CASE STUDY

Bioscope.ai



Akkermansia

A hypothesis-generating approach using integrated genomic and microbiome analysis.



Age
34 years old

Height
5' 7"

Weight
132 pounds

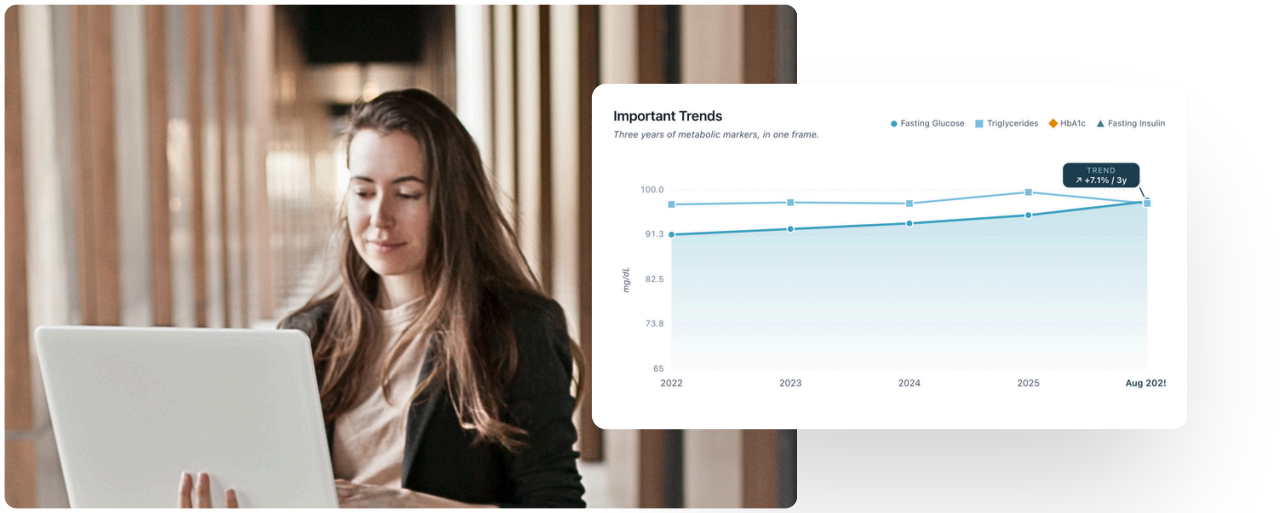
About *Lina*

Lina is a 34-year-old Seattle vegetarian thought she recovered from an acute viral gastroenteritis.

Three months later, she experienced persistent diarrhea with abdominal cramping and cognitive difficulties she described as mental fog. Her primary care physician diagnosed post-infectious irritable bowel syndrome (IBS) and recommended increased dietary fiber, though the patient felt this explanation did not adequately address her ongoing symptoms.

Despite these recommendations, her symptoms continued to affect her daily functioning.

Patient *Snapshot*



Symptoms

Lina's symptoms were both gastrointestinal and cognitive. She experienced persistent abdominal cramps, unpredictable diarrhea, and uncomfortable bloating. In addition to these physical ailments, she experienced a subjective cognitive difficulties she described as mental fog, removing significant cognitive impairment, which clouded her thinking and daily life.

New Flags

Despite Lina’s normal lab results, her persistent symptoms presented a clinical picture that standard investigation alone could not fully explain. Her physician elected to pursue a more comprehensive evaluation using microbiome analysis: a severe depletion of *Akkermansia*. Undetectable through standard laboratory investigation, this finding provided a biologically plausible basis for connecting her microbiome disruption to her gastrointestinal and cognitive symptoms.

