

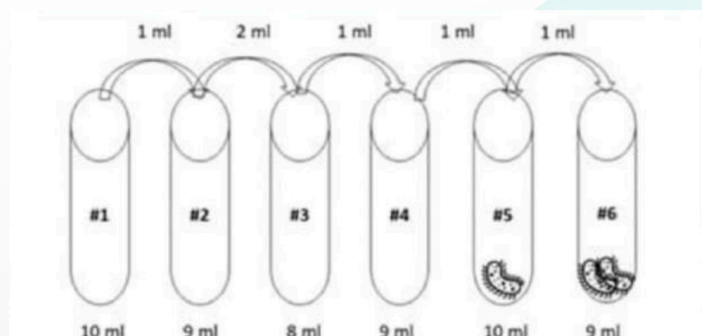


Which of the following adverse drug reactions precludes a patient from being rechallenged with that drug in the future? Equity concerns about fair distribution of resources.

- A. Kidney injury- gentamicin.
- B. Toxic epidermal necrolysis- sulfamethoxazole/trimethoprim
- C. GI upset - clarithromycin
- D. Pseudomembranous colitis clindamycin
- E. Skin rash - Penicillin

2. The picture shows an MIC experiment testing the potency of the antibiotic penicillin V. Penicillin V was added to tube #1 at a concentration of 5 mM (final concentration in tube #1) and then serial dilutions were performed as shown by the arrows (each arrow represents the volume that was added to the next tube. Total volume of each tube before serial dilution is shown below). The tubes were injected with E. coli and incubated overnight. After incubation, visible bacterial growth was only observed in tubes #5 and #6. Which of the following represents the MIC of penicillin V in this experiment?

- A. 0.5mM. B. 0.1 mM
- C. 0.001mM. D. 0.05 mM. E. 0.01mM



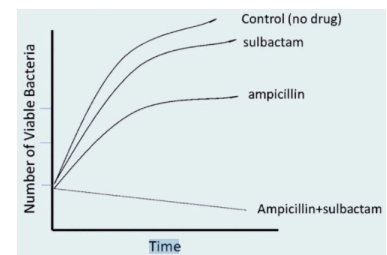


Scientific team

3-The diagram represents viability results from an experiment testing the antibacterial effects of the indicated drugs against *E. coli* in vitro. The synergistic effect observed in the drug combination group is most likely due to?

Time

- A. Activation of gram-negative cell wall porins.
- B. Upregulation of penicillin-binding proteins.
- C. Inhibition of bacterial beta-lactamase activity.
- D. Inhibition of proteoglycan membrane transport.
- E. Inhibition of cytosolic proteoglycan synthesis.



4-

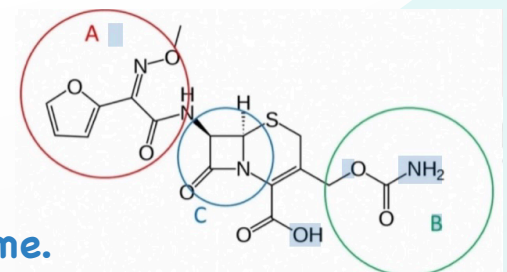
The following diagram depicts the chemical structure of cefuroxime. Based on your understanding of the structure-effect relationship of cephalosporins, which of the following statements is correct?

A

O

NH<sub>A</sub> B OH

- A. Group C is responsible for the activity of cefuroxime against MRSA.
- B. Group C is responsible for the extent of hepatic metabolism of cefuroxime.
- C. Group A is responsible for the pharmacokinetic properties of cefuroxime.
- D. Group A is responsible for determining the antibacterial spectrum of cefuroxime.
- E. Group B is responsible for the susceptibility of cefuroxime to beta-lactamases.



5-55-year-old male patient has been hospitalised for the last 3 days after suffering from severe upper gastrointestinal bleeding. While in the hospital, and possibly due to aspiration, the patient started developing fever, dyspnea, and productive cough, with pleuritic chest pain. On examination, the patient had purulent sputum and auscultatory signs of pulmonary consolidation. Radiography showed widespread pulmonary infiltrates suggestive of MRSA infection. Your initial evaluation highly favours the possibility of nosocomial aspiration pneumonia. Which of the following antibiotics must be included in your empiric therapy regimen?

Scientific team

- B. Cefepime
- C. Linezolid.
- D. Nafcillin.
- E. Ceftriaxone.



1

6-The graphs in the diagram represent data collected from a next experiment measuring protein synthesis of human heart mitochondria incubated with one of the indicated five antibiotics. The rate of mitochondrial protein synthesis is depicted on the y axis while drug concentration is depicted on the x axis. IC50 values were calculated as shown on each plot. Which of the following protein synthesis inhibitors do you expect to be associated with the most adverse reactions/toxicity?

100

Clindamycin

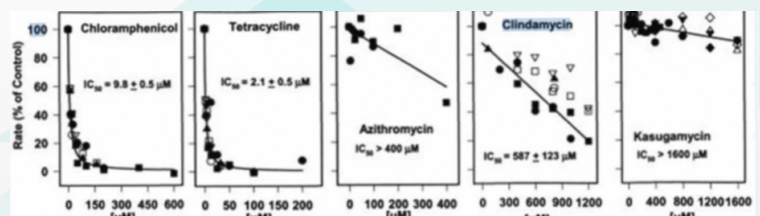
Lasner A. Azithromycin.

