Midlife Clarity with Dr. Tracy Page

"Clarity Changes Everything"

Hosted by Dr. Tracy Page

Episode # 12 —

Thymosin Alpha-1: Rebuilding the Immune System After 40

Listen Here

Hi, I'm Dr. Tracy Page, and welcome to Midlife Clarity, where we're seeking clear answers to things that are important to you and making sure that you're getting the information you need. Right now, we're doing a peptide series. Today we're going to talk about thymosin alpha-1: rebuilding the immune system after 40.

I'm super excited to talk to you about thymosin alpha-1 and your thymus gland, because we never talk about it, and you're going to be pretty surprised to hear some of these statistics.

My patient Karen is 49. She came into my office last fall with a list of every infection she had caught in the previous eight months. There were a few. She had counted them all and written them down, and she wanted me to understand that something, she felt, had actually changed.

In January - this was last year - she had a sinus infection that lasted three weeks. Then, in February, a stomach bug knocked her out for five days. In April, she had what she thought was COVID, but she tested negative four times. She said she lost her taste anyway, and it didn't return for almost two months, but she never tested positive. In June, she had strep throat. In August, bronchitis actually turned into pneumonia.

By the time she came to my office last October, she had been on antibiotics three times in the prior 12 months, because she had also had something in December the year before. She was carrying a fatigue that she said no amount of sleep would fix.

She also told me, just in passing, that she had been diagnosed with Hashimoto's thyroiditis at age 41. Her thyroid antibodies were elevated. She had been on a low dose of levothyroxine for years and had seen an endocrinologist, and she was what she thought was stable. She also had occasional eczema flares, especially after stress.

She had never quite recovered from her COVID infection in 2022. She still had brain fog. She had exercise intolerance. She didn't have the same stamina, couldn't do the same things, and her heart sometimes raced for reasons she couldn't identify.

Here's what nobody explained to Karen, and what I see often in my practice: her infection pattern, autoimmune disease, lingering long COVID symptoms, and chronic fatigue were not separate diagnoses. They were the same diagnosis expressing itself in different organs. They were all symptoms of an immune system that had quietly stopped working the way it used to. The central organ responsible for that decline had been shrinking inside her chest, of all places, since she was a teenager.

By the time Karen turned 49, the gland that had trained her immune system since birth - her thymus gland - was approximately 90 percent gone. It had been replaced, slowly and silently, by fat. This is normal aging in all of us. It happens to every single one of us. Nobody had told Karen, because nobody talks about it.

We talk about menopause and declining estrogen, as we should. These are important topics. But we don't talk about the fact that the most important gland for immune function is fading away in plain sight. There is a peptide that takes over the conversation when the thymus gland can no longer have it, and that's what we're going to talk about today: thymosin alpha-1.

Researchers have studied it in over 4,400 patients across more than 80 clinical trials. It has been used in 35 countries for over 30 years. It is one of the most well-validated immune-modulating peptides in functional medicine, and it is the closest thing we have to giving the midlife immune system a chance to work.

By the end of this episode, you're going to understand exactly what happened to Karen's immune system, what's happening to your immune system, and how thymosin alpha-1 helps a body that has stopped bouncing back finally have the ability to bounce back again.

Let's talk about that gland, and how and why your immune system has changed. I'm going to tell you about an organ you almost certainly don't think about. As I said, almost

no doctors will mention it. It has been disappearing inside your chest since you were age 14.

The thymus is a small, butterfly-shaped gland. It sits just behind your sternum and right above your heart. In a child, it is robust and active. It is where naive T lymphocytes - the cells responsible for nearly every adaptive immune function in your body - are educated.

They go to the thymus to learn what is you and what is foreign, what to attack and what to leave alone, when to mount a response, and when to stand down. The thymus is, quite literally, the immune system's boarding school, where it teaches everything.

Here's what almost nobody tells us: the thymus begins to shrink at puberty. By age 30, it is significantly atrophied. By 50, it is mostly gone. By 70, it is largely fatty tissue with a few residual functional cells. This process is called thymic involution. It happens to all of us, regardless of how clean our diet is, how often we exercise, how much we sleep, or how committed we are to our health.

