

PhD position in Grenoble

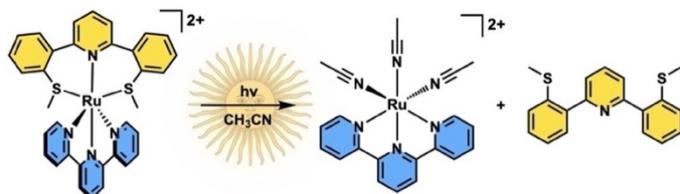
Light-induced cytotoxicity of photolabile ruthenium complexes: Towards new antitumor agents

Topic: *coordination photochemistry, ligand synthesis, biological assays.*

Organization: Département de Chimie Moléculaire.

Project Leaders: Damien Jouvenot and Nathalie Berthet.

Project Description: Ruthenium complexes have a rich photochemistry and in particular, they show the ability of expelling a specific ligand upon light irradiation at appropriate wavelength. A ruthenium complex once one of the ligands is ejected is highly toxic, as it reveals a reactive Ru complex able to



bind to DNA and eventually lead to single or double-strand cleavage and also, the expelled ligand can be damaging as well. We have recently reported the first example of a ruthenium complex bearing two different tridentate ligands, generally

strongly bound to the metal center, that is able to eject one of them upon visible light irradiation. Ejection of a tridentate ligand releases 3 positions on the metal center, which should increase its ability to link to DNA and lead to cancer cell death.

The project's objectives are to improve, diversify, and generalize the principle of tridentate ejection and to examine the cytotoxicity of the photo-generated products. *The novelty of this approach is the light-induced generation of a reactive $[Ru(tpy)]^{2+}$ fragment, which can only stem from the ejection of a tridentate. This fragment should display an enhanced toxicity.*

Methods and Materials: The candidate will take part in the ligands design and perform the ligand synthesis and the coordination chemistry reactions. All the compounds will be thoroughly characterized by the usual physico-chemical techniques, and their photochemical behavior under irradiation will be studied. Next, the biological activity will be investigated. Interaction with DNA plasmid and potentially cleavage activity of the metallic complex will be first examined by gel electrophoresis. The cytotoxicity will be finally investigated on different cancer cells. A photochemical reaction screening will be carried out in order to optimize the cytotoxicity of the complexes and eventually establish a correlation between structure of the ligand and biological properties.

Requirements: Master's degree in chemistry or a related field, background in molecular synthesis and coordination chemistry, including characterization techniques, ideally background in biology and biochemistry or great interest in participating in biological studies, strong motivation to work on novel therapies research, good written and oral communication skills in English.

Application Process: Interested candidates should submit their CV, motivation letter outlining research interests and relevant experience in the domain, copies of academic transcripts and degrees, and names and contact information of two references to the project leaders: Damien Jouvenot (damien.jouvenot@univ-grenoble-alpes.fr) and Nathalie Berthet (Nathalie.berthet@univ-grenoble-alpes.fr). **APPLICATION DEADLINE: March 31 at 23.59.**