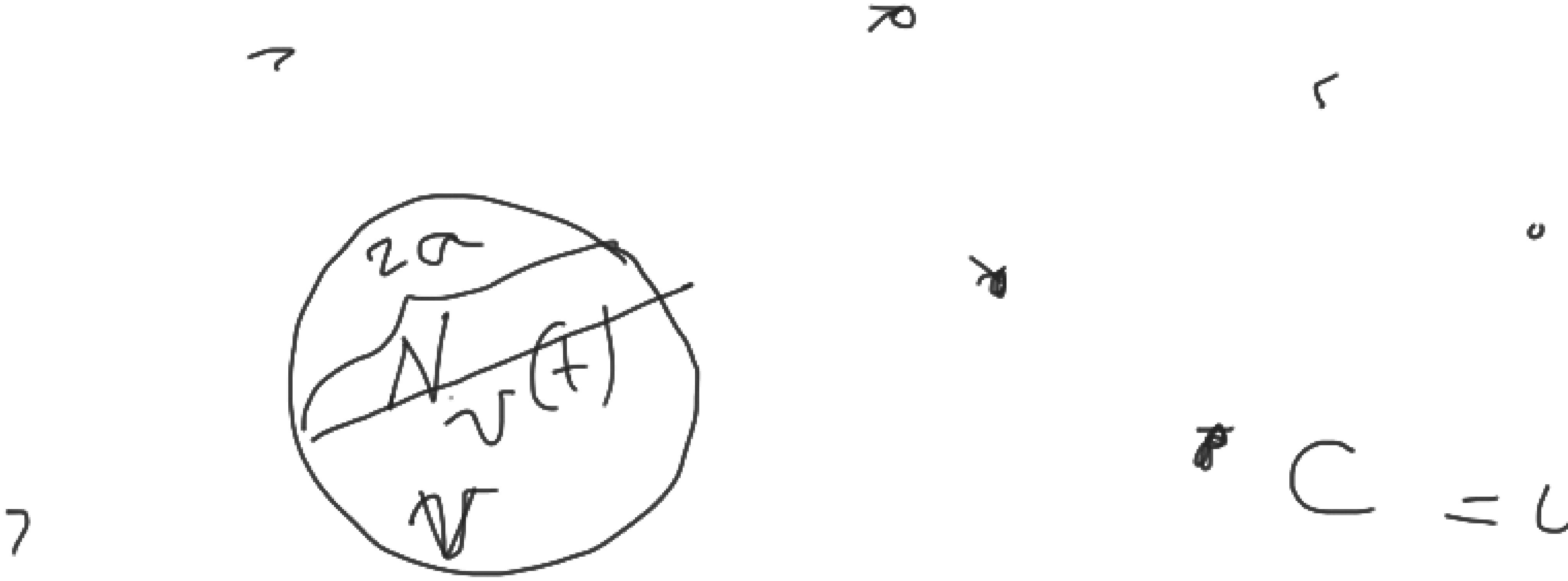

C = concentración

Las moléculas entran de a 1 (difunden con coef D)

$$N_V(t) = \begin{cases} 0 \\ 1 \end{cases}$$

tiempo de permanencia

$$\tau \sim \frac{a^2}{D}$$

$$N_v(t) = 1, 0, 1, 0, 0, \ldots$$

Discretizo el tiempo de modo que $dt \gtrsim \tau$

$$dt = \frac{a^2}{D} = \tau$$

Después de 1 tiempo $T = n\tau$

$$\overline{N}_v(T) = \frac{1}{n} \sum_{i=1}^{n} N_v(t = i\tau) \xrightarrow[\text{T suf grande}]{} \langle N_v \rangle$$

$$\langle N_v \rangle = c\, v$$

$$Var(\overline{N}_v(T)) = \langle (\overline{N}_v(T) - \langle N_v \rangle)^2 \rangle$$

$$\overline{N}_v(T) = \frac{1}{n} \sum_{i=1}^{n} N_v(t = i\tau)$$

$N_v(t = i\tau) = N_i$, Las N_i son indep entre sí

N_i tienen todas la misma distribución

$Var(N_i)$ $\quad \langle \sum_{i=1}^{n} N_i \rangle = nc v$; $Var(\sum_{i=1}^{n} N_i) = n Var(N_i)$

