Gene signature for prediction of acute rejection in kidney transplant

Unmet Need

Kidney transplant is the best current treatment for kidney failure. The kidney is the most common organ to be transplanted, and in 2019 there were 23,405 kidney transplants in the United States. Unfortunately, around 30% of patients who undergo kidney transplants develop acute rejection (AR) due to antibody mediated rejection and T-cell mediated rejection. AR is associated with significant decreased long-term allograft survival independent of patient age, as well as inflammation within areas of interstitial fibrosis and tubal atrophy. Immune monitoring to detect AR allows for early intervention and decreased graft damage, but diagnostic methods, particularly those relying on molecular signatures, are likely confounded by differences in the immunosuppressive strategies used, and these differences are non-uniformly distributed by recipient age. Therefore, there is an urgent unmet need for improved early detection of AR.

Technology

Researchers at Duke University have identified biomarkers that detect acute rejection of kidney transplants in both children and adults. This technology is intended to enable early intervention and decreased graft damage for patients who develop AR after a kidney transplant. Specifically, this is a set of eight genes observed in both kidney transplant biopsy and peripheral blood as differentially expressed between kidney transplant patients who are stable over two years and patients who developed AR. Importantly, this set of genes retained significance irrespective of immunosuppression regimen or recipient age and was significant after adjusting for clinical variables in the cohort, such as race, gender, age, and treatment. The gene set was validated as a variable diagnostic biomarker in 110 adult and pediatric kidney transplant patients who either experienced AR within one year or stable for at least six months.

Advantages

- Identifies acute rejection regardless of the immunosuppressive strategies used during patient treatment

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Links
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• Allows for non-invasive method of testing by using peripheral blood assay
• Independent of age, unlike previous studies that separate adult patient samples and pediatric samples
• Identifies peripheral signature of AR caused by both antibody mediated rejection and T-cell mediated rejection in patients

**Publications**

• *An age-independent gene signature for monitoring acute rejection in kidney transplantation (Theranostics, 2020)*