



Scientific team

1. A 16-year-old male high school football player takes 800 mg of ibuprofen after morning practice for a sore knee. Ibuprofen has a half-life of about 2 hrs. What percentage of the original plasma load of ibuprofen will remain in his blood when afternoon practice starts in 4 hrs?

- A. 0%
- B. 12.5%
- C. 25%
- D. 50%
- E. 75%

Answer: C

2. A 64-year-old female patient (60 kg) is treated with experimental Drug A for type 2 diabetes. Drug A is available as tablets with an oral bioavailability of 90%. If the  $V_d$  is 2 L/kg and the desired steady-state plasma concentration is 3.0 mg/L, which of the following is the most appropriate oral loading dose of Drug A?

- A. 6mg
- B. 6.66mg
- C. 108 mg
- D. 360 mg
- E. 400 mg

Answer: E

3. Drugs which are lipid soluble:

- A. do not usually penetrate CNS
- B. generally have very long elimination half lives
- C. are readily excreted by kidney without prior metabolism
- D. All of the above
- E. None of the above

Answer: E

4. Which of the following is an enzyme inducer?

- A. cimetidine
- B. chloramphenicol
- C. rifampicin
- D. oestrogens
- E. erythromycin

Answer: C

5. A patient receives a single dose of antibiotics following a prostate needle biopsy. He takes 500 mg of ciprofloxacin immediately after completion of the procedure. The half-life of the medication is 8 h. At approximately how many half-lives will it take for 90% of the drug to be excreted from the body?

- A. 1.0
- B. 2.0
- C. 3.0
- D. 3.3
- E. 5.0

Answer: D



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6. All the following are possible consequences of phase-I biotransformation reaction EXCEPT:

- A. Production of a pharmacologically inactive metabolite
- B. Conversion of a pharmacologically inactive to an active substance
- C. Conversion of one pharmacologically active to another active substance
- D. Combination of a drug with an endogenous substance
- E. Production of a toxic metabolite

Answer: D

7. A 74-year-old man was admitted to the hospital for treatment of heart failure. He received 160 mcg of digoxin intravenously, and the plasma digoxin level was 0.4 ng/mL. If the desired plasma concentration of digoxin for optimal therapeutic activity in heart failure is 1.2 ng/mL, and the patient has an estimated  $V_d$  of 400 L, calculate the additional dose of digoxin needed for this patient to achieve the desired plasma concentration.

- A. 128 mcg
- B. 160 mcg
- C. 320 mcg
- D. 480 mcg
- E. 640 mcg

Answer: C

8. Conjugation of a drug with glucuronic acid:

- A. Increases its water solubility
- B. Is an example of a phase-I biotransformation reaction
- C. Involves cytochrome P-450
- D. Occurs in the same rate in adults and in the newborn
- E. Usually results in increased activity of the drug

Answer: A

9. A 55-year-old man with chronic cardiac failure currently takes multiple medications, including digoxin.

He is brought to the emergency department because of slurred speech and inappropriate behavior. It turns out that he has not taken his digoxin for the last 2 weeks. The physician gives 125 microgram as standard dose. Twenty-four hours later, his serum levels were reported to be 2 ng/mL (= 2 microgram/L). The target therapeutic level is 0.8 ng/mL. What dose of digoxin should he receive?

- A. 25 mcg (microgram)
- B. 50 mcg (microgram)
- C. 75 mcg (microgram)
- D. 100 mcg (microgram)
- E. 125 mcg (microgram)

Answer: B

10. A 27-year-old female with vulvovaginal candidiasis is given a one-time 100 mg dose of oral fluconazole. She has no other pertinent medical problems and takes no prescription medications. Administration of the medication results in a peak plasma concentration of 20 mcg(microgm)./mL. What is the apparent volume of drug distribution?

- A. 1 L
- B. 3 L
- C. 5 L
- D. 10 L
- E. 50 L

Answer: C



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11. A 29-year-old man presents to his primary care physician complaining of dysuria, urgency, and painful ejaculation. The patient has a past medical history of allergic rhinitis. Physical examination reveals a tender prostate. The patient is given a prescription of sulfamethoxazole to be taken daily (every 12 h) for 30 days. The half-life is 12 h. How long will it take for the medication to reach 90% of its final steady state level?

- A. 10 h
- B. 20 h
- C. 30 h
- D. 40 h
- E. 50 h

Answer: D

12. A 40-year-old male patient (70 kg) was recently diagnosed with infection involving methicillin-resistant *S. aureus*. He received 2000 mg of vancomycin as an IV loading dose. The peak plasma concentration of vancomycin was 28.5 mg/L. The apparent volume of distribution is:

- A. 1 L/kg
- B. 7 L/kg
- C. 10 L/kg
- D. 14 L/kg
- E. 70 L/kg

Answer: A

13. Drug A is a weakly basic drug with a  $pK_a = 7.8$ . If administered orally, at which of the following sites of absorption will the drug be able to readily pass through the membrane?

- A. Mouth (pH approximately 7.0)
- B. Stomach (pH of 2.5)
- C. Duodenum (pH approximately 6.1)
- D. Jejunum (pH approximately 8.0)
- E. Ileum (pH approximately 7.0)

Answer: D

14. A 58-year-old man is recovering in the hospital following a heart attack. He is started on clopidogrel. The initial loading dose, is higher than his normal daily maintenance dose. Which of the following represents the calculation for a maintenance dose?