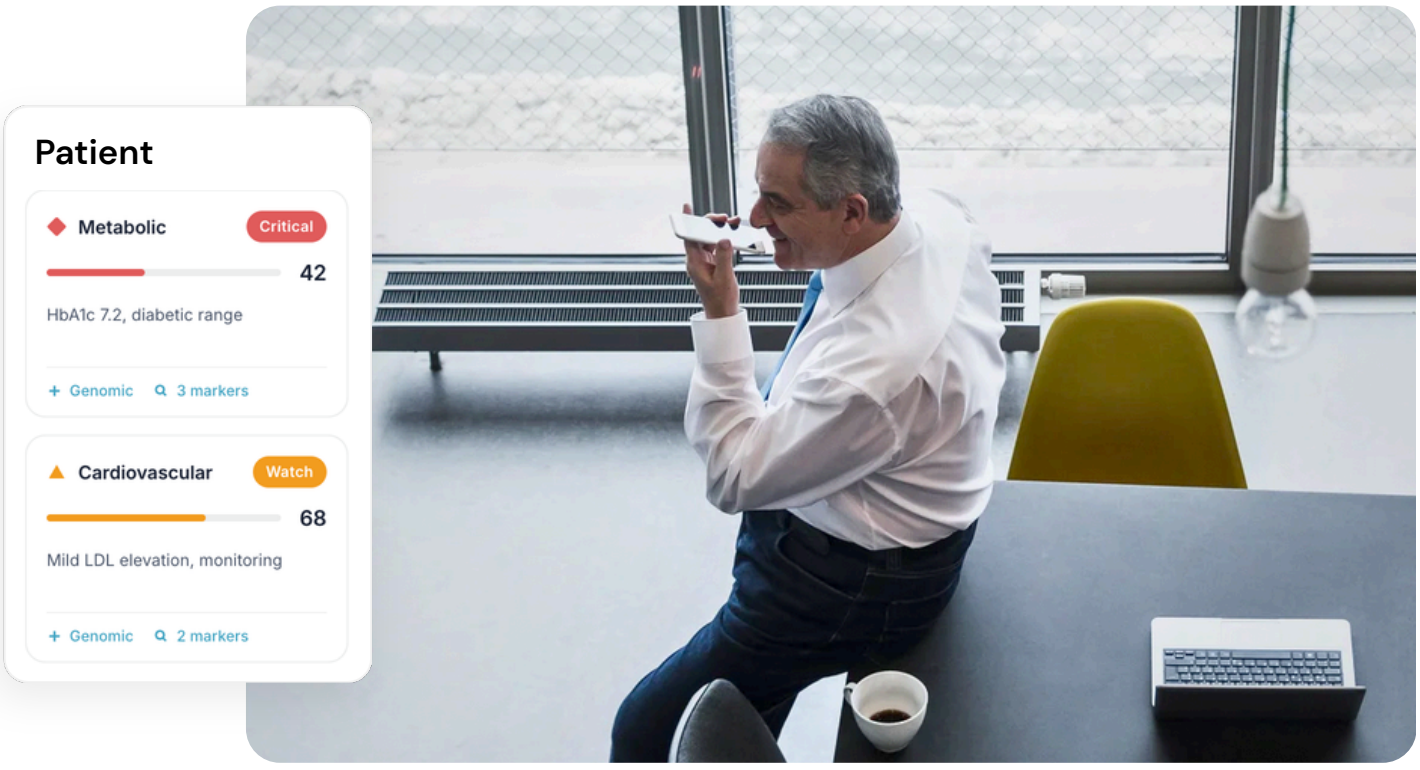
Data Ingestion & Genome Sequencing

From EMRs to genomic insight: How the investigation began

Automatic EMR ingest

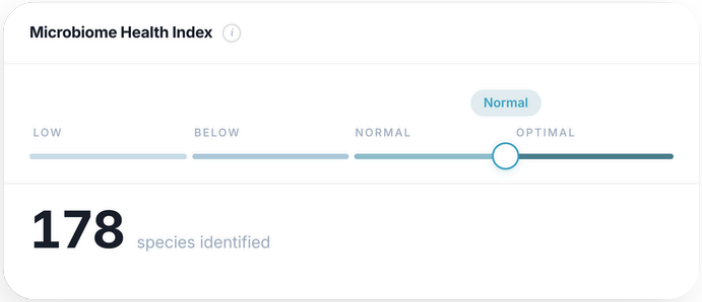
The initial patient workup documented normal vitals, unremarkable blood work (CBC, CMP, CRP), and negative stool and breath tests. Despite these reassuring results, Lina continued to report chronic diarrhea, abdominal cramps, bloating, and persistent cognitive difficulties in the months following a viral gastroenteritis.

