BIOLOGY 585

CELLULAR AND MOLECULAR IMMUNOLOGY

COURSE SYLLABUS

San Diego State University
Spring 2010

Tuesday and Thursday 11:00 AM to 12:15 PM

Room LS 132.

Professor: Constantine D. Tsoukas, Ph.D.
Office: LS 406
Telephone: 594-5764
Office hours: By appointment
E-mail: ctsoukas@sunstroke.sdsu.edu
LaboratoryWeb Address: http://www.bio.sdsu.edu/pub/tsoukas/Tsoukas.html

Course Objectives and Learning Outcomes

This course is designed to serve two types of student populations; advanced upper division undergraduates and graduate students. Students are introduced to selected contemporary topics of Immunology through various approaches. Topics and concepts are introduced through lectures, readings and discussions of research papers from the primary literature where the whole class participates, and presentation of selected topics by individual students. In the last two cases the instructor serves as moderator. Typically, the instructor will introduce the fundamental principles of each topic through lecture presentations. Each set of lectures will be then followed by discussion of selected relevant papers from the primary research literature. The papers will be presented and discussed by the students and the instructor will moderate the discussion and critical evaluation of the presented papers. Depending on class size and available time, during the latter part of the course each student will be responsible for preparing and presenting a selected immunological topic that will be assigned by the instructor.

The course does not require any previous knowledge of immunology. In fact, students who have taken a full immunology course, at any level, during the past five years are discouraged from taking this course. The prerequisites for this course is a solid understanding of basic concepts of biochemistry and cellular and molecular biology as those studied in Chem 365, Bio 366, and Bio 567 or other equivalent courses. The prerequisites for the course (Chem 365 and Bio 366 or equivalents) will be enforced. Strongly recommended is also Bio 567, which can be taken concurrently. Blackboard will be extensively used and it will be the major means of communication.

The expected learning outcomes of this course is to attain a working knowledge of current immunological principles as they relate to the cells and molecules of the immune system, how they interact in defending the body against invading microorganisms, how they develop and acquire the ability to recognize antigens, and finally how they malfunction in autoimmune diseases and how they become inadequate in immune deficiency states. Furthermore, students will extend and solidify their understanding of the presented principles through critical readings from the primary research literature. Reading of research papers will help introduce students to research techniques and also help them appreciate the value of scientific research.
Textbook

Each student must obtain an Immunology textbook to use as a reference source and in order to expand his/her class notes. There is no specific textbook assigned or required. The following textbooks are recommended as excellent sources:

- Cellular and Molecular Immunology, by Abbas, Lichtman, and Pillai (the instructor uses this textbook to prepare some of the lecture material)
- Janeway’s Immunobiology; Murphy, Travers, Walport
- Kuby Immunology; Kindt, Goldsby, Osborne

In all of the above textbooks you should obtain the 6th or later editions. If there is a need, I can place a copy of these textbooks on reserve.

Performance Evaluation and Grading

There will be several quizzes during the semester (~1 quiz every 2-3 weeks). Quizzes will be given on the day of paper discussion before the assigned literature paper is discussed. They will contain questions on the preceding lecture(s) and on the literature paper. Thus, you will be expected to keep up on your lecture material on a regular basis. Even though you will not be able to use your notes on the lecture material, you will be able to consult the assigned literature paper in order to answer the questions related to it. Each quiz will worth 10 points. You will be allowed to drop the quiz with the lowest points. So you could miss one quiz (not recommended). Any other missed quiz will count for zero points. Quizzes will count towards 40% of the final grade.

All students will be expected to actively participate in the paper presentations and discussion. Students will be asked randomly to come up to the board and discuss particular segments of the paper under discussion. So, every student will be expected to come prepared during paper discussions. The PDF files of the assigned papers will be provided on BB. Evaluation of student presentation and participation will be based on clarity of presentation, understanding the issues addressed and questions raised in the paper, and an effort to provide some critical evaluation of the presented work. Each student will be called upon several times during the semester. Performance on this assignment will be evaluated on a scale from 0-5. This will be a semi-quantitative assessment with a score of 5 to indicate that the student exceeded expectations, 4 to indicate excellent presentation, 3 to indicate expected presentation, 2 below average presentation, 1 not acceptable, and 0 no effort. Recurrent absence when a student is called upon will be reflected by a low score on this assignment regardless of performance. Paper Discussion will count towards 10% of the final grade.

