Understanding Stem Cell Therapy for Long Covid

A Patient Guide from Auragens

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Advancing Regenerative Medicine:
Treatments & Empathy Amplified by Science and Technology

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Welcome

If you are reading this guide, you, or someone you care about is likely living with Long Covid — also known as Post-Acute Sequelae of SARS-CoV-2 infection, or PASC. You may have recovered from the initial infection weeks, months, or even years ago, yet you continue to struggle with symptoms that simply have not gone away: exhaustion that sleep does not fix, a mind that feels clouded, lungs that still fall short, a body that no longer feels like your own.

You are not alone. Millions of people around the world share this experience. And your symptoms are real.

At Auragens, we believe that every patient deserves both answers and options. This guide was created to walk you through what Long Covid is, why treating it has proven so difficult, and why human umbilical cord-derived mesenchymal stem cell therapy — hUC-MSC therapy — is being explored as a potentially meaningful complement to existing care. We will explain the science in plain language, summarize what the clinical research has shown so far, and be honest about what is still unknown.

This is not a promise of a cure. It is an invitation to learn — and to have an informed conversation with our medical team about whether this investigational approach may be right for you.

1. Understanding Long Covid and Current Treatment Limitations

What Is Long Covid?

Long Covid, or Post-Acute Sequelae of SARS-CoV-2 infection (PASC), refers to a broad and often debilitating cluster of symptoms that persist or emerge weeks to months after acute COVID-19 infection has resolved. The World Health Organization defines Long Covid as symptoms continuing beyond 12 weeks that cannot be explained by an alternative diagnosis. Importantly, Long Covid can occur regardless of how mild or severe the initial infection was, and it affects people across all age groups.

Long Covid is not a single disease with a single mechanism. It is a multisystem condition that can involve the lungs, brain, heart, immune system, nervous system, and vasculature — often simultaneously. This complexity is part of what makes it so difficult to treat.

How Does Long Covid Progress?

For many patients, symptoms emerge gradually after the acute illness and can fluctuate over time. Some individuals experience partial improvement followed by relapse. Others

have symptoms that remain relatively stable for months. The trajectory is highly individual and unpredictable.

Neurological and cognitive symptoms — including memory problems, difficulty concentrating, and sleep disturbances — have been reported to emerge one to three months after acute infection and may persist long-term [1], [2]. Respiratory symptoms, including persistent cough, breathlessness, and interstitial lung changes visible on imaging, have been documented in follow-up cohorts and may improve slowly or incompletely [3], [4].

Common Symptoms

Long Covid affects people differently, but the most frequently reported symptoms include:

- **Fatigue and post-exertional malaise:** An overwhelming tiredness that is not relieved by rest, and that worsens with physical or mental exertion. This is reported by the majority of Long Covid patients and is often the most disabling symptom [5].
- **Cognitive dysfunction ("brain fog"):** Difficulty with memory, concentration, word retrieval, and mental processing speed [1], [2].
- **Respiratory symptoms:** Persistent shortness of breath, chronic cough, reduced exercise capacity, and in some cases, ongoing lung changes on CT imaging [3], [4].
- **Mood and psychiatric symptoms:** Depression, anxiety, and emotional dysregulation — which may reflect both the psychological burden of chronic illness and direct neurobiological effects of the virus [1], [2].
- **Sleep disturbances:** Insomnia, unrefreshing sleep, and disrupted sleep architecture [1].
- **Autonomic dysfunction:** Heart palpitations, lightheadedness, and symptoms consistent with postural orthostatic tachycardia syndrome (POTS).
- **Pain:** Headaches, joint pain, and muscle aches.

What Causes Long Covid?

Researchers have identified several overlapping biological processes that appear to drive Long Covid:

- **Persistent immune dysregulation:** The immune system remains in a state of chronic, low-grade activation long after the virus is cleared. Abnormalities in T cell and B cell populations, as well as elevated inflammatory markers, have been documented in Long Covid patients [6].
- **Chronic inflammation:** Sustained production of pro-inflammatory cytokines contributes to tissue damage, fatigue, and neurological symptoms.
- **Endothelial dysfunction and microclotting:** Damage to the inner lining of blood vessels impairs circulation and oxygen delivery to tissues and organs.

