

Discovery of new signal pathway important to diabetes research

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Scientists at Karolinska Institutet in Sweden and Miami University have discovered that cells in the pancreas cooperate – signal – in a way hitherto unknown. The discovery can eventually be of significance to the treatment of diabetes.

The aim of the project was to find out how the healthy body regulates glucose concentrations in the blood. Scientists have known for a long time that glucose is regulated with the help of hormones in the pancreas, which is to say that pancreatic beta cells produce insulin, which reduces sugar levels, and that alpha cells produce glucagon, which boosts them. This glucose balance must be kept within a very narrow interval, and we need both insulin and glucagon to remain in good health.

"A person with low blood sugar levels feels poorly and faint; a person with excessively high blood sugar levels gets diabetes," says Per-Olof Berggren, professor of experimental endocrinology at Karolinska Institutet and the leader of this study.

Much more is known about insulin secretion than glucagon secretion, and so Professor Berggren's team focused on the latter. They discovered that alpha cells also secreted glutamate, which facilitates glucagon release and makes it more efficient.

The scientists are working on the hypothesis that when glucose levels are raised in a healthy person, the beta cells become active and start to release insulin, which reduces sugar concentrations in the blood, upon

which the alpha cells then start to secrete glucagon and glutamate. In this context, glutamate acts as a positive signal that tells the alpha cells that it is time to accelerate the production of glucagon to prevent glucose levels from falling too low.

"It's this signal pathway that is our discovery," says Professor Berggren. "This interaction between beta cells and alpha cells is crucial for normal blood sugar regulation."

The discovery also means that when the beta cells fail to produce insulin properly, as is the case in diabetes, the alpha cells' signal path is also blocked, which upsets the glucose balance even more. The team hope that their discovery of the signal pathway will eventually give new impetus to clinical diabetes research.

"Maybe we'll be able to achieve better blood sugar regulation in diabetes patients if we target more the glucagon/glutamate rather than just the insulin", says Professor Berggren.

Source: Karolinska Institutet

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