

Decoding the Research: *The Inflammatory Reflex*

By Kelly Owens

Ok, so how does stimulating the Vagus nerve with electricity *actually* work?

Your Vagus nerve is one important guy. Kind of like the quarterback. (Most) organs function — or don't function — depending on the communication (or lack thereof) between the Vagus nerve and the organ itself.

If the quarterback isn't doing a good job, the other players can't do theirs.

This important nerve runs throughout your body, similar to, as Dr. Tracey would explain, an “*undersea cable*” that delivers nerves to each organ.

Think of the nervous system as a personal computer. The personal computer is sending out and receiving data, as well as working as a security system checking in on everyone.

Think of the immune system as a border patrol agent. The border patrol agent does its job based on the information he or she is receiving from security cameras and whatnot.

So, for inflammatory diseases, evidence has shown that the Vagus nerve isn't active enough, yet until Dr. Tracey as well as Paul Peter Tak started their research, no one really correlated it with the production of inflammation.

Evidence mounted that the nervous system influences the immune system, and vice versa.

When the Vagus nerve is electrically stimulated, it causes an electrical reaction that soon becomes a chemical reaction in the spleen.

That electrical impulse travels down the nerve to the spleen and when it gets there it then becomes a chemical reaction.

That chemical reaction releases a **neurotransmitter** called “**norepinephrine**.”

So, a neurotransmitter is a chemical that is released at the end of a nerve.

Norepinephrine is the thing that tells the body and brain that it's time to take action. *Basically, it's the guy at the gym that is trying to sign you up for a training package and they are super enthusiastic about the results you're going to see.*

The **norepinephrine** in this case is going to regulate some unique **T-cells** (i.e., whip their toosh into beach body shape).

The **T-cells** in turn release another neurotransmitter called “**acetylcholine**.”

In this case, we're going to think of **acetylcholine** as a diplomatic negotiator that always gets their way (but lovingly, of course).

The **acetylcholine** travels to the **macrophages** which are at the end of the process.

Macrophages are a type of white blood cell, and here, they express something called an **A7 Receptor**, which are **pro-inflammatory**. This is the guy that is making too many **pro-inflammatory cytokines**.

(This is all happening in the spleen, and I don't know about you guys, but I never thought my spleen was all that important. Huh.)

The interaction between the **acetylcholine** with the **A7 receptor** then TURNS OFF the inflammation — in this case, turning off the over-production of **cytokines**, such as TNF, IL-1, IL-6, IL-8, and HMGB-1 — all of which cause inflammation.... While at the same time turning on IL-10, which is a nice, anti-inflammatory **cytokine**. Think of IL-10 as the Mr. Rogers of **cytokines**.

Dr. Tracey says that when the Vagus nerve is cut, it's like a car is losing its ability to use its brakes — so inflammation can just run wild — and that's also true if the Vagus nerve isn't functioning properly and in my case, wasn't active enough.

So, what diseases does the Vagus nerve and stimulation of it have the potential to treat?

Rheumatoid Arthritis. Crohn's. Alzheimer's. Lupus. And so many more.

It's helpful to use the car analogy to understand the mechanisms of action that occur in order for the engine itself to run as a whole:

My body is the car itself.

My **Vagus Nerve Stimulator** is the **flywheel**, which allows inertia to keep the crankshaft turning smoothly during the times when power is not being applied.

The **Vagus nerve** is the **crankshaft** that connects the rods (the nerves) to the pistons (different organs in the body).

.... *you get the point.*

Sources:

"The Inflammatory Reflex" by Kevin J Tracey, Nature Publishing Group

"The Mind Body Interface." The Academy of Medical Sciences 2017 FORUM Lecture