

Supplementary Materials

The Role of Dimensionality in Understanding Granuloma Formation

Simeone Marino ^{1,2}, **Caitlin Hult** ^{1,3}, **Paul Wolberg** ^{1,3}, **Jennifer J. Linderman** ³ and **Denise E. Kirschner** ^{1,4,*}

¹ Department of Microbiology and Immunology, University of Michigan Medical School, Ann Arbor, MI 48109, USA; simeonem@umich.edu (S.M.); cshult@umich.edu (C.H.); pwolberg@umich.edu (P.W.)

² Statistics Online Computational Resource (SOCR), Department of Health Behavior and Biological Sciences, University of Michigan, Ann Arbor, MI 48109, USA

³ Department of Chemical Engineering, University of Michigan, Ann Arbor, MI 48109, USA; linderma@umich.edu

⁴ Department of Computational Medicine and Bioinformatics, University of Michigan, Ann Arbor, MI 48109, USA

* Correspondence: kirschne@umich.edu

Table S1. List of all the parameters varied in the pilot uncertainty study, with the respective description and LHS range.

Parameter Name	Range	Units	Description
<i>Mtb/@growthExtMtbBound</i>	[180,240]	#bacteria	Upper bound of number of extMtb used in growth function
<i>Mtb.Numbers/@growthRateIntMtb</i>	[1.001, 1.006]	fraction of mtb/agent time step	Fractional growth rate of intracellular bacteria
<i>Mtb.Numbers/@growthRateExtMtb</i>	[1.001, 1.003]	fraction of mtb/agent time step	Fractional growth rate of extracellular bacteria
<i>Mtb.Numbers/@deathRateExtMtbCaseated</i>	[1,2]	1/agent time step	Upper bound on the number of extMtb used in growth function
<i>Core/@estBoundFactorTNF</i>	[0.4,0.5]	fraction of TNFR1 receptors that are TNF bound	Adjustment for coarse grained internalized fraction estimate
<i>Core/@estBoundFactorIL10</i>	[0.4,0.6]	?fraction of IL10R receptors that are IL10 bound	Adjustment for coarse grained internalized fraction estimate
<i>Core/@estConsRateTNF</i>	[5e-4,9e-4]	1/seconds	Scaling factor for coarse grained TNF dynamics
<i>Core/@estConsRateIL10</i>	[2e-4,6e-4]	1/seconds	Scaling factor for coarse grained IL10 dynamics
<i>Core/@estIntPartitionTNF</i>	[9,13]	?fraction of TNFR1 receptors that are internalized	Scaling factor for coarse grained internalization of boundTNFR1
<i>Core/@nrKillingsCaseation</i>	[7,13]	#cells	Number of killings for a compartment to become caseated
<i>Core/@caseationHealingTime</i>	[1700,2600]	#agent time steps	Time it takes for a caseated compartment to heal
<i>Core/@sourceDensity</i>	[0.002,0.05]	fraction of total grid compartments	Density of vascular sources on the grid
<i>Core/@diffusivityTNF</i>	[4e-08,6e-08]	cm ² /second	TNF diffusivity
<i>Core/@diffusivityChemokines</i>	[4e-08,6e-08]	cm ² /second	Chemokine diffusivity
<i>Core/@diffusivityIL10</i>	[4e-08,6e-08]	cm ² /second	IL10 diffusivity
<i>Core/@ChemokineDeg</i>	[0.0005,0.005]	1/seconds	Chemokine degradation rate constant
<i>Core/@kDeg</i>	[0.0005,0.005]	1/seconds	TNF degradation rate constant
<i>Core/@Ikdeg</i>	[0.0003,0.003]	1/seconds	Degradation rate constant for ODE IL10
<i>Core/@IC50ChemokineIL10</i>	[1,10]	#molecules/milli-liter	IC50 of IL10 inhibition of chemokine secretion - All chemokines are the same
<i>Core/@thresholdApoptosisTNF</i>	[1000,5000]	#internalized TNF-bound TNFR1	TNF threshold for TNF-induced apoptosis
<i>Core/@kApoptosis</i>	[1e-07,2e-6]	1/seconds	Rate of TNF-induced apoptosis
<i>Core/@saturationApoptosisTNF</i>	[5000,9000]	#molecules	Signal saturation of number of int-bound TNFR1 Molecules

