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Smartphone app for the brain, the vagus nerve and the therapy depression and anxiety

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Can an iPhone App and a set of ear buds treat depression and epilepsy? Sounds too good to be true; maybe a good April fool's joke; well, maybe not. The vagus nerve ganglion inside the skull has an auricular branch (Arnold's nerve) that passes through Arnold's canal to enervate the sensory receptors in the inner surface of the inside of the concha of the external ear. If you stimulate Arnold's nerve you cause vagal stimulation. Arnold nerve stimulation via an earbud delivering electrical stimuli has been used in Europe to treat depression. It is possible that this electrical stimulation could be achieved with a simple smartphone app and acoustic earbuds. We have reviewed our experience with 54 patients diagnosed with gastroparesis into which we have placed gastrointestinal electrical stimulators then studied their results based upon Likert scale quantification of symptoms, neuronal cell counts of full thickness gastrointestinal biopsies, electrogastrographic evidence of GI electrical wave frequency and amplitude to personalize electrical stimulation by adjusting voltage (amplitude), frequency, pulse width and cycle times. 59% of patients showed immediate changes in electrical rhythm as well as symptomatic relief. Direct gastric electrical stimulation appears to have an effect on vagal mediated symptoms. This very preliminary data raises the possibility that direct vagal electrical stimulation (instead of indirect vagal stimulation via the gut) of the gut may have an impact upon other vagus mediated reflexes as well such as its beneficial effect upon depression and epilepsy. Our current technique would use off the shelf devices to transcutaneously stimulate the vagus nerve or one of its branches to determine if such stimulation has an impact upon depression and epilepsy. The transcutaneous stimulation of the vagus nerve via its auricular branch would be achieved with a smartphone app with an internal safety valve. The heart rate is regularly monitored and vagal stimulation stopped if the heart rate dropped below 60.

Biography

Christopher J Lahr is an Associate Professor in the Departments of Surgery, Medicine and Obstetrics and Gynecology at the University of Mississippi Medical Center.

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