PHA 6425 Xenobiotic Biotransformation and Molecular Mechanisms of Toxicity

Online version - syllabus

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Phone: 352 273 7715

Teaching assistant: Dustin Tate Yeatman, MS.

Both Dr. James and Mr. Yeatman may be contacted through the course discussion board and the course email function. Since this is an online course, there are no lectures or office hours.

COURSE OBJECTIVES

This course provides a strong conceptual foundation of enzymology and mechanisms of drug biotransformation pathways. As a foundation for learning we will provide examples of drugs and other xenobiotics that exhibit toxicity related to biotransformation.

At the completion of this course students are expected to be able to:

- Predict from the structure of a xenobiotic, the structures of its probable metabolites including intermediates and final products.
- Predict the enzymes (including isozymes where known) likely to be involved in the biotransformation of a xenobiotic and its primary metabolites.
- Understand and correctly use the terminology of the field.
- Understand and be able to predict the effects of prototype inducers of xenobiotic biotransformation on enzymes present in liver and other organs.
- Understand and be able to predict the effects of prototype inhibitors of various xenobiotic biotransformation reactions.
- Understand the role of route of administration on the fate of a xenobiotic or the action of a modulator of xenobiotic transformation.
- Understand the roles of transporter proteins in directing uptake and efflux of xenobiotics and their metabolites.
- Understand the basis for interaction between reactive metabolites and cellular macromolecules, and be able to predict the potentially reactive metabolites of a particular xenobiotic.
- Comfortably navigate the WWW and know how to locate and use web based resources for their interest and further education.
- Use web based tools for communication and for the education of themselves and others.

MODULE TOPICS

Module 1: An Overview of Xenobiotic Metabolism
Module 2: Cytochrome P450
Module 3: Flavin Monoxygenase and Other Oxidative Enzymes
Module 4: Ester/Amide Hydrolysis
Module 5: Epoxide Hydrolases
Module 6: Glucuronosyltransferases and Glucosyltransferase
Module 7: Sulfotransferases
Module 8: Glutathione S-transferases
Module 9: Other Phase II Reactions
Module 10: Transport of Xenobiotics and Their Metabolites
Module 11: Metabolism and Toxicity General Concepts
Module 12: Metabolic Activation of Drugs
Module 13: Metabolic Activation of Industrial Chemicals
Module 14: Metabolic Activation of Pyrolysis Products
Module 15: Metabolic Activation of Natural Products

GETTING STARTED

To get started, briefly introduce yourself via the bulletin board then go to the first module. Read through the course content and any required reading listed in the module introduction. Once you are familiar with the material, complete the assignment and quiz. Do not hesitate to contact your TA or instructor at any time if you need guidance; if you are unsure about the focus of the assignment; if you have assignment questions or questions relating to the course content or quiz. If you don’t tell us you need help, we can’t help you!

Reading Assignments

Reading assignments for the modules consist of on-line journal articles available to all students within this class.

Recommended Reading: There is no single recommended textbook for this course. Helpful background information is found in the following texts:

  - Publisher Contact info: International Specialized Book Services
    920 NE 58th Avenue, Suite 300
    Portland OR 97213-3786
    Tel: (503) 287 3093
    Toll Free Tel: 800 944 6190
    Fax: (503) 280 8832
    Contact: Ms Tamma Greenfield
    E-mail: isbs@isbs.com
    Web: www.isbs.com
- *Enzyme Systems that Metabolise Drugs and Other Xenobiotics*, edited by Costas Ionnides, published in 2002 by Wiley Press. (This book will be referenced often in Modules 3-10)

Required Materials: Students must comply with the UF Computer and Software Requirements

EMAILS AND NOTES

As you go through the semester, keep copies of important emails, bulletins and assignments you may use for revision as these will be purged from the course at the end of the semester. We recommend you make a copy of the course modules since this will be the only access you will get to these materials. We will not be able to provide you with copies of course content once the course is removed from your account.

EMAIL AND BULLETIN/DISCUSSION BOARD
Course Email, not the discussion board, should always be used to contact the faculty or staff if you have a problem of a personal nature.

If you are having technical problems with the course content (downloads, etc) or you are unable to access your course interface, please contact us directly, and please don’t spend hours trying to get something to work as this will only lead to frustration. We don’t want any of you to be offline for any length of time. Contact us as soon as you can so we can check it out and help you. If you are experiencing difficulty with your access to course email then please email your course instructor directly via regular email. In that email, make sure you give your name and the name of your course.

Please respond to all emails from your instructor or TA. When we email you we are usually contacting you because we want to help you.

If you have a question about your grade, a quiz, or assignment question, please email us and we'll be happy to help you.

The course bulletin/discussion board can be used to post content related questions and assignment materials when necessary. Please ask us questions any time; we are here to help you. Please do not use the community forum to ask specific questions about your current course content, assignments etc.

It’s VERY important that you read all the discussion bulletins that have been posted. We will use this site to post important information relating to content or quiz changes, deadlines etc. Since postings can accumulate quickly, please login each day to stay on top of these postings or you may miss important information.

Please make sure you don’t post assignments that are supposed to be submitted to the assignment drop box. If you accidentally do, email us as soon as you can and we’ll delete it for you.

**COURSE ASSIGNMENTS**

This course does not have a mid term or final exam. Students are evaluated continuously throughout the semester and graded according to their performance in the course module assignments and quizzes. All modules have a written assignment and a timed quiz that must be completed by the assignment deadline for the corresponding module.

All written assignments must be completed in your own words. Cutting and pasting from the internet is not acceptable and may be considered to be plagiarism. Failure to complete an assignment in your own words may result in you receiving a score of zero for the written assignment.