Here are the numbers. The thymus decreases in size approximately 3 percent per year from birth until middle age, and then 1 percent per year thereafter. That means that by the time you're 50, the active thymic tissue you have left is a small fraction of what you had at age 14. As I said, nobody ever tells us this.

Naive T-cell output - the production of fresh, well-trained immune defenders - drops in parallel. Recent thymic emigrants, the term researchers use for newly minted T cells, are a small fraction of their childhood numbers by midlife. The T cells you have at 49 are largely the ones you had at 25. They're now older, more exhausted, and have a more limited repertoire of what they recognize.

This is why older adults are more susceptible to infection. This is why vaccine responses decline with age. I'm not advocating for or against vaccines in this podcast; I'm just

using it as an example of what happens as we get older. It is one reason your flu shot is less protective at 65 than it was at 35, if you choose to get one.

This is why cancer becomes more common in older adults and why immune surveillance against early tumor cells is impaired. This is why autoimmunity sometimes worsens with age. An immune system with fewer well-trained T cells becomes less able to distinguish self from non-self.

The phenomenon has a name: immunosenescence. It has a paradoxical companion called inflammaging. As immune function declines, low-grade chronic inflammation rises. Those are the companions. The system swings between under-responsiveness and over-responsiveness, and neither extreme is healthy.

Think of your thymus as an elite boarding school where every immune defender went to learn its job. In childhood, the school is full. Professors teach, classrooms run, a curriculum runs, and the student body stays active. Naive T cells arrive, get trained for years, and graduate as competent, self-tolerant, threat-recognizing defenders.

By midlife, that school is mostly closed. The buildings are still there, mostly filled with fat now, but the active classrooms are few, and the professors are retiring. The few graduates leaving the school - remember those naive T cells that showed up - are using a curriculum that hasn't been updated. The T cells they're training don't know how to recognize new threats.

Thymosin alpha-1 is the visiting professor, let's call it that, who keeps the most important lessons alive even when the school can't. It restores the signal the thymus gland normally would produce. The graduates that do leave are then better trained because of it.

Of course, there's a hormonal layer to all of this. As if thymic involution alone weren't enough, the perimenopausal hormonal shift makes the picture, you guessed it, even worse.

Estrogen and progesterone are immune-modulating hormones. As estradiol fluctuates and declines through perimenopause, immune function shifts. I've seen women start hormones and do great, come off hormones and have immune problems, then get back on hormones and start to feel good again. When women lose their hormones, autoimmunity rears its head. I've seen it so many times.

Some women see autoimmune flares for the first time in their 40s. Some see chronic infections that won't resolve. Some see allergies return that they haven't had since adolescence. Estrogen also influences how aggressively the immune system responds.

Women generally have a more robust immune response than men, which is why we have stronger vaccine reactions, faster infection clearance, and also higher rates of autoimmunity. As estrogen starts to fall, the protective immune response also weakens.

But there is also that inflammatory layer, the co-companion. Underneath all of this, a slow accumulation of what we call senescent cells occurs: cells that have stopped dividing but have not died. Those senescent cells constantly secrete inflammatory signals. This is the senescence-associated secretory phenotype, or SASP. It helps explain why a 50-year-old's baseline inflammation is higher than a 25-year-old's, even if they look exactly the same on the outside.

Karen's pattern - four infections in eight months, autoimmune disease, long COVID, and chronic fatigue - isn't random. It is a textbook expression, I would say, of a midlife immune system that has lost its central regulator, is now running an open loop, and can't function.

What is thymosin alpha-1, and why does the body already make it? Thymosin alpha-1 is a 28-amino-acid peptide naturally produced by the thymus gland. Dr. Allan Goldstein first isolated it in 1977 and spent decades characterizing its mechanism.

Like BPC-157 and larazotide, it is not a foreign chemical. It is a molecule your own body makes, just in dramatically smaller quantities by midlife than it did in your youth.

Here's what makes thymosin alpha-1 so distinctive. It does not directly kill pathogens. It does not directly suppress inflammation. It does not directly attack tumor cells. What it does is reestablish the conversation between your innate and adaptive immune systems and get them working.

