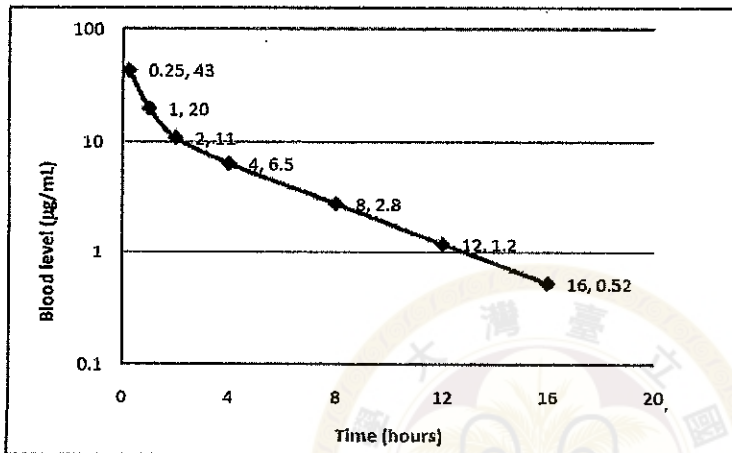
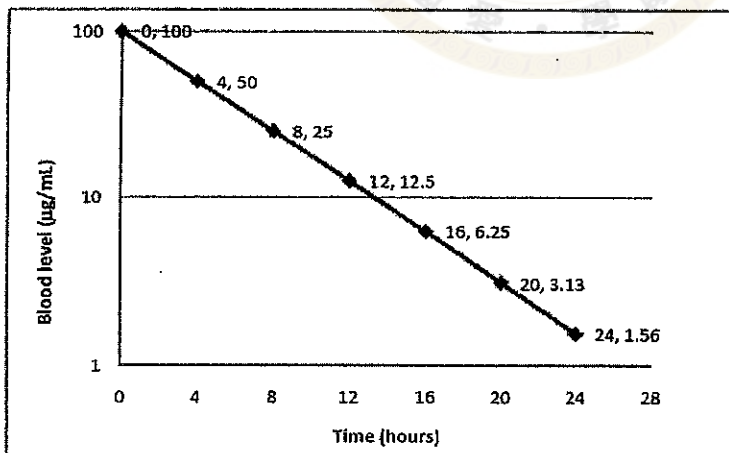


一、 甲、乙、丙等三藥品為研發中之抗癌藥物，分別在六十公斤健康男性經靜脈注射相同劑量 5 mg 之藥品，24 小時藥品血中濃度變化分別如圖甲、圖乙、及圖丙，圖中資料標籤(x,y)分別表示不同時間點 x，對應之血中濃度值 y，請留意圖中縱座標單位。

圖甲— 甲藥之血中濃度變化

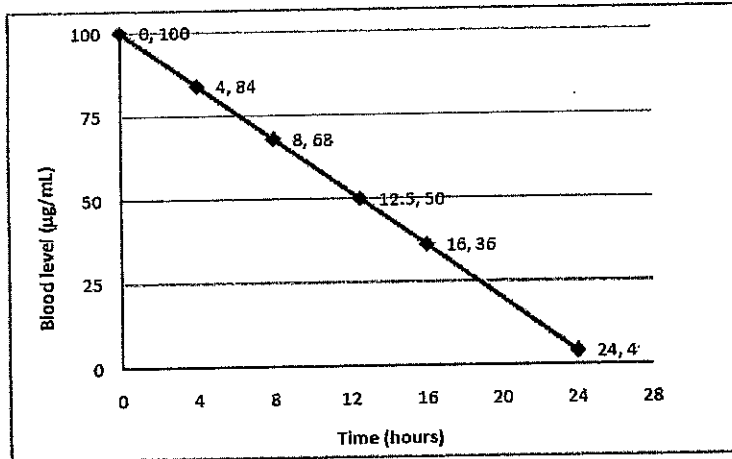


圖乙— 乙藥之血中濃度變化



圖丙— 丙藥之血中濃度變化

見背面



請回答下列問題(每題五分，第9題十分，共五十分)

