Asian Transplantation Week 2023
Nov. 15(Wed)~18(Sat), 2023
Conrad Seoul, Korea
Submission No.: PG12-03
Session : Postgraduate Course 12 (Basic)
Date & Time, Place : November 16 (Thu), 15:00-16:30, Room 6F-1
Session Title : Single cell biology in transplantation

Single cell transcriptomics in heart transplantation

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Acute cellular rejection (ACR) is a major barrier to the long-term survival of cardiac allografts. Although immune cells are well known to play critical roles in ACR, the dynamic cellular landscape of allografts with ACR remains obscure. Single-cell RNA sequencing (scRNA-seq) was carried out for mouse cardiac allografts with ACR. Bioinformatic analysis was performed, and subsequent transplant experiments were conducted to validate the findings. Despite an overall large depletion of cardiac fibroblasts (CFBs), highly expanded cytotoxic T lymphocytes and a CXCL10+Gbp2+ subcluster of CFBs were enriched within grafts at the late stage. CXCL10+Gbp2+ CFBs featured strong interferon responsiveness and high expression of chemokines and major histocompatibility complex molecules, implying their involvement in the recruitment and activation of immune cells. Cell–cell communication analysis revealed that CXCL9/CXCL10-CXCR3 might contribute to regulating CXCL10+Gbp2+ CFB-induced chemotaxis and immune cell recruitment. In vivo transplant studies revealed the therapeutic potential of CXCR3 antagonism in transplant rejection. The findings of our study unveiled a novel CFB subcluster that might mediate acute cardiac rejection. Targeting CXCR3 could prolong allograft survival.