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Foundations Rewritten: The Microbiome Metabolism Axis in Modern Clinical Practice

Sinead Burns
Metagenics Australia



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Key Learning Outcomes

Understand the role of the microbiome–metabolism axis in modern chronic health presentations

Identify mechanisms linking gut barrier function to metabolic health and inflammation

Explore the emerging clinical relevance of *Akkermansia muciniphila*

Apply microbiome- and metabolism-focused strategies according to the patient's clinical phenotype.

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AGENDA

1. A weighty & complex clinical challenge
2. Where to go when diets don't work?
3. **Personalised care:**
   When to go with your Gut or lead with Metabolic focus

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Gut health is the foundation of health

- Digestion
- Metabolic health
- Immune regulation
- Gut barrier integrity
- Gut derived communication

Nutrition, lifestyle and targeted microbiome interventions work together to improve long-term health outcomes.



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Overweight and obesity in Australia

Seven in 10 Australian men are living with overweight or obesity.



33% are living with obesity

Six in 10 women are living with overweight or obesity.



31% are living with obesity

One in 4 children are living with overweight or obesity (2-17y)



8% are living with obesity

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Available online: www.aihw.gov.au/reports/overweight-obesity/overweight-and-obesity/contents/summary

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The clinical presentation



Excess adiposity



Insulin resistance



Systemic inflammation



Gut symptoms



Weight regain



Hormonal shifts

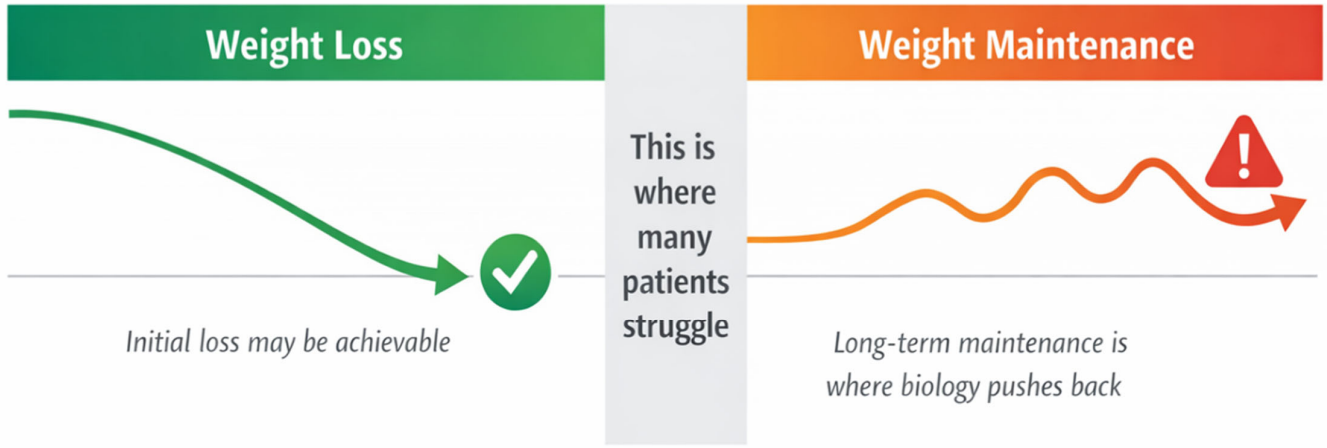
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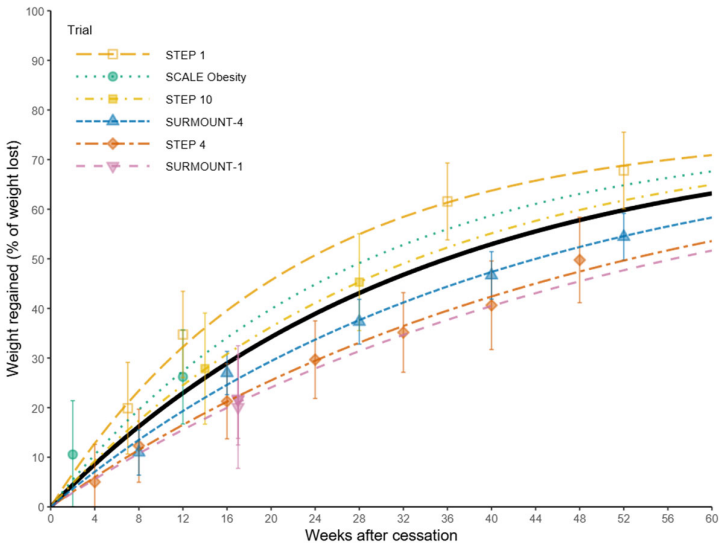
Weight maintenance = clinical challenge



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Post-treatment rebound



After GLP-1RA cessation, weight regain is substantial and begins early.

- 60% of lost weight regained at 1 year.
- Long-term regain estimated to plateau at 75% of lost weight.

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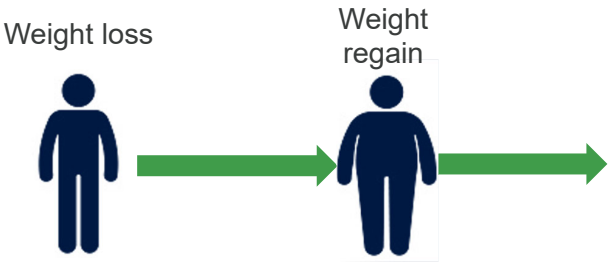
Budini B, et al. *eClinicalMedicine*. 2026. doi:10.1016/j.eclinm.2026.103796

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Weight regain occurs despite adherence



Appetite regulation shifts

Altered hypothalamic signalling → ↑ drive to eat

Energy expenditure declines

Greater lean mass loss → reduced energy expenditure

Adipose tissue remains altered

Persistent inflammation and obesogenic memory post-weight loss

Gut signalling may amplify regain

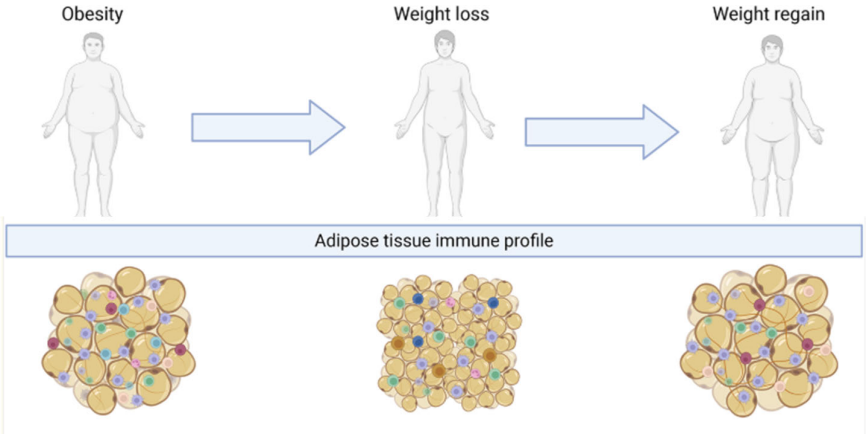
Microbiome shifts and impaired gut barrier → metabolic endotoxaemia and low-grade inflammation

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van Baak, M. A., et al. *Current obesity reports.* 2025. doi: 10.1007/s13679-025-00619-x

