Microscopic Colitis Foundation

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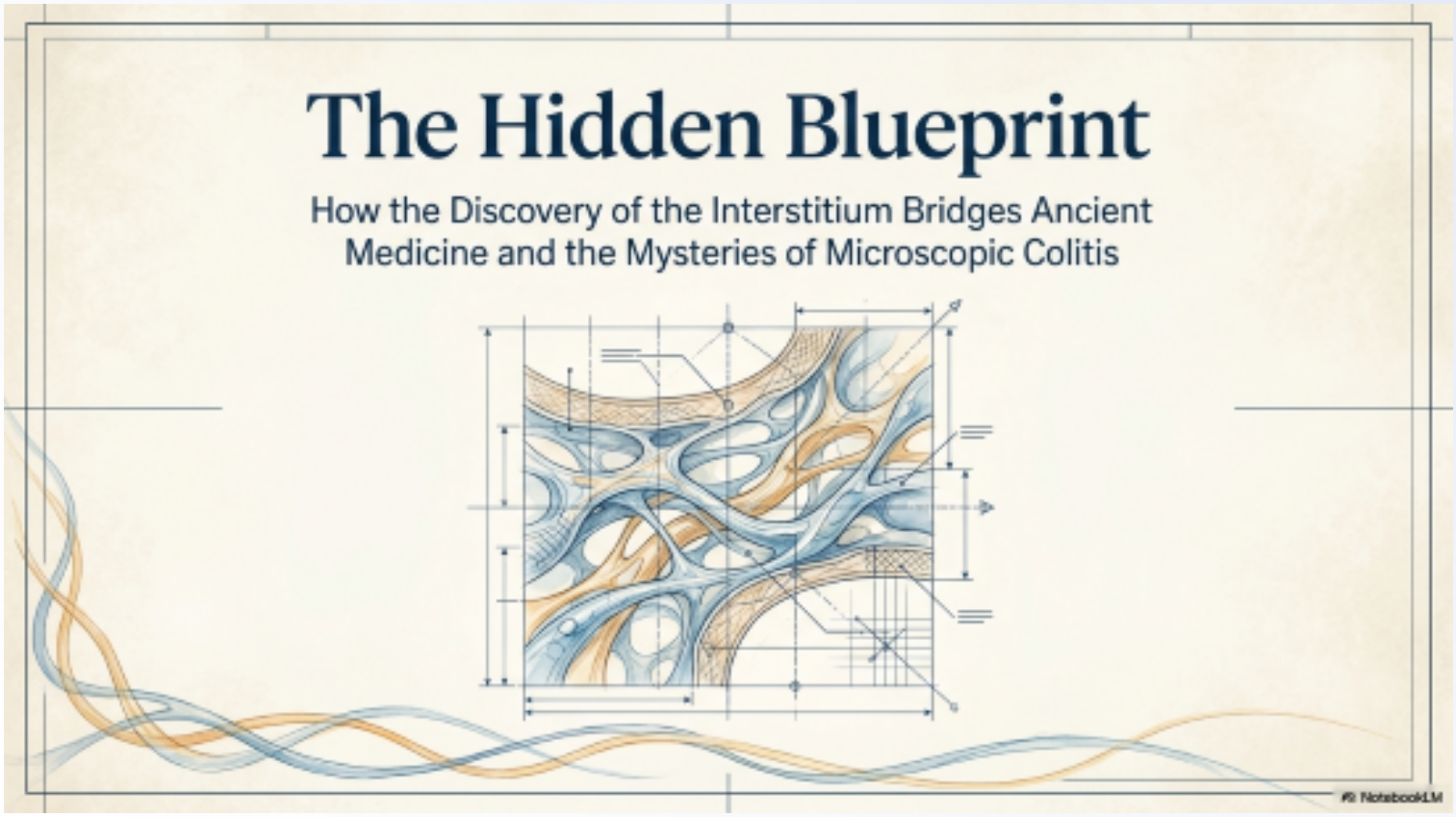


The Bridge Between Ancient Eastern Wisdom and Modern Western Anatomy: "The Interstitium" and Its Connection to MC

by Wayne Persky

In 2018, a scientific paper proposed that medicine had overlooked a vast, fluid-filled network throughout the body — the interstitium. The discovery sparked immediate speculation. Could this newly recognized structure help explain what traditional Chinese medicine practitioners had observed for thousands of years when describing meridians and the flow of qi?

