Pharmaceutical Biochemistry II (PHM 281N)
PHM 281N - #57485, Spring 2020, Tu/Th 2:00-3:00 p.m. in PHR 2.110

Schedule:
Lectures, Tuesday/Thursday 2-3 p.m. in PHR 2.110
Optional: Weekly Problem-Solving Sessions, TBA

<table>
<thead>
<tr>
<th>Faculty</th>
<th>E-mail</th>
<th>Phone</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Seongmin Lee</td>
<td><a href="mailto:seongminlee@austin.utexas.edu">seongminlee@austin.utexas.edu</a></td>
<td>512-471-1785</td>
<td>PHR 3.206A</td>
</tr>
<tr>
<td>Course Coordinator</td>
<td></td>
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</tr>
<tr>
<td>Dr. Kevin Dalby</td>
<td><a href="mailto:dalby@austin.utexas.edu">dalby@austin.utexas.edu</a></td>
<td>512-471-9627</td>
<td>BME 6.202B</td>
</tr>
<tr>
<td>Dr. Kun Yang</td>
<td><a href="mailto:Kun.Yang@austin.utexas.edu">Kun.Yang@austin.utexas.edu</a></td>
<td>512-471-4843</td>
<td>PHR 3.206D</td>
</tr>
</tbody>
</table>

Teaching Assistants:

Course Information

Note: Exam questions may come from assigned text readings.

Course Learning Objectives (CAPE Objectives):

Develop, integrate, and apply knowledge from Pharmaceutical Biochemistry to evaluate the scientific literature, explain drug action, and solve therapeutic problems.

Course Success:
Chapter readings from the textbook are suggested prior to each class. Attendance and active participation in class discussions will provide students with the opportunity to seek clarification and readily apply the material.

Course Website:
The Canvas® web site for this course is located at: http://courses.utexas.edu/

On login (with your UTEID) you will see a list of Canvas® websites for your current courses. Click on Pharmaceutical Biochemistry II to access the site. You are strongly encouraged to visit this site for additional resources associated with the courses (electronic quizzes, powerpoint presentation, contacting faculty by Email, electronic versions of suggested and required readings). Support is provided by the ITS Help Desk at 475-9400 Monday through Friday 8 am to 6 pm.

Course Communication:
Messages sent to you via the Canvas® Website (Email and Notifications) are official mechanisms for communication in this course; be sure you understand the College Email policies. The Discussion Board for this course is also on the Canvas® website. The Discussion Board will be used for posting questions, exchanging class information, and making class announcements. You may also contact faculty members directly via phone or Email.

Video Capture:
A video capture system will be used in this course. The video streams are offered as a supplement to lecture attendance, not as a substitute. Therefore, if technical problems preclude recording the lecture, the lecture will not be re-recorded, but students are still responsible for the content of the lecture.
Lecture recordings will be available to you for the balance of the semester unless otherwise specified. Do not expect to have access after the semester is over.

Faculty and students utilizing class video recordings should be careful to not compromise the privacy of either themselves or other users (http://registrar.utexas.edu/students/records/ferpa), or the rights of the presenter. Students are free to make their own recordings of lectures unless specifically prohibited from doing so by the presenter. Any additional distribution of College- or student-generated recordings (regardless of format) is prohibited without the written and signed permission of the presenter and students identifiable on the recording. Likewise, all course materials developed by the faculty member (handouts, PowerPoints, etc.) are the intellectual property of that faculty member and cannot be distributed further without the permission of that faculty member.

Viewing video-streamed recordings of lectures can be streamed on campus or can be viewed off-campus using a DSL broadband connection. Your faculty are not in a position to troubleshoot your video-streaming problems, so please do not ask them to do so; rather, you should access the LRC’s help website at https://www.utexas.edu/pharmacy/help/ to address those problems. You will find additional information about the lecture capture system or can report technical issues at http://sites.utexas.edu/pharmacy/lrc/

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Course Policies

1. Examinations:

There will be three 1-hr summary examinations throughout the semester, plus a comprehensive final administered during the Final Exam period. Exams will be given according to the following schedule:

