## Abstract

Modern diagnostic method magnetic resonance imaging (MRI) usually uses contrast agents $T_1$-type, which are based on $Gd^{3+}$ complexes. Due to severe toxicity of free $Gd^{3+}$, it is desired to have thermodynamically stable and kinetically inert complexes with fast elimination from the body. This work summarizes information about a novel contrast agent based on ligand $DO3A^P$ (1,4,7,10-tetraazacyclododecane-1-methyl(alkyl)phosphinic-4,7,10-triacetic acid) with pendant hydrophobic dibenzylamino group which is able to interact hydrophobically with the macromolecule of serum albumin. The stability of supracomplex is dependent on pH value, *i.e.* on the protonation of the pendant amino group of the complex ($pK_A$ = 5.6) and this interaction was confirmed from $^1$H-NMRD profile and fluorescent analysis. The compound was tested for its angiographic properties *in vivo* on rat model. Furthermore, other complexes of the ligand with trivalent lanthanides ($Nd^{3+}$, $Eu^{3+}$, $Tb^{3+}$, $Dy^{3+}$, $Er^{3+}$) were characterized by various methods (XRD, luminescence, UV-VIS, $^1$H-, $^{17}$O- and $^{31}$P-NMR). The cleavage of the benzyl groups affords ligand whose $Ln^{3+}$ complexes possess pH dependent PARACEST effect. These complexes were characterized by XRD, luminescence and $^1$H- and $^{31}$P-NMR. Moreover, the novel ligands with modified length of pendant arm and with dibenzylamino group were synthesized. The altered value of $pK_A$ was determined by NMR titration method.



## Keywords

MRI, gadolinium, macrocyclic ligands, macrocyclic complexes, serum albumin