Summary

Renal accumulation of radiolabelled receptor specific substances can represent clinical problems for diagnosis and therapy of some typical malignancies due to radionephrotoxicity of these substances.

The aim of this work was to design a suitable *in vitro* model for evaluating cumulative disposals of studied radiopharmaceuticals in the kidney and for finding possible mechanisms reducing the reabsorption of these substances by renal tubular cells. The suggested model designed for this purpose provides another opportunity for evaluation of their radionephrotoxical potential.

The aforementioned *in vitro* method was standardised and used for the study of transport mechanism of some representatives of radiolabelled somatostatin analogues (^{111}In/^{125}I/^{90}Y/^{177}Lu-DOTA-Tyr$_3$-octreotate, ^{111}In/^{90}Y/^{177}Lu-DOTA-1-Nal$_3$-octreotide), antibodies (^{111}In/^{90}Y/^{99m}Tc-AntiCD66) and albumin (FITC-albumin, ^{99m}Tc-albumin). All studied radioactive substances were radiolabelled with good practice and analyzed using HPLC and/or ITLC-SG methods. The radiolabelling technique of all studied specifically acting substances (radiolabelled peptides and antibodies) and also any concrete radionuclide showed no significant influence over the internalization into the renal OK cells. The difference of the internalized amount of FITC-albumin and ^{99m}Tc-albumin can be predicated to the alternation in the structure by radiolabelling with ^{99m}Tc.

The *in vitro* results were compared with the obtained *in vivo* results. Interspecies differences in the kidney transport of the peptides under study, the differences of transport mechanisms between isolated cells and the organ with intact architecture, the effect of the different lipophilicity of the agents on their transport across biological membranes in the whole kidney, the presence of other transport/ co-transport systems in the intact organ can cause discrepancies in these two sets of results. This work brought also pilot results of internalization of radiolabelled antibodies (^{111}In/^{90}Y/^{99m}Tc-AntiCD66) into the OK cells. Whenever studied antibodies could not be excreted by the kidney, they were used to determine the fate of antibody fragments in terms of their affinity to the transport systems that are responsible for internalization in the kidney.