PhrmSci 174L Biopharmaceutics and Nanomedicine Lab
https://eee.uci.edu/12f/88540

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Office hour Fri 1-2pm or by appointment in 132 Sprague Hall

Credits 3

Prerequisite Pharm Sci 170A and Pharm Sci 170B, or approval by instructor

Time Discussion Fri 8:00-8:50 am, SH 174
Lab TBD
Research TBD

Catalog Data Introduction to cancer drug screening using cellular models and
confirmation of comprehensive therapeutic efficacy using a live animal
model. Includes basic cell culture, cytotoxicity assays, cell analysis, drug
circulation test, and tumor eradication. Prerequisites: Pharm Sci 170A
and Pharm Sci 170B, or approval by instructor

Textbook Online lab manual provided by the instructor

Course Objectives To understand and taste how clinically approved drugs are screened at
cellular and whole body levels is an indispensible educational component
for students majoring in Pharmaceutical Sciences and relevant fields. The
course will cover major in vitro and in vivo procedures involved in drug
discovery. Students will 1) be familiar with basic cell culture techniques, 2)
know how to quantitatively assess efficacy of cancer drugs based on
different cellular responses, 3) practice using live animals including
establishing tumors, drug injections, and euthanasia, 4) monitor
therapeutic efficacy in vivo, and 5) understand logics and overall steps of
drug discovery.

Topics covered 1. Introduction to biopharmaceutics lab, class objectives, and equipments
2. Basic cell culture techniques
3. Cytotoxicity of cancer drugs: MTT assay
4. Tumor establishment
5. Injection of cancer drugs
6. Quantification of drug concentration in blood
7. Measurement of tumor size and body weight

Mandatory Training Basic lab safety training (by the end of 1st week)
Blood borne pathogen training (by the end of 1st week)
Animal care and use tutorial and lab animal occupational health form on file with EH&S (by the end of 3rd week)
Further training for animal handling if required (by the end of 3rd week)

Class Schedule
Each class meets 3 hours (lab, subject to change, depending on each experiment) and 1 hour (discussion) per week.

Exam dates
Final Presentation        TBD
Final exam                Nov 30 (Fri) 8:00-8:50 am, SH 174

Course Website
The course web site will be created at http://eee.uci.edu. The syllabus, course schedule, manual, links to mandatory training, and any useful information will be posted. This webpage will be updated to post the most recent changes and announcements.

Attendance
Attendance at labs and discussion sessions is required and recorded. Students arriving 5 minutes late will not be escorted by the TA to the lab. Unauthorized absence, for all or part of any session, will result in a substantially reduced final grade.

Lab Reports
Midterm and final reports in designated formats are required to be submitted. Reduction of grade will be calculated based on the formulation of grade/(1.5)^D, where D is the number of late days. For example, 67%, 44%, and 30% of grade will be given for homework 1, 2, and 3 days late, respectively. There will be no credit for homework late more than 3 days.

Evaluation by TAs
TAs will evaluate students’ performance in the lab. Late attendance and absence without prior approval, interference of the lab, a rejection of TAs’ instructions (particularly regarding safety matter), un-allowed behaviors (including but not limited to: eating, sleeping, etc.), poor preparation, will be negatively counted toward a total grade. If TAs judge that a problem is not correctable upon a warning and/or could be an immediate harm to the class, they can ask student(s) to leave the lab.

Grading Criteria

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<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tr>
<td>15%</td>
<td>Midterm report</td>
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<tr>
<td>30%</td>
<td>Final report</td>
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<td>15%</td>
<td>Final group presentation</td>
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<td>10%</td>
<td>Final exam</td>
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<td>15%</td>
<td>Attendance</td>
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<td>15%</td>
<td>Assessment by TAs</td>
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# Lab Schedule

<table>
<thead>
<tr>
<th>Date (Week)</th>
<th>Topics</th>
<th>Objectives</th>
<th>Note</th>
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| Oct 1-Oct 5 (1) | Introduction to biopharmaceutics lab and equipment for cell culture (Incubator, microscope, biosafety cabinet, etc.) | - To understand objectives of the lab  
- To comprehend overall flow of the topics  
- To get familiar with equipment to be used  
- To practice personal safety in the lab | - Completion of basic lab safety and blood borne pathogen training |
| Oct 8-Oct 12 (2) | Basic cell culture techniques (Cell thawing, freezing, counting, and cell growth curve) | - To learn principles of cell culture  
- To acquire and practice basic techniques in cell culture  
- To complete cell growth curve and understand limited growth of cells |
| Oct 15-Oct 19 (3) (4 Groups) | Cancer drug screening in vitro: MTT assay | - To understand how to quantify cell viability based on mitochondrial activity  
- To observe different cellular responses to cancer drugs  
- To quantify dose-dependent therapeutic effects  
- To identify a candidate cell model to a drug | - Completion of animal use training by Oct 19  
- Due of midterm report by November 2 |
| Oct 22-Oct 26 (4) (4 Groups) | - Injection of free DOX and Doxil  
- Measurement of drug concentrations in serum  
- Tumor establishment | - To test pharmacokinetic knowledge  
- To understand roles of drug delivery systems  
- To learn how to establish a cancer model in animals |
| Oct 29-Nov 2 (5) | - Injection of free DOX and Doxil  
- Tumor establishment | - To identify and quantify therapeutic effects and side effects of cancer drugs  
- To experience in vivo imaging technology  
- To analyze in vivo data |
| Nov 5-Nov 16 (6 and 7) | - Injection of free DOX and Doxil  
- Tumor and weight measurement | - To identify and quantify therapeutic effects and side effects of cancer drugs  
- To experience in vivo imaging technology  
- To analyze in vivo data |
| Nov 19- Nov 23 (8) | No Lab (Thanksgiving week) | | |
| Nov 26-Nov 30 (9) | - Final presentation and exam | - To share what learned  
- To revisit goals set at the beginning  
- To find things to be improved | - Final exam on Nov 30 |
| Dec 3-Dec 7 (10) | - Report writing | - To effectively present and communicate results | - Final report due by Dec 7 |

Prepared by: Young Jik Kwon  
Date: September 2012