



NEW HOPE FOR LONG COVID AT RIORDAN CLINIC

Riordan Approach Using HOT-UBI + IVC

WRITTEN BY Ron Hunninghake, MD

Over the past several years, we have been seeing a growing number of patients who never fully recover from a COVID infection...be it severe or just mildly debilitating. Months or even years later, they continue to experience fatigue, brain fog, breathing difficulties, digestive problems, and a long litany of other lingering symptoms that can be very disabling.

This pattern has come to be known as "Long COVID", a condition now estimated to affect more than 330 million people globally. Although this is now an accepted medical diagnosis, it unfortunately lacks a clear understanding of its underlying cause or causes. Thus, most treatments can address only symptoms...but not the cause. Hence, Long COVID often means "long suffering."

Emerging research suggests that Long COVID may involve changes in the micro-vascular system that can occur somewhat randomly throughout the body. This is a clue as to why there is so much symptom variability from patient to patient... and why it is closely related to the infamous behavior of the long COVID spike protein.

The Role of Spike Protein in Long COVID

The spike protein is known to be closely associated with the COVID virus. This novel protein typically interacts with ACE2 receptors that are widely distributed throughout the body. These receptors are especially common along the inner lining of blood vessels.

When spike proteins interact with these receptors, inflammatory signals may develop within the inner lining of the blood vessel. Healthy blood vessels normally provide a smooth pathway for circulation. You might picture it like a well-paved highway where blood cells can move freely.

When inflammation develops along the vessel lining, that smooth surface may become rough and reactive. Instead of a clear roadway, the circulation system may begin to resemble a damaged highway with debris scattered along the path.

In this environment, very small but destructive fibrin structures may begin forming in the linings of these small vessels. These structures are now ▶

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Elevated NET markers have been observed in some individuals experiencing Long COVID symptoms.

A D-dimer Test Detects Microclots

The D-dimer test measures fragments that appear in the bloodstream when fibrin clots break down. Rather than detecting the clot itself, the test detects evidence of clotting activity.

For that reason, the D-dimer test can function somewhat like a smoke detector. It does not show the fire directly but indicates that minute clotting activity may be present.

Many laboratories consider levels below 0.50 mg/L (or 500ng/mL) to fall within the standard reference range. Some clinicians prefer to see levels below 0.35 mg/L (or 300ng/mL) when possible. Healthy young adults have levels as low as 0.20 mg/L (or 200ng/mL).

At Riordan Clinic, the D-dimer test is being researched as a possible Long COVID marker. While results are encouraging, we have found that a normal D-dimer does not necessarily rule out the Long COVID syndrome.

The HOT-UBI Approach at Riordan Clinic

If circulation and oxygen delivery are part of the story, an important question becomes how clinicians might support these processes during recovery.

One approach used at Riordan Clinic is Hematogenic Oxidation Therapy, or HOT. This therapy is a specialized form of ultraviolet blood irradiation in which a small portion of the patient's blood is withdrawn, exposed to ultraviolet light and 100% oxygen under pressure, and then slowly reinfused into the circulation.

The goal is to help support circulation, oxygen delivery, and immune system signaling. The procedure is under a 1955 free-use patent.

Because only a small amount of blood is treated directly, the therapy is intended to stimulate broader responses throughout the body.

At Riordan Clinic, HOT is a combined oxygen/ultraviolet blood irradiation with other integrative therapies. The combined approach is sometimes referred to as HOT-UBI.

Researchers and clinicians continue to study how combination therapies like this might improve microcirculation and oxygen delivery to support recovery in people experiencing Long COVID.

Adding Intravenous Vitamin C: HOT-UBI + IVC

Following HOT-UBI therapy, we are now recommending that our co-learners receive intravenous vitamin C.

Vitamin C functions as an electron donor and supports the body's antioxidant balance. Because it can enter many tissues throughout the body, including the brain, vitamin C

may help support normal cellular metabolism and speed up recovery after injury

As circulation improves and inflammatory debris begins to clear, some individuals may experience temporary fatigue or mild flu-like symptoms.

After receiving two HOT-UBI treatments combined with intravenous vitamin C, she reported significant improvement in her symptoms. She was again able to kneel in church, walk upstairs, and visit several stores during a single outing.

This reaction is sometimes referred to as the Herxheimer response. It occurs when the body clears biological debris faster than detoxification pathways can process it. These symptoms are typically temporary and resolve as the body restores balance.