The mechanism is pretty elegant. Thymosin alpha-1 binds to two specific receptors on what we call dendritic cells: Toll-like receptor 2 and Toll-like receptor 9. Dendritic cells are the immune system's Boy Scouts. They patrol the body, encounter potential threats, and bring information back to the lymph nodes, where they educate naive T cells about what is happening.

When thymosin alpha-1 activates these Toll-like receptors, dendritic cells start to mature. They upregulate the molecules they need to present information to T cells. They drive the differentiation of naive T cells into the specific subtypes the body needs: CD4-positive helper cells, CD8-positive killer cells, and regulatory T cells that prevent autoimmunity. The molecule restores the immune response orchestra.

Thymosin alpha-1 also increases what we call interleukin-2, interleukin-3, and interferon-gamma. These three chemical signals help immune cells communicate. They have their own language. It improves the CD4-to-CD8 ratio and enhances natural killer cell activity. It does all of this without triggering the kind of broad inflammation that other immune stimulants produce.

Most importantly, it works bidirectionally. In an underactive immune system - someone with chronic infection, immunodeficiency, or vaccine nonresponse - it begins to stimulate. In an overactive immune system - someone with autoimmunity or chronic inflammation - it modulates and balances. This is why it has been used safely across such a wide range of conditions.

Imagine your immune system is like a thermostat that has lost its calibration. In one room, it's freezing; we'll call that immune deficiency, chronic infection, and things you can't shake. In another room, it's overheating; we'll call that autoimmunity, allergies, and inflammation that won't quit.

Most immune drugs push in one direction. Steroids cool the whole house; stimulants overheat the whole house. Thymosin alpha-1 is different. It doesn't push the temperature. It recalibrates the thermostat itself so the system can read the actual conditions and respond appropriately. This is why it works for both Karen's chronic infections and her Hashimoto's. It is the same thermostat with different problems. I hope that helped.

Thymosin alpha-1 has been evaluated in over 4,400 patients across more than 80 clinical trials. It has a history of more than 30 years. It has been studied in chronic hepatitis B, hepatitis C, HIV adjunct therapy, sepsis and intensive care settings, cancer immunotherapy in combination with checkpoint inhibitors, chronic fatigue syndrome, autoimmune conditions, and vaccine nonresponse in older populations. So, many clinical scenarios.

It received FDA orphan drug designation for chronic active hepatitis B in 1991, one of the earliest biological peptides to receive that classification. It is approved as a prescription medicine in 35 countries and marketed under the trade name Zadaxin.

In the United States, thymosin alpha-1 is not approved as a finished pharmaceutical drug, but functional and integrative medicine physicians have compounded and used it clinically for many years, with a remarkably clean safety profile. As I discussed in Episode 9, it has been compounded and clinically used.

The FDA Category 2 reclassification in April 2026 shifted the regulatory landscape, and the July Pharmacy Compounding Advisory Committee, or PCAC, meeting will determine its formal status going forward. For now, it remains accessible through

licensed compounding pharmacies under physician supervision. Again, I will reiterate: licensed compounding pharmacies and physician or provider supervision.

The safety profile across that 4,400-patient experience is pretty striking. The most common side effects are mild injection-site reactions and occasional transient fatigue. Serious adverse events are rare. Unlike most immune therapies, it does not appear to drive autoimmunity, even in patients who already have autoimmune disease. This is what makes it so useful for midlife women, who carry a disproportionate share of the autoimmune burden in our population.

I didn't know how powerful this peptide was. When I first opened the Wisconsin Institute of Functional Medicine (WIFM), a patient came into my clinic in a wheelchair. She had received a vaccine. I don't need to mention which vaccine it was, but she had a history of Guillain-Barré syndrome. That's where you start to lose muscle function from your extremities inward. Your muscles slowly begin to weaken, to the point that some patients have to go on a respirator.

She had this a long time ago, probably 10 years before she saw me. She had a vaccine, and when she had the vaccine, she had a recurrence of this condition. That's why she was in a wheelchair. She came to me and wanted my help. I remember talking to my husband and saying, "I'm not sure. I don't know if I can help her. I don't know what to do. But this is an immune reaction. This is her immune system."

