Speaker 1: The Missouri State Journal. A weekly program keeping you in touch with Missouri State University.

Emily Yeap: According to the Centers for Disease Control and Prevention, more than 64,000 Americans died from drug overdoses in 2016. Opioids now cause about three-fourths of all overdose deaths. One solution to address this deadly crisis is reducing dependence on prescription painkillers through Vagus Nerve Stimulation (VNS). I’m Emily Yeap.

Joining me today are Dr. Paul Durham, distinguished professor of biology at Missouri State University and director of the Center for Biomedical and Life Sciences (CBLS), and Lauren Cornelison, senior research scientist at CBLS in the Jordan Valley Innovation Center.

They discuss their research in this area. Cornelison.

Lauren C.: Vagus Nerve Stimulation is an electronic pulse, in this case, is non-invasive, it's transdermal going through the skin to stimulate the Vagus nerve in the body.

The Vagus nerve has a lot of different targets throughout the body. The viscera, the internal organs, it helps control autonomic symptoms and things like that. And it's shown, in older research, that it can help with epilepsy and other types of symptoms.

But, what's different about our research is that it is a completely non-invasive stimulator. These types of devices that have been studied in the past were surgically implanted, whereas ours can just be given to you as a device to use. And, we're actually using it to study its potential for assisting with orofacial pain, specifically migraine and other types of headache.

Emily Yeap: VNS offers a way to manage pain without using medications.

Paul Durham: Most people are dependent on some type of drug. The opioid epidemic is caused by people trying to manage their pain by using something that's addictive. And, the thing that we're really excited about with this technology is that it won't have those addictive properties. And, it doesn't seem to have any negative side effects, which is actually quite amazing that they've been able to come up with a device that doesn't change the heart rate, doesn't really seem to cause any problems with digestion, but yet seems to specifically target the pathways that are involved in pain modulation.

The actual device is called gammaCore, and the nice thing about it, is it's portable. And it's actually been approved for both chronic migraine as a prophylactic, which would be the daily use of it. And then also for abortive therapy for migraine.

Emily Yeap: Cornelison explains the ongoing VNS research in CBLS as it relates to the opioid crisis.

Lauren C.: We're looking at a model of chronic, long-term and severe orofacial pain to see if by using the non-invasive Vagus Nerve Stimulator, you can ameliorate the need for opioids. And, whether or not it might actually work better than opioids in some way so you could either reduce the dose necessary or eliminate their need entirely.

So far, the answer kind of appears to be yes, that it's eliminated the need for, in this case, we're testing it compared to morphine. Interestingly about that, is that whereas morphine has a lot of side effects, it doesn't just kill pain, it makes people loopy and non-responsive. We're not seeing any types of effects. Rather, it returns the users to normal pain levels.

We've been looking at that since about May and going forward, we're probably going to see about potentially other opioid drugs that are a little bit less potent than morphine, if you might use them in conjunction with Vagus Nerve Stimulation to reduce the overall needed dose of them to still reach pain suppression. And we may also be looking at dyspoiesis, which is an imbalance of the microbiota of the gut, which people often experience when they are addicted or dependent on an opioid drug.

Emily Yeap: What would this research mean for those struggling with pain?

Paul Durham: The biggest thing with this, like we said, it's a non-pharmacological way to manage pain and so we think it does provide an option that will be a lot safer. We know that people who have been using it on a daily basis do not seem to have any side effects and it does not seem to be addictive in the same sense that like opioids are.

One of the things we are trying to push is to even see whether or not it becomes part of the anesthesiology protocol. So, instead of patients getting hydrocodone or some other type of potentially addictive substance, that maybe they might be sent home with a Vagus Nerve Stimulator and they can manage their pain through stimulation of the Vagus nerve.

One of the things that we are really interested in is understanding the mechanism by how this works. And the company has spent a lot of time and energy trying to figure out how it works. And, Lauren has been pioneering research to show that it actually looks like it's increasing descending modulation to block pain signaling up the spinal cord. And this is a really novel finding and if it's true, and if we validate it, basically it means that there's a different target that Vagus nerve's hitting compared to the other types of pain drugs that are on the market.

Emily Yeap: To find out more about Missouri State’s Center for Biomedical and Life Sciences, visit jvic.missouristate.edu/cbls. I'm Emily Yeap for the Missouri State Journal.

Speaker 1: For more information, contact the office of University Communications at 417-836-6397. The Missouri State Journal is available online at ksmu.org.