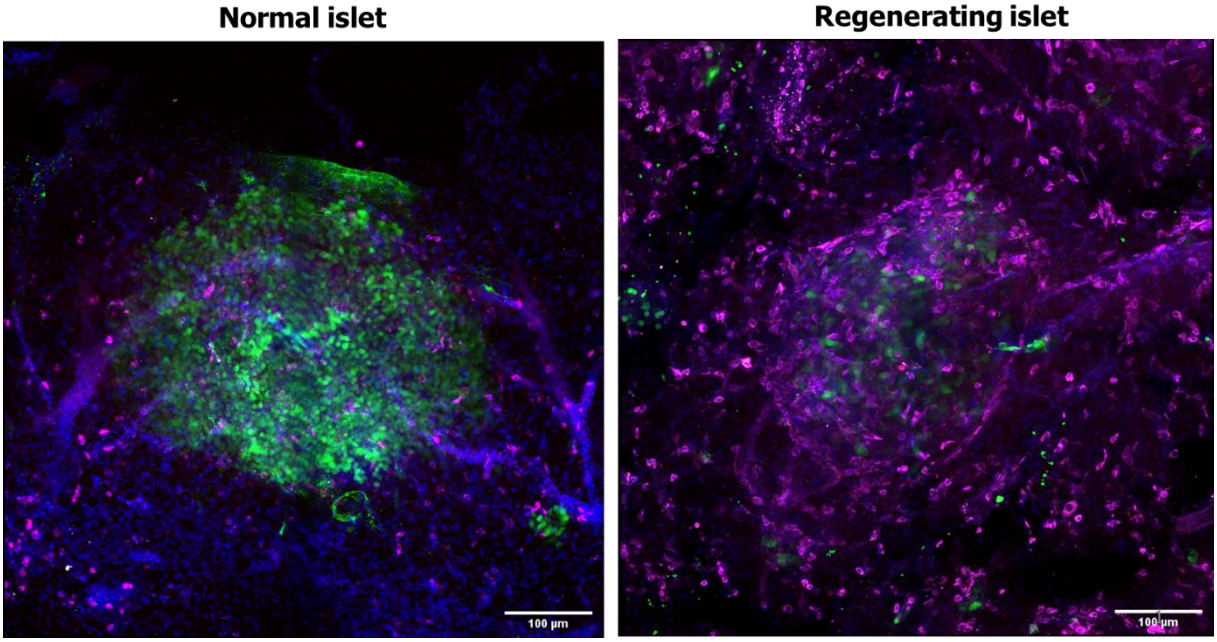
Immune-islet crosstalk in β-cell regeneration

The project will address the hypothesis that the immune system is critically important for the regeneration of β-cells across species. We have developed new conditional models for the fluorescent labeling and ablation of specific immune cell populations, including macrophages and T-cells in transgenic zebrafish. The goal is to define the role of the immune cell subtypes in β-cell regeneration and renewal. Subsequently, genomic and epigenetic interspecies comparison of immune cells in zebrafish, mouse, pig and human will enable to define unique pro-regenerative signals that enable cell plasticity. The identified ligands and paracrine factors will be applied in vitro and in vivo systems to restore regeneration of β-cells in human islets.

The successful PhD candidate will join the International research training group (IRTG) 2251 “Immunological and Metabolic Strategies in Metabolic Disease” https://tu-dresden.de/med/mf/irtg2251 and will be eligible for a joint PhD degree from both TU Dresden and Kings College London and a research experience in London. The preferred start is 04.01.2023.



The cells of the immune-system are shown in purple and the islet's beta-cells in green. Immune cells are present in the homeostatic condition in the islets (left). I response to beta-cell injury and regeneration the presence of immune cells dramatically increase (right). Our central hypothesis is that the crosstalk between immune cell subtypes and the islet is critical for the regeneration of beta cells and those differences in immune cell programs between fish and mammals confer differences in regenerative capacity.