

Scientists uncover cells at the origin of basal cell carcinoma

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For years researchers have been trying to identify the molecular changes that occur in tumour-initiating cells from the very first oncogenic mutation to the development of invasive tumors. The most frequently diagnosed skin cancer in humans is basal cell carcinoma, with over a million such cases reported each year. An EU-funded team of

researchers led by Prof. Cédric Blanpain of the Université libre de Bruxelles (ULB) has identified the molecular events that occur during basal cell carcinoma initiation. This study was recently published in the journal *Nature Cell Biology* and it was partially supported by the European Research Council (ERC) Starting Grant worth EUR 1.6 million awarded to Prof. Blanpain.

Using an inducible mouse model, the Belgian research team discovered that [basal cell carcinoma](#) initiating cells are first reprogrammed before progressing to [invasive carcinoma](#). 'We were extremely surprised to see that tumor initiating cells were progressively and profoundly reprogrammed into a molecular identity that resembles [progenitor cells](#) present during embryonic development,' said Dr Youssef, first author of the publication.

The scientists showed that the Wnt/beta-catenin signalling pathway is activated in basal cell carcinoma-initiating cells immediately after oncogene expression, and using genetic or pharmacologic inhibitors they demonstrated that this signalling pathway is necessary for both the reprogramming of tumour-initiating cells and for tumour initiation.

Professor Blanpain's team worked together with physicians from the Department of Dermatology, Pathology and Plastic Surgery at the Hospital Erasme in Brussels to demonstrate that human basal cell carcinoma initiating cells behave in the same way as the mouse model in that they are also reprogrammed into embryonic hair follicle progenitors and activate Wnt/beta-catenin signalling.

'I am particularly excited about this work, because this basic research turns out to be very relevant for human diseases, with the identification of potentially new avenues to treat or to prevent the occurrence of the most common cancer in humans,' said Professor Blanpain.

This research study should greatly benefit future work on cancer, and developmental and stem cell biology.

More information: Youssef, K.K., et al. 'Adult interfollicular tumour-initiating cells are reprogrammed into an embryonic hair follicle progenitor-like fate during basal cell carcinoma initiation', *Nature Cell Biology*, 2012. [doi:10.1038/ncb2628](https://doi.org/10.1038/ncb2628)

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