



— YOUTUBE RESEARCH SUMMARY

Research Summary: Nervous System Dysregulation

As featured in Dr. Kenny Mittelstadt's video: [Why Your Nervous System Keeps Resetting to Dysregulated](#)

— Research Context

This week's topic explores how nervous system dysregulation is not simply a habit problem or a regulation skill gap. It is, in many cases, a read-out of something deeper. The research below looks at three distinct pieces of that picture: how ongoing physiological load keeps the stress-response systems activated, how a specific post-viral mechanism can narrow the very pathway breathwork depends on, and what the current evidence actually says about vagal tools and their limits. Together, these studies help connect what you may be experiencing to what is happening at the chemistry level.

— Key Findings from the Research

STUDY 1 • PMID 32886587

O'Connor and colleagues published a comprehensive review in the Annual Review of Psychology examining how stress activates two major biological pathways: the autonomic nervous system, which runs background physiology without conscious input, and the HPA axis, a communication pathway from the brain to the adrenal glands that sets baseline stress chemistry. These two systems do not simply turn on and off in response to individual stressful events. They feed back into each other in ways that compound over time. When the load feeding those systems stays present, from infection, environmental exposure, hormonal disruption, or accumulated life stress, the systems have no biological reason to recalibrate. The nervous system is not misfiring. It is responding accurately to a signal that has not been resolved.

STUDY 2 • PMID 37848036

Wong and colleagues published research in Cell examining what happens to serotonin in people with post-acute sequelae of viral infection, commonly known as Long COVID. The study found that persistent viral inflammation can reduce serotonin availability through two routes: changes in gut absorption reduce how much serotonin enters circulation, and platelet hyperactivation pulls serotonin out of circulation at an unusually high rate. The result is less serotonin available for the rest of the body. The study found this reduction directly impairs the vagus nerve, which is the primary biological pathway through which breathwork, cold exposure, and somatic tools produce a nervous system shift. This is a documented, specific example of how an unresolved physiological driver can directly limit how much the output layer of the nervous system can shift.

STUDY 3 • PMID 39678231

Khan and colleagues published a 2024 review in Infectious Medicine examining vagal nerve stimulation as an approach for managing Long COVID symptoms. Vagal nerve stimulation, whether through devices or practices like breathwork and cold exposure, showed real reductions in systemic inflammation and improvements in autonomic symptoms in the studies reviewed. However, the authors were clear about what the evidence does and does not show. The current data comes from small pilot studies, and durable, large-scale benefits have not been established. This is not a reason to stop using these tools. It is a reason to use them with an accurate picture of what they can and cannot do. They produce a real signal. They do not replace an investigation into what is generating the load the system keeps returning to.



— Functional Medicine Connections

Your nervous system is, in functional medicine terms, an output layer. It reflects what is happening in the terrain beneath it, including the gut, the immune system, the hormonal communication network, and the chemical environment the body is living in. When the terrain is under load, the nervous system reads that load and responds accordingly. That is not dysfunction. That is the system working as designed.

What the research above maps is a chain: persistent load activates the stress-response pathways (Study 1), those pathways can be sustained by specific mechanisms like post-viral inflammation reducing serotonin availability (Study 2), and the primary tools most people are using to shift the nervous system depend on the very pathway that inflammation can compromise (Study 3). The tools are real. The window they work through can be narrowed by things that have nothing to do with how well or how consistently you use them.

From a root cause perspective, the clues to look for are patterns over time, not single events. Does regulation feel harder after certain environments? Does improvement fade even when nothing in your habits has changed? Does your threshold for stress seem lower than it used to be, even when your life circumstances have not dramatically worsened? These are not signs of a nervous system problem in isolation. They are potential signs of a terrain that is still signaling load.

— Practical Reflections & Takeaways

Think back to a period when your nervous system felt more stable. What else was different at that time? Not just your practices or your stress level, but your environment, your health, your exposures. What the research suggests is that those factors may be more connected to your baseline than they appear.

If you have used nervous system tools consistently and experienced genuine but temporary improvement, what happened when the improvement faded? Did anything external change, or did it feel like the body simply returned on its own? Your lived experience of that pattern is meaningful data about what layer of the system may still need attention.

— References

- O'Connor, D. B., Thayer, J. F., & Vedhara, K. (2021). Stress and health: A review of psychobiological processes. *Annual Review of Psychology*, 72, 663-688. PMID: 32886587.
- Wong, A. C., Devason, A. S., Umana, I. C., et al. (2023). Serotonin reduction in post-acute sequelae of viral infection. *Cell*, 186(22), 4851-4867.e20. PMID: 37848036.
- Khan, M. W. Z., Ahmad, M., Qudrat, S., et al. (2024). Vagal nerve stimulation for the management of long COVID symptoms. *Infectious Medicine*, 3(4), 100144. PMID: 39678231.

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