Development of a point-of-care application for chemokine CXCL10 quantification after kidney transplantation

Research proposal for funding

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Summary for laypersons in English

As allograft rejection with current immunosuppression mostly presents as a “smoldering” process not detectable by serum creatinine, today so-called surveillance biopsies are the gold standard to detect early stages of rejection. However, performing an allograft biopsy bears a certain risk, is costly for the health care system and inconvenient for patients and thus, cannot be performed during the whole post-transplant period. **Therefore, innovative, non-invasive screening strategies which help to distinguish patients at high risk for rejection, who would benefit from further evaluation by an allograft biopsy, and patients at low risk (i.e. with a negative result), where surveillance biopsies might be safely omitted are urgently requested.** Advantageously, to realize such non-invasive monitoring strategies we would need tests for biomarkers, which would be amenable to a wide range of transplanted patients. There is a significant body of evidence demonstrating that urinary chemokine CXCL10 is a sensitive marker for inflammation (= possible rejection), and several groups, including ours, have shown that urinary CXCL10 is associated with acute allograft rejection. With the development of a suitable device for self-measurement of chemokine CXCL10 concentrations in the urine, it may be possible for patients with a transplanted kidney to quantify urinary chemokine CXCL10 in an outpatient setting such as doctor's offices and pharmacies, or even independently using a hand-held reader or smartphone at home/business, thereby profiting from the latest technologies. A wireless transmission of the concentration values into the laboratory information system of the hospital - already established in other processes - would guarantee compliance with the quality of the data. This novel, so-called non-invasive monitoring approach would not only advance personalized medicine, but also revolutionize risk stratification and intervention options in kidney transplantation. **In this project, we develop a prototype device for self-measurement of chemokine CXCL10 concentrations in the urine using a hand-held reader or smartphone.** With the two collaborators - the University Hospital of Basel and the School of Life Sciences FHNW - two very experienced and innovative partners will join their forces to realize this novel test system as illustrated below.