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Adipose tissue is biologically primed for regain



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Caceres L, et al. *Arterioscler Thromb Vasc Biol.* 2025 Dec. doi: 10.1161/ATVBAHA.125.322196

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Introducing the microbiome–metabolism axis

Diet, lifestyle, medication and age

Microbial composition and activity

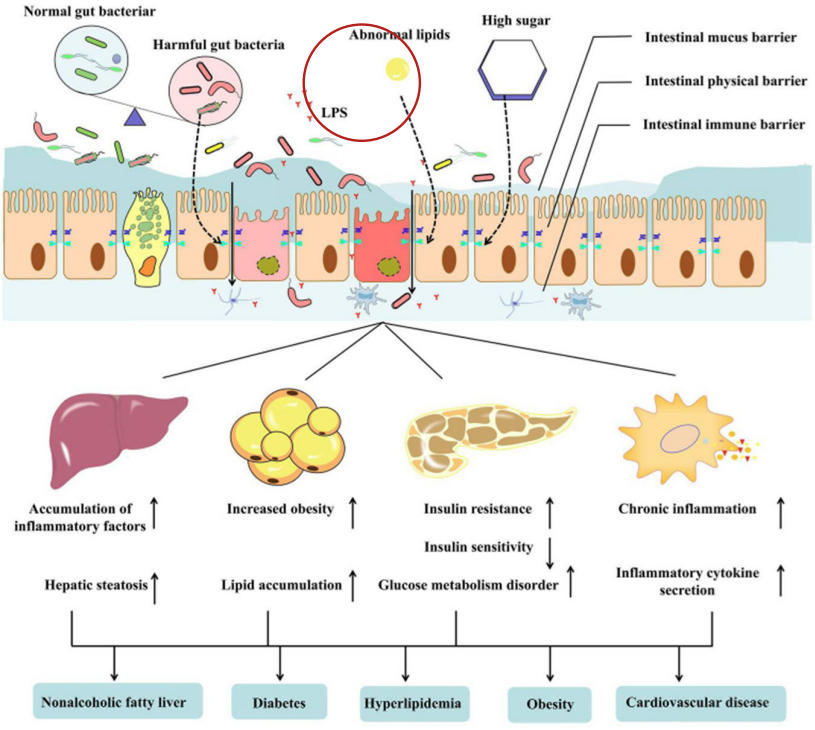
Mucus layer and epithelial barrier

Microbial metabolites and immune signalling

Insulin sensitivity, adipose biology, appetite and energy regulation

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When the microbiome-metabolism axis becomes disrupted

- Excess sugar/lipids
- Altered microbial balance
- Disruption of barriers
- Effects on organs, adipose tissue and immune system
- Downstream systemic effects

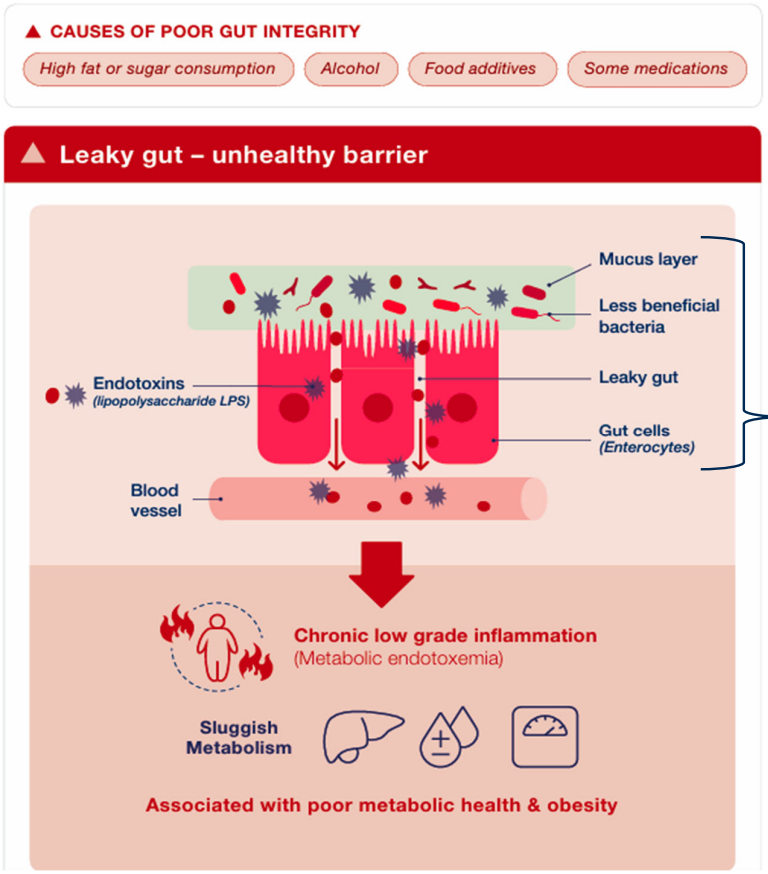
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Zhang Y, et al. *Front Nutr.* 2023 Mar 2. doi: 10.3389/fnut.2023.1120168

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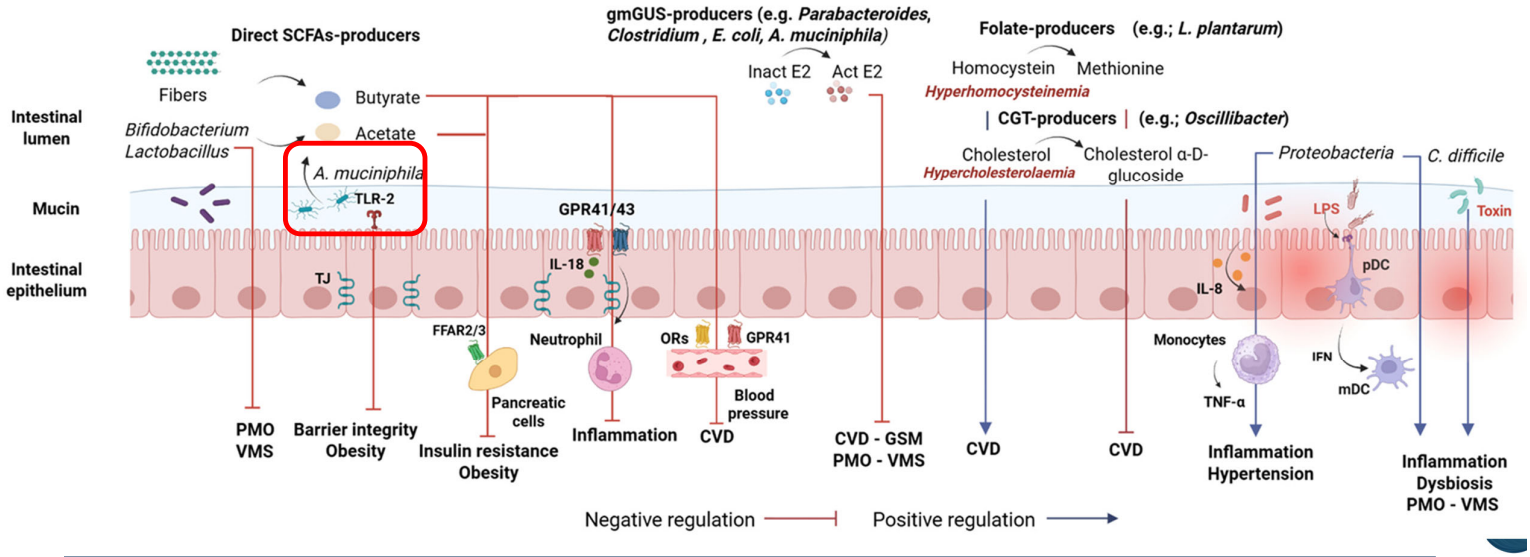
Lifestyle shapes metabolism via the gut barrier

