

Thesis abstract Sabine Lam

"Study of the complexation de Tb(III) with hydroxamic and pyridinecarboxylic ligands for applications in nuclear medicine"

Nuclear medicine is rapidly evolving, driven by advances in radiopharmaceuticals that improve both diagnosis and therapy, enabling personalized patient care. The theranostic approach, combining individualized diagnostics and targeted treatment within a single radiopharmaceutical, represents a key strategy in this field. In this context, the element terbium stands out for the diversity of its isotopes, enabling both imaging and therapy. However, the ligands traditionally used do not allow for optimal radiochelation under physiological conditions. Thus, the development of innovative ligands is essential to optimize the complexation of radioisotopes. This thesis focuses on the study of Tb(III) complexation with two families of ligands, hydroxamic acids and pyridinecarboxylic acids, with the aim of assessing their potential application in the design of radiopharmaceuticals.

The first part was devoted to studying the complexation of Tb(III) with different ligands using several analytical methods (capillary affinity electrophoresis, fluorescence spectroscopy, DFT calculations) to select the most promising ligand for further work. The second part of the thesis was devoted to preclinical in vitro studies, including ligand cytotoxicity, stability, and radiostability of Tb(III) and [^{161}Tb]Tb complexes with the ligands of interest. These results contributed to a better understanding of the behavior of Tb(III) complexes with these ligands and open up prospects for their potential use as part of theranostic strategies.