1 Equations

$$
\begin{aligned}
\frac{dLeish_{promas(t)}}{dt} =& \frac{-log(0.01)}{24}\text{Leish\_promas}\,(t)\\
\frac{dTLR4(t)}{dt} =& c_{TLR4} + p64\text{STAT3}\,(t) - \text{TLR4}\,(t)\max\left(p64 + 0.1c_{TLR4}, 0.0001\right)\\
\frac{dTLR4a(t)}{dt} =& c_{TLR4a} - \text{TLR4a}\,(t)\max\left(0.1c_{TLR4a}, 0.0001\right) + \frac{100p2\text{Leish\_promas}\,(t)\,\text{TLR4}\,(t)}{kntr + \text{Leish\_promas}\,(t)}\\
\frac{dNOTCH3(t)}{dt} =& c_{NOTCH3} + p3\text{TLR4a}\,(t) - \text{NOTCH3}\,(t)\max\left(p3 + 0.1c_{NOTCH3}, 0.0001\right)\\
\frac{dTRAF6(t)}{dt} =& c_{TRAF6} + \left(-0.1c_{TRAF6} + 0.001p5 + 10p7\right)\text{TLR4a}\,(t)\\
& - \text{TRAF6}\,(t)\max\left(0.001p5, 0.0001\right) - p7\text{NLRP12}\,(t)\,\text{TRAF6}\,(t)\\
\frac{dMAP4K3(t)}{dt} =& c_{MAP4K3} + p9\text{TRAF6}\,(t) - \text{MAP4K3}\,(t)\max\left(p9 + 0.1c_{MAP4K3}, 0.0001\right)\\
\frac{dNFkB(t)}{dt} =& c_{NFkB} + p10\text{MAP4K3}\,(t) - \text{NFkB}\,(t)\max\left(p10 + 0.1c_{NFkB}, 0.0001\right)\\
& - p51\text{Leish\_amas}\,(t)\,\text{NFkB}\,(t)\\
\frac{dIL1B(t)}{dt} =& c_{IL1B} + p11\text{NFkB}\,(t) + p12\text{P2RX7a}\,(t) - \text{IL1B}\,(t)\max\left(p11 + p12 + 0.1c_{IL1B}, 0.0001\right)\\
\frac{dTNFA(t)}{dt} =& c_{TNFA} + p13\text{NFkB}\,(t) - \text{TNFA}\,(t)\max\left(p13 + 0.1c_{TNFA}, 0.0001\right)\\
\frac{dCREB(t)}{dt} =& c_{CREB} + p15\text{MAP4K3}\,(t) + p16\text{ADORA2Ba}\,(t)\\
& - \text{CREB}\,(t)\max\left(p15 + p16 + 0.1c_{CREB}, 0.0001\right)\\
\frac{dIL10(t)}{dt} =& c_{IL10} + p17\text{CREB}\,(t) - \text{IL10}\,(t)\max\left(p17 + 0.1c_{IL10}, 0.0001\right)\\
\frac{dSTAT3(t)}{dt} =& c_{STAT3} + p19\text{IL10}\,(t) - \text{STAT3}\,(t)\max\left(p19 + 0.1c_{STAT3}, 0.0001\right)\\
& - lpst\text{Leish\_promas}\,(t)\,\text{STAT3}\,(t)\\
\frac{dNLRP12(t)}{dt} =& c_{NLRP12} + p20\text{STAT3}\,(t) - \text{NLRP12}\,(t)\max\left(p20 + 0.1c_{NLRP12}, 0.0001\right)\\
\frac{dCCL24(t)}{dt} =& c_{CCL24} + p22\text{STAT3}\,(t) - \text{CCL24}\,(t)\max\left(p22 + 0.1c_{CCL24}, 0.0001\right)\\
\frac{dTIGAR(t)}{dt} =& c_{TIGAR} + p24\text{CREB}\,(t) - \text{TIGAR}\,(t)\max\left(p24 + 0.1c_{TIGAR}, 0.0001\right)\\
\frac{dFOS(t)}{dt} =& c_{FOS} + p26\text{MAP4K3}\,(t) + p65\text{STAT3}\,(t) - \text{FOS}\,(t)\max\left(p26 + p65 + 0.1c_{FOS}, 0.0001\right)\\
\frac{dNADP_{oxi(t)}}{dt} =& c_{NADP\_oxi} + \text{FOS}\,(t)\left(p27 + 10p28\right) - \text{NADP\_oxi}\,(t)\max\left(p27 + 0.1c_{NADP\_oxi}, 0.0001\right)\\
& - p28\text{NADP\_oxi}\,(t)\,\text{NOTCH3}\,(t)
\end{aligned}
$$

