LYMPHOCYTE RECEPTOR SEQUENCING TO MONITOR ALLOIMMUNE RESPONSE: A SYSTEMATIC REVIEW

The clinical importance of T-cell alloreactivity in the post-transplant period is clear. However, early predictors of alloreactivity are still not widely available, and TCR tracking may be fundamental in predicting and preventing irreversible graft damage. Recent research demonstrates the potential value of lymphocyte receptor sequencing as an indicator for alloreactivity. This systematic review examines current research in lymphocyte receptor sequencing in immune monitoring and assesses clinically feasibility for applications in transplantation.

Search and screening was conducted in accordance with PRISMA guidelines. We searched PubMed for English-language studies published between 2010 and 2020 that examine the relationships between changes in T cell and B cell repertoires, donor reactivity, and clinical outcomes. Manual filtering of search results was performed based on relevancy and predefined inclusion criteria, and data were extracted based on study and methodology characteristics.

We found an extensive body of literature on lymphocyte receptor sequencing in transplantation. Initial screening yielded 764 articles of which 82 met the inclusion criteria. 21 were kidney transplantation studies (26%), 31 were other or general transplantation studies (38%), and 30 pertained to other diseases (36%). Sequencing the TCRβ CDR3 region for TCR studies and IGHV region for BCR studies dominated repertoire quantification studies due to its high degrees of variability and prominent roles in antigen recognition. Clonal expansion and diversity indices are well-accepted benchmarks for receptor repertoire studies, with many demonstrating correlation between clonal expansion and adverse health outcomes. More studies focused on TCR methods compared to BCR, but no difference is seen in their effectiveness of predicting post-transplant course.

Methodological approaches of receptor sequencing are well-established and this novel technology is positioned to be adopted as a new and important clinical diagnostic assay for allorecognition and prediction of rejection.