<table>
<thead>
<tr>
<th>Exam Date &amp; Time</th>
<th>Location</th>
<th>Coverage</th>
<th>Faculty</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday, February 20</td>
<td>2.110</td>
<td>Lectures 1-9</td>
<td>Dalby/Lee</td>
<td>100 pts</td>
</tr>
<tr>
<td>Thursday, April 2</td>
<td>2.110</td>
<td>Lectures 10-17</td>
<td>Lee/Yang</td>
<td>100 pts</td>
</tr>
<tr>
<td>Tuesday, May 5</td>
<td>2.110</td>
<td>Lectures 18-25</td>
<td>Yang</td>
<td>100 pts</td>
</tr>
<tr>
<td>Final Exam</td>
<td>TBA</td>
<td>Lectures 1-25</td>
<td>Dalby, Lee</td>
<td>100 pts</td>
</tr>
</tbody>
</table>

# Points for Exams 1-3 are proportional to actual lectures given, and may be adjusted accordingly.

The format for the exam is entirely the prerogative of the faculty. **Students must arrive on time for examinations.** All instructions and corrections will be made at the beginning of the examination period and will not be repeated. Semester exams will begin promptly at the designated hour and will be picked up after exactly 1 hr. The final examination will last three hours. Students arriving after any students have completed the exam and left the room may not be allowed to sit for the exam and may receive a score of zero.

**No allowances will be made for an exam being missed, other than documented illness or emergency.** The student must contact the course coordinator for confirmation prior to the exam. If permission is granted to delay the exam, it is the student responsibility to complete the College Form titled “Student Request for Alternate Exam Time” for consideration and final approval by the Faculty member. In this event, the nature of the make-up will be at the discretion of the faculty (oral, written, increased weighting on the final, etc.). An unexcused absence from an exam may result in a grade of "zero" for that exam.

**Graded course examinations will be administered using ExamSoft®.** It is the student’s responsibility to ensure functionality (hardware, battery charge, sufficient memory, etc.) prior to each assessment. The examination should be downloaded prior to the exam within the specified time. Students should contact ExamSoft at support@examsoft.com or 1-866-429-8889 for issues and technical support.
1.A. Posting Class Scores & Keys:

Following the grading of each exam, score statistics and/or the exam key will be posted on Canvas.

1.B. Post-Exam Remarks and Reconsideration Requests:

If there is a disagreement over the answer to a specific question, the student should present his/her exam plus a written explanation (with appropriate documentation) to the instructor within 72 hours of the listserv announcement of the posting of exam results & key as described above. Documentation may include statements from textbooks, handouts, packets, or current scientific reprints; lecture notes are not authoritative documentation. The explanation must be clear, rational, and concise. (This policy does not apply to addition or other grading errors).

1.C Final Exam Re-Examination Policy: The re-examination policy for this course will follow the General Information Catalog (GIC) policy for the University, which reads as follows: “Only a student who has a grade average of at least a C on all class work and lab work submitted before the final exam may request a temporary delay of the final course grade because he or she failed the final examination, which is the examination given during the final exam period as printed in the official examination schedule. If the petition is denied by the instructor (i.e., course coordinator), the student’s final course grade will remain as originally determined. If the petition is granted by the instructor (i.e., course coordinator), the grade on the reexamination will be substituted for the grade on the original exam in determining the student’s final course grade, provided the student earns at least a C on the reexamination. If the grade on the reexamination is less than a C, a final course grade of F must be recorded.”

2. Course Grading:

There will be a total of 400 points for the course: 300 points (75 %) for in-class exams, quizzes, and online exams, and 100 points (25 %) for the final exam. The final letter grade assignments will be based on the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100%-93%</td>
</tr>
<tr>
<td>B</td>
<td>89%-87%</td>
</tr>
<tr>
<td>C</td>
<td>79%-77%</td>
</tr>
<tr>
<td>D</td>
<td>69%-67%</td>
</tr>
<tr>
<td>F</td>
<td>Below 65%</td>
</tr>
</tbody>
</table>

This scale may be curved more leniently in the final analysis of grades at the discretion of the instructors.

3. Attendance:

Excused Absences:
The only absences that will be considered excused are for religious holy days or extenuating circumstances due to an emergency. If you plan to miss class due to observance of a religious holiday, please let the course coordinator know at least two weeks in advance, preferably at the beginning of the semester. You will not be penalized for this absence, although you will still be responsible for any work you will miss on that day if applicable. Check with the course coordinator for details or arrangements.

