

Pathway of Emphasis in Immunologic Medicine & Infectious Diseases

Mission: The ***Immunologic Medicine & Infectious Diseases Pathway***, sponsored by the Department of Microbiology & Immunology, provides a means for medical students interested in the many topics encompassed by contemporary immunology and microbiology to gain broad and in-depth insights in their relevance to the practice of medicine. In particular, students will gain knowledge in the areas of immunology/microbiology related to:

- disorders of the immune system (including primary immune deficiencies),
- infectious diseases (including HIV, AIDS, and vaccines)
- pathogenic mechanisms of bacteria (including type III secretion systems, bioterrorism, antibiotic resistance)
- transplantation (including bone marrow transplantation)
- autoimmunity (including SLE and diabetes) and immune regulation (functions of T regulatory cells)
- neonatal immunity
- allergy and asthma
- immunotherapeutics (including cancer vaccines)
- aging of the immune system and morbidity
- neuroimmunology

The ***Immunologic Medicine & Infectious Diseases Pathway*** will accomplish its mission via forums, seminars, journal clubs and research opportunities provided by primary and secondary faculty within the Department of Microbiology and Immunology at UMMSM.

Goals: Participants in the ***Immunologic Medicine & Infectious Diseases Pathway*** will gain an appreciation for the many ways at the organism, tissue, cell, and molecular levels that pathogens cause diseases and an understanding of how the immune system is involved in 1) protection against infectious diseases and cancer; 2) contributing to pathology via immunodeficiency, immune hyperactivity, and cancers of the lymphoid system; and 3) providing novel diagnostic, prognostic, and therapeutic tools in treatment of diseases, including cancer, AIDS, and autoimmune diseases. This insight into the mechanisms of pathogen action and the relevance of the immune system to medicine will be achieved by 1) participation in monthly Microbes and Immunity Forums focused on defined topics in Immunologic Medicine & Infectious Diseases; 2) attendance at seminars relevant to immunology or microbiology; 3) performance of laboratory or clinical research within the scope of Immunologic Medicine & Infectious Diseases Pathway; and 4) discussion of patient cases relevant to the Immunologic Medicine & Infectious Diseases Pathway.

Requirements of the *Immunologic Medicine & Infectious Diseases Pathway*:

There are six requirements that the participants in the Immunologic Medicine & Infectious Diseases Pathway must fulfill:

1) Participate in the *Microbes and Immunity Forums*—a series of monthly meetings that serve as the principal setting for all Pathway participants to understand and discuss the relevance of immunology and microbiology to medicine. These monthly forums are attended by students during all four medical school

years. These also provide a means for interaction between students at different points in their medical school experience as they explore immunology and microbiology topics in both basic science and in the clinic. These Forums will include journal clubs for students led by faculty mentors as well as discussions of student research and clinical cases where microbial infection and/or the immune system play important roles. Each Forum meeting will focus on a particular topic within the scope of the Pathway.

2) Attend at least 2 seminars per semester on topics related to immunology and/or infectious diseases. These can be seminars sponsored by the Department of Microbiology & Immunology as well as seminars sponsored by the Developmental Center for AIDS Research (D-CFAR) and selected seminars in the Division of Hematology/Oncology, Diabetes Research Institute, and Stem Cell Institute. Students will summarize each seminar and provide this write-up to the Pathway Director. Forms for the write-up are attached.

3) Choose a mentor by May 1 of the first year and plan a summer research project that will be performed between the first and second years of medical school (approximately 5-6 weeks, although students are welcome to continue laboratory work contingent upon their available time and mentor permission). Mentors are to be primary or secondary faculty within the Department of Microbiology and Immunology.

Faculty mentors/Forum participants and their areas of research/clinical expertise are listed below and are available on the Department of Microbiology & Immunology website.

4) Document at least 4 examples of clinical cases observed directly by the Pathway participant during the clinical clerkships in the 3rd and/or 4th years of medical school where microbes contributed to the pathology and/or the immune system either contributes to the pathology, was integral to the resolution of the disease process, or was utilized therapeutically in the treatment of the patient. Documentation consists of a write up of the case, including brief exposition of the particular case. These cases may be discussed during the monthly Microbes & Immunity Forums. Forms for the write-up are attached. While appropriate cases involving immunology/microbiology can be found in many required and elective clinical rotations, students are encouraged to participate in Hematology, Special Immunology, Pediatric Infectious Diseases and Immunology, or other suitable rotations in the 3rd and/or 4th years.