Multi-layered gut barrier

Zhang Y, et al. *Front Nutr.* 2023 Mar 2. doi: 10.3389/fnut.2023.1120168

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Microbiome health shapes metabolic health



Ferrando ML, et al. *Ageing Res Rev.* 2026 Jan. doi: 10.1016/j.arr.2025.102950

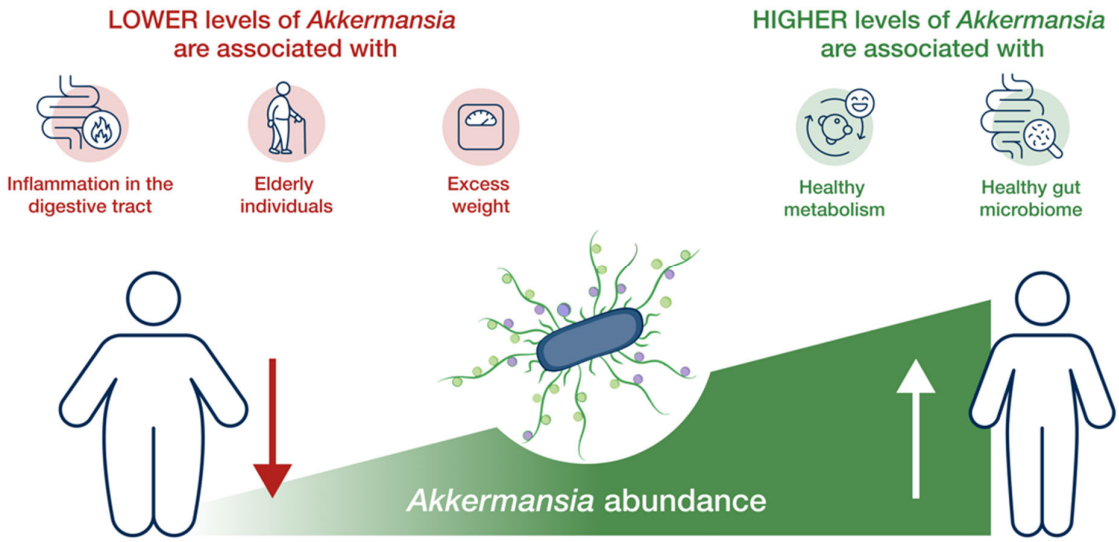
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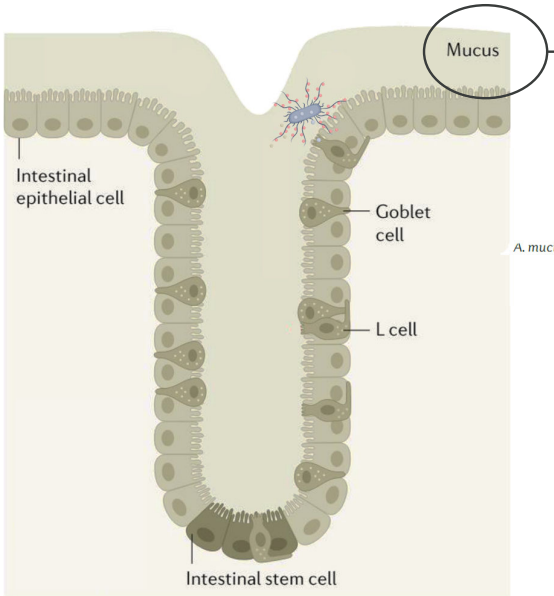
Why Akkermansia is attracting ‘metabolic’ attention?



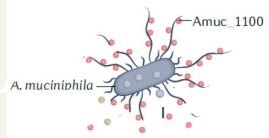
Cani PD, et al. Nat Rev Gastroenterol Hepatol. 2022 Oct;19(10):625-637. doi: 10.1038/s41575-022-00631-9.
Dao MC, et al. *Gut*. 2016 Mar;65(3):426-36. doi: 10.1136/gutjnl-2014-308778

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Akkermansia muciniphila - a crucial keystone species



A natural defense barrier



- Lives in the gut mucus layer
- Uses mucins as a nutrient source
- Helps mucus degradation, a normal turnover process
- Keeps mucus layer healthy
- Supports the gut barrier function
- Produces SCFA and metabolites that cross feed other butyrate producers

Cani PD, et al. Nat Rev Gastroenterol Hepatol. 2022 Oct;19(10):625-637. doi: 10.1038/s41575-022-00631-9
Derrien M, et al. *Int J Syst Evol Microbiol*. 2004;54(Pt 5):1469-1476. doi:10.1099/ijs.0.02873-0

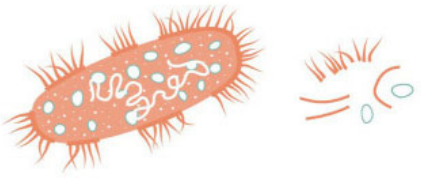
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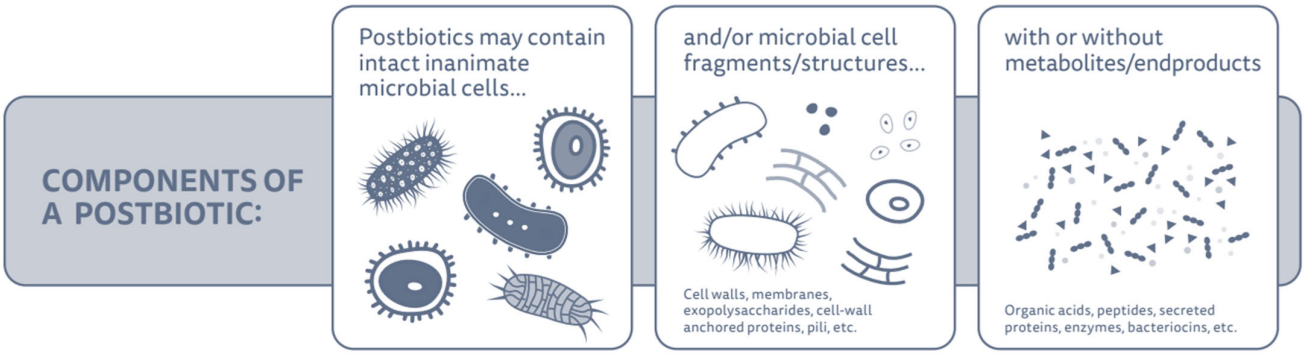
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What is a Postbiotic?

A preparation of inanimate microorganisms and/or their components that confers a health benefit on the host.



