I. Supplementary material

In this section, all the parameters used in the simulations can be found, jointly with their respective units within the model. Likewise, additional analysis that was not included in the results section.

TABLE I
Initial conditions for the variables.

Variable	Initial Value
A_{MII0}	1000
I_0	0.2×10^{-8}
β_0	2.5×10^{-7}
A_{MC0}	1000
A_{F0}	500
A_{M0}	100
$A_{M\alpha0}$	1
C_{III0}	0.001
C_{I0}	0.001

Tables I, II, III, IV, and V correspond to standard ideal parameters found through experimentation with the model.

TABLE II
Production(κ) and transition(ρ) rates for the System of ODEs. IP means inflammatory phase.

Parameter	Description	Value
κ_1	$IL - 8$ production rate from IP	1.625×10^{-8} ($\frac{concentration}{day}$)
κ_2	$TGF - \beta$ production rate from IP	6.94×10^{-9} ($\frac{concentration}{day}$)
κ_3	TGF-$\beta1$ production rate by Type II macrophages	6.1×10^{-8} ($\frac{concentration}{day}$)
κ_4	$TGF - \beta$ production rate by Mast Cells	6.9×10^{-9} ($\frac{concentration}{day}$)
κ_5	$IL - 8$ production rate by Mast cells	3.47×10^{-7} ($\frac{concentration}{day}$)
κ_6	Collagen type III production rate by Fibroblasts	$\frac{1}{48}$ ($\frac{concentration}{day}$)
κ_7	Collagen type I production rate by Fibroblasts	6.94×10^{-4} ($\frac{concentration}{day}$)
κ_8	Collagen type I production rate by Myofibroblasts	$\frac{5}{144}$ ($\frac{concentration}{day}$)
κ_9	Collagen type III production rate by Myofibroblasts	$\frac{1}{48}$ ($\frac{concentration}{day}$)
κ_{10}	Collagen type I production rate by α-SMA expressing Myofibroblasts	$\frac{1}{72}$ ($\frac{concentration}{day}$)
ρ_1	Fibroblast rate of transition into Myofibroblast	$\frac{1}{288}$ ($\frac{cells}{day}$)
ρ_2	Myofibroblasts rate of transition to expressing α-SMA	$\frac{1}{480}$ ($\frac{cells}{day}$)
ρ_3	Collagen type III rate of transition into Collagen type I	$\frac{1}{80}$ ($\frac{concentration}{day}$)

Table VI shows the ranges for the initial value problem experiment conducted.

TABLE III
Increase of proliferation(λ) and Decay(μ) Rates for the System of ODEs

Parameter	Description	Value (day^{-1})
λ_1	Fibroblast increase of proliferation rate by TGF-$\beta1$	$\frac{5}{72}$
λ_2	Fibroblast increase of proliferation rate by IL-8	$\frac{5}{18}$
λ_3	Mast cell increase of proliferation rate by $IL - 8$	$\frac{5}{24}$
λ_4	Fibroblast increase of proliferation rate by Mast cells	6.94×10^{-11}
μ_1	M_{II} decay rate	$\frac{1}{720}$
μ_2	$IL - 8$ decay rate	$\frac{1}{120}$
μ_3	TGF-$\beta1$ decay rate	$\frac{1}{144}$
μ_4	Mast cell decay rate	$\frac{11}{1440}$
μ_5	Fibroblast decay rate	$\frac{1}{144}$
μ_6	Myofibroblast decay rate	$\frac{1}{144}$
μ_7	Collagen type III decay rate	$\frac{1}{288}$
μ_8	Collagen type I decay rate	6.94×10^{-4}

TABLE IV
Conversion parameters.

Parameter Symbol	Value	Value
υ_1	function decay	-0.001
υ_2	function decay	-0.1
υ_3	function decay	0.001
υ_4	function decay	0.001
ω_1	Angular frequency	$\frac{\pi}{1440}$
ω_2	Angular frequency	$\frac{10\pi}{144}$
ω_3	Angular frequency	$\frac{8\pi}{144}$

TABLE V
Conversion parameters.

Parameter Symbol	Value	Value Reference
ζ	cell-solute conversion factor	10^{-5}
γ	solute-cell conversion factor	10^5

TABLE VI
Parameter Ranges and result limits showed in Figures III e-l.

