

ITI HiFunMat Master Internship Proposal

M 1

M 2

Title: Synthesis and photophysical study of new potential photosensitizers for stimulative photodynamic therapy

Internship supervisor

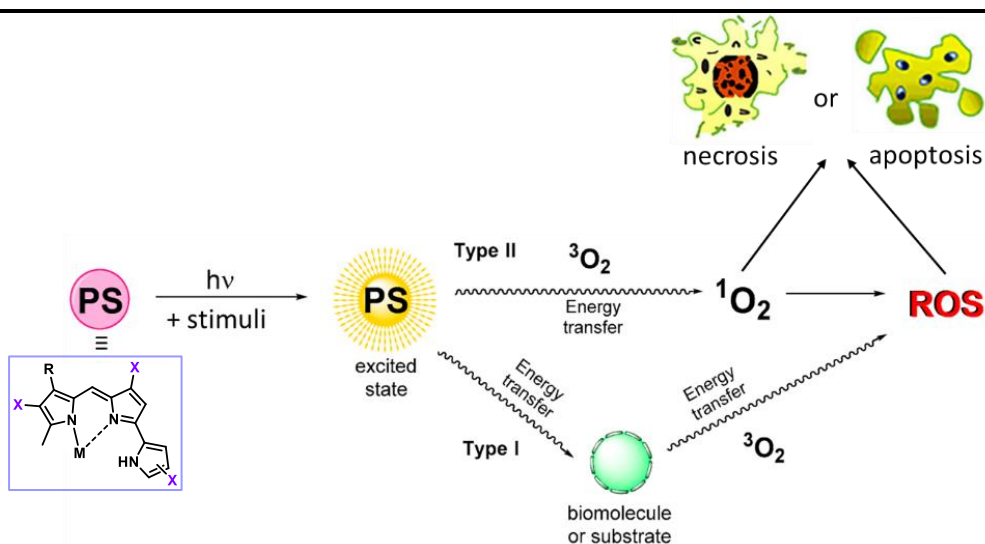
Name, first name	Figliola, Carlotta
E-mail, Telephone	figliola@unistra.fr
Laboratory	UMR 7515, Institut de Chimie et Procédés pour l'Environnement, l'Energie et la Santé (ICPEES)
Collaboration with a HiFunMat member (<i>please indicate their name</i>)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes :

Student profile looked for

Master program (<i>more than one box can be ticked</i>)	<input type="checkbox"/> Material science and engineering <input checked="" type="checkbox"/> Chemistry <input type="checkbox"/> Physics
Other indications if necessary	Highly motivated candidate with good training in organic chemistry and willing to learn different spectroscopic and electrochemical techniques.

Internship description

Photodynamic therapy (PDT) is a photochemistry-based medical treatment combining two non-toxic components, *i.e.* the light at specific wavelength and a photosensitizer (PS). The absorption of the light by the PS produces the reactive oxygen species (ROS) and the singlet oxygen ($^1\text{O}_2$), both causing cell death followed by an inflammatory and immune response. PDT has been known for over 30 years as a promising anticancer and antimicrobial treatment, but it is still used as complement to other therapeutic solutions, such as radiotherapy, chemotherapy, and surgery. In case of head and neck cancers (HNC), PDT is an interesting and promising alternative with better outcomes than these treatments in terms of morbidity, mutilation, and other significant side effects affecting patients' compliance. Our laboratory proposes to evaluate the potential stimulative PDT activity of new dyes, which are inspired to known and clinically approved PS. This internship will be dedicated to the synthesis of prodigiosin-inspired chromophores and their step-by-step functionalization. Each synthetic modification will be verified by photophysical studies, such as light absorption, fluorescence emission, $^1\text{O}_2$ production and electrochemical measurements. In case of promising candidates, the intern will also have the opportunity to perform the cytotoxic tests evaluating the *in vitro* photodynamic activity in the project partner laboratory, the Laboratory of Bioimaging and Pathologies (LBP, UMR 7021), on the Illkirch University campus.



Key words: Multi-step organic synthesis, fluorescence, singlet oxygen.

Application: please send CV, motivation letter and M1 final grades to Dr. Carlotta Figliola (figliola@unistra.fr).