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RADIOACTIVELY LABELLED PORPHYRIN DERIVATIVES

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Porphyrins and related analogues are essential for many vital and biological functions of normal metabolism of living organisms. Medicine exploits especially high affinity of these macrocyclic compounds to various types of neoplasms and they can be successfully used in combination with suitable radionuclides for diagnostic or therapeutic purposes in nuclear medicine.

Radioactive labelling of guanidine bearing tetraphenylporphyrin and Dy - texaphyrin by selected lanthanides (^{166}Ho and ^{90}Y) is described. Basic characterisation of studied porphyrin and texaphyrin, including their behaviour in wide range of pH was probed using UV-VIS absorption spectrometry. This technique also gave preliminary information of holmium and yttrium complexation with mentioned porphyrin and texaphyrin. The labelling yield of these macrocyclic molecules depends on pH of reaction mixture, metal : ligand ratio and time of incubation. Optimal reaction conditions for the formation of porphyrin and texaphyrin radioactive complexes were determined by thin layer chromatography with detection of β - activity.

The ability of porphyrin derivatives to bind anions was examined as well. Our experiments were focused on perrhenate ion (ReO_4^-) because the radiopharmaceuticals labeled by isotopes ^{186}Re and ^{188}Re play an important role in therapy of numerous tumor diseases. The possibility to use ReO_4^- anion directly for labeling purposes, without necessity of its reduction to lower oxidation state, can considerably simplify preparation of these radiotherapeutic pharmaceuticals. The incorporation of ReO_4^- anion into the porphyrin ring was proved neither by UV-Vis spectrometry nor by TLC.