Graduate Training Program in Immunology

Graduate Training Program at: Mount Sinai School of Medicine
One Gustave L. Levy Place
New York, New York 10029

URL http://www.mssm.edu

9/21/07
The Program

The goal of the Immunology Training area is to provide students interested in immunology with a rigorous and flexible program. Students will be given the individual intellectual and technical skills required to become outstanding scientists in the field of immunology.

The course requirements include the basic Core I and Core II courses as well as a minimum of two immunology courses: Fundamentals in Immunology and Advanced Topics in Immunology. In Fundamentals in Immunology they will get a general yet in depth overview of the immune system through a lecture based course. This will be complemented with several small group discussions that will give students the opportunity to review and analyze papers with experts in the area. The Advanced Topics in Immunology course that follows the fundamentals course will offer students a guided discussion class that reviews current literature in three major areas of immunology. The Advanced Topics course will cover different materials every year and students who wish to take this course more than once are free to do so. Students will be encouraged to benefit from the multidisciplinary nature of our graduate program and take additional credits that could be in any area of interest to them and may include topics in microbiology, cancer, genetics, signaling etc.

Laboratory rotations and research training allows students to rotate and select any of the multiple laboratories that are currently working in immunology, which include allergy, immunology of infectious disease, inflammation, immunodeficiency, autoimmunity, mucosal immunity and transplantation among others. Research groups in the Immunology Institute are using multiple approaches and different model systems to understand how the immune system works, how it is regulated and its function is defective in the context of disease. Numerous laboratories are working in close collaboration with the Mount Sinai Hospital and clinical investigators to develop a clear understanding of the role of the immune system in various diseases with a focus on translational research. All of these training opportunities will be in our program.

Students will also participate in an Immunology Journal Club, Work in Progress and Seminar Series. Journal Club will provide the means for students to interact with each other in a small scientific forum. During Work in Progress their work will be evaluated and critiqued by their peers, which include other students, postdocs and faculty members from the Immunology Institute. The seminar series will give them the chance to further their knowledge in immunology through a formal seminar while at the same time provide them the opportunity to meet with prominent scientists during an informal lunch. Students in the immunology training area will also be encourage to participate in the training activities of other multidisciplinary training areas with overlapping interest such as those in Microbiology and Genetics and Genomic Sciences. Similarly, students from all the training areas are welcome to participate in any of the immunology training activities.

After completing the immunology training program students will be prepared to continue their careers in basic and/or translational research, and will be able to compete effectively for the best postdoctoral training opportunities in both academia and industry.
Program directors

Patricia Cortes, Ph.D. ext. 89443
Adrian Ting, Ph.D. ext. 89410

Steering Committee

Julie Blander, Ph.D.
Peter Heeger, M.D.
Miriam Merad, M.D., Ph.D.
Thomas Moran, Ph.D.
Jay Unkeless, Ph.D.
Karen Zier, Ph.D.

Student representatives
Shruti Malu
Constantin Friedman

Curriculum

Year 1
Fall
  Core I
  Biostatistics
  Introduction to Journal Club I
  Responsible Conduct of Research
  Laboratory Rotation
  Dean’s Seminar

Spring
  Core II
  Core III Fundamentals in Immunology
  Introduction to Journal Club II
  Methods in Biomedical Sciences
  Laboratory Rotation
  Dean’s Seminar

Year 2
Fall
  Adv. Topics in Immunology
  Immunology Journal Club
  Immunology Seminar Series
  Dissertation Research

Spring
  3 Credits Elective
  Immunology Journal Club
  Immunology Seminar Series
  Dissertation Research

Year 3
Fall
  Immunology Journal Club
  Immunology Seminar Series
  Dissertation Research

Spring
  Immunology Journal Club
  Immunology Seminar Series
  Dissertation Research
**Year Two** - Six advanced credits are required in the second year. Students will be required to take the Advanced Topics in Immunology Course (see below), which is a 3-credit modular course. Each module of Advanced Topics consists of a 1-credit course. In addition to Advanced Topics in Immunology, students will be required to take at least 3 additional credits of elective courses in their second year. They are encouraged to take elective courses appropriate to their interests during this year (e.g. Microbiology, signal transduction, genetics). **MSTP Students** – have the same course requirements but they may need to distribute their course work differently. This will be decided in consultation with the preceptor and training area directors.

**Students Advisory Committee**

First year students interested in Immunology will have at least one faculty member from the Immunology Institute on their advisory committee. Once a student selects a preceptor, the student and preceptor will select an advisory committee, which will be comprised of two expert faculty in their field of study and one faculty in a related field.

**Course Directors:**

**Fundamentals of Immunology**: Dr. Karen Zier  
**Adv. Topics in Immunology**: Dr. Jay Unkeless  
**Seminar Series, which includes Immunology Seminars and Work in Progress**: Dr. Julie Blander  
**Journal Club**: Dr. Patricia Cortes and Dr. Adrian Ting

**Course description:**

**Fundamentals in Immunology**

This is a comprehensive introductory course to cellular and molecular immunology. It will be updated each year to accommodate increasing knowledge of this field and the expansion of immunology research into topics of interest to cell and molecular biologists.

**Advanced Topics in Immunology**

The advanced topics course highlights specific areas of immunology for in depth study. This is organized as a series of interactive seminars where students are given current papers to read, present and discuss in a focused fashion. Student will gain an appreciation of current areas of active research and can extrapolate these to concepts in general immunology. Students should take Fundamentals in Immunology, or have taken a comparable course, before they can register for Advanced Topics.

