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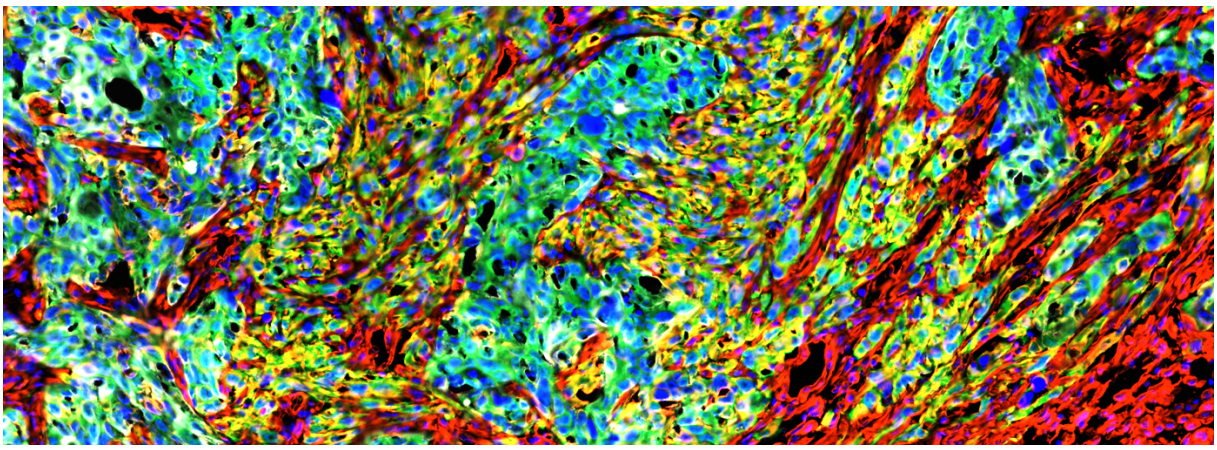
COMMUNIQUÉ DE PRESSE



Brussels, July 14 2026.

Cancer research: Discovery of the molecules controlling EMT and metastasis in cancer.

Publication in ***Nature Communications***: by analyzing individual cancer cells, researchers from the Université Libre de Bruxelles (ULB) discovered the transcriptional regulators governing EMT in tumors and identified key master regulators that control metastasis, unraveling novel therapeutic vulnerabilities to block metastatic dissemination.

Metastasis, the process by which cancer cells spread from their original site into other distant organs, is responsible for 90% of all cancer patient deaths. To give rise to metastasis, cancer cells undergo Epithelial-to-Mesenchymal Transition (EMT), a cellular process that allows them to detach from neighboring cells and disseminate into the blood to reach distant organs. Rather than a simple on-off switch, EMT progresses through a spectrum of intermediate "hybrid" states. These hybrid states hold the highest metastatic potential. However, the specific transcriptional regulators governing the different EMT states and metastasis remained poorly understood.

In a study published in *Nature Communications*, a research team led by Prof. Cédric Blanpain, MD/PhD, investigator of the WEL Research Institute, Director of the Stem Cells and Cancer Laboratory, and Professor at the Université Libre de Bruxelles, discovered the precise transcription factors that dictate EMT transitions and control metastasis.

Using multidisciplinary approaches combining advanced sequencing techniques at single cell resolution and functional experiments, Andrea Pérez González, Gabriel Windels and colleagues found that the transcription factors *Klf5* and *Pitx1* act as gatekeepers and essential regulators of the early EMT transitions. Genetic deletion of *Klf5* and *Pitx1* dramatically reduced metastasis formation. Conversely, they found that *Nfatc1* and *Creb3l1* regulate late EMT states.

“Uncovering that the suppression of *Pitx1* or *Klf5* drastically reduced metastasis in mouse models was fascinating, suggesting that these new regulators controlling EMT state could represent new potential therapeutic targets to prevent metastasis” explains Dr. Andrea Pérez González, first author of the paper.

Because the regulatory networks discovered in mouse tumors closely align with human data, these findings expose fundamental therapeutic vulnerabilities to prevent metastasis. “Clinical strategies to prevent or block metastasis remain a major unmet clinical need. We hope that by blocking factors involved in metastasis formation, such as *Pitx1* and *Klf5*, we will be able to keep cancer cells locked in non-metastatic states preventing metastatic dissemination” commented Prof. Cedric Blanpain, the director of this study.

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Single cell multiomics unravel the transcription networks controlling the different EMT tumor states

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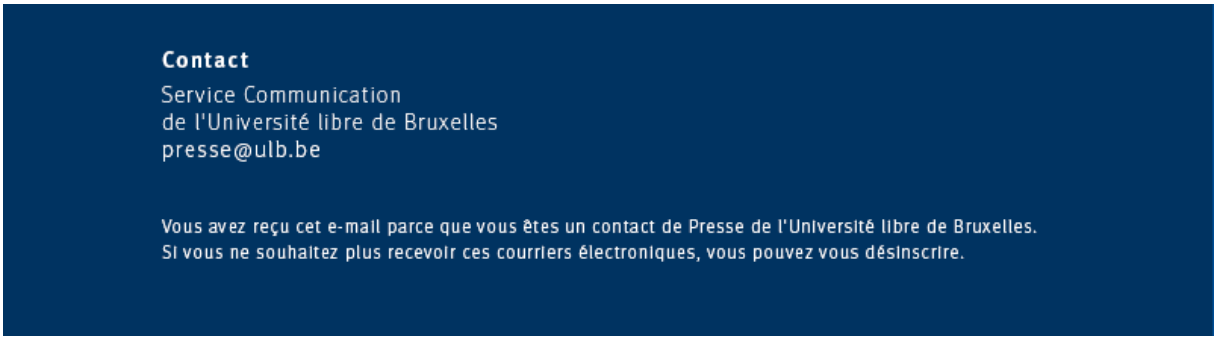
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