*Propositions*

# Dynamics of Stem Cells in Liver Homeostasis, Injury and Carcinogenesis

1. Proliferative LGR5 cells are an intermediate stem cell population in the liver that emerge only during tissue injury. In contrast, LRCs are quiescent stem cells that are present in homeostatic liver, respond to tissue injury, and can give rise to LGR5 stem cells, as well as SOX9- and CD44-positive cells. (*This thesis*)

2. Tumor organoid model systems provide new research opportunities to advance knowledge on liver cancer (stem cell) biology, drug development and personalized medicine. (*This thesis*)

3. Hepatic LGR5 stem cells contribute to DEN-induced liver carcinogenesis and LGR5 marks tumor initiating cells. (*This thesis*)

4. The unprecedented self-renewal rate of intestinal epithelium appears reflected in a high susceptibility to malignant transformation.(*Hans Clevers, Science, 2005*).

5. Increased insights into the basis of cell plasticity in normal tissues and tumors are essential for the design of smarter therapies that aim to target CSCs.(*Eduard Batlle, Nature Medinine, 2017*)

6. Organoids have emerged as an essential tool for fundamental biology and are promising model systems for translational research. They may represent the key to clinical applications of stem cells or, in Howard Green's words, the birth of therapy with cultured cells. (*Kai Kretzschmar, Developmental Cell, 2016*)

7. When all else is lost the future still remains.(*Unknown*). Likewise failed experiments open the door to new investigations.

8. When you want knowledge like you want air under water then you will get it (*Socrates*). Hence progress in science depends on the efforts of dedicated people and if society craves such knowledge, it should be prepared to support the individuals involved.

9. 笨鸟先飞.(*关汉卿*)(Clumsy birds have to start flying early, *Guan Han Qin*). Likewise, scientific training should start early, as we are all born clumsy in this respect.

10. Do not try to fully understand a cell, that cell is just as complicated as the human being. (*myself*).