- **Neuroinflammation:** Inflammatory changes in the brain and nervous system may underlie cognitive symptoms and mood disorders [2].
- **Viral persistence:** Some researchers have proposed that residual viral material or antigens may continue to stimulate the immune system in certain patients.
- **Reactivation of latent viruses:** Reactivation of Epstein-Barr virus and other latent pathogens has been observed in some Long Covid patients.
- **Tissue damage and fibrosis:** Structural damage to the lungs and other organs may result in lasting functional impairment [4].

Current Treatment Limitations

Despite the scale of the Long Covid epidemic — affecting an estimated 65 million people worldwide — there is currently **no proven, disease-modifying therapy** for this condition [1]. Treatment remains largely supportive and symptom-focused.

Existing approaches include:

- **Rehabilitation programs:** Pacing strategies, graded exercise (where tolerated), and cognitive rehabilitation can help some patients manage symptoms, but do not address underlying disease mechanisms.
- **Symptom management:** Medications for pain, sleep, mood, and autonomic dysfunction offer partial relief but do not modify the course of the disease.
- **Anticoagulation and anti-inflammatory agents:** Being explored in some clinical settings but without established evidence of benefit in Long Covid specifically.
- **Antiviral therapies:** Trials of antivirals are underway, but no antiviral is currently approved for Long Covid.

The limitations are significant:

- Most published studies on potential Long Covid treatments are small, uncontrolled, or lack placebo comparisons, making it difficult to draw firm conclusions [5], [6].
- Long Covid is heterogeneous — what helps one patient may not help another.
- No treatment has yet been shown to reverse the underlying immune dysregulation consistently or durably.

This unmet need has driven researchers and clinicians to investigate novel approaches, including regenerative medicine and stem cell-based therapies that may address the root biological causes of Long Covid rather than simply managing its symptoms.

2. What Are hUC-MSCs from Wharton's Jelly?

Understanding Mesenchymal Stem Cells

Mesenchymal stem cells (MSCs) are a class of adult stem cells found in multiple tissues throughout the body, including bone marrow, adipose (fat) tissue, and the umbilical cord.

They are distinct from embryonic stem cells — their collection does not require the destruction of embryos, and they carry no associated ethical controversy.

MSCs have three defining capabilities that make them of great interest in regenerative medicine:

1. **Differentiation potential:** Under the right conditions, MSCs can develop into bone, cartilage, fat, and other connective tissue cell types.
2. **Paracrine signaling:** MSCs release a wide array of bioactive molecules — including growth factors, cytokines, and extracellular vesicles — that communicate with and influence surrounding cells and tissues.
3. **Immunomodulation:** MSCs have a remarkable ability to sense and respond to the local immune environment, dialing down excessive immune responses and promoting tissue repair.

What Is Wharton's Jelly?

Wharton's jelly is the gelatinous connective tissue found within the umbilical cord, surrounding the cord's blood vessels. It is rich in a particularly potent population of MSCs — human umbilical cord-derived mesenchymal stem cells, or hUC-MSCs.

These cells are collected from umbilical cords donated by consenting mothers after healthy, full-term births. The cord would otherwise be discarded. No harm comes to the mother or infant in the collection process.

Why Are hUC-MSCs of Particular Interest?

hUC-MSCs derived from Wharton's jelly offer several advantages over MSCs collected from adult tissues such as bone marrow or fat:

- **Neonatal origin:** Because these cells come from newborn tissue, they are biologically younger, more proliferative, and generally more potent than MSCs from adult donors.
- **Allogeneic use:** hUC-MSCs can be administered to patients who are not the original donor — a critical advantage, since it allows for large-scale manufacturing and off-the-shelf availability without requiring an invasive harvest procedure from the patient.
- **Low immunogenicity:** hUC-MSCs express low levels of the immune-recognition molecules (MHC class I, and very little MHC class II) that normally trigger rejection. This makes them significantly less likely to provoke an immune reaction when infused into another person.
- **Rich secretome:** hUC-MSCs produce a particularly robust array of trophic factors, anti-inflammatory mediators, and extracellular vesicles, which are believed to be the primary drivers of their therapeutic effects.

