Specialisation – Master's in Biomedical Sciences

Immunology and Host Defence

Explore how our defense system battles disease, unveil the body's shield

The BMS Master's has seven specialisations to choose from. Each specialisation contains a number of courses that reflect its central topics and methodology. The Immunology and Host Defence specialization focuses on how our body's defense system works, how it protects us and what happens if it fails or overreacts. The ultimate result of a failing or overreactive defense system is disease.

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Courses within this specialization (1/2)

W36 = September, W40 = October, W44 = November,
A = Monday/Tuesday contact hours, time for self study or exam (final week) on Wednesdays,
B = Thursday/Friday contact hours, time for self study on Wednesdays.

Period	Code	Course
W36-A	MED-BMS88	**Advanced immunology**

In this course, you explore the current state of art in the immunological field, where immune cells, molecular and cellular interactions, and new concepts are discussed. You will experience that the immune system is not a black and white network, as was most likely thought in your Bachelor program, but that it contains more cell subsets than you knew so far, and that context can determine the diversity and plasticity of the immune cells and their interactions.

Period	Code	Course
W36-B	MED-BMS74	**Inflammatory diseases**

In this course, you start with deepening our knowledge on basic immunology and exploring the use of that knowledge for research. For this purpose you will be defining common pathways and essential molecules in immunology, and investigating how you could use cell culture and animal models to study inflammatory diseases. Also, which biomarkers are useful and reliable, and how do you design a clinical trial?

Period	Code	Course
W40-A	MED-BMS43	**From target to therapy**

In this course, you will zoom out and go through the preclinical steps of the pipeline focusing on a genetic target and a immunological target. This will cover several model systems for target identification and validation, and understanding the development of key assays to test and optimize a drug candidate.

Courses within this specialization (2/2)

Period	Code	Course
W40-B	MED-BMS42	**Targeting cellular processes to treat disease**

In this course, you will focus on the classical small molecules, the newer biologics and the most recent cell-based therapeutics. The classical drug development pipeline will be illustrated by focusing on targeting metabolism by means of small molecules. Next, you will identify differences in the development of biologics as compared to small molecules. The biologics that will be studied are used in inflammation and cancer to target cell migration. The challenges of the cell-based therapeutics will be analyzed in the context of stem cell differentiation for regenerative medicine.

Period	Code	Course
W44-A	MED-BMS72	**Cancer development and immune defence**

In this course, you will discuss the development of malignancies, with a focus on mutational evolution and epigenetic gene expression in acute myeloid leukemia. Next, you will focus on how the immune system can recognize and attack these malignant cells, and how this can be applied as different therapeutic strategies.

Period	Code	Course
W44-B	MED-BMS37	**Cell death in life and disease** or*
W44-B	MED-BMS76	**Cell motility in physiology and pathology**

In MED-BMS37, you will focus on the mechanisms of cell death and how they relate to life and disease. In this course, you will gain a better understanding of the molecular and cellular biology principles involved in cell death and how these can be used to treat diseases, with a special attention to cancer. In MED-BMS76, you explore cellular motions, with a focus on cell migration, crucial for processes in embryonic development, tissue homeostasis, immunity, and wound repair. This course highlights how cell motility shapes cells, tissues, and organs, and its role in regeneration and immunity, while also addressing its implications in various diseases and cancer metastasis.

**You can decide on your interest which course you prefer, both courses contribute to the specialisation in an equal but different way (see the prospectus of both courses for details). If you are interested in both, you can decide to follow one in your first year and the other in your second year.*

Internship testimonial (1)

Exploring the impact of galectin-9 on dendritic cell-mediated T cell function

I did an internship in the Galectin Group of Dr. Laia Querol Cano at the department of Medical Biosciences. I worked on a project where I aimed to unravel the function galectin-9 on DC-mediated T cell function. I loved the fundamental focus of this project and I enjoyed the department a lot. The supervisors stimulated the students to think about their results and think about the next step. I gained a lot of new experience the last 6 months and has motivated me continue my studies in the tumor immunology field.

Dept. of Medical BioSciences
Radboudumc
Nijmegen, the Netherlands

Internship testimonial (2)

Identifying IgG epitopes in OMV-vaccinated mice against non-typeable Haemophilus influenzae

I was very curious about the immune system and vaccine development in practice. During my internship of 6 months the goal was to identify the binding epitopes of IgG (and also briefly IgM) produced after vaccination with a new non-typeable Heamophilus influenzea OMV (outer membrane vesicle) vaccine in mice. During this time I learned/optimised different techniques such as PCR, Western blotting, SDS-PAGE, the creation mutants (bacteria), the production of outer membrane vesicles (OMVs), and other methods like flowcytometry to analyse potential binding epitopes. Besides that, the department also offered a small R course for data visualisation which I could later use for my internship report. At the department I experienced no hierarchy at all which made everyone very approachable. Everyone was very friendly and always wanted to help.

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