Bio 111 Handout for Cell Biology 1

This handout contains:
1. Today's iClicker Questions
2. Handout for today's lecture.

iClicker Question #22A - before lecture

Which of the following forces cause phospholipids to form a bilayer (membrane)?

(A) Ionic bonds
(B) Hydrogen bonds
(C) Hydrophobic interaction.
(D) van der Waals bonds
(E) all of the above.

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iClicker Question #22B - after lecture

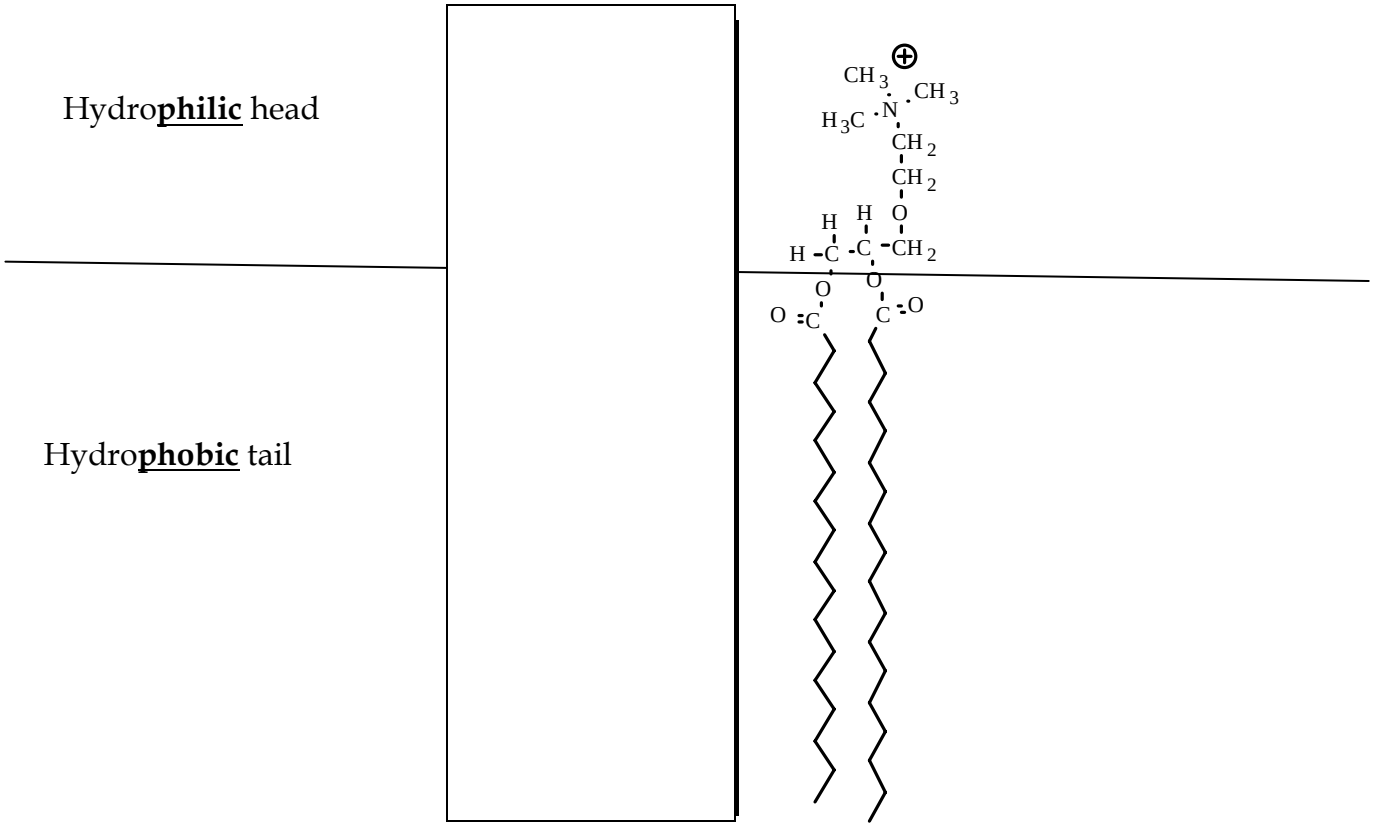
Which of the following statements is TRUE?
(A) Plant cells do not have DNA.
(B) Mitochondria and chloroplasts do not have DNA.
(C) Plant cells have mitochondria.
(D) Bacterial cells have a nucleus.
(E) More than one of the above is true.