Attendance at Professional Meetings:
It is the student’s responsibility to ASK permission IN ADVANCE if they plan to attend a professional meeting that would necessitate missing an exam, assignment, or other required course activity. It is at the discretion of the course coordinator as to whether to grant permission and allow the student to make up any missed work.
4. **Classroom Expectations:**

**Cell Phones:** Cell phones must be put away during class.

**Laptops:**
Laptop computer use during class is strictly limited to viewing lecture handouts and taking notes.

5. **Campus Carry**

Students should familiarize themselves with the information provided by the University regarding the implementation of “Campus Carry” legislation. You will find an information sheet specifically for students (as well as sheets for parents, visitors, faculty, and staff) at http://campuscarry.utexas.edu/info-sheets.

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### Exam Policies

**ExamSoft®:**
Students are responsible for the maintenance of their approved personal devices and Examplify® software. Students are required to bring approved personal devices and privacy screens for all exam and indicated assignments. Lack of preparation may result in an inability to take the exam, adjustments to course grades at the discretion of course coordinators, and/or an unprofessional conduct referral.

Any problems with Examplify® or ExamSoft® should be addressed via phone to Student Tech Support at 866.429.8889, email to support@examsoft.com, or live chat at www.examsoft.com. Do not expect your faculty to troubleshoot your technology issues.

Students found improperly using ExamSoft® or Examplify® to gain unfair academic advantage are violating the College of Pharmacy Honor Code. Violations such as “academic dishonesty” and/or “professional misconduct” would include, but are not limited to using a classmate’s login/password, tampering with exam files, and falsifying upload or download information, or any attempt to circumvent the security features of the software.

Students should refer to the ExamSoft® Policies Handbook for a complete listing of policies related to exams, quizzes and assignments.

**Exam Format:**
Exam questions will cover learning objectives given at the beginning of each topic. Exam questions may include: multiple choice, true/false, fill-in-the-blank, matching and/or short answer.

**Exam Grading:**
Grading of exams, along with statistical analysis and review of exam questions, will be the responsibility of the course coordinator and faculty, who may choose to grant credit for statistically poor questions.

**Exam Return:**
No examinations will be returned. Exam scores will be posted on the course Canvas site.

**Exam Review:**
A secure delayed review will be offered for each midterm exam.

**Exam Reconsideration Requests:** During exam review session, exam reconsideration requests will be collected.

**Final Exam Review of Old Exams:** Old exams will be not available for review prior to the final. Students should attend the review sessions for the individual exams during the semester.
Final Exam Re-Examination Policy:
There is no final exam reconsideration requests or re-examinations allowed for this course.

Request for an Alternate Exam Time:
No allowances will be made for an exam being missed, other than documented illness or emergency, or by prior approval by the Course Coordinator. An unexcused absence from an exam may result in a grade of "zero" for that exam. Any student requesting accommodation for an upcoming exam must submit the request to the course coordinator using the online form posted on Canvas® at least one month prior to the exam.

https://utexas.qualtrics.com/jfe/form/SV_bfGs9VUDgOYwoXH

Academic Integrity:
The “Statement on Scholastic Dishonesty of the College of Pharmacy” reads as follows: "Pharmacy practitioners enjoy a special trust and authority based upon the profession's commitment to a code of ethical behavior in its management of client affairs. The inculcation of a sense of responsible professional behavior is a critical component of professional education, and high standards of ethical conduct are expected of pharmacy students. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including failure of the course involved and dismissal from the college and/or the University. Since dishonesty harms the individual, fellow students, and the integrity of the University and the College of pharmacy, policies of scholastic dishonesty will be strictly enforced in this class”.

Students are expected to work independently on all examinations and on all laboratory write-ups (unless specifically instructed otherwise). Any student caught cheating will be given a "zero" on the assignment (minimum). Any student suspected of dishonesty will be reported to the Dean of the College of Pharmacy and to the Dean of Students, as per University regulations. Students are expected to have read and understood the current issue of the General Information Catalog published by the Registrar's Office for information about procedures and about what constitutes scholastic dishonesty. Students are also expected to be familiar with and abide by the College Honor Code, and will be expected to sign the Honors Statement at the end of each examination.

Services for Students with Disabilities:
Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities at 471-6259 (voice) or 232-2937 (video phone) or https://diversity.utexas.edu/disability/. All University rules concerning accommodations must be followed, including the student arranging for special accommodations prior to each examination. In the absence of such prearrangement, it will be assumed that the student is not requesting special accommodations for that exam, and will be expected to take the exam with the rest of the class at the regularly scheduled exam time.

