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GLP 1 Therapies and GI Health:

Mechanisms, Microbiome Interactions and Lifestyle Medicine Strategies to Support Digestive Health

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Introduction

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What we will cover today

1. Review how GLP-1 receptor agonists impact gastrointestinal physiology
2. Review the common GI complaints and their underlying mechanisms
3. Explore motility, bile flow, gut barrier and microbiome impact
4. Identify key nutritional deficiency risks
5. Discuss diet, lifestyle and supplement strategies to help mitigate gastrointestinal side effects and support digestive health in individuals using these medications.

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The GI symptom landscape

GI side effects are the norm, not the exception

Patients affected	Gastric emptying
40–70%	**80%**
experience GI adverse effects	show delayed emptying (motility capsule)

GLP-1 RAs slow more than just the stomach: in a wireless motility capsule case series, **90% of patients** on GLP-1 RAs showed delays in at least one GI segment — gastric emptying (80%), small bowel transit (33%) or colonic transit (33%) (Cymbal et al. 2025).

Cymbal et al. 2025 ACG Case Rep J · Sodhi et al. 2023 JAMA · Jalleh et al. 2024 Lancet Gastroenterol Hepatol · Reiss et al. 2025 Biomolecules

Pre-existing UK nutrient deficits

- Many clients enter therapy with low nutrient status
- GLP-1 RAs compound this by reduced caloric intake (35–50%) • narrower food variety • early satiety • possible vomiting losses

NDNS 2019–2023 (OHID, 2025) — biomarker status		
Vitamin D	**18%**	*of adults 19–64y deficient (rising to 31% in winter)*
Folate	**83%**	*of women 16–49y have RBC folate below NTD risk threshold*
Iodine	**↓25%**	*median urinary iodine in adults 19–64y since 2013*

Derbyshire 2018 (NDNS yrs 1–6) — % adults below LRNI from food

Nutrient	Women	Men	Note
Selenium	**50%**	26%	*antioxidant pathway*
Iron	**25%**	—	*menstruation, vegetarian*
Potassium	**24%**	—	*BP, cardiovascular*
Magnesium	**19%***	19%*	**adults 20–29y*

NDNS 2019–2023 (OHID, 2025) · Derbyshire 2018 · Friedrichsen et al. 2021 Diabetes Obes Metab · Blundell et al. 2017 · Cymbal et al. 2025 · Sodhi et al. 2023 JAMA · Jalleh et al. 2024

