LTA) which has been demonstrated in-vivo to stimulate goblet-cell mucin O-glycans (MUC2) production in the colon (Wang et al., 2019)

N-Acetyl-D-Glucosamine (**NAG**) modulates immune and inflammatory signalling whilst providing the substrate for MUC2 synthesis, synergising with PoZibio® to re-establish a protective mucosal environment supporting keystone species like *Akkermansia muciniphila* and modulating SCFA production (Choi et al., 2023)

elénzia - Ingredients For Life® - Real World Results

Design: Randomised, single-blind, *placebo*-controlled trial

Participants: 82 adults (18–65 years)

Groups: PoZibio Vs Control (Prebiotic fibre)

750mg Sunfiber®

100mg PoZibio®

340mg PoZibio®

Duration: 8 weeks

Methods: 1 capsule taken twice per day, 30min before meal

Assessments:
GSRS (GI symptom rating)
DQLQ (Quality of life impact)
Bi-weekly via Ingredients for Life® app

elénzia - Ingredients For Life® - Real World Results

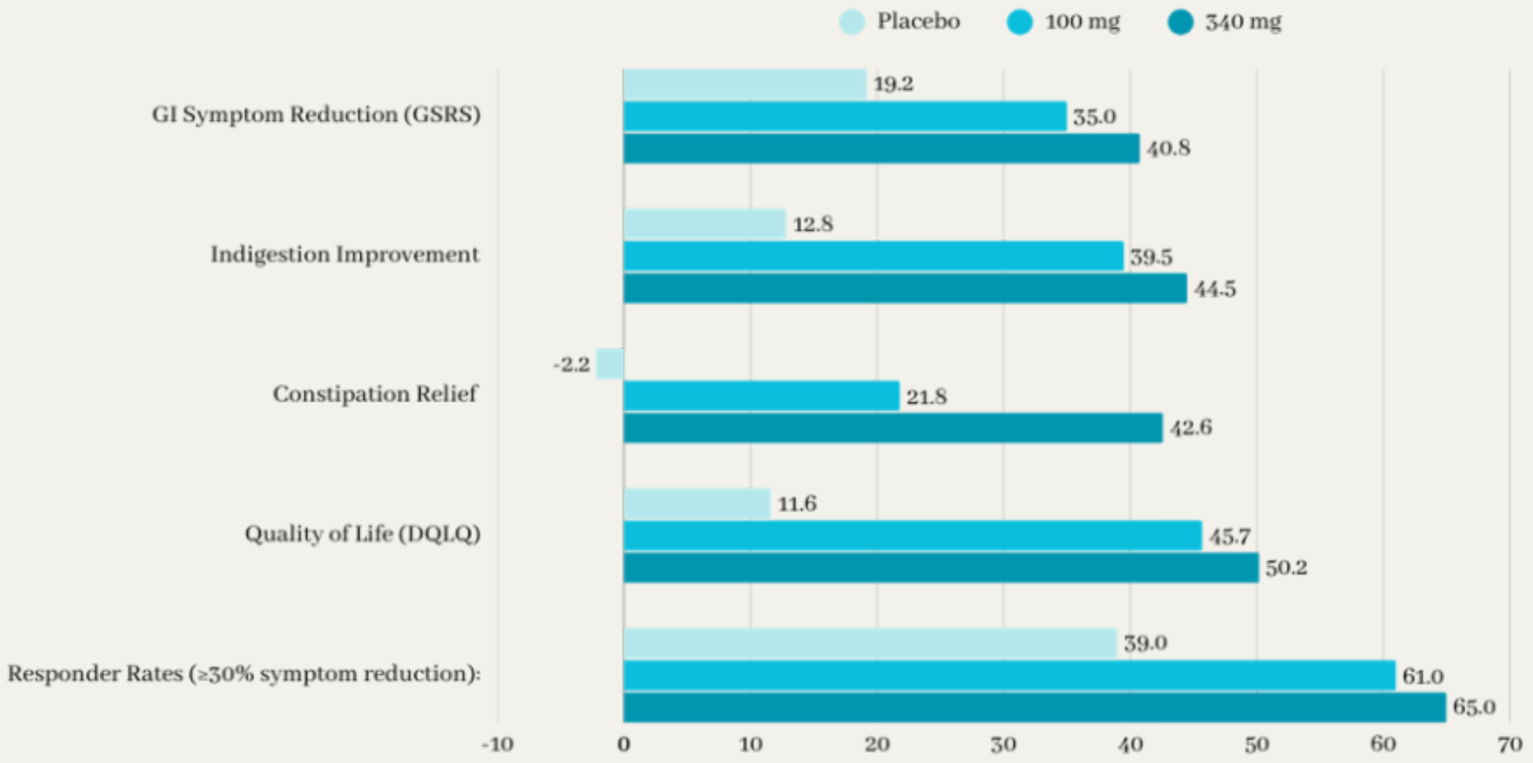


Fig. 1 Cross-sectional comparison of percentage changes in overall improvements from baseline to week 8 across study arms

Participant feedback after 8 weeks on the 100mg dose:

"Significant lowering of acid problems. Able to eat things I haven't for years such as pickles and bread no burping, everything so much calmer. I feel like I've been reset, rebooted. I feel like I did many years ago. How long will this last? I am cured of my awful issues?"