<i>Core/@minChemotaxis</i>	[1,50]	#molecules	Chemotaxis sensitivity range (lower bound)
<i>Core/@maxChemotaxis</i>	[100,1000]	#molecules	Chemotaxis sensitivity range (upper bound)
<i>Core/@MaxIL10Inhibition</i>	[0.05,0.3]	log10(nanograms/milli-liter)	Coarse grained TNF/IL10 dose dependence parameter beta
<i>Core.Mac/@initDensity</i>	[0.005,0.03]	fraction of total grid compartments	Initial density of resting macrophages on the grid
<i>Core.Mac/@movementRest</i>	[1,10]	#agent time steps	Time required for a resting macrophage to move one micro-compartment
<i>Core.Mac/@movementAct</i>	[10,50]	#agent time steps	Time required for an active macrophage to move one micro-compartment
<i>Core.Mac/@movementInf</i>	[100,200]	#agent time steps	Time required for an infected macrophage to move one micro-compartment
<i>Core.Mac/@dTnf</i>	[1.3,1.7]	#molecules/second	Secretion rate of TNF by Mac
<i>Core.Mac/@dCCL2</i>	[4,8]	#molecules/second	Secretion rate of CCL2 by Mac
<i>Core.Mac/@dCCL5</i>	[4,8]	#molecules/second	Secretion rate of CCL5 by Mac
<i>Core.Mac/@dCXCL9</i>	[10,14]	#molecules/second	Secretion rate of CXCL9 by Mac
<i>Core.Mac/@dIL10Act</i>	[0.2,0.4]	#molecules/second	Secretion rate of IL10 by Mac Act
<i>Core.Mac/@dIL10Inf</i>	[0.01,0.03]	#molecules/second	Secretion rate of IL10 by Mac Inf
<i>Core.Mac/@halfSatIL10</i>	[170,210]	#molecules	Half Sat for TNF induction of IL10 in activated Macs
<i>Core.Mac/@thresholdNFkB</i>	[75,115]	#molecules	TNF threshold for NFkB activation
<i>Core.Mac/@kNFkB</i>	[0.7e-5,1e-5]	1/seconds	Rate of NFkB activation
<i>Core.Mac/@probKillExtMtbRest</i>	[0.05, 0.3]	probability	Probability of a resting macrophage to kill some extracellular bacteria
<i>Core.Mac/@fKillExtMtbRest</i>	[0.3, 0.5]	fractional increase of a STAT1 or NFkB stimulated resting mac's probability to kill an extmt	Fractional increase of a resting macrophage to kill some extracellular bacteria when STAT1 NFkB
<i>Core.Mac/@nrExtMtbNFkB</i>	[150, 250]	#bacteria	Number of extracellular bacteria for NFkB activation in an infected macrophage
<i>Core.Mac/@nrIntMtbCInf</i>	[8,12]	#bacteria	Number of intracellular bacteria for an infected macrophage to become chronically infected
<i>Core.Mac/@nrIntMtbBurstCInf</i>	[13, 20]	#bacteria	Number of intracellular bacteria for an chronically infected macrophage to burst