Beaming in your answers

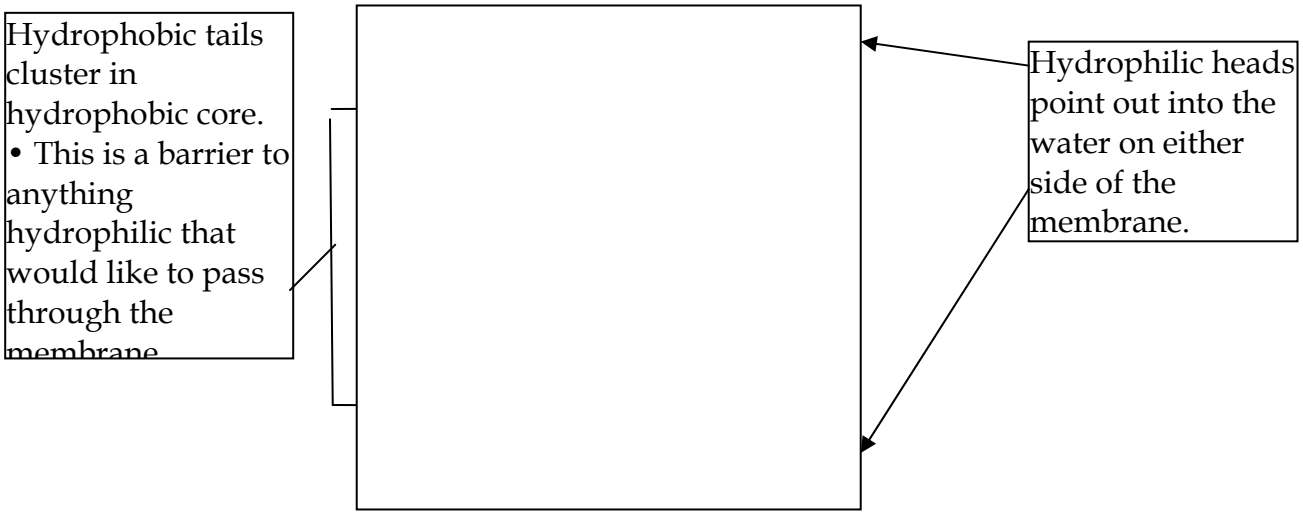
1. Figure out your answer and select the appropriate letter (A-E).
2. Turn on your iClicker by pressing the "ON/OFF" button; the blue "POWER" light should come on. If the red "LOW BATTERY" light comes on, you should replace your batteries soon.
3. Transmit your answer as follows:
    a. Press the button corresponding to the answer you've selected (A thru E).
    b. The "STATUS" light will flash green to indicate that your answer has been received. If the "STATUS" light flashed red, your answer was not received; you should re-send it until you get a green "STATUS" light.

Bio 111 Membranes & Membrane Proteins

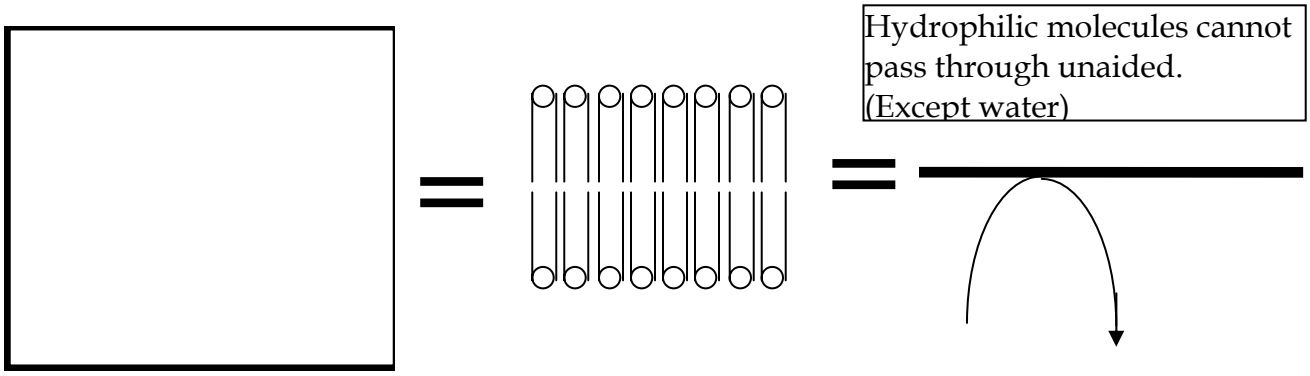
A Phospholipid: (phosphatidyl choline)