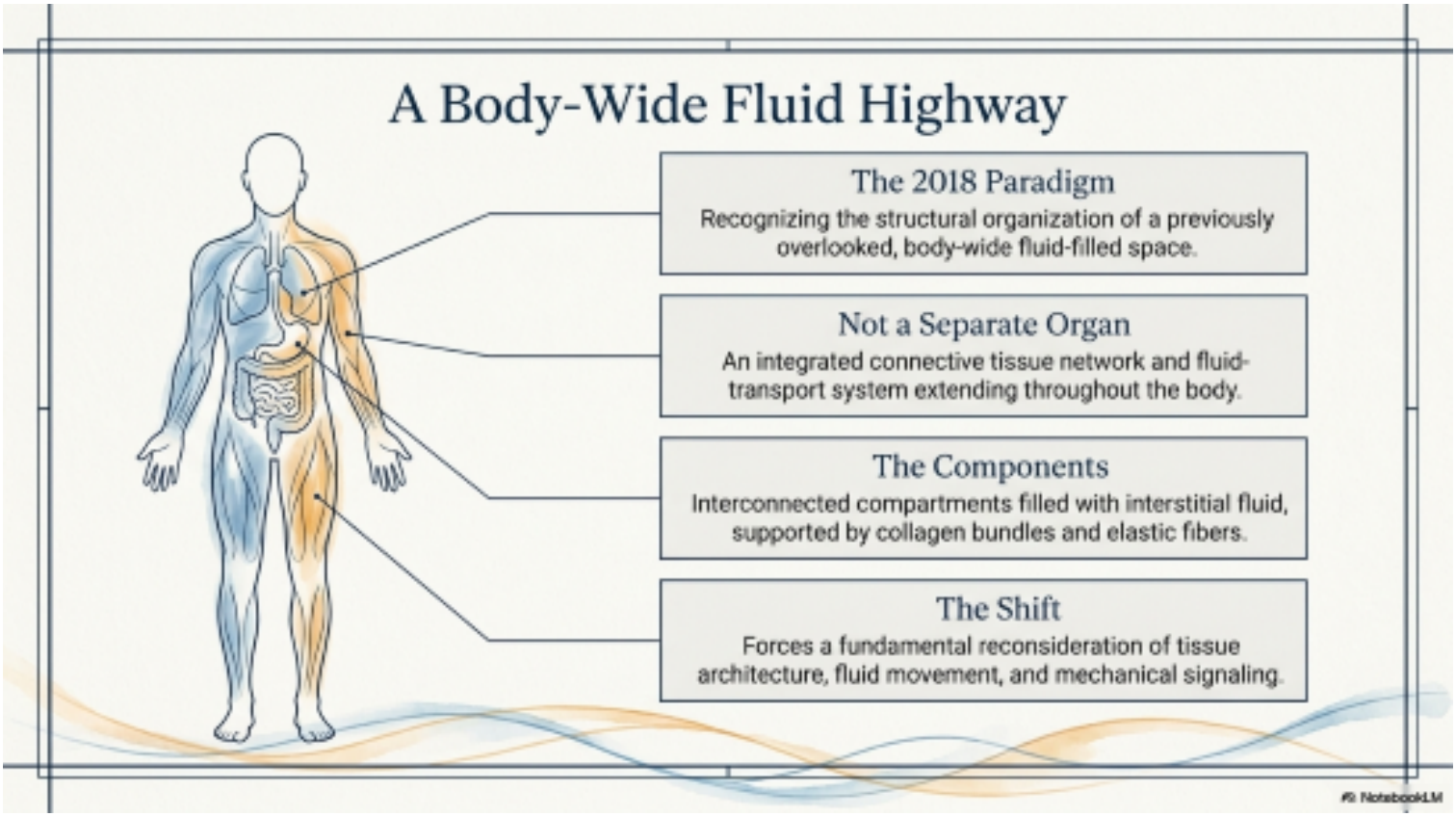
The answer remains uncertain, but the question represents one of the most fascinating intersections between ancient medicine and modern science.

