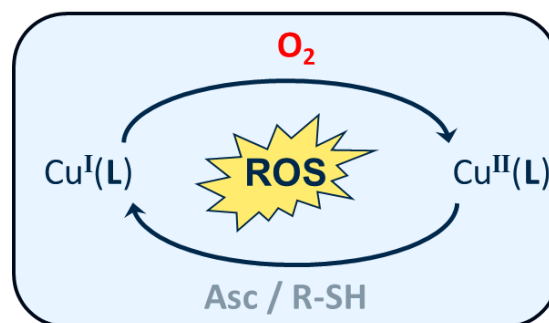


M2 position at the Coordination Chemistry Lab - Toulouse

Carbene-derivatized peptides for Cu-based redox catalysis in living cells

The use of redox-active Cu-complexes for in cell catalysis, including the formation of cytotoxic reactive oxygen species (ROS), remains thwarted by their low stability in the presence of strong intracellular competitors such as glutathione (GSH) and metallothioneins (MT).

To tackle this challenge in medicinal inorganic chemistry, we aim to derivatize short **Cu-binding peptides** with N-heterocyclic carbenes (NHC) to achieve enhanced resistance towards reductive dissociation by GSH/MT, while keeping efficient redox cycling and hence O₂ activation towards the generation of ROS.



First, an NHC-amino acid derivative will be synthesized and incorporated in short peptides by solid-phase peptide synthesis (SPPS). Then, Cu-binding to such innovative molecular platforms will be characterized via a wide set of **spectroscopy** techniques (UV-vis, CD, EPR, NMR) and **electrochemistry** (CV). Then the stability and reactivity of the complexes will be tested in physiological-like conditions and eventually in biological media (plasma, cell culture medium, cell lysates) and on **cell cultures**, paving the way for their application as anticancer drugs and beyond.

Environment: The successful candidate will work in a dynamic and international environment at the [Laboratoire de Chimie de Coordination](#) (CNRS) in Toulouse, in the [ALAMBIC team](#) and “Molecular Design of Transition-Metal Pre-Catalysts” team, experts in Cu-peptide and NHC chemistry respectively. The technical and scientific environment of the laboratory and of the host teams is ideally suited to the project. The successful candidate will perform NHC and peptide synthesis, characterization by advanced spectroscopic techniques such as NMR, EPR, UV-Visible, circular dichroism, fluorescence and studies in cellular medium.

Profile: We are looking for a highly motivated candidate with background in molecular and inorganic chemistry and with a keen interest in multidisciplinary projects in the field of bioinorganic chemistry. The internship will enable you to acquire the autonomy and skills necessary to work in a collaborative manner.

Application : Please email your CV, along with the contact details of your M1 supervisors and a copy of your L3/M1 grades and a cover letter. It should be sent to Drs. Christelle Hureau (christelle.hureau@lcc-toulouse.fr), Enrico Falcone (enrico.falcone@lcc-toulouse.fr) and Vincent César (vincent.cesar@lcc-toulouse.fr).

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