



## PhD Call – Spring 2018

The VIB-UGent Center for Medical Biotechnology groups 7 laboratories and 120 researchers with a strong focus on innovating the analysis and engineering of biomolecular systems, to investigate and alleviate human disease. We are developing tomorrow's technologies for biomedical research, molecular diagnostics and therapeutics.

For 2018, the VIB-UGent Center for Medical Biotechnology recruits candidate PhD students for the following projects in the context of the FWO competition for PhD fellowships:

### 1. Multidimensional interactome profiling of the innate antiviral GTPase MX1

Promoters: prof. dr. Xavier Saelens and prof. dr. Sven Eyckerman

MX1 proteins are GTPases with broad antiviral activity that are evolutionary conserved in vertebrates. How MX1 proteins interfere with virus replication is poorly understood. The aim of this PhD project is to identify and functionally characterize proteins and RNAs that interact with MX1. These MX1 interaction partners will be identified by a combination of state of the art and in house developed protein-protein and protein-RNA interaction methods. If and how the newly identified MX1 interaction partners modulate the antiviral activity of MX1 will be investigated in the context of influenza A virus infection models.

### 2. Study of endogenous human protein complexes using genome engineering

Promoters: prof. dr. Sven Eyckerman and prof. dr. Jeroen Lammertyn

The analysis of the genome and the transcriptome at the single cell level is currently experiencing a true revolution. The analysis of the proteome and the interactome (the interactions that occur between proteins) still lags significantly behind. In this project we will introduce innovative tags by genome engineering in mammalian cells. In combination with microfluidics approaches we will push the analysis of proteins and their interactions to the single cell level and even to the single molecule level by ultimately aiming for a digital read-out. The critical microfluidics expertise required for this project will be provided by the MEBios lab from Jeroen Lammertyn. The PhD candidate will learn basic and advanced cell culture procedures, basic and advanced molecular biology skills, CRISPR-Cas9 genome engineering of human

cell lines, proteomics workflows for analysis of protein complexes, data analysis, and the student will also obtain a solid background in mass spectrometry and microfluidics.

### 3. Novel disease-diagnostic tissue leakage proteins in blood

Promotor: prof. dr. Kris Gevaert

The full repertoire of blood serum proteins is notoriously problematic to uncover as serum proteomes are skewed to a few very abundant proteins that mask lower abundant proteins. Several human diseases lead to tissue damage upon which intracellular proteins are dumped into the bloodstream. These disease biomarkers are low abundant, hence remain unnoticed. We will exploit protein characteristics of intracellular proteins (compared to secreted proteins), isolate their reporter peptides and use them as proxies for tissue-leaking intracellular proteins in patient plasma samples.

### 4. Characterization of transcription factor cross-talk mechanisms in models of non-alcoholic fatty liver disease

Promotors: prof. dr. Karolien De Bosscher and prof. dr. Frank Peelman

PPAR $\alpha$  (encoded by NR1C1), a transcription factor acting in the liver as nutrient sensor, was recently identified as a potential therapeutic target in non-alcoholic steatohepatitis (NASH). Using a mammalian protein-protein interaction screen, we identified ERR $\alpha$  (encoded by ESRRRA or NR3B1) as a novel interaction partner. The aim of this PhD project is to further characterize the interaction interface between PPAR $\alpha$  and ERR $\alpha$ , using random mutagenesis coupled to interaction techniques, and to study the impact of pharmacological modulation of both PPAR $\alpha$  and ERR $\alpha$  in models of liver disease.

### 5. Glyco-active enzymes as experimental therapeutics

Promotor: prof. dr. Nico Callewaert

Glycan structures are present at virtually all interfaces where two biological entities contact each other. For example, the bacterial/fungal cell wall is a complex composite material largely consisting of carbohydrate polymers. Also, the immunological response to pathogens is controlled at several stages by interactions in which glycans are critically involved. Enzymes are present in nature that synthesize or degrade these glycans and these often have exquisite glycan specificity. In this PhD project, we will explore the experimental therapeutic use of such enzymes for the treatment of disease. Our lab has several such projects running since several years, and good leads are already available that now need to be further studied. The techniques used will be in enzyme exploration, protein engineering and -purification, and in vitro and in vivo studies of important human disease models such as in host-pathogen interactions and oncology.

For more information about our research, please visit the CMB website: <http://mbc.vib-ugent.be/>.

***We offer:***

- A unique research program focused on tackling important challenges in biomedicine by developing novel molecular methods for research, diagnostics and therapy.
- A working environment where quality work, trust, collaboration and commitment are essential.
- Access to state-of-the art research tools and infrastructure.
- A stimulating and supportive international research environment.

***Your profile:***

- You have a passion for research at the cutting edge of molecular medical biotechnology.
- You have recently obtained or will soon be obtaining a Master degree in a core field of molecular life sciences (biochemistry, biomedical sciences, biotechnology, bio-engineering, ...), with very good study results.
- Candidates are expected to apply for external PhD fellowships and **need to be eligible** for at least those fellowships obtainable from the Fund for Scientific Research-Flanders (FWO; <http://www.fwo.be/en/fellowships-funding/phd-fellowships/phd-fellowship/regulations-for-phd-fellowship/>) except if they come with their own fellowships.
- English is used in all VIB laboratories for scientific communication. Therefore, candidates must have an excellent command of English. A language test for English, such as the TOEFL (Test of English as a Foreign Language) is not necessary for the application, but should you have TOEFL test results, please add these to your application. Please note that VIB does not yet have a TOEFL Institutional code. If you take the TOEFL-test specifically to enter our PhD Program, please use the TOEFL codes of Ghent University.

***How to apply:***

Please send us your CV, transcripts of study, motivation/research interest statement letter, subject preference from our subject list and contact info of 2 or 3 referees. Please compile these documents in one PDF document and submit your application to [cmb@vib-ugent.be](mailto:cmb@vib-ugent.be) before June 1, 2018.