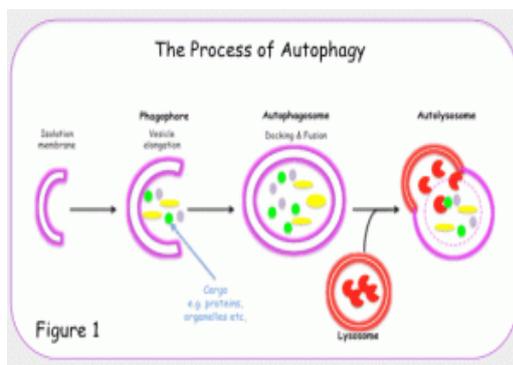


# Healthy Living

Your daily dose of health

## Tiny RNA molecules microRNA-101 starve cancer cells

Christine Stomes · Tuesday, October 11th, 2011



**Autophagy**, or **autophagocytosis**, is a catabolic process involving the degradation of a cell's own components through the lysosomal machinery. It is a tightly regulated process that plays a normal part in cell growth, development, and homeostasis, helping to maintain a balance between the synthesis, degradation, and subsequent recycling of cellular products. It is a major mechanism by which a starving cell reallocates nutrients from

unnecessary processes to more-essential processes. Autophagy is an evolutionarily conserved mechanism of cellular self-digestion in which proteins and organelles are degraded through delivery to lysosomes. Defects in this process are implicated in numerous human diseases including cancer.

### Autophagic processes

The most well-known mechanism of autophagy involves the formation of a membrane around a targeted region of the cell, separating the contents from the rest of the cytoplasm. The resultant vesicle then fuses with a lysosome and subsequently degrades the contents.

### Starving of Cancer Cells by microRNA-101

Many cancer cells have an increased capacity to carry out activity of autophagy, which give them an unfair advantage over normal cells. Defects in the process have been associated with a number of other health disorders.

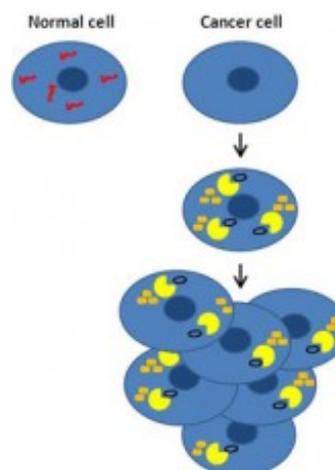


Figure: In normal cells microRNA-101 (★) inhibits the system where cellular waste (■) is "eaten" by components in the cell (□) and converted into building blocks (□). MicroRNA-101 is lost in several cancer types. This can likely enable the cancer cells to up-regulate the production of building blocks and stimulate cancer cell growth. Illustration: Katrine Sonne-Hansen

Professor Andres H. Lund, principal scientist at the University of Copenhagen and his team has developed a small molecule known as **microRNA-101** to block this process, and to also shed light on its mechanics. According to them, microRNA-101 can be used specifically to increase the sensitivity of breast cancer cells towards a commonly used treatment.

They identified the tumour suppressive miRNA, miR-101 as a potent inhibitor of basal, etoposide- and rapamycin-induced autophagy. Through transcriptome profiling, they identified three unique miR-101 targets e.g. STMN1, RAB5A and ATG4D. siRNA-mediated depletion of these genes phenocopied the effect of miR-101, resulting their involvement in autophagy regulation. Importantly, overexpression of STMN1 could partially rescue cells from miR-101-mediated inhibition of autophagy, indicating a functional importance for this target.

The researchers concluded that breast cancer cells become more sensitive towards treatment with the anti-hormone Tamoxifen, when they turn off the autophagy system. Resistance against tamoxifen is a large problem in the treatment of breast cancer, through microRNA-101.

Via

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