HSTalks

The Biomedical & Life Sciences Collection

VACCINES

Principles, recent developments and future directions

A complete advanced undergraduate/graduate course with:

- 20 online lectures by leading authorities
- Resources for workshops, tutorials, journal clubs, projects and seminars
- Suggested exam questions and model answers
- Multiple choice questions and answers
- Recommended reading: original papers and review articles

View the content of the course on our website: hstalks.com/Vaccines

View our in-depth HSTalks: hstalks.com/CoursesBrochure

Course module with video lectures, material for tutorials (case studies, projects, workshops and recommended reading), multiple choice questions and suggested exam questions with model answers. A comprehensive course on a subject of major importance.

The material is especially designed to support research and teaching staff when presenting a comprehensive course at graduate or advanced undergraduate level with seminars, journal clubs, laboratory exercises, data workshops, online tests and end of course examinations.

The course is also suitable for continuing professional development/education programmes.

This brochure provides brief details of the complete module, including the lectures, lecturers and additional learning material.

Who is the course for?

The comprehensive material is especially suitable for teachers and researchers who wish to offer courses on specialist subjects to small groups of students (or even a single student) when it is not possible to justify the time and expense of preparing, internally, a course or there is not the range of expertise available locally to do so. All the lecturers are highly regarded experts in their fields and few institutions are likely to have a comprehensive group of faculty members with a similar range of experience and knowledge of the subject matter.

The course material is designed to be used by local faculty and staff acting as course directors, tutors and mentors.

The material is suitable for flipped classroom, blended, team and distance learning courses.

New courses are time consuming and expensive to create. These modules cut both the cost and the time, enabling a wider range of options to be offered on specialist topics. Graduate students can take the courses, mentored by their supervisors, while pursuing their research.

Ideal for Virtual Learning Environments (VLE)

All course material, including the additional learning material, is arranged in a standard format that allows easy embedding into virtual learning environments such as Moodle, Blackboard or your institute's own system.

Supporting learning and teaching goals

In an age when faculty and staff face ever greater demands on budgets and time, these lectures and additional learning material will be of great help when preparing and delivering graduate and advanced undergraduate courses.

Course Summary

Vaccines are among the greatest success stories in the history of public health, with the eradication of smallpox, near eradication of polio, and significant prevention of morbidity and mortality of several infectious diseases. Surprisingly, while there are a plethora of courses on microbiology and immunology, there are very few courses available on vaccines. Thus, we decided to develop a course on vaccines that would provide a comprehensive overview of the state of the field.

The first section of the course focuses on an introduction to vaccines and consists of lectures on: History of vaccination; Vaccine Immunology; Vaccine Adjuvants; Preclinical Development; Manufacturing; Clinical Development, Regulatory Considerations; Licensed Viral Vaccines; Licensed Bacterial Vaccines; and Recommended Immunization Practices.

The second section of the course focuses on vaccines in development, including HIV, TB, Malaria, Parasitic Diseases, Dengue, RSV, Herpes, Bacterial Diseases, Biodefense and Special Pathogens, and Cancer.

The final section of the course focuses on future directions for vaccine development including lectures on: Nucleic acid based vaccines; Replication competent viral vectors; Reverse vaccinology; Structural vaccinology; Systems vaccinology, Vector mediated immunoprophylaxis; Future directions for vaccine discovery.

Each lecture will be given by an internationally recognized expert in the field, and will provide students with the current status and future directions for the respective area. A new generation of vaccinologists will be needed to discover, develop and test vaccines for new and emerging diseases of the 21st century, and we hope this course stimulates the best and the brightest to enter this field, which will continue to be transformative for public health.

Dr. Wayne Koff
Senior Vice President and Chief Scientific Officer,
International AIDS Vaccine Initiative, USA

The course module is designed for:

- Researchers and graduate students in the fields of immunology and vaccines
- Advanced undergraduate students
- Policy makers and managers in public and private sectors
- Continuing Professional Education/Development

Course Lectures

Introduction to vaccines

Click the lecture title to access

History of vaccines

Prof. Stanley Plotkin
University of Pennsylvania and Sanofi Pasteur, USA

Vaccine adjuvants

Dr. Derek O'Hagan
GSK Vaccine Research, USA

Vaccine preclinical studies

Dr. Rebecca Sheets
Grimalkin Partners, USA

Vaccine manufacturing

Dr. Don Gerson
PnuVax, Inc, Canada

Regulatory considerations for vaccine development: talk1 - CMC

Dr. Norman W. Baylor
Biologics Consulting Group, Inc., USA

Regulatory considerations for vaccine development: talk 2 – clinical regulatory considerations

