Ruthenium nitrosyl compound coupling to the fluorescent bodipy specie as strategy to theranostic applications

Renata B. da Silveira (PG) *, Juliana C. Biazotto (PQ), Shaiane M.G. Melo (PG), Flávio Emery (PQ), Roberto S. da Silva (PQ)

*University of São Paulo, Pharmaceutical Sciences School, Ribeirão Preto, Brazil.

*e-mail: renata.bortoleto.silveira@usp.br

Boron-dipirromethene (bodipy) is a compound of high fluorescence intensity can be used in confocal microscopy. It combined with nitrosyl ruthenium compounds allows a combination of diagnostics and therapy. In this paper, the fluorescent ligand was added to a complex, considering its use as a tumor marker coupled to their cytotoxic potential.The project pursuit synthesizes the complex $[Ru(bpy)_2(py\text{-}bodipy)NO](PF_6)_3$ through an amidic bond and to probe chemical and kinect aspects. Also, the purpose will be to evaluate the uptake and relationship between the compounds and apoptotic processes related to mitochondria. The compound was synthesized by refluxing *cis*-$[Ru(bpy)_2(NO_2)NO]^{2+}$ and isonicotinic acid for 90 minutes in acetone. This product was isolated and reacted with thionyl chloride for 5 hours. Then, it was refluxed with 1,3,5,7 tetramethyl-meso-aminophenyl-BODIPY for 1,5 hours in acetonitrile. The final product was monitored by thin layer chromatography, UV-vis, FTIR and spectrofluorescence. The ruthenium complex shows fluorescence emission band at 509 nm when excited at 490 nm and UV-vis bands at 297, 450 and 498 nm. The NO release occurs by reduction of coordinated nitrosyl as noted by NO-sensor analysis. Cytotoxicity has been analysed in B16F10 and L929 cell lines and subcellular localization evaluated by confocal microscopy.

The synthesis and initial chemical characterization of the compound were performed. The coordination to py-bodipy constitutes an excellent strategy to synthesize fluorescent metal-based compounds. Furthermore, the fluorescence allows using it to comprise the pathways involved in cell death process caused by NO release.

References

Figueiredo, L. E., Cilli, E.M. et al; Synthesis and cytotoxicity of a ruthenium nitrosyl nitric oxide donor with isonicotinic acid and a cell penetrating peptide. Inorg. Chem. Commun **2013,** *28, 60-63***.**

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