New treatment may lead the way to fighting obesity and diabetes

April 25 2013

Credit: AI-generated image (disclaimer)

Two professors believe they may have a promising lead from which to develop a new treatment for obesity and diabetes.

The project titled i2MOVE ('Intelligent implantable modulator of vagus nerve function for treatment of obesity') is being led by two Imperial

College London Professors: Christofer Toumazou from the Department of Electrical and Electronic Engineering, and Sir Stephen Bloom from the Department of Medicine. The Professors' combined expertise in bioengineering and endocrinology is leading the way in creating a device that mimics the response of the vagus nerve, which connects the brain to everything from the tongue, pharynx, vocal chords, lungs, heart, stomach and intestines. Their device is designed to suppress the appetite of a patient.

With a starting grant from the European Research Council (ERC) of over EUR 7 million, the four-year project is already making headway. They have so far developed a hormone combination using glucagon and glucagon-like peptide 1 (GLP-1), which plays a key role in regulating blood sugar levels and helps reduce appetite. This may form the basis for a new treatment for obesity and diabetes in the future.

Glucagon works in opposition to insulin, preventing the storage of glucose in fat deposits and the liver, and raising blood sugar levels. GLP-1 stimulates the release of insulin to lower blood sugar and also acts on the brain to reduce appetite.

Fighting obesity is the main objective of the project, a condition considered by the World Health Organization (WHO) as one of the greatest public health challenges of the 21st century. Over 23 % of Europeans are regarded as obese and the health costs alone accounted for more than 10 billion EUR in 2010. Existing treatments such as surgery are deemed to be rarely effective, which is why the i2MOVE research team believes that electrical stimulation of the Vagus nerve could be efficient when combined with intelligent recording. This is an intelligent' implant which records vagal signals associated with hormone release during eating. This is designed to stimulate the nerve to modulate these signals to better regulate appetite.

Professor Bloom, together with his research team, set out to identify whether glucagon and GLP-1 infused into the blood might work together to reduce appetite. In his study, 16 volunteers were given a sequence of four treatments: glucagon, GLP-1, glucagon and GLP-1 in combination, and saline as a control. The order of the treatments was determined at random. Each treatment was then given via a drip over a period of two hours. After the first hour and a half, each volunteer was offered a meal. Researchers recorded how much they ate and measured their energy expenditure and blood sugar levels. The results revealed that subjects ate 13 % fewer calories after being given the two hormones in combination compared with saline, but no significant difference was detected after taking either hormone on its own.

Volunteers treated with a glucagon/GLP-1 combination consumed significantly less food, according to Professor Bloom. These results replicate the team's findings in animals, suggesting that a glucagon/GLP-1 combination may be a promising lead from which to develop a new treatment for obesity and diabetes.

'Thirteen per cent is a big reduction in food intake by anyone's standards, but our experiment is only an appetiser' he stresses. 'An effective future treatment will need to suppress appetite in the long term, so we next aim to establish whether the effects can be sustained to lead to real weight loss.'

Provided by CORDIS