B. Chloramphenicol.

C. Tetracycline.

D. Kasugamycin.

E. Clindamycin.

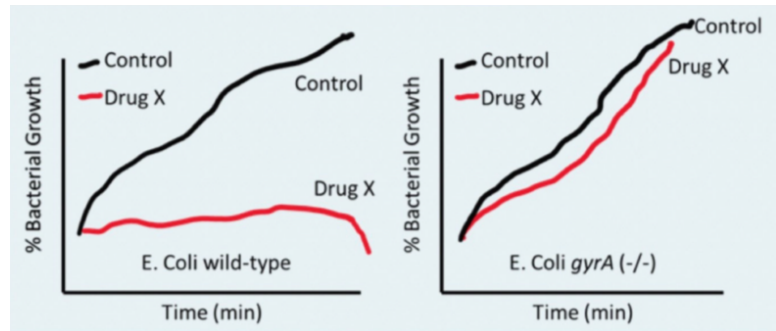




Scientific team

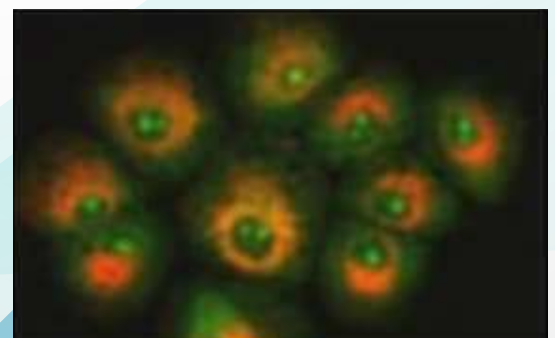
7-In an experiment, you were identifying the growth inhibitory effect of Drug X on two strains of *E. coli*: *E. coli* wild-type (regular) strains vs. *E. coli gyrA* knockouts (*gyrA*  $-/-$  which means it is missing the gene *gyrA*) as shown in graph A and B, respectively. Based on the data shown in both figures, you highly suspect that Drug X is?

- A. Levofloxacin.
- B. Daptomycin.
- C. Trimethoprim.
- D. Clarithromycin.
- E. Linezolid.



8-H460 is a non-small cell lung cancer cell line used frequently for in vitro studies of anticancer drug sensitivity, H460 cells were exposed to 1 micromolar camptothecin for 24 hours in culture. After 48 hours the cells were growth-arrested and stained positive for acridine orange staining (orange color in the image) indicative of autophagy induction. The induction of autophagy in H460 cells in response to camptothecin is most likely due to which type of DNA damage:

- A. insertion-deletion mismatches
- B. Inter- and intrastrand DNA crosslinks
- C. methylation of the O6 position of guanine
- D. Single-stranded DNA breaks
- E. Double-stranded DNA breaks





Scientific team

9-33-year old healthy female presents with 2-day history of dysuria (painful urination), urinary frequency and urgency. Urine culture indicated that she has an uncomplicated urinary tract infection caused by *E. coli*. Which of the following agents will be your FIRST CHOICE for the treatment of the lady?

- A. Bacitracin.
- B. Sulfadiazine.
- C. Nitrofurantoin.
- D. Moxifloxacin.
- E. Clotrimoxazole.

20

10-A 45-year-old man presented to the emergency room with localized papulopustular eruption on his upper back. The rash was associated with great discomfort and pruritis. Cotton swab samples of the pus were sent for gram-staining and culture, but you highly suspect that the cause of infection is methicillin-resistant *S. aureus* (MRSA). Which of the following antibiotics will you choose to start treatment while waiting for the culture results?

- A. Amoxicillin + clavulanic acid.
- B. Ceftazidime.
- C. Ciprofloxacin.
- D. clindamycin
- E. Nafcillin.



Scientific team

11-Which of the following anticancer drugs is expected exert is maximal effect in the S phase of the cell cycle:

- A. Vincristine
- B. Cyclophosphamide
- C. Paclitaxel
- D. Carboplatin
- E. 5-Fluorouracil

12-A 44-year-old AIDS male patient presents to the clinic with dyspnea, fever, and tiredness. His chest x-ray shows typical lobar pneumonia. Sputum was collected for culture which was positive for the fungus *Histoplasma capsulatum*. Which of the followings is the drug of choice for the treatment of pneumonia in this patient:

- A. Voriconazole
  - B. Itraconazole
  - C. Ceftriaxone
  - D. Paromomycin
- Tashemite Universit

13-310-A 23-year-old male patient living in the countryside came to your clinic after an outbreak of gastroenteritis in his village. The patient has no symptoms and feels fine, but he is worried that he might be infected since all his family members developed dysenteric diarrhea over the past week. Upon his request, you ordered a stool analysis which confirmed the existence of

E. histolytica cysts. Which of the following options is best to treat this patient:

- A. Paromomycin
- B. Albendazole
- C. Chloroquine
- D. Metronidazole
- E. Metronidazole +iodoquinol



Scientific team

## Answers

1:B

2:E

3:C.

4:D

5:C

6:C

7:A

8:D

9:C

10:D

11:E

12:B

13:A