Do you know what I gave her? Thymosin alpha-1. Today, she is still my patient. I've probably seen every member of her family and all of her friends. She walks and talks, and she's great and healthy. In all the time I've cared for her, she's lost, I don't know, 30 to 50 pounds. She turned her whole life around health-wise.

She wasn't unhealthy when I met her. She just couldn't walk on her own two feet, and she was weak. It was crazy, all the things that happened to her after she had a recurrence of this diagnosis. It is a pretty powerful peptide. At least, I've seen it be pretty

powerful. I could tell you at least a dozen more cases - maybe not as severe as hers - but definitely with some miraculous outcomes.

I'm going to walk you through the clinical situations where thymosin alpha-1 makes the biggest difference, because the breadth of this peptide is generally remarkable. Like I just told you, that story was pretty crazy.

First, recurrent and persistent infections. This is the textbook indication for midlife patients: the woman who catches every cold the kids bring home and shakes none of them; the patient with chronic sinus infections that keep coming back despite multiple antibiotics; and the patient with recurrent urinary tract infections, recurrent [inaudible 17:50] infections, or recurrent shingles outbreaks.

Thymosin alpha-1 strengthens the underlying immune surveillance that should be preventing these patterns in the first place. Most patients see a meaningful reduction in infection frequency within two to three months of starting therapy.

Second, long COVID and postviral syndromes. Karen's lingering brain fog, exercise intolerance, and unexplained tachycardia followed her COVID. She didn't actually get diagnosed with COVID, but she probably had COVID. This is one of the cleanest emerging applications.

Long COVID appears to involve, in many patients, a dysregulated immune response to viral antigens that have not been fully cleared. Thymosin alpha-1 supports T-cell function, helps complete viral clearance, and recalibrates an immune system stuck in what we call a partially activated state. Patients with chronic Epstein-Barr virus reactivation, chronic Lyme symptoms, and postviral fatigue syndromes also fit this profile. I have seen patients with long COVID start to feel like themselves again.

Third, autoimmune conditions. This is where the bidirectional mechanism matters most. In autoimmunity - such as Hashimoto's, rheumatoid arthritis, lupus, psoriasis, and multiple sclerosis - the immune system has lost the ability to discriminate self from foreign.

Thymosin alpha-1 helps restore that discrimination by promoting regulatory T-cell function, the cells that put the brakes on inappropriate immune attacks.

This is not a replacement for disease-modifying therapy in severe autoimmune disease, but it is increasingly used as an adjunct, particularly in older patients or in a mild presentation like Karen's Hashimoto's.

Think of autoimmunity as a smoke alarm that fires every time you make toast. The alarm itself is fine. The wiring is fine. The problem is its calibration. The system has lost the ability to distinguish between actual smoke and harmless steam from the toaster. Thymosin alpha-1 doesn't disable the alarm. It helps the system relearn what should set it off and what shouldn't. The alarm becomes useful again. The body stops firing on its own breakfast. Think of it that way.

Fourth, cancer immunotherapy adjunct. This is an emerging application. I want to be careful because the evidence is strongest in specific oncologic settings, in combination with checkpoint inhibitors and other immunotherapies. In research and clinical trial contexts, thymosin alpha-1 is being studied in non-small cell lung cancer, melanoma, hepatocellular carcinoma, and several other cancers.

It is not a cancer treatment by itself in functional or integrative medicine practice. But for patients in active oncology care, it can be a meaningful supportive therapy when coordinated with their oncologists. Someone who knows peptides and oncology must manage that.

Fifth, vaccine-response enhancement. In older adults, vaccines often produce a weaker antibody response than they did when those people were younger. Thymosin alpha-1 has been studied to enhance vaccine response in older adults, with positive results across multiple trials. For midlife and older patients heading into a vaccination schedule, particularly those with known immune compromise, this is a useful adjunct.

I have mixed feelings about some of the vaccines. What I'm going to say is, let's strengthen your immune system. That would be my first and foremost objective. But let's talk about the vaccine analogy.

A vaccine works by showing your immune system a picture of the threat. Your dendritic cells take the picture, carry it to the lymph nodes, and teach your T cells what to look for. In a young person, this works nicely, quite beautifully. The picture is taken in high resolution, the lesson is taught with full attention, and the T cells graduate with a clear memory of what to do.

