

**DEPARTMENT OF MEDICINAL CHEMISTRY  
SCHOOL OF PHARMACY**

Introduction to Pharmaceutical Sciences  
Exam 1

PCEU/MEDC 607  
October 30, 2007

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<b>STUDENT NAME</b>	<b>HONOR PLEDGE</b>
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*Dr. Yan Zhang's Section*

See separate sheets

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***Dr. Susanna Wu-Pong's Section***

Describe a class of drug or therapy produced by biotechnology. Include in your description the type of technology involved, how the drug or therapy are designed, and any other issues unique to the drug or therapy that are different compared to small molecules. (10 points)

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***Dr. Glen Kellogg's Section***

Molecular mechanics is based on physical principles and laws rather than chemistry. Give (and very briefly discuss) two examples of how physics is used to describe the conformation and energy of an organic molecule in a typical molecular mechanics forcefield. (10 points)

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*Dr. Jason Rife's Section*

**(2 pts. each)**

1. The mechanism of antisense action that leads to mRNA degradation requires which protein:
  - a. Dicer
  - b. RNase H
  - c. Ribosome
  - d. No protein is required, the antisense drug can cleave mRNA.
2. The group I intron ribozyme that we discussed can be used to
  - a. repair a defect in a specific mRNA
  - b. down regulate the expression of a certain gene.
  - c. up regulate the translation of all mRNA.
  - e. integrate a new gene into the chromosome.
3. siRNA has the potential to therapeutically
  - a. up regulate the expression of a gene.
  - b. down regulate the expression of a gene.
  - c. correct a gene.
  - d. a, b, and/or c.
4. List one problem that is common to *all* the methods of gene therapy that we discussed  
\_\_\_\_\_
5. There are several possible strategies for gene replacement therapy. We discussed several ideal qualities a strategy should have. List two of the ones we discussed.  
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\_\_\_\_\_

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*Dr. Lemont Kier's Section*

1. A pharmacophore is
  - a. an active small molecule
  - b. part of an active small molecule
  - c. part of a protein
  - d. part of DNA
2. A receptor
  - a. an active small molecule
  - b. part of an active small molecule
  - c. part of a protein
  - d. part of DNA
3. In a QSAR model
  - a. the lead compound is correlated with properties
  - b. only the properties of compounds are considered
  - c. the properties used in a correlation require transformation to structure information
  - d. only structure is considered
4. The Log P parameter is based on
  - a. lipophilicity
  - b. electronic effects
  - c. steric effects
  - d. biological activity
5. The Hammett sigma parameter is based on
  - a. electronic influence
  - b. steric effects
  - c. lipophilicity
  - d. all of the above
6. Molecular connectivity parameters give information about
  - a. electronic influence
  - b. steric effects
  - c. lipophilicity
  - d. structure

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***Dr. Umesh Desai's Section***

1. What is combinatorial synthesis of molecules? (4 pts) Why was it expected to speed up the process of drug discovery? (2 pts) What is the new realization regarding the limitation(s) of combinatorial drug discovery? Rationalize your answer. (4 pts) In your opinion, what could be done to overcome the limitation(s)? (4 pts)

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2. Define the following (do not write everything you know about these terms!) (6 pts)  
**Receptor-based drug design**

**Pharmacophore-based drug design**

**Mechanism-based drug design**

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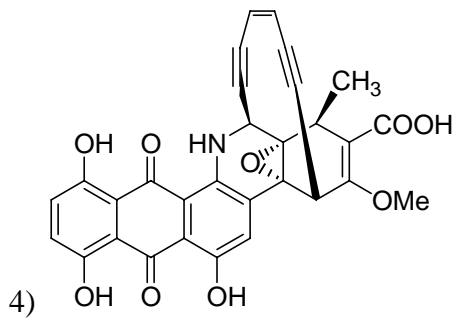
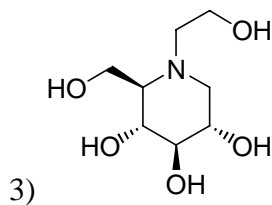
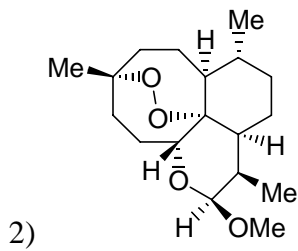
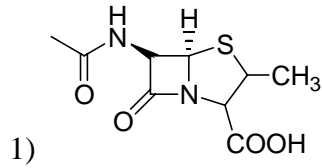
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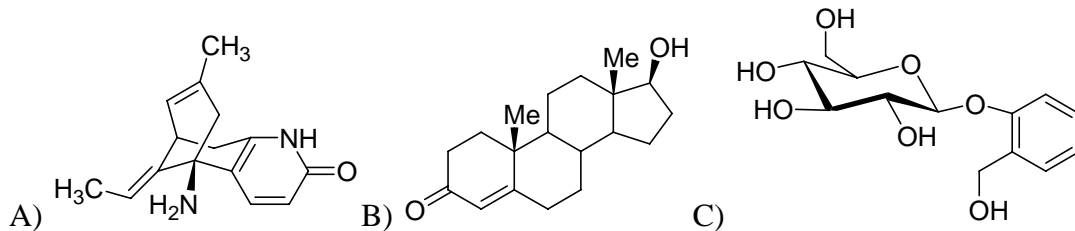
3. What are the key elements of drug discovery? In your opinion, identify the different areas that contribute to a significant extent to discovering drugs and justify in **one** sentence your choice. (10 pts)

1. What is the possible clinical relevance of the following natural products? (One point each)

- A) anti-cancer      B) anti-diabetics      C) anti-malaria      D) antibiotics



2. Which compound below may be the least toxic to human subject? (Two points)



3. The following natural product has been identified a few years ago. Please try to identify its possible pharmacological profile and the possibly most important chemical structure feature for the pharmacological activity you have just figured out. Explain your comments. (Four points)