Exactly what is the Interstitium?

The interstitium is a body-wide network of fluid-filled spaces supported by connective tissue, existing beneath the skin, around muscles, surrounding blood vessels, lining the digestive tract, around the lungs, and surrounding many organs. These spaces contain microscopic fluid channels, collagen bundles, elastic fibers, and interconnected compartments filled with interstitial fluid.

Historically, standard tissue preparation for microscopy caused these spaces to collapse, making them appear solid rather than fluid-filled. Using newer imaging approaches such as confocal laser endomicroscopy, live tissue imaging, and improved histologic preservation, researchers are able to observe the true structure of these fluid-filled networks.

The 2018 paper, published in Scientific Reports, described the interstitium as "a previously unrecognized fluid-filled space," with some media outlets dramatically labeling it "a newly discovered organ." That characterization remains controversial.



It's not exactly a new organ.

Most anatomists would clarify that the interstitial space itself has long been known. What changed was recognition of its structural organization, extent, and possible physiologic importance. Many scientists now view the interstitium as a connective tissue network, part of the fascial system, or an integrated fluid-transport system rather than a separate "organ" in the traditional sense.

Still, the discovery forced medicine to reconsider fundamental assumptions about tissue architecture, fluid movement, mechanical signaling, and disease spread.

Why the interstitium matters:

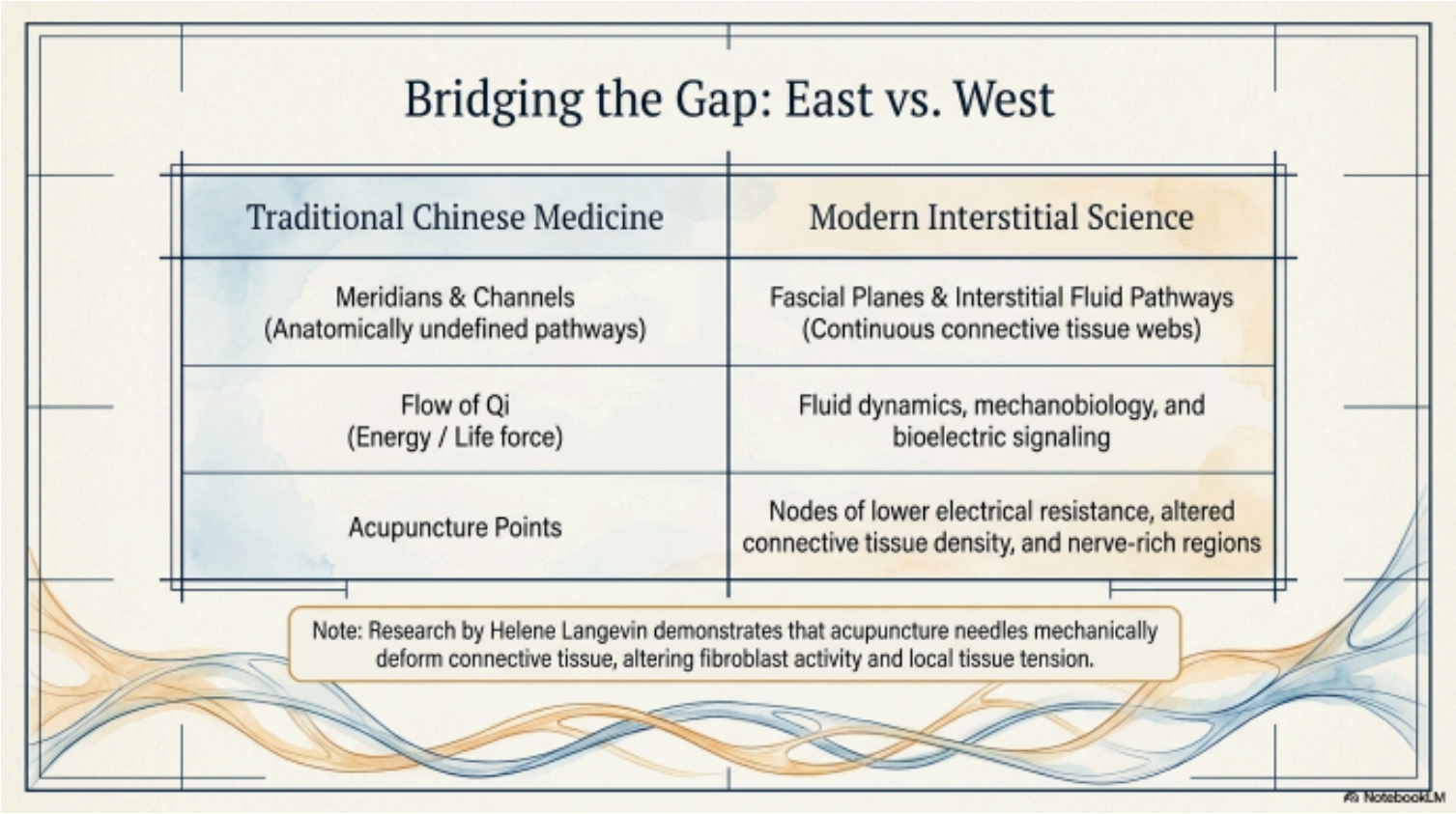
The interstitium appears to play major roles in several critical physiologic processes.