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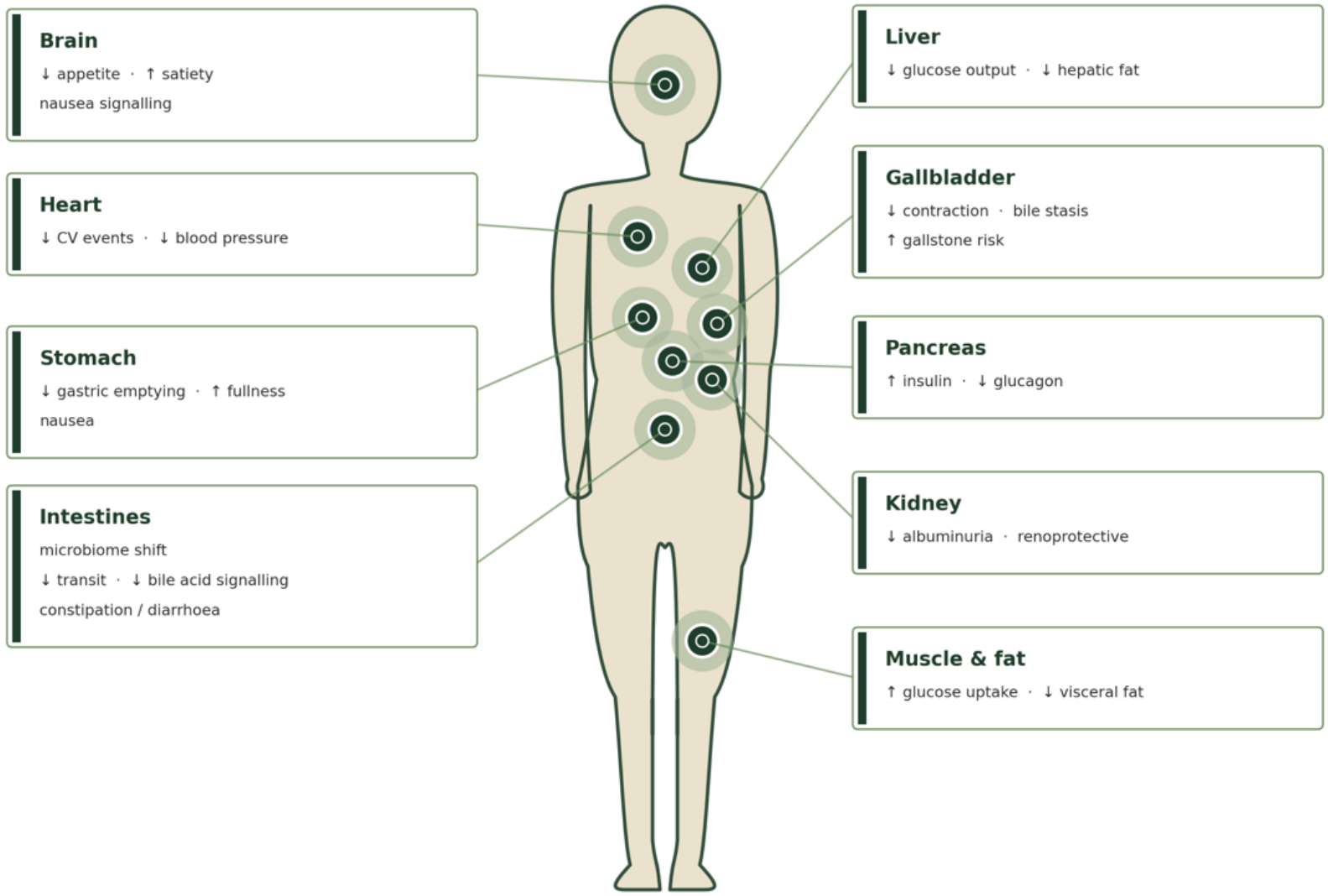
GLP-1 agonists act on multiple organ systems



GLP-1 agonists act on multiple organ systems simultaneously, supporting glycaemic control, weight loss, and cardio-renal protection.