In an older person, the picture is kind of grainy, the classroom is half empty, and the lesson barely registers. Thymosin alpha-1 sharpens the picture and reopens the classroom. That is how it helps your immune system work better. The vaccine still does the work; it just finally has an audience that can learn from it.

Sixth, chronic fatigue and energy. Many midlife patients with chronic fatigue have underlying immune dysregulation driving their fatigue. When the immune system is chronically activated at a low level, it consumes a tremendous amount of metabolic energy. Restoring immune balance often translates into measurable improvements in fatigue, even when patients didn't initially identify their fatigue as immune-related.

Finally, cellular aging and healthspan - the longevity angle. Because thymic involution is a central driver of immunosenescence, and immunosenescence is a central driver of age-related disease, restoring thymic-style immune signaling is increasingly seen as a healthspan intervention. The data are preliminary, but the biological rationale is strong. Patients in their 50s and 60s are increasingly using thymosin alpha-1 not for any specific disease, but as part of a comprehensive longevity protocol.

Imagine your body as a city and your T cells as the patrol force. In a healthy young city, there are plenty of officers. They're all well trained, and they know every block of the city. In an aging city, officers retire faster than the city recruits new ones. The remaining

force is older, less mobile, and stretched thin. Crime starts to rise, public health declines, and the city itself begins to deteriorate.

Thymosin alpha-1 doesn't hire new officers. The academy is closed. But it does make the existing force more effective, coordinated, and responsive. It is the difference between a city in decline and a city that is aging gracefully. That's why we use it for longevity.

Thymosin alpha-1 is administered as a subcutaneous injection. No effective oral form exists. The molecule is too large and too fragile to survive in the digestive tract. Patients self-administer at home, similar to how a diabetic patient injects insulin. They give it subcutaneously with a small BD insulin syringe. The needles are very small, 31-gauge. Most patients describe it as no more than a little pinch, especially if you squeeze your skin beforehand; you hardly feel the needle go through.

The injection is given subcutaneously, usually in the abdomen or thigh, typically in the morning or just before bed. The molecule is absorbed into circulation, distributes systemically, and binds to its targets on dendritic cells throughout the body.

What's the dosing? The clinically studied dose is 1.6 milligrams per dose, given subcutaneously, with the frequency varying by indication. For chronic infection or immune support, twice weekly is common. For active acute infection or a postviral syndrome, more frequent dosing in the early phases is necessary - sometimes even daily for the first one to two weeks, then tapering down to a maintenance frequency.

As always, I don't give a specific dosing regimen here on a podcast because it requires a clinical workup and a specific regimen based on your protocol.

How long are patients on this? Most patients initially run a 12-week course to establish whether they are responders. Some patients continue at lower maintenance doses long-term, particularly if they have chronic conditions that benefit from ongoing immune support: chronic viral infection, autoimmunity, or recurrent infection patterns. Others use it cyclically - 12 weeks on and 12 weeks off - or seasonally during high-risk

infection periods. Think about schoolteachers, too, who are exposed to so many kids with so many [inaudible 25:20] and illnesses. That is a prime time for them.

What should you expect? Some patients notice a subtle increase in baseline energy within a few weeks. One thing I hear from my patients a lot is, "Oh my gosh, I haven't felt like myself. I really feel like myself again," especially my long COVID patients.

Most patients notice a difference when they don't catch the next thing going around - the cold their kids bring home or the bug at the office. I see that a lot in practice. It goes from one person to the next.

Patients with autoimmune conditions often see stabilization and fewer flares over the first 8 to 12 weeks. Patients with long COVID or postviral syndromes typically see gradual improvement over 12 to 24 weeks, sometimes even longer.

This peptide does not produce dramatic, immediate results. It works in the background, slowly and consistently. The change patients describe most often is the absence of something: the absence of the next infection, the absence of an autoimmune flare, or the absence of post-exertional fatigue. They notice something is different - or, rather, the lack of something.

Always put foundations first. Thymosin alpha-1 works dramatically better when the foundations are in place. That means adequate sleep, because chronic sleep deprivation suppresses immune function more than almost any other variable. When we don't sleep, we get sick, right? Our immune system starts to get suppressed.