- **Ethical and practical accessibility:** Collection is non-invasive, ethically uncontroversial, and can be standardized across accredited facilities.

Donor Screening, Laboratory Expansion, and Quality Control

At Auragens, hUC-MSCs are sourced exclusively from thoroughly screened donors. The process includes:

- **Donor health screening:** Mothers undergo comprehensive medical history review, physical examination, and laboratory testing.
- **Infectious disease testing:** Donors are tested for HIV, hepatitis B and C, syphilis, cytomegalovirus, and other relevant pathogens, in compliance with regulatory standards.
- **Cell expansion:** Following collection, cells are expanded in certified laboratory conditions under Good Manufacturing Practice (GMP) guidelines to produce a sufficient therapeutic dose.
- **Quality control:** Cell batches are tested for viability, identity, purity, potency, and sterility before release.
- **Cryopreservation:** Cells are cryopreserved (frozen) at controlled temperatures until the time of treatment, then thawed and prepared for infusion according to validated protocols.

How Are hUC-MSCs Administered?

In clinical studies for Long Covid and related conditions, hUC-MSCs are most commonly administered via **intravenous (IV) infusion** — similar to receiving a saline drip or IV antibiotic in a clinical setting. The cells are infused slowly, typically over 30 to 60 minutes, and most patients tolerate the procedure well on an outpatient basis.

Some protocols involve multiple infusions spaced days to weeks apart to maximize the therapeutic effect [1], [5]. Emerging research also explores alternative delivery routes — including **nasal administration of MSC-derived extracellular vesicles** — which may allow more direct access to the central nervous system for patients with predominant neurological symptoms [2].

Why Auragens: AABB Accreditation — The Gold Standard in Cellular Therapy

Auragens Stem Cell Center is proud to be AABB accredited — a critical distinction that sets us apart from unaccredited clinics.

What is AABB Accreditation?

AABB (Association for Advancement of Blood and Biotechnologies) is the internationally recognized

leader in setting quality and safety standards for cellular therapies. AABB is a deemed status organization by the FDA and AABB accreditation represents the gold standard in the field — the most rigorous, comprehensive certification available for facilities that process and administer cellular products.

What Does AABB Accreditation Mean for You?

When you choose an AABB-accredited center like Auragens, you can trust that we meet the highest international standards in:

- **Cell Processing Excellence:** Our laboratory protocols follow strict, validated procedures ensuring every cell product meets pharmaceutical-grade quality specifications.
- **Donor Screening & Safety:** Comprehensive screening protocols ensure all donor tissue is thoroughly tested and meets stringent safety criteria.
- **Laboratory Practices:** Our facilities, equipment, and processes undergo regular inspection and must meet exacting standards for sterility, environmental control, and quality assurance.
- **Patient Safety:** From cell arrival through administration and follow-up, every step is designed and monitored to protect your safety.
- **Staff Expertise:** Our team maintains specialized training and competency requirements specific to cellular therapy.
- **Traceability & Documentation:** Complete tracking and documentation of every cell product ensures full accountability.
- **Continuous Quality Improvement:** Regular audits, proficiency testing, and quality reviews.

Why This Matters

The field of stem cell therapy is rapidly growing, but not all clinics meet the same standards. Many facilities operate without independent accreditation or oversight. AABB accreditation means an external, U.S., FDA, expert organization has thoroughly inspected and validated our practices — giving you independent verification, proven quality systems, and genuine peace of mind. When you choose Auragens, you're choosing a center that has been independently verified to meet the most stringent international standards for cellular therapy quality and safety.

AABB accreditation is not easy to achieve or maintain — it requires significant investment in infrastructure, training, quality systems, and ongoing compliance. We've made this commitment because you deserve nothing less than the highest standard of care.

3. How hUC-MSCs May Help with Long Covid

The Biological Rationale

Long Covid is, at its core, a disease of dysregulation — of an immune system that has not returned to normal, of inflammation that has not resolved, of tissues and vessels that have

not fully healed. hUC-MSCs are being investigated precisely because their biological properties appear to address several of these dysregulated processes simultaneously.