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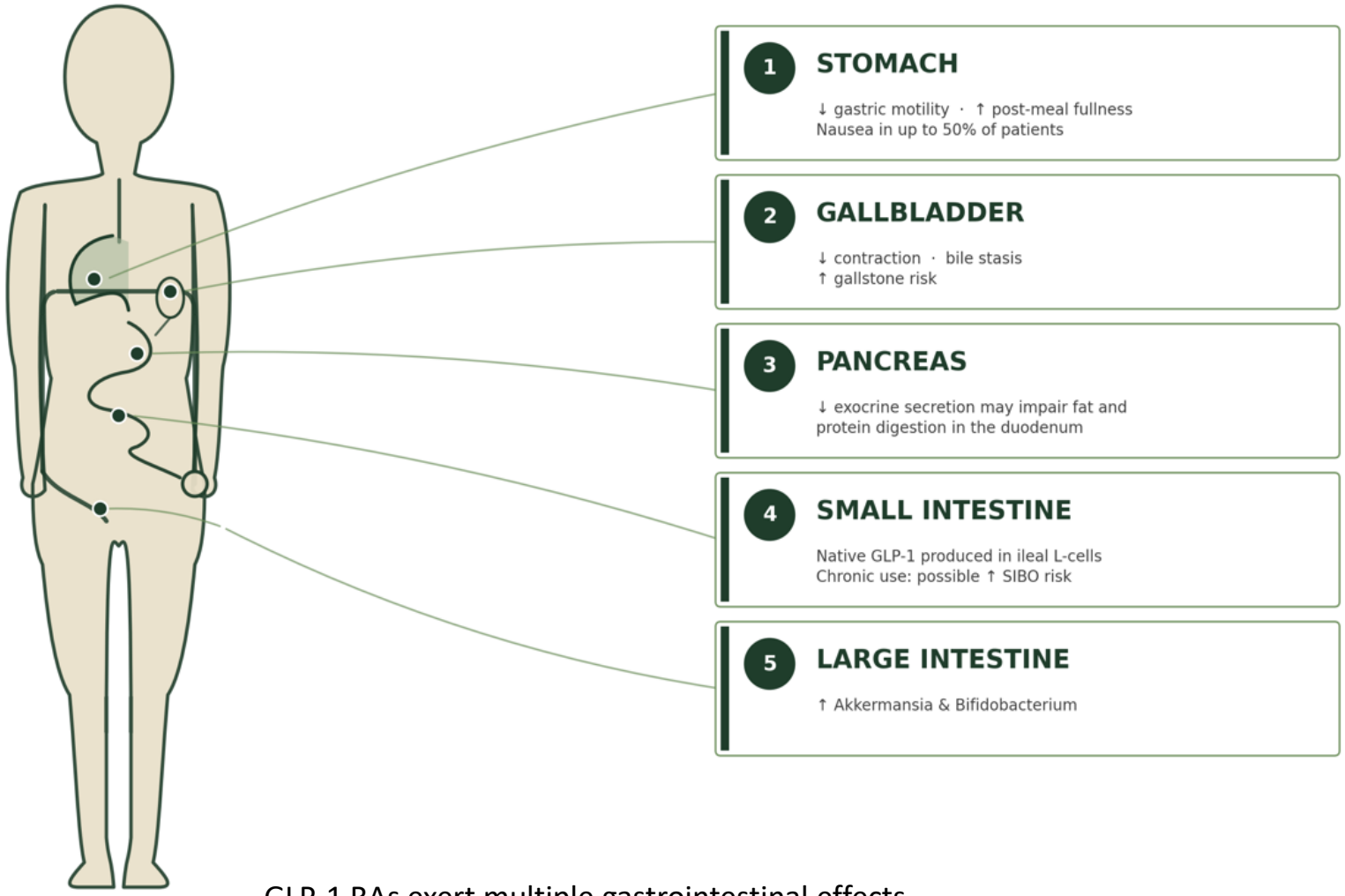
The Focus for Today



GLP-1 RAs exert multiple gastrointestinal effects

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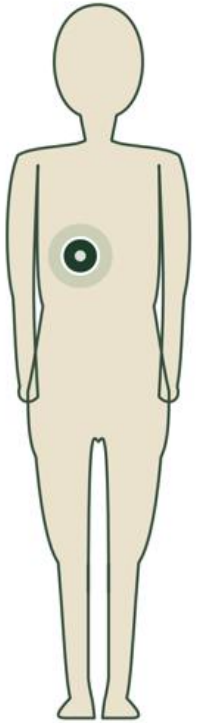
The Stomach

GLP-1 RA agonists slow gastric emptying — local symptoms, downstream risk, and practical support



Local symptoms

- Nausea
- Vomiting
- Reflux/GERD
- Feeling of fullness, belching
- Gastroparesis

Downstream effects

- Suppression of digestive enzymes
- Suppressed CCK
- Reduced MMC activity

Diet and Supplement support

- Smaller, nutrient-dense meals / consider setting alarm reminders
- Mindful eating
- Hydration + electrolytes / consider setting alarm reminders
- Gentle post-meal movement
- Digestive enzymes

Jalleh et al. 2024 Endocrinology · Cymbal et al. 2025 ACG Case Rep J · Sodhi et al. 2023 JAMA · Saha et al. 2025 Mayo Clin Proc · Ismaiel et al 2025 Int J of Obesity

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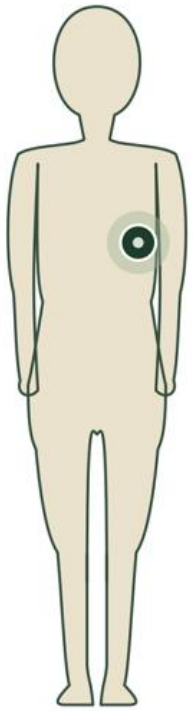
Conditions of the Gallbladder



