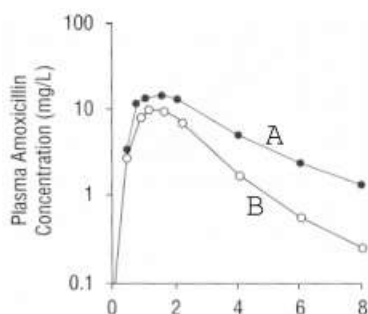


PHA 5127 Case Study 5 2013

1. A male patient (30-year old, 100kg, 5'5" height) was given a 400 mg IV bolus dose of drug X. His serum creatinine level was determined to be 1.0 mg/dL.
 - a) Please calculate the patient's creatinine clearance.
 - b) Assume that drug X is solely eliminated via the kidneys. The volume of distribution of drug X is 20 L. Please calculate the half-life, $AUC_{0-\infty}$, and plasma concentration after 8 hours of drug X.

2. The image below shows an Amoxicillin concentration-time profile when administered with and without Probenecid. Amoxicillin is eliminated solely via the kidneys and Probenecid inhibits its active renal secretion. Please identify the curve that corresponds best to Amoxicillin when administered alone or in combination with Probenecid. Justify your answer by comparing the PK parameters, such as the peak plasma concentration (C_{max}), half-life ($t_{1/2}$), renal clearance (CL_R), total clearance, etc. between the two scenarios.



3. Based on the information given below, state the likely involvement of filtration, secretion, and tubular reabsorption in the renal clearance (CL_R) of each drug listed. The GFR (glomerular filtration rate) is 120 mL/min and urine flow is 1.5 mL/min.

| | CL_R (mL/min) | Fraction unbound in plasma (f_{up}) |
|--------------|--------------------|--|
| Theophylline | 10 | 0.50 |
| Phenytoin | 0.15 | 0.10 |
| Cefonicid | 20 | 0.02 |
| Digoxin | 100 | 0.79 |

4. The renal clearance of inulin is equal to the GFR. Which statement is incorrect regarding inulin?
 - (A) It is not bound to plasma proteins
 - (B) It undergoes renal tubular secretion
 - (C) It does not undergo passive reabsorption
 - (D) It does not undergo active reabsorption
 - (E) Both A and D