It is important to emphasize that the mechanisms described below are supported by preclinical research, human biomarker studies, and early clinical observations — but the causal link between these mechanisms and specific symptom improvements in Long Covid patients is still being established. This is an active and rapidly evolving area of research.

4.1 Immunomodulation: Rebalancing the Immune System

One of the most well-documented properties of hUC-MSCs is their ability to modulate immune responses. In Long Covid, the immune system appears to remain in a state of chronic activation — producing inflammatory signals that damage tissues and perpetuate symptoms long after the virus is gone.

hUC-MSCs can interact with multiple immune cell populations and shift the balance from pro-inflammatory to regulatory:

- **Regulatory T cells (Tregs):** hUC-MSC treatment has been associated with a gradual increase in Tregs — specialized immune cells that suppress excessive immune activation and help restore immune tolerance. In the Tang et al. (2024) study of Long Covid patients treated with hUC-MSCs, Treg proportions increased progressively over 12 months of follow-up [1].
- **B cell rebalancing:** Changes in B cell subpopulations — including increases in naïve B cells and reductions in certain memory B cell subsets — were also observed, suggesting a broader immunological reset [1].
- **Cytokine modulation:** In COVID-19 ARDS patients treated with MSCs, significant reductions in pro-inflammatory cytokines (IL-6, IFN-γ, TNF-α, IL-17A) and increases in anti-inflammatory cytokines (TGF-β, IL-10) were documented, suggesting a shift in the inflammatory environment [8].

4.2 Anti-Inflammatory Effects: Quieting Chronic Inflammation

Beyond their effects on immune cells, hUC-MSCs and their secreted factors directly suppress inflammatory signaling. They produce molecules that inhibit the activation of macrophages and other innate immune cells, reduce the production of inflammatory cytokines, and promote the resolution of inflammation in affected tissues [9], [10].

This broad anti-inflammatory action is particularly relevant in Long Covid, where chronic, low-grade inflammation is believed to contribute to fatigue, cognitive symptoms, and ongoing organ-level dysfunction.

4.3 Neuroprotection and Neuroinflammation Reduction

For the many Long Covid patients experiencing cognitive symptoms, mood disturbances, and sleep disruption, neuroinflammation — inflammation within the brain and nervous system — may be a key driver.

hUC-MSCs and their derived extracellular vesicles (small membrane-bound particles that carry therapeutic signals) have been proposed to:

- **Modulate microglial activity:** Microglia are the brain's resident immune cells. When overactivated, they contribute to neuroinflammation and neuronal injury. MSC-derived extracellular vesicles may help dampen this overactivation [2].
- **Support endothelial repair in the brain:** Damage to the blood-brain barrier and cerebrovascular endothelium has been implicated in Long Covid neurological symptoms. MSC-derived signals may promote the repair and restoration of these structures [2].
- **Provide neurotrophic support:** MSCs secrete growth factors, including brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF), which support the survival and function of neurons.

Notably, researchers have proposed that **nasal administration of MSC-derived extracellular vesicles** may offer a more direct route to the central nervous system, bypassing the blood-brain barrier and delivering therapeutic signals to the brain more efficiently [2]. While this approach remains largely investigational, it represents an exciting frontier for patients with predominantly neurological Long Covid symptoms.

4.4 Vascular Repair and Endothelial Support

Endothelial dysfunction — damage to the inner lining of blood vessels — is a well-documented feature of both acute COVID-19 and Long Covid. Impaired endothelial function compromises blood flow, oxygen delivery, and the regulation of inflammation throughout the body.

hUC-MSCs secrete a range of pro-angiogenic and vascular-supportive factors that may help repair damaged endothelial cells, restore vascular integrity, and improve microcirculation in affected tissues [2], [9]. This mechanism may contribute to improvements in exercise tolerance, breathlessness, and systemic fatigue.

