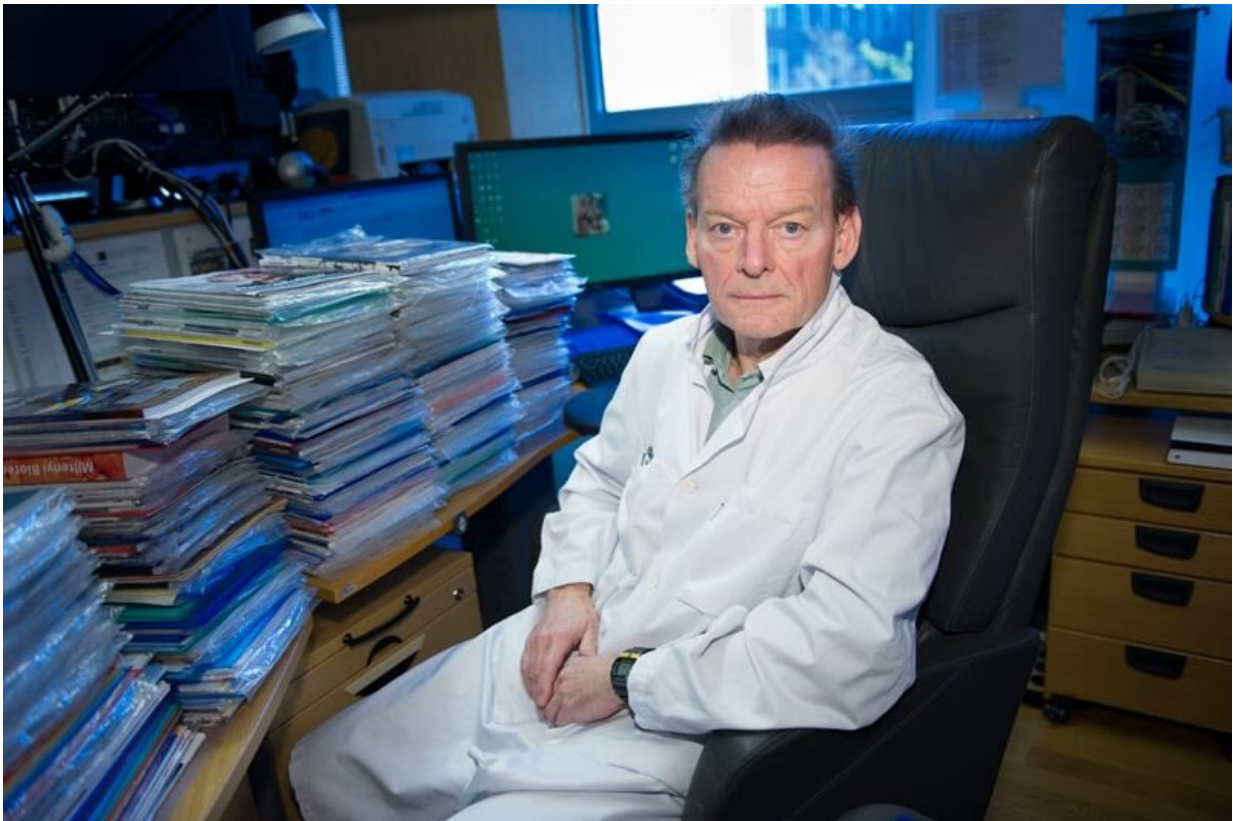


# Novel findings explain indirect regulation of glucose homeostasis

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Credit: Karolinska Institutet

The hormone secreting islets of Langerhans in the pancreas have a unique cyto-architecture that allows functional interrelationships between the different cell types. Somatostatin is secreted by the delta

cell and is an effective inhibitor of the insulin-secreting beta cell and the glucagon-secreting alpha cell. According to a novel study from Sweden's Karolinska Institutet, published in the journal *Nature Communications*, the delta cell can thereby indirectly affect glucose homeostasis in health and disease.

Our results provide important insight into the activity of the delta cell in health and pre-diabetes and a possible mechanism for how somatostatin can so effectively exert its potent suppressive effects within the islet of Langerhans," says senior author Professor Per-Olof Berggren of the Rolf Luft Research Center for Diabetes and Endocrinology, Karolinska Institutet in Sweden, who is also a visiting professor at Lee Kong Chian School of Medicine, Singapore.

Most delta [cells](#) are elongated and have a well-defined cell soma and a filopodia-like structure. Using in vivo optogenetics and high-speed  $\text{Ca}_2^+$  imaging, Per-Olof Berggren and his colleagues show that these filopodia are dynamic structures that contain a secretory machinery, enabling the delta cell to reach large numbers of [beta cells](#) within the islet.

This provides for efficient regulation of beta cell activity and is modulated by endogenous IGF-1/VEGF-A signaling. In pre-diabetes, delta cells undergo morphological changes that may be a compensation to maintain paracrine regulation of the beta cell.

"It has long been a mystery how delta cells so effectively regulate the function of alpha and beta cells, only constituting a minority among the hormone secreting cells," says Per-Olof Berggren. "These are fundamental data explaining an important structure/function relationship between delta cells and other hormone-secreting cells, and provides the basis for how delta cells, despite being in minority, can act as efficient modulators of glucose homeostasis."

**More information:** Rafael Arrojo e Drigo et al. Structural basis for delta cell paracrine regulation in pancreatic islets, *Nature Communications* (2019). [DOI: 10.1038/s41467-019-11517-x](https://doi.org/10.1038/s41467-019-11517-x)

Provided by Karolinska Institutet

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