By following their HOT-UBI treatment with IVC, the hope is to reduce any likelihood of a Herxheimer response.

One Patient's Experience

One patient in her sixties had experienced persistent symptoms following COVID for several years. Generalized fatigue, along with stiffness and discomfort in her legs, made it difficult to kneel in church or walk upstairs comfortably.

Even routine errands, such as grocery shopping, required careful planning due to severe fatigue and muscle discomfort.

Individual experiences vary, and ongoing research continues to explore these approaches.

In our clinic, we continue learning from each patient who walks through the door. Each case adds another piece to the puzzle of how circulation, immune response, and cellular metabolism interact during recovery.

Looking Ahead

Long COVID remains an evolving area of research. Physicians and scientists continue exploring how inflammation, circulation, and cellular energy interact following viral infection.

By carefully following the biological breadcrumbs, clinicians may uncover better ways to support individuals navigating this complex condition.

Frequently Asked Questions

What are microclots in Long COVID?

Microclots are tiny clumps of fibrin circulating in the bloodstream that may affect blood flow in the body's smallest vessels.

Why do people with Long COVID feel fatigued?

Fatigue may be related to several factors, including inflammation, changes in circulation, and reduced oxygen delivery to tissues.

What are NETs?

NETs, or neutrophil extracellular traps, are webs of DNA released by immune cells to trap microbes during infection.

What does a D-dimer test measure?

A D-dimer test measures fragments produced when blood clots break down in the body.

What is HOT-UBI + IVC therapy?

HOT-UBI refers to Hematogenic Oxidation Therapy (HOT) combined with ultraviolet blood irradiation. A small portion of blood is exposed to ultraviolet light and oxygen before being returned to circulation, as part of an integrative clinical approach being explored to support circulation and immune balance. The Riordan IVC treatment is added to reduce the likelihood of a Herxheimer, or rapid healing response. ■

References

- ▶ Levy TE. Curing Long COVID and Associated Hypercoagulation. Shanghai Salon Zoom Dialogue, February 24, 2026.
- ▶ Pretorius E, et al. Circulating microclots are structurally associated with neutrophil extracellular traps and are elevated in Long COVID patients. Journal of Medical Virology. October 2025.
- ▶ Knott EK. Historical observations on ultraviolet blood irradiation therapy.

referred to as "microclots" and NETs. (See below, the Journal of Medical Virology. October 2025.)

What Are Microclots in Long COVID

To understand why researchers are paying attention to microclots in Long COVID, it helps to look more closely at what scientists mean by the term.

Unlike larger clots associated with strokes or heart attacks, microclots are microscopic and cannot be easily detected with standard imaging.

The smallest blood vessels in the body are capillaries. These vessels are so narrow that red blood cells often move through them one at a time. Since normal blood flow means oxygen easily reaches all our tissues, microclots can decrease blood flow in the body's smallest vessels, robbing the cells they feed of optimal levels of oxygen. Physicians sometimes refer to this as localized or "spotty" hypoxia.

Uneven oxygen delivery may help explain symptoms such as fatigue, brain fog, shortness of breath, or muscle discomfort. Researchers are studying whether these micro changes in the circulation play a role in these lingering symptoms.

How NETs May Contribute to Microclots

Microclots may not be the only factor involved. Researchers have also been studying a related immune process that may interact with these clots called NETs, or neutrophil extracellular traps.

NETs are webs of DNA released by immune cells to help trap microbes during infection. In normal circumstances, they play an important role in immune defense.

When NET formation becomes excessive, these sticky DNA webs may interact with fibrin proteins in the bloodstream. This interaction may contribute to the persistence of microclots.

Considering HOT-UBI + IVC?

If you're new to Riordan Clinic, you're welcome to schedule an appointment at our Wichita or Overland Park, Kansas location to discuss your health goals and explore whether HOT-UBI + IVC may be a good fit.

If you're a current Riordan Clinic co-learner, talk with your provider about whether incorporating HOT-UBI + IVC into your existing care plan may be appropriate.

SCAN TO LEARN MORE





SUPPORTING THE FUTURE OF INTEGRATIVE ONCOLOGY

WRITTEN BY Michelle Niesley, ND, MS, FABNO

On April 25, 2026, the Riordan Clinic will gather current and former staff, co-learners, supporters, community members, donors, and the general public to celebrate our 50th Anniversary Gala.