$\langle N_i \rangle = \mu = c v$

$$\mathrm{Var}\left(\sum N_i\right) = n\,\mathrm{Var}(N_i)$$

$$\mathrm{Var}\left(\sum N_i\right) = \left\langle \left(\sum N_i - ncv\right)^2 \right\rangle$$

$$\mathrm{Var}\left(\frac{\sum (N_i)}{n}\right) = \left\langle \left(\frac{\sum N_i}{n} - cv\right)^2 \right\rangle =$$

$$= \left\langle \frac{1}{n^2} \left(\sum N_i - ncv\right)^2 \right\rangle$$

$$\mathrm{Var}(\overline{N}_v) = \frac{\mathrm{Var}\left(\sum N_i\right)}{n^2} = \frac{n\,\mathrm{Var}(N_i)}{n^2} = \frac{\mathrm{Var}(N_i)}{n}$$

$$\bar{N}_v(T) \longrightarrow \langle N_i \rangle = v c$$

$$\mathrm{Var}(\bar{N}_v(T)) = \tau \frac{\mathrm{Var}(N_i)}{n\tau} = \tau \frac{v c}{T} = \langle (\bar{N}_v - \langle \bar{N}_v \rangle)^2 \rangle$$

$$n\tau \sim T$$

$$\mathrm{Var}(N_i) = \langle N_i \rangle = v c$$

$$\tau = a^2/D$$

$$\frac{\Delta \bar{N}_v}{\bar{N}_v} = \frac{\sqrt{\tau v c / T}}{v c} = \sqrt{\frac{\tau}{v c T}}$$

$$v \sim a^3 \Rightarrow \tau = (v^{1/3})^2/D$$

$$\frac{\Delta \bar{N}_\nu}{\bar{N}_\nu} = \sqrt{\frac{(\nu^{1/3})^2}{\nu c D T}} = \sqrt{\frac{1}{\nu^{1/3} c D T}}$$

$$\bar{N}_\nu \longrightarrow c\nu \qquad ; \quad \bar{c} = \frac{\bar{N}_\nu}{\nu} \longrightarrow c$$

$$\frac{\Delta \bar{c}}{\bar{c}} = \frac{\Delta \bar{N}_\nu / \nu}{\bar{N}_\nu / \nu} = \frac{1}{\sqrt{\nu^{1/3} c D T}}$$

$$\frac{\Delta \bar{c}}{\bar{c}} = \alpha < 1$$

$$\alpha = \frac{1}{\sqrt{v^{1/3} c D T}} \Rightarrow \alpha^2 = \frac{1}{v^{1/3} c D T}$$

$$\Rightarrow T \propto \frac{1}{\alpha^2 v^{1/3} c D}$$

$$\text{Receptor} + \text{Molecula} \underset{k_{off}}{\overset{k_{on}}{\rightleftharpoons}} \text{RecMol}$$

$$\underbrace{\text{Receptor}}_{x=0} \qquad \underbrace{\text{RecMol}}_{x=1}$$

$$P_{eq}(x=1) = 1 - P_{eq}(x=0)$$

$$P_{eq}(x=1) = \frac{k_{on}c}{k_{on}c + k_{off}}$$

$$k_{on}\underbrace{(1 - P_{eq}(x=1))}_{P_{eq}(x=0)}\, c = k_{off}\, P_{eq}(x=1)$$

$$P_{eq}(x=1) = \frac{K_{on}C}{K_{on}C + K_{off}}$$

$$P_{eq}(x=1) = \frac{1}{1 + \frac{K_{off}}{K_{on}C}} \qquad \frac{K_{off}}{K_{on}} = C_{1/2}$$

Si $C = C_{1/2} \Rightarrow P_{eq}(x=1) = \frac{1}{1 + \frac{C_{1/2}}{C_{1/2}}} = \frac{1}{2}$

$$P_{eq} = \frac{1}{1 + \frac{C_{1/2}}{C}} \Rightarrow 1 + \frac{C_{1/2}}{C} = \frac{1}{P_{eq}} \Rightarrow \frac{C_{1/2}}{C} = \frac{1}{P_{eq}} - 1 = \frac{1}{P_{eq}}$$

$$P_{eq} = \frac{1}{1 + \frac{c_{1/2}}{c}}$$

$$1 + \frac{c_{1/2}}{c} = \frac{1}{P_{eq}} \qquad \frac{c_{1/2}}{c} = \frac{1}{P_{eq}} - 1$$

$$\frac{c}{c_{1/2}} = \frac{1}{\frac{1}{P_{eq}} - 1} = \frac{P_{eq}}{1 - P_{eq}}$$

$$\frac{\delta c}{c_{1/2}} = \left| \frac{d}{dP_{eq}} \left(\frac{P_{eq}}{1 - P_{eq}} \right) \right| \delta P_{eq}$$