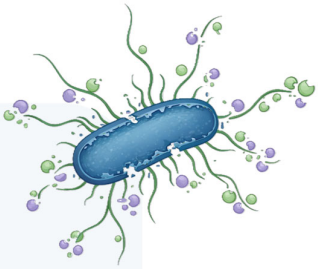


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ISAPP International Scientific Association for PROBIOTICS and PREBIOTICS

Accessed March 2026. https://isappscience.org/for-consumers/infographics/

Pasteurisation retains *A. muciniphila* MucT®'s gut-metabolic signalling



Pasteurisation (30 min at 70◦C)

- Retains bioactive molecules to facilitate healthy gut-metabolic signalling
- Stable: Room-temperature stable, ensuring reliable delivery
- Safe: Non-colonising
- Versatile: Can be used alongside antibiotics

MucT® is a registered trademark of The Akkermansia Company

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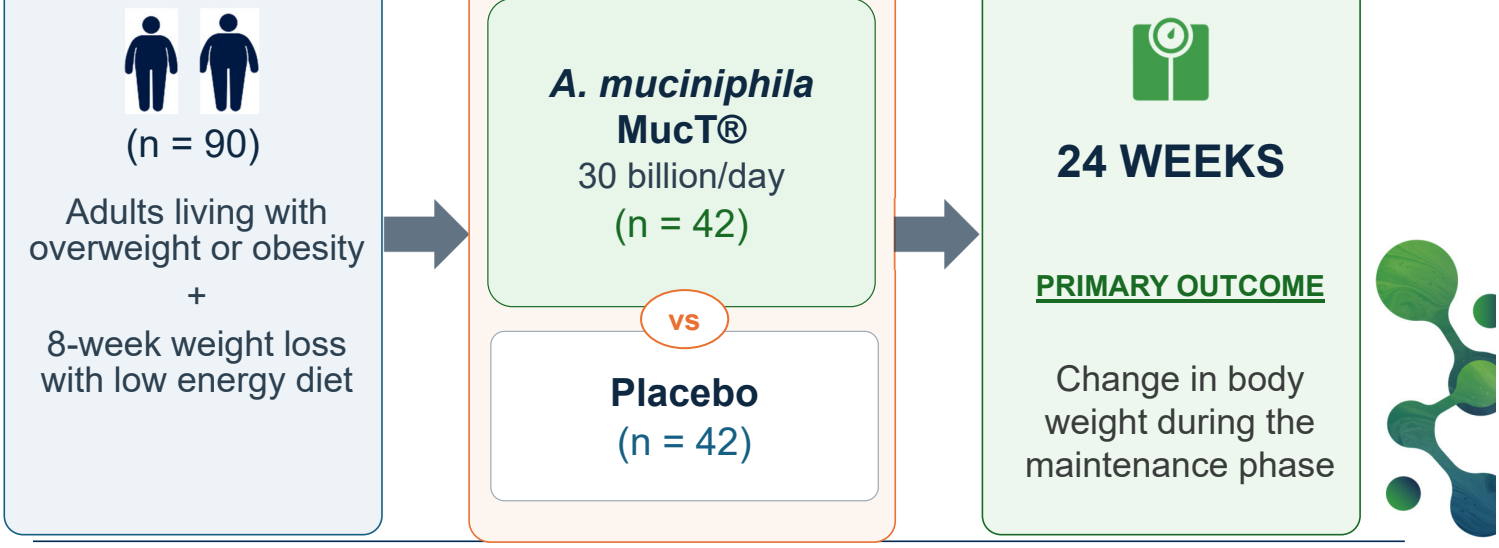
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Grant, E.T et al. *Nat Microbiol* **11**, 20–30 (2026). https://doi.org/10.1038/s41564-025-02222-1

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2026 Study - MucT® Postbiotic & weight regain



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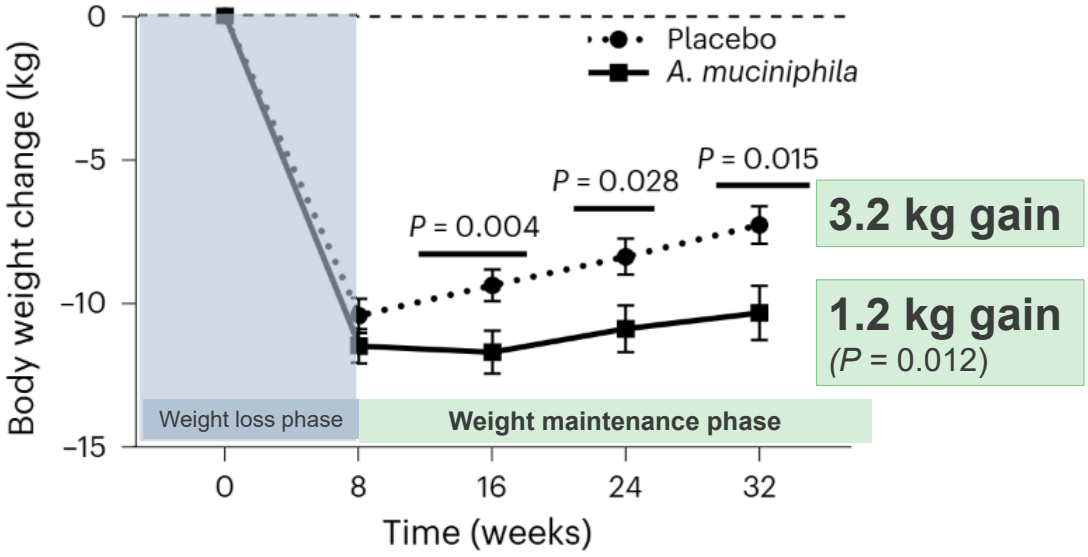
Mount S, et al. *Nat Med*. Published online May 13, 2026. doi:10.1038/s41591-026-04394-7

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MucT® Postbiotic is clinically shown to slow weight regain



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Mount, S., et al. *Nat Med.* 2026. doi.org/10.1038/s41591-026-04394-7

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MucT® Postbiotic supports preservation of insulin sensitivity during weight maintenance



*Matsuda Index is a measure of whole-body insulin sensitivity.