Providers such as myself, who have spent decades caring for patients with a cancer diagnosis, have much to thank the Riordan Clinic for. While we speak about functional and integrative medicine today, the practice of using testing to determine an individual patient's specific deficiencies and therapies was pioneered by Dr. Riordan and the Center for the Improvement of Human Functioning long before it became the Riordan Clinic. Personalized medicine may now be a buzzword in oncology, but the Riordan Clinic has been doing this work for decades.

Integrative oncology is grounded in evidence-based medicine. Understanding how a certain nutrient may help reduce unwanted side effects of chemotherapy, or how best to support co-learners with personalized advice on diet, supplements, and other integrative therapies, requires careful consideration of the diagnosis, the individual sitting in front of you, and the treatment they are receiving.

Riordan Clinic is known internationally for studies on intravenous (IV) vitamin therapies in oncology, specifically high-dose IV vitamin C and its use alongside cancer care. In 1989, Dr. Riordan initiated the RECNAC Project, which sought to understand why cancer develops and how it can be approached safely. He focused on how nutrient deprivation affects the behavior of our cells and how the immune system's response can be improved. Out of this work came multiple research papers, high-dose IV vitamin C protocols used around the world, studies on dendritic cell therapy, and other foundational contributions to integrative oncology.

As we look forward to the next 50 years, the landscape of oncology is shifting. We are seeing an increase in cancer diagnoses in patients under the age of 50. These cancers are often more aggressive and more challenging to treat compared to similar diagnoses in older populations. While we know about risk factors like obesity, alcohol

consumption, smoking, and certain genetic mutations, these do not fully explain the rise in diagnoses across age groups.

Advances in conventional oncology have improved outcomes, and more individuals are living beyond their diagnosis. Survivorship is often the time when patients begin asking questions about what may have contributed to the cancer in the first place.

We know there is more to this story.

We continue to use testing methods championed by Dr. Riordan through our Bio-Center Lab, along with expanded testing for chronic infections, environmental exposures, heavy metals, and mycotoxins. These insights help us better understand what may have contributed to a co-learner developing cancer. With data from thousands of co-learners, there is an opportunity to identify patterns that could help guide future research.

This work takes time and resources, and it requires the support of a broader community.

The Gala is not only a celebration, but an opportunity to support this work. It allows us to continue advancing research while also providing personalized care to new co-learners, with a goal of serving 1,000 new co-learners annually over the next 10 years.

We also recognize the barriers to receiving truly integrative support. One of the most common challenges our New Patient Coordinators hear is financial limitations. Many individuals navigating cancer care, including those who have explored other options without success, are unable to move forward due to cost.

We want to change that.

With your support, whether by attending the Gala or contributing in other ways, more co-learners can begin their journey toward health, healing, and hope.

SUPPORTING YOUR STRESS RESPONSE

April is Stress Awareness Month. It is a good time to pause and consider how stress is affecting your body. Stress reaches beyond your mood. It can influence energy, sleep, immune function, and hormone balance.

Your adrenal glands help regulate this response by producing cortisol and other hormones that guide how your body adapts. When stress continues over time, this system can become strained. You may feel fatigued, run down, or have a harder time recovering.

This month, focus on supporting your body's ability to respond and adapt.



Adrenal Revive

Support for energy and resilience during prolonged stress

Adrenal Revive is formulated for those feeling the effects of prolonged stress. It combines plant-based adaptogens like ashwagandha, rhodiola, eleuthero, and skullcap to help support adrenal function and restore balance.

May support:

- ▶ Steady energy and reduced fatigue
- ▶ Sleep and recovery
- ▶ Mental clarity and focus
- ▶ Immune and endocrine function

Adrenal Adapt

Daily support for stress response and immune health

Adrenal Adapt pairs essential vitamins with adaptogenic herbs to support cortisol balance and immune function during times of stress.

With ingredients like eleuthero, rhodiola, schisandra, ashwagandha, and licorice root, it helps the body return to equilibrium.

May support:

- ▶ Healthy stress response
- ▶ Immune resilience
- ▶ Energy, stamina, and mental performance



Support Your Stress Response

Stress is part of life. How your body responds to it matters.

Supporting adrenal health can help maintain balance, energy, and resilience over time.