$$
\begin{aligned}
\frac{dROS_{cytos(t)}}{dt} =& nftf3\text{Leish\_promas}\,(t)\,\text{NADP\_oxi}\,(t) + nftf4\text{Leish\_amas}\,(t)\,\text{NADP\_oxi}\,(t) \\
& - p57\text{Glutathione}\,(t)\,\text{ROS\_cytos}\,(t) \\
\frac{dLeish_{amas(t)}}{dt} =& 0.096\text{Leish\_promas}\,(t) \\
\frac{dP2RX7(t)}{dt} =& c_{P2RX7} + p32\text{STAT3}\,(t) - \text{P2RX7}\,(t)\max\left(p32 + 0.1c_{P2RX7}, 0.0001\right) \\
\frac{dP2RX7a(t)}{dt} =& c_{P2RX7a} - \text{P2RX7a}\,(t)\max\left(0.1c_{P2RX7a} + \frac{10.0p33}{10.0 + kilp2r}, 0.0001\right) \\
& + \frac{p33\text{ATP\_ext}\,(t)\,\text{P2RX7}\,(t)}{kilp2r + \text{ATP\_ext}\,(t)} \\
\frac{dNFE2L2(t)}{dt} =& c_{NFE2L2} + p34\text{NFkB}\,(t) + p35\text{ROS\_Mito}\,(t) - \text{NFE2L2}\,(t)\max\left(p34 + 0.1c_{NFE2L2}, 0.0001\right) \\
\frac{dGlutathione(t)}{dt} =& c_{Glutathione} + p36\text{NFE2L2}\,(t) - \text{Glutathione}\,(t)\max\left(p36 + 0.1c_{Glutathione}, 0.0001\right) \\
\frac{dPANX(t)}{dt} =& c_{PANX} + pcrebtr\text{CREB}\,(t) - \text{PANX}\,(t)\max\left(pcrebtr + 0.1c_{PANX} - 10.0n_{ext\_tr}, 0.0001\right) \\
& - n_{ext\_tr}\text{ATP\_ext}\,(t)\,\text{PANX}\,(t) \\
\frac{dPANXa(t)}{dt} =& c_{PANXa} - \text{PANXa}\,(t)\max\left(0.1c_{PANXa}, 0.0001\right) + \frac{k_{PANXa}\text{ATP\_cytos}\,(t)\,\text{Leish\_promas}\,(t)\,\text{PANX}\,(t)}{katppnx + \text{ATP\_cytos}\,(t)} \\
\frac{dATP_{ext(t)}}{dt} =& p61\text{PANXa}\,(t) - \text{ATP\_ext}\,(t)\max\left(p61, 0.0001\right) \\
\frac{dNT5E(t)}{dt} =& c_{NT5E} + p66\text{STAT3}\,(t) + p67\text{HIF1A}\,(t) + p68\text{NFkB}\,(t) - \text{NT5E}\,(t)\max\left(p66 + p67 + p68 + 0.1c_{NT5E}, 0.0001\right) \\
\frac{dAdenosine(t)}{dt} =& -\text{Adenosine}\,(t)\max\left(\frac{10.0v38}{10.0 + k38}, 0.0001\right) + \frac{v38\text{ATP\_ext}\,(t)\,\text{NT5E}\,(t)}{k38 + \text{ATP\_ext}\,(t)} \\
\frac{dADORA2B(t)}{dt} =& c_{ADORA2B} + p68\text{HIF1A}\,(t) - \text{ADORA2B}\,(t)\max\left(p68 + 0.1c_{ADORA2B}, 0.0001\right) \\
\frac{dADORA2Ba(t)}{dt} =& c_{ADORA2Ba} - \text{ADORA2Ba}\,(t)\max\left(0.1c_{ADORA2Ba} + \frac{10.0i_{ADAd}}{10.0 + kadocreb}, 0.0001\right) + \\
& \frac{i_{ADAd}\text{ADORA2B}\,(t)\,\text{Adenosine}\,(t)}{kadocreb + \text{Adenosine}\,(t)} \\
\frac{dATP_{cytos(t)}}{dt} =& p18\text{Glycolysis}\,(t) - \text{ATP\_cytos}\,(t)\max\left(p18, 0.0001\right) - p37\text{ATP\_cytos}\,(t)\,\text{Leish\_promas}\,(t)\,\text{PANX}\,(t) \\
\frac{dGlycolysis(t)}{dt} =& c_{Glycolysis} + (p43 - 0.1c_{Glycolysis} + 10p41)\,\text{HIF1A}\,(t) - \text{Glycolysis}\,(t)\max\left(p43, 0.0001\right) \\
& - p41\text{Glycolysis}\,(t)\,\text{TIGAR}\,(t) \\
\frac{dPyruvate(t)}{dt} =& \text{Glycolysis}\,(t)\,(p44 + p45) - p44\text{Pyruvate}\,(t) - p45\text{Pyruvate}\,(t) \\
\frac{dSuccinate(t)}{dt} =& c_{Succinate} + p45_{prop}\text{Pyruvate}\,(t) - p60\text{Succinate}\,(t) - \text{Succinate}\,(t)\max\left(p45_{prop} + 0.1c_{Succinate} - p60, 0.0001\right)
\end{aligned}
$$

