

Supplementary

Table S1: Summary of Terms and Description used in the model.

Equation Terms	Description	Value
<i>Promotion or Inhibition saturation cytokine concentration (C) in g/mL</i>		
ϕ_{IL-8}	C_{IL-8}	2×10^{-9}
$\phi_{IL-1\beta}$	$C_{IL-1\beta}$	5×10^{-9}
ϕ_{IL-6}	C_{IL-6}	5×10^{-9}
ϕ_{IL-10}	C_{IL-10}	5×10^{-9}
$\phi_{TNF\alpha}$	$C_{TNF\alpha}$	5×10^{-9}
$\phi_{TGF\beta1}$	$C_{TGF\beta1}$	5×10^{-9}
<i>Diffusion coefficient (DC) in cm^2/s</i>		
D_{IL-8}	DC of IL-8	2.09×10^{-6} [31]
$D_{IL-1\beta}$	DC of $IL-1\beta$	3×10^{-7} [32]
D_{IL-6}	DC of IL-6	8.49×10^{-8} [33]
D_{IL-10}	DC of IL-10	1.45×10^{-8} [33]
$D_{TNF\alpha}$	DC of $TNF\alpha$	4.07×10^{-9} [33]
$D_{TGF\beta1}$	DC of $TGF\beta1$	2.6×10^{-7} [33]
<i>Secretion rate in $\frac{pg}{ml \ 10^5 \ cells \ day}$</i>		
$KE IL-8$	EC secrete IL-8	234 [34]
${}^kN_A IL-1\beta$	AN secrete $IL-1\beta$	225 [35]
${}^kN_A TNF\alpha$	AN secrete $TNF\alpha$	250 [38]
${}^kM_1 IL-6$	M1 secrete IL-6	250 [36]
${}^kM_1 TNF\alpha$	M1 secrete $TNF\alpha$	70 [36]
${}^kM_2 IL-10$	M2 secrete IL-10	45 [37]
${}^kM_2 TGF\beta1$	Rate of production of $TGF\beta1$ by M2	280 [40]
${}^kN_{DN} IL-8$	Rate of production of IL-8 by NN	1.46 [39]
<i>Decay rate(DR) per hour</i>		
μ_{IL-8}	DR of IL-8	0.2 [41]
$\mu_{IL-1\beta}$	DR of $IL-1\beta$	0.6 [42]
μ_{IL-6}	DR of IL-6	0.5 [43]
μ_{IL-10}	DR of IL-10	0.5 [44]
$\mu_{TNF\alpha}$	DR of $TNF\alpha$	0.1125 [45]
$\mu_{TGF\beta1}$	DR of $TGF\beta1$	0.02 [46]
<i>Endocytosis rate(ER) in $\frac{pg}{ml \ 10^5 \ cells \ day}$</i>		
$\theta_{N_A} IL-8$	ER of IL-8 by AN	3.024 [39]

Table S2: Initial Description of Different Cell Types. (-) means that this value is unknown or dependent on the cell differentiation process. Life span in the simulation symbolizes the maximum amount given to the cell type to either die or differentiate, some values are simulation dependent.

Cell Type	Number	Initial Location	Movement	Mitosis	Life span
Endothelial Cell	See Table 3	Tissue	No	No	Immortal
Resting Neutrophil	1000	Blood	Yes	No	120h [47]
	100	Tissue	Yes	No	120h [47]
Monocyte	1000	Blood	Yes	No	24h [48]
Fibroblast	100	Tissue	Yes	No	Immortal
Macrophages type I	-	Tissue	Yes	No	Immortal
Macrophages type II	-	Tissue	Yes	No	Variable in time, immortal after 96h
Myofibroblast	25	Tissue	Yes	No	Immortal

Table S3: (a) Coefficients from the sigmoid function and (b) Cytokine concentration Transformations used. These transformations are useful to obtain calculations in the same order of magnitude.

Coefficient(s)	Value	Cytokine	Transformation
w_1, w_2, w_3, w_4	0.25	$IL - 8$	$\times 10^9$
w_5, w_9	0.5	$IL - 1\beta$	$\times 10^9$
w_6	0.9	$TNF\alpha$	$\times 10^9$
w_7, w_8	0.45	$TGF_{\beta 1}$	$\times 10^{10}$
w_{10}	0.9	$IL - 6$	$\times 10^{11}$
w_{11}	0.1	$IL - 10$	$\times 10^{12}$

(a)

(b)

Table S4: Plugin modules used in the simulation.

Plugin Name	Function
CellType	List all cell types with specific IDs and colors
CenterOfMass	Track center of mass of each cell
PixelTracker	Track pixels of each cell
Contact	Specify adhesion energies
DiffusionSolverFE	Specify diffusion field and PDE solvers
Chemotaxis	Specify chemotaxis properties of select cell types
Connectivity	Apply connectivity constraint to each cell