Peritoneal dialysis is an alternative to hemodialysis form of the renal replacement therapy. During that procedure peritoneum is used as the dialysis membrane through which water and solutes are transported from the bloodstream to the dialysis fluid introduced into the peritoneal cavity. During Continuous Ambulatory Peritoneal Dialysis, which is one of the most popular form of that therapy, dialysate continuously dwells in the peritoneal cavity, what due to its low biocompatibility results in the progressive damage to the peritoneum and decreased efficiency of that therapy. During last years, new dialysis solutions were introduced, with normal pH, low concentration of glucose degradation products, what improved their biocompatibility, but still it is relatively low. Intraperitoneal infusion of the dialysis fluid initiates local inflammatory response, with the different intensity in the individual patients. That reactions leads to structural and functional changes in the peritoneal mesothelium, known as the epithelial-mesenchymal transition of the mesothelial cells, which start to produce molecules stimulating growth of the connective tissue and neoangiogenesis within the peritoneum. The consequence of these morphological changes is the hypopermeability or hyperpermeability of the peritoneum, depending on that which process dominates. Both changes result in decrease of the dialysis efficiency. In many laboratories research is conducted on the methods/substances which could prevent development of these disorders within the peritoneum. Another problem, which starts to be understood during last years, is the negative effect of the peritoneal dialysis on function of the vascular endothelium, what predisposes to progression of the arteriosclerosis. However still during evaluation of the peritoneal dialysis biocompatibility most of the researchers concentrate on the effect of that procedure on the peritoneum, neglecting effect of that therapy on function of the vascular endothelium. Lack of the objective data describing the relationship between the intraperitoneal inflammation during peritoneal dialysis and the endothelial dysfunction in that group of patients.

We plan to elaborate a complex approach for testing the peritoneal dialysis biocompatibility taking into account both the peritoneal and vascular effects of that therapy. Individual reaction of the patients to that form of treatment, intraperitoneal and endovascular inflammation, strongly varies. Therefore we plan a prospective study in a group of 45 patients starting the peritoneal dialysis, with the evaluation at 3 months intervals, during 12 months, in which changes of the intraperitoneal and endovascular inflammation will be monitored. Dialysate and serum samples obtained during the study will be studied in *in vitro* culture on human peritoneal mesothelial cells and arterial endothelial cells. Results from that study will allow us to describe the relationship between the intraperitoneal and endovascular inflammation. Additionally we will be able to describe how these disorders affect function of the endothelial cells. In the next part of our study we plan to evaluate effect of two substances, with a potential protective effect towards the mesothelial and endothelial cells. Mixture of glycosaminoglycans – sulodexide and a substrate for glutathione synthesis – L-2-Oxothiazolidine-4-Carboxylic Acid will be studied. Results from our previous studies as wells as reports from other laboratories suggest that these substances may be effective in preservation of the mesothelial and endothelial function in conditions of chronic peritoneal dialysis.

Results from our study will allow us to propose a complex method for analysis of the peritoneal dialysis biocompatibility, what should help in making clinical decisions, reducing number of complications in that group of patients. Additionally introduction into the clinical practice of substances preventing mesothelial and endothelial injury during chronic peritoneal dialysis will result in preservation of the peritoneal function as the dialysis membrane and reduction of the cardiovascular complications.