

***Development of novel systems of MRI contrast agents and photothermal agents  
with transition and rare earth metals***

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Magnetic Resonance Imaging (MRI) technique is a powerful diagnostic tool which provides anatomical and physiological information simultaneously at a good spatial resolution. The use of MRI contrast agents (CAs) provide great resolution assistance which helps to improve the contrast of the images. CAs can be classified by the nature of their metal center and magnetic properties, where paramagnetic agents are more effective. MRI has been used to obtain detailed images of the organs and tissues within the body, helping in the detection of different types of tumors. For cancerous tumors, photothermal therapy (PTT) provides a potentially effective treatment with the assistance of photothermal agents which must have strong near-infrared (NIR) absorbance, high photothermal conversion efficiency, and good photostability. Relaxivity characteristics of the  $[\text{Ni}(\text{dmit})_2]^-$  complex as photo thermal agent, which has been already appointed as a good PPT agent, have been studied. Currently, work to combine a paramagnetic metal complex with this system is the principal objective. Rare earth metals such as gadolinium ( $\text{Gd}^{3+}$ ) and transition metals such as copper, nickel, zinc and manganese are being used to coordinate with a synthesized ligand for the development of a novel system. Those complexes are being characterized by X-Ray Diffraction, FT-IR, NMR and UV-Vis techniques. Toxicity tests using breast cancer cells and skin cancer cells will be done to prove their biosafety which is a paramount priority.