Technology Offer

Cell-based urinary biomarkers for renal transplantation rejection

Ref. No.: CH846/2017

Background

For patients with terminal kidney insufficiency, renal transplantation is the best therapy. Every transplantation however bears the risk of transplant rejection, recurrence of the underlying disease or chronic transplant damage. Impaired transplant function can be detected by the assessment of the glomerular filtration rate (creatinine clearance), analysis of the permeability of the blood-urine-barrier (proteinuria), and microscopic analysis of the cells present in the urine (examiner-dependent). If impaired transplant function is detected by one of the mentioned methods, the patient usually has to undergo a renal biopsy in order to clarify the cause for the impaired transplant function. In case of transplant rejection, at least three rejection types are distinguishable: acute cellular based rejection (ACR), acute humoral-(AHR) and chronic humoral rejection (CHR). Currently, only biopsy can confirm graft rejection and the type of rejection. Various authors describe elevated urinary T-cells in patients with acute kidney rejection. However T-Cells alone are not sufficient accurate markers for acute cellular rejection as also patients without rejection might have elevated T-cell concentration in the urine.

Technology

We offer a novel non-invasive diagnostic approach to detect renal transplant rejection and to differentiate between acute cellular rejection and humoral rejection. The method is based on the quantification of urinary CD8+ CD4+ T cells, podocytes and proximal renal tubular epithelial cells (TEC) by flow cytometry using antibodies against cell-specific cell surface markers.
In a retrospective cross-sectional study, the urine of 40 patients with suspected renal graft rejection was analyzed maximal three days after transplant biopsy. Patients with acute cellular rejection (ACR, grouped according to biopsy results) have significant higher T-cell concentrations than humoral rejection patients and significant less podocytes than patients with no rejection ($p<0,05$). Humoral rejection patients have significantly lower concentrations of podocytes, CD10+ epithelial cells and EPCAM+ epithelial cells than patient with no rejection. Using this different urinary cell concentrations and their ratio it is possible to differentiate between graft rejection and no graft rejection as well as cellular or humoral reasons for graft rejection.

Benefits

- ✓ Non-invasive method
- ✓ Differentiation of acute rejection and humoral rejection from other causes of graft deterioration allows for suitable and earlier therapy

Application

Diagnosing of renal graft rejection and differentiating acute cellular from humoral rejection

Commercial Opportunity

Searching for a licensing partner

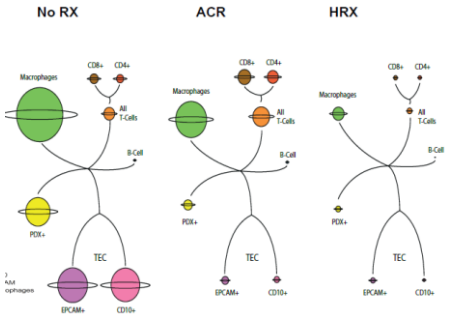

Fig. 1: Using different urinary cell concentrations and their ratio it is possible to differentiate between graft rejection and no graft rejection as well as cellular or humoral reasons for graft rejection.

Key words

Renal transplantation rejection, cell-based biomarker, flow cytometry, diagnostic, T-cells, podocytes, proximal renal tubular epithelial cells, CD10, EPCAM

Developmental Status

Patient data

IP Status

EP priority patent application (03/2017)

Patent Owner

Charité – Universitätsmedizin Berlin

Contact

Dr. Bettina Büttner
Technology Manager

Tel.: +49 30 450 570 874
Fax: +49 30 450 7570 964
Bettina.Buettner@charité.de
http://technologietransfer.charite.de
http://www.berlinhealthinnovations.com