# **How can metabolomics help the follow-up management of kidney transplantation recipients? An untargeted based-metabolomics multiplatform study.**

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**Abstract**

**Introduction:** In the context of chronic kidney disease (CKD), kidney transplantation (Ktx) represents the most favorable solution in terms of quality of life, morbidity and mortality for patients affected by end-stage renal disease (ESRD). However, KTx is not devoid of risks and the follow-up of kidney graft function is crucial in the management of kidney transplantation recipients (KTRs). Currently used techniques for monitoring kidney function remains rather imprecise in the case of its estimation (eGFR) or time-consuming and rarely performed in case of its measurement (mGFR). Because of these limits the need of new biomarkers able to precisely reflect the renal function or even predict its evolution in KTRs is a key challenge to improve patients’ management.

**Objective:** This study aims to identify a new panel of biomarkers able to predict kidney function and KTx evolution.

**Methods:** 56 Patients from a well phenotyped French KTRs cohort has been followed for 1 year post-transplantation. Urinary samples have been collected at 3 and 12 month and the patients have been stratified as “decrease” or “stable” based on the decline or the stability of their kidney function after 1 year. Untargeted NMR- and MS-based metabolomic approaches were applied to the cohort followed by integration of results coming from this dual-method.

**Results:** Multivariate analysis deriving by both techniques allowed the identification of panels of biomarkers that could be linked to a GFR evolution and used as predictive markers. Merged results from the dual approach, enabled an increase of discrimination and predictive performances delineating a metabolomic signature that may forecast kidney function decline at 12 month post-Ktx though analysis of urinary sample at 3 months.

**Conclusions:** Analysis of urinary metabolome of KTR patients in early post- transplantation shows the possibility to predict GFR evolution at 1 year. These findings may represent an innovative and helpful tool for clinicians to enhance patient care in post-transplantation period.