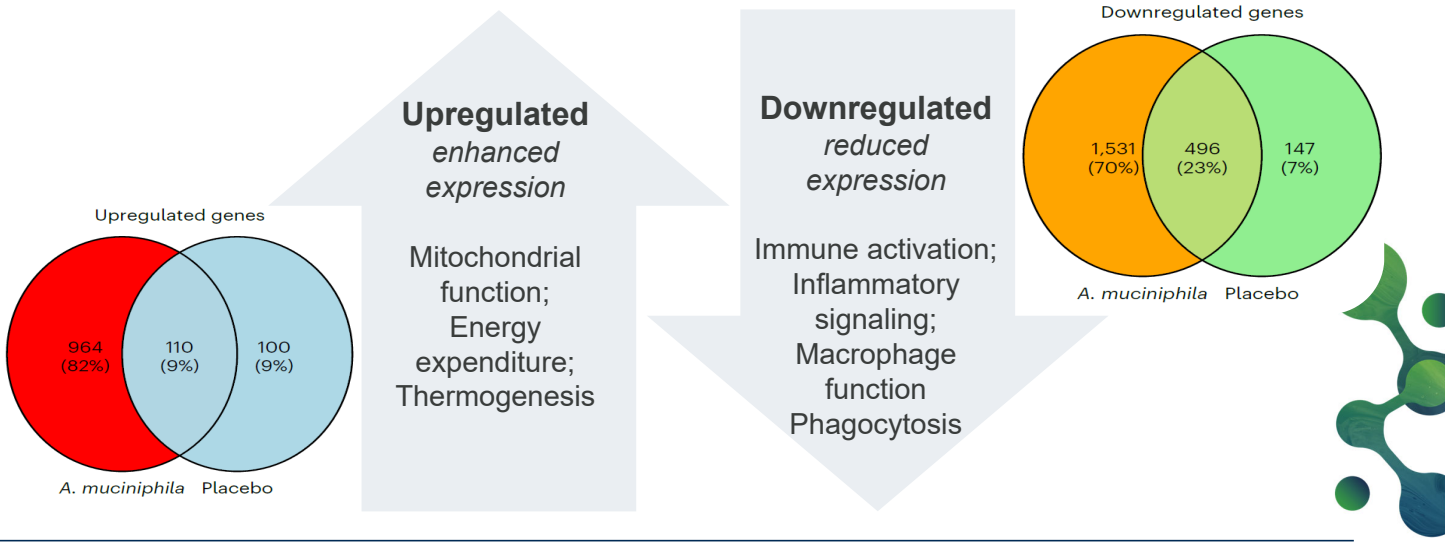
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Mount, S., et al. *Nat Med.* 2026. doi.org/10.1038/s41591-026-04394-7

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MucT® promotes metabolically active, anti-inflammatory adipose tissue phenotype during weight maintenance



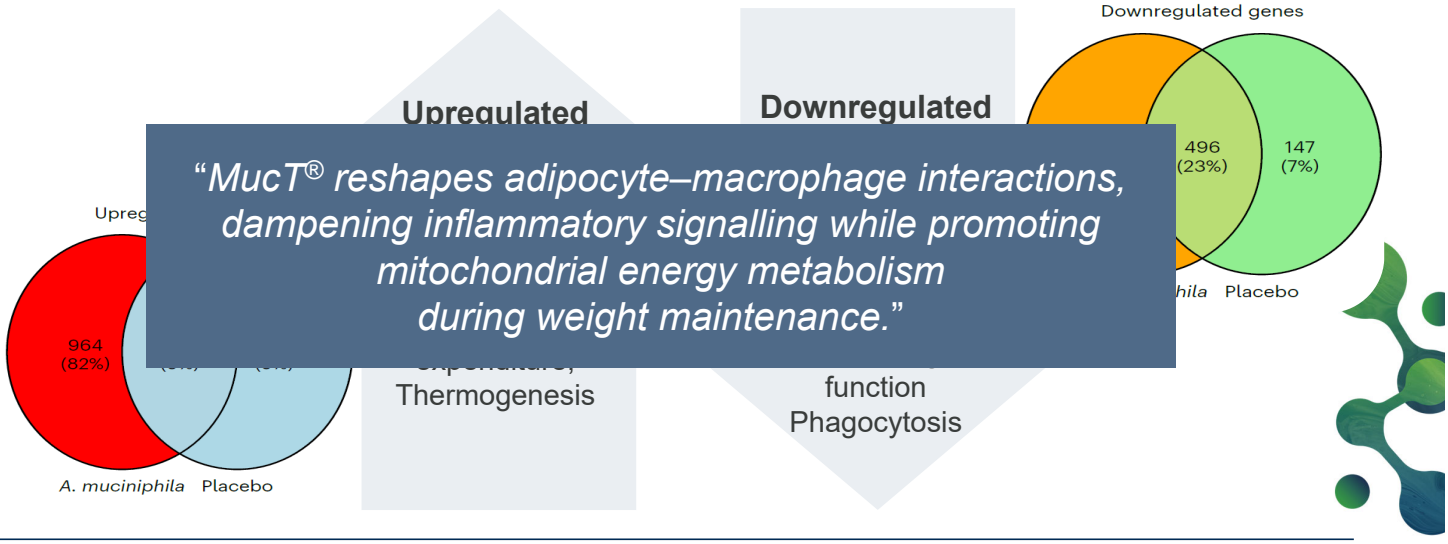
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Mount, S., et al. *Nat Med.* 2026. doi.org/10.1038/s41591-026-04394-7

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MucT® promotes metabolically active, anti-inflammatory adipose tissue phenotype during weight maintenance

> *"MucT® reshapes adipocyte–macrophage interactions, dampening inflammatory signalling while promoting mitochondrial energy metabolism during weight maintenance."*



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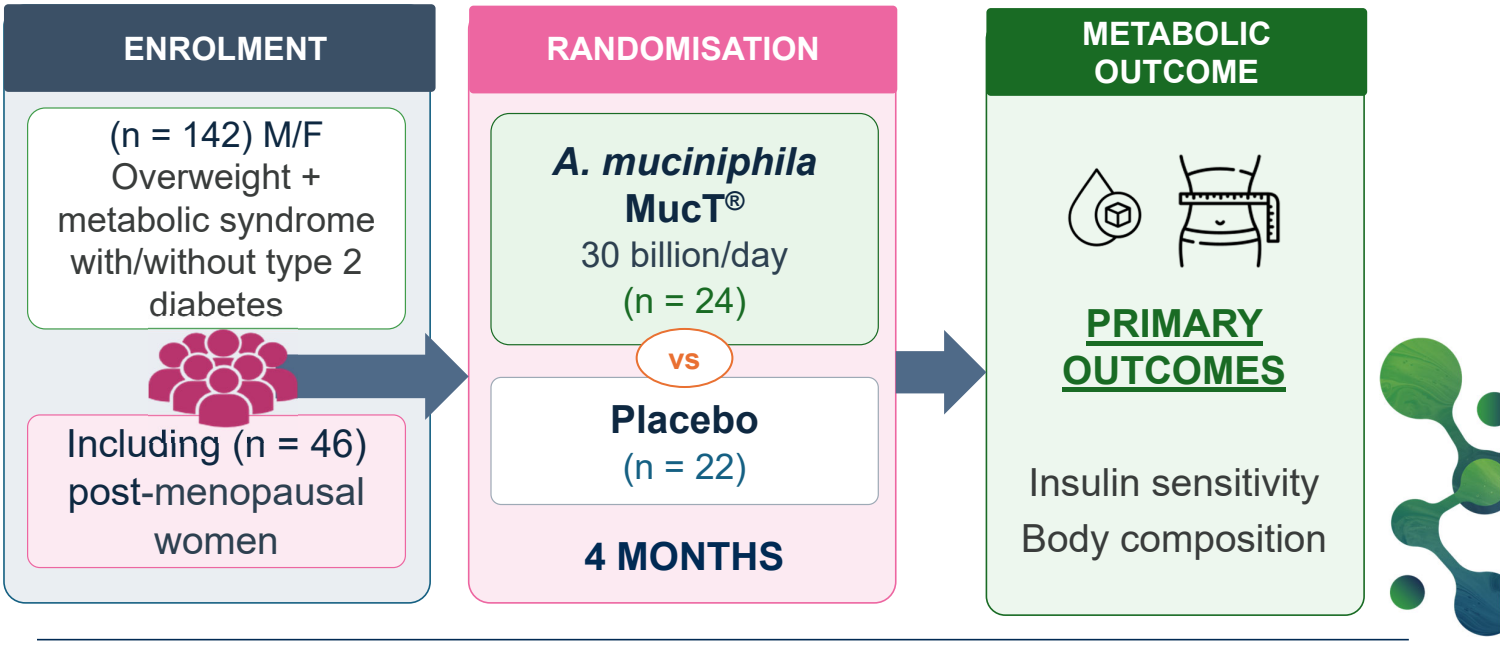
Mount, S., et al. *Nat Med.* 2026. doi.org/10.1038/s41591-026-04394-7

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Who else may benefit from MucT®?