1. Fluid transport: Interstitial fluid acts as a transitional compartment between blood vessels, lymphatics, and tissues. Disorders of this system may contribute to edema, inflammation, fibrosis, and immune signaling.
2. Cancer spread: Researchers suspect the interstitium may act as a "highway" for tumor cell migration, with cancer cells traveling through interstitial channels into lymphatic vessels more easily than previously understood.
3. Immune system communication: The interstitium contains immune cells, cytokines, inflammatory mediators, and extracellular matrix proteins, making it important in wound healing, autoimmune disease, infection, and inflammatory signaling.

4. Mechanical signaling: The connective tissue matrix appears capable of transmitting pressure, stretch, vibration, and cellular mechanical forces — an emerging field called mechanobiology.

The Fascia Connection

Many researchers believe the interstitium overlaps heavily with fascia, the continuous connective tissue web surrounding muscles, nerves, organs, and blood vessels. For decades fascia was dismissed as merely packaging material or structural wrapping. Now it's increasingly viewed as metabolically active, neurologically rich, immunologically important, and deeply involved in pain signaling.This shift has legitimized research into chronic pain, myofascial disorders, connective tissue dysfunction, and body-wide mechanical signaling systems.



The acupuncture question:

Traditional Chinese medicine describes meridians, channels, and flows of energy (qi) throughout the body. Modern anatomy never identified discrete "meridian tubes," leading many Western scientists to reject the concept entirely.

However, some modern researchers have proposed that acupuncture points often correspond to fascial planes, connective tissue intersections, nerve-rich regions, or interstitial fluid pathways. Research by Helene Langevin and others demonstrated that acupuncture needles can mechanically deform connective tissue, alter fibroblast activity, influence inflammatory signaling, and affect local tissue tension.

Some studies found that acupuncture points have lower electrical resistance, altered connective tissue density, or increased interstitial fluid conductance. None of this proves the existence of "qi" in the traditional sense, but it suggests ancient practitioners may have empirically identified biologically important connective tissue pathways long before modern anatomy understood them.

A couple of perspectives on ancient medicine:

The skeptical view argues that meridians are not anatomically discrete structures, acupuncture studies often suffer from placebo effects, and claims connecting the interstitium to qi are speculative.

The more open-minded view suggests ancient physicians may have observed reproducible physiologic phenomena but described them using pre-scientific language. In this framework, "qi" might reflect fluid

dynamics, nerve signaling, fascial tension, electromagnetic phenomena, or integrated physiologic communication systems — concepts that didn't exist in ancient terminology.

What are the implications for chronic disease?

