Master 2 – Immunology and Immunopathology (I2P)

The Immunology and Immunopathology (I2P) Master's program is a collaborative initiative between Université Paris Cité and the Pasteur Institute. It provides comprehensive training aimed at equipping students for prominent careers in academic research as well as in the biotechnology and pharmaceutical sectors.

An In-Depth Academic Program in Advanced Immunology

The *Immunology and Immunopathology (I2P)* track offers specialized, high-level training at the forefront of modern immunology. It provides an in-depth understanding of immune system mechanisms in both physiological and pathological contexts, with a strong emphasis on scientific rigor and critical thinking. This intensive program is tailored for students who seek a deep and comprehensive immersion in immunology, from the molecular basis of immune responses to their implications in complex diseases. It reflects the most recent advances in the field, including emerging concepts in inflammation, infection, immune dysregulation, and therapeutic strategies. One of the program's great strengths lies in the diversity of its student body, bringing together students from scientific backgrounds with those from medical or pharmacy studies—fostering interdisciplinary dialogue and enriching the learning experience. Designed to meet the expectations of today's scientific and medical challenges, I2P prepares students to engage with the complexity of immunological research and to contribute meaningfully to innovation in the field. The program offers an intellectually demanding environment that fosters autonomy, scientific precision, and long-term research engagement.

Learning objectives:

Students will acquire both theoretical knowledge and practical expertise in immunology, enabling them to engage with complex scientific questions and contribute to cutting-edge biomedical research.

The program's learning objectives include:

- **Understanding the immune system** in physiological and pathological contexts, including current advances in immunotherapy and immune-related diseases (transplantation, new therapies, immuno-senescence and -deficiencies, autoimmunity, inflammation, immunity at interface, antiviral and antitumor immunity, and neuro-immunology).
- **Applying advanced molecular and cellular biology concepts** to investigate key immunological processes such as hematopoiesis, inflammation, infection, and immune dysregulation.
- **Mastering a wide range of experimental techniques**, from standard laboratory methods to cutting-edge technologies used in immunological research.
- **Designing and conducting scientific research projects**, including formulating hypotheses, planning experiments, analyzing data, and interpreting results critically.
- **Communicating scientific work effectively**, both orally and in writing, in English, within academic and professional settings.
- **Developing key professional and personal skills**, such as autonomy, teamwork, project management, scientific ethics, and readiness for doctoral studies or research-intensive careers.

Internship

The second semester will be fully dedicated to an internship in either an academic research laboratory or in the private sector, in France or abroad.

- The internship should be aligned with the I2P program, therefore in the immunology field.
- The Internship can start either from September or from February for a maximal duration of 6 months
- The internship is evaluated based on a thesis report and an oral defense mid-June or mi-September (according to students' wishes)

Language & prerequisite

- The program is conducted in **English**.
- Since I2P program is grounded on the immunology program of Sorbonne Université that includes prior training in immunology (12 ECTS) and year 1 of the master, applicants must justify of equivalent education.
- A prior research experience in a lab or industry (minimum 2 months) is highly recommended.
- Medical, pharmacist and veterinarian students as well as students from other universities can contact the heads of the master to validate their profile.

Audience, capacity & schedule

- I2P is open to scientific students enrolled in the Master's program as well as students enrolled in **medical, pharmacy, veterinary studies and engineers** from Sorbonne Université or other French or foreign University.
- **Capacity: 20 students.** 6 students for Advanced Immunology (Pasteur Institute) and 14 for I2P modules
- Teaching starts the 1st week of November and ends the 3rd week of January
- Provisional schedule (subject to change)

<table>
<tr><th></th><th colspan="2">Courses</th><th></th><th></th></tr>
<tr><th>Date</th><th>I2P Modules</th><th>Advenced Immunology (Pasteur)</th><th></th><th>Evaluation type - tentative schedule</th></tr>
<tr><td>november week 1</td><td colspan="2">Project module 1: Dialogue in Immunology, Immunophatology (MU5BM091 - 3 ECTS)</td><td rowspan="11">Electives Courses (all years) (6 ECTS or 2x3 ECTS)</td><td>project based: oral + written report</td></tr>
<tr><td>november week 2</td><td colspan="2">Project module 2: Masteriales in Immunology, Immunophatology (MU5BM091 - 3 ECTS)</td><td>project based: oral + written report</td></tr>
<tr><td>november week 3</td><td>Module 1 (I2P): Transplantation and New therapies (MU5BM557 - 3 ECTS) or Antiviral Immunity (MU5BM559 - 3 ECTS)</td><td rowspan="4">Advanced Immunology (Pasteur), including:
Practical courses (MU5BM531)
Conferences (MU5BM531)
Bibliographgy seminars (MU5BM051)</td><td>final exam - January week 2</td></tr>
<tr><td>november week 4</td><td>Module 2 (I2P): From Foetal Immunity to Immunosenesence and Primary immunodeficiencies (MU5BM555- 3 ECTS)</td><td>final exam - January week 2</td></tr>
<tr><td>december week 1</td><td>Module 3 (I2P): AutoImmunity and Inflammation (MU5BM554- 3 ECTS)</td><td>final exam - January week 2</td></tr>
<tr><td>december week 2</td><td>Module 4 (I2P): Immunity at interfaces (MU5BM556- 3 ECTS)</td><td rowspan="2">final exam - January week 2</td></tr>
<tr><td>december week 3</td><td>Module 5 (I2P): Tumor Immunity (MU5BM558- 3 ECTS) or NeuroImmunology (MU5BM558- 3 ECTS)</td></tr>
<tr><td>december week 4</td><td colspan="2" rowspan="2">winter holidays</td></tr>
<tr><td>January week 1</td></tr>
<tr><td>January week 2</td><td colspan="2">final Exam (I2P and IA)</td></tr>
<tr><td>January week 2 or 3</td><td>Scientific analysis (I2P) : News and Views article Comments (MU5BM051 - 6 ECTS)</td><td></td><td></td></tr>
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Teaching responsible:

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