<i>Core.Mac/@nrExtMtbUptakeAct</i>	[3, 7]	#bacteria	Number of extracellular bacteria an active macrophage can uptake and subsequently kill
<i>Core.Mac/@stat1ActivationTime</i>	[400, 460]	#agent time steps	Time interval a Macrophage is STAT1 Activated
<i>Core.Mac/@nfkbActivationTime</i>	[13, 17]	#agent time steps	Time a Macrophage is NFkB Activated
<i>Core.Mac/@stat3ActivationTime</i>	[75, 125]	#agent time steps	Time a Macrophage is STAT3 Activated
<i>Core.Mac/@thresholdSTAT3IL10</i>	[5, 15]	#molecules	Threshold of bound IL10 to IL10R1 for STAT3 signaling - Non-Molecular
<i>Core.Mac/@kSTAT3IL10</i>	[5e-4, 1.5e-3]	1/(#molecules * agent time step)	Rate constant of bound IL10 to IL10R1 for STAT3 signaling - Non-Molecular
<i>Core.Mac/@probHealCaseation</i>	[0.005, 0.05]	probability	Rate constant for wound healing - Non-Molecular
<i>Core.Tcell/@maxAge</i>	[400, 460]	#agent time steps	Maximal T cell age
<i>Core.Tcell/@exhaustedMaxAge</i>	[400, 460]	#agent time steps	Maximal T cell age of an exhausted T cell
<i>Core.Tcell/@probMoveToMac</i>	[0.01, 0.2]	probability	Probability of a T cell moving onto a compartment already containing a macrophage
<i>Core.Tcell/@probMoveToTcell</i>	[0.01, 0.2]	probability	Probability of a T cell moving onto a compartment already containing another T cell
<i>Core.Tcell/@maxDivisions</i>	[3, 5]	#Tcell divisions	Maximum number of divisions: max number of times a T cell can create a daughter cell
<i>Core.Tcell.Tgam/@dTnf</i>	[0.1, 0.2]	#molecules/second	Secretion rate of TNF by Tgam
<i>Core.Tcell.Tgam/@maxTimeReg</i>	[30, 40]	#agent time steps	Time span during which a Tgam cell remains down-regulated
<i>Core.Tcell.Tgam/@probApoptosisFasFasL</i>	[0.01, 0.03]	Probability	Probability of Fas/FasL induced apoptosis by a Tgam cell
<i>Core.Tcell.Tgam/@probTNFProducer</i>	[0.04, 0.1]	Probability	Probability that this Tgam is producing TNF
<i>Core.Tcell.Tgam/@probIFNProducer</i>	[0.3, 0.4]	Probability	Probability that this Tgam is producing TNF
<i>Core.Tcell.Tgam/@probIFNMooreExtend</i>	[0.20, 0.3]	Probability	Probability Mac will be IFN/STAT1 activated in the extended Moore
<i>Core.Tcell.Tcyt/@dTnf</i>	[0.01, 0.02]	#molecules/second	Secretion rate of TNF by Tcyt
<i>Core.Tcell.Tcyt/@maxTimeReg</i>	[30, 40]	#agent time steps	Time span during which a Tcyt cell remains down-regulated
<i>Core.Tcell.Tcyt/@probKillMac</i>	[0.005, 0.015]	Probability	Probability of a Tcyt cell killing a (chronically) infected macrophage
<i>Core.Tcell.Tcyt/@probKillMacCleanly</i>	[0.6, 0.9]	Probability	Probability of a Tcyt cell killing a chronically infected macrophage cleanly