GLP1-RA associations with Gallbladder & Biliary Disease

+27%	increased risk of cholelithiasis	*(RR 1.27)*
+36%	increased risk of cholecystitis	*(RR 1.36)*
+55%	increased risk of other biliary events (bile duct, biliary tract)	*(RR 1.55)*

Risk amplified by:

↑ higher dose • ↑ longer treatment duration

He et al. 2022 JAMA Intern Med — meta-analysis of 76 RCTs, 103,371 patients

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Bile flow — cascade, consequences & risk

Gastric emptying slowed

Pharmacological effect at GLP-1 receptors

Fat enters duodenum later

CCK signal correspondingly delayed

Bile release signal delayed

Gallbladder contraction less timely

Bile stasis & pooling

Concentrated bile favours crystallisation

Potential health consequences

Gallstone formation	Fat maldigestion	Fat-soluble vitamin loss
Concentrated bile forms sludge and stones	Without bile salts, dietary fats pass undigested	A, D, E, K absorption depends on emulsification

GLP-1 receptors in the gallbladder wall reduce gallbladder contractions

Jalleh et al. 2024 Endocrinology • He et al. 2022 JAMA Intern Med — meta-analysis of 76 RCTs, 103,371 patients

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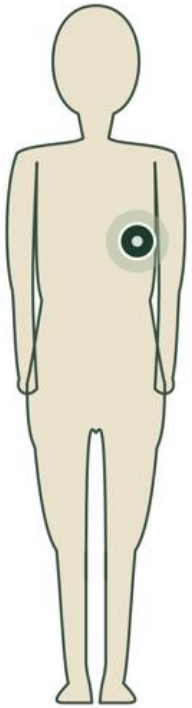
The Gallbladder



Local symptoms

- Nausea, pain
- Poor fat tolerance
- Urgency, loose stools
- Cholelithiasis
- Cholecystitis

Downstream effects

- Loss of bile's antimicrobial action
- Mucosal barrier loss of integrity

Diet and Supplement support

- Do not over-restrict fat – can worsen bile stasis
- Bitters (food sources, artichoke, gentian)
- Choleretics and cholagogues to support bile production and flow, e.g. dandelion, milk thistle, globe artichoke, burdock
- Lipase-containing digestive enzyme
- Monitor vitamin D levels and consider supplementing vitamin A, D, E and K. Liquid supplements may be preferable.

Note: *Use cholagogues with caution in patients with diagnosed gallstones or a history of biliary colic*

Ramírez-Mejía MM et al. 2025 *Ther Adv Endocrinol Metab* · Larabi AB et al. 2023 *Gut Microbes* · Floreani A et al. 2024 *Gastrointest Disord* · Degrassi I et al. 2023 *Nutrients*

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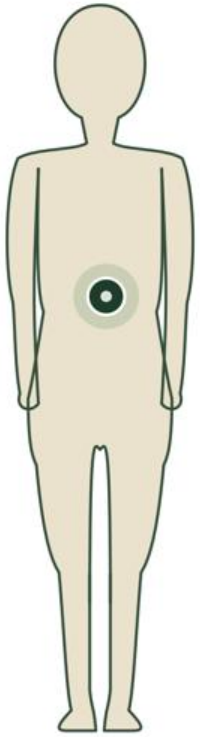
The Pancreas



Local symptoms

- Bloating, pain
- Altered bowel movements
- *Pancreatitis

Downstream effects

- Impaired digestion in duodenum
- Nutrient malabsorption

Diet and Supplement support

- Smaller, slower meals
- Mindfulness, prepare to eat
- Digestive enzymes

***Pancreatitis risk:** a long-standing concern, but **high-quality studies have not confirmed an increased class-wide risk** (Saha et al. 2025). Vigilance still warranted — monitor closely and advise patients to report new or persistent severe abdominal pain promptly.

Saha B et al. 2025. Mayo Clin Proc.

