XXI Brazilian Meeting on Inorganic Chemistry
X Brazilian Meeting on Rare Earths
III Workshop on Theoretical Bioinorganic Chemistry
Belo Horizonte, September 12 - 15th 2024

A New Water-Soluble Antimony(V) Porphyrin: Synthesis, Characterization and Biological Activity Against Cancerous Cell Lines

Cláudio Eduardo Moreira de Souza[1]*, Tulio Resende Freitas[2], Adriano de Paula Sabino[2] and Gilson DeFreitas-Silva[1]**

1. Departamento de Química/ ICEx; 2. Departamento de Análises Clínicas e Toxicológicas/Faculdade de Farmácia, Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Brazil
*E-mail: *claudio.edms@gmail.com; **gilson.freitas@gmail.com*

Thematic Area: Biological Inorganic Chemistry

Keywords: Metalloporphyrin, Antimony(V), chronic B leukemia.

Cancer is an anomaly in cell growth that causes the destruction of healthy body tissues. This disease has been the subject of extensive research, some of which demonstrates that antimony(V) complexes exhibit selectivity against some cancerous cell lines[1]. Additionally, cationic porphyrins have gained prominence in this field due to their DNA-binding properties[2]. Therefore, the objective of this research is to obtain a new cationic antimony(V) porphyrin and test it as a possible drug against MEC-1 cells (chronic B-cell leukemia). To synthesize the ligand meso-tetrakis(3-pyridyl)porphyrin (H_2T3PyP), pyrrole and 3-pyridinecarboxaldehyde are reacted in an acidic medium[3]. After purification, H_2T3PyP is refluxed with dichloromethane, and antimony pentachloride is then added to form the complex $[Sb^VCl_2(T3PyP)]Cl$[4]. Finally, $[Sb^VCl_2(T3PyP)]Cl$ is alkylated for 48 hours with ethyl p-toluenesulfonate in a dimethylformamide system, resulting in the novel compound $[Sb^VCl_2(T3EPyP)]Cl_5$[5] (FIGURE 1A). The compounds obtained during these processes were characterized by UV-VIS spectroscopy (FIGURE 1B), elemental analysis (CHN), and mass spectrometry (MALDI-TOF), indicating the formation of the target complex. The testing of this compound with MEC-1 cells (chronic B-cell leukemia) has already begun, and preliminary results will be presented at the conference.

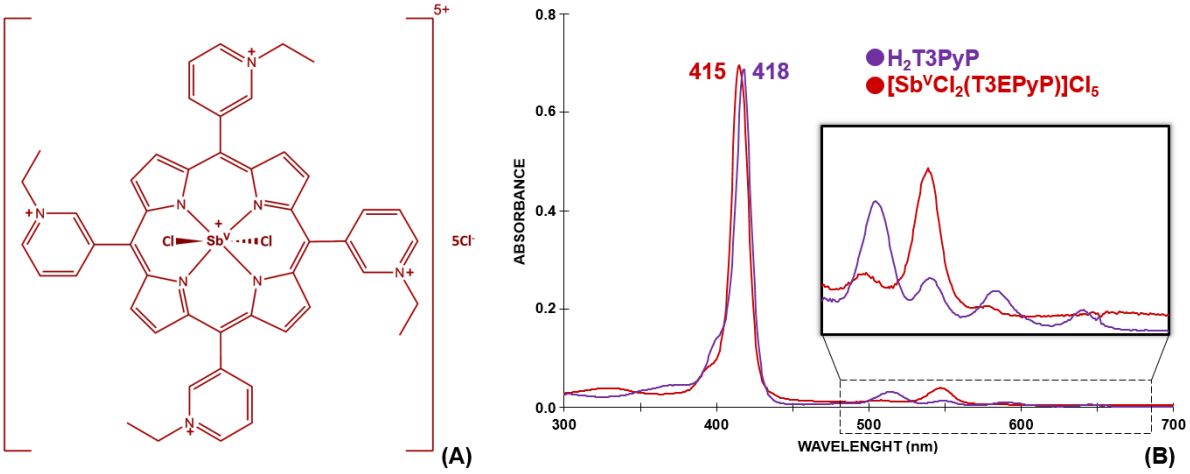

Figure: (A) Structure of the complex $[SbCl_2(T3EPyP)]Cl_5$ and (B) UV-VIS spectroscopy of H_2T3PyP (CH_2Cl_2, 1.6 µM) and $[Sb^VCl_2(T3EPyP)]Cl_5$ (PBS buffer, pH = 7.4, 3.2 µM).

Acknowledgments: We thank CNPq, CAPES, FAPEMIG and INCT-Cimol for the financial support.

References

[1] C. Demicheli et *al*, European Journal of Medicinal Chemistry, **109**, 254-267 (2016).
[2] T. Uno et al, Biochemistry, **41**, 13059-13066 (2002).
[3] I. Mayer et al, Inorg. Chim. Acta, **358**, 2629-2642 (2005).
[4] KM. Kadish et al, Inorg. Chem., **35**, 5564-5569 (1996).
[5] I. Batinić-Haberle et al, Inorg. Chem., **38**, 4011-4022 (1999).