One section through the phospholipid bilayer (membrane)

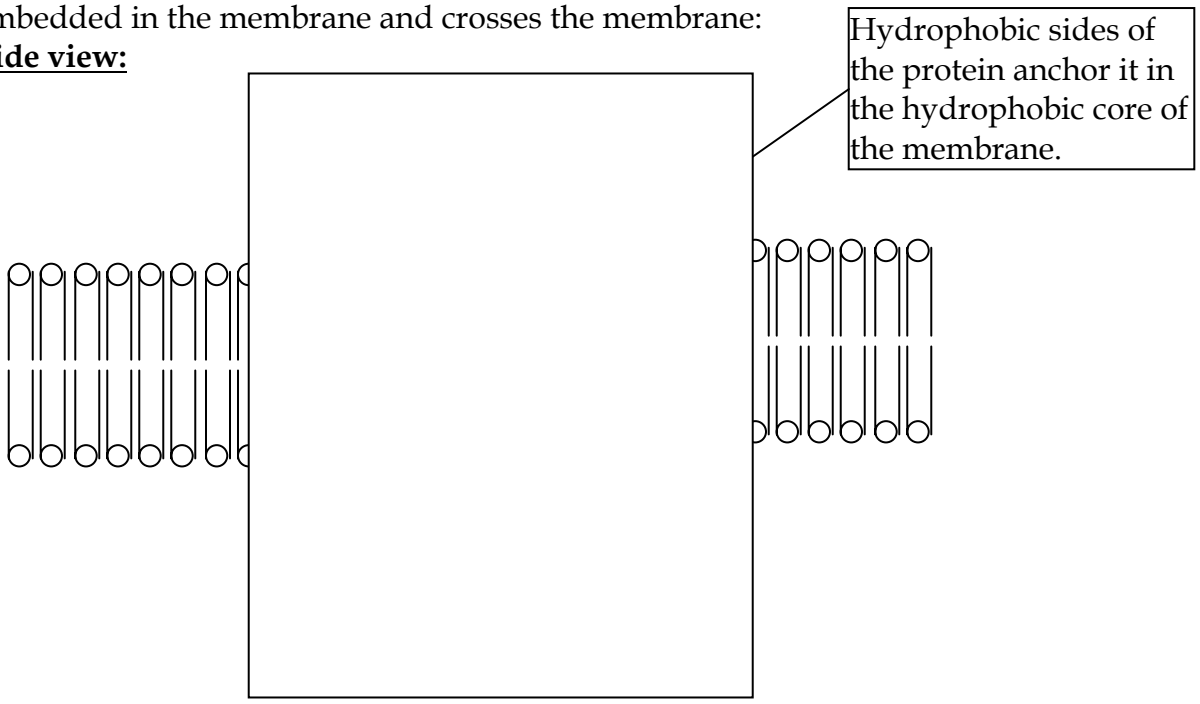


Different representations of a membrane:

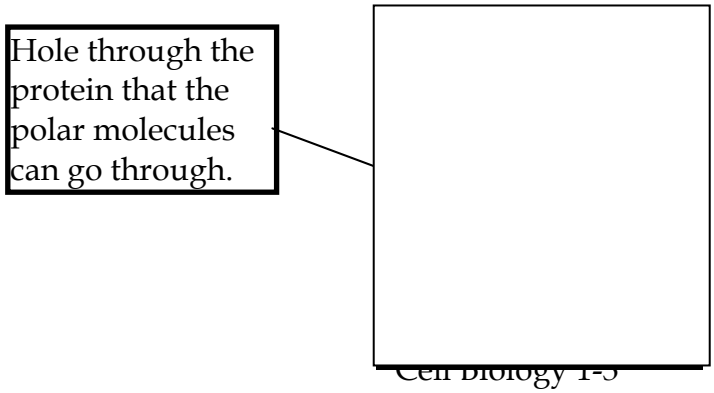


In order to get hydrophilic molecules through a membrane, the cell needs a transport protein that is embedded in the membrane and crosses the membrane:

