

Parameter Name	Description	Range	Units	Reference
growthExtMtbBound	Upper bound of number of external Mtb used in growth function	[180,240]	Number of bacteria	[44-49]
growthRateIntMtb	Fractional growth rate of intracellular bacteria	[0.001,0.005]	Unitless	[44-49]
growthRateExtMtb	Fractional growth rate of extracellular bacteria	[0.001,0.003]	Unitless	[44-49]
deathRateExtMtbCaseated	Upper bound on the number of external Mtb used in growth function	[1,2]	Number of bacteria	[44-49]
Core				
estBoundFactorTNF	Adjustment for coarse grained internalized fraction estimate	[0.4,0.5]	Unitless	[44-49]
estBoundFactorIL10	Adjustment for coarse grained internalized fraction estimate	[0.4,0.6]	Unitless	[44-49]
estConsRateTNF	Scaling Factor for coarse grained TNF dynamics	[5e-4,9e-4]	Unitless	[44-49]
estConsRateIL10	Scaling Factor for coarse grained IL10 dynamics	[2e-4,6e-4]	Unitless	[44-49]
estIntPartitionTNF	Scaling Factor for coarse grained internalization of bound TNFR1	[9,13]	Unitless	[44-49]
nrKillingCaseation	Number of killings for a compartment to become caseated	[7,13]	Number	[44-49]
caseationHealingTime	Time it takes for a caseated compartment to heal	[1700,2600]	Timesteps	[44-49]
sourceDensity	Density of vascular sources on the gridspace	[0.002,0.05]	Unitless	[44-49]
diffusivityTNF	TNF diffusivity	[4e-08, 6e-08]	Cm ² /second	[44-49]
diffusivityChemokines	Chemokine diffusivity	[4e-08,6e-08]	Cm ² /second	[44-49]
diffusivityIL10	IL10 diffusivity	[4e-08,6e-08]	Cm ² /second	[44-49]
ChemokinekDeg	Chemokine degradation rate constant	[0.0005,0.005]	1/second	[44-49]
kDeg	TNF degradation rate constant	[0.0005,0.005]	1/second	[44-49]

Ikdeg	Degradation rate constant for IL10	[0.0003,0.003]	1/second	[44-49]
IC50ChemokineIL10	IC50 of IL10 inhibition of chemokine secretion	[1,10]	Molecules/mL	[44-49]
thresholdApoptosisTNF	TNF threshold for TNF-induced apoptosis	[1000, 5000]	Unitless	[44-49]
kApoptosis	Rate of apoptosis happening	[1e-07, 2e-6]	1/second	[44-49]
saturationApoptosisTNF	Signal saturation of number of internal bound TNFR1 Molecules	[5000, 9000]	Molecules	[44-49]
minChemotaxis	Minimum of Chemotaxis sensitivity range	[1, 50]	Molecules	[44-49]
maxChemotaxis	Maximum of Chemotaxis sensitivity range	[100,1000]	Molecules	[44-49]
maxIL10Inhibition	Coarse grained TNF/IL10 dose dependence parameter beta	[0.05, 0.3]	Log10(ng/mL)	[44-49]
Mac				
initDensity	Initial density of macrophages on the gridspace	[0.005,0.03]	Unitless	[44-49]
movementRest	Time required for a resting macrophage to move one micro-compartment	[1,10]	Timesteps	[44-49]
movementAct	Time required for an activated macrophage to move one micro-compartment	[10,50]	Timesteps	[44-49]
movementInf	Time required for an infected macrophage to move one micro-compartment	[100,200]	Timesteps	[44-49]
dTNF	Secretion rate of TNF by a macrophage	[1.3,1.7]	Molecules/second	[44-49]
dCCL2	Secretion rate of CCL2 by a macrophage	[4,8]	Molecules/second	[44-49]
dCCL5	Secretion rate of CCL5 by a macrophage	[4,8]	Molecules/second	[44-49]
dIL10Act	Secretion rate of IL10 by an	[0.2, 0.4]	Molecules/second	[44-49]