$$
\begin{aligned}
\frac{dTCA(t)}{dt} =& p60_{prop}\text{Succinate}\left(t\right) - \text{TCA}\left(t\right)\max\left(p60_{prop}, 0.0001\right) - p55\text{ROS\_Mito}\left(t\right)\text{TCA}\left(t\right)\\
\frac{dQH2(t)}{dt} =& c_{QH2} + p46\text{Succinate}\left(t\right) - \text{QH2}\left(t\right)\max\left(p46 + 0.1c_{QH2}, 0.0001\right)\\
\frac{dATP_{Mito(t)}}{dt} =& o_{ATP\_Mito} + \left(p47 - 0.1o_{ATP\_Mito} + 10p53\right)\text{QH2}\left(t\right) - \text{ATP\_Mito}\left(t\right)\max\left(p47, 0.0001\right)\\
& - p48\text{ATP\_Mito}\left(t\right)\text{ROS\_Mito}\left(t\right) - p53\text{ATP\_Mito}\left(t\right)\text{HIF1A}\left(t\right)\\
\frac{dROS_{Mito(t)}}{dt} =& - d_{ROS\_Mito}\text{ROS\_Mito}\left(t\right) + p21\text{Glycolysis}\left(t\right)\text{Leish\_promas}\left(t\right)\\
\frac{dHIF1A(t)}{dt} =& c_{HIF1A} + p49\text{NFkB}\left(t\right) + p62\text{Leish\_promas}\left(t\right)\text{Succinate}\left(t\right) - \text{HIF1A}\left(t\right)\max\left(p49 + 0.1c_{HIF1A}, 0.0001\right)\\
\frac{dLactate(t)}{dt} =& c_{Lactate} + p44_{prop}\text{Pyruvate}\left(t\right) + p50\text{HIF1A}\left(t\right) - \text{Lactate}\left(t\right)\max\left(p44_{prop} + p50 + 0.1c_{Lactate}, 0.0001\right)
\end{aligned}
$$