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Suenaert P, et al. *Gut Microbes*. 2026 doi: 10.1080/19490976.2026.2690689

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Exploratory subgroup findings in postmenopausal women

(n=24) **MucT®** postbiotic

At 4 months

- Insulin sensitivity **+21%** (p= 0.031)
- Improved kidney function
  - ↑ eGFR (p= 0.031)
  - ↓ Creatinine (p= 0.008)

Why might postmenopausal women respond?

Menopause is associated with:

- ↑ visceral adiposity
- ↑ insulin resistance
- Depletion of *Akkermansia spp*.
- Endothelial dysfunction
- ↑ cardiometabolic and renal risk

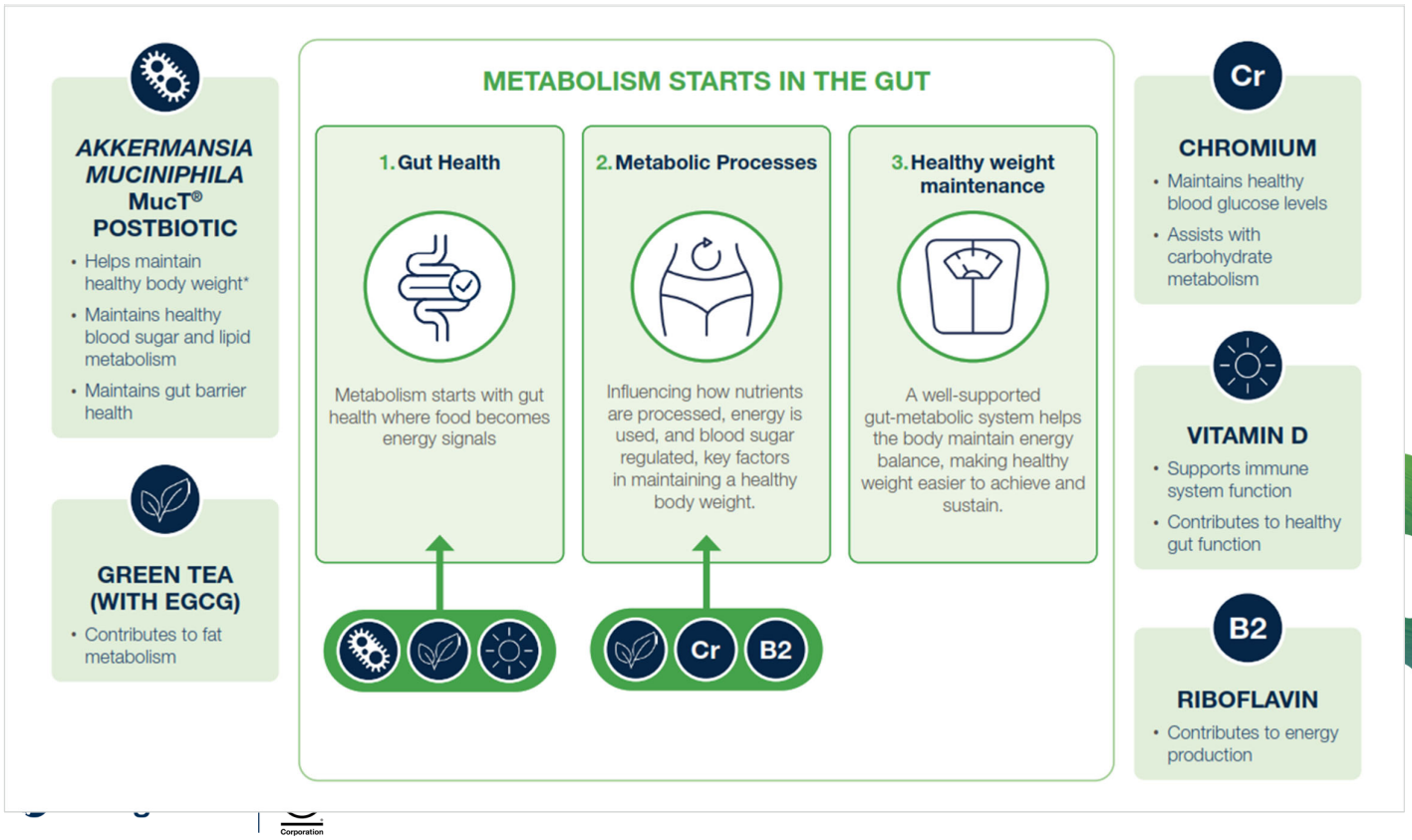
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Suenaert P, et al. *Gut Microbes*. 2026 doi: 10.1080/19490976.2026.2690689

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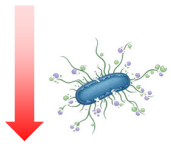
Patient profile











Post-weight loss phase

- Recently completed weight loss intervention
- At high risk of weight regain

Gut-metabolic dysfunction

- Impaired gut barrier
- Dysbiosis
- Low-grade chronic inflammation
- Hx of poor diet

Cardiometabolic risk profile

- Reduced insulin sensitivity
- Low-grade inflammation

Aging patients with poor metabolic health

- Reduced insulin sensitivity
- Existing metabolic conditions

Low baseline endogenous *Akkermansia muciniphila*

Clinically demonstrated support for weight maintenance and healthy glucose metabolism

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Where is your strongest clinical leverage point?

Gut-metabolic dysfunction

↓

Gut-metabolic support

↓

Akkermansia MucT® and Green Tea for Healthy Weight



Overt metabolic picture

↓

Metabolic support

↓

Indian Barberry & Milk Thistle for Blood Glucose Metabolism & Liver
+
B-420™ and HN019™ for Weight Control and Cardiometabolic Health

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Reductions in central adiposity with berberine and silymarin

1000 mg/d berberine + 210 mg/day silymarin for 52 weeks, n=136

Waist circumference (cm)

Baseline	52 weeks
Berberine + silymarin: 118 → 103	-15 cm
Placebo: 116 → 110	- 6 cm

↓ 15 cm

Bioimpedance-derived visceral fat (%)

Baseline	52 weeks
Berberine + silymarin: 23 → 14	-39%
Placebo: 23 → 19	-17%

↓ 39%

Guarino G, et al. *J Biol Regul Homeost Agents*. 2017 Apr-Jun;31(2):495-502. PMID: 28685558

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Evidence for synergy of berberine + probiotics

Cohort	Intervention	Duration	Key Findings
Newly Diagnosed T2D (N=409)	Berberine 1.2 g/day ± multi-strain probiotic (>50B CFU/day)	12 weeks	• **Berberine + probiotics** achieved the greatest HbA1c reduction (-1.04%) and improved fasting and postprandial glucose. • Enhanced abundance of *Ruminococcus bromii*, supporting metabolic homeostasis.
Newly diagnosed T2D (N=365)	Berberine 1.2 g/day ± multi-strain probiotic (>50B CFU/day)	12 weeks	• **Berberine + probiotics** produced superior reductions in postprandial total cholesterol and LDL-C versus berberine or probiotics alone. • Increased *Bifidobacterium breve* shown to enhance lipid metabolism.
Newly diagnosed hyperglycemia (N=300)	Berberine 1 g/day ± *Bifidobacterium* probiotic (2M CFU/day)	16 weeks	• **Berberine + probiotics** delivered the greatest HbA1c improvement while significantly reducing fasting and postprandial glucose. • Demonstrated enhanced microbiome modulation versus probiotics alone.

