Regulation of epidermal progenitor cells self-renewal and differentiation

During 2016, we continued exploring how tissues acquire an adequate control of cell division and differentiation. In particular, using mouse epidermal development as a model system, we investigated the contributions of mitotic and cytoskeletal proteins in the regulation of skin progenitors’ self-renewal through oriented cell divisions.

Contributions of stromal cells to the skin stem cell niche in homeostasis

We have recently identified a novel connection between macrophages and skin progenitor cells, which modulates their stem cell properties and regenerative potential. We are expanding these results to decipher how other signals, and cells from the stroma, are connected with the skin stem cell niche and regulate skin regeneration.

Contributions of stromal cues in cancer stem cell maintenance and tumour progression

The formation of tumours and their progression to malignancy undoubtedly involves the contributions of the tumour microenvironment. Identifying the signalling mechanisms and cell types that contribute to tumour initiation and progression to malignancy is instrumental for detecting potential targets for clinical applications aimed at eradicating tumours.

The microenvironment of many tumours is rich in cytokines, chemokines, and inflammatory enzymes. During 2016, we continued exploring the role of diverse cell-derived soluble mediators in modulating proliferation, migration and survival of skin cancer stem cells.

In addition, we focused our efforts on dissecting the contributions of immune cells to the cancer stem cell niche in tumour initiation and development. We are employing conditional loss- and gain-of-function studies in genetically modified mice in order to demonstrate the role of specific cell types and their derived soluble mediators in tumourigenesis; this may provide further insights for the potential development of immunotherapeutic approaches.

"During 2016, we continued our efforts to uncover novel events controlling the behaviour of skin stem cells in order to open up new insights into the mechanisms that control their regenerative characteristics, and how when disrupted they can lead to cancer."