

Sujet de thèse ILM/IMP :

**« Development of chelating polysaccharides polymers for metallic extraction »
« Développement de polymères chélatants à base de saccharides pour l'extraction métallique »**

Recently, Institut Lumière Matière (team FENNEC) and Laboratoire Ingénierie des Matériaux Polymères (team Matériaux Polymères à l'Interface avec les Sciences de la Vie) have begun long term collaboration on the development of functionalized chitosans for biomedical applications combining their expertises in imaging and chelation for ILM and in biopolymers for IMP (P. N. Oliveira *et al.*, *Int. J. Biol. Macromol.*, **2019**). This promising collaboration has been reinforced by two grants: (i) UreStent Pro (CLARA 2018) for development of biodegradable stents followed by MRI and (ii) MedForce (Booster Région 2020) for the development of drugs and medical devices and analytical characterization for clinical translation.

In this context, the PhD proposed here will be performed under the supervision of Dr François Lux from ILM and Pr Laurent David from IMP to take advantage of this very favorable environment. The PhD student will be in charge of developing new polysaccharides with multimodal properties. The polymers will be used either as colloidal solution for chelating dialysis (for treatment of lead poisoning or Wilson disease) or as medical implants after processing of the polymers as bioimageable medical devices in different contexts. Adding imaging properties on biodegradable implants is of importance to detect them and to confirm their *in situ* resorbability. Important part of the PhD will be focused on the development of original and reproducible analytical characterizations for further clinical translation of the most promising polymers.

During the PhD, the candidate will also be in tight relation with industrial partners of the project (Nano-H and MexBrain companies) and with biological partners (VetAgro Sup, Lyon) and clinicians (Pr Olivier Chapet, Lyon Sud Hospital and Pr Alain Lachaux, Hospices Civils de Lyon).

The competences required for the PhD are basic skills in chemistry, in organic functionalization and in coordination chemistry. Interest and skills in biology are not mandatory but will be appreciated.

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