Dr. Lewis K. Schrager
Aeras, USA

Recommendations of the U.S. advisory committee on immunization practices

Prof. Jonathan Temte
University of Wisconsin, USA

Vaccines in development

HIV vaccine development

Dr. Patricia Fast
Stanford University School of Medicine, USA

Developing tuberculosis vaccines: challenges and strategies

Dr. Thomas Evans
Aeras, US

20 specially recorded, animated lectures by world leading authorities

Click the lecture title to access

Malaria vaccine development

Dr. Ashley Birkett
PATH Malaria Vaccine Initiative, USA

Dengue vaccine development: I status

Prof. Scott Halstead
International Vaccine Institute, Korea

Dengue vaccine development: II. problems to be solved

Prof. Scott Halstead
International Vaccine Institute, Korea

Respiratory syncytial virus vaccine development

Prof. Peter Openshaw
Imperial College London, UK

Herpes simplex virus vaccines

Prof. Lawrence Stanberry
Columbia University, USA

Bacterial vaccines in development

Dr. Kathrin Jansen
Pfizer Vaccine Research & Development, USA

Biodefense and special pathogen vaccines in development

Dr. Gerald Kovacs
Advanced BioScience Laboratories, USA

Cancer vaccines

Prof. Cornelis Melief
Leiden University Medical Center, NL

Future directions for vaccine development

Replication-competent viral vectors

Dr. Farshad Guirakhoo
Vaxess Technologies, USA

Vector mediated immunoprophylaxis

Dr. Bruce Schnepp
The Children's Hospital of Philadelphia, USA

Future directions for vaccine discovery

Dr. Chris Wilson
Bill and Melinda Gates Foundation, USA

Examples of Course Materials

For each lecture the course offers tutorials, workshops, recommended reading, multiple-choice questions, and suggested exam questions with model answers.

HST Moodle My Courses ▸ Vaccines

Tutorial: Vaccine adjuvants

Lecturer: Dr. Derek O'Hagan – GSK Vaccine Research, USA

You have been recently hired to work in a company that has a long term vision to become number one in vaccines. You have been asked to make an assessment of the available adjuvant systems that can enhance the immune responses to weaker vaccine antigens and may be able to contribute to the development of successful vaccines. Define a pragmatic approach how you would create an attractive adjuvant portfolio by applying different disciplines (immunology, pharmaceutical chemistry, physical pharmacy, etc.). Which are the technologies that you would include in your portfolio and why?

Recommended reading:
- Key roles of adjuvants in modern vaccines: Nature 2011, Reed et al
- Vaccine Adjuvants: Putting Innate Immunity to Work: Immunity 2010, Coffman, et al
- New generation adjuvants--from empiricism to rational design: Vaccine 2015, O'Hagan and Fox
- Designing and building the next generation of improved vaccine adjuvants: Journal of Controlled Release 2014; Brito and O'Hagan
- Vaccine adjuvant formulations: a pharmaceutical perspective: Seminars in Immunology 2013; Brito et al

Exam Questions and Model Answers

Question 1
Not yet answered
Marked out of 1.00
Flag question
Edit question

Second generation vaccine adjuvants were developed by combining the learnings of first generation adjuvants and adding Immune Potentiators. Based on existing knowledge of the adjuvants currently available, what would be the most desirable features to design into the next generation of vaccine adjuvants?

Multiple-choice questions and answers

Question 4
Not yet answered
Marked out of 1.00
Flag question
Edit question

Which major advantage would the MF59 adjuvant offer in the event of a pandemic influenza outbreak eg H5N1 ('bird flu')?

Select one:
- a) Higher vaccine potency
- b) Dose sparing for the antigen
- c) More rapid responses
- d) Higher antibody, and T cell responses
- e) All of the above

Recommended reading supporting each lecture: Original research papers and review articles

Recommended Review Articles

1. Reed, S.G., M.T. Orr, and C.B. Fox, Key roles of adjuvants in modern vaccines. Nat Med, 2013. 19(12): p. 1597-608.
2. Coffman, R.L., A. Sher, and R.A. Seder, Vaccine adjuvants: putting innate immunity to work. Immunity, 2010. 33(4): p. 492-503.
3. O'Hagan, D.T. and C.B. Fox, New generation adjuvants--from empiricism to rational design. Vaccine, 2015. 33 Suppl 2: p. B14-20.
4. Brito, L.A. and D.T. O'Hagan, Designing and building the next generation of improved vaccine adjuvants. J Control Release, 2014. 190: p. 563-79.
5. Brito, L.A., P. Malyala, and D.T. O'Hagan, Vaccine adjuvant formulations: a pharmaceutical perspective. Semin Immunol, 2013. 25(2): p. 130-45.

How to access the course

Extracts of lectures can be viewed at hstalks.com/biosci/. The full length lectures can be viewed by all members of universities, colleges and medical schools currently subscribing to The Biomedical & Life Sciences Collection. Institutions that do not subscribe to The Biomedical & Life Sciences Collection may take annual licenses at US $2,000 covering an unlimited number of students.

Full supporting material: video lectures, material for tutorials (case studies, projects, workshops and recommended reading), multiple choice questions and suggested exam questions with model answers are provided to faculty members of subscribers.

To subscribe, obtain additional information and/or the additional learning material contact Dr. Eyal Kalie at eyalk@hstalks.com.

Upload to your VLE

The complete course (lectures and additional learning material) can be loaded into Moodle, Blackboard and other virtual learning environments.

HSTalks provides access to world class lectures by leading authorities from around the globe, in one online resource.

Our subscribers include a wide range of universities, medical schools, colleges, hospitals, government agencies and pharmaceutical companies.

HSTalks

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