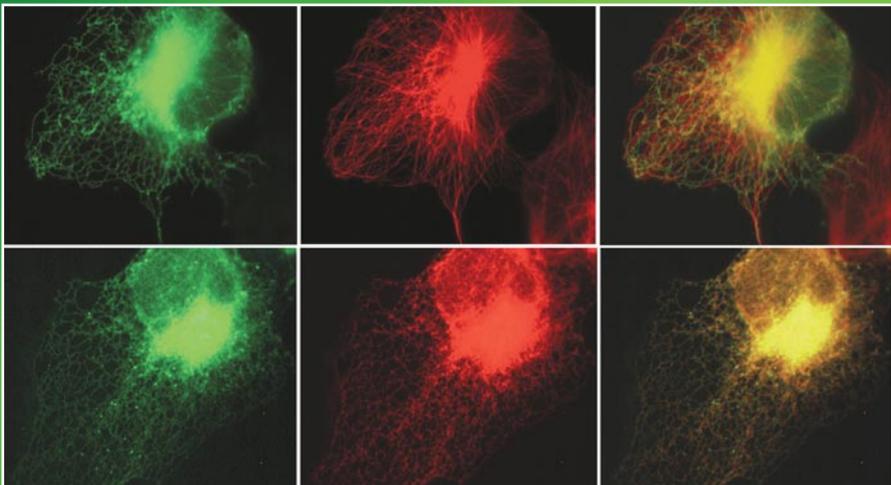




# Master of Science in Molecular Biology



# Molecular Biology

Molecular biology is the discipline within the life sciences aimed at understanding the molecular basis of life in health and disease. It is a multidisciplinary area of study and deals with the structure and function of molecules as well as their interplay in creating the phenomenon of life.

Research in molecular biology not only generates knowledge but also offers new opportunities for the development of diagnostic tools and new strategies for improving agricultural production, animal health, and human health.



The programme, commonly referred to as the Interuniversity Programme in Molecular Biology (IPMB), is jointly organised by KU Leuven ([www.kuleuven.be/kuleuven](http://www.kuleuven.be/kuleuven)), the Vrije Universiteit Brussel ([www.vub.ac.be](http://www.vub.ac.be)) and the University of Antwerp ([www.ua.ac.be](http://www.ua.ac.be)).

It is endorsed and supported as an international programme by the Flemish Interuniversity Council (VLIR-UOS). Although originally designed to meet the needs of students from developing countries, the programme offers an exquisite opportunity for those who seek re-orientation to enter the fascinating world of molecular biology. Exchange students studying at one of the organising universities for one or two semesters are also most welcome to attend classes and acquire laboratory skills.

## Structure and scope of the programme

The IPMB is organised over two academic years. In view of the diverse background of its students, the first year consists of in-depth courses covering the most important topics in molecular biology. By the end of the first year, you will have obtained the level of knowledge required to take successfully part in the advanced, specialised courses of the second year. Intensive laboratory training will prepare you to embark on the preparation of your thesis, which you will complete in the second year along with four advanced courses followed by three specialisation courses in the field of either human health, animal production or plant production. Extensive attention is also devoted to the preparation and writing of the thesis, which is an original research project completed under the guidance of a supervisor and defended in public.



“The programme’s international environment and events gave me an opportunity to interact with people from various parts of the world and appreciate different cultures and cuisines. The programme offers relevant courses taught by people who are experienced in the field. After completing the IPMB programme, I received a VLIR-UOS ICP-PhD scholarship, which is enabling me to do research both at the Vrije Universiteit Brussel and at Makerere University, Uganda. My research deals with the monitoring and prevention of colibacillosis, a bacterial disease that affects newly weaned piglets, causing great losses to farmers.”

(Emmanuel Okello)

“IPMB has given me more than I thought I would get, and this within a short period of time. My views have broadened and I am better equipped in the field of science. With this knowledge, I hope to make my contributions to my country, Nigeria, to Africa and to the world at large.”