A diagnosis of post-infectious irritable bowel syndrome (IBS) was recorded, though the clinical picture did not fully account for the duration or breadth of her ongoing symptom burden.



Data Ingestion & Genome Sequencing

From EMRs to genomic insight: How the investigation began



Genome Sequencing

To investigate potential predispositions, her 30× Whole Genome Sequence (WGS) was examined using Lina's existing data on file with Bioscope.ai from her initial enrolment.

Interpretation: This makes her a "non-secretor," meaning her body does not produce a specific sugar (fucose) in her intestinal mucus. This variant has been associated in the published literature with altered colonisation patterns of certain commensal bacteria, including Akkermansia.

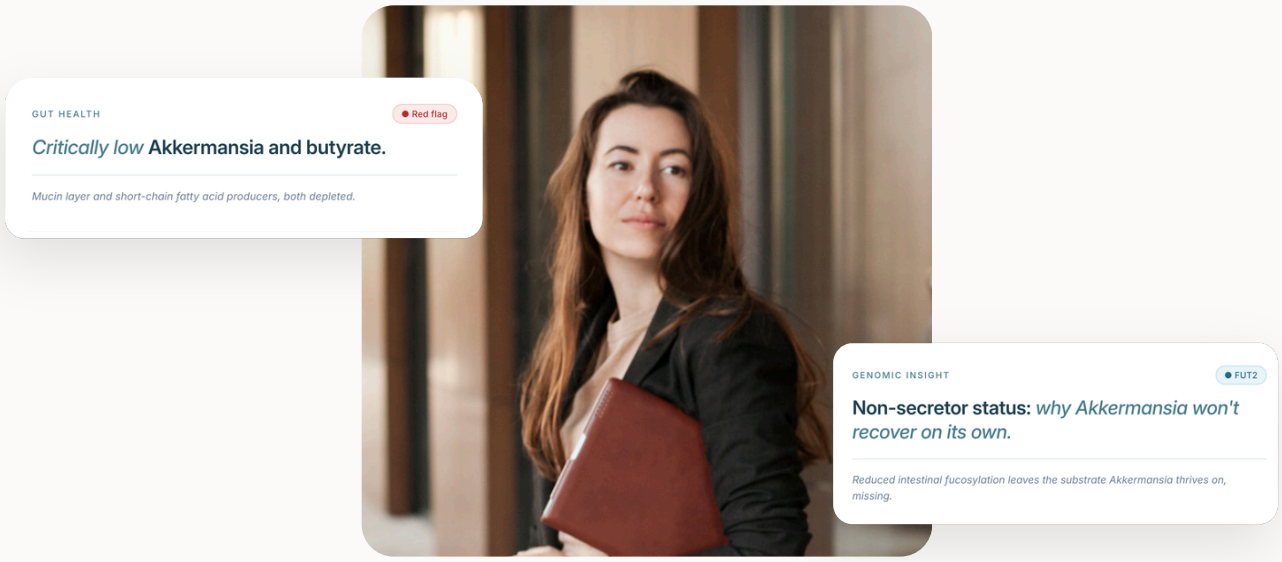
Gut Microbiome Analysis

A stool sample was analyzed to get a direct view of Lina's gut ecosystem. This test moved beyond looking for pathogens and instead assessed the composition of her commensal bacteria.

Finding: The analysis revealed a severe depletion of *A. muciniphila* and low levels of butyrate, a vital nutrient for colon cells.

