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Synthesis and characterization of Fe (III)-Pyrimethamine complexe and its potential use as MR-imaging probe for assessing the P-glycoprotein function

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Pyrimethamine is an anti-malaria drug known as a substrate of *P. falciparum* P-glycoprotein homologue protein 1 and human P-glycoprotein. In this study it was selected to be a ligand for constructing a ferric ion based molecular probe for MR imaging the multidrug transport proteins. The Fe(III)-Pyrimethamine complex was spectrophotometrically characterized at 325 nm. It was immediately done with stoichiometry of 1 mole of Fe^{3+} to 3 mole of pyrimethamin. The $[Fe\text{-}Pyrimethamine3]^{3+}$ was efficiently enhanced an increase in the on proton relaxivity. The relaxivity of T1 and T2 relaxation time determined using soft tissue materials such as 7% acrylamide gel was equal to 7 $mM^{-1}.s^{-1}$ and 10 $mM^{-1}.s^{-1}$, respectively. The specific interaction of the complex with intrinsic MDR proteins particularly P-glycoprotein and MRP1 protein and its biodistribution in wistar rats were performed in 1.5 T medical MRI instrument. The MRI images revealed that the complex diffused into the tissues as a function of time and has retention time in these tissues at least 2 hours. This retention time is long enough for analyzing the function of P-glycoprotein and MRP1 protein. The $[Fe\text{-}Pyrimethamine3]^{3+}$ complex might be considered as a potential molecular probe for MR Imaging and with further investigation it could be used for monitoring the drug response in cancer chemotherapy regimens.

Biography

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