DEPARTMENT OF MEDICINAL CHEMISTRY
SCHOOL OF PHARMACY

Introduction to Pharmaceutical Sciences — PCEU/MEDC 607
Exam 1 — October 30, 2006

STUDENT NAME **HONOR PLEDGE**

Dr. Yan Zhang's Section

1. Which of the following comments is **NOT** correct about natural products? (2 points)
   A) Natural products often will contribute to the identification and understanding of novel biochemical pathways both in vivo and in vitro.
   B) Natural products often will provide novel chemical structural skeletons.
   C) The majority of lead compounds for pharmaceutics are from or related to natural products.
   D) Compounds separated from plants, animals and marine environment are called natural products while those from microorganisms are not.

2. Write True (T) or False (F) for each of the following. (2 points each)

(_____) 1) Morphine is the major component from opium puppy extraction and has analgesic effect as well as addiction potency.

(_____) 2) Aspirin was developed based on the lead compound, Salicin, from willow bark.

(_____) 3) Taxol can be used to treat ovary cancer and it has to be extracted from yew tree bark as the only resource.

(_____) 4) While the primary metabolism is the source of energy for survival, the second metabolism actually is the major biological pathway involved for the production of most natural products.

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Dr. Susanna Wu-Pong's Section

Briefly describe how biotechnology will impact drug development. Include at least 1 specific example in your discussion. (10 points)

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Dr. Glen Kellogg's Section

Circle either 'TRUE' or 'FALSE' below that best match the statement. (2 points Each)

1. The global minimum energy conformation for cyclohexane is in the boat conformation.
   TRUE or FALSE

2. The high energy conformation for cyclohexane can be converted to the low energy conformation by continuing the energy minimzation for more cycles.
   TRUE or FALSE

3. The best physical approximation for a bond, as used in molecular mechanics, is a spring (also known as a harmonic oscillator).
   TRUE or FALSE

4. Molecular dynamics is a computational method that allows molecules to have motion by simulating the effects of temperature. This is particularly useful for studying the physics of bond breaking and formation.
   TRUE or FALSE

5. In Systematic Search the angles of all rotatable bonds in a molecule are varied through their full range (0-359 deg) and the minimum structure of all possibilities is chosen as the global minimum conformation.
   TRUE or FALSE

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Dr. Jason Rife's Section

(2/4 pts. each)

1. The primary mechanism of antisense action is
   a. for the DNA oligonucleotide to physically block the ribosome from translating the target mRNA.
   b. for the DNA oligonucleotide to block attachment of the target mRNA onto the ribosome.
   c. to directly cut its target mRNA.
   d. to recruit RNAse H to cut the target 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. 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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Dr. Lemont Kier's Section

Define and reveal the information coming from the Hammett sigma value and the Log P measurement. (10 pts)

STUDENT NAME **HONOR PLEDGE**

Dr. Umesh Desai's Section

1. Draw a diagram showing the combinatorial synthesis of at least 9 different peptides using split and mix strategy. Clearly identify any symbols/labels you use. (8 pts)

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

3. In one sentence each, describe what you understand by random drug search, rational drug search and combinatorial drug search. (6 pts).

4. In continuation of the above question, choose the drug search that you believe is most favored to result in a pharmaceutical agent on the market and rationalize your belief. (10 pts).