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References on next slide

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Evidence for synergy of berberine + probiotics

- Yifei Z, Yanyun G, Huahui R, et al. Gut microbiome-related effects of berberine and probiotics on type 2 diabetes (the PREMOTE study). *Nat Commun*. 2020. doi:10.1038/s41467-020-18414-8
- Wang S, Ren H, Zhong H, et al. Combined berberine and probiotic treatment as an effective regimen for improving postprandial hyperlipidemia in type 2 diabetes patients: a double blinded placebo controlled randomized study. *Gut Microbes*. 2022. doi:10.1080/19490976.2021.2003176
- Ming J, Yu X, Xu X, et al. Effectiveness and safety of *Bifidobacterium* and berberine in human hyperglycemia and their regulatory effect on the gut microbiota: a multi-center, double-blind, randomized, parallel-controlled study. *Genome Med*. 2021 Aug. doi: 10.1186/s13073-021-00942-7

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Bifidobacterium animalis subsp. lactis

2 distinct strains join forces for healthy weight & metabolism

B420™	HN019™
Weight + adiposity strain	**Cardiometabolic strain**
↓ body fat mass, ↓ central/android fat, ↓ waist cm ↓ appetite & supports satiety	↓ BMI ↓Total cholesterol, ↓LDL-C ↓Inflammation – TNF-α, IL-6 ↓homocysteine ↑ adiponectin



Shared actions:

• Gut barrier support • GI barrier resilience • Healthy inflammatory regulation • Microbiome modulation • Metabolic health support

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Akkermansia MucT® and Green Tea for Healthy Weight





Indian Barberry & Milk Thistle for Blood Glucose Metabolism & Liver
+
B-420™ and HN019™ for Weight Control and Cardiometabolic Health

Prioritise when:

- **Weight loss maintenance**
- History of gut concerns with weight gain
- Gut barrier dysfunction + metabolic endotoxaemia
- High-fat ultra-processed diet
- Low *A. munciniplila* abundance

Prioritise when:

- **Metabolic risks** (insulin resistance, dyslipidaemia, dysglycaemia, obese, high VAT)
- For suboptimal responders to MucT®
- Probiotic gut-metabolic support

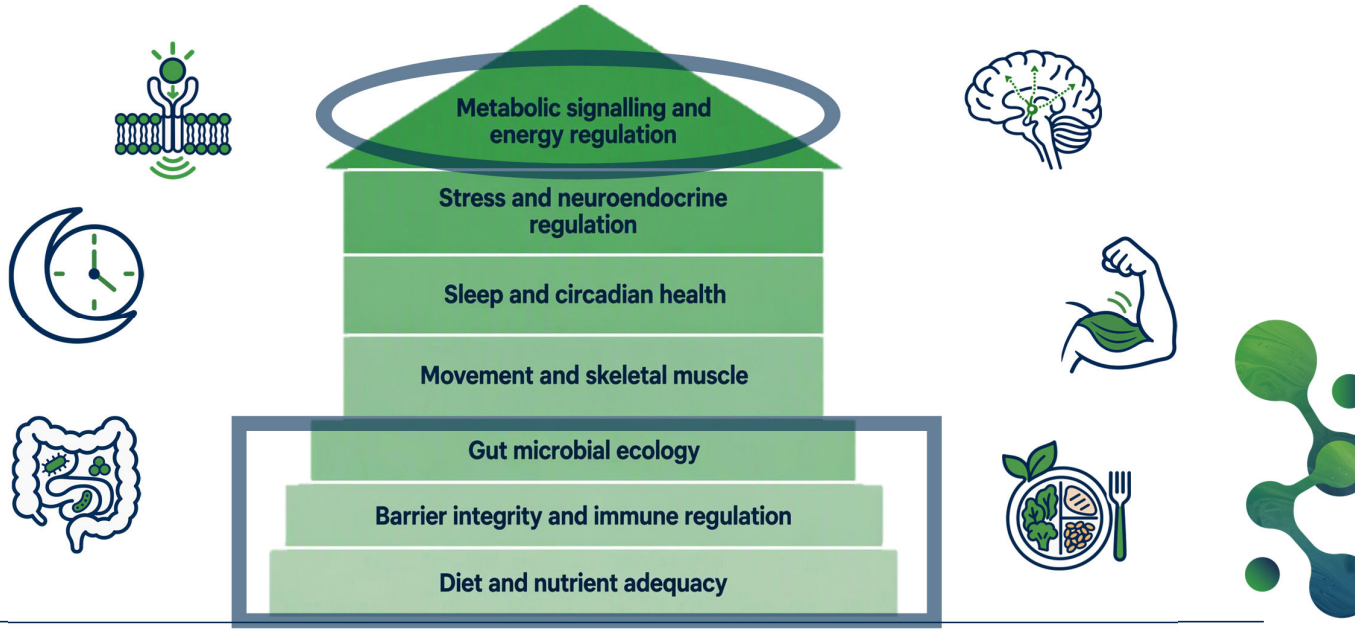
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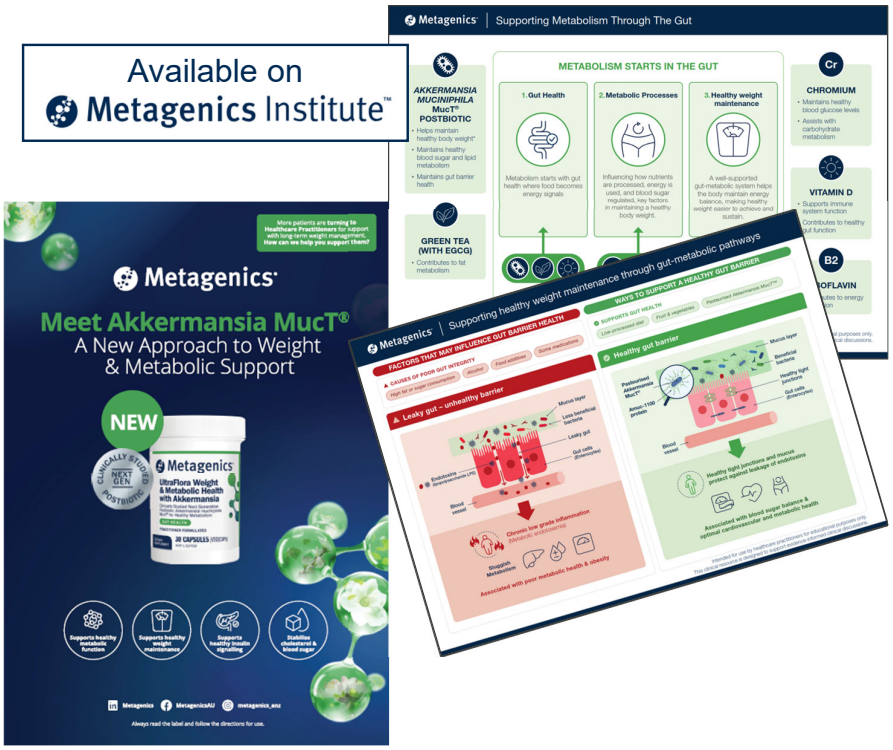
The foundations have not changed. Our understanding has

