A complete advanced undergraduate/graduate course with:

- 12 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

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.
The premise of this course exploits the concept that the mechanisms of multicellular physiology evolved from unicellular organisms and their interactions, giving insight to how and why physiology evolved as an integrated whole. This is in contrast to the way physiology is currently perceived, as an association of loosely related parts without a raison d’etre. For example, rather than the conventional way in which homeostasis is perceived as a ‘snapshot’ for maintaining the integrity of the organism, the cellular approach focuses on homeostasis as the organizing principle for life. Complex life emerged in a series of transitions of individuality, e.g. molecules within simple cells, simple cells within complex cells, and complex cells within multicellular organisms. In each transition, conflicts among lower-level units had to be mediated. Co-opted features of lower-level units produced conflict mediation and ultimately homeostasis. The recognition that structural and functional relationships emerged from selection for homeostatic mechanisms further illuminates central concepts. Concepts such as the life cycle, endothermy, pleiotropy, reproduction, and others will be examined in the context of cellular mechanisms, offering a mechanistically-based, scale-free continuum from development to homeostasis, regeneration and death for the first time. As a result of the fundamental understanding of physiology, predictive models for hypothesis testing can be generated for stability and change at all levels, from the zygote to the organism.

At the end of this course the student will have an understanding of physiologic principles based on First Principles. This perspective will enable students to devise ways of ‘trouble-shooting’ their own biologic problems. A blog will be provided in which to query Prof. Torday as to how to address specific problems.

The course module is designed for:

This course will be of interest to graduate and undergraduate students in the areas of physiology, molecular biology, biochemistry and paleontology; medical students; biomedical researchers; informaticists; philosophy majors with an interest in the theory of science; theoreticians and physicists.
Course Lectures

On the utility of a mechanistic approach to physiology
Prof. John S. Torday
Harbor-UCLA Medical Center, USA

A brief history of evolutionary biology
Prof. Neil Blackstone
Evolutionary Biology, Northern Illinois University, USA

Major transitions in the history of life
Prof. Neil Blackstone
Evolutionary Biology, Northern Illinois University, USA

On the origins of life
Dr. William B. Miller Jr.
OmniBiome Therapeutics, USA

The origin of eukaryotes
Prof. Neil Blackstone
Evolutionary Biology, Northern Illinois University, USA

Trichoplax and the origin of animal complexity
Prof. Bernd Schierwater
Institute for Animal Ecology and Cell Biology, Germany
On the value of comparative physiology

Prof. Karen L. Sweazea
Arizona State University, USA

How to ‘deconvolute’ lung evolution

Prof. John S. Torday
Harbor-UCLA Medical Center, USA

Using lung evolution as a cipher for physiology

Prof. John S. Torday
Harbor-UCLA Medical Center, USA

The Unicellular Origins of Complex Physiology

Prof. John S. Torday
Harbor-UCLA Medical Center, USA

Pleiotropy: cellular-molecular evolution in action

Prof. John S. Torday
Harbor-UCLA Medical Center, USA

The dynamic interactions between cellular-molecular physiology and the environment

Prof. John S. Torday
Harbor-UCLA Medical Center, USA
For each lecture the course offers tutorials, workshops, recommended reading, multiple-choice questions, and suggested exam questions with model answers.

**Exam Questions and Model Answers**

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

Discuss the implications of unidirectional vs bidirectional communication between cells during development.

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

Epithelial-Mesenchymal Interactions mediate:
Select one:
A) Axial body orientation
B) Peristalsis
C) Digit formation
D) Organ growth and differentiation

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

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

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 (England and Wales)