<i>Core.Tcell.Tcyt/@probTNFProducer</i>	[0.05, 0.09]	Probability	Probability that this Tcyt is producing TNF
<i>Core.Tcell.Treg/@dIL10</i>	[0.7, 0.8]	#molecules/second	Secretion rate of IL10 by Treg
<i>Core.Tcell.Treg/@probTregDeactivate</i>	[0.01, 0.02]	probability	Probability of successful downregulation by a Treg
<i>Core.Tcell.Treg/@factorDeactIL10</i>	[1,3]	unitless	Factor when a Treg is making IL-10 to scale probTregDeactivate
<i>Recruit.Prob/@timeMaxRecDelay</i>	[500,900]	#agent time steps	Time after which maximum T cell recruitment is enabled
<i>Recruit.Prob.Mac/@maxRecProb</i>	[0.1, 0.4]	probability	Max probability of recruiting a macrophage - Scales recruitment function
<i>Recruit.Prob.Mac/@thresholdRecChemokine</i>	[0.015, 1.5]	#molecules	Threshold of Mac Recruitment for Chemokines
<i>Recruit.Prob.Mac/@thresholdRecTNF</i>	[0.005, 0.5]	#molecules	Threshold of Mac Recruitment for TNF
<i>Recruit.Prob.Mac/@recruitmentHalfSatTNF</i>	[0.055, 5.5]	#molecules	Half-saturation paramter for Mac TNF-dependent recruitment
<i>Recruit.Prob.Mac/@recruitmentHalfSatChemokine</i>	[1, 10]	#molecules	Half-saturation paramter for Mac chemokine-dependent recruitment
<i>Recruit.Prob.Tcell.Tgam/@maxRecProb</i>	[0.05, 0.15]	probability	Max probability of recruiting a Tgam - Scales recruitment function
<i>Recruit.Prob.Tcell.Tgam/@thresholdRecChemokine</i>	[0.0151, 1.5]	#molecules	Threshold of Tgam Recruitment for Chemokines
<i>Recruit.Prob.Tcell.Tgam/@thresholdRecTNF</i>	[0.01, 1.0]	#molecules	Threshold of Tgam Recruitment for TNF
<i>Recruit.Prob.Tcell.Tgam/@recruitmentHalfSatTNF</i>	[0.04, 4.0]	#molecules	Half-saturation paramter for Tcell TNF-dependent recruitment
<i>Recruit.Prob.Tcell.Tgam/@recruitmentHalfSatChemokine</i>	[0.15, 15]	#molecules	Half-saturation paramter for Tcell chemokine-dependent recruitment
<i>Recruit.Prob.Tcell.Tcyt/@maxRecProb</i>	[0.03, 0.13]	Probability	Max probability of recruiting a Tcyt - Scales recruitment function
<i>Recruit.Prob.Tcell.Tcyt/@thresholdRecChemokine</i>	[0.03775, 3]	#molecules	Threshold of TCYT Recruitment for Chemokines
<i>Recruit.Prob.Tcell.Tcyt/@thresholdRecTNF</i>	[0.01, 1.0]	#molecules	Threshold of TCYT Recruitment for TNF
<i>Recruit.Prob.Tcell.Tcyt/@recruitmentHalfSatTNF</i>	[0.04, 4.0]	#molecules	Half-saturation paramter for Tcell TNF-dependent recruitment
<i>Recruit.Prob.Tcell.Tcyt/@recruitmentHalfSatChemokine</i>	[0.15, 15]	#molecules	Half-saturation paramter for Tcell chemokine-dependent recruitment

<i>Recruit.Prob.Tcell.Treg/@maxRecProb</i>	[0.0075, 0.075]	probability	Max probability of recruiting a Treg - Scales recruitment function
<i>Recruit.Prob.Tcell.Treg/@thresholdRecChemokine</i>	[0.00755, 0.7]	#molecules	Threshold of TREG Recruitment for Chemokines
<i>Recruit.Prob.Tcell.Treg/@thresholdRecTNF</i>	[0.01, 1.0]	#molecules	Threshold of TREG Recruitment for TNF
<i>Recruit.Prob.Tcell.Treg/@recruitmentHalfSatTNF</i>	[0.04, 4.0]	#molecules	Half-saturation paramter for Tcell TNF-dependent recruitment
<i>Recruit.Prob.Tcell.Treg/@recruitmentHalfSatChemokine</i>	[0.15, 15]	#molecules	Half-saturation paramter for Tcell chemokine-dependent recruitment

