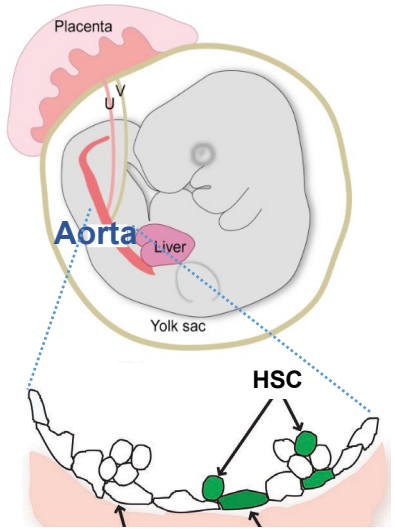
Dzierzak Group

Programming *in vivo* transplantable hematopoietic stem cells during development

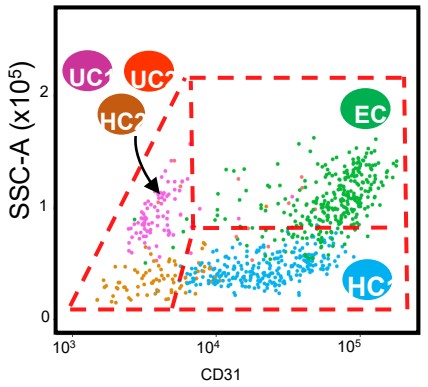
Haematopoietic stem cell (HSC) generation and expansion are key **challenges** facing clinical treatments for blood related-genetic disease and leukemia. We **aim** to uncover the molecular developmental program of HSC generation *in vivo* and harness this knowledge to generate, repair and expand these potent stem cells. We use mouse *in vivo* models, *in vitro* human and mouse pluripotent stem cells, genetic manipulations, vital imaging and single cell omics to examine:

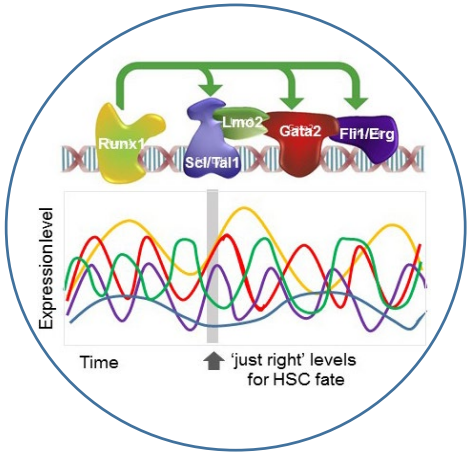
- Single cell omics associations with *in vivo* transplantable HSC function as cells transition from embryonic aortic endothelial cells.
- Stochasticity of dynamic transcription factor quantitative/combinatorial programming of hematopoietic fate development.
- GPR56 and GPR97 signaling pathways in the generation of healthy HSC and dysfunction in leukemic stem cells.



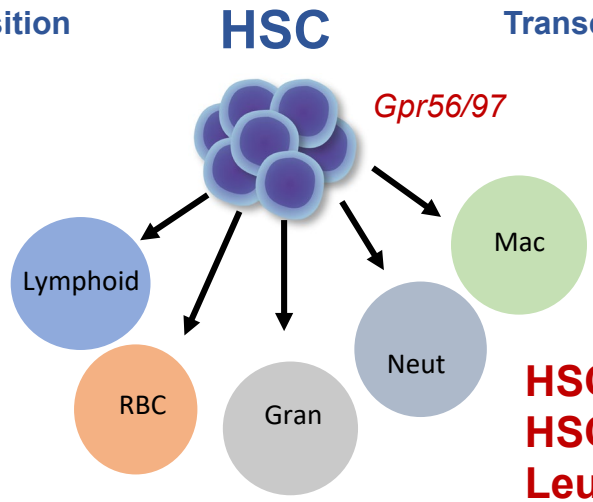
Endothelial-to-HSC transition

Single cell omics/function





Transcription factor dynamics



HSC generation
HSC lineage bias
Leukemia