

薬剤学 I 試験解答用紙 (2004 年度)

2年 Y S 番号 _____ 氏名 _____

問 1	1	<p>a) 初濃度 (2 ng/ml) から半減するのに 3 h を要している : $t_{1/2} = 3 \text{ (h)}$</p> <p>b) $\lambda = \ln 2 / t_{1/2} = 0.693 / 3 = 0.231 \text{ (h}^{-1}\text{)} \rightarrow 0.23 \text{ h}^{-1}$</p> <p>c) $V = \text{投与量} / \text{初濃度} = 500 / 2 = 250 \text{ (l)}$ $(0.5 \text{ mg} = 500 \text{ }\mu\text{g}; 2 \text{ ng/ml} = 2 \text{ }\mu\text{g/l})$</p>			
	2	a	c	b	e
問 2	1	<p>投与間隔が 2 半減期なので : $e^{-\lambda\tau} = e^{-\lambda(2t_{1/2})} = (1/2)^2 = 1/4$</p> <p>患者あたりの分布容積 : $V = 4 \times 50 = 200 \text{ (l)}$ $D/V = 150 / 200 = 0.75 \text{ (mg/l)} = 0.75 \text{ (}\mu\text{g/ml)}$</p> <p>$\lambda = \ln 2 / t_{1/2} = 0.693 / 6$</p> <p>$C_{ss,max} = C_{ss}(t=0) = D/V / (1 - e^{-\lambda\tau}) = 0.75 / (1 - 1/4) = 1.0 \text{ (}\mu\text{g/ml)}$</p> <p>$C_{ss,min} = C_{ss}(t=12 \text{ h}) = C_{ss,max} e^{-\lambda\tau} = 1.0 \times 1/4 = 0.25 \text{ (}\mu\text{g/ml)}$</p> <p>$C_{ss,av} = \text{AUC} / \tau = (\text{初濃度}) / \lambda\tau = (D/V) / \lambda\tau = 0.75 / (0.693/6) / 12 = 0.541 \rightarrow 0.54 \text{ }\mu\text{g/ml}$</p>			
	2	<p>$D_1 / V = C_{ss,max}$</p> <p>$D_1 = C_{ss,max} V = 1.0 \times 200 = 200 \text{ (mg)}$</p>			
問 3	1	<p>a) $CL_{tot} = D_{iv} / \text{AUC}_{iv} = 200 / 2.5 = 80 \text{ (l/h)}$</p> <p>b) $CL_h = A_{iv,mc} / \text{AUC}_{iv} = 160 / 2.5 = 64 \text{ (l/h)}$</p> <p>c) $CL_r = CL_{tot} - CL_h = 80 - 64 = 16 \text{ (l/h)}$</p>			
	2	<p>a) $A_{po,e} = CL_r \text{AUC}_{po} = 16 \times 1 = 16 \text{ (mg)}$</p> <p>b) 循環血中到達後の代謝量 : $A_{po,m} = CL_h \text{AUC}_{po} = 64 \times 1 = 64 \text{ (mg)}$</p> <p>$A_{r,m} = A_{po,mc} - A_{po,m} = 260 - 64 = 196 \rightarrow 200 \text{ mg}$</p>			
	3	<p>a) $F = (\text{AUC}_{po} / D_{po}) / (\text{AUC}_{iv} / D_{iv}) = (1/500) / (2.5/200) = 0.16$</p> <p>b) 総吸収量 = $A_{po,mc} + A_{po,e} = 260 + 16 = 276 \text{ (mg)}$</p> <p>$F_a = (\text{総吸収量}) / D_{po} = 276 / 500 = 0.552 \rightarrow 0.55$</p> <p>c) $E_h = A_{r,m} / (\text{総吸収量}) = 196 / 276 = 0.710 \rightarrow 0.71$</p>			

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問 4											
問 5	1	a	Langmuir	b	結合定数	c	結合部位数	d	Scatchard	e	n-K - K-r
	2	a	well stirred	b	固有クリアランス	c	血流速度	d	Q	e	血流
問 6	1	<p>尿中排泄速度 = $C_p \text{GFR} + S$ $2.6 = 0.004 \times 120 + S$ $S = 2.12 \text{ (mg/min)} \rightarrow 2.1 \text{ mg/min}$ $(4 \mu\text{g/ml} = 0.004 \text{ mg/ml})$</p>									
	2										
問 7	1	25 l	2	1.4 h	3	19 mg	4	0.69 l/h/kg	5	14 l/h	
	6	25 l/h	7	0.88 $\mu\text{g}\cdot\text{h/ml}$	8	22 mg/h	9	35 l/h	10	2.3 h	
問 8	1	×	2	○	3	○	4	○	5	×	
	6	×	7	×	8	○	9	×	10	○	