

1. Luento z: pillerin side $a = a_0 \sqrt{1 - t/\tau}$ $a_0 =$ alkuside

$$\tau = \frac{\rho a_0^2}{M \partial DCs} = \text{cliniikki}$$

$$m = N_1 \rho \frac{4}{3} \pi a_{1,0}^3 = N_2 \rho \frac{4}{3} \pi a_{2,0}^3 \Rightarrow \frac{N_1}{N_2} = \left(\frac{a_{2,0}}{a_{1,0}} \right)^3 = 10^{-3}$$

$$\frac{\tau_1}{\tau_2} = \frac{a_{0,1}^2}{a_{0,2}^2} = 100 \Rightarrow \tau_2 = \tau_1 / 100$$

$$J_{1,TOT} = N_1 A_1 D \frac{cs}{a_1}$$

$$A_1 = 4\pi a_1^2$$

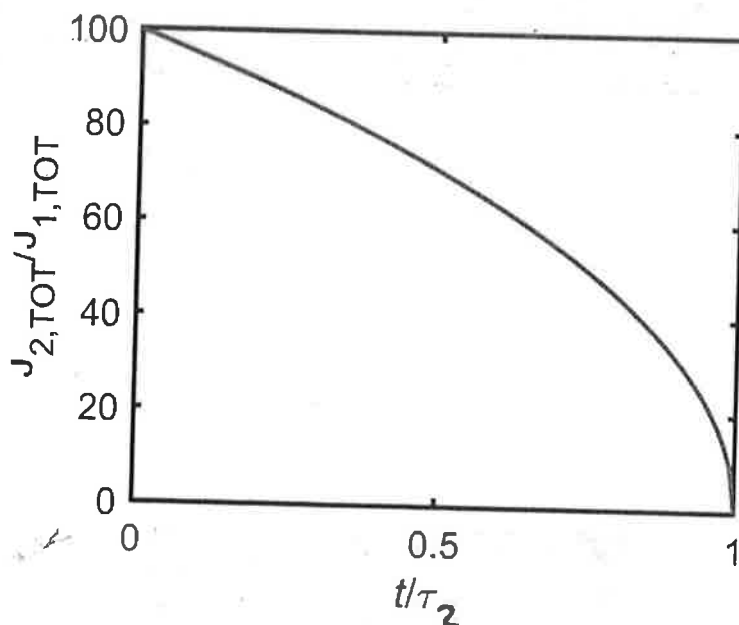
$$\left. \begin{array}{l} A_1 = 4\pi a_1^2 \\ A_2 = 4\pi a_2^2 \end{array} \right\} \frac{A_1}{A_2} = \frac{a_1^2}{a_2^2}$$

$$J_{2,TOT} = N_2 A_2 D \frac{cs}{a_2}$$

$$\begin{aligned} \frac{J_{1,TOT}}{J_{2,TOT}} &= \frac{N_1}{N_2} \frac{A_1}{A_2} \frac{a_2}{a_1} = \frac{N_1}{N_2} \frac{a_{0,1}^2 (1 - t/\tau_1)}{a_{0,2}^2 (1 - t/\tau_2)} \frac{a_{0,2} \sqrt{1 - t/\tau_2}}{a_{0,1} \sqrt{1 - t/\tau_1}} \\ &= \frac{N_1}{N_2} \frac{a_{0,1} \sqrt{1 - t/\tau_1}}{a_{0,2} \sqrt{1 - t/\tau_2}} = 10^{-3} \cdot 10 \frac{\sqrt{1 - t/\tau_1}}{\sqrt{1 - 100t/\tau_1}} \end{aligned}$$

Kun $t=0$, $J_{2,TOT} = 100 \cdot J_{1,TOT}$

$$\frac{J_{1,TOT}}{J_{2,TOT}} = 0,01 \frac{\sqrt{1 - t/100\tau_2}}{\sqrt{1 - t/\tau_2}}$$