When it comes to grading, both quizzes and written assignments are weighted equally.

If you lose your internet connection during your quiz and scores are not recorded simply email us and we can help you.

When sending course assignments, include your name and please make sure your assignments are labelled clearly. Assignments should be submitted using the assignment drop box. If you have difficulty with the drop box email your instructor and we will work with you to troubleshoot the problem. Assignment feedback will also be provided via the assignment drop box, so students should check back to the drop box feature in the appropriate module to receive feedback and the assignment grade.
Always keep a copy of your course assignments in case you need to resend it. Also, you may want it for revision purposes later.

**ASSIGNMENT DEADLINES**

Each module includes an assignment that has a due date posted on the Course Calendar. Please review the information regarding our policy for missed deadlines in the section on Instructional policies.

In some courses content modules may be released before the scheduled calendar date to help those who need to work ahead because of work commitments, court appearances, and work related travel. If a module is released ahead of time, the deadline for the assignment and quiz will remain the same as it is on the course calendar.

**GRADING**

Students will be graded on written assignments and module quizzes. The final grade will be based on the student’s cumulative score divided by the total number of available points. The resulting percentage will be converted to a letter grade based on the scale below.

Students will receive individual feedback on points lost on the assignments. The comments of the TA or professor can be viewed on the assignment submission page for the corresponding module found on the last page of each module.

**Grading scheme:**

Students will receive individual feedback on points lost on the assignments. The comments of the TA or professor can be viewed on the assignment submission page for the corresponding module found on the last page of each module.

Grades will be assigned as follows:

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90% or Above</td>
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<tr>
<td>A-</td>
<td>88 - 89%</td>
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<tr>
<td>B+</td>
<td>85 - 87%</td>
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<tr>
<td>B</td>
<td>80 - 84%</td>
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<tr>
<td>B-</td>
<td>78 - 79%</td>
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<tr>
<td>C+</td>
<td>75 - 77%</td>
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<tr>
<td>C</td>
<td>70 - 74%</td>
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<tr>
<td>C-</td>
<td>68 - 69%</td>
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<tr>
<td>D+</td>
<td>65 - 67%</td>
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<tr>
<td>D</td>
<td>60 - 64%</td>
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<tr>
<td>D-</td>
<td>58 - 59%</td>
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<td>&lt; 58</td>
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**Makeup Policy:** Make up assignments are not usually given, but may be at the discretion of the course instructor after evaluation of the circumstances leading to the request.
Grade Changes: Grades will be changed only when a grading error has been made. If you think an error has been made, you should email the instructor or TA as soon as possible. Your entire assignment will then be re-graded.

INSTRUCTIONAL POLICIES

This course is part of the distance education program at the University of Florida. Instead of traditional lecture format, the medium for communication between course instructors, teaching assistants and students will be via WebCT VISTA, a user-friendly Web-based classroom management tool, and the World Wide Web.

Attendance: Students must participate in the bulletin board discussions, and are required to visit the course website daily for important updates and bulletins.

Class Participation: Students are expected to constructively join in bulletin board discussions, with appropriate preparation; to post interesting and relevant information on the class bulletin board, and to interact professionally with their classmates.

Performance Expectations: Students are expected to produce quality work of a standard comparable to any graduate level didactic course. All deadlines are final. Bulletin postings and discussions must be legible, constructive, and appropriate. Students are required to think for themselves and will be expected to complete assignments that require the application of logic and reasoning skills when the answer may not be found in a book or the course notes.

Academic Honesty: All students are expected to abide by the student honor code. To review the student honor code read the information on standards of ethical Conduct at: http://www.dso.ufl.edu/judicial/honorcodes/honorcode.php

Plagiarism: Plagiarism includes any attempt to take credit for another person’s work. This includes quoting directly from a book or web site, without crediting the source. Sources should always be referenced, a link to the website added, or quotation marks placed around the material. However, we expect more than simply cutting and pasting in this graduate level course. Students are expected to review, evaluate and comment on material they research, rather than simply copying relevant material. Your work will be graded accordingly.

Assignments: Each module includes an assignment that has a due date posted on the Course Calendar. While we understand that our students have other work and personal commitments, we expect every effort to be made to meet these deadlines. If for some reason, because of circumstances beyond your control, you are unable to meet an assignment deadline, students should e-mail the professor and explain the situation in advance. Being consistently late in submitting assignments disrupts the discussion of topics on the bulletin board and will therefore result in loss of marks for that assignment up to a full letter grade. If you email us we will work with you around the deadline.

If you have outstanding assignments at the end of the semester we will send you a follow up email as a reminder and as a means to determine your plans for completion. If you do not respond to us before the final day of classes you will be assigned a grade based on the completed assignments.

Incomplete grades: Under special circumstances, if a student is unable to finish a course before the end of the semester we may be able to assign an incomplete grade. An incomplete grade is a non punitive grade assigned at the discretion of the course instructor. In this course an incomplete grade may be assigned if 1/3rd or more of the course assignments have been completed and if the student has remained in communication with TA’s and instructors throughout the course, or has made an effort to request an incomplete grade. If an incomplete grade is assigned, outstanding assignments and quizzes
must be completed by the end of the next semester. If the assignments are not completed in this time you will be assigned a grade based on the completed assignments.

**Drop Dates**: consult the UF Calendar of Critical Dates at http://www.forensicscience.ufl.edu/Students/Dates.asp. Students must inform us directly that they are withdrawing from a course to ensure appropriate tuition reimbursement. Deleting yourself from the course roster does not officially withdraw you from a course.