



Summer School
Immune modulation in human and animal infections:
impact on health, disease and therapy

8-12 July 2019

LEIDEN UNIVERSITY MEDICAL CENTER

30 participants

Registration closes at 1 June 2019

Fee: 200 euro

Organizing Committee:

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Introduction

The immune system provides defense against microbial pathogens. However, pathogens exploit the host immune system for their own benefit and modulate or evade immune responses that would otherwise eradicate them. This relationship has evolved during our evolutionary life span and for the larger part of mankind infectious diseases were the biggest threat and the main cause of death. However, not all microbes are pathogenic. On the contrary, some commensal microbes have an important role in programming and educating the immune system to distinguish between harmful and harmless. Nowadays, in our modern society infectious diseases are not as deadly anymore, due to better understanding, extensive vaccination programs, well-working antimicrobial treatments and much improved surveillance. Still, novel infectious agents increasingly appear in the human population and the need for innovative solutions is as urgent as ever, especially since emergency of antibiotic-resistant bacteria. Additionally, we are now facing a different epidemic: hyperinflammatory disorders, such as auto-immunity, allergies, asthma, cardiovascular diseases, type 2 diabetes and obesities. In addition, we encounter an increasing antimicrobial resistance in bacteria, viruses, parasites and fungi. Investigating the shared principles of immunity and tolerance that underlie infectious diseases, hyperinflammatory and metabolic disorders, immunologists and microbiologists are actively learning from each other and using this knowledge in the critical development of vaccines, immunotherapies and other new therapeutic approaches. Immunotherapy and vaccinology are cross-disciplinary subjects and we need to bridge principles of immune evasion by infectious agents and inflammatory flares found in modern society diseases to generate cross fertilization. People from diverse research, business and medical backgrounds should be brought together and collectively use their skills to tackle the problems of modern and future societies and generate novel (chemical) drugs, vaccines, novel immunotherapies and microbiota interventions against emerging infections and inflammatory diseases.

Main themes

The 5-day Summer School will focus on immunotherapy, vaccinology, microbiota interventions and drug development for infectious and hyperinflammatory diseases, including novel therapeutic approaches such as host-directed personalized therapies. The overall aim of the course is to give participants an understanding of vaccine design and immunotherapy, preclinical testing, and clinical evaluation. Skills and knowledge will be imparted through a combination of lectures, discussion, workshops and site visits. Lectures will cover developments in human and animal infectious diseases and the culprit of

inflammatory disorders; but at the same time immune training by commensals and the microbiome will be covered versus the growing threat of antimicrobial resistance; the course will address strategies for cross fertilization of tolerance induction in inflammatory disease versus novel effective protection against pathogens. Importantly, speakers will include academics and representatives from industry, in order to give not only an overview of the latest developments in the field but also to help prepare participants for a variety of careers, for example as scientists in academic research, industrial scientists or clinical trial development.

The LUMC Summer School will build on a successful research programs run by the Center of Infectious Diseases (CID) and aims to strengthen collaborative links with the University of Edinburgh. Prof. dr. David Dockrell, prof. dr. Ross Fitzgerald and prof. dr Mark Stevens (University of Edinburgh) are collaborating in the design and execution of the LUMC Summer School and a number of their staff members will also teach in the LUMC Summer School. It is the intention of the LUMC summer school to combine elements from courses on immune modulation, antimicrobial resistance, biodiversity and One Health, and vaccine development that utilize the strengths of Leiden and Edinburgh. Specifically, in addition to experts within the LUMC Center of Infectious Disease, the course will have speakers from the Leiden Bioscience Park, in particular the vaccine company Janssen (Johnson & Johnson), as well as from the Dutch collaborative NCOH initiative on One Health, and a variety of other companies and institutes in the Netherlands and UK.

The Themes covered by the Summer School can be summarized as follows:

- Introduction to current standards in (emerging) infectious disease control
- The molecular mechanisms of immune modulation by infectious agents
- Antimicrobial resistance in bacteria, viruses, parasites and fungi and new approaches for treatment of drug resistant microorganisms
- The role of microbiome in health and disease, both animal and human
- Controlled human and (large) animal infection models (combined with entrepreneurship)
- Infectious disease vaccine design and preclinical validation
- Novel host-directed and personalised therapies for infectious and immune diseases
- Develop a research proposal in small tutor-guided sessions on a topic related the themes of the Summer School

Learning objectives

The objectives of the course are as follows:

1. To develop an overall understanding of immune modulation by pathogens and commensals and the balance between immune exploitation and immune training, including the role of the microbiota (benefit).
2. To give participants the knowledge and skills to design and test a vaccine/immunotherapy for a given infection or disease, including understanding of the immune responses involved, role of adjuvant, target antigen(s) and immune cells.
3. To understand the role and application of controlled human infections in vaccine and/or immunotherapy development.
4. To impart knowledge and understanding of manufacture across a spectrum of different vaccines, including the requirements of GMP (Good Manufacturing Practice).
5. Translate the acquired knowledge into novel research proposals on themes related to One Health.

Participant requirements

The Summer School would run for 5 days in July 2019 at will be hosted by the LUMC, Leiden, The Netherlands.

This Summer School is particularly suitable for (bio)medical Master students, PhD students, as well as early stage post-doctoral scientists who are interested in one or more of the following; immunology, microbiology and metabolism.

The course is best suited for those interested in increasing their knowledge on human and animal infectious diseases, immunotherapy for inflammatory diseases, microbiota interventions and host-directed therapies against infectious diseases, clinical trials as well the industrial production of vaccines and antimicrobial therapies.

While the course is directed at PhD/graduate students, scientists working in industry may also wish to apply to gain latest insights into immunotherapy and vaccinology. Applicants will be required to provide a CV, some background to the research they are engaged in, a motivation letter and letter of recommendation from their current supervisor. The number of applicants in the course will not exceed 30. Applications can be sent to h.h.smits@lumc.nl.