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Epithelial to mesenchymal transition and stem cells: their roles in the formation of tumors and metastases

by Julie Caramel

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"Our team focuses on the process of epithelial to mesenchymal transition (EMT), a process that permits the transition between epithelial cells (lining cells that cannot migrate), to mesenchymal cells that will acquire the capacity to migrate.
EMT plays a fundamental role in the formation of the embryo by allowing the migration of cells to other remote sites. This transition permits in particular the formation of the different tissues that compose the different organs because there are differentiated tissues composed of different types of cell.
The team has shown that the EMT process is frequently and aberrantly reactivated in several types of cancer, whether in breast cancer or melanoma (which is what we are most interested in).
First of all, it has been shown that the EMT process plays a role in metastasis, the dissemination of cells that involves a process of cellular migration. More recently, we have shown that EMT can also confer stem cell characteristics to cancerous cells. This gives them a far greater capacity and potential that contributes in particular to the aggressiveness of these tumors.
Cancerous stem cells have 2 main characteristics:

1. Their capacity for self-renewal,
2. Their capacity to differentiate in the different cell lineages.

A cancerous stem cell can maintain a tumor by regenerating a pool of stem cells on the one hand, and on the other, lead to the growth of the rest of the tumor that will then differentiate in the different types of cells contained within it.

By stimulating the process of self-renewal via the activation of important factors for maintaining stem cells, EMT is capable of stimulating the pool of cancerous cells which in turn can participate in maintaining the tumor and its growth.