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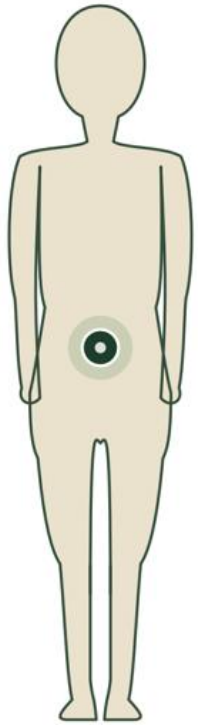
Gut Barrier and Microbiome

Microbial metabolites stimulate endogenous GLP-1; GLP-1 RAs reshape the microbiome



The impact of upstream drivers	Mitigating the impact
• Reduced intake of key nutrients for barrier health	• Barrier nutrients: vitamin D, zinc, glutamine, protein
• Reduced bile secretion → fat digestion and mucosal barrier compromised	• Bile support (foods, choleretics, cholagogues) + fibre to further support the mucosal barrier
• Increased risk of SIBO – bloating, constipation, diarrhoea	• Reduce SIBO risk: meal timing, digestive support
• Reduced fibre intake → reduced SCFA production	• Prebiotic fibres, polyphenols, diversity of plants, low and slow
• Slower transit → constipation, altered pH, fermentation & microbial communities	• Support transit time: hydration, plant diversity, prebiotics

Kamath et al. 2026 Br J Clin Pharmacol · Zeng et al. 2024 mBio · Gofron et al. 2025 Nutrients · Huber et al. 2024 Am J Clin Nutr · Singh et al. 2024 Cureus

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GLP-1 RAs and Gut Microbiome

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Systematic Review — Gofron et al., Nutrients 2025 (38 studies: 9 human, 29 animal) - liraglutide (Saxenda), semaglutide (Ozempic, Wegovy), exenatide (Byetta), dulaglutide

Emerging Impacts e.g.

***Akkermansia muciniphila* ↑**

All four agents — associated with improved barrier & metabolic health. Possible impact on endogenous GLP-1 secretion.

***Lactobacillus* ↑**

Some species may support endogenous GLP-1 secretion

SCFA producers ↑ e.g. *Faecalibacterium prausnitzii*

SCFAs associated with improved barrier, metabolic, and immune health

***Bifidobacterium* ↑**

Liraglutide & exenatide (human studies)

Mixed results in terms of diversity

More research needed, especially in humans

Limitations

Animal-heavy evidence

Most of the research in mice or rats

Very few RCTs

Only 2 randomised trials

High heterogeneity

Varied dose, duration, sequencing methodology (16s rRNA vs. metagenomic sequencing).

Uncontrolled confounders

e.g. metformin and dietary and lifestyles factors often unaccounted for obscuring the direct contribution of GLP-1 RAs to observed microbiota changes. Observed changes may also be secondary to metabolic improvement rather than primary therapeutic mechanisms.

Short-term data

Long-term microbiome effects essentially unknown

Future Research

Larger human RCTs

Establish causality; replicate animal findings

Long-term studies

Longitudinal studies required to assess persistence of shifts and the long-term gut microbiome impact

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Supporting Endogenous GLP-1

Dietary levers

- **Mediterranean / plant-rich pattern**
  Best-evidenced dietary pattern for enhanced GLP-1 secretion *Huber 2024; Mozaffarian 2025*
- **Macronutrient sensing — GPCRs & SGLT1**
  Peptides, amino acids, MUFAs, PUFAs and glucose directly trigger L-cell GLP-1 release *Huber 2024*
- **Fermentable fibre → SCFAs**
  Microbial fermentation produces SCFAs that stimulate L-cells via GPR41/GPR43 *Huber 2024*
- **Protein quality & timing**
  Whey best-studied; collagen also promising. High-protein meal (30%) > high-carb for GLP-1 in OW/IGT *Huber 2024*
- **Plant-based meal additions**
  Berries, virgin olive oil, mushroom powder (~20g) increase postprandial GLP-1 *Huber 2024*
- **Prebiotic fibres & probiotics**
  Enrich SCFA-producing bacteria and A. muciniphila to amplify endogenous GLP-1 *Dias 2025*
- **Botanical actives (emerging)**
  Bitter melon, cinnamon, ginger, citrus flavonoids, guava, maritime pine *Dias 2025*
- **Targeted nutrients**
  Zinc, L-glutamine, chromium picolinate, omega-3 fatty acids *Dias 2025*