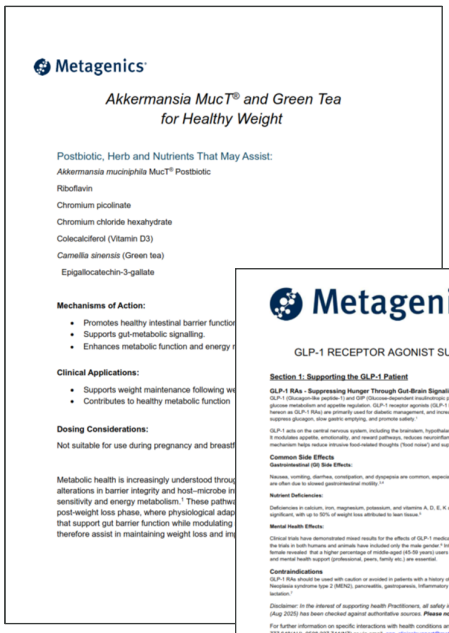


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Akkermansia MucT® and Green Tea for Healthy Weight

Postbiotic, Herb and Nutrients That May Assist:

Akkermansia muciniphila MucT® Postbiotic
Riboflavin
Chromium picolinate
Chromium chloride hexahydrate
Colecalciferol (Vitamin D3)
Camellia sinensis (Green tea)
Epigallocatechin-3-gallate

Mechanisms of Action:

- Promotes healthy intestinal barrier functio
- Supports gut-metabolic signalling.
- Enhances metabolic function and energy r

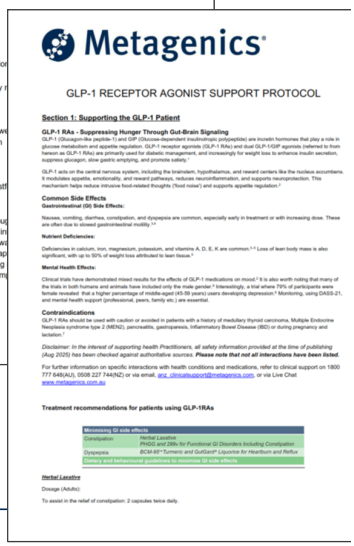
Clinical Applications:

- Supports weight maintenance following we
- Contributes to healthy metabolic function

Dosing Considerations:

Not suitable for use during pregnancy and breastf

Metabolic health is increasingly understood throug alterations in barrier integrity and host–microbe in sensitivity and energy metabolism.[1] These pathwa post-weight loss phase, where physiological adap that support gut barrier function while modulating therefore assist in maintaining weight loss and im


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GLP-1 RECEPTOR AGONIST SUPPORT PROTOCOL

Section 1: Supporting the GLP-1 Patient

GLP-1 RAs - Suppressing Hunger Through Gut-Brain Signaling

GLP-1 (Glucagon-like peptide-1) and GIP (Glucose-dependent insulinotropic polypeptide) are incretin hormones that play a role in glucose metabolism and appetite regulation. GLP-1 receptor agonists (GLP-1 RAs) and dual GLP-1/GIP agonists (referred to from hereon as GLP-1 RAs) are primarily used for diabetic management, and increasingly for weight loss to enhance insulin secretion, suppress glucagon, slow gastric emptying, and promote satiety.[1]

GLP-1 acts on the central nervous system, including the brainstem, hypothalamus, and reward centers like the nucleus accumbens. It modulates appetite, emotionality, and reward pathways, reduces neuroinflammation, and supports neuroprotection. This mechanism helps reduce intrusive food-related thoughts ("food noise") and supports appetite regulation.[1]

Common Side Effects

Gastrointestinal (GI) Side Effects:

Nausea, vomiting, diarrhea, constipation, and dyspepsia are common, especially early in treatment or with increasing dose. These are often due to slowed gastrointestinal motility.[1,4]

Nutrient Deficiencies:

Deficiencies in calcium, iron, magnesium, potassium, and vitamins A, D, E, K are common.[1,4] Loss of lean body mass is also significant, with up to 50% of weight loss attributed to lean tissue.[1]

Mental Health Effects:

Clinical trials have demonstrated mixed results for the effects of GLP-1 medications on mood.[1] It is also worth noting that many of the trials in both humans and animals have included only the male gender.[1] Interestingly, a trial where 79% of participants were female revealed that a higher percentage of middle-aged (45-59 years) users developing depression.[1] Monitoring, using DASS-21, and mental health support (professional, peers, family etc.) are essential.

Contraindications

GLP-1 RAs should be used with caution or avoided in patients with a history of medullary thyroid carcinoma, Multiple Endocrine Neoplasia syndrome type 2 (MEN2), pancreatitis, gastroparesis, Inflammatory Bowel Disease (IBD) or during pregnancy and lactation.[1]

Disclaimer: In the interest of supporting health Practitioners, all safety information provided at the time of publishing (Aug 2025) has been checked against authoritative sources. ***Please note that not all interactions have been listed.***

For further information on specific interactions with health conditions and medications, refer to clinical support on 1800 777 648(AU), 0508 227 744(NZ) or via email, anz_clinicalsupport@metagenics.com, or via Live Chat www.metagenics.com.au

Treatment recommendations for patients using GLP-1RAs

Minimising GI side effects	
Constipation	Herbal Laxative *PHGG and 299v for Functional GI Disorders Including Constipation*
Dyspepsia	*BCM-95™ Turmeric and GutGard® Liquorice for Heartburn and Reflux*
Dietary and behavioural guidelines to maximise GI side effects	

Herbal Laxative

Dosage (Adults):

To assist in the relief of constipation: 2 capsules twice daily.

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Three take-home messages

1. Microbiome and gut barrier health belong in the metabolic assessment

Consider how microbial metabolites and barrier-immune signalling may contribute to the patient's metabolic presentation. Interpret these alongside clinical history and metabolic risk..

2. Akkermansia muciniphila MucT® as a next-generation postbiotic

Emerging research is continuing to add clinical benefits. Consider pasteurised Akkermansia muciniphila MucT® as an adjunct to foundational metabolic care.

3. Foundations first – including gut microbiome!

The microbiome does not replace the foundations of metabolic care. It helps us understand why those foundations work differently from one patient to another, and where more targeted support may add value.

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Q&A with Special Guests

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Join us for Afternoon tea



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