It means adequate vitamin D. I usually like serum levels around 80. It means adequate protein, because your immune cells are built from protein. It also means addressing chronic stress, because cortisol is profoundly immunosuppressive. It means avoiding the things that suppress thymic function: chronic alcohol use, chronic infection burdens, ongoing inflammation, and a poor diet of processed foods.

What about synergies? Thymosin alpha-1 pairs powerfully with several other peptides we have covered or will cover. With BPC-157, you get immune modulation plus tissue repair, which is useful in immune conditions where there is both inflammation and structural damage. With larazotide, you address the gut-barrier component of immune dysregulation. Since roughly 70 percent of our immune tissue is in and around the gut, this is important.

We haven't talked about this one yet, but CJC-1295 and ipamorelin will support the thymic environment itself, since growth-hormone signaling appears to slow thymic involution. That's coming up.

Who should not use thymosin alpha-1? It is contraindicated in pregnancy and breastfeeding, not because of any specific evidence of harm - we don't have that - but because of insufficient data. If we don't have the data, it's probably best not to use it in that environment.

We use caution in patients on immunosuppressive therapy because the immunomodulating effect could theoretically interfere with the treatment plan. Any decision to combine them should be coordinated with the prescribing specialist. Typically, if someone is coming off immunosuppressive therapy, that's when I would try it. Or, if they have transitioned off immunosuppressive therapy to something like low-dose naltrexone and I want to give an adjunct to the treatment, then I might use thymosin alpha-1.

We also use caution in patients with active organ transplants for the same reason. Otherwise, the safety profile across decades has been remarkably clean.

Think of thymosin alpha-1 as the radio that gets your immune team talking again. The dispatcher - your dendritic cells - has been at her station all along, but the radio has been broken for years. Calls come in, and the team in the field doesn't hear them. A crisis escalates without a coordinated response.

Restore the radio and give the dispatcher her voice back, and suddenly the entire team starts moving in one direction and is one again. Not louder, not faster - just coordinated. That is what thymosin alpha-1 restores. It restores the coordination of what should happen. It doesn't add new capacity or make things bigger than they were. It connects what you already had.

What did this look like for Karen? Here's exactly what we did. When I say "we," I have a team. We all work together. I couldn't do my job without my team. Again, as I always say, sequence matters just as much as the medication, peptide, or whatever we're giving.

First, comprehensive testing. We ran a complete immune panel, including CD4 and CD8 T-cell counts, the CD4-to-CD8 ratio, and a quantitative immunoglobulin panel. We also pulled her thyroid antibodies: thyroid peroxidase (TPO) and thyroglobulin antibodies. We checked her vitamin D, and yes, it was low at 22.

We also checked inflammatory markers, including high-sensitivity C-reactive protein (hs-CRP), homocysteine, and ferritin, another inflammatory marker. We looked at her Epstein-Barr virus titers, given her post-COVID symptoms, and found evidence of chronic reactivation.

Her morning cortisol was elevated, and her evening cortisol was flat. Her sex hormones showed low estradiol, very low progesterone, and DHEA below the reference range.

Then came her foundations, starting with sleep: a strict 10:00 p.m. wind-down with a hard cutoff, and that's the latest. We used vitamin D supplementation, aiming for serum levels of at least 70 and closer to 80; protein at a minimum of 100 grams per day; and she had to work on stress.

We added a structured breathwork practice and a once-a-week therapy session. We removed alcohol entirely for her first 12 weeks, and we treated her gut dysbiosis with a combination of dietary work and a gentle antimicrobial [inaudible 31:00] protocol.

Then came her targeted protocol. We started thymosin alpha-1 subcutaneously, twice weekly. At week four, we layered in low-dose bioidentical progesterone and a topical estradiol patch to support her hormone function.

We added BPC-157 by injection because her gut symptoms warranted additional repair signaling. At week 12, we evaluated her response and continued thymosin alpha-1 at a maintenance frequency of once weekly.

I have to correct that: we didn't give her the injection because we didn't have the injection at the end of last year. We actually gave her oral BPC-157 with KPV because we didn't have the injection available.

