

## **PhD Thesis Position Open in Advanced Drug Delivery and Biomaterials, Louvain Drug Research Institute, Université catholique de Louvain, Brussels, Belgium**

The Advanced Drug Delivery and Biomaterials research group of the Louvain Drug Research Institute of the Université catholique de Louvain (UCL) in Brussels, Belgium, aims to develop new drug delivery systems for two main challenges of the pharmaceutical industry, namely the delivery of biotech-based drugs (proteins, vaccines, nucleic acids) and poorly soluble drugs. The scientific approach is multidisciplinary and mechanistic-driven. It involves i) the development of new formulations, ii) their physico-chemical characterization, iii) the demonstration of their efficacy *in vitro* and *in vivo*, iv) the understanding of their mechanisms of action. The research themes include transdermal drug delivery, polymeric nanocarriers, pulmonary drug delivery and drug delivery in tissue engineering (<http://www.uclouvain.be/en-269736.html> ).

The research of Prof. Rita Vanbever within the Advanced Drug Delivery and Biomaterials research group focuses on pulmonary drug administration aspects, that is, the formulation of inhalation dry powders, the study of the pulmonary fate of diverse molecules following delivery to the lung *in vivo*, the assessment of the potential of vaccine delivery to the lung for protection against respiratory infections as well as the development of formulation strategies to sustain drug release within the lung. This latter topic has particularly been developed within Rita Vanbever's group these last years, in particular with the study of the impact of the PEGylation of proteins and small molecule drugs on their residence time in the lung and on their therapeutic efficacy locally.

### **Project Description :**

Lung cancer remains the leading cause of cancer-related deaths worldwide. Systemic chemotherapy offers limited clinical benefit in lung cancer because the access of chemotherapeutics to lung tumors is limited and nonspecific. Aerosolised chemotherapy could increase exposure of the lung tumor to the anti-cancer agent, while minimizing systemic side effects. A sustained-release formulation for inhalation could further improve efficacy by maintaining the concentrations of the anti-cancer drug at effective levels within the lung for extended time periods. In addition, it could avoid peaks in local drug concentrations, toxic to the pulmonary tissue. The goal of this project will be to assess the interest of different biocompatible polymers for sustaining drug residency within the lung and to apply this sustained release strategy to a model cytotoxic drug in lung cancer. The pulmonary fate of the different polymers will be compared both *in vitro* and *in vivo*. The polymer presenting the longest residence time within the airway lumen will then be selected and used to assess whether its conjugation to the model cytotoxic drug could sustain its release within the lung, decrease its systemic and local toxicity and increase its antitumor efficacy in a murine model of lung carcinoma. The project will be done at UCL, Brussels, in collaboration with Prof. Raphaël Frederick (Medicinal chemistry, Louvain Drug Research Institute, UCL). The position is open to PhD candidates who have been granted or will apply to a PhD fellowship in their home country.

### **Your Profile:**

- You have recently obtained a master degree in pharmacy.
- You have a background or keen interest in drug delivery, polymer-drug conjugates, lung cancer, cell culture methods and animal studies.
- You possess good communicational skills in English. While a knowledge of French would be useful, it is not an absolute requirement.

If you are interested, please send a letter of application along with your curriculum vitae and the names and contact information of 2 references, by email to Prof. R. Vanbever at: [rita.vanbever@uclouvain.be](mailto:rita.vanbever@uclouvain.be)