(Obishakin Emmanuel Tumininu)

## Admission requirements

Holders of a bachelor's or master's degree awarded by a Flemish university in one of the following disciplines are eligible for **direct admission** to the programme: biology; chemistry; biochemistry and biotechnology; medicine; veterinary medicine; biomedical sciences; pharmaceutical sciences; industrial engineering; chemistry; biology; bioscience engineering. For holders of a bachelor's or master's degree awarded by a non-Flemish university in one of the above disciplines, admission decisions are **based upon evaluation of a complete application file**.

## Enrolment

All students enrol at the Vrije Universiteit Brussel for the first year of the IPMB. In the second year, students who opt for the Human Health major enrol once again at the Vrije Universiteit Brussel while those who opt for the Animal Production or Plant Production majors enrol at KU Leuven.

Prospective students must pre-apply by filling out the pre-application form. This form can be downloaded from the Vrije Universiteit Brussel website: [www.vub.ac.be/english/downloads/applicationforms/Pre-Application\\_package\\_mol\\_biol\\_biomol\\_scien.pdf](http://www.vub.ac.be/english/downloads/applicationforms/Pre-Application_package_mol_biol_biomol_scien.pdf).

The completed form must be sent to Mr. Rudi Willems at: [rwillms@vub.ac.be](mailto:rwillms@vub.ac.be). Based on this information, the programme director and his staff will evaluate whether the basic requirements for admission have been fulfilled. Once you have received a positive answer on your pre-application, you may submit the final application. To do so, go to:

[www.vub.ac.be/en/admission](http://www.vub.ac.be/en/admission). Please read the information very carefully and follow the instructions closely. If you experience any problem when filling out the online application, please send an email to [admission@vub.ac.be](mailto:admission@vub.ac.be).

For all students proof of English proficiency is compulsory (see: [www.vub.ac.be/en/admission](http://www.vub.ac.be/en/admission)).

## Scholarships

A limited number of scholarships are offered by VLIR-UOS for participants from developing countries. For details on the application procedure and required forms, please consult the VLIR-UOS website: [www.vliruos.be](http://www.vliruos.be).

Citizens of countries with bilateral agreements with Belgium may apply for a scholarship from the Belgian Technical Cooperation (BTC) through the Belgian Embassy. For details and procedures, please contact the Belgian diplomatic representation in your country or consult the website: [www.btctb.org](http://www.btctb.org). Similarly, citizens of countries that have bilateral agreements with the Flemish community are eligible to apply for scholarships. For details, please consult the website of the Flemish community at [www.flanders.be](http://www.flanders.be).

# Programme

<b>MASTER OF SCIENCE IN MOLECULAR BIOLOGY</b>	<b>120 ECTS</b>
COURSES	ECTS
<b>FIRST YEAR: IN-DEPTH COURSES IN BIOSCIENCE</b>	<b>60</b>
<b>FIRST SEMESTER</b>	<b>30</b>
• Molecular Biology	5
• Nucleic Acid Chemistry and Genetic Engineering	3
• General Chemistry and Protein Chemistry	5
• General and Analytical Biochemistry	6
• Mathematics and Statistics	3
• Microbiology	3
• Practicals I	5
<b>SECOND SEMESTER</b>	<b>30</b>
• Bioinformatic Tools	3
• Immunology	5
• Microbial Genetics and Genetics of Higher Eukaryotes	3
• Physiology:	
- Option Plant Physiology	3
- Option Animal Physiology	3
• Virology and Parasitology	3
• Practicals II	10
• Visits	3



