

Pro-enkephalin (Penkid): A novel plasma biomarker to assess renal impairment

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Abstract

Enkephalins are well known as small, unstable endogenous opioid peptides. Their peripheral functions are largely unknown, not least due to the fact that their reliable measurement has not been possible so far. To overcome this problem we devised a simple immunoassay method to detect as surrogate marker a stable peptide (“penKid”), which is stoichiometrically generated from the same precursor peptide as the Enkephalins. Reported high expression levels of both Enkephalins and their receptors in the kidney prompted us to investigate plasma levels of penKid in various clinical settings, where kidney function is impaired. In patients undergoing coronary artery bypass graft surgery (CABG) plasma penKid increased quickly, when patients developed acute kidney injury (AKI). A study employing several thousand patients in various acute disease settings (sepsis, acute myocardial infarction, acute heart failure) consistently revealed a strong correlation of plasma penKid with eGFR and showed that eGFR is the major determinant for penKid. Elevated plasma penKid also predicted developing AKI, use of renal replacement therapy (RRT) and mortality risk. Serial measurements demonstrated penKid to be a dynamic marker, as concentration changes over time improved outcome risk prediction. It is especially noteworthy that penKid levels – as opposed to other kidney biomarkers currently discussed – were not raised over healthy normal concentrations by systemic inflammation only, when kidney function was not impaired. This aspect along with the fact that penKid is determined from plasma (not urine) makes it an especially attractive novel kidney biomarker for use in critically ill patients.

Biography

Joachim Struck has received his PhD in Biochemistry at the Free University Berlin and worked as Post-doctoral fellow at UMASS Amherst. He has more than 20 years experience in industrial Basic and Clinical Research *in vitro* diagnostics (IVDs) and is currently CRO at Sphingo Tec GmbH, a company developing innovative IVDs for improved management of acutely diseased patients and for risk prediction in non-hospitalized subjects. He has co-authored more than 150 papers in peer-reviewed journals and is co-inventor of numerous patents.