	activated macrophage			
halfSatIL10	Half saturation for TNF induction of IL10 in an activated macrophage	[170,210]	Number/cell	[44-49]
thresholdNFkB TNF	TNF threshold for NFkB activation	[75,115]	Molecules	[44-49]
kNFkB	Rate of NFkB activation	[0.7e-5, 1e-5]	Fraction	[44-49]
probKillExtMtbRest	Probability of a resting macrophage to kill extracellular bacteria	[0.05, 0.3]	Unitless	[44-49]
fKillExtMtbRest	Fractional increase of a resting macrophage to kill extracellular bacteria when STAT1 or NFkB pathways are on	[0.3,0.5]	Unitless	[44-49]
nrExtMtbNFkB	Number of extracellular bacteria for NFkB activation in an infected macrophage	[150, 250]	Bacteria	[44-49]
nrIntMtbCInf	Number of intracellular bacteria necessary for an infected macrophage to become chronically infected	[8,12]	Bacteria	[44-49]
nrIntMtbBurstCInf	Number of intracellular bacteria necessary for a chronically infected macrophage to burst	[13,20]	Bacteria	[44-49]
nrExtMtbUptakeAct	Number of extracellular bacteria an activated macrophage can uptake and kill	[3,7]	Bacteria	[44-49]
Stat1 ActivationTime	Time a macrophage is Stat1 activated	[400,460]	Timesteps	[44-49]
nfkbActivationTime	Time a macrophage is NFkB activated	[13,17]	Timesteps	[44-49]
Stat3 ActivationTime	Time a macrophage is Stat3 activated	[75,125]	Timesteps	[44-49]
thresholdSTAT3IL10	Threshold of IL10	[5,15]	Unitless	[44-49]

	to IL10R1 for STAT3 signaling			
kSTAT3IL10	Rate constant of bound IL10 to IL10R1 for STAT3 signaling	[5e-4, 1.5e-3]	Unitless	[44-49]
probHealCaseation	Rate constant for wound healing	[0.005, 0.05]	Unitless	[44-49]
T cell				
maxAge	Maximum age of a T cell	[400,460]	Timesteps	[44-49]
exhaustionThreshold	Threshold of Exposure Events for an individual T cell before it becomes exhausted	[200, 10000] (5236 during generation of 2 nd biorepository)	Count	Estimated
probMoveToMac	Probability of a T cell moving into a compartment already containing a macrophage	[0.01, 0.2]	Unitless	[44-49]
probMoveToTcell	Probability of a T cell moving into a compartment already containing another T cell	[0.01, 0.2]	Unitless	[44-49]
maxDivisions	Maximum number of times a T cell can create a daughter cell	[3,5]	Timesteps	[44-49]
γ-producing T cells				
dTNF	Secretion rate of TNF by γ -producing T cell	[0.1, 0.2]	Molecules/second	[44-49]
maxTimeReg	Time span during which a γ producing T cell remains down-regulated	[30,40]	Timesteps	[44-49]
probApoptosisFasFasL	Probability of Fas/FasL induced apoptosis by a γ -producing T cell	[0.01,0.03]	Unitless	[44-49]
probTNFProducer	Probability that a γ -producing T cell can produce TNF	[0.04, 0.1]	Unitless	[44-49]
probIFNProducer	Probability that a γ -producing T cell can produce IFN γ	[0.3, 0.4]	Unitless	[44-49]
probIFNMooreExtend	Probability a macrophage will be IFN γ /STAT1 activated in the extended Moore	[0.2, 0.3]	Unitless	[44-49]

	Neighborhood.			
Cytotoxic T cells				
dTNF	Secretion rate of TNF by a cytotoxic T cell	[0.01, 0.02]	Molecules/second	[44-49]
maxTimeReg	Time span during which a cytotoxic T cell remains down-regulated	[30,40]	Timesteps	[44-49]
probKillMac	Probability of a cytotoxic T cell killing a chronically infected mac	[0.005, 0.015]	Unitless	[44-49]
probKillMacCleanly	Probability of a cytotoxic T cell killing a chronically infected mac cleanly	[0.6, 0.9]	Unitless	[44-49]
probTNFProducer	Probability that a cytotoxic T cell is producing TNF	[0.05, 0.09]	Unitless	[44-49]
Regulatory T cells				
dIL10	Secretion of IL10 by a regulatory T cell	[0.7, 0.8]	Molecules/second	[44-49]
probTregDeactivate	Probability of successful downregulation by a regulatory T cell	[0.01, 0.02]	Unitless	[44-49]
factorDeactIL10	Factor when a regulatory T cell is making IL10 to scale probTregDeactivate	[1,3]	Unitless	[44-49]