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<https://reachmd.com/programs/rethinkingmigraine/why-migraines-happen-expert-insights-on-disease-pathophysiology/9962/>

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## Why Migraines Happen: Expert Insights on Disease Pathophysiology

Announcer:

This is ReachMD. Welcome to this special series, Rethinking Migraine, sponsored by Lilly.

On this episode, titled Migraine Answers: How Experts are Exploring the Brain's Pathophysiology we will hear from Dr. Stephanie Nahas, The Director of the Headache Medicine Fellowship Program at the Jefferson Headache Center in Philadelphia.

Dr. Nahas:

The pathophysiology of migraine is complex, to say the least, and in just a few minutes, I could not do it any service. Our understanding has been evolving over decades and centuries, from vascular theories to neuronal theories and beyond. I will say, in short, there are a couple of major pathophysiological concepts that we do like to cover when explaining why migraine happens. Number 1) you can think of the migraine brain as a sensitive brain. Our brain is designed to be plastic and reactive to the environment, to learn, and to change, and to adapt. That's just the nature of the brain and the nervous system. And for those with migraine some aspects of that flexibility and plasticity are amplified and amplified to a fault. And what I mean by that is, ordinary stimuli, such as looking at a light that's a little bit bright, or hearing a noise that's a little bit loud, becomes amazingly amplified during a migraine

attack, and sometimes even in between. Some patients with migraine are always a little bit hypersensitive, and during the attack itself, they become even more sensitized. And this is just the nature of the neuronal tissue of a person with migraine. Something can flip a switch inside the brain to change the circuitry and to change, even more drastically, how the brain is reacting to external stimuli, and then how the brain is changing the experience and the consciousness of that individual, such that they perceive that they have head-splitting pain. Many patients may say it's as though a hammer is being hit onto their head, or a knife is being driven through their skull. Obviously, this isn't actually happening, but this is the perception that they get from the way that neuronal signaling and pain pathways and processing are changing in the brain during an attack.

When the trigeminal nerve becomes activated or sensitized, or both, it can release inflammatory mediators and also become more sensitive to inflammation signals that are coming in. Blood vessel pulsations can become perceived as painful. That might be where the throbbing of migraine comes from. It's not really that well understood, but it's postulated. Another aspect of migraine pathophysiology that we're getting to understand better is cortical spreading depression. And this is a wave of abnormal electrical activity that sweeps over the surface of the brain over the course of several minutes. And it is thought to be a potential switch to turn on migraine and activate the trigeminal system. It's also thought that it might be the reason that some patients with migraine, about 30%, may experience aura before or during the migraine attack. Aura is a gradual appearance, spread, and evolution, and then disappearance of some neurologic phenomenon. Usually, it's visual in nature. Many patients will describe seeing a dark spot that starts to shimmer and expands with sparkling lights. That's just one example, but there are many examples.

Understanding the pathophysiology of migraine is so important because that helps to lead to new treatments. Many of the migraine-specific treatments that we have available today were engineered based on our understanding of the pathophysiology. And it's still evolving and we can look forward to new treatments on the horizon based on our increase in understanding.

Announcer:

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