

Pancreas, Xeno, Tissue/Histocompatibility

The progress and clinical challenging of gene editing for donor pig

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Xenotransplantation is currently the most effective solution to alleviate the shortage of organ resources. However, as a highly advanced technology in the field of organ transplantation, there are many obstacles that need to be overcome for it to be successful. The presentation will be divided into three parts: the main problems of xenotransplantation; the generation of xenograft donor pigs; the pre-clinical trials and clinical challenges that we have encountered. Our group generated over 10 different combinations of genetically edited donor pigs, including GTKO, SdaKO, CMAHKO, hCD55, hCD46, hTBM EPCR, LEA29Y, CD47, and SLA-I10. GTKO/CD55 lineage pigs have been bred for more than six generations. The expression level of CD55 in gene-edited pigs is several times higher when compared to that in humans. TBM showed a good coagulation effect but appears not sufficient, necessitating the combination of TBM with EPCR to yield an improved coagulation effect. Up to date, the six genetically modified pigs (GTKO/SdaKO/CMAHKO/hCD55/hTBM/hEPCR) would be an ideal genotype for current clinical trials. Moreover, Designated Pathogen-Free facility for genetically engineered pigs have been established, which would ensure the provision of biologically safe donor pigs for clinical trials.

Head to shoulder colour photo (high resolution, not less than 1M file size): see attachment.