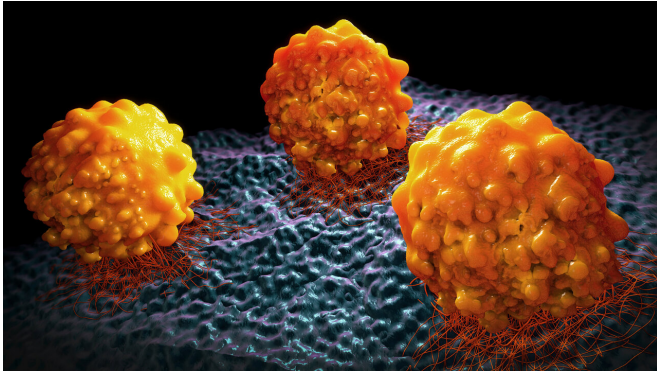# Preventing metastasis by stopping cancer cells from making fat

23 January 2020

Olivier Feron, a UCLouvain researcher, studies how cancer spreads through the body via metastasis.His major discovery was that cancer cells multiply by using lipids as food. His latest discovery, published in the scientific journal *Nature Communications*, is that lipid storage promotes cancer invasiveness.A new drug currently being tested to treat obesity may also help fight metastasis. Credit: University of Louvain

Olivier Feron, a researcher at the University of Louvain (UCLouvain) Institute of Experimental and Clinical Research, seeks to understand how metastases form from a tumor. He previously demonstrated that the most aggressive cancer cells use significant amounts of lipids as energy sources. Now, Prof. Feron has discovered that cancer cells store lipids in small intracellular vesicles called lipid droplets. Cancer cells loaded with lipids are more invasive and therefore more likely to form metastases. Prof. Feron and his team sought to identify the link between lipid storage and metastasization.

They identified a factor called TGF-beta2 as the switch responsible for both lipid storage and the aggressive nature of cancer cells. Moreover, it appeared that the two processes were mutually reinforcing. In fact, by accumulating lipids—more precisely, fatty acids—cancer cells build up energy

reserves, which they can then use as needed throughout their metastatic course.

Researchers have known that the acidity of tumors promotes cancer cells' invasion of healthy tissue. The process requires the detachment of the cancer cell from its original anchor site and the ability to survive under such conditions, which are fatal to healthy cells.

The UCLouvain researchers have now demonstrated that this acidity promotes, via the same TGF-beta2 switch, the invasive potential and formation of lipid droplets. These provide the invasive cells with the energy they need to move around and withstand the harsh conditions encountered during the metastasization process. It's like a mountaineer who takes the food and equipment necessary to reach the summit in spite of complex weather conditions.
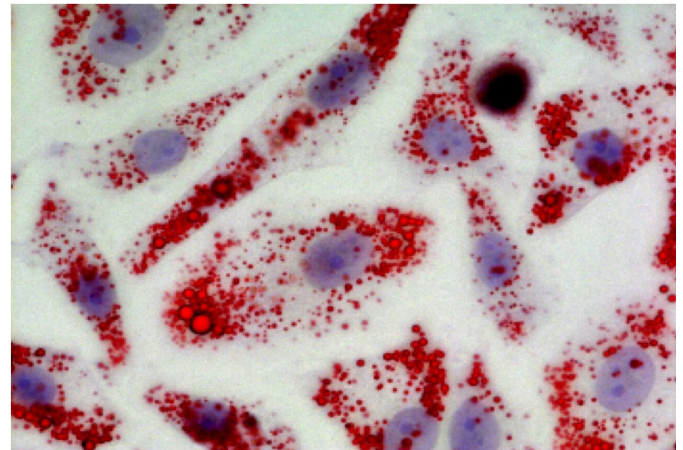
Olivier Feron, a UCLouvain researcher, studies how cancer spreads through the body via metastasis. His major discovery was that cancer cells multiply by using lipids as food. His latest discovery, published in the scientific journal *Nature Communications*, is that lipid storage promotes cancer invasiveness. A new drug currently being tested to treat obesity may also help fight metastasis. Credit: University of Louvain

Concretely, this UCLouvain research opens up new therapeutic avenues thanks to the discovery of the metabolic constituents involved in metastasis. These actors can thus be targeted and combated. Prof. Feron and his team show that it is possible to reduce tumor invasiveness and prevent metastases using specific inhibitors of TGF-beta2 expression, as well as compounds capable of blocking the transport of fatty acids or the formation of triglycerides. Among the latter are new drugs that are being evaluated to treat obesity. Their indications could therefore be rapidly extended to counter the development of metastases, which is the major cause of death among cancer patients.

The findings are published in *Nature Communications*.

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