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New Wireless Device Can Help Combat Obesity

Researchers from Texas A&M University have developed a medical device that could help with weight loss and that requires a simple operative procedure for implantation. This could be an alternative option for people who struggle with obesity or have serious health-related issues because of their weight.

Gastric bypass surgery is usually the last resort for those with obesity but this procedure involves making a small stomach pouch and rerouting the digestive tract. It is very invasive with a long recovery period. But this new medical device would require minimal surgery for implantation.

This new centimetre-sized device provides the feeling of fullness by stimulating the endings of the vagus nerve with light. Unlike other devices that require a power cord, this device is wireless and can be controlled externally from a remote radio frequency source. This device could prove to be extremely beneficial for people who need to lose weight as they may not have to undergo dramatic weight-loss surgeries.

Obesity is a global epidemic. Its associated health problems have a significant economic impact on health care systems. Obesity also puts people at risk for chronic diseases such as diabetes, heart disease and some cancers. People with a body mass index greater than 35 or those who have at least two obesity-related conditions often have surgery as their only available option.

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The vagus nerve has been identified as a target for treating obesity since it provides sensory information about fullness from the stomach lining to the brain. Although there are medical devices that can stimulate the vagus nerve endings and consequently help in curbing hunger, these devices are similar in design to a pacemaker and require wires to be connected to a current source providing electrical jolts to activate the tips of the nerve.

However, this new wireless technology has the potential to make nerve stimulation devices less cumbersome and more comfortable for the patient. The researchers used genetic tools to express genes that respond to light into specific vagus nerve endings in vivo. Then, they designed a tiny, paddle-shaped device and inserted micro LEDs near the tip of its flexible shaft, which was fastened to the stomach. In the head of the device, called the harvester, they housed microchips needed for the device to wirelessly communicate with an external radio frequency source. The harvester was also equipped to produce tiny currents to power the LEDs. When the radio frequency source was switched on, the researchers showed that the light from the LEDs was effective at

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suppressing hunger.

The researchers found that the biological machinery coordinating hunger suppression in their experiments was different from conventional wisdom. In other words, it is widely accepted that when the stomach is full, it expands and the information about stretch is conveyed to the brain by mechanoreceptors on the vagus nerve. These findings suggest that stimulating the non-stretch receptors could also give the feeling of satiety even when the stomach was not distended.

Wireless optogenetics and identifying peripheral neural pathways that control appetite and other behaviours are all of great interest to researchers. This novel tool enables interrogation of neuronal function in the peripheral nervous systems in a way that was impossible with existing approaches, explains Dr. Sung Il Park, assistant professor in the Department of Electrical and Computer Engineering.

Source: Texas A&M University
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