Six months in, this is how she presented. She had no respiratory infections in the prior five months. That was the longest stretch in nearly two years that she had not been sick. Her thyroid antibodies were down approximately 40 percent. Her chronic Epstein-Barr virus titers were trending down. Her brain fog had resolved. Her exercise tolerance had returned to roughly 80 percent of her pre-COVID baseline, and her energy was steady throughout the day.

She says she feels, for the first time since her early 40s, like her body is working again and is on her side. That's what thymosin alpha-1 does in the right patient, with the right protocol, sequenced in the right order. It isn't magic. It's biology. We finally gave it back its conductor, so to speak.

What can you do this week, even before you see a physician about peptides? Get your vitamin D level tested. Aim for a serum level around 70 to 80. Most midlife adults are deficient or insufficient, and vitamin D is one of the most important modulators of immune function. Inadequate vitamin D will limit how much benefit you get from any immune therapy that we give you.

Prioritize sleep with a strict bedtime. Sleep deprivation suppresses immune function more than almost any other variable. Aim for seven to nine hours, with a consistent bedtime no later than 10:00 p.m.

Track your infection pattern over the last 12 months and write it down. The list itself is pretty diagnostic. If you've had more than three infections in a year, more than two courses of antibiotics, or any infection that has lingered beyond what feels "normal," bring that information to your clinical visit, especially when seeing a functional medicine provider.

Address chronic stress as a medical issue, not a lifestyle issue. I've done this many times with many patients. I have a lot of overachievers. Cortisol drives immune dysfunction. Whether it's therapy, breathwork, structured exercise, or boundary-setting at work and at home, the intervention matters more than doing nothing.

If you have any of the patterns we discussed today - recurrent infections, long COVID symptoms, an autoimmune condition that won't stabilize, or persistent fatigue - ask your provider specifically about thymosin alpha-1, or seek out a functional medicine clinician who is familiar with and trained in peptides.

That's important because there is a lot of peptide noise right now. Unfortunately, I see some people who haven't been trained but may have access to them. You really want to make sure they've been trained on how to use them.

If you recognize Karen in yourself - if you've caught more illnesses in the last two years than in the prior 20; if your body has stopped bouncing back from things that used to be easy; if you have an autoimmune condition that flared in midlife after being quiet for years; or if a viral infection has left a shadow you can't shake - I want you to hear something from me.

You're not just getting older. You are losing the central regulator of your immune function, slowly and silently, the same way every other human loses it. It is all of us. The

difference between you and the 25-year-old version of you is not effort. It is a signal. The thymus that used to run the show is mostly gone, and nobody told you.

Because the medical system doesn't have a name for this in-between space you're in, you're kind of stuck with it, right? You're not sick enough for an immunologist. But let me tell you that you can get better. You are too symptomatic to live with it.

Thymosin alpha-1 is a peptide that takes over the conversation when the thymus gland can no longer have it. It does not regrow the gland. It does not reverse aging. But it restores the orchestration of the immune response: the dispatcher's voice, so to speak; the conductor; the calibration of a thermostat that has lost its read on the room.

Used carefully, sequenced thoughtfully, and sourced responsibly from a licensed compounding pharmacy, it is one of the most quietly powerful interventions we have for midlife immune decline. In a patient like Karen - high-functioning, doing all the right things, but losing ground every season - it is often the difference between a decade of decline and a decade of return.

In our next episode, we're going to talk about CJC-1295 and ipamorelin, the growth-hormone duo that restores the master signaling cascade behind sleep, recovery, lean body mass, and the body's entire repair economy.

With your gut sealed - remember, I'm doing this in order for a reason - your tissues repaired, and your immune system back online, the next layer is signal restoration. Your gut sealed: larazotide. Your tissues repaired: BPC-157. Your immune system back online: thymosin alpha-1. Signal restoration is the next episode.

If today's episode resonated, share it with someone in your life who is quietly counting their infections; someone you think of as, "Gosh, they're always sick"; someone who has been told they have long COVID, but it's in their head; or maybe someone who has simply been told they have long COVID.

If you have a family member whose autoimmune condition has been managed but never really resolved, they may really benefit from this episode. There is a name for what they're experiencing. A molecule addresses it, and there is a path forward.

Thanks for listening. Until next time, I'm Dr. Tracy Page, and I hope you enjoyed Midlife Clarity.