4.5 Tissue Repair and Anti-Fibrotic Signaling

In the lungs, Long Covid can leave behind interstitial changes and early fibrotic remodeling — scarring that impairs normal respiratory function. hUC-MSCs and their extracellular vesicles have demonstrated anti-fibrotic properties in multiple tissue contexts:

- They secrete factors that inhibit the activation of fibroblasts (the cells responsible for scar formation).
- They promote the resolution of existing fibrosis and support the regeneration of normal tissue architecture.
- They modulate the local microenvironment to favor repair over scarring [4], [5].

In the Tang et al. (2024) study, Long Covid patients treated with hUC-MSCs showed improvement in lung lesions on high-resolution CT imaging, consistent with a tissue-reparative effect [1].

4.6 Paracrine and Exosome Signaling

It is now understood that MSCs do not primarily work by directly replacing damaged cells. Instead, their therapeutic effects are largely mediated through **paracrine signaling** — the release of bioactive molecules, growth factors, cytokines, and extracellular vesicles (including exosomes) that communicate with and reprogram surrounding cells.

This paracrine mechanism means that MSCs do not need to permanently engraft in tissues to be effective. They act more like a biological "reset signal," delivering a complex therapeutic message to the local immune and cellular environment. This is also one reason why MSC therapy has a favorable safety profile — the cells are transient, and their effects are mediated through signaling rather than permanent structural integration [9].

4. Clinical Evidence and Research Findings

The Current State of Evidence

The clinical evidence for hUC-MSC therapy in Long Covid is still in its early stages. The most direct human evidence comes from small, open-label studies and expanded-access programs — not yet from large, randomized, placebo-controlled trials specifically designed for Long Covid. This is an important distinction that we want to be transparent about.

At the same time, a meaningful body of evidence from severe COVID-19 trials and meta-analyses provides important context, since Long Covid and severe COVID-19 share overlapping pathological features — particularly immune dysregulation, inflammation, and tissue injury.

Below, we summarize the most relevant human studies.

4.1 Direct Long Covid Studies

Tang et al. (2024) — hUC-MSCs in Long Covid Patients

This is among the most directly relevant published studies to date. Tang and colleagues conducted an open-label study enrolling 10 Long Covid patients who received intravenous hUC-MSC infusions on days 0, 7, and 14 [1].

Key findings:

- **Symptom relief:** Patients reported significant improvements in sleep difficulty, depression and anxiety, and memory problems over the follow-up period.
- **Lung repair:** High-resolution CT imaging showed improvement in persistent lung lesions in treated patients.

- **Immune rebalancing:** Regulatory T cell proportions increased gradually over 12 months, and changes in B cell subpopulations were documented — consistent with progressive immunological normalization.
- **Safety:** No serious adverse events were reported. A transient elevation in IL-6 was observed post-infusion, which resolved without clinical consequence.

This study provides the first direct evidence that hUC-MSC therapy may improve both subjective symptoms and objective biological markers in Long Covid patients. Its limitations include the small sample size, open-label design, and absence of a placebo control.

Vij et al. (2023) — Adipose-Derived MSCs for Post-COVID Syndrome

In this intermediate-size expanded-access program, 10 patients with post-COVID syndrome received multiple intravenous infusions of autologous (their own) adipose-derived MSCs [5].

Key findings:

- Significant improvements in symptom severity scores (VAS) and fatigue.
- Improved scores across multiple domains of the SF-36 quality-of-life questionnaire.
- Mostly mild adverse events; no serious adverse events reported.

While this study used a different cell source (adipose-derived rather than umbilical cord-derived MSCs), the findings are relevant because they demonstrate that MSC therapy can produce meaningful, patient-reported improvements in Long Covid symptoms. The absence of a control group limits conclusions about causality.

Bone Marrow MSC-Derived Extracellular Vesicles (2024)

A case series published in 2024 reported on the use of intravenous bone marrow MSC-derived extracellular vesicles (EVs) in Long Covid patients [6].

Key findings:

- Potential symptom improvement was reported in the treated cases.
- Safety was acceptable in the reported cohort.

This study is limited by its very small sample size and uncontrolled design, but it contributes to the emerging picture that MSC-derived products — including extracellular vesicles alone — may carry therapeutic potential in Long Covid.