Explore Adrenal Revive and Adrenal Adapt online, in-store, or by phone through the Riordan Clinic Nutrient Store at 1-800-447-7276 ext. 1464.





TULSI + PEPPERMINT BLEND

Grounding and brightening, Holy Basil, also known as tulsi helps calm the stress response while mint supports the parasympathetic nervous system. This duo is great for stress, digestion, and mental clarity.

This herbal tea blend calls for these two simple ingredients and hot water.

- ▶ Pick **6 fresh tulsi leaves + 8 fresh mint leaves** per cup.
- ▶ Bruise the leaves lightly between your fingers and place in your mug.
- ▶ Pour **just-off-boiling water** over the leaves.
- ▶ Cover and steep for **5 minutes**.
- ▶ Strain and enjoy warm. Add a little monk fruit or stevia if you prefer some sweetness.

Perfect for stress, tulsi is one of Ayurveda's most respected adaptogens. It supports the HPA axis, which plays a key role in the body's stress response and cortisol regulation. Growing it on your windowsill and making tea from it can be both a medicinal act *and* a mindfulness practice. That's a two-for-one that no supplement can replicate.

This recipe was provided by **Remission Nutrition** in support of Health Hunters.

Remission Nutrition focuses on how food and nutrients support metabolic health, cellular function, and overall resilience during cancer care. This approach considers the individual to help guide personalized nutrition strategies alongside a broader care plan.



Learn more at remissionnutrition.com

Growing Holy Basil (Tulsi) & Peppermint in Pots at Home

Tulsi

Pot: 8–10 inches deep and wide, terracotta works well because it allows the soil to breathe.
Soil: Organic, well-draining potting mix with a little compost. Tulsi prefers rich soil that does not stay wet.
Sun: Full sun, 6+ hours a day. A south or west-facing window or warm outdoor spot is ideal.
Water: Water when the top inch of soil is dry. It is slightly drought-tolerant but can develop root rot if over-watered.
Temp: Keep above 50°F. Bring inside before frost. It can thrive indoors year-round with enough light.
Tip: Pinch flowers as soon as they appear. Once it flowers, the plant focuses on seeds and the leaves lose potency.

Peppermint

Pot: 10–12 inches wide. Mint spreads quickly, so keeping it in its own pot prevents it from taking over other plants.
Soil: Rich, organic potting mix that holds some moisture. Mint prefers more moisture than tulsi.
Sun: Partial to full sun, 4–6 hours. It tolerates more shade, making it easier to grow indoors.
Water: Keep soil consistently moist but not soggy. It will wilt quickly when dry but usually bounces back after watering.
Temp: Very cold hardy. It may die back in winter but will regrow from the roots in spring if protected.
Tip: Harvest often by cutting stems just above a leaf node to encourage full, bushy growth. Avoid taking more than one-third of the plant at a time.

Riordan Clinic

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Riordan Clinic is a not-for-profit 501(c)(3), integrative health center with locations in **Wichita and Overland Park, Kansas**. The clinic was co-founded by Olive Garvey and Hugh D. Riordan. We intersect lifestyle and nutrition to help you find the underlying causes of your illness. Since our inception in 1975, the mission has been clear and unwavering to **"...stimulate an epidemic of health."**

To become a patient at Riordan Clinic, call 1-800-447-7276

Please send any comments or suggestions to newseditor@riordanclinic.org. Thank you for reading.

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“We’re moving from reactive care to proactive care.” —Dr. Michelle Niesley

In this episode of the Real Health Podcast, Dr. Ron Hunninghake talks with Dr. Michelle Niesley about leadership at Riordan Clinic and the shift toward proactive care. They explore how team communication shapes the co-learner experience from the first call through long-term follow-up, and how Dr. Niesley’s background in integrative oncology and research supports more connected, clear care.

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New Hope for Long COVID at Riordan Clinic

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New Hope for Long COVID at Riordan Clinic

“This is a circulation upgrade.” —Dr. Ron Hunninghake

In this episode of the Real Health Podcast, Dr. Ron Hunninghake and Dr. Michelle Niesley discuss long COVID, microclots, and how changes in circulation are being studied in relation to ongoing symptoms.

They walk through what clinicians are seeing in practice and why long COVID can be difficult to define. Symptoms can show up in many different ways, which makes it harder to pinpoint a single cause. This has led to more attention on how blood flow and capillary function may influence how the body feels and functions over time.

Listen now at realhealthpodcast.org

