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Communication Recherche

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PRESS RELEASE

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Advanced online publication in *Nature*: Researchers at the Université Libre de Bruxelles, ULB show the existence of cancer stem cells for the first time in vivo.

One of the key questions in cancer is to understand how do tumour grow. Recent studies suggest that cancer can be hierarchically organized as normal tissues containing cancer stem cells at the top of the cellular hierarchy.

In a study published in *Nature*, researchers lead by Pr. **Cédric Blanpain**, MD/PhD, FNRS/FRS researcher and WELBIO investigator at the IRIBHM, Université Libre de Bruxelles, Belgium, in collaboration with Pr. **Benjamin Simons**, University of Cambridge, UK, **demonstrate for the first time the existence of cancer stem cells during unperturbed solid tumor growth.**

Cancer stem cells have been described in different human cancers including skin cancers. Cancer stem cells have been hypothesized to sustain tumour growth, to resist to chemotherapy and radiotherapy and to be responsible for tumor relapse after therapy. Until now, cancer stem cells have been demonstrated by their ability to reform tumour upon transplantation into immunodeficient mice. These studies show the potential of cancer cells in these experimental conditions but do not necessarily reflect the actual fate of tumour cells in their native environment. The existence of cancer stem cells during unperturbed tumour growth remained unproven so far.

In this new study published in *Nature*, **Gregory Drisessens** and colleagues developed a novel genetic approach to unravel how tumours grow in their natural environment. They

used a genetic tracing strategy to fluorescently mark individual tumour cells and follow their fate of their progeny overtime.

Interestingly, they found that in benign skin tumours, the majority of tumor cells have limited proliferative potential, while only a minority have the capacity to persist long term, giving rise to progeny that occupy a big part of the tumour, consistent with the marking of long lived cancer stem cells. “This was particularly exciting to visualize for the first time cancer stem cells in action in their natural environment”, comments **Gregory Driessens**, the first author of the study.

In collaboration with Pr. **Benjamin D. Simons**, Cavendish Laboratory, University of Cambridge, UK, they developed a mathematical model of their clonal analysis, which in benign tumours supports the existence of hierarchical organization of the tumour with long lived stem cells and short lived committed progenitors. By contrast, in invasive cancer, the hierarchical organization changes with the emergence of cancer stem cell with limited potential for terminal differentiation. “The stochastic mode of division in tumour cells mimics the situation found in normal tissue and suggests that tumour heterogeneity can be the consequence of this particular mode of division rather than be necessarily the result of a Darwinian selective process” explains Pr Benjamin Simons, physicist and co-corresponding author of the study.

Altogether, this study provides novel and important insights into the mode of tumor growth, and demonstrates for the first time the existence of cancer stem cells during unperturbed solid tumour growth. “This new approach will be important to better define the mode of tumour growth in different types of cancer, metastasis and tumour relapse after therapy, which may have important implications for the development of new therapeutic strategy.” explains **Cédric Blanpain**, the senior author of this study.

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Gregory Driessens, Benjamin Beck, Amélie Caauwe, Benjamin D. Simons and Cédric Blanpain. Defining the mode of tumour growth by clonal analysis. Nature 2012, DOI: 10.1038/nature11344.

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