During the course (likely during the last few weeks), students will present their own short talks. These will be based on highly focused topics assigned by the instructor. Each student will be assigned a specific topic and a general outline of what should be included. The student will be responsible for developing a short (~10 min + 5 min discussion) talk that will be presented to the class on a pre-assigned date. Evaluation and grading of this assignment will be based on the clarity of presentation, inclusiveness of all points in the outline provided, timeliness of presentation, and command of knowledge judged by answers to the questions the presenter might be asked. A textbook will be useful guide in preparing these presentations. Performance evaluation for this assignment will be similar to the paper presentations above on a scale 0-5. No make up assignment for this. If you anticipate an absence you must let the instructor know so, assignments can be shuffled to accommodate the absence. No show will earn 0 points on this assignments. Short talks will count towards 20% of the final grade.
There will be an oral **final exam**. The instructor will prepare several questions from either the lecture material or material covered in one of the papers discussed during the semester and will randomly call upon students to answer the questions. The questions will be of equivalent difficulty, as much as possible. Evaluation of the answers will be based on accuracy, logic of thought, and overall effort. Grading will be based on the 0-5 scale as described above. Absence from the final exam session will earn 0 points. Final exam will count towards **30% of the final grade**.

Make up policy has been discussed above under each assignment. Situations that are beyond an individual’s control (critical illness, emergencies etc) will be dealt with at an individual basis. It is the student’s responsibility to justify such situations.

### Grading

The point distribution for each of the assignments has been indicated above. There will be different grade distribution for undergraduate and graduate/post-baccalaureate students as follows:

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### Furlough implementation

As you probably know California public universities have been subjected to severe budget cuts due to the financial shortfalls the state is facing. In an effort to address these severe budget cuts the Chancellor of the CSU has implemented a **furlough program** for all campuses including SDSU. A furlough entails faculty taking leave of absence without pay. According to this program, each faculty member has to take 9 such furlough days. The number of furlough days has to be distributed equally among the various duties of each professor including teaching. I have decided to limit the number of furlough days I will take on teaching days to one out of the total nine I am obligated to take. My furlough day during which I will not be in class will be **Thursday February 4, 2010**. Furthermore, furlough will impact the days on which I will be available for office hours and consultation. The best way to mitigate this will be to address your questions to me via e-mail.
Topics

The lecture topics listed below are tentative and subject to change. Topics indicated as ‘Student Presentation’ are also tentative and the extent of their coverage will depend on class size. Papers will be provided in PDF format and they will become available on BB at least one week before discussion. Also, all lecture slides will be provide as PDF on BB 1-2 days before the lecture.

It will be the students’ responsibility to determine the relevant background reading pages on the various topics in their textbook of choice.

Lecture Topics

Cells and Tissues of the Immune System
Antibody Structure and Antigens
MHC Structure and Antigen Presentation
Antigen Receptors and Accessory Molecules
Lymphocyte Development and Expression of Antigen Receptors (BCR/TCR)
Regulation of the Immune Response
Lymphocyte Activation and Signal Transduction
Cytokines
Innate Immunity and Effectors of Adaptive Immunity
Autoimmunity and Hypersensitivities
Respiratory Allergies (Presentation of Instructor’s Research)
Immune Deficiencies

Selected Student Presentation Topics

Natural Killer Cells
TLR signaling
Activation Induced Cell Death
Opportunistic Infections in AIDS
Antibody-mediated Immunity
Cancer Immunity
Regulation of the Complement System

Genetic Immune Deficiencies
Immunological Tolerance
Parasitic Diseases
Vaccines
Selected Cytokines
Cytokine-based Therapies