Please provide a copy of the letter to the course coordinator and the office of the Associate Dean for Academic Affairs as soon as possible after receipt.
<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Topic(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 21</td>
<td>Introduction <em>(Dalby)</em></td>
</tr>
<tr>
<td>2</td>
<td>Jan 23</td>
<td>Cholesterol metabolism and steroids <em>(Dalby)</em></td>
</tr>
<tr>
<td>3</td>
<td>Jan 28</td>
<td>Cholesterol metabolism and steroids <em>(Dalby)</em></td>
</tr>
<tr>
<td>4</td>
<td>Jan 30</td>
<td>Plasma Lipoproteins and metabolism <em>(Dalby)</em></td>
</tr>
<tr>
<td>5</td>
<td>Feb 4</td>
<td>Plasma Lipoproteins and metabolism <em>(Dalby)</em></td>
</tr>
<tr>
<td>6</td>
<td>Feb 6</td>
<td><em>In class questions and review</em> <em>(Dalby)</em></td>
</tr>
<tr>
<td>7</td>
<td>Feb 11</td>
<td>Nucleic acids structures <em>(Lee)</em></td>
</tr>
<tr>
<td>8</td>
<td>Feb 13</td>
<td>Nucleic acids structures <em>(Lee)</em></td>
</tr>
<tr>
<td>9</td>
<td>Feb 18</td>
<td>DNA synthesis <em>(Lee)</em></td>
</tr>
</tbody>
</table>

Exam 1 on Feb 20 Covering Lectures 1-8 *(Dalby/Lee)*

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>10</td>
<td>Feb 25</td>
<td>DNA synthesis <em>(Lee)</em></td>
</tr>
<tr>
<td>11</td>
<td>Feb 27</td>
<td>Transcription <em>(Lee)</em></td>
</tr>
<tr>
<td>12</td>
<td>March 3</td>
<td>Transcription <em>(Lee)</em></td>
</tr>
<tr>
<td>13</td>
<td>March 5</td>
<td>Nucleotide metabolism <em>(Lee)</em></td>
</tr>
<tr>
<td>14</td>
<td>March 10</td>
<td>Nucleotide metabolism <em>(Lee)</em></td>
</tr>
<tr>
<td>15</td>
<td>March 12</td>
<td>DNA damage and repair <em>(Lee)</em></td>
</tr>
</tbody>
</table>

Spring Break March 16-20

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Topic(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>March 24</td>
<td>DNA damage and repair <em>(Lee)</em></td>
</tr>
<tr>
<td>17</td>
<td>March 26</td>
<td>Overview of protein structures <em>(Yang)</em></td>
</tr>
<tr>
<td>18</td>
<td>March 31</td>
<td>Translation <em>(Yang)</em></td>
</tr>
</tbody>
</table>

Exam 2 on April 2 Covering Lectures 9-17 *(Lee/Yang)*

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Topic(s)</th>
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</thead>
<tbody>
<tr>
<td>19</td>
<td>April 7</td>
<td>Translation <em>(Yang)</em></td>
</tr>
<tr>
<td>20</td>
<td>April 9</td>
<td>Translation <em>(Yang)</em></td>
</tr>
<tr>
<td>21</td>
<td>April 14</td>
<td>Post-translational protein modifications <em>(Yang)</em></td>
</tr>
<tr>
<td>22</td>
<td>April 16</td>
<td>Post-translational protein modifications <em>(Yang)</em></td>
</tr>
<tr>
<td>23</td>
<td>April 21</td>
<td>Post-translational protein modifications <em>(Yang)</em></td>
</tr>
<tr>
<td>24</td>
<td>April 23</td>
<td>Protein metabolism <em>(Yang)</em></td>
</tr>
<tr>
<td>25</td>
<td>April 28</td>
<td>Protein metabolism <em>(Yang)</em></td>
</tr>
<tr>
<td>26</td>
<td>April 30</td>
<td>Protein metabolism <em>(Yang)</em></td>
</tr>
</tbody>
</table>

Exam 3 on May 5 Covering Lectures 18-26 *(Yang)*

* These lectures may be replaced with in- or out-of-class activities.
Learning Objectives to Dr. Dalby’s Section:

Review Material

At the end of this course and after reviewing the reading and review material you should be able to:

1. Cholesterol Metabolism and Steroids

Using structures presented in the lectures as a guide, be able to recognize and differentiate structures corresponding to the following: cholesterol, cholesteryl esters, steroid nucleus, bile acids, vitamin D3, HMG-CoA, L-mevalonic acid, prodrug and active forms of Lovastatin, Lipitor, Pravastatin, Crestor, cholic acid, chenodeoxycholic acid, glycholic acid, taurochenodeoxycholic acid, aldosterone, and cortisol. The identification of individual steroid drugs is not expected.

