

Novel genomic and proteomic biomarkers of cardiovascular prognosis in uremia

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Abstract

Impaired redox homeostasis is a hallmark of end-stage renal disease (ESRD). Oxidative stress is one of the major risk factors associated with increased cardiovascular complications and mortality in this group. Both increased free radical production and reduced antioxidant activity play role in systemic oxidative stress in these patients. Genetic polymorphisms in genes encoding antioxidative enzymes such as glutathione transferases (GST), superoxide dismutase 2 or glutathione peroxidase 1 influence susceptibility towards chronic kidney disease as well as oxidative phenotype and mortality. Thus, individuals with a homozygous deletion of GSTM1 gene have shorter overall and cardiovascular-specific survival in ESRD. Biomarkers of oxidative stress including advanced oxidation protein products, malondialdehyde and cell adhesion molecules (soluble vascular cell adhesion molecule-1 and soluble intercellular adhesion molecule-1) also demonstrated a significant predictive role in terms of overall and cardiovascular survival in ESRD. Very recently a new approach towards testing proteomic biomarkers of endothelial dysfunction in the uremic milieu has been applied. Namely, biomarkers of oxidative stress and expression of a panel of inflammatory markers were studied in human umbilical vein endothelial cells (HUVECs) incubated in uremic serum. Incubation in uremic serum resulted in changes in the expression of a series of arteriosclerosis and atherosclerosis biomarkers including retinol-binding protein 4, regulated on activation, normal T cell expressed and secreted (RANTES), C-reactive protein, angiogenin, dickkopf-1 and platelet factor 4. The biomarker signature consisting of genomic and proteomic biomarkers could enable better monitoring of cardiovascular risk in ESRD patients and stratification into appropriate treatment groups.

Biography

Simic T has completed her PhD from Faculty of Medicine, University of Belgrade (FMUB), Serbia. She is the full professor of Medical biochemistry at FMUB and a corresponding member of Serbian Academy of Sciences and Arts. She has over 100 publications that have been cited over 2000 times. Her publication H-index is 26 and has been serving as an editorial board member of *Medicina* and *Journal of Medical Biochemistry*.