Askenase (2022) — Nasal MSC-EV Delivery for Long Covid Encephalopathies

This paper proposed a novel delivery strategy: administering MSC-derived extracellular vesicles via the nasal route to target Long Covid neurological symptoms directly [2].

Rationale:

- Nasal delivery may allow MSC-EVs to access the central nervous system via the olfactory pathway, bypassing the blood-brain barrier.
- MSC-EVs can target overactivated microglia and damaged endothelial cells in the brain, potentially reducing neuroinflammation and restoring cerebrovascular integrity.

This remains an early-stage proposal, but it represents a scientifically grounded rationale for addressing the cognitive and neurological dimensions of Long Covid that may be difficult to reach via intravenous infusion alone.

4.2 Long-Term Follow-Up Evidence

Yuan et al. (2025) — Three-Year Follow-Up of MSC Therapy in Severe COVID-19

This study followed patients from a randomized, double-blind, placebo-controlled trial of MSC therapy given during acute severe COVID-19 (original n=100) for three years [7].

Key findings:

- **Long-term safety confirmed:** No evidence of tumorigenesis or other serious delayed adverse effects was observed at three years — an important reassurance for patients considering MSC therapy.
- **Quality-of-life improvements:** Some quality-of-life measures were improved in the MSC group compared to placebo at three years.
- **Long Covid symptom rates:** Similar rates of Long Covid symptoms were observed in both MSC and placebo groups, suggesting that MSCs given during acute illness may not prevent the later development of Long Covid.

This last finding is important context: it suggests that **treating Long Covid directly** (as in Tang et al.) may be more relevant than treating acute COVID-19 as a prevention strategy for PASC.

4.3 Evidence from Severe COVID-19 Clinical Trials

Because Long Covid and severe COVID-19 share key pathological mechanisms — including immune dysregulation, cytokine elevation, endothelial damage, and lung injury — studies of MSC therapy in severe COVID-19 provide meaningful biological and safety context.

Lanzoni et al. (2021) — hUC-MSCs for COVID-19 ARDS

This double-blind, phase 1/2a randomized controlled trial enrolled 24 patients with COVID-19 acute respiratory distress syndrome (ARDS) who received two intravenous infusions of hUC-MSCs [10].

Key findings:

- No infusion-related serious adverse events.
- Lower 28-day mortality and faster recovery in the MSC group compared to controls in this small trial.
- Supports both the safety profile and preliminary efficacy signal of hUC-MSCs in severe COVID-19.

4.4 Meta-Analyses and Systematic Reviews

Several meta-analyses have pooled data from multiple randomized controlled trials of MSC therapy in COVID-19:

- **Lu et al. (2024):** Meta-analysis of RCTs found that MSC therapy significantly reduced mortality in COVID-19 patients, with an acceptable safety profile [11].
- **Zhang et al. (2023):** Meta-analysis with trial sequential analysis confirmed both efficacy and safety of MSCs in COVID-19, with consistent benefit across included trials [12].
- **Azar et al. (2023):** Systematic review and meta-analysis found a significant reduction in mortality (OR=0.18, $p<0.0001$) with no increase in adverse events compared to control groups [13].

These meta-analyses, while focused on acute COVID-19 rather than Long Covid specifically, provide robust aggregate evidence that MSC therapies are safe and biologically active in the COVID-19 disease context.

4.5 Summary: What the Evidence Tells Us

What We Know	What We Still Need
hUC-MSCs are safe and well-tolerated in Long Covid and COVID-19 patients across multiple studies	**Larger randomized, placebo-controlled trials specifically in Long Covid**
Small studies report symptomatic improvements in fatigue, cognition, mood, sleep, and respiratory function	**Standardized outcome measures to allow cross-study comparison**
Measurable immune rebalancing and anti-inflammatory effects have been documented in human studies	**Longer follow-up to assess durability of benefit**

What We Know	What We Still Need
Meta-analyses confirm safety and mortality benefit in acute COVID-19	**Optimization of cell source, dose, timing, and route for Long Covid**
Long-term follow-up (3 years) shows no tumorigenesis or serious delayed effects	**Identification of biomarkers that predict treatment response**

The evidence is early but scientifically coherent. The biological rationale is strong, the safety data are reassuring, and the initial human results are encouraging. Larger, better-designed studies are needed — and are underway — to establish definitive efficacy.