Describe why cholesterol is important – for steroid hormones, food digestion, cell membranes, vitamin D

Describe the basic physical and chemical properties of cholesterol

Using structures presented in the lectures as a guide draw a biological membrane, and a mixed micelle

Describe how cholesterol is synthesized in the body

Describe an overview of how cholesterol levels are regulated in the body through the liver

Write out the mechanism of HMG-CoA reductase

Draw out the five mechanisms by which HMG-CoA reductase is regulated in human cells

Describe how statins work to lower cholesterol

Describe the synthesis and properties of bile salts and acids

Describe the purpose of enterohepatic circulation and draw the mechanism of enterohepatic circulation

Describe the basis for the mechanism of cholelithiasis

Describe the basis for the mechanism of action of bile acid sequestrants

Describe the basis for the mechanism of action of statins

Describe the basis for the mechanism of action of Ezetimide

Describe the basis for the mechanism of action of fibric acids on cholesterol levels

Describe the basis for the mechanism of action of niacin on cholesterol levels

Describe the basic regulation of endogenous corticosteroids

Distinguish between mineralocorticoid and glucocorticoid activity

Describe with the aid of a figure, the receptor-mediated mechanism of corticosteroid action

2. Lipids and lipid metabolism

Describe what lipids are and what they are used for in cells

Understand the nomenclature for naming fatty acids

Describe, with the aid of diagrams, the following:

Pathway of digestion of dietary lipids and absorption of dietary lipids into intestinal cells

The steps of the synthesis of chylomicrons in intestinal cells

The composition of a lipoprotein

Metabolic pathway of a nascent chylomicron to the liver

Metabolic pathway of a nascent VLDL to the liver and extrahepatic tissue.

Mechanism of conversion of TAGs (chylomicrons or VLDLs) into TAGs in adipose cells.

Mechanism of the regulation of cellular cholesterol homeostasis by cholesterol

Mechanism of aspirin

Using structures presented in the lectures as a guide, be able to recognize and differentiate structures corresponding to the following: cis and trans fatty acids, saturated and unsaturated fatty acids, TAGs, waxes, glycerophospholipids, cardiolipins, sphingolipids, glycolipids, plasmalogens, L-glycerol 3-phosphate, myo-inositol 4,5 bisphosphate, inositol 1,4,5-triphosphate, diacylglycerol, phosphatidyl...
choline, phosphatidyl ethanolamine, sphingomyelin, a cerebroside, ganglioside, sialic acid, ceramide, prostaglandin E1, thromboxane A2, leukotriene A4, 1,25-dihydroxyvitamin D3, vitamin A1, beta-carotene, all-trans-retinoic acid, 13-cis-retinoic acid, 11-cis-retinal, 11-trans-retinal, vitamin E, vitamin K, Warfarin, ubiquinone, canthaxanthin, zeaxanthin, erythromycin, amphotericin B, phosphatidylcholine, glycerylphosphorylcholine, 2-monooacylglycerol, arachidonic acid

Describe the properties of TAGs
Describe the properties of waxes
Describe the properties of lipid bilayers
Describe (with examples) how lipids can interact with lipid bilayers
Describe Niemann-Pick disease
Describe lipids as signaling molecules in cells e.g. DAG, inositol 1,4,5 triphosphate
Describe what eicosanoids are
Describe the role of cholesterol in 1,25-dihydroxyvitamin D3 synthesis
Describe the uses and mechanism of action of vitamin A1 and derivatives
Describe the mechanism of action of vitamin E and K
Describe the mechanism of warfarin
Describe the mechanism of ubiquinone
Describe how lipids can make pigments with different colors
Describe lipids used in medicine
Describe the function of all the lipases we encounter during lipid digestion
Describe the roles of the enzymes secreted by the pancreas.
Describe what chylomicrons are
Describe the physical properties, composition and structures of the plasma lipoproteins
Describe the function of key apolipoproteins
Outline the metabolism of chylomicrons
Compare the metabolism of VLDLs to chylomicrons
Outline the production of LDL from VLDL
Outline the metabolism of LDLs
Describe the role of endocytosed cholesterol on cellular cholesterol homeostasis
Describe the metabolism of HDLs and their role in cholesterol homeostasis
Define hyperchylomicronemia
Describe the mechanism of synthesis of prostaglandins, thromboxanes and leukotrienes
Describe the mechanism of inhibition of prostaglandin synthesis by cortisol