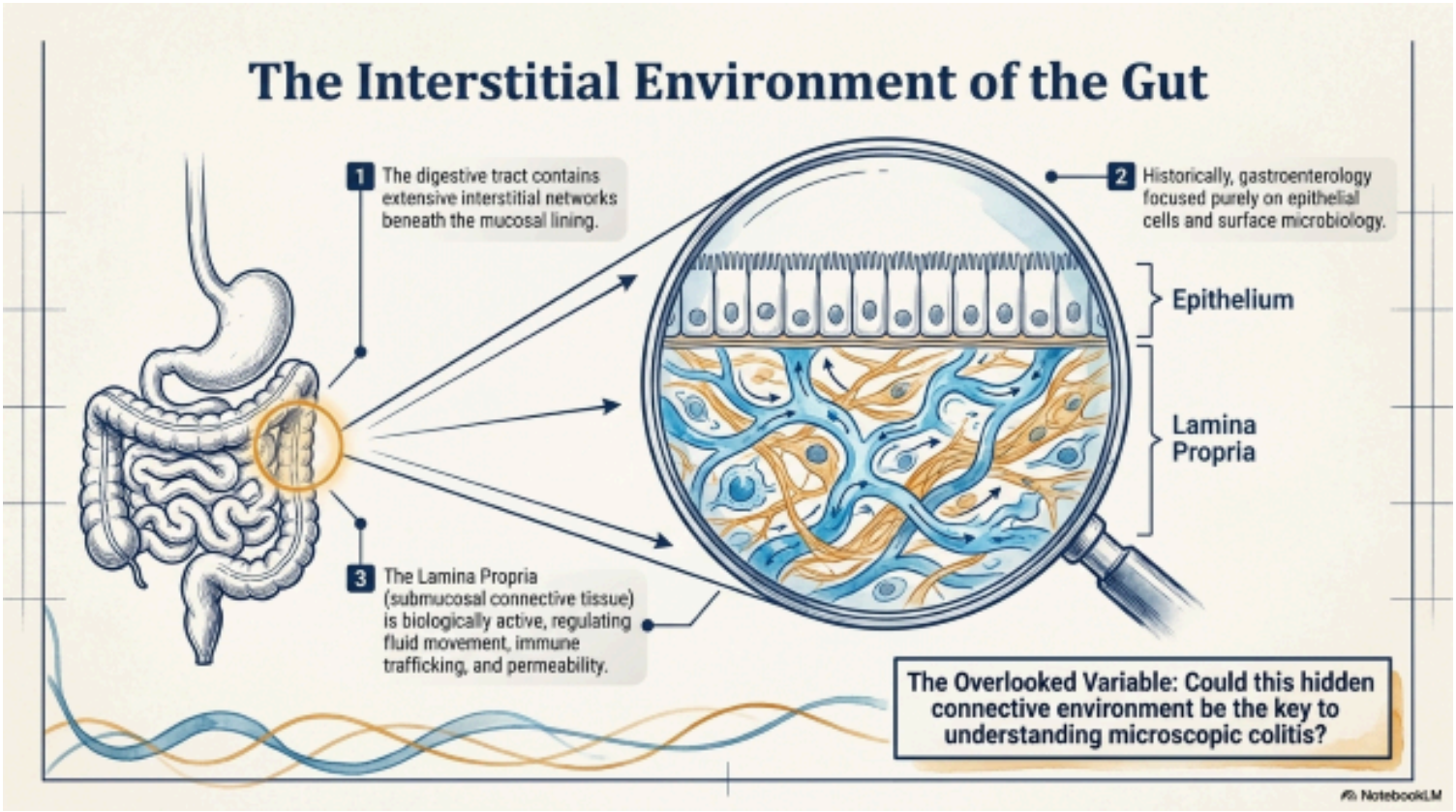
Researchers increasingly suspect the interstitium may be involved in fibrosis, autoimmune disease, chronic inflammation, edema, and pain syndromes. Because the interstitium interacts with immune cells, collagen, lymphatics, and inflammatory mediators, some scientists believe it may become central to understanding diseases involving connective tissue dysfunction, inflammatory signaling, and abnormal tissue permeability.