– 65 y/o Female

elénzia FIX® - Restore

L-Glutamine – *Fundamental Support*

L-Glutamine

- Protects tight-junction integrity (occludin, claudins)
- Supports cell proliferation, repair & cytoskeletal organisation in enterocytes.
- Elevated requirement under stress (Rao and Samak., 2012).

Clinical Outcomes at Optimal FIX® Dose (15 g/day)

- 58% reduction in IBS-Severity Score (IBS-SSS).
- 88% clinical responders vs 60% in control group (low FODMAP diet).
- Improved motility, stool form & quality of life (Rastgoo et al., 2021).

Zinc & Copper - *Structural Barrier Reinforcement*

Zinc directly regulates Claudins, occludin, ZO-1 and actin cytoskeleton organisation (Liu et al., 2021).

Copper supports angiogenesis, collagen & elastin cross-linking, strengthening the mucosa (Chen et al.,2020)

Algal Derived Vitamin D_3 (D3V®)- *Immune-Barrier Integration*

VDR activation regulates tight-junction proteins & antimicrobial peptides.

Promotes **GALT** immune tolerance reducing chronic inflammatory drive (Fakhoury et al., 2020).

elénzia FIX® - Clinician Guidance - Testing, Not Guessing

Test	Principle	Practical Use	Pros	Cons / Notes
Lactulose–Mannitol Ratio (LMR)	Differential urinary sugar excretion reflects small intestine paracellular permeability	Baseline & post-intervention assessment	Non-invasive; well-validated	Requires urine collection and specialised lab analysis
Sucralose or PEG test	Measures total gut permeability via urinary excretion	Assess entire GI tract	Non-invasive; complements LMR	Longer collection; lab analysis needed
I-FABP	Marker of enterocyte injury	Supportive, non-invasive	Quick blood test	Only indicates epithelial damage, not barrier function
LPS, LBP, sCD14	Indicators of microbial translocation	Supplementary to functional tests	Non-invasive; part of inflammatory panel	Indirect; interpret considering supporting information

(Vanuytsel et al., 2021)

elénzia FIX® - Clinician Guidance .1

For clients with symptoms of mucosal irritation:

- IBS-D or IBS-M–type bowel patterns
- Chronic bloating, gas, or digestive reactivity
- Food sensitivities or post-infectious gut changes
- Skin presentations including; acne, rosacea and eczema
- Stress-related gut symptoms or low immune resilience

elénzia FIX®
Soothe, Repair, Restore

Ingredient	Per 1 Tbsp (7.5 g)	Per 2 Tbsp (15 g)	Per 3 Tbsp (22.5 g)
	Maintenance Phase		*Optimisation Phase*
L-Glutamine	5 g	10 g	15 g
PoZibio®	60 mg	120 mg	180 mg
N-Acetyl D-Glucosamine	1.3 g	2.6 g	3.9 g
Marshmallow root 5:1	435 mg	870 mg	1,300 mg
Aloe extract 200:1	340 mg	680 mg	1,000 mg
Zinc	5 mg	10 mg	15 mg
Copper	1 mg	2 mg	3 mg
Vitamin D3V®	25 µg (1000 IU)	50 µg (2000 IU)	75 µg (3000 IU)

elénzia FIX® - Clinician Guidance .2

elénzia FIX®: What makes a good supplement?

1. **Effective** - dosed according to literature where possible
2. **Palatable** - Light tropical flavour
3. **Convenient** - Simple dosing & soluble formulation
4. **Clean Label** - No fillers, flow agents, artificial sweeteners...

Full Ingredients listing: L- Glutamine, N-Acetyl-D-Glucosamine, Marshmallow Root 5:1 Extract (Althaea officinalis), Aloe Vera 200:1 Extract (Aloe Barbadensis Leaf Juice Powder), Heat-treated Lactobacillus paracasei D3.5 (as PoZibio®), Natural Flavour, Natural Sweetener: Steviol Glycosides (E960), Zinc (Zinc Gluconate), Copper (as Copper Citrate Hemitrihydrate), Vitamin D_3 (as VD3® cholecalciferol from algae).