5) All student participants in the Pathway are expected to meet yearly with the Pathway Director to assess compliance with the Pathway requirements.

6) In the four years of the Pathway, each participant is expected to accumulate a portfolio which contains, at minimum, an extended abstract of a clinical or basic research project performed (approximately 5 pages, see attached forms), log of attendance at the Pathway Forum meetings, documentation of relevant clinical cases observed, and a log of Pathway-relevant seminars attended.

The extended abstract contains, at minimum: 1) abstract/summary; 2) brief background to the project, 3) results obtained, and 4) conclusions derived from the project (total length ~ 5pages, see attached forms). This will be submitted as a record of your scholarly activities during the Pathway. It is encouraged that Pathway participants with sufficient completed research participate at the annual Eastern Student Research Forum (ESRF) meeting on the medical school campus or another local,

regional, and/or national meeting. Note that formal award of credit for research is not necessarily satisfied by this portfolio; Pathway participants requesting research distinction or research credit toward graduation should consult the Medical Education website and/or Office of Medical Curriculum (attention Julie Johnson, Manager of Curriculum Programs) for the requirements. At the time of graduation, and dependent on the successful completion of the activities described above, Pathway participants will be awarded a Certificate of Pathway Completion indicating added qualifications in Immunologic Medicine & Infectious Diseases.

Student Checklist for Pathway Requirements:

1. Attendance at 80% (7/9) of Microbes & Immunity Forums (Held monthly September-May). Absence at a Forum must be communicated in writing to the Pathway Director.
2. Attendance at 2 seminars per semester (4/year for each of years 2, 3, and 4). A list of seminars that are suitable for this Pathway will be provided to the Pathway participants. Students who wish to attend other seminars not listed, and have this credited toward their seminar participation, must have permission of the Pathway Director. Students will summarize each seminar in one paragraph on the Seminars form. This document should be provided to the Pathway Director no later than 1 week after the date of the seminar.
3. Completion of the research project and extended abstract. The research project will normally be completed in the 5-6 week period between the MS-1 and MS-2 years. Students will complete the extended abstract, and return to the Pathway Director, no later than the end of the first semester of the MS-2 year. Students are encouraged to continue their research during the Pathway; any additional research documents will be included in the student's portfolio. Completed research will be reported on at the Microbes & Immunity Forums.
4. Completion of case reports on 4 patients (2 in each of the third and fourth years) with microbial diseases, immune system diseases or disorders, and/or where immune-based therapy/diagnostics was of major importance. Case reports should be provided to the Pathway Director and will be discussed in the Microbes & Immunity Forums.

Administrative Structure for the Immunologic Medicine & Infectious Diseases Pathway

The Pathway will be administered by two Co-Directors, one in Microbiology and one in Immunology. Dr. Greg Plano, Professor of Microbiology & Immunology, will serve as the Microbiology Co-Director; Dr. Richard Riley, Professor of Microbiology & Immunology, will serve as the Immunology Co-Director. The Pathway Co-Directors will be assisted by the Pathway Advisory Committee whose members currently are Drs. Richard Riley, John Bethea, Mathias Lichtenheld, Zhibin Chen, and Greg Plano. The Pathway Director is responsible for 1) scheduling the Microbes & Immunity Forums; 2) providing a listing of suitable seminars; 3) ensuring that students have chosen a mentor for research; 4) receiving research reports, seminar summaries, and clinical case reports; 5) chairing the Pathway Advisory Committee meetings; 6) meeting annually with each student to assess progress towards the Pathway objectives. The Pathway Advisory Committee meets at least 2 times per year to 1) choose students who wish to enter the Pathway and 2) assess the progress of students through the Pathway objectives. Pathway Advisory Committee members serve 3 year terms, with staggered replacement of members as needed. The Pathway is supported by partial assistance from Mr. Brian Ruther within the Dept. Microbiology & Immunology.

