Discovery of a new mechanism involved in the migration of cancer cells

June 23 2017

A team of young French researchers has discovered a new mechanism which facilitates cell migration. On the surface of its membrane, the cell develops multiple small hooks which help it to attach to fibers outside the cell and move along them. This action helps us to understand better how a cell escapes from the tumor mass and moves around the body to form a new focus.

Supervised by Guillaume Montagnac, Inserm research leader at Gustave Roussy, in collaboration with the Institut Curie and the Institut de Myologie (Myology Institute), this research, is published in the 16th June issue of the American journal *Science*.

Cell migration is a normal process which is essential to life. In oncology it is involved in the formation of new metastases.

"Up till the present, we knew that the cell relied on certain structures to anchor itself within its environment. We have now identified new cell structures known as 'clathrin-coated pits', already known to be important for other cell functions. The cancer cell uses them as hooks to attach to other structures in order to move around, These novel structures underlie some 50% of cell adhesion to surrounding structures," declared Guillaume Montagnac, Leader of the ATIP-Avenir team, attached to Inserm Unit 1170, "Normal and abnormal haematopoiesis", at Gustave Roussy.

Recognised in 1964, these clathrin pits are small invaginations of the cell

membrane which allow it to renew itself or to help molecules to enter the cells. The cell uses them particularly to supply itself with nutritional material (iron, cholesterol, etc.).

Using fluorescence methods, the researchers succeeded in demonstrating with an aggressive human breast cancer line, known for its marked propensity to metastasise, that the clathrin pits adhere to collagen fibres and surround them. The pit squeezes the fibre, so strengthening its hold and allowing it to move.

"Our Gustave Roussy team is one of the few with an interest in cell membrane dynamics when the cell is placed in 3D matrices under conditions close to normal ones. By studying these clathrin pits in 3D we were able to see the phenomenon when we were not expecting it," concluded Guillaume Montagnac.

More information: Tubular clathrin/AP-2 lattices pinch collagen fibers to support 3D cell migration, *Science* (2017). DOI: 10.1126/science.aal4713 , science.sciencemag.org/content/356/6343/eaal4713

Provided by Comprehensive Cancer Centre Gustave Roussy