Side view:



Top view: (membrane not shown)



Bio 111 Handout for Cell Biology 2

This handout contains:
1. Today's iClicker Questions
2. Handout for today's lecture.

iClicker Question #23A - before lecture

Suppose you wanted to treat a bacterial infection. Which of the following drugs would be the best treatment?

(A) Drug A, which is toxic to both bacteria and human cells.
(B) Drug B, which is toxic to bacteria but non-toxic to human cells.
(C) Drug C, which is non-toxic to bacteria but toxic to human cells.
(D) Drug D, which is non-toxic to both bacteria and human cells.
(E) I don't know.

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iClicker Question #23B - after lecture

Suppose you are treating a patient who has an infection with a bacterium that is resistant to penicillin because the bacterium makes the enzyme β-lactamase. In addition to penicillin, you have a drug called clavulanic acid. Clavulanic acid has no effect on transpeptidase, but it is a very effective inhibitor of β-lactamase.

Based on this, which of the following would be the most effective treatment for your patient?

(A) Normal dose of penicillin.
(B) 2-times the normal dose of penicillin.
(C) Clavulanic acid alone.
(D) The normal dose of penicillin with a dose of clavulanic acid sufficient to inhibit β-lactamase
(E) more than one of the above

Beaming in your answers

1. Figure out your answer and select the appropriate letter (A-E).
2. Turn on your iClicker by pressing the "ON/OFF" button; the blue "POWER" light should come on. If the red "LOW BATTERY" light comes on, you should replace your batteries soon.
3. Transmit your answer as follows:
   a. Press the button corresponding to the answer you've selected (A thru E).
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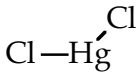
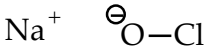
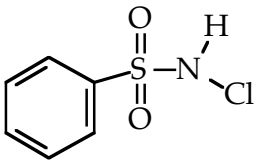
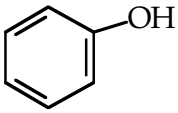
Bio 111: Anti-bacterial agents

Agents available in 1928		Mechanism of action	Kills bacteria	Kills human cells
iodine		covalently attaches to proteins and disrupts their tertiary structure	Yes	Yes
bichloride of mercury				
sodium hypochlorite (chlorox)				
chloramine-T (Dakins Solution)				
phenol (carbolic acid)		non-covalently attaches to proteins and disrupts their tertiary structure	Yes	Yes

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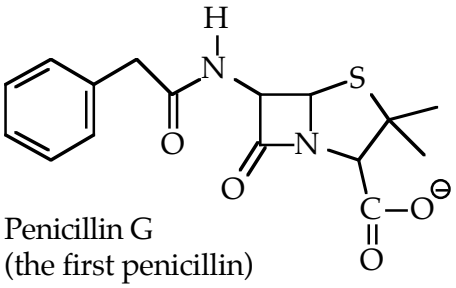
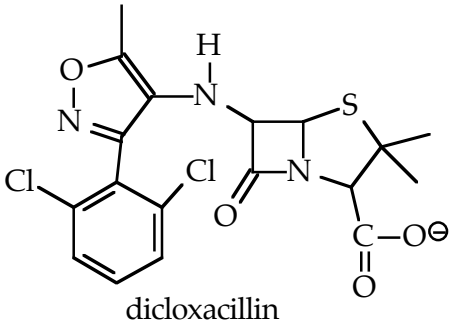
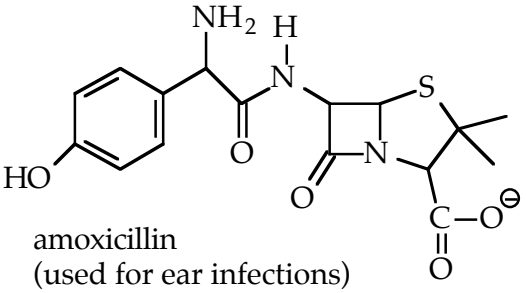
Penicillin and related molecules β-lactam antibiotics