5. Safety Profile: What the Research Shows

An Encouraging Safety Record

Across the published literature on MSC therapy in Long Covid and COVID-19, the safety profile of hUC-MSCs has been consistently favorable. No consistent signal of serious, treatment-related adverse events has emerged across multiple studies and patient populations.

This does not mean that stem cell therapy is without any risk — no medical treatment is. But the available evidence provides meaningful reassurance.

What the Studies Show

No serious adverse events in Long Covid-specific studies: The Tang et al. (2024) study of hUC-MSCs in 10 Long Covid patients reported no serious adverse events related to treatment [1]. The Vij et al. (2023) expanded-access program similarly reported no serious adverse events in post-COVID syndrome patients [5]. The bone marrow MSC-EV case series also reported acceptable safety [6].

Mild and transient effects: The most commonly reported adverse events in MSC studies are mild and transient — including temporary fatigue, mild headache, or low-grade fever following infusion. These typically resolve within hours to days and do not require intervention [8].

Transient immune activation: In the Tang et al. study, a transient elevation in IL-6 (an inflammatory cytokine) was observed after infusion, consistent with a brief immune activation response. This resolved without clinical consequence and did not correlate with adverse outcomes [1]. This type of transient response is considered a known, expected, and manageable aspect of MSC infusion.

No long-term safety concerns at three-year follow-up: The Yuan et al. (2025) three-year follow-up of a randomized MSC trial found no evidence of tumorigenesis, autoimmune disease, or other serious delayed adverse effects — an important long-term safety data point [7].

Favorable safety in meta-analyses: Meta-analyses pooling data from multiple COVID-19 MSC trials have consistently found no increase in adverse events in MSC-treated patients compared to controls [11], [12], [13].

Why Are hUC-MSCs Considered Relatively Safe?

Several biological properties contribute to the favorable safety profile:

- **Low immunogenicity:** hUC-MSCs express low levels of immune-triggering surface markers, reducing the risk of immune rejection or serious immune reactions.
- **No tumor formation:** Unlike pluripotent stem cells, MSCs do not form teratomas. Long-term studies have confirmed no increased cancer risk [7].
- **Transient presence:** Infused MSCs do not permanently engraft. They exert their effects through paracrine signaling and are gradually cleared by the body, limiting the window of potential systemic effects.
- **Rigorous pre-release testing:** AABB-accredited cells undergo comprehensive testing for viability, sterility, identity, and infectious disease markers before administration.

Honest Limitations

The safety data reviewed here come primarily from small studies with limited follow-up. While the picture is consistently reassuring, it is important to acknowledge that:

- Larger trials may reveal lower-frequency adverse events not yet captured in small cohorts.
- Long-term safety beyond three years has not yet been systematically studied in Long Covid-specific populations.
- Individual patient factors — including comorbidities, medications, and immune status — may influence tolerability.

At Auragens, we discuss all of these considerations openly with every patient during the consultation process.

6. What to Expect Next at Auragens

Your Journey Begins with a Comprehensive Consultation

No two Long Covid patients are the same. The breadth and severity of symptoms, the timeline of illness, prior treatments, comorbidities, and personal goals vary enormously from person to person. For this reason, Auragens does not offer a one-size-fits-all protocol. Every patient's path begins with a thorough, individualized consultation.

The Consultation Process

During your initial consultation with the Auragens medical team, you can expect:

- **Comprehensive medical history review:** We will take a detailed history of your COVID-19 illness, your Long Covid symptoms, their timeline, and their impact on your daily life.
- **Prior treatment review:** We will review what treatments you have already tried, what has helped, and what has not.
- **Goals discussion:** We will ask what matters most to you — whether that is improving cognitive function, reducing fatigue, improving respiratory capacity, or some combination — so that we can frame realistic expectations and tailor your care plan accordingly.
- **Eligibility assessment:** Based on your medical profile, current evidence, and clinical judgment, our team will discuss whether hUC-MSC therapy is appropriate for your situation and what the evidence suggests about likely benefit and risk.
- **Evidence-based discussion:** We will walk you through the research — including its strengths and limitations — so that you can make a genuinely informed decision.
- **Transparent logistics:** We will explain the treatment schedule, the number of infusions proposed, what the infusion process involves, what monitoring will be provided, and what follow-up looks like.