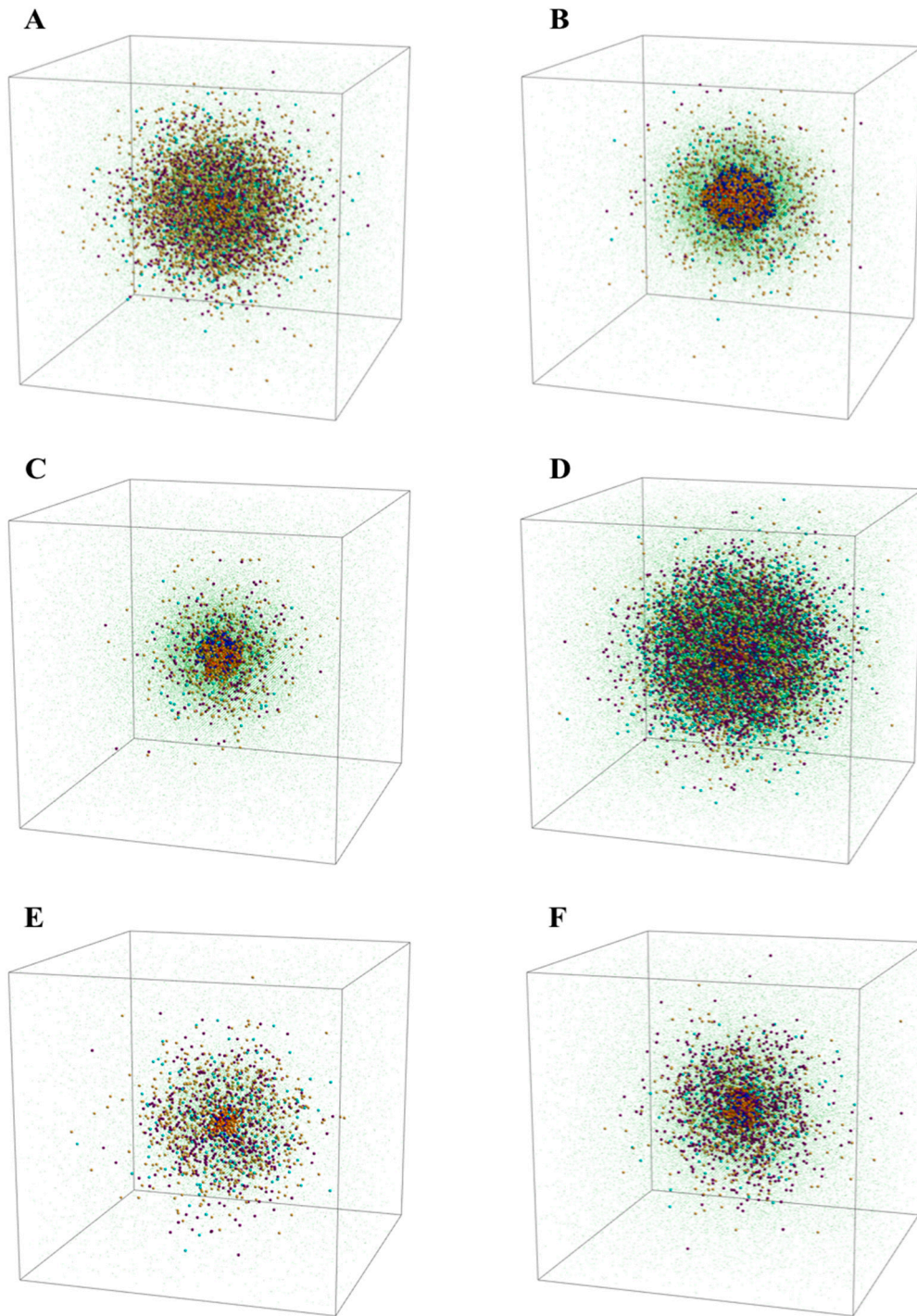


Figure S1. Examples of other *in silico* granulomas, visualized in 3D. Here we visualize *in silico* granulomas corresponding to eight of the 22 parameter files determined through the CFU calibration described in the Methods and Results section. These images illustrate some of the variation possible among the parameter files. Granulomas correspond to day 32 post infection. The list of the 90 parameters corresponding to each granuloma are shown in Table S2 in the Supplementary Material.

Table S2. list of the 90 parameters values corresponding to each granuloma shown in Figure S1. The experiment numbers shown refer to the correspondent parameter sample (out of 1,500 samples) generated by the Latin hypercube sampling scheme.