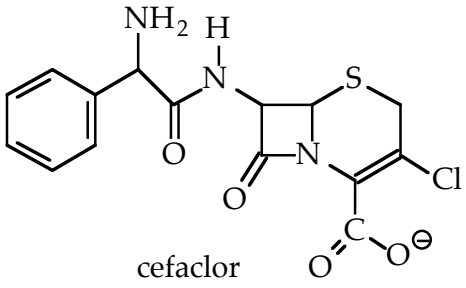
Penicillin G
(the first penicillin)



dicloxacillin



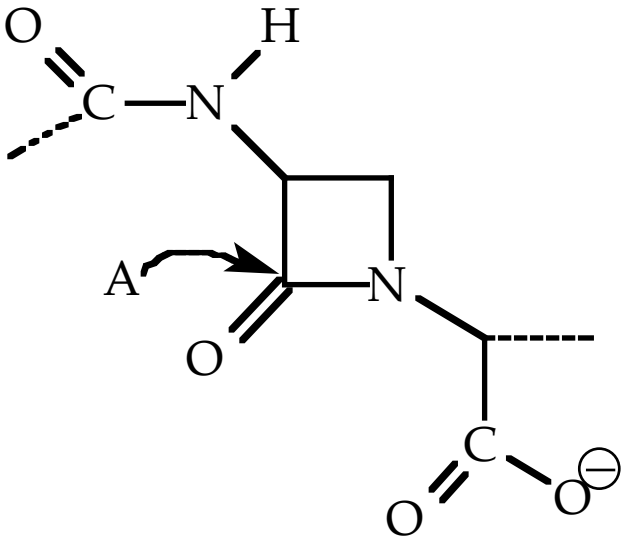
amoxicillin
(used for ear infections)



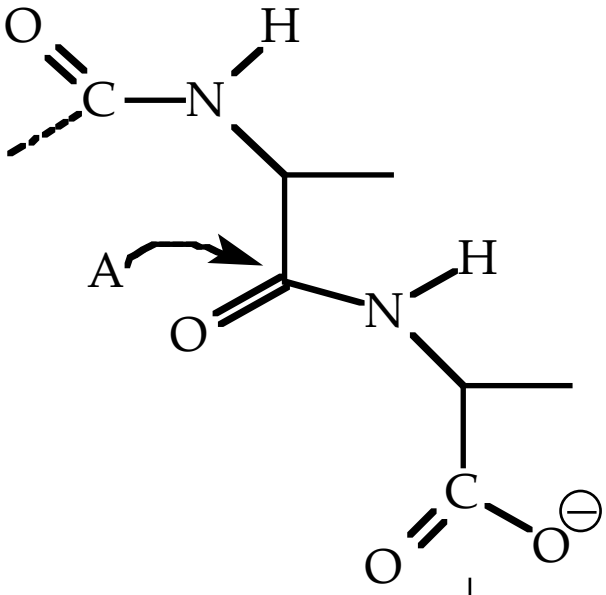
cefaclor

β-lactams

Structure in common to all β lactams

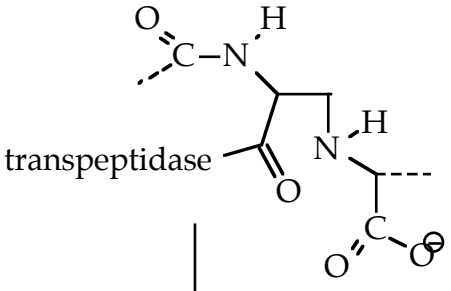


Substrate for transpeptidase enzyme



transpeptidase's active site reacts with carbon "A".

β-lactam molecule
remains covalently attached
to transpeptidase enzyme
(very strained 4-membered ring
opens: very large – ΔG)



transpeptidase enzyme
permanently inactivated

altered substrate
relased from
transpeptidase enzyme

transpeptidase enzyme
remains active