

## PhD Thesis Proposal

Professors Benjamin Elias (Institute of Condensed Matter and Nanosciences) and Patrick Jacquemin (de Duve Institute) are looking for a doctoral student to perform a doctoral thesis on the theme of optimizing the use of antibodies for diagnostic purposes.

Antibodies used in immunostaining experiments on patient tissue sections are currently essential for medical diagnosis. To avoid their degradation, patient tissues must be stabilized by a fixation agent, which is very often formaldehyde. Formaldehyde reacts with proteins and establishes covalent bonds with them. These reactions profoundly modify the structure of proteins and contribute to the fact that many antibodies no longer recognize their antigenic determinant. A process called “antigen retrieval”, based on heating, can reverse the phenomenon: this process requires empirical testing of many protocols that employ different heating methods in buffers of varying composition to identify the most effective unmasking condition. Nevertheless, the success is partial and many antibodies remain unusable, which prevents the diagnosis of many pathologies using immunostaining.

The chemistry involved in the fixation and antigen retrieval processes is still poorly understood. The aim of the project is to characterize in detail, using mass spectrometry analyses, the action of formaldehyde and the effects of unmasking to establish rules for the selection of the best antigenic peptides and suitable unmasking protocols, ultimately allowing the use of a larger number of antibodies for diagnostic purposes.

An interest and knowledge in molecular biology and/or organic chemistry are necessary to carry out this thesis. For the funding of the doctoral fellowship, applications will be submitted to the Special Research Funds (FSR) and to the FRIA.

Your questions or your application should be sent to [patrick.jacquemin@uclouvain.be](mailto:patrick.jacquemin@uclouvain.be)