Learning Objectives to Dr. Lee’s Section:

Upon successful completion of this portion of the course, students should be able to:

1. Nucleic Acid Structures
* Define bases, nucleosides, nucleotides, DNA, and RNA
* Explain Watson-Crick and Hoogsteen base pairings
* Describe various double helical DNA structures
* Describe forces stabilizing nucleic acid structures
* Describe the mechanism of action of camptothecin, a topoisomerase inhibitor

2. Nucleotide Metabolism
* Define the de novo pathways and the salvage pathways
* Describe de novo synthesis of purine ribonucleotides
* Describe the purine salvage pathway

8
*Describe biosynthesis of pyrimidine ribonucleotides
*Describe the formation of deoxyribonucleotides
*Describe the function of ribonucleotide reductase
*Describe biosynthesis of nucleotide coenzymes
*Describe the catalytic mechanism of thymidylate synthase
*Explain the mechanism of action of 5-FU

3. DNA replication
*Outline fundamental rules of DNA replication
*Describe the role of DNA polymerases in DNA synthesis
*Discuss how DNA replication proceeds accurately
*List and describe the functions of proteins required in DNA replication
*Describe the mechanism of DNA ligase reaction
*Describe the role of hemi-methylation in DNA replication

4. DNA Repair
*Discuss the types of DNA damage
*List DNA damaging agents
*Discuss why DNA damages can cause mutations
*Describe the fates of oxidative, alkylative, and deaminative DNA damages
*Describe base-excision repair
*Describe nucleotide-excision repair
*Describe direct repair
*Describe mismatch repair
*Outline the role of DNA glycosylases, endonucleases, ligases, and polymerases in DNA repair

5. Transcription and Its Regulation
*How do transcription and DNA synthesis differ? How are they the same?
*What descriptors are used to refer to the DNA strand that is copied in transcription? The other DNA strand?
*How are transcribed regions of DNA recognized in prokaryotes? In eukaryotes?
*What is the function of the sigma factor in prokaryote RNA polymerase? What carries out the corresponding function in eukaryotes?
*What sub-unit of the prokaryote RNA polymerase is targeted by rifamicin and analogs?
*What distinguishes constitutive and regulated gene expression?
*What is an operon? Be able to sketch out the lac operon and describe how it functions.
*What are transcriptional repressors and activators?
*How does Transcription terminate in prokaryotes? In eukaryotes?
*What structural features allow regulatory proteins to recognize DNA? To recognize each other?
*How does the organization of eukaryotic DNA affect the way it is transcribed?
*How do DNA and histone modifications regulate transcription?

Learning Objectives to Dr. Yang’s Section:

Review Material
At the end of this course and after reviewing the reading and review material you should be able to:

1. Protein structures
   • Know the basic structures and biochemical properties of amino acids
   • Discuss the primary, secondary, tertiary and quaternary structures of proteins
• Discuss the examples of diseases due to point mutations or protein misfolding

2. Translation
• Describe prokaryotic translation
• Describe eukaryotic translation
• Discuss the examples of translation related diseases and drugs

3. Post-translational protein modifications
• Discuss post-translational protein modifications
• Discuss how post-translational protein modifications regulate protein structures and functions
• Discuss the examples of post-translational protein modification related diseases and drugs

4. Protein metabolism
• Describe how and why cells degrade proteins
• Discuss the examples of protein degradation related diseases and therapeutics
• List the proteolytic enzymes involved in protein digestion
• Explain the specificity and mechanism of activation of the proteolytic enzymes in protein
• Correlate some clinical problems with abnormal protein digestion and amino acid absorption
• Discuss the role of the urea cycle in detoxifying ammonia produced during amino acid metabolism
• Describe the processes of amino acid catabolism to produce ATP
• Describe the processes of amino acid catabolism to produce glucose and ketone bodies
• Discuss the examples of diseases due to amino acid metabolism disorders

