The lack or dysfunction of insulin-producing β-cells is the cause of type I or type II diabetes, respectively. The primary objective of the Institute of Diabetes and Regeneration Research (IDR) at the Helmholtz Zentrum München is to develop regenerative therapeutic approaches to treat diabetes mellitus - complementary and alternative to the classical immunological and metabolic therapy strategies. In vitro generation of β-cells from pluripotent stem cells for cell-replacement therapy or triggering endogenous mechanisms of β-cell repair have great potential in the field of regenerative medicine. Both approaches rely on a thorough understanding of β-cell development and homeostasis in pre-clinical models. Therefore, the aim is to improve current strategies for functional β-cell production in vitro with the ultimate goal to provide alternative sources of β-cells for therapy. Additionally, we analyze and characterize the embryonic and adult pancreatic progenitor cells to understand β-cell development, homeostasis and function for in vivo regeneration.