LIXOFT

Response

direct

Cc $\xrightarrow{A}$ E

$E = A(\mathrm{Cc})$

effect compartment

Cc $\underset{k_{e0}}{\overset{k_{e0}}{\rightleftharpoons}}$ $C_e \xrightarrow{A}$ E

$\frac{dC_e}{dt} = k_{e0}C_c - k_{e0}C_e$

$E = A(C_e)$

k_{e0}

turnover

production

$R(0) = R_0$

$k_{in} = R_0 k_{out}$

$\frac{dR}{dt} = k_{in}A\,(C_c) - k_{out}R$

$R_0\ k_{out}$

degradation

$R(0) = R_0$

$k_{in} = R_0 k_{out}$

$\frac{dR}{dt} = k_{in} - k_{out}A\,(C_c)R$

Drug action

Stimulation

C= Cc or Ce $\quad A(\mathrm{C}) = E_0 + \frac{E_{max}C^{\gamma}}{C^{\gamma} + EC_{50}{}^{\gamma}}$ $\quad E_0$ (if baseline) E_{max} EC_{50}

$A(\mathrm{Cc}) = 1 + \frac{E_{max}Cc^{\gamma}}{Cc^{\gamma} + EC_{50}{}^{\gamma}}$ $\quad E_{max}$ EC_{50}

(iii) Production stimulation

(iv) Degradation stimulation

Inhibition

C= Cc or Ce $\quad A(\mathrm{C}) = E_0\left(1 - \frac{I_{max}C^{\gamma}}{C^{\gamma} + IC_{50}{}^{\gamma}}\right)$ $\quad E_0$ $I_{max} \le 1$ (if partial) IC_{50}

$A(\mathrm{Cc}) = 1 - \frac{I_{max}Cc^{\gamma}}{Cc^{\gamma} + IC_{50}{}^{\gamma}}$ $\quad I_{max} \le 1$ (if partial) IC_{50}

(i) Production inhibition

(ii) Degradation inhibition

Sigmoidicity

$\gamma > 1$

Stimulation example

Cc E Moves point Translates curve Rotates curve