College Policies

College of Pharmacy Honor Code:
Pharmacy practitioners enjoy a special trust and authority based on the profession’s commitment to a code of ethical behavior in its management of patient-centered pharmaceutical care. The inculcation of a sense of responsible professional behavior is a critical component of professional education, and high standards of ethical conduct are expected of pharmacy students and faculty. Violators of University rules on scholastic dishonesty are subject to appropriate disciplinary penalties. Since dishonesty harms the individual, fellow students, and the integrity of the University and the College of Pharmacy, policies on scholastic dishonesty must be strictly enforced. The Honor Code is designed to maintain the quality and integrity of the College of Pharmacy. Matriculation to the University of Texas at Austin College of Pharmacy is manifestation of acceptance of the Honor Code and its implications.

The full honor code can be found at:
http://pharmacy.utexas.edu/students/programs-of-study/pharm-d-program/pharm-d-student-handbook/codes-of-conduct-and-professionalism/

Oath of a Pharmacist:
“I promise to devote myself to a lifetime of service to others through the profession of pharmacy. In fulfilling this vow:
• I will consider the welfare of humanity and relief of suffering my primary concerns.
• I will apply my knowledge, experience, and skills to the best of my ability to assure optimal outcomes for my patients.
• I will respect and protect all personal and health information entrusted to me.
• I will accept the lifelong obligation to improve my professional knowledge and competence.
• I will hold myself and my colleagues to the highest principles of our profession’s moral, ethical, and legal conduct.
• I will embrace and advocate changes that improve patient care.
• I will utilize my knowledge, skills, experiences, and values to prepare the next generation of pharmacists.

I take the vows voluntarily with the full realization of the responsibility with which I am entrusted by the public.”

Professionalism:
As a student at The University of Texas at Austin College of Pharmacy, it is a great privilege to study pharmacy. Over the course of education and training, student pharmacists will assume extraordinary responsibility for the health and well-being of others. This undertaking requires that student pharmacists uphold the highest standards of ethical, compassionate, and professional behavior. Accordingly, student pharmacists are expected to adopt the listed principles to guide their respective academic and clinical careers. Student pharmacists are expected to uphold both the spirit and the letter of the APhA Student Pharmacist Pledge of Professionalism in addition to the following principles:

1. Accountability
   a. Upholds commitments and completes required tasks
   b. Demonstrates timeliness in all domains
   c. Willingness to accept responsibility for one’s actions
   d. Utilizes an evidence-based approach in patient care
   e. In all endeavors, places the patient’s well-being above all other concerns

2. Honesty
   a. Respects the sacred covenant with the patient by protecting personal information in all settings
   b. Maintains standards of academic honesty
   c. Demonstrates ethical decision-making and holds oneself to rigid ethical standards
   d. Exhibits truthfulness, integrity, and pride in all aspects of one’s work

3. Respect
   a. Demonstrates sensitivity towards individual needs, values, and beliefs
   b. Exhibits effective conflict resolution skills
   c. Completes evaluations and provides feedback in a constructive manner
   d. Uses appropriate communication with peers, faculty/staff, residents, preceptors, community partners, patients and all others while representing the College of Pharmacy

4. Pride in the Profession
   a. Engages in professional organizations
   b. Demonstrates strong work ethic in all environments
   c. Conforms to appropriate dress code in all settings
   d. Represents The University of Texas at Austin College of Pharmacy and the profession appropriately on social media, in the community, at professional meetings, and in all health care settings

5. Commitment to Self-Improvement
   a. Prioritizes maintaining one’s own health and wellbeing
   b. Recognizes limitations and seeks help when necessary
   c. Accepts and responds to constructive feedback
   d. Dedication to lifelong growth and learning

Student Rights & Responsibilities:
• You have a right to a learning environment that supports mental and physical wellness.
• You have a right to respect.
• You have a right to be assessed and graded fairly.
• You have the right to review any exam, assignment, paper, etc., that is used to assess your grade.
• You have a right to freedom of opinion and expression.
• You have a right to privacy and confidentiality.
• You have a right to meaningful and equal participation, to self-organize groups to improve your learning environment.
• You have a right to learn in an environment that is welcoming to all people. No student shall be isolated, excluded or diminished in any way.