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④

$$\frac{dc}{dt} = \frac{JA}{V_d} - kc \quad \text{tai} \quad \frac{V_d dc}{dt} = r - CL \cdot C = 0 \quad \text{vakiotilassa}$$

$$r = CL \cdot C = 67 \frac{\text{mL}}{\text{min}} \cdot \frac{10 \mu\text{g}}{\text{mL}} = 670 \mu\text{g}/\text{min}$$

$$J = 0.9 \text{ mg}/\text{cm}^2 \text{ h} = \frac{r}{A} \Rightarrow A = \frac{r}{J}$$

$$A = \frac{0.67 \text{ mg}/\text{min}}{\frac{0.9 \text{ mg}/\text{cm}^2}{60}} \approx 44.7 \text{ cm}^2$$

Pyöreä laastari ($r = 4 \text{ cm}$) hoitaa homman, $A \approx 50,265 \text{ cm}^2$

$$\frac{-kdc}{\frac{JA}{V_d} - kc} = -k dt \Rightarrow \ln\left(1 - \frac{k c V_d}{JA}\right) = -k t$$

$$t = -\ln\left(1 - \frac{CL \cdot C}{JA}\right) / k = -\ln\left(1 - \frac{CL \cdot C}{JA}\right) \frac{V_d}{CL}$$

$$JA = \frac{0.9}{60} \cdot 50,265 \text{ mg}/\text{min} \approx 0.754 \text{ mg}/\text{min}$$

$$V_d = 0.5 \text{ L}/\text{kg}, 60 \text{ kg} \Rightarrow V_d = 30 \text{ L}$$

$$t = \frac{30 \text{ L}}{0.067 \text{ L}/\text{min}} \ln\left(1 - \frac{0.670}{0.754}\right) \approx 9827 \text{ min} \approx 16 \text{ h } 23 \text{ min}$$

Tulos riippuu laastarin kosta: $\phi = 10 \text{ cm} \Rightarrow t \approx \underline{\underline{6 \text{ h } 16 \text{ min}}}$

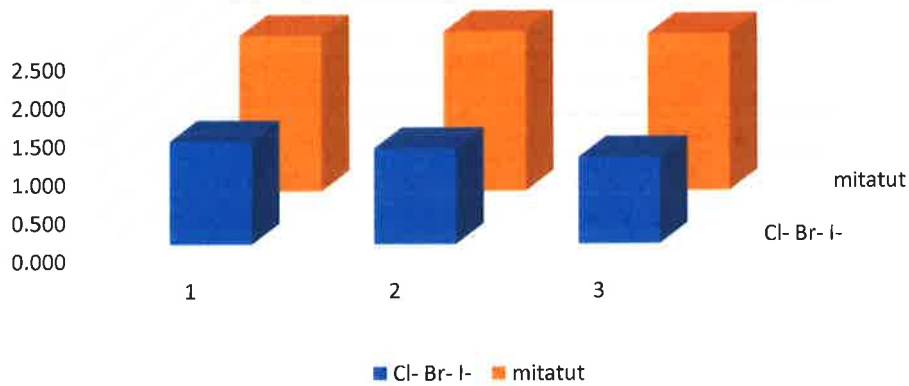
Ioni	$r/\text{Å}$	$D_{S-E} (10^{-5} \text{ cm}^2/\text{s})$	$D_m (10^{-5} \text{ cm}^2/\text{s})$	r_{obs}
Li^+	0.74	3.299	1.030	2.370
Na^+	1.05	2.325	1.334	1.830
K^+	1.33	1.835	1.957	1.247
Rb^+	1.48	1.649	2.071	1.179
Cs^+	1.69	1.444	2.110	1.157
Cl^-	1.81	1.349	2.032	1.201
Br^-	1.95	1.252	2.084	1.171
I^-	2.16	1.130	2.044	1.194

 $k_B: 1.38\text{E-}23$

T: 298

 $\eta: 0.000894$

anionit



kationit