The digestive tract contains extensive interstitial and connective tissue networks beneath the mucosal lining, potentially important for inflammatory bowel disease, microscopic colitis, intestinal permeability, and immune-cell trafficking. The gut interstitium may influence fluid movement, inflammatory signaling, and interactions between microbes and the immune system, though research remains early.

Why this discovery is important:

The “discovery” of the interstitium challenged a longstanding assumption in medicine — that anatomy was essentially complete. Instead, it demonstrated that imaging methods shape what we think exists, tissue preparation can distort biology, and even familiar structures may be misunderstood.

It also reopened interest in fascia, connective tissue medicine, bioelectric signaling, mechanobiology, and ancient body-mapping systems — fields that had been largely ignored in conventional Western medicine.



The interstitium and MC:

No established medical doctrine states that the interstitium causes (or is even associated with) microscopic colitis. However, modern understanding of connective tissue biology, immune signaling, epithelial barrier function, and interstitial fluid dynamics suggests the interstitium may be far more relevant to MC than most gastroenterologists currently realize.

The problem is simple — almost nobody has specifically studied the interstitium in MC. Yet when examining what MC actually involves biologically, the potential connections become surprisingly plausible.

What actually happens in MC:

MC involves immune activation in the colon, inflammatory cell infiltration, epithelial dysfunction, altered permeability, cytokine signaling, and fluid transport abnormalities. In collagenous colitis (CC) specifically, there's abnormal collagen deposition beneath the epithelium — a finding that strongly suggests involvement of connective tissue and extracellular matrix biology.

The interstitium is fundamentally a connective tissue and fluid signaling system. This overlap alone warrants closer examination.

The gut's interstitial environment:

Beneath the intestinal epithelium lies extensive connective tissue containing extracellular matrix, lymphatics, immune cells, fibroblasts, collagen fibers, and interstitial fluid channels. This environment, sometimes called the lamina propria or submucosal connective tissue, is biologically active, not inert.

It regulates fluid movement, immune-cell trafficking, inflammatory signaling, tissue repair, and permeability. All of these functions are abnormal in MC.

The CC clue:

The hallmark finding in CC, thickened subepithelial collagen bands, represents abnormal connective tissue remodeling. This is essentially a disorder of fibroblasts, extracellular matrix signaling, and interstitial biology, yet this perspective is rarely discussed explicitly in gastroenterology.

CC may partly represent a disorder of interstitial and connective tissue regulation rather than purely an epithelial or immune problem.

Interstitial fluid and diarrhea:

MC patients experience profound watery diarrhea, traditionally explained by inflammation, ion transport abnormalities, bile acid effects, and epithelial dysfunction. But interstitial fluid dynamics may also matter.

The interstitium regulates water movement between tissues, capillaries, lymphatics, and mucosal surfaces. If inflammatory signaling disrupts interstitial pressure, permeability, or fluid transport, this could contribute to excessive fluid secretion into the bowel lumen, a mechanism that current models obviously don't adequately address.

The immune system connection:

The intestinal interstitium is packed with lymphocytes, mast cells, macrophages, dendritic cells, and cytokines. Since MC is fundamentally an immune-mediated inflammatory condition, the interstitium likely acts as a communication medium, immune signaling environment, and inflammatory transport system.

The disease may involve abnormal interactions between epithelial cells, connective tissue, immune cells, and interstitial fluid signaling — multi-system dysfunction, rather than a single-cell-type problem.

Mast cells and the interstitial environment:

Some researchers suspect subsets of MC patients have mast-cell activation, histamine intolerance, or neuroimmune hypersensitivity. And in contrast with those researchers who suspect the involvement, those of us who actually have mast cell activation, histamine intolerance, and neuroimmune hypersensitivity, have absolutely no doubt about the involvement after the symptoms of those sensitivities make our lives miserable. Mast cells reside heavily within connective tissue, fascia, and interstitial environments. When activated, they release histamine, cytokines, proteases, and inflammatory mediators that affect intestinal permeability, nerve signaling, diarrhea, and pain.

This potentially links MC symptoms, histamine reactions, and interstitial immune activity in a way that conventional epithelial-focused models miss.