- A.  $= 0.7 \times V_d / t_{1/2}$
- B. = amount of drug in body/drug plasma concentration
- C.  $= C_p \times CL / F$
- D.  $= C_p \times V_d / F$
- E.  $= C(\text{urine}) \times V_d / C_p$

Answer: C

15. Which of the following statements is INCORRECT:

- A. Unionized drug is lipid-soluble and diffusible.
- B. Ionized drug is lipid-insoluble and non-diffusible.
- C. Weak base drugs are best absorbed in the intestine
- D. Weak acid drugs become less ionized in an acidic medium
- E. Acidification of urine enhances renal reabsorption of weak base drugs

Answer: E



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16: A 55-year old male patient presents to the ER unit with a large painful swelling on his right shin. The patient recalls minor trauma to his leg a few days ago while doing some repairs in his garage. On examination, the patient had an abscess surrounded by erythema (shown in the image). The patient vitals for mild fever. The patient has diabetes mellitus type II with moderate control of his blood sugar weg stable except with lifestyle changes and metformin. The ER physician decided to initiate empirical therapy based on the most common bacteria that can cause this condition and prescribed Drug X 300- 450 mg PO q8h for 5-7d (after taking a swab for culture) and sent the patient home. After 3 days, the patient condition has improved and culture was positive for MRSA. Based on the previous information, Drug X is most likely to be: \* (1 Point)



- A• Erythromycin
- B• Ceftriaxone
- C• Clindamycin
- D• Daptomycin
- E• Vancomycin

Answer:E

17: In the lab, you were able to isolate a new strain of E. Coli that uniquely has altered structure of its small 30 S ribosomal subunit. Which of the following antibiotics will likely to be ineffective against this new bacteria in culture?\* (1 point)

- A• Minocycline
- B• Azithromycin
- C• Aztreonam
- D• Chloramphenicol
- E• Clarithromycin

Answer: A

18 : A 52-year old, chronic renal failure female patient presents with signs and symptoms of severe, life- threatening, bacterial gastroenteritis. Stool analysis and culture indicated that the causative agent is C. difficile. You have 5 different antibiotics with variable characteristics to choose from (see the table) to treat this condition. Which of these antibiotics will be your first choice? \* (1 Point)

Drug Name	Efficacy against C. difficile	Absorption	Hepato-enteric metabolism	Renal excretion	Cost
Drug A	+++	Low	High	Low	\$\$\$
Drug B	++++	Moderate	Moderate	High	\$
Drug C	+	Low	Extensive	Low	\$\$
Drug D	+	High	Low	Low	\$\$
Drug E	++	High	Low	High	\$

- A• Drug A\*
- B• Drug B
- C• Drug C
- D• Drug D
- E• Drug E

Answer:A



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A 55-year-old female was hospitalized for throbbing flank pain. In addition, the patient had marked fever, chills, and malaise and reported the presence of blood in her urine. On physical examination, she had flank tenderness and signs of dehydration. The patient has diabetes mellitus type II and previous history of kidney stones. Urine analysis showed abundance of RBCs and WBCs in urine. Kidney ultrasound showed signs of perirenal abscess. The patient was diagnosed with complicated pyelonephritis. Drug history indicated a previous hypersensitive reaction (skin rash) to sulfa drugs. Which of the following antibiotics is BEST for the treatment of this patient.?

- A• Nitrofurantoin 100 mg PO BID for 5-7d
- B• Levofloxacin 750 mg IV daily for 5
- C• Fosfomycin 3 g PO as a single dose with 3-4 oz of water
- D• Nitrofurantoin 50-100 mg PO QID for 7d
- E• Trimethoprim/sulfamethoxazole 160 mg/800 mg 1 tablet PO BID for 3d

Answer : B

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 *Aspergillus fumigatus*. Which of the followings is the DRUG OF CHOICE for the treatment of pneumonia in this patient?

- A• Itraconazole
- B• Voriconazole\*\*
- C• Ceftriaxone
- D• Amphotericin B
- E• Flucytosine-5

Answer : B

In the lab, you were trying to experimentally find a drug combination that will produce maximum inhibition of ergosterol synthesis. For that you used a fungal cell line grown in culture, then you treated it with different combinations of antifungals. Next, you homogenized all the fungal samples and measured ergosterol concentration. Which of the following antifungal combinations is expected to produce the LOWEST ergosterol level?.

- A• Nystatin + Amphotericin
- B• Posaconazole + ciclopirox
- C• Amphotericin B+ 5-flucytosine
- D• Fluconazole + terbinafine\*\*
- E• Caspofungin + itraconazole

Answer : D

A 26-year old female patient presented to the clinic with abdominal pain and fever of 10 days. Examination indicated abdominal left upper quadrant tenderness. Ultrasound revealed a rounded, hypoechoic mass in the liver with well-defined margins (see image). The patient reported having had severe dysentery 1 month ago. Serological EIA test showed antibodies specific for *E. histolytica*. Which of the following drug combinations is your BEST option to treat the patient's condition?

- A• Tinidazole + iodoquinol
- B• Metronidazole + chloroquine
- C• Metronidazole + paromomycin\*\*
- D• Iodoquinol + paromomycin
- E• Albendazole + paromomycin

Answer : C