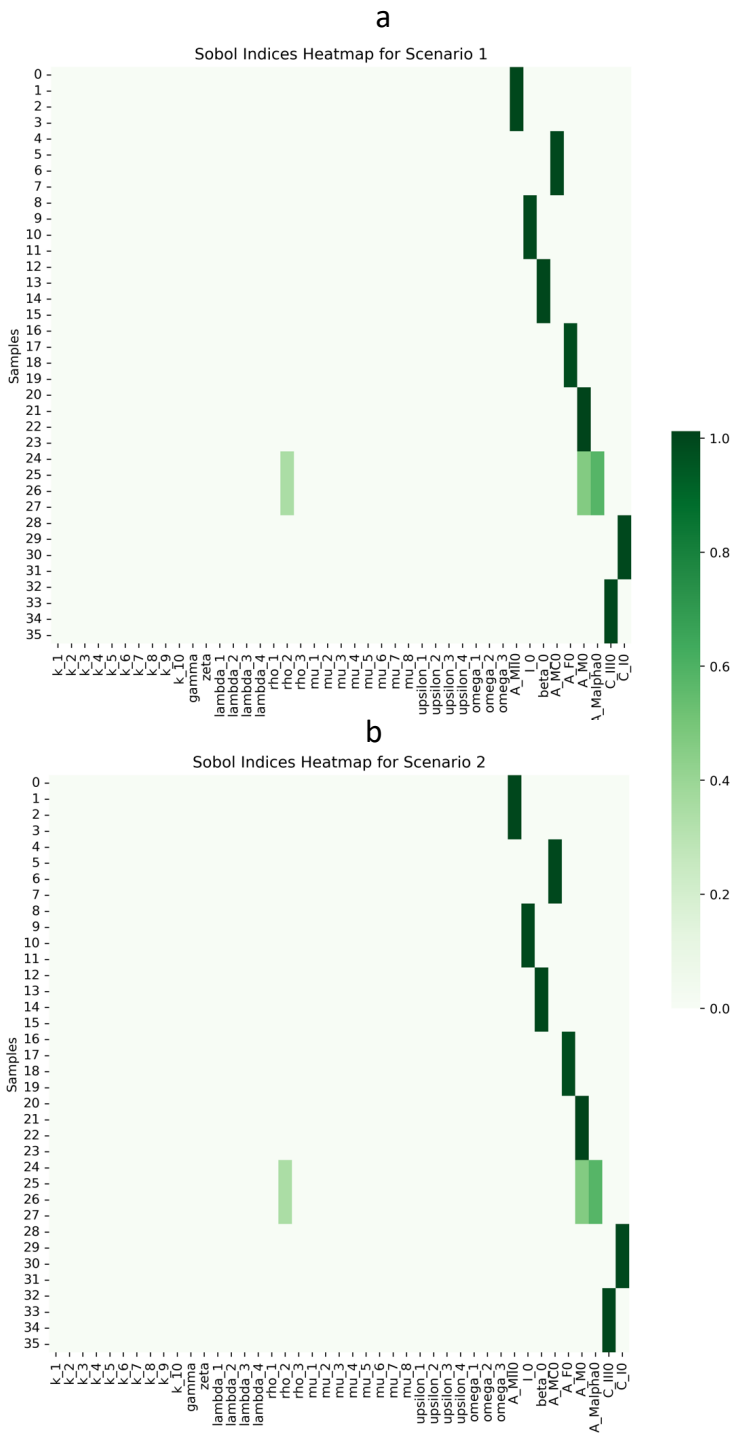| | Ranges | | Result | |
Variable	Min	Max	Min	Max
A_{MII}	500	3500	N/A	N/A
A_{MC}	500	3500	N/A	N/A
I_0	1×10^{-9}	5×10^{-7}	N/A	N/A
β_0	1×10^{-9}	5×10^{-7}	N/A	N/A
A_F	1	2800	1	5000
A_M	1	1000	1	3000
C_{III}	0	1	0	1
C_I	0	0.1	0	2

a

b

Fig. 1. Parameter sensitivity analysis. (a) shows the parameter sensitivity analysis results for scenario 1 and (b) shows the parameter sensitivity analysis results for scenario 2. Only significant parameters are shown. Color bars on the right side of each plot indicate the influence of the parameter in the simulated sample.