The microbiome-interstitium interface:

The gut microbiome interacts closely with the mucosal barrier, immune cells, and connective tissue signaling networks. If the interstitium acts as a signaling and transport environment, then microbial metabolites and inflammatory molecules may influence interstitial inflammation, connective tissue remodeling, and immune activation.

This could explain why microbiome disruption, from antibiotics, infections, or dietary changes, triggers MC flares through mechanisms beyond simple epithelial damage.

What part does the nervous system play?

The interstitium is closely associated with nerves, neuroimmune signaling, and mechanosensory communication. MC patients often report visceral hypersensitivity, urgency, cramping, and exaggerated stress responses. Some of this may involve neuroimmune interactions occurring within interstitial and connective tissue environments rather than purely epithelial nerve endings. This would explain why MC symptoms often feel disproportionate to visible inflammation and why stress so powerfully affects symptoms.

The bowel prep question revisited:

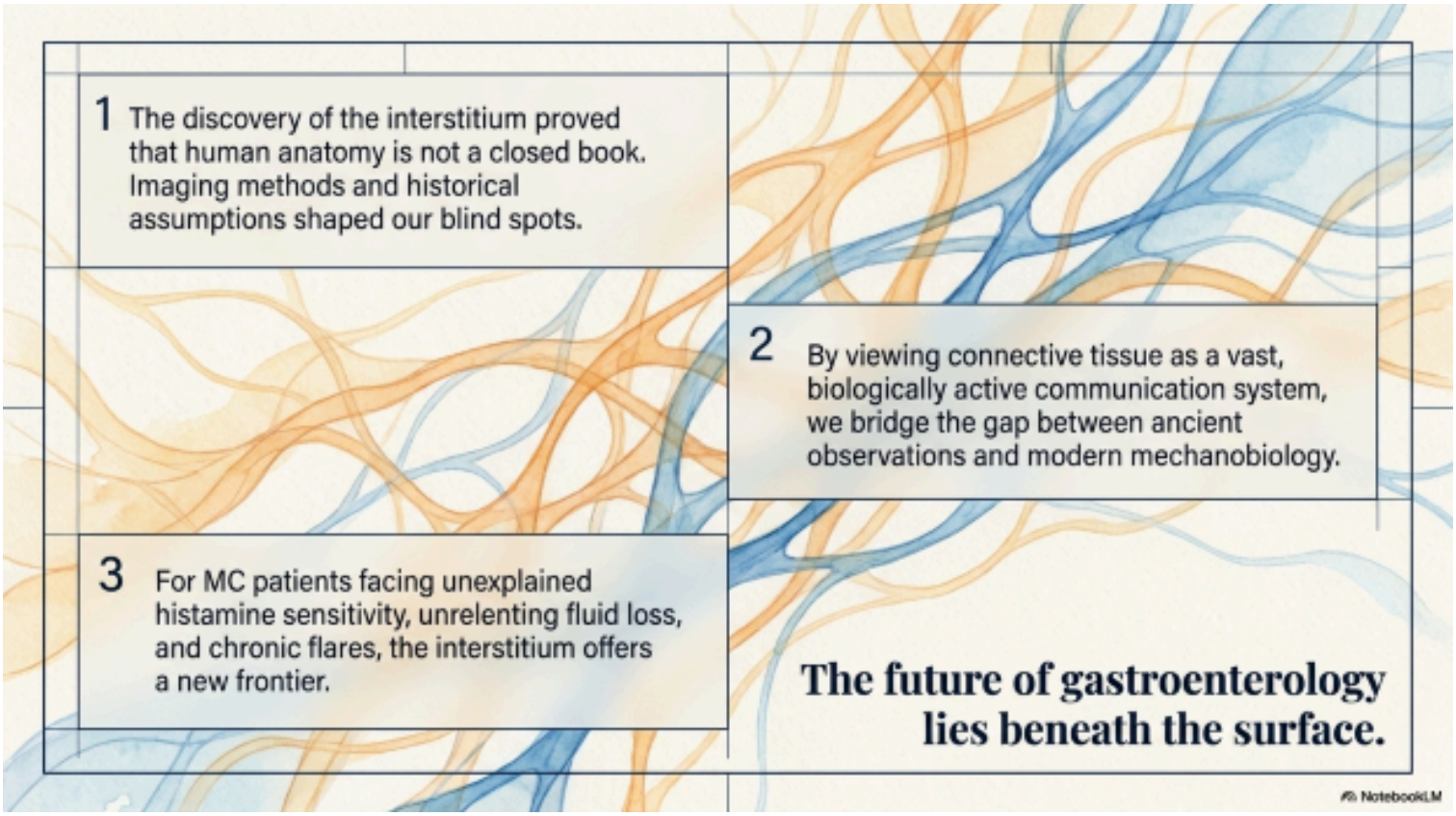
If harsh bowel preparations damage the mucosal barrier, alter connective tissue hydration, disrupt interstitial fluid balance, or trigger inflammatory signaling, then the interstitium could theoretically play a role in initiating, amplifying, or prolonging inflammation.