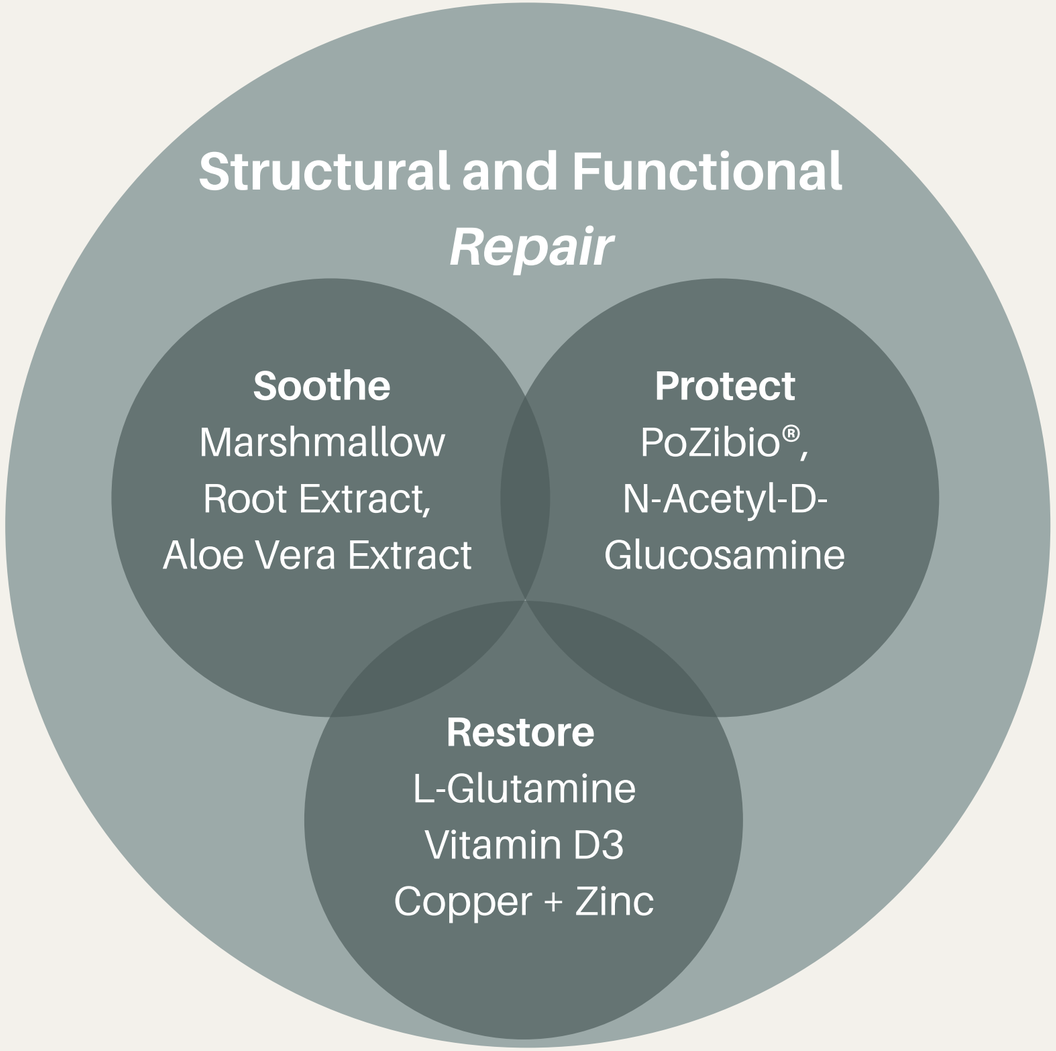
No artificial colours or flavours, no fillers or anti-caking agents. Non-GMO. Suitable for vegans.

elénzia FIX® | 450g | Pouch
Soothe, Repair, Restore

Why is elénzia FIX® the Science-Backed Solution?

- Poor Gut Health is the ***New Normal***
- **Removing** (reducing) UPF's and known irritants is essential, yet difficult to sustain.
- People are looking for answers in pre and postbiotics to **reinoculate** their gut.
- But they neglect the **repair** phase - rebuilding the mucosa - ***The Home of our Microbiome***

elénzia FIX® targets the foundational pillars of gastrointestinal integrity, taking full advantage of dietary and lifestyle modification.



Any Questions?

Thank you for listening

If you want to find out more or have any questions, please contact:

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The Healthy Ageing Experts

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www.professional.medical.elenzia.com

Scan to request your professional account

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