Lifestyle levers

- **Mindful, slow eating**
  Time for incretin axis to register the meal
- **Adequate sleep (>6h)**
  Short sleep disrupts appetite hormones
- **Stress management**
  Chronic cortisol disrupts gut hormones
- **Resistance training**
  Endorsed by the 2025 joint advisory

Avoid/minimise: refined carbohydrates · sugar-sweetened beverages · red & processed meats · ultra-processed sweets & savoury snacks *Mozaffarian 2025*

Theoretical feedback loop: *fibre → SCFAs → A. muciniphila ↑ → endogenous GLP-1 ↑ → improved appetite regulation*

Huber et al. 2024 Am J Clin Nutr · Dias et al. 2025 Obesities · Mozaffarian et al. 2025 — ACLM/ASN/OMA/TOS joint advisory

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Key Invivo Products

DIGESTIVE CAPACITY

Bio.Revive™ Digestive+

Digestive enzyme support to compensate for reduced motility and prolonged gastric residence, and support digestion and absorption. May help with maldigestion and dyspepsia.

FOUNDATIONAL MICROBIOME

Bio.Me™ Essential

Foundational broad-spectrum polyphenol formula.

MOTILITY & MICROBIOME

Bio.Me™ Prebio PHGG

Partially hydrolysed guar gum — soluble prebiotic fibre. Gentle for sensitive guts; feeds SCFA-producing bacteria and supports Akkermansia.

BILE & HEPATIC SUPPORT

Bio.Clear™ Endotox LV

Comprehensive botanical formula to provide liver and gallbladder support, providing key botanicals such as dandelion, burdock, milk thistle, and artichoke.

MUCOSAL BARRIER

Bio.Revive™ Mucin+

Phytonutrient formula for mucosal layer integrity. Muco-Save®, fucoidans and aronia extract to support A. muciniphila — the key bacterium in the GLP-1 feedback loop.

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Evidence Strength

Where the evidence is strong, promising, and still emerging

STRONG

- GI adverse effects 40–70% prevalence
- Delayed gastric emptying confirmed (esp. semaglutide)
- Increased biliary disease risk (meta-analysis, 76 RCTs, 103k patients)
- Fibre & protein → endogenous GLP-1 secretion

MODERATE

- Microbiome shifts from short-term studies
- Specific dietary patterns enhance GLP-1 secretion
- Whey/collagen protein for L-cell stimulation
- Prebiotic fibres for SCFAs and A. muciniphila

EMERGING

- Botanicals (bitter melon, ginger, citrus bioflavonoids) — mechanistic plausibility
- Human gut microbiome impact
- Dietary GLP-1 modulation as standalone strategy

He et al. 2022 JAMA Intern Med · Sodhi et al. 2023 JAMA · Anjom-Shoae et al. 2024 Frontiers in Endocrinology · Huber et al. 2024 Am J Clin Nutr · Gofron et al. 2025 Nutrients · Dias et al. 2025 Obesities · Mozaffarian et al. 2025 (ACLM/ASN/OMA/TOS joint advisory)

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Five key takeaways

Anchors for those working with GLP-1 RA clients

1

Support gut and microbiome health as early as possible, ideally before GLP-1 RAs

May help to reduce the risk and severity of the GI side effects as well as help optimise gut and overall health.

2

Make every meal matter

Wholefood, nutrient-dense way of eating, even if very small portions. Education about a balanced plate.

3

Don't over-restrict fat

To ensure ongoing engagement of the bile axis.

4

Zoom out, take a 360 approach, and read the individual in front of you

The dietary, lifestyle and GI context may have a big impact on the likelihood of experiencing GI side effects. Look at the big picture e.g. stress and activity level, food quality, how they eat, nutrient testing, gut health and microbiome testing, tailored supplements.

