Cédric BLANPAIN
Fundamental Research

The 2020 Francqui-Collen Prize in Biological and Medical sciences is awarded to Cédric Blanpain for his seminal contributions in the areas of cancer and normal stem cell biology. Dr Blanpain's work at the interface between biological and medical sciences has transformed the way we think about the largest of our organs, the skin.

Trained in Belgium and at Rockefeller University, Dr Blanpain developed unique experimental techniques, called lineage tracing, that allowed him to analyze stem cells over time and follow in a quantitative manner, using sophisticated mathematical analysis, how they generate various daughter cells. Using this approach, Dr Blanpain was able to identify the specific stem cell populations that give rise to the skin and those that only become active when our skin is injured. He has done parallel work unraveling a similar arrangement in the mammary gland. Together with his team at the Université Libre de Bruxelles, he was also able to generate unique insights into the biology of lung and heart stem cells, identifying the stem cells that give rise to the various parts of those organs. These findings are of tremendous importance and will help to develop regenerative therapies for skin, lung and heart injuries.

Dr Blanpain's unique quantitative approach gained particular attention for the analysis of various types of skin and breast cancers. He could identify cell types that lead to squamous cell carcinoma and to basal cell carcinoma and could analyze in a quantitative manner how they turn from normal stem cells into tumor promoting tumor stem cells when oncogenic mutations are introduced. Using those models, he could define the signaling pathways responsible for the steps and identify potential backup treatments for skin tumors resistant to common medical first-line treatment, a therapeutic approach that is now in clinical trials. Similarly, he has made key observations about the origin of luminal and basal-like breast cancers.

The work of Dr Blanpain illustrates beautifully how precise and quantitative basic biology studies can generate insight into human disease that can be directly translated into therapy. His unique success in going all the way from basic science to clinical application makes Dr Blanpain one of the premier researchers in his field.