Immunologic Medicine & Infectious Diseases Seminars Report Form

Seminar Title:

Seminar Presenter:

Seminar Date:

Sponsoring Department or Division:

Summary:

Please provide a brief (one paragraph is sufficient) summary of the main topic of the seminar and conclusions that you obtained as an attendee at this seminar.

Signature:

Printed Name:

Date:

Research Project for the Immunologic Medicine & Infectious Diseases Pathway Report Form

Date:

Signature:

I. Abstract (250 words or less)

II. Introduction (provide the basic context for the work you performed including pertinent references)

III. Materials and Methods (briefly describe the approaches used in your research)

IV. Results (describe the research studies that you conducted and your findings and observations)

V. Conclusions (please indicate what you concluded from the studies; this may include both studies that you would suggest be pursued in future and/or your interpretation of your results)

VI. References

Clinical Case Studies in the Immunologic Medicine & Infectious Diseases Pathway Report Form

Student:

Date:

MS Year:

Clinical Rotation:

Clinical Case: Briefly describe (2 pages or less) a patient's case you have encountered in your clinical rotations, focusing upon relevance to microbiology and immunology.

Faculty Mentors/Forum Leaders for the Immunologic Medicine & Infectious Diseases Pathway

The Faculty Mentors/Forum Leaders represent approx. 25 faculty members from multiple departments/divisions (Microbiology & Immunology; Neurology; Pediatrics; Gastroenterology; Infectious Diseases) and centers/institutes (Developmental Center for AIDS Research; Diabetes Research Institute; Sylvester Comprehensive Cancer Center; Miami Project to Cure Paralysis; Interdisciplinary Stem Cell Institute)

Richard Riley, Ph.D., Microbiology & Immunology	B cell development and function in old age
Alberto Pugliese, M.D., Diabetes Research Institute	Mechanisms of Type 1 diabetes
Geoffrey Stone, Ph.D., Microbiology & Immunology	Novel mechanisms of cancer therapy
Mathias Lichtenheld, M.D., Ph.D., Microbiology & Immunology	Regulation of T cell cytotoxicity
Mario Stevenson, Ph.D. , Infectious Diseases	Mechanisms of HIV infection and Diseases
Savita Pahwa, M.D., Microbiology & Immunology, D-CFAR	HIV and AIDS
Mary Ann Fletcher, Ph.D., Medicine, Clinical Immunology	HIV and AIDS
Maria Abreu, M.D., Medicine, Gastroenterology	Gastrointestinal inflammation
Micheline McCarthy, M.D., Medicine	Neuroimmunology
Robert Levy, Ph.D., Microbiology & Immunology	Transplantation immunology
Diana Lopez, Ph.D., Microbiology & Immunology	Immunology of tumor cells
Samita Andreansky, Ph.D., Pediatrics	Cancer/viral vaccines
Enrique Mesri, Ph.D., Microbiology & Immunology	Viral oncology
Bonnie Blomberg, Ph.D., Microbiology & Immunology	B cell function in the aging human
Zhibin Chen, Ph.D., Microbiology & Immunology	Immune tolerance/diabetes
John Bethea, Ph.D., Neurological Surgery, Miami Project	Neuroimmunology
Eckhard Podack, M.D., Ph.D., Microbiology & Immunology	Novel vaccines for cancer and inflammatory Diseases
Greg Plano, Ph.D., Microbiology & Immunology	Bacterial virulence factors/secretion systems
Lisa Plano, M.D., Pediatrics	Infectious Diseases in the neonate

George Munson, Ph.D., Microbiology & Immunology	Microbial pathogenesis of E. coli and diarrhea
Tom Malek, Ph.D., Microbiology & Immunology	Regulatory T cells
Ed Harhaj, Ph.D., Microbiology & Immunology	Inflammation
Luca Inverardi, M.D., Diabetes Research Institute	Mechanisms of Type 1 Diabetes
Octavio Martinez, Ph.D., Orthopedics (Tissue Bank)	Microbial Diseases; microbes and tissue transplants; microbial resistance
Ian McNiece, Ph.D., Interdisciplinary Stem Cell Institute	Identification and use of stem cells in medicine