2 Parameters

$$
\begin{aligned}
p64 &= 3.21 \\
c_{TLR4} &= 0.0246 \\
kntr &= 1.64 \\
p2 &= 17.8 \\
c_{TLR4a} &= 42.4 \\
p3 &= 0.0386 \\
c_{NOTCH3} &= 0.00401 \\
c_{TRAF6} &= 1.22 \\
p7 &= 0.00158 \\
p5 &= 951.0 \\
c_{MAP4K3} &= 0.000455 \\
p9 &= 378.0 \\
c_{NFkB} &= 0.0291 \\
p10 &= 1.81 \\
p51 &= 0.184 \\
p12 &= 4.02e-5 \\
p11 &= 0.987 \\
c_{IL1B} &= 0.0669 \\
c_{TNFA} &= 0.298 \\
p13 &= 1.19 \\
p15 &= 0.0514 \\
p16 &= 0.319 \\
c_{CREB} &= 0.000878 \\
p17 &= 43.7 \\
c_{IL10} &= 0.31 \\
p19 &= 0.159 \\
lpst &= 13.1 \\
c_{STAT3} &= 0.000127 \\
c_{NLRP12} &= 3.05e-5 \\
p20 &= 0.136 \\
c_{CCL24} &= 0.00737 \\
p22 &= 0.153 \\
c_{TIGAR} &= 0.0177
\end{aligned}
$$

$$
\begin{aligned}
p24 &= 0.724 \\
p26 &= 0.252 \\
p65 &= 0.0339 \\
c_{FOS} &= 0.0139 \\
c_{NADP\_oxi} &= 1.45 \\
p27 &= 0.102 \\
p28 &= 2.01e-5 \\
nftf3 &= 0.258 \\
nftf4 &= 2.22 \\
p57 &= 0.0397 \\
p32 &= 0.33 \\
c_{P2RX7} &= 2.26 \\
p33 &= 455.0 \\
kilp2r &= 1.61 \\
c_{P2RX7a} &= 0.978 \\
p34 &= 1.22 \\
p35 &= 3.43 \\
c_{NFE2L2} &= 0.92 \\
c_{Glutathione} &= 20.6 \\
p36 &= 0.159 \\
n_{ext\_tr} &= 0.0169 \\
pcrebtr &= 0.191 \\
c_{PANX} &= 0.0815 \\
katppnx &= 0.242 \\
k_{PANXa} &= 0.314 \\
c_{PANXa} &= 0.827 \\
p61 &= 0.377 \\
p66 &= 0.0336 \\
p68 &= 0.0139 \\
c_{NT5E} &= 0.0055 \\
p67 &= 0.388 \\
v38 &= 3.18 \\
k38 &= 0.00369 \\
c_{ADORA2B} &= 1.65 \\
i_{ADAd} &= 1.32 \\
kadocreb &= 22.1 \\
c_{ADORA2Ba} &= 0.878 \\
p18 &= 1.35 \\
p37 &= 1.11 \\
p41 &= 1.8
\end{aligned}
$$

$$
\begin{aligned}
c_{Glycolysis} &= 0.186 \\
p43 &= 0.178 \\
p44 &= 0.656 \\
p45 &= 0.596 \\
p60 &= 0.515 \\
c_{Succinate} &= 0.194 \\
p45_{prop} &= 13.8 \\
p55 &= 0.0178 \\
p60_{prop} &= 3.8 \\
p46 &= 0.00841 \\
c_{QH2} &= 0.00685 \\
o_{ATP\_Mito} &= 0.635 \\
p47 &= 49.8 \\
p53 &= 0.334 \\
p48 &= 0.00279 \\
p21 &= 0.012 \\
d_{ROS\_Mito} &= 0.385 \\
p49 &= 0.47 \\
p62 &= 0.885 \\
c_{HIF1A} &= 1.67e-5 \\
p50 &= 0.000463 \\
c_{Lactate} &= 0.321 \\
p44_{prop} &= 0.0341
\end{aligned}
$$