

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





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

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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

> 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

Malaria vaccine development

Dr. Ashley BirkettPATH 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 StanberryColumbia University, USA



Bacterial vaccines in development

Dr. Kathrin JansenPfizer Vaccine Research & Development, USA



Biodefense and special pathogen vaccines in development

Dr. Gerald Kovacs



Cancer vaccines

Prof. Cornelis Melief Leiden University Medical Center, NL

Advanced BioScience Laboratories, USA



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



Click

the lecture title

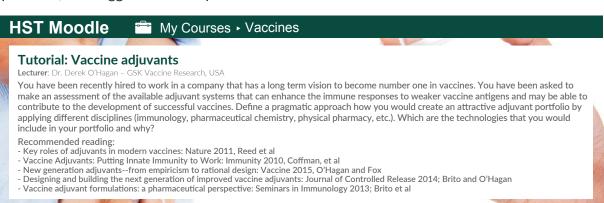
to access



Examples of Course Materials

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









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

C Edit question

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

Select one:

- O a) Higher vaccine potency
- \bigcirc b) Dose sparing for the antigen
- o c) More rapid responses
- O d) Higher antibody, and T cell responses
- o 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.

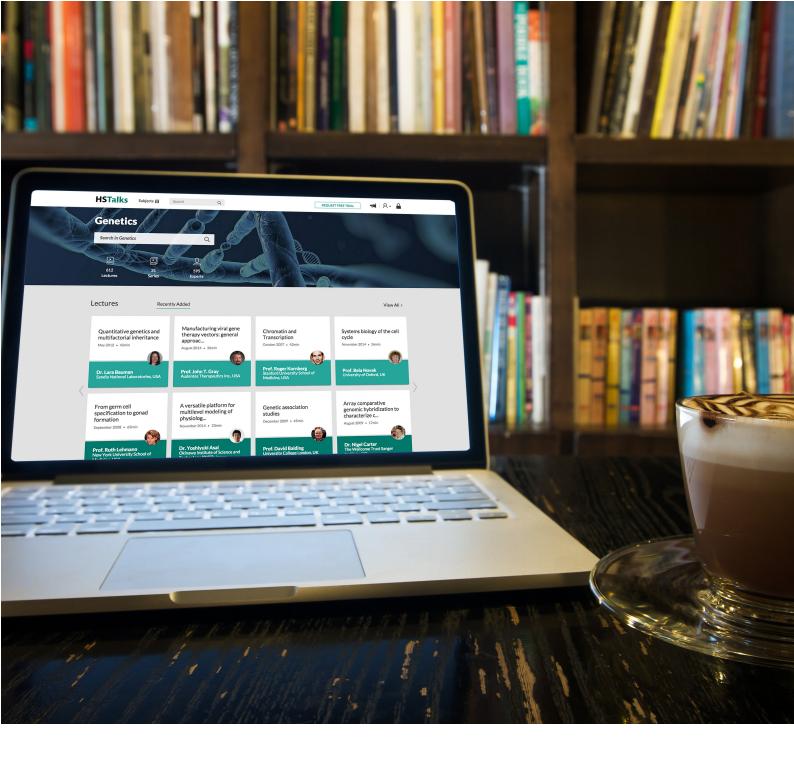
Full supporting material: video lectures, material for tutorials (case studies, projects, workshops and recommended reading), multiple choice questions and suggested exam questions with model answers are provided to faculty members of subscribers.

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.

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hstalks.com

Email: sales@hstalks.com Tel: +44 207 164 6721

Corporate Headquarters Ruskin House, 40/41 Museum Street London WC1A 1LT, United Kingdom Company Registration Number: 04833828

