Tumor Growth

$V_{boundary} = \mathbf{v}_c \cdot \mathbf{n}$	Evolution of tumor ($\mathbf{n}$ denotes boundary normal direction)
$\mathbf{v}_c = -\mu \nabla P + \chi_E \nabla E$	Non-dimensional tumor velocity $\mathbf{v}_c$ (**Eq. 1**; Ref. 35, Eq. 7)
$\nabla \cdot \mathbf{v}_c = \lambda_p$	Growth of tumor (**Eq. 2**; Ref. 35, Eq. 8)
$\lambda_p = \lambda_\mathrm{M}\sigma - \lambda_\mathrm{A}$ in Ω_P and $\lambda_p = \lambda_\mathrm{N}$ in Ω_N	Proliferation rate λ_p (**Eq. 12**; Ref. 16. Eq. 13)
$0 = \nabla \cdot \left(D_\sigma \nabla \sigma\right) + \lambda_{ev}^{\sigma}(\mathbf{x}, t, \mathbf{1}_{vessel}, p, \sigma, h) - \lambda^{\sigma}(\sigma)\sigma$	Transport of oxygen σ (**Eq. 4**; Ref. 34, Eq. 1)
$\lambda_{ev}^{\sigma} = \overline{\lambda}_{ev}^{\sigma} \mathbf{1}_{vessel}(\mathbf{x}, t)\left(\frac{h}{\overline{H}_D} - \overline{h}_{\min}\right)^{+}\left(1 - k_{p_i}\frac{p_i}{p_e}\right)(1-\sigma)$	Oxygen extravasation rate λ_{ev}^{σ}(**Eq. 5**; Ref. 34, Eq. 3)

Angiogenesis

$\frac{\partial n}{\partial t} = \nabla \cdot (D \nabla n) - \nabla \cdot \left(\chi_{\text{sprout}}^{T}(T) n \nabla T\right) - \nabla \cdot \left(\chi_{\text{sprout}}^{E} n \nabla E\right)$	Endothelial cell density n (**Eq. 3**; Ref. 35, Eq. 21) (discrete and stochastic implementation)
$0 = \nabla \cdot (D_T \nabla T) + \overline{\lambda}_{\text{prod.}}^{T}(1-T)\mathbf{1}_{\Omega_H} - \overline{\lambda}_{\text{decay}}^{T} T - \overline{\lambda}_{\text{binding}}^{T}\mathbf{1}_{\text{sprout tips}}$	TAF concentration T (Ref. 35, Eq. 20)
$\frac{\partial E}{\partial t} = -\overline{\lambda}_{\text{degradation}}^{E} EM + \overline{\lambda}_{\text{prod.}}^{E}(1-E)\mathbf{1}_{\Omega_V} + \overline{\lambda}_{\text{sprout prod.}}^{E}\mathbf{1}_{\text{sprout tips}}$	ECM density E (Ref. 35, Eq. 18)
$\frac{\partial M}{\partial t} = \nabla \cdot (D_M \nabla M) + \overline{\lambda}_{\text{prod.}}^{M}(1-M)\mathbf{1}_{\Omega_V} - \overline{\lambda}_{\text{decay}}^{M} M + \overline{\lambda}_{\text{sprout prod.}}^{M}\mathbf{1}_{\text{sprout tips}}$	MDE concentration M (Ref. 35, Eq. 17)

Blood Flow

$\sum_q Q_{qp} = O_V$	Flow conservation for each vascular node (Ref. 34, Eq. 22)
$O_V = K_{Vf} S_V (P_c - P_f)$	Fluid extravasation at a node (Ref. 34, Eq. 23)
$\Delta R = (S_{wss} + S_p + S_m - S_s) R \Delta t$	Vessel radius R adaptation (Ref. 34, Eq. 25)

Nanoparticles

$N(d, R_u, S_u) = S_u \alpha d^{\delta_1} \exp\left(-\beta(1+\gamma d^{\delta_2}) Srt_u\right)$	Particle number N attached in a vessel segment (**Eq. 7**; Ref. 13, Eq. 14)
$Srt_u = 4Q_u / \pi R_u^{\ 3}$	Shear rate Srt in vessel segment u (Ref. 13)
$(1 + \frac{\Delta t}{V_p}\sum_u Q_u) C_p^{t+\Delta t} = C_p^t + \frac{\Delta t}{V_p}(\sum_{Qu} C_u^t Q_u (1 - N(d, R_u, S_u)))$	Particle concentration C_p in blood (**Eq. 8** ; Ref. 13, Eq. 15)
$C_{pS}^{t+\Delta t} = C_{pS}^t + \frac{\Delta t}{S_p}\sum_{Q_u} C_u^t Q_u N(d, R_u, S_u)$	Particle concentration C_{pS} on vessel surface (**Eq. 9** ; Ref. 13, Eq. 16)

Drug

$\frac{\partial G}{\partial t} = \nabla \cdot (D_G \nabla G) + \lambda_{release}^{G}(t, C_{pS}, d) - \overline{\lambda}_{decay}^{G} G$	Drug concentration G (**Eq. 10**)
$\lambda_{release}^{G} = k C_{pS}\sqrt{d}$	Drug release rate $\lambda_{release}^{G}$ (**Eq. 11**)
$\lambda_p = \lambda_\mathrm{M}\sigma(1 - \overline{\lambda}_{effect} G) - \lambda_\mathrm{A}$	Effect of drug on tumor net proliferation λ_p (**Eq. 12**; Ref. 16, Eq. 13)