Unified Health Dashboard

Connecting the dots: What the integrated data revealed



Key Dashboard Findings

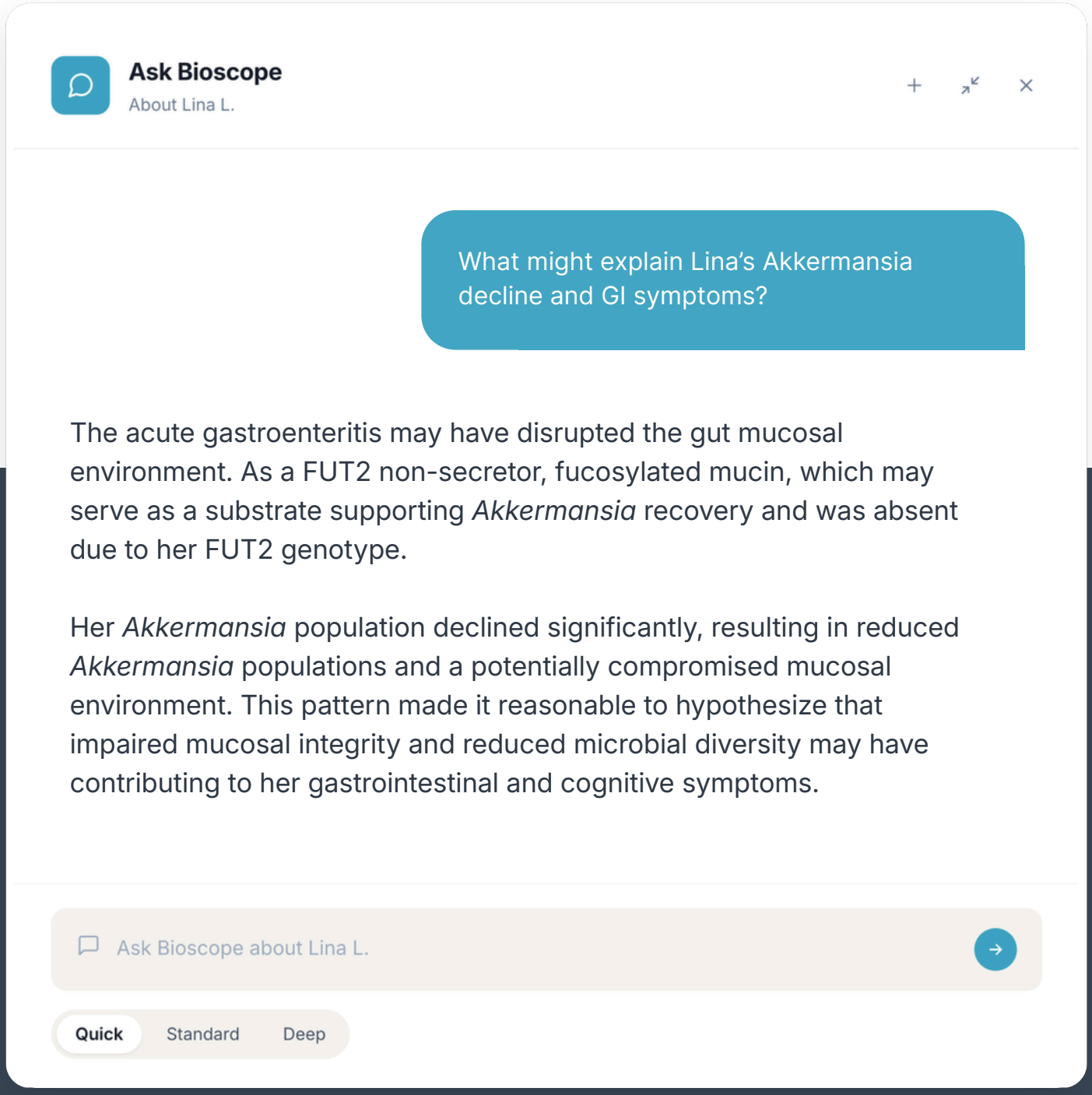
Data from the EMR, genome, and microbiome were integrated into a single dashboard at Bioscope.ai. This tool synthesized the complex information into clear, actionable insights.

- **Gut Health:** RED FLAG triggered by the critically low *Akkermansia* and butyrate levels.
- **Metabolic Health:** YELLOW FLAG noted as a separate concurrent finding, suggesting early insulin resistance.
- **Genomic Insight:** Identified FUT2 non-secretor status as a genomic factor associated with impaired Akkermansia recovery.

The metabolic finding was documented for ongoing monitoring. Given Lina's clinical presentation, the gut health deficit was prioritised as the primary focus for initial intervention. Metabolic markers were scheduled for reassessment at the 12-week follow-up visit.

Red Flag Analysis

Connecting the dots: What the integrated data revealed



Suggested *Next Steps*

From hypothesis to action: A targeted, low-risk intervention plan.



