

Module 1: Why the Microbiome Matters

From gut to brain — and why everyone is suddenly talking about it.

Tracks: Core, Clinical, Advanced | Duration: 45 min

KEY TAKEAWAYS

- The human microbiome is an ecosystem, not a single organ — and it varies by site, person, diet, and age.
- Clinically validated interventions exist (FMT for C. diff, specific probiotics for AAD) but most consumer products outpace the evidence.
- Correlation ≠ causation is the single biggest trap in microbiome research.
- Calibrated honesty protects patient trust in a field flooded with marketing.

EVIDENCE-GRADED CLAIMS

FMT is effective for recurrent C. difficile infection	A — Clinically established	Multiple RCTs, guideline-supported, >85% cure rate.
Probiotics prevent antibiotic-associated diarrhea	B — Supported, context-specific	Strain-specific evidence (S. boulardii, L. rhamnosus GG); not all probiotics are equal.
Gut bacteria influence mood via the gut-brain axis	C — Promising, preliminary	Mechanistically plausible, animal data strong, human RCTs inconsistent.
Probiotic supplements cure IBS	E — Popular, weak support	Some strains show modest benefit; 'cure' is marketing, not science.
Everyone needs a daily probiotic	F — Misleading or false	No evidence supports universal supplementation; may be harmful in some contexts.
Microbiome testing kits provide actionable health advice	E — Popular, weak support	Consumer kits lack clinical validation and actionable reference ranges.

MYTH BUSTER

Myth: You have 10 times more bacterial cells than human cells.

Reality: The updated Sender et al. (2016) estimate puts the ratio at roughly 1:1 for a 70 kg male. The 10:1 figure, widely cited since the 1970s, was a back-of-envelope calculation that was never validated.

SUMMARIES

For Patients

Trillions of bacteria, viruses, and fungi live on and inside your body — mostly in your gut. Together, they're called your microbiome. They help digest food, train your immune system, and produce important chemicals. But the microbiome isn't a magic cure-all. Some treatments like fecal transplants for severe gut infections are proven, while many probiotic supplements are oversold.

For Clinicians

Frame the microbiome as a complex, site-specific ecosystem influenced by genetics, diet, medications, and environment. Establish three evidence tiers: established (FMT for rCDI, specific probiotics for AAD), investigational (FMT for IBD, microbiome-based cancer immunotherapy), and consumer/wellness (most OTC probiotics, 'gut health' supplements). Use this taxonomy when counseling patients who arrive citing influencer content.

REFERENCES

- Revised estimates for the number of human and bacteria cells in the body — Sender R et al., Cell 2016 [\[Link\]](#)
- Structure, function and diversity of the healthy human microbiome — Human Microbiome Project Consortium, Nature 2012 [\[Link\]](#)