Parameter Name	Exp107	Exp1217	Exp1331	Exp588	Exp1099	Exp1460
<i>Mtb/@growthExtMtbBound</i>	212.7036	190.2303	226.7785	212.3112	216.5995	208.039
<i>Mtb.Numbers/@growthRateIntMtb</i>	1.001955	1.00332	1.002095	1.00286	1.001791	1.001946
<i>Mtb.Numbers/@growthRateExtMtb</i>	1.002698	1.001362	1.002077	1.002509	1.002293	1.002236
<i>Mtb.Numbers/@deathRateExtMtbCaseated</i>	1.73065	1.007751	1.839851	1.423186	1.949764	1.69439
<i>Core/@estBoundFactorTNF</i>	0.431709	0.463145	0.463788	0.42911	0.414548	0.44913
<i>Core/@estBoundFactorIL10</i>	0.484486	0.575668	0.510042	0.493809	0.438566	0.464123
<i>Core/@estConsRateTNF</i>	0.000844	0.000578	0.000868	0.000802	0.00073	0.000888
<i>Core/@estConsRateIL10</i>	0.000509	0.000342	0.000254	0.0004	0.000465	0.000522
<i>Core/@estIntPartitionTNF</i>	11.66407	12.57022	9.003913	10.61256	12.93329	9.716339
<i>Core/@nrKillingsCaseation</i>	8	9	13	8	7	7
<i>Core/@caseationHealingTime</i>	2250	2598	1834	2499	2295	2457
<i>Core/@sourceDensity</i>	0.031379	0.045881	0.047061	0.047537	0.006303	0.01274
<i>Core/@diffusivityTNF</i>	5.7E-08	4.11E-08	5.76E-08	4.28E-08	4.95E-08	4.7E-08
<i>Core/@diffusivityChemokines</i>	4.04E-08	5.66E-08	5.39E-08	5.08E-08	4.7E-08	5.21E-08
<i>Core/@diffusivityIL10</i>	4.09E-08	5.6E-08	4.82E-08	5.06E-08	4.78E-08	5.52E-08
<i>Core/@ChemokineDeg</i>	0.001173	0.003544	0.003088	0.001213	0.000677	0.001754
<i>Core/@kDeg</i>	0.004089	0.004835	0.003819	0.00222	0.004528	0.003773
<i>Core/@Ikdeg</i>	0.001559	0.002579	0.00089	0.002063	0.002785	0.000909
<i>Core/@IC50ChemokineIL10</i>	5.986183	7.494756	4.081917	4.651744	9.853524	7.519626
<i>Core/@thresholdApoptosisTNF</i>	3768.642	3834.609	3371.569	2061.799	4096.084	1422.949
<i>Core/@kApoptosis</i>	1.64E-06	1.73E-06	1.55E-06	2.86E-07	1.78E-06	2.02E-07
<i>Core/@saturationApoptosisTNF</i>	8296.478	5055.741	8394.854	6674.25	6964.417	8877.03
<i>Core/@minChemotaxis</i>	26.10367	13.74456	33.17806	17.66427	12.74171	12.47196
<i>Core/@maxChemotaxis</i>	716.5819	714.0672	453.7457	659.3666	213.8385	728.2961
<i>Core/@MaxIL10Inhibition</i>	0.156721	0.056617	0.28328	0.27405	0.210947	0.121587
<i>Core.Mac/@initDensity</i>	0.013239	0.007467	0.014246	0.027988	0.009458	0.01706
<i>Core.Mac/@movementRest</i>	3	6	4	3	9	3
<i>Core.Mac/@movementAct</i>	49	42	38	27	11	33
<i>Core.Mac/@movementInf</i>	123	113	123	144	175	153
<i>Core.Mac/@dTnf</i>	1.373567	1.52956	1.60419	1.695448	1.467669	1.558262
<i>Core.Mac/@dCCL2</i>	4.909274	5.895709	4.794036	6.306414	5.774316	5.632097
<i>Core.Mac/@dCCL5</i>	4.47138	4.943601	7.567779	7.016468	5.62262	6.173624

