

Biol 4610 FA – Basic Concepts in Immunology

Time and Place: 11:30 am to 1:00 pm, Tuesdays and Thursdays at ATAC 1007

Course Instructor: Ingeborg Zehbe, PhD, Research Chair (email: izehbe@lakeheadu.ca; phone: 807-474-7275: Mo to Fri, 2–3 pm); LU Office: CB 4018; Office hours: Thursdays, 3–4 pm; our group's website: www.zehbelab.weebly.com

Graduate Assistant: Melissa Togtema, MSc, PhD Candidate; please direct inquiries to mtogtema@lakeheadu.ca

Textbook: Janeway, Immunobiology (9th edition, 2016, Garland Science). PowerPoint presentations will be provided after each class

Date *Topics*

Block A: Introduction and Innate Immunity

Sept. 6/8 Course overview & concepts of immunology (general overview) [Ch. 1]

Sept. 13/15 The innate immune system: First lines of defence [Ch. 2]

Sept. 20/22 Induction of innate immunity [Ch. 3]

Sept. 27/29 Student presentation 1 (20 + 10 min for questions each): The human papillomavirus (HPV) and the host innate immune system (2 on Tuesday and 1 on Thursday; debriefing on Thursday)

Oct. 4/6 Special guest lectures: **Evolution of immunology & Global immune globulin structure and antibodies** [PhD Candidates Robert Jackson (RJ), and Melissa Togtema (MT)]

Oct. 11/13 Reading week

Block B: Antigen Recognition

Oct. 18/20 Human leukocyte antigen (HLA): B and T lymphocyte development & receptors [Chs 6, 8]

Oct. 25/27 Student presentation 2 (20 + 10 min for questions each): HPV and antigen presentation to T lymphocytes (2 on Tuesday and 1 on Thursday; debriefing on Thursday and format discussion of next student presentations)

Block C: The adaptive immune system

Nov. 1/3 T cell-mediated immunity & the humoral immune response [Chs 9, 10]

Nov. 8/10 Integrated dynamics of innate and adaptive immunity & the mucosal immune system [Chs 11, 12]; at the end of Thursday class, students are given the theme for final exam

Nov. 15/17 Student presentation 3: *Pro-seminar* on Tuesday & *Journal Club seminar* on Thursday (group discussion of one journal article): HPV variants and HLA, HPV and dendritic cells & HPV and interferons; at the end of Tuesday class, students are provided time to complete the course survey

Block D: Applied immunity

Nov. 22/24 Immune tolerance, immune deficiency & autoimmunity. During the Nov. 24 class, students will be guided through Dr. Zehbe's research lab to learn about the techniques used there

Nov. 29/Dec. 1 Student presentation 4: *Pro-seminar* on Tuesday & *Paper Presentation* on Thursday (the same journal article for all; 10 min presentation each with 5 min for questions from the floor): Human immune deficiency virus (HIV) and CD4 T lymphocytes & HIV and impact on humans

Dec. 8 Final Oral Exam (20 min each candidate): Dr. Zehbe's office with individual appointments

Course rationale

Focus on fundamental principles of basic immunology from first engagement of innate immunity to the generation of the adaptive immune response with strong focus on vertebrates (humans). No previous knowledge in immunology is necessary. Some insight in basic genetics and signalling pathways with their receptors is necessary.

Course objective

Obtain knowledge of immunological principles related to:

- Cell surface molecules and receptors on cells of the immune system
- How immune cells develop and acquire the ability to recognize antigens
- How they interact to defend the organism against microbes
- How they malfunction in autoimmunity & immunodeficiency

Grading

The final grade will be determined by performance of the 2 presentations, by participation and preparedness during class as well as during the final exam: 35% for each presentation, 10% for participation during class including the student presentations and 20% for the final oral examination. During examinations, the instructor, the GA (MT) and RJ will be present as judges.