Controlling diabetes with your phone might be possible someday

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Think about this. You have diabetes, are trying to control your insulin levels and instead of taking a pill or giving yourself an injection, you click an app on your phone that tells your pancreas to bring blood sugar

levels back to normal.

Sound improbable? Not according to Luis Ulloa, an immunologist at Rutgers New Jersey Medical School in a paper published today in *Trends in Molecular Medicine*.

"Our bodies are a lot like rooms in a house," says Ulloa. "In order to see when you enter a darkened room, you need electricity to turn on the lights. Our body is like that room and has an electrical network that can be used to manipulate and help control how it works."

In a 2014 study, Ulloa and his colleagues discovered that transmitting short electrical pulses into mice through acupuncture needles, the vagus nerve that links the neck, heart, lungs and abdomen to the brain was stimulated and sepsis, a life-threatening infection that kills about 750,000 Americans each year, prevented. There is no drug treatment to cure this deadly infection, which is the leading cause of death in hospital intensive care units.

This new Rutgers research indicates that data available on a wide range of nerve stimulating procedures - from ancient traditional acupuncture and the more modern electroacupuncture, to neuromodulation, a procedure that involves implanting electrical devices to relieve chronic pain, pelvic disorders and Parkinson's disease, can be advantageous for treating inflammatory disorders like arthritis and deadly infections like sepsis.

Ulloa says these studies have found that nerve stimulation provides therapeutic benefits in treating colitis, diabetes, obesity, pancreatitis, paralysis, and life threatening infections. Bioelectronic medicine, a new and more advanced version of electroacupuncture, is aiming to treat chronic diseases with electrical signals in the body by using miniature implantable devises to make sure organs function properly.

"All you have to do is look at the pacemaker and how it has enabled people with arrhythmias to live long lives," says Ulloa. "We believe this type of medicine could be used throughout the body."

What scientists now need to do, Ulloa says, is compare the data from all these nerve-stimulating procedures to the recent studies done in experimental and animal models.This means recognizing the clinical advantages of varying procedures including acupuncture, controversial and questioned by some clinicians for its efficacy. Ulloa argues that the clinical outcome of acupuncture depends on the experience of the practitioner and the precision of the needles. More studies need to be done, he says, to determine how and why the procedure, according to clinical studies, can improve postoperative recovery, osteoarthritis, migraine, joint pain, stroke, post-traumatic stress disorder and drug addiction.

The American Pain Society, The National Center for Complementary and Alternative Medicine, the National Institutes of Health and the World Health Organization all endorse the use of electroacupuncture.

"Acupuncture is used by over 15 million Americans and it is difficult not to recognize the clinical implications of these methods," Ulloa says.

Further examination of nerve-stimulating techniques will lead to new and improved treatments for physical and mental health ailments, Ulloa says.

The belief has always been just take a pill when you're sick," he says. "In the future, I believe we will be connected to the cell phone in order to to control our organ functions."

Provided by Rutgers University