With these rights come responsibilities:
• You are responsible for taking care of yourself, managing your time, and communicating with the teaching team and with others if things start to feel out of control or overwhelming.
• You are responsible for acting in a way that is worthy of respect and always respectful of others.
• Your experience with this course is directly related to the quality of the energy that you bring to it, and your energy shapes the quality of your peers’ experiences.
• You are responsible for creating an inclusive environment and for speaking up when someone is excluded.
• You are responsible for holding yourself accountable to these standards, holding each other to these standards, and holding the teaching team accountable as well.

Scholastic Dishonesty:
• Students are expected to work independently on examinations and assignments, unless otherwise specified.
• Any student engaging in academic dishonesty will be given an appropriate penalty, including possible failure of the course.
• Any case of academic dishonesty will be reported to the Dean’s Office of the College of Pharmacy and to the University Dean of Students, as per University regulations.
• Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the courses and/or dismissal from the University.
• Such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.
• Also, you should refer to the Dean of Students’ website at: http://deanofstudents.utexas.edu/conduct/academicintegrity.php to assess the official University policies and procedures on scholastic dishonesty as well as further elaboration on what constitute scholastic dishonesty.

Common examples of scholastic dishonesty include, but are not limited to, the following:
- Looking at and copying answers from another student’s exam or quiz paper.
- The use of crib notes or crib sheets.
- Writing information for testing purposes on concealed paper, desks, skin, clothing or other material.
- Stealing copies of the exam.
- Changing answers after the exam period is completed.
- Use of programmable calculators or computers for concealing information.
- Talking to another student, including electronically, during an exam or quiz.
Campus Carry: Students should familiarize themselves with the information provided by the University regarding the implementation of “Campus Carry” legislation. You will find an information sheet specifically for students (as well as sheets for parents, visitors, faculty, and staff) at http://campuscarry.utexas.edu/info-sheets."

Religious Holidays: If you will miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you must notify me the first week of class so that arrangements for all such students can be made for the full semester.


- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- If you have concerns about another student’s behaviors, particularly if you believe they could potentially harm themselves or others, do not hesitate to contact the Behavior Concerns Advice Line (BCAL): 512-232-5050

Behavioral Concerns Advice Line (BCAL): If you are worried about someone who is acting differently, you may use the Behavior Concerns Advice Line to discuss by phone your concerns about another individual’s behavior. This service is provided through a partnership among the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and the University of Texas Police Department (UTPD). Call (512) 232-5050 or visit http://www.utexas.edu/safety/bcal.

CARE Counseling

The College of Pharmacy, in partnership with the Counseling and Mental Health Center, has a CARE counselor located on site. It is common to need support when dealing with feelings and problems that seem beyond your control. CARE counselors support students in a number of different ways. Sometimes we help through a one-time meeting to talk about a specific concern. Other times we might offer short-term counseling. For students who want ongoing support, we can help you navigate connecting to other on-campus and off-campus resources.

Your CARE Counselor:

Gretchen Rees, LCSW
Office: PHR 2.102A
Telephone: 512-232-5923
College of Pharmacy Office Hours: Monday and Friday 1 pm – 2 pm
College of Pharmacy days on-site: Monday, Thursday afternoon, and Friday
About Gretchen:
Gretchen Rees (pronouns: she/her) is a Counselor in the Counselors for Academic Residence (CARE) Program, a program that provides mental health services in academic offices to facilitate students' academic and life goals. Gretchen provides individual, group and crisis counseling for students in the College of Pharmacy as well as the School of Nursing and Dell Medical School. She is also available to provide consultation to staff as well as prevention and outreach services.

Gretchen brings a relational approach to her work with students with the goal of helping them navigate life’s challenge and connect to their own internal and external resources. Her areas of professional interest include mindfulness, healing from trauma and grief, healthy boundaries, depression, anxiety, and “imposter syndrome.” In her free time, she enjoys traveling, reading and spending time with her family and their dog, Rocket.

How to Schedule a CARE Appointment:

There are two ways to schedule with Gretchen:

1. Call 512.232.5923 and ask to schedule a CARE appointment. You may need to leave a voicemail. Be sure to leave your UTeid and a good contact number.
2. Come by Gretchen’s office. If the door is open, you are welcome to talk to her about services. Gretchen’s office hours are Monday and Friday 1 pm to 2 pm.