COURSES	ECTS
<b>SECOND YEAR</b>	<b>60</b>
<b>FIRST SEMESTER: COMMON CORE COURSES IN MOLECULAR BIOLOGY</b>	<b>18</b>
• Advanced and Applied Molecular Biology	5
• Advanced Microbial Genetics and Virology	4
• Physical Chemistry and Structural Analysis of Macromolecules	4
• Social and Economic Aspects of Biotechnology	5
<b>SECOND SEMESTER: SPECIALISATION COURSES</b>	<b>12</b>
Students must choose one major	
• Plant Production:	
- Phytopathology	4
- Biocontrol of Plant Diseases and Biofertilisation	4
- Option Plant Biodiversity	4
- Option Plant Yield	4
• Animal Production:	
- Prophylaxis of Infectious Diseases of Farm Animals	3
- Applied Biotechnology in Livestock Production	4
- Livestock Genetics	5
• Human Health:	
- Human Infectious Diseases	4
- Epidemiology: Study Design and Analysis	4
- Human Genetics and Diseases	4
<b>THESIS</b>	<b>30</b>

For detailed descriptions of this programme's courses and for the course timetable, please consult [www.kuleuven.be/ma/ipmb](http://www.kuleuven.be/ma/ipmb) or [www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html](http://www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html)

## Career prospects

IPMB graduates find employment in universities, hospitals, private and governmental research laboratories and patenting bureaus, as lecturers, consultants and advisors to policy makers, among other careers. Many graduates go on to begin PhD programmes in Belgium or abroad. Students from developing countries may apply for a 'sandwich' PhD scholarship from the VLIR-UOS. Flemish students may apply for a PhD scholarship from the VLIR-UOS for research projects on topics relevant to development.

## Alumni voices

“Studying in Belgium was a wonderful experience. I learnt very useful molecular techniques that have been very important in my scientific career. While studying in Belgium, I also had a chance to interact with high-profile scientists. After completion of the IPMB, I was granted a PhD scholarship by IRO at KU Leuven and defended my PhD in March 2010. Currently, I am a Senior Research Scientist/Fellow (Institute of Primate Research, Nairobi, Kenya) as well as a Lecturer (Jomo Kenyatta University of Agriculture and Technology, Karen campus). Additionally, I am a WHO Trainer on effective project planning, evaluation and implementation.”

(Atunga Nyachieo)

“IPMB changed the course of my career. One of the courses called “Social and Economic Aspects of Biotechnology” helped me to understand the facts, myths and controversies surrounding the world of genetically modified organisms (GMOs) and their application in modern biotechnology. Today, I am a biosafety officer in charge of analysing and reviewing applications for GMO work and related activities, and I also monitor compliance with biosafety laws.”

(Evans Njeru Simon)

“When I returned to Ethiopia, I established a Biochemistry and Molecular Biology Laboratory, making good on my mission to bring much-needed equipment to the country, such as PCR machines, gel-electrophoresis apparatuses, gel documentation and other related materials. The IPMB programme gave me the tools to serve my country in accordance with the promise I made upon accepting my scholarship to better my college as well as the whole country.”

(Getachew Gugsu)

“Thanks to the competitive foundation laid by IPMB, I was able to secure a PhD fellowship in the prestigious VIB International PhD programme. At present, I am conducting research on the relationship between hosts’ immune system and their microbiota.”

(Nguyen Thi Loan Anh)

## Learn more

[www.kuleuven.be/ma/ipmb](http://www.kuleuven.be/ma/ipmb)  
[www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html](http://www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html)  
[www.ipmbgazette.weebly.com](http://www.ipmbgazette.weebly.com)

### **KU Leuven**

International programmes: [www.kuleuven.be/internationalprogrammes](http://www.kuleuven.be/internationalprogrammes)

### **Vrije Universiteit Brussel**

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*This brochure provides the most complete and accurate information available concerning this master's programme jointly offered by KU Leuven, the Vrije Universiteit Brussel and the University of Antwerp. However, amendments to the composition of this programme may be approved at any time. Consequently, the universities are in no way legally bound by the information provided in this brochure. The most recent information on all our academic programmes can be consulted at [www.kuleuven.be/coursecatalogue](http://www.kuleuven.be/coursecatalogue). For additional information about the Master of Science in Molecular Biology programme, please also consult the VUB website: [www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html](http://www.vub.ac.be/english/infoabout/education/bama/of-ma-molecularbiology.html)*

*Last updated: April 2014*