This mechanism, which could explain why some patients develop persistent symptoms after a colonoscopy, remains almost completely unexplored in scientific research.

Why fascia researchers may eventually study MC:

Modern fascia and interstitium research increasingly focuses on chronic inflammatory states, immune dysregulation, fluid stagnation, and mechanobiology. CC especially may overlap conceptually with fibrosis biology, extracellular matrix dysregulation, and connective tissue remodeling disorders.

This could eventually connect MC research with fibrosis medicine, mechanobiology, and connective tissue science — fields that have made substantial progress in understanding other chronic inflammatory conditions.



Why has this field remained underdeveloped?

Modern gastroenterology has traditionally focused on epithelial cells, immune cells, and microbiology. Connective tissue and interstitial biology were historically treated as secondary (mere scaffolding for the "real" cellular action).

But medicine is increasingly recognizing that connective tissue is biologically active and immunologically important. That shift could eventually reshape how inflammatory bowel diseases, including MC, are understood and treated.

The bottom line:

The interstitium is a widespread fluid-filled connective tissue network involved in fluid transport, immune signaling, mechanical communication, and possibly disease spread. It's not entirely "new," but modern imaging has revealed its organization and importance far more clearly than before.

Its possible relationship to acupuncture, fascia, and traditional Chinese medicine remains controversial, but scientifically intriguing. At minimum, the interstitium has helped modern medicine recognize that connective tissue is not merely inert packing material—it may represent one of the body's largest and most important communication systems, one that ancient medical traditions may have partially recognized long before modern science could visualize it.

Whether this validates ancient Chinese medicine or simply reveals that empirical observation can identify real phenomena even without scientific understanding, remains debated. What's clear is that the discovery has bridged a gap between traditional and modern medicine, suggesting that dismissing ancient practices as purely mystical may have been misleading. Sometimes what appears as metaphor in one era becomes measurable biology in another.

There is currently no definitive proof that interstitial dysfunction causes MC. However, the interstitium may plausibly contribute to immune activation, fluid dysregulation, collagen deposition, mast-cell signaling, inflammatory communication, and connective tissue remodeling in MC.

CC in particular strongly suggests involvement of extracellular matrix and connective tissue biology, a connection that deserves far more research attention than it currently receives.

As interstitium research expands, it may eventually help explain aspects of MC that current models still poorly account for, such as histamine sensitivity that doesn't fit standard allergy patterns, fluid secretion disproportionate to visible inflammation, chronic inflammation that persists despite epithelial healing, and abnormal collagen deposition without clear triggers.

Understanding MC through an interstitial lens doesn't replace existing epithelial or immune models; rather. it potentially integrates them into a more complete picture of a disease that affects multiple interconnected tissue systems simultaneously. The interstitium may be the missing piece that connects epithelial dysfunction, immune activation, connective tissue remodeling, and fluid dysregulation into a unified framework for understanding this complex condition.

And last, but certainly not least, this long-overdue “discovery” of the interstitium may eventually lead to gastroenterologists actually understanding MC, and how to treat it. Wouldn't that be nice?

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