

# Important regulation of cell invaginations discovered

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Lack of microinvaginations in the cell membrane, caveolae, can cause serious diseases such as lipodystrophy and muscular dystrophy. Researchers at Lund University in Sweden have now discovered a "main switch" that regulates the formation of these invaginations.

Many cells in the body are equipped with small microinvaginations in the [cell membrane](#) called caveolae. They are important for the cell's ability to take up molecules and particles from the cell surface into the cell. If this doesn't work, the function of the cell is disturbed, resulting in diseases. Having too few invaginations is associated with atrial fibrillation. A total absence of invaginations causes lipodystrophy and [muscular dystrophy](#) combined with fatal cardiac arrhythmia.

"The latter is an unpleasant disease, CGL4, which usually leads to death in the patient's teenage years. Many children presumably also die from this disease during their first week of life, without any diagnosis other than 'sudden infant death syndrome'" says Karl Swärd and Catarina Rippe, researchers at Lund University.

About ten different genes contribute to the formation of caveolae. Until recently it was not known how these genes are coordinated. In a recently published study in the journal *PLOS ONE*, the researchers at Lund University reveal that a family of so-called [transcription factors](#) called "myocardin family coactivators" regulate the formation of invaginations. Transcription factors are proteins in the cell that are needed to start using a gene.

This newly discovered genetic regulatory mechanism meets all the requirements to constitute what could be called a main switch. The factors are active in all cells that have caveolae, and the number of caveolae increases or decreases when transcription factor activity is increased or inhibited.

This discovery helps us understand how cells work, and provides insight into how to combat diseases caused by a lack of caveolae. Moreover, the discovery paves the way for further studies on the significance of caveolae for cancer and renal diseases.

"These transcription factors regulate the [cells](#)' ability to move and therefore play an important role in metastasis, for example", says Karl Swärd who, together with colleagues at Lund University, is also investigating whether the regulatory mechanism is activated in the case of kidney disease.

**More information:** "Myocardin Family Members Drive Formation of Caveolae." *PLOS ONE*. August 5, 2015, [DOI: 10.1371/journal.pone.0133931](#)

Provided by Lund University

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