<i>Core.Mac/@dCXCL9</i>	12.73673	10.04317	12.44619	10.43985	11.04102	13.88383
<i>Core.Mac/@dIL10Act</i>	0.344593	0.226707	0.387289	0.288056	0.369029	0.207422
<i>Core.Mac/@dIL10Inf</i>	0.023796	0.028697	0.019229	0.011304	0.027456	0.024041
<i>Core.Mac/@halfSatIL10</i>	208.5436	202.9831	208.1734	193.1971	205.0046	184.1318
<i>Core.Mac/@thresholdNFkBTFN</i>	108.1988	76.39743	80.25483	83.68737	87.04637	84.98787
<i>Core.Mac/@kNFkB</i>	9.92E-06	9.85E-06	7.33E-06	8.96E-06	8.17E-06	7.89E-06
<i>Core.Mac/@probKillExtMtbRest</i>	0.236164	0.243177	0.213914	0.125766	0.225209	0.156869
<i>Core.Mac/@fKillExtMtbRest</i>	0.33891	0.318811	0.336385	0.436383	0.316346	0.485938
<i>Core.Mac/@nrExtMtbNFkB</i>	203.5147	232.828	213.6564	187.7995	151.7827	242.0825
<i>Core.Mac/@nrIntMtbCInf</i>	12	12	9	8	11	11
<i>Core.Mac/@nrIntMtbBurstCInf</i>	18	19	13	20	19	14
<i>Core.Mac/@nrExtMtbUptakeAct</i>	4	3	5	3	4	4
<i>Core.Mac/@stat1ActivationTime</i>	438.74	455.9144	449.9	459.7025	438.8812	452.404
<i>Core.Mac/@nfkbActivationTime</i>	14.16019	16.42173	13.23257	14.23056	16.21124	14.84746
<i>Core.Mac/@stat3ActivationTime</i>	114.3614	88.32152	104.3877	124.7755	89.6549	105.7309
<i>Core.Mac/@thresholdSTAT3IL10</i>	9.737525	13.11575	13.86993	6.789302	12.12305	11.70058
<i>Core.Mac/@kSTAT3IL10</i>	0.00139	0.001232	0.001019	0.000713	0.001193	0.000849
<i>Core.Mac/@probHealCaseation</i>	0.014079	0.024336	0.049197	0.027745	0.028963	0.036337
<i>Core.Tcell/@maxAge</i>	411	434	424	432	411	402
<i>Core.Tcell/@exhaustedMaxAge</i>	443	424	433	413	409	413
<i>Core.Tcell/@probMoveToMac</i>	0.074868	0.042021	0.027888	0.077404	0.12059	0.088926
<i>Core.Tcell/@probMoveToTcell</i>	0.025554	0.012214	0.032102	0.163135	0.083153	0.010266
<i>Core.Tcell/@maxDivisions</i>	3	3	3	3	5	4
<i>Core.Tcell.Tgam/@dTNF</i>	0.197828	0.173356	0.127363	0.187541	0.157129	0.126285
<i>Core.Tcell.Tgam/@maxTimeReg</i>	40	37	37	39	39	35
<i>Core.Tcell.Tgam/@probApoptosisFasFasL</i>	0.01646	0.018783	0.02629	0.012317	0.018548	0.018535
<i>Core.Tcell.Tgam/@probTNFProducer</i>	0.083465	0.050492	0.093335	0.056354	0.057832	0.045978
<i>Core.Tcell.Tgam/@probIFNProducer</i>	0.37901	0.338223	0.319791	0.371618	0.38481	0.301018
<i>Core.Tcell.Tgam/@probIFNMooreExtend</i>	0.228199	0.243467	0.206911	0.279134	0.268253	0.26071
<i>Core.Tcell.Tcyt/@dTNF</i>	0.014435	0.019764	0.01376	0.016656	0.016756	0.019005
<i>Core.Tcell.Tcyt/@maxTimeReg</i>	39	38	39	32	34	37
<i>Core.Tcell.Tcyt/@probKillMac</i>	0.013302	0.012353	0.007546	0.008492	0.01136	0.012423
<i>Core.Tcell.Tcyt/@probKillMacCleanly</i>	0.886567	0.623039	0.890478	0.755467	0.635762	0.640955
<i>Core.Tcell.Tcyt/@probTNFProducer</i>	0.086863	0.066919	0.084475	0.069241	0.066652	0.070682
<i>Core.Tcell.Treg/@dIL10</i>	0.773153	0.798214	0.705819	0.737648	0.746762	0.756761
<i>Core.Tcell.Treg/@probTregDeactivate</i>	0.014375	0.011237	0.016095	0.014172	0.01214	0.017359

