# Towards Raman spectroscopy of urine as screening tool.

Zukovskaja O, Ryabchykov O, Straßburger M, Heinekamp T, Brakhage AA, Hennings CJ, Hübner CA, Wegmann M, Cialla-May D, Bocklitz TW, Weber K, Popp J (2020) Towards Raman spectroscopy of urine as screening tool. *J Biophotonics* 13(1), e201900143.

Details

**Abstract**

For the screening purposes urine is an especially attractive biofluid, since it offers easy and noninvasive sample collection and provides a snapshot of the whole metabolic status of the organism, which may change under different pathological conditions. Raman spectroscopy (RS) has the potential to monitor these changes and utilize them for disease diagnostics. The current study utilizes mouse models aiming to compare the feasibility of the urine based RS combined with chemometrics for diagnosing kidney diseases directly influencing urine composition and respiratory tract diseases having no direct connection to urine formation. The diagnostic models for included diseases were built using principal component analysis with linear discriminant analysis and validated with a leave-one-mouse-out cross-validation approach. Considering kidney disorders, the accuracy of 100% was obtained in discrimination between sick and healthy mice, as well as between two different kidney diseases. For asthma and invasive pulmonary aspergillosis achieved accuracies were noticeably lower, being, respectively, 77.27% and 78.57%. In

conclusion, our results suggest that RS of urine samples not only provides a solution for a rapid, sensitive and noninvasive diagnosis of kidney disorders, but also holds some promises for the screening of nonurinary tract diseases.

**Beteiligte Forschungseinheiten**

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