**Journal Clubs, Seminars and Work in Progress**

Throughout their graduate career students are required to participate in the Immunology Journal Club, Seminar Series and Work in Progress. They are also encouraged to take part in similar activities taking place in the Department in which they are performing their research.
**Immunology Journal Club**

This course follows an intensive small group discussion format that critically evaluates original research articles in the area of immunology. The articles are selected by the presiding faculty member, and include recent important advances in immunology or investigations that provide conceptual advances relating to long-standing problems. The analysis will include background to the research, the hypothesis tested, the experimental methods used, as well as interpretation and discussion of results. This is a discussion class and participation is required. Students are also expected to discuss the implications of the research, the new questions it raises, and how it relates to the rest of the field. Grading will be based on class participation and extent of preparation. This class is required for students beginning in their second year until they successfully pass their thesis proposal exam. First year students interested in immunology are encouraged to attend. Attendance is required for all classes.

**Immunology Seminar Series**

This seminar series features presentations by prominent leaders in the field of Immunology, and is attended by all faculty, post-docs and student members of the Immunology Institute. Speakers are either from the US or abroad. Post-docs and students are strongly encouraged to meet with invited seminar speakers during an informal luncheon scheduled for that day. Students are expected to familiarize themselves with the speaker’s research areas. This is a wonderful opportunity to meet renowned scientists in an informal setting, approach them with specific scientific ideas or questions, and listen to their views and opinions about scientific matters.

**Immunology Work in Progress Seminars**

This seminar series is conducted on a weekly basis, and provides a forum for both students and post-docs to present their own research work to colleagues and mentors within the Immunology Institute. Students are required to attend all Work in Progress seminars. Students will be required to present a 25-minute seminar annually, beginning at the end of their 3rd year. Presentations should be focused and well-prepared covering the background to the dissertation research, its specific aims, and why these aims are important and warrant investigation. The experimental strategy should be clearly presented with emphasis on why it was chosen and how it would be executed. Emphasis should be on a work-in-progress presentation and final polished studies are not expected. When data are presented, they should be clear and concise with all possible interpretations and implications thoroughly discussed. Conclusions should be drawn at the end of the presentation, and future directions must be stated. Students are expected to leave a 5-minute period at the end of their presentation for questions and discussions.

**Preliminary exam, Thesis Proposal and Dissertation**

All exams follow the guidelines put forth by the graduate school.

**Immunology Institute website**
General and relevant information of the weekly activities of the Institute can be found at our website:

http://www.iisinai.org/
Training faculty:

Maria Abreu, M.D.
Associate Professor, Medicine/Gastroenterology
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Toll-like receptor signaling in the intestine, and inflammatory bowel disease

Chris Basler, Ph.D.
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Host-pathogen interactions; emerging viruses

Julie Magarian Blander, Ph.D.
Assistant Professor, Medicine/Clinical Immunology
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Regulatory control of immune responses by Toll-like Receptors

Constantin A. Bona, M.D., Ph.D.
Professor, Microbiology
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Immunology; molecular immunology

Jonathan S. Bromberg, M.D., Ph.D.
Professor, Gene and Cell Medicine
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Clinical interest: pediatric and adult liver, kidney and pancreas transplantation. Research interests: basic molecular and cellular transplantation immunobiology

Benjamin K. Chen, M.D., Ph.D.
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HIV-1, virus-host interactions, assembly, membrane protein interactions, RNA-Gag interactions, functional cloning, mouse model for lentiviral infection.

Shu-Hsia Chen, Ph.D.
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Cancer Immunology, immune modulated cancer therapy

Patricia Cortes, Ph.D.
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Molecular mechanism and regulation of antigen receptor gene rearrangement

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Human immunodeficiency disease; mechanisms and treatments
Christopher C. Dascher, Ph.D.
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Antigen presentation and infectious diseases

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Mechanisms in autoimmune disease with an emphasis on autoimmune thyroid disease

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Molecular genetics of inherited metabolic disease and disease gene discovery

Paul S. Frenette, M.D.
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Adhesion mechanisms regulating hematopoiesis and the pathophysiology of sickle cell disease

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Molecular biology of RNA viruses

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Transplant immunology, complement, T cells

Mary Klotman, M.D.
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Molecular pathogenesis and therapy of HIV

Paul E. Klotman, M.D.
Professor & Chair, Medicine/Nephrology
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HIV pathogenesis; gene therapy; renal diseases

Sergio Lira, M.D., Ph.D.
Professor, Medicine/Clinical Immunology
Co-Director, Immunology Institute
Chemokines; leukocyte trafficking; angiogenesis; lymphoid development; mouse genetics

Fred Lublin, M.D.
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Multiple Sclerosis

Lloyd F. Mayer, M.D.
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Regulation of mucosal immune responses; antigen presentation by intestinal epithelial cells

Miriam Merad, M.D., Ph.D.
Assistant Professor, Gene and Cell Medicine
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Ontogeny and homeostasis of Langerhans cells; role of Langerhans cells in skin graft versus host disease (GVHD).

Thomas M. Moran, Ph.D.
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The immune response to virus infection with a particular emphasis on virus-dendritic cell interactions.

Gwendalyn J. Randolph, Ph.D.
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Differentiation and migration of dendritic cells

Hugh A. Sampson, M.D.
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Immunopathogenic mechanisms of food allergic disorders and asthma; immunomodulatory therapies

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Women’s cardiovascular health and prevention

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Signaling specificity of G protein couple receptors

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Cancer Metastasis, lymphangiogenesis, leukocyte trafficking

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Stem cell biology; immunology; gene therapy; hematopoiesis

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Signal transduction in lymphocytes; molecular mechanisms of inflammation

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Viral subversion of the adaptive branch of the immune system

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Fc receptors and signal transduction

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Tumor immunology; T cells; gene therapy; immunotherapy and immunosuppression