Realistic Expectations

We want to be clear: hUC-MSC therapy for Long Covid is investigational. It is not a guaranteed cure, and not every patient will experience the same degree of benefit. Some patients in published studies have reported meaningful improvements; others have had more modest responses. The durability of any benefit over the long term is still being studied.

What we can offer is a treatment grounded in a sound biological rationale, administered to the highest quality and safety standards, with full transparency about what the evidence does and does not show.

7. Next Steps

Considering Whether This Is Right for You

Deciding to explore stem cell therapy is a meaningful step, and it should be made thoughtfully, in partnership with your medical team. This section is designed to help you think through that decision clearly.

Who May Want to Explore a Consultation

hUC-MSC therapy may be worth discussing with the Auragens team if:

- You have a confirmed or clinically recognized diagnosis of Long Covid (PASC) with persistent symptoms.
- Your symptoms significantly impair your quality of life, work capacity, or daily functioning.
- You have pursued conventional treatments and rehabilitation without adequate relief.
- You are interested in an approach that targets the underlying biological mechanisms — immune dysregulation, inflammation, tissue repair — rather than only managing symptoms.
- You understand and accept that this is an investigational therapy with promising but still-evolving evidence, and you are comfortable with the current level of uncertainty.

Questions Worth Asking

Before your consultation, consider reflecting on the following:

- What are my most disabling symptoms, and how are they affecting my life?
- What treatments have I already tried, and what were the results?
- What are my specific goals for treatment? What would “meaningful improvement” look like for me?
- Have I discussed this with my primary care physician or specialist? What is their perspective?
- Am I prepared to commit to a multi-infusion protocol and follow-up visits?
- Do I understand that results may vary and that this therapy is not a guaranteed cure?

The Importance of Your Primary Care Team

We strongly encourage every patient considering hUC-MSC therapy to discuss this option with their primary care physician, pulmonologist, neurologist, or other relevant specialist. Stem cell therapy should complement — not replace — your existing medical care. Your Auragens team is committed to collaborating with your broader care team to ensure that your treatment plan is safe, coherent, and aligned with your overall health goals.

A Message of Hope

Living with Long Covid is exhausting in every sense of the word. The physical symptoms are relentless. The uncertainty is its own burden. And for many patients, the experience of not being believed — of being told that nothing is wrong when everything feels wrong — adds a layer of isolation that is hard to describe.

We want you to know that Auragens sees you. We take your symptoms seriously. And we believe that science is moving in a meaningful direction.

Human umbilical cord-derived mesenchymal stem cells represent one of the most scientifically coherent investigational approaches to Long Covid available today. The biological rationale is sound: these cells address the very mechanisms — immune dysregulation, chronic inflammation, endothelial damage, neuroinflammation, tissue injury — that researchers believe drive Long Covid. The safety data, across multiple studies and patient populations, are consistently reassuring. And the early clinical results, while still preliminary, are giving researchers and patients genuine reason for optimism.

We are not here to promise you a cure. We are here to offer you access to the most advanced, rigorously quality-controlled regenerative medicine available — delivered with honesty, compassion, and a deep commitment to your wellbeing.

The science is advancing. The evidence is building. And at Auragens, we are committed to walking alongside you — with transparency about what we know, humility about what we are still learning, and unwavering dedication to your care.

You deserve answers. You deserve options. You deserve hope grounded in

science.

We look forward to meeting you.

The Auragens Patient Care Team

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This educational document is provided for informational purposes only and does not constitute medical advice. Individual results may vary. Please consult with your physician and the Auragens medical team to determine if UC-MSC therapy is appropriate for your specific situation. hUC-MSC therapy for Long Covid is investigational. The information contained in this guide reflects the state of published scientific literature as of 2026 and is subject to change as new evidence emerges.
