Chronic kidney disease (CKD) and acute kidney injury (AKI) are major public health problems. It is important to be able to identify those at high risk of adverse outcome, CKD progression and associated cardiovascular disease. The aim of the thesis was to study novel promising biomarkers, their relationship to kidney function, chronic inflammation and/or cardiovascular risk – placental growth factor (PlGF), pregnancy associated plasma protein A (PAPP-A), matrix metalloproteinase 2 (MMP-2), matrix metalloproteinase 9 (MMP-9), soluble receptor for advanced glycation end products (sRAGE), calcium binding protein S100A12 or extracellular newly identified RAGE binding protein (EN-RAGE), and high mobility group box protein-1 (HMGB-1) in patients with renal diseases including CKD, haemodialysis (HD), AKI patients, and healthy controls for comparison. First study revealed that PlGF is elevated in patients with decreased renal function. Second study demonstrated the association of MMP-2 and PAPP-A with proteinuria in patients with CKD. Moreover, serum MMP-2, MMP-9 and PAPP-A levels significantly differed in patients with various nephropathies. EN-RAGE levels are not elevated in patients with CKD, but are related to inflammatory status. PAPP-A, EN-RAGE and HMGB-1 levels are significantly elevated, but sRAGE and PlGF levels are not increased in AKI patients. Whereas PAPP-A correlates with markers of nutrition; PlGF, EN-RAGE and HMGB-1 are related to inflammatory parameters in AKI patients. Taken together, these studies identified the novel biomarkers to be useful in patients with renal disease.