<i>Core.Tcell.Treg/@factorDeactIL10</i>	2.899996	2.6052	1.660427	1.292824	1.398151	2.641041
<i>Recruit.Prob/@timeMaxRecDelay</i>	740	554	851	617	645	562
<i>Recruit.Prob.Mac/@maxRecProb</i>	0.311086	0.357383	0.277989	0.287472	0.140233	0.365722
<i>Recruit.Prob.Mac/@thresholdRecChemokine</i>	0.844973	1.299753	0.288299	1.063154	0.567517	0.409053
<i>Recruit.Prob.Mac/@thresholdRecTNF</i>	0.32985	0.328308	0.346965	0.196217	0.01885	0.476191
<i>Recruit.Prob.Mac/@recruitmentHalfSatTNF</i>	2.013039	2.80207	2.313902	1.689667	4.445079	4.003354
<i>Recruit.Prob.Mac/@recruitmentHalfSatChemokine</i>	9.336256	3.056593	6.790684	9.098188	6.538349	5.050239
<i>Recruit.Prob.Tcell.Tgam/@maxRecProb</i>	0.113713	0.054449	0.115355	0.0585	0.070061	0.079866
<i>Recruit.Prob.Tcell.Tgam/@thresholdRecChemokine</i>	0.104409	0.179187	1.100593	0.492282	0.710556	0.513107
<i>Recruit.Prob.Tcell.Tgam/@thresholdRecTNF</i>	0.833406	0.856212	0.9306	0.234757	0.9124	0.288354
<i>Recruit.Prob.Tcell.Tgam/@recruitmentHalfSatTNF</i>	0.040101	3.369557	3.622599	1.723027	0.953238	1.924597
<i>Recruit.Prob.Tcell.Tgam/@recruitmentHalfSatChemokine</i>	8.499244	11.20854	13.40532	10.91517	7.0765	9.254699
<i>Recruit.Prob.Tcell.Tcyt/@maxRecProb</i>	0.116013	0.040857	0.06603	0.099326	0.098067	0.088366
<i>Recruit.Prob.Tcell.Tcyt/@thresholdRecChemokine</i>	1.995664	1.663344	1.241825	1.831602	1.829797	1.621107
<i>Recruit.Prob.Tcell.Tcyt/@thresholdRecTNF</i>	0.742341	0.759802	0.294099	0.186856	0.209493	0.281977
<i>Recruit.Prob.Tcell.Tcyt/@recruitmentHalfSatTNF</i>	1.182729	1.921854	2.932541	3.602318	3.510149	1.085081
<i>Recruit.Prob.Tcell.Tcyt/@recruitmentHalfSatChemokine</i>	4.760701	12.63024	8.863514	4.184256	13.54121	1.145628
<i>Recruit.Prob.Tcell.Treg/@maxRecProb</i>	0.061887	0.032558	0.040755	0.044468	0.030325	0.050833
<i>Recruit.Prob.Tcell.Treg/@thresholdRecChemokine</i>	0.375637	0.407376	0.489457	0.500638	0.101731	0.539927
<i>Recruit.Prob.Tcell.Treg/@thresholdRecTNF</i>	0.054114	0.102815	0.939653	0.813379	0.04119	0.931099
<i>Recruit.Prob.Tcell.Treg/@recruitmentHalfSatTNF</i>	3.205315	3.839902	3.859628	3.317244	1.653953	1.676516
<i>Recruit.Prob.Tcell.Treg/@recruitmentHalfSatChemokine</i>	14.48033	13.57721	10.82076	2.082219	6.314493	4.472219