The Three Part Intervention Plan

Based on the clinical hypothesis, the following low-risk intervention was considered appropriate to trial.

01 **Akkermansia Repletion:** A daily dose of pasteurized *Akkermansia* was trialled for 12 weeks to support potential restoration of Akkermansia populations.

02 **Prebiotic Scaffolding:** A diet rich in inulin, psyllium, and polyphenols (from berries, cocoa, etc.) was introduced to provide substrate and nutritional support for gut microbiome recovery.

03 **Monitoring:** A plan was set to track symptoms (stool consistency, brain fog score) and watch for red flags like lack of improvement.

Bioscope.ai does not endorse specific commercial products.
Product selection remains a clinical decision.

Auto Generated *Plan & Outcome*

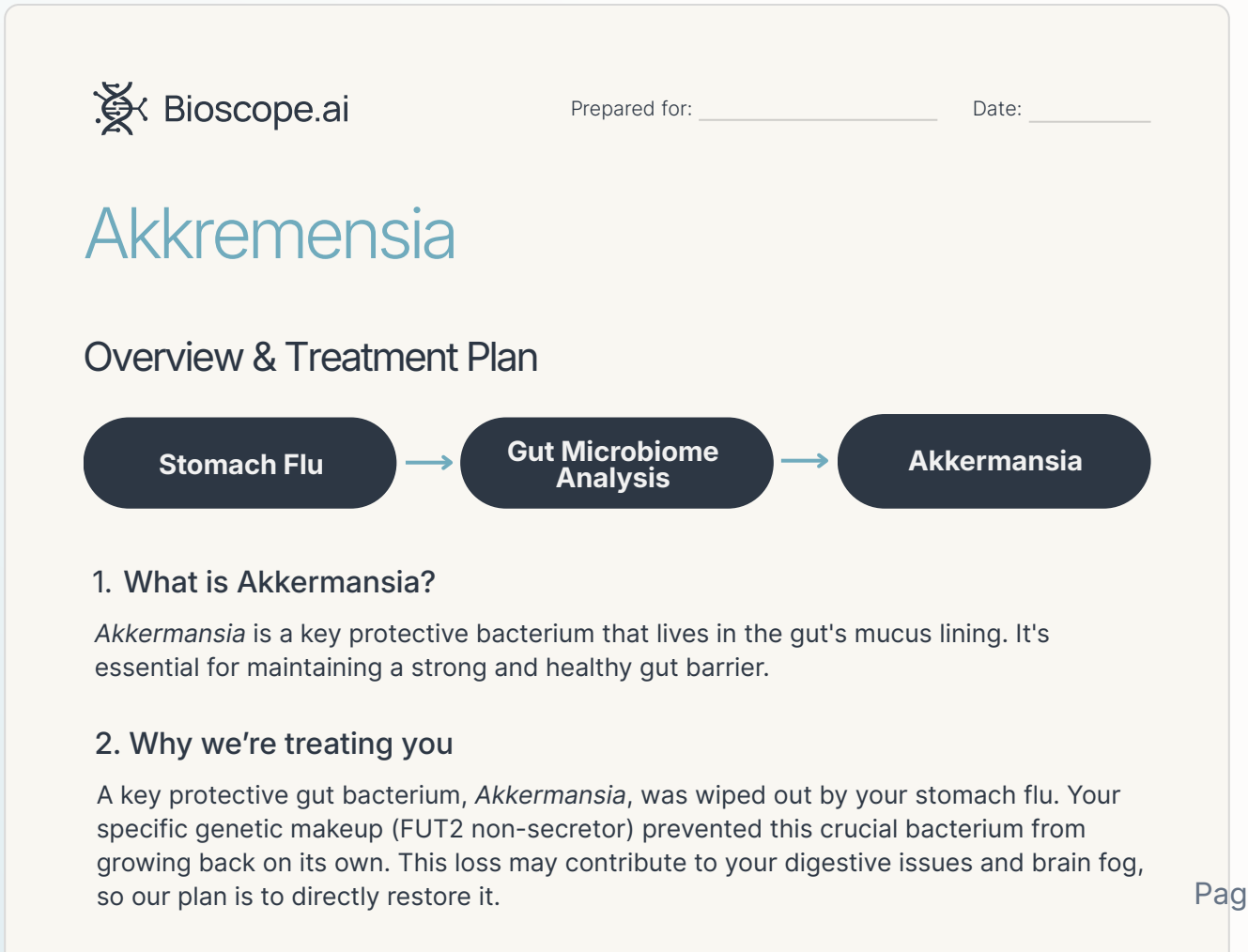
Closing the loop: Clinical outcome and patient education

