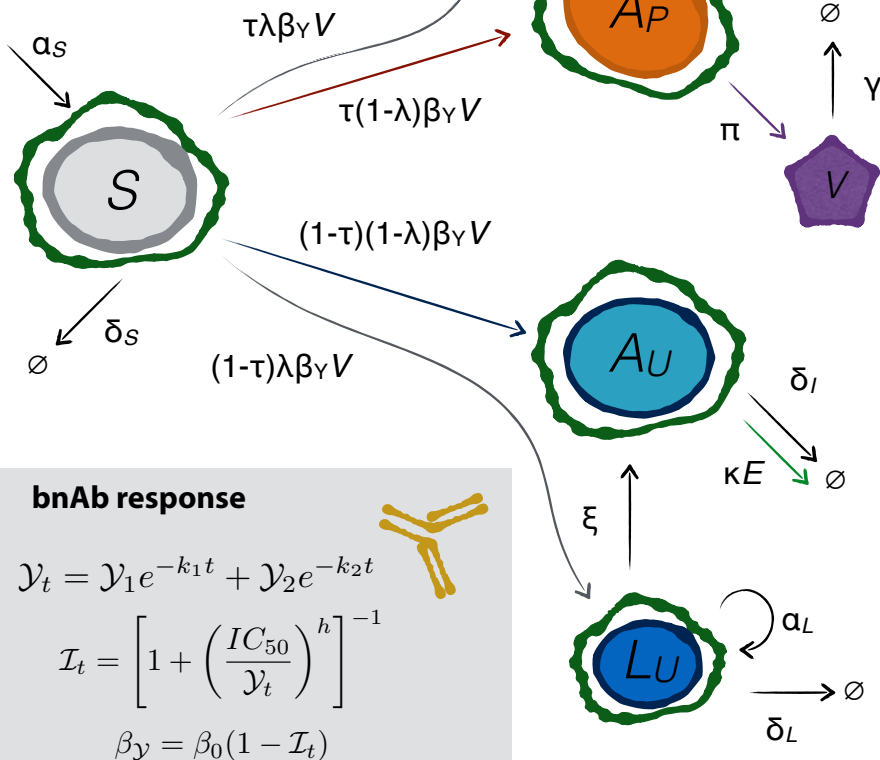
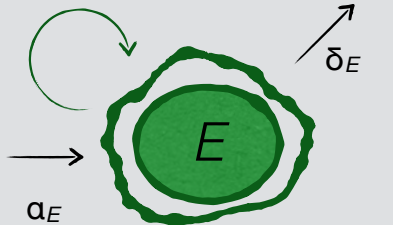


adaptive immune response

$$\omega(I_P + I_U)/(E + E_{50})$$



bnAb response

$$\mathcal{Y}_t = \mathcal{Y}_1 e^{-k_1 t} + \mathcal{Y}_2 e^{-k_2 t}$$

$$\mathcal{I}_t = \left[1 + \left(\frac{IC_{50}}{\mathcal{Y}_t} \right)^h \right]^{-1}$$

$$\beta_{\mathcal{Y}} = \beta_0 (1 - \mathcal{I}_t)$$

