

IMMUNOBIOLOGY

Immunobiology Interdepartmental Graduate Program

Work is offered for the master of science and doctor of philosophy degrees with a major in Immunobiology. Faculty are drawn from ten university departments along with researchers from the National Animal Disease Center. Participating departments include: Animal Science; Biochemistry, Biophysics, and Molecular Biology; Biomedical Sciences; Chemical & Biological Engineering; Kinesiology; Natural Resource Ecology & Management; Veterinary Clinical Sciences; Veterinary Diagnostic & Production Animal Medicine; Veterinary Microbiology & Preventative Medicine; and Veterinary Pathology. The diversity of faculty expertise ensures a broad education, while offering flexibility in choice of specialization. Ongoing research projects include areas such as: antibody and cell-mediated immunity, gene expression, immunochemistry, immunogenetics, immunomodulation, immunophysiology, mucosal immunity and nutritional immunology. Additional information about program faculty members is available at: www.immunobiology.iastate.edu (<http://www.immunobiology.iastate.edu>).

Students may enter the Immunobiology program in one of two ways; prospective students may apply directly to the major, or current ISU graduate students may be admitted as a co-major or minor in Immunobiology. Ph.D. students admitted into the Interdepartmental Immunobiology major will take IMBIO 697 Graduate Research Rotation, during their first two semesters. From these rotations the student will select a major professor and join a home department. Affiliating with a major professor is done by the end of the second semester.

Before entering the Immunobiology program, prospective students should have a strong background in the biological sciences; typically including work in immunology, genetics and biochemistry. Prior research experience is highly encouraged. The submission of GRE General Test scores is required for admission.

Immunobiology students should include in their program of study a core of courses which will provide a broad coverage of the basic program in immunobiology. Formal courses should include immunology, biochemistry, and statistics. Additional coursework may be selected to satisfy individual interests or departmental requirements. The foreign language and teaching requirements are determined by the student's home department. All students will take a minimum of one seminar course per fall and spring semester.

Graduates of the Immunobiology program will have a broad understanding of the interdisciplinary field of immunobiology and will be able to effectively integrate the principles of immunology with related disciplines. They are able to effectively communicate with scientific colleagues and the general public in both formal and informal settings. Graduates are able to integrate theory and research to address complex problems facing scientific professionals studying animal and human health, taking into account related ethical, social, legal and environmental issues. They are skilled at carrying out research, communicating research results, and writing persuasive grant proposals.

Graduate Study in Immunobiology Curriculum Requirements for Immunobiology Doctoral Students

Ph.D. candidates majoring in Immunobiology must take at least 72 graduate credits. This 72 credits includes the below core course

requirements and applicable research credits earned. Credits taken during a student's M.S. program in Immunobiology at Iowa State University will count towards their Ph.D. in Immunobiology.

Ph.D. students should take each of the following:

BBMB 405	Biochemistry II	3
IMBIO 602	Current Topics Workshop in Immunology each Fall	1
IMBIO 604	Seminar in Immunobiology Repeated each Spring	1
IMBIO 699	Research	arr †
STAT 401	Statistical Methods for Research Workers	4
V MPM 615	Molecular Immunology	3
V PTH 554	Ethics in Scientific Research and Writing	1

† Arranged with instructor.

Take one of the following two:

V MPM 520	Medical Immunology I	4
V MPM 575	Immunology	3

Take at least two courses from the following approved electives:

BBMB 645	Molecular Signaling	2
GDCB 528	Advances in Molecular Cell Biology	3
V MPM 540	Livestock Immunogenetics	2
V MPM 608	Molecular Virology	3
V MPM 625	Mechanisms of Bacterial Pathogenesis	4
V MPM 629	Advanced Topics in Cellular Immunology	2
V PTH 655	Cellular and Molecular Pathology I	3
V PTH 656	Cellular and Molecular Pathology II	3

Curriculum Requirements for Immunobiology Master's Students

All M.S. students majoring in Immunobiology are required to complete a minimum of 30 graduate credits. These 30 credits includes core course requirements and applicable research credits earned. The requirements for M.S. students are the same as that for Ph.D. students with the exception of the elective credits. M.S. students are required to take **at least one course from the list of electives** as opposed to the two course minimum for Ph.D. students.

Curriculum Requirements for a Minor in Immunobiology at the PhD Level

Graduate students studying at Iowa State University with an interest in completing an Immunobiology minor for their Ph.D. studies are required to take a total of 12 credit hours of coursework including core courses and approved electives.

Students must be approved for the minor by the Immunobiology program and must follow Graduate College guidelines for POS Committee membership.

Graduate students wishing to seek a minor in Immunobiology are encouraged to contact the Immunobiology Interdepartmental Graduate Program Coordinator for further information. Inquiries can be submitted to: idgp@iastate.edu.

Immunobiology Minor Curriculum at the Ph.D. Level Includes:

One course from each of the following two categories:

Category A:

V MPM 520	Medical Immunology I	4
V MPM 575	Immunology	3

Category B:

V MPM 615	Molecular Immunology	3
V MPM 629	Advanced Topics in Cellular Immunology	2

One enrollment in the following:

IMBIO 602	Current Topics Workshop in Immunology	1
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Minimum of 4 credit hours from any of the following approved electives:

BBMB 645	Molecular Signaling	2
GDCB 528	Advances in Molecular Cell Biology	3
MICRO 554	Virology	1
V MPM 540	Livestock Immunogenetics	2
V MPM 608	Molecular Virology	3
V MPM 625	Mechanisms of Bacterial Pathogenesis	4
V MPM 629	Advanced Topics in Cellular Immunology	2
V PTH 655	Cellular and Molecular Pathology I	3
V PTH 656	Cellular and Molecular Pathology II	3

Courses for graduate students:

IMBIO 602: Current Topics Workshop in Immunology

(1-0) Cr. 1. Repeatable. F.

Lectures provided by off-campus experts. Students are required to participate in discussion sessions with lecturers.

IMBIO 604: Seminar in Immunobiology

(1-0) Cr. 1. Repeatable. S.

Student and faculty presentation.

IMBIO 661: Comparative Immunology and Infectious Disease

(Cross-listed with V PTH). (2-0) Cr. 2. Alt. S., offered odd-numbered years.

Prereq: Graduate level Immunology or permission of instructor.

Discuss and define similarities and differences of varied host responses to infectious challenge. Learning will focus on comparative aspects of the host response and the unique aspects of immunity from different organisms, while highlighting molecular and mechanistic similarities of pathogen recognition, response and resolution.

IMBIO 690: Special Topics

Cr. arr. Repeatable.

Advanced study of specific topics in specialized field of immunobiology.

IMBIO 697: Graduate Research Rotation

Cr. arr. Repeatable.

Graduate research projects performed under the supervision of selected faculty members in the Interdepartmental Immunobiology major.

IMBIO 699: Research

Cr. arr. Repeatable.