

## Introduction to Immunology and Infectious Diseases

### Course Outline 2024

All lectures are recorded for flexible viewing from Friday, January 5, 2024

#### Instructors:

Section 1: Dr Bonnie Mallard (Professor of Immunology & Immunogenetics)

Section 2: Dr Niel Karrow (Professor of Immunology & Immunotoxicology)

Section 3: Dr Byram Bridle (Associate Professor of Viral Immunology & Cancer Biology)

#### ICI Course Certification Provided Upon Course Completion

### Course Details

- **Description**

This course provides an exciting introduction to the mammalian immune system with specific emphasis on infectious diseases, including SARS-CoV-2, influenza and other relevant human and animal pathogens. The cells and tissues involved in immunity, innate and adaptive host responses, and the concept of immunity to infectious diseases will be explored in an easy-to-understand manner.

This nine-lecture course will also touch on strategies to help provide protection of the host and optimize immune function. This will include an introduction to conventional and novel vaccines, as well as immunoceuticals.

The professors teaching this course have decades of experience in teaching immunology at all levels and manage highly successful immunology-based research programs.

- **Prerequisites**

No prerequisites are required but any background in biology will be helpful. All concepts will be carefully explained in this introductory course. Health care professionals and health-conscious individuals wanting to understand the immune system will find this course particularly useful.

- **Timetable**

- Nine lectures (three by each professor) will be presented.
  - Lectures will be recorded to ensure flexible viewing of each topic.
  - Various live 45-minute Q&A sessions on Zoom with the professors will be available throughout the course to provide flexibility for those with other commitments.

- **Start Date**

Friday, January 5th: Lecture 1 opens with flexible viewing for three weeks. Each subsequent lecture recording is released on Friday for nine weeks (not all are consecutive; see schedule below).

- **Exams**

No formal exams are required, but there will be optional test questions provided for you to assess your understanding of the course material.

## Instructional Team

**Instructor 1:** Professor Bonnie Mallard will teach the first three lectures which cover an overview of the immune system, including gene-by-environmental impact on immunity, and an introduction to immune response to infectious diseases, such as COVID-19.

**Instructor 2:** Professor Niel Karrow will give the next three lectures that cover how stress affects immune function, an introduction to immunotoxicology including how it relates to SARS-CoV-2, and immunomodulation by select immunocellulars.

**Instructor 3:** Professor Byram Bridle will give the final three lectures that cover an introduction to cancer immunology, viral immunology, and vaccinology.

## Learning Resources

All required resources will be provided to the participants.

**Optional Resources** - Text Book: Immunology, 8th Edition, 2013, by Judith A. Owen, Jenny Punt, Sharon A. Stanford. W.H. Freeman & Co.

Discussion along with Question and Answer Sessions each week

## Learning Outcomes

The goal of this course is to gain a basic understanding of the structure and function of the mammalian immune system in an integrated easy to comprehend manner. Emphasis will be placed on host defense against harmful microbes, immune system homeostasis, strategies to optimize immune function, and traditional and new vaccine strategies. An understanding of the current application of immunology in health and disease will be established.

At the end of the course, participants should be able to explain, analyze and apply:

1. Common terms used in the field of Immunology
2. The structure and function of key cells, molecules & organs of the immune system
3. How the immune system provides protection and what can go wrong and why
4. Strategies to help optimize immune function
5. Traditional and novel vaccine design and function
6. The latest on Covid-19, current variants and other emerging pathogens

## Teaching and Learning Activities

**Learning Strategy:** The goal is to create a friendly interactive learning environment.

- PowerPoint slides and multimedia will be used to convey the basic concepts in immunology. Key papers from the peer-reviewed literature will be discussed and provided to the students as appropriate to gain an introductory but state-of-the-art knowledge of the field of immunology.
- Lectures will be recorded for viewing by the registered participants throughout each week. A live 30-45 minute Q&A session will be held each week. One Zoom link will be sent to participants for all sessions.
- Participants are encouraged to participate in discussions and ask questions to enhance their understanding by joining online sessions whenever possible to support their learning experience.
- Brief guided notes will accompany the lectures and there will be opportunities to informally test your knowledge throughout the course although formal exams are not required.
- Certificates of completion will be provided to those who complete the course.
- Official grading may be provided upon request if necessary for certification by specific professional organizations.