Platform Recommendation

Bioscope.ai surfaces a hypothesis-based intervention plan for clinician review, which in this case included pasteurised Akkermansia supplementation and introducing a prebiotic scaffold (inulin, psyllium, and polyphenol-rich foods). Bioscope.ai also generates an educational PDF explaining the FUT2 gene-microbiome interaction and the gut restoration plan to Lina.

Within weeks, her GI urgency subsides and her brain fog begins to lift, fully resolving by week 10.

Lina adapts her diet to permanently support her microbiome, and a follow-up stool test is scheduled to monitor her progress and confirm gut health restoration.



Bioscope.ai

Prepared for: _____ Date: _____

Akkremensia

Overview & Treatment Plan

Stomach Flu → Gut Microbiome Analysis → Akkermansia

1. What is Akkermansia?

Akkermansia is a key protective bacterium that lives in the gut's mucus lining. It's essential for maintaining a strong and healthy gut barrier.

2. Why we're treating you

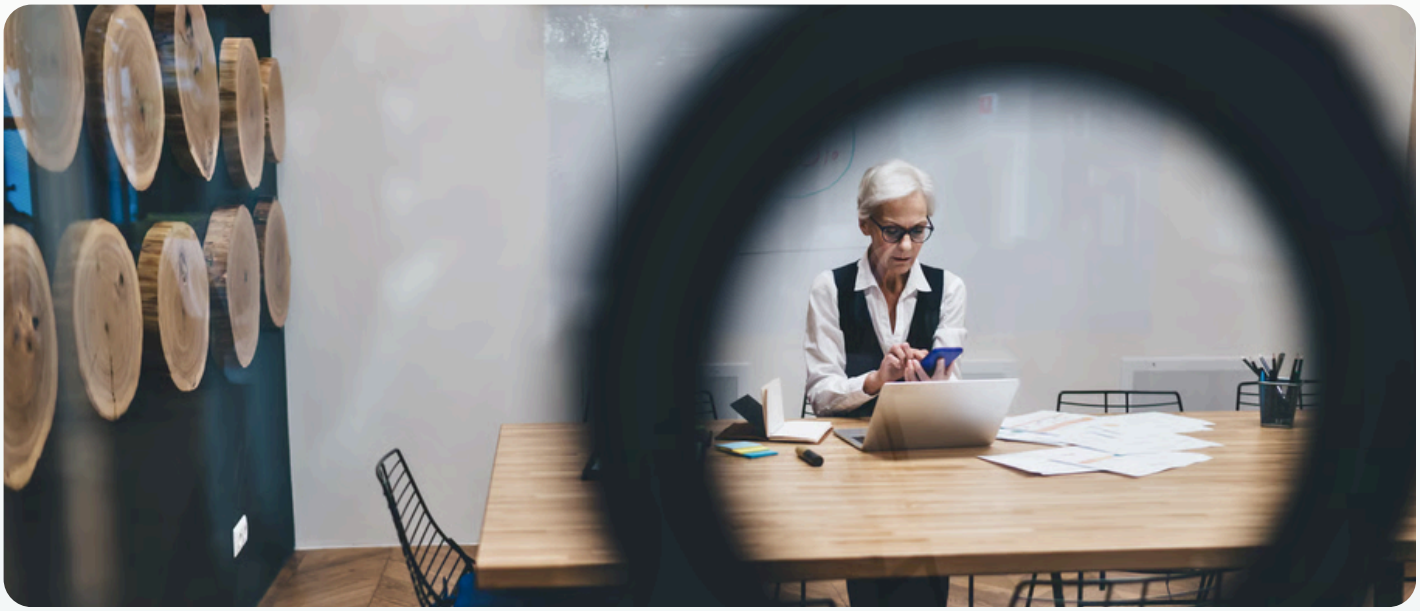
A key protective gut bacterium, *Akkermansia*, was wiped out by your stomach flu. Your specific genetic makeup (FUT2 non-secretor) prevented this crucial bacterium from growing back on its own. This loss may contribute to your digestive issues and brain fog, so our plan is to directly restore it.