- 請問甲藥可用以下哪一個數學方程式得以正確描述之? (C_p 表給藥後第 t 小時之血中濃度)

 - (1) $C_p = 100 e^{-0.173t}$
 - (2) $C_p = 45e^{-1.8t} + 15e^{-0.21t}$
 - (3) $C_p = 100 - 4t$
 - (4) 以上皆非
- 請問乙藥可用以下哪一個數學方程式得以正確描述之? (C_p 表給藥後第 t 小時之血中濃度)

 - (1) $C_p = 100 e^{-0.173t}$
 - (2) $C_p = 45e^{-1.8t} + 15e^{-0.21t}$
 - (3) $C_p = 100 - 4t$
 - (4) 以上皆非
- 請問丙藥可用以下哪一個數學方程式得以正確描述之? (C_p 表給藥後第 t 小時之血中濃度)

 - (1) $C_p = 100 e^{-0.173t}$
 - (2) $C_p = 45e^{-1.8t} + 15e^{-0.21t}$
 - (3) $C_p = 100 - 4t$
 - (4) 以上皆非
- 請問甲乙丙三藥品中，何者血中濃度變化為 two compartments model?

- (1) 甲藥
 - (2) 乙藥
 - (3) 丙藥
 - (4) 以上皆非
5. 請問甲乙丙三藥品中，何者血中濃度變化為 zero order kinetic?
- (1) 甲藥
 - (2) 乙藥
 - (3) 丙藥
 - (4) 以上皆非
6. 請問甲藥之排除半衰期為何?
- (1) 4 小時
 - (2) 3.3 小時
 - (3) 0.4 小時
 - (4) 以上皆非
7. 請問乙藥之排除半衰期為何?
- (1) 4 小時
 - (2) 3.3 小時
 - (3) 0.4 小時
 - (4) 以上皆非
8. 請問丙藥之排除半衰期為何?
- (1) 4 小時
 - (2) 3.3 小時
 - (3) 0.4 小時
 - (4) 以上皆非
9. 請問甲乙丙三藥之中央室分布體積，何者較大?並說明理由。

見背面

二、請詳述解題過程

1. A patient was given 250 mg of a drug by IV bolus dose, and periodic urinary data was collected as the following:

Time (hr)	Plasma concentrations ($\mu\text{g/ml}$)	Urinary volume (ml)	Urinary concentration ($\mu\text{g/ml}$)
0	25	100	0
1	20	125	288
2	16	140	190
3	15	100	212
4	10	80	210
5	8	250	55
6	7	170	60
8	4	90	75
10	3	240	17

- (a) Please estimate the total clearance of this drug. (10 分)
- (b) Please estimate the renal clearance of this drug. (10 分)
- (c) According to the answer of (b), is the drug secreted or re-absorbed in the renal tubules? (5 分).
- (d) The usual therapeutic range for this drug is between 5 and 15 $\mu\text{g/ml}$. Adverse toxicity for this drug is often observed at serum concentrations greater than 25 $\mu\text{g/ml}$. Calculate a dosage regimen (multiple IV doses) that will maintain the serum drug concentration between 5 and 15 $\mu\text{g/ml}$. (10 分) ($\ln 3 = 1.1$)
- (e) If the percent of unchanged drug excreted in the urine is 0.7, calculate the dosage regimen for a female patient (40 years, 65 kg) whose serum creatinine is 2 mg/dL. (5 分).

2. The hepatic intrinsic clearances of two drugs are

Drug A: 1300 ml/min

Drug B: 26 ml/min

Both drugs are mainly metabolized by CYP2C19. Which drug is likely to show the greatest decrease in hepatic clearance in a patient who is a CYP2C19 poor metabolizer?

(Explain the reason) (5 分)

3. Calculate the half-life of a drug (I.V. bolus) with AUC value of 621 mg-hr/L and AUMC value of 1865 mg-hr²/L. (assume one-compartment model) (5 分)