## Assessments

- Methods of assessment include optional quizzes with grades available upon request.

## Course Statements

- Students are required to check their email for course announcements regularly.
- No email sent to ICI can be considered as confidential unless clearly stated.
- Use of cell phones during the lecture is not allowed.
- Electronic recording of classes is expressly forbidden without prior written consent of the instructor.
- Students are encouraged to participate in discussions
- Any unusual incident during the conducting of the course should be immediately brought to the attention of Professor.

## Personal Information

Personal information will not be shared.

## Disclaimers

This is an introductory course. Additional and more advanced courses will follow.

From time to time due to unforeseen circumstances such as illness the course timetable may need to be adjusted but every effort will be made to limit changes.

Please contact the course administrator for any matter concerning the course at [admin@immunoceutica.ca](mailto:admin@immunoceutica.ca)

## Course Content & Lecture Schedule: January to March 2024

Instructor: Dr. Mallard (Sessions 1-3), Dr Karrow (Sessions 4-6), Dr Bridle (Sessions 7-9)

| Session Numbers & Release Dates       | Topics Covered in Lecture   | Q&A Session Date/Time<br>All times in North American Eastern Standard*Time |
|---------------------------------------|---|--|
| 1. Wk of Jan. 8<br>(release Jan. 5)   | Introductory overview of the immune system: Cells, Organs, Genes and Micro-environments   | Tues., Jan. 9 @ 7:00 pm  |
|                                       |   | Thurs., Jan. 11 @ 2:00 pm  |
| 2. Wk of Jan. 15<br>(release Jan. 12) | Innate and Adaptive Host Defense Mechanisms: Recognition of Danger Signals, Antibody and Cell-mediate Immunity, Immunological Memory  | Tues., Jan. 16 @ 7:00 pm   |
|                                       |   | Thurs., Jan. 18 @ 2:00 pm  |
| 3. Wk of Jan. 22<br>(release Jan. 19) | Introduction to Infection and Immunity: SARS-CoV-2, Influenza, HIV-AIDS   | Tues., Jan. 23 @ 7:00 pm   |
|                                       |   | Thurs., Jan. 25 @ 2:00 pm  |
| 4. Wk of Jan. 29<br>(release Jan. 26) | Stress and the immune system  | Tues., Jan. 30 @ 7:00 pm   |
|                                       |   | Thurs., Feb. 1 @ 2:00 pm   |
| 5. Wk of Feb. 5<br>(release Feb. 2)   | Introduction to immunotoxicology<br>Including how it relates to SARS-CoV-2  | Tues., Feb. 6 @ 7:00 pm  |
|                                       |   | Thurs., Feb. 8 @ 2:00 pm   |
| 6. Wk of Feb. 12<br>(release Feb. 9)  | Immunomodulation by Immunoceuticals   | Tues., Feb. 13 @ 7:00 pm   |
|                                       |   | Thurs., Feb. 15 @ 2:00 pm  |
| BREAK                                 |   |  |
| 7. Wk of Feb. 26<br>(release Feb. 23) | Cancers and the Role of the Immune System: How the immune system prevents cancers from developing, shapes their development when they do grow, and how the immune system can be harnessed to treat cancers                      | Tues., Feb. 27 @ 7:00 pm   |
|                                       |   | Thurs., Feb. 29 @ 2:00 pm  |
| 8. Wk of Mar. 4<br>(release Mar. 1)   | Making Sense of Alphabet Soup:<br>The Immune Response to Viruses, From A to Z   | Tues., Mar. 5 @ 7:00 pm  |
|                                       |   | Thurs., Mar. 7 @ 2:00 pm   |
| BREAK                                 | <b>*Daylight Savings Time</b>   | <b>begins March 10 (EDT)</b>   |
| 9. Wk of Mar. 18<br>(release Mar. 15) | COVID-19 Shots as the Antithesis of an Ideal Vaccine: What an ideal vaccine looks like and how it works, contrasted with how COVID-19 modified RNA shots perform; also, the phenomenon of SARS-CoV-2 variants will be discussed | Tues., Mar. 19 @ 7:00 pm   |
|                                       |   | Thurs., Mar. 21 @ 2:00 pm  |
| Wk of Mar. 25                         | Wrap Up Session with all three Professors   | Tues., Mar. 26 @ 7:00 pm   |
|                                       |   | Thurs., Mar. 28 @ 2:00 pm  |