5

Ensure appropriate medical supervision

A high proportion of GLP-1 RA prescriptions are sourced from private prescribers/online pharmacies so many individuals may not be benefitting from all important medical supervision given the risks.

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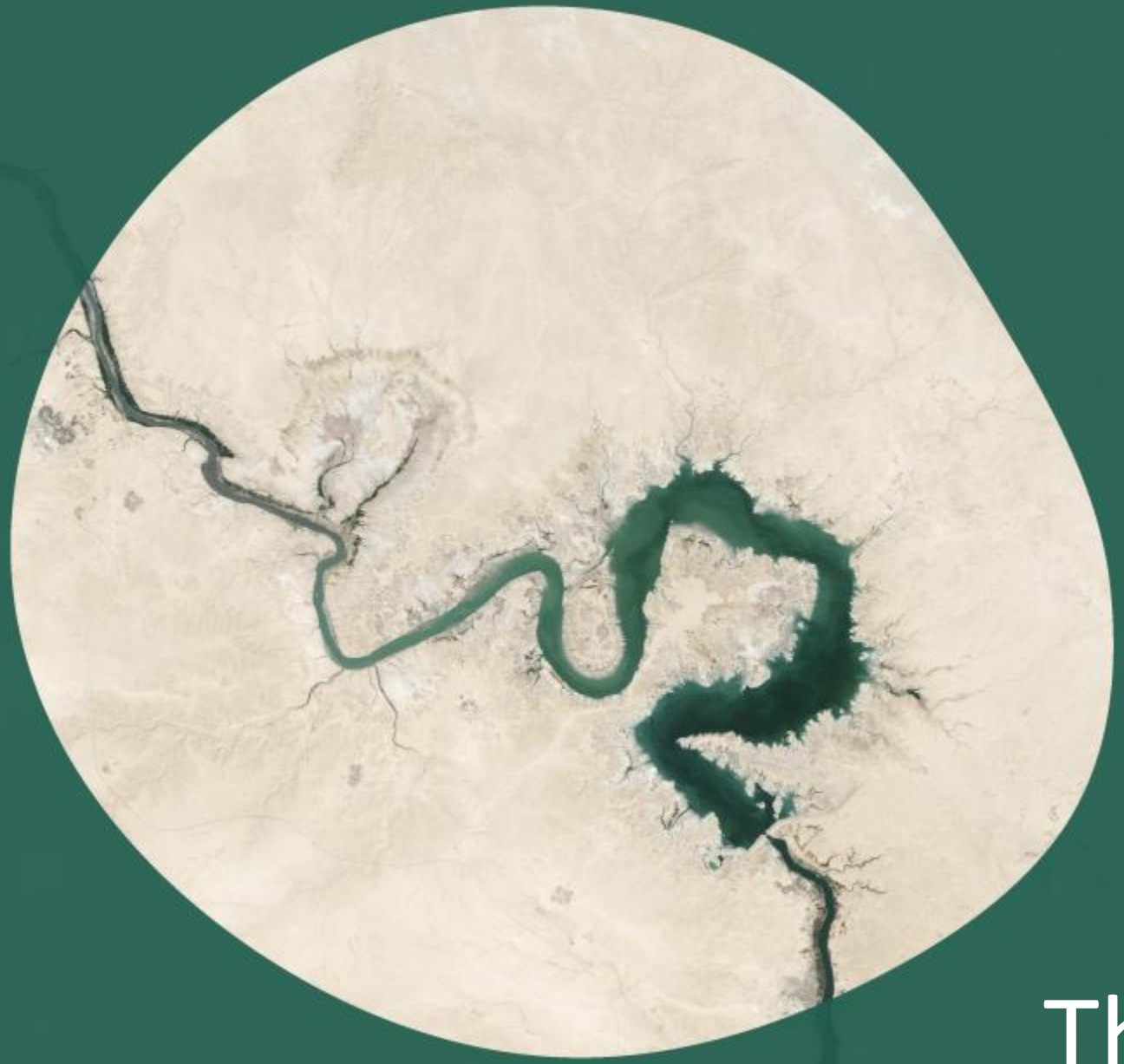

Thank *you*