Before & *After*

See how targeted insights and personalized action translated into real clinical change.

	Before	After
Symptoms	Constant diarrhea, cramps, bloating and persistent cognitive difficulties described as mental fog	Normalized stool and cognitive fog completely lifted.
Gut Microbiome	Severe depletion of *Akkermansia*. Low butyrate	*Akkermansia* population restored to a healthy range.
Genetics	rs601338 A/A (Non-secretor). An unknown and unmanaged genetic predisposition	rs601338 A/A (Non-secretor). A known genetic predisposition, now incorporated into ongoing clinical management

The improvements described above are consistent with the clinical hypothesis, but do not confirm it. Natural disease resolution, dietary modification, and placebo effects may have contributed independently to the patient's recovery. The relationship between FUT2 non-secretor status, *Akkermansia* depletion, and post-infectious gut symptoms remains an area of active investigation. This case illustrates biological plausibility, not established causation.



What This Means for *Your Practice*?

Catches “invisible” patterns

FUT2 non-secretor gene + microbiome collapse point to a treatable gut-brain dysfunction, previously presenting as post-infectious IBS without a clear mechanistic explanation.

Native to your workflow

EMR link launches Bioscope.ai; results sync back automatically.

Clinician-ready plans

Auto-generated patient education materials and intervention summaries support clinical communication.

A note on interpretation. The clinical improvement observed in this case is consistent with — but does not confirm — the hypothesis that impaired mucosal integrity and Akkermansia depletion contributed to the patient's symptoms. Several important caveats apply: placebo effects, natural disease resolution, and other unmeasured factors may have played a role in the patient's recovery. The relationship between FUT2 non-secretor status, Akkermansia colonisation, and post-infectious gut symptoms remains under active investigation, and definitive clinical trials establishing causation are still lacking. Bioscope's platform is designed to surface clinically relevant patterns that would not emerge from a conventional workup alone — enabling physicians to generate and test targeted hypotheses, rather than providing definitive diagnoses. Clinical judgement remains central to all decisions arising from these findings.



Frequently Asked *Questions*

01

Does Bioscope.ai diagnose?

No. Bioscope.ai functions as a decision-support platform that surfaces genomic and microbiome patterns for clinician review and generates testable clinical hypotheses. Diagnosis and treatment decisions remain with the physician.

02

What is the enrollment process?

Physicians subscribe annually and enroll patients. Patients receive a buccal swab kit, return it by mail, and within 10–20 days we generate a full 30X genome. That data, along with their medical records, feeds into the dashboard for continuous analysis.

Frequently Asked *Questions*

03

How do you keep it updated with latest science information?

We maintain a curated annotation store for clinical genomics that's continuously refreshed with the latest trusted datasets. The biggest inputs are ClinVar, ClinPgx, and ClinGen, which update weekly, sometimes even daily. We also pull from sources like dbSNP and gnomAD for broader genetic context. This ensures Bioscope always reflects the newest knowledge, unlike most large AI models that become outdated as soon as they're released.

04

Is Bioscope.ai Service DTC?

No, the service is designed for clinicians. However, Bioscope.ai makes it easy to communicate complex findings and recommendations with your patients.

05

What are the limitations of Bioscope's insights?

Bioscope is designed as a hypothesis-generating tool, not a diagnostic platform. The patterns it surfaces genomic variants, microbiome findings, and their interactions are based on associations identified in the published literature. Clinical improvement following a hypothesis-driven intervention does not establish that the underlying hypothesis was correct. All findings should be interpreted by a qualified clinician in the full context of the patient's history, symptom burden, and clinical judgement. Bioscope supports physician decision-making; it does not replace it.

Bioscope.ai

A smarter way to practice precision medicine.

AI-Powered Precision Medicine

Bioscope.ai gives concierge physicians the depth of insight that used to take a team of specialists.

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