

1.

$$\begin{aligned}\dot{T}_L = & -[\alpha_1(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]T_L M - \alpha_2 T_L C_N - [\mu_1(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]T_L \\ & + [\alpha_3(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]M_i + \alpha_4 C_i\end{aligned}$$

2.

$$\begin{aligned}\dot{M} = & [\nu_1(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})](M - M_0) - [\alpha_1(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]T_L M \\ & - [\mu_2(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]M\end{aligned}$$

3.

$$\dot{C}_N = -\alpha_2 T_L C_N - [\mu_3(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]C_N$$

4.

$$\dot{M}_i = [\alpha_1(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]T_L M - [\mu_5(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]M_i$$

5.

$$\dot{C}_i = \alpha_2 T_L C_N - [\mu_6(\frac{TNF^h}{\eta_{(M)(TNF)}^h + TNF^h})(\frac{\eta_{(M)(IL10)}^h}{\eta_{(M)(IL10)}^h + IL10^h})]C_i$$

6.

$$T\dot{N}F = [\alpha_5(\frac{\eta_{(TNF)(IL10)}^h}{\eta_{(TNF)(IL10)}^h + IL10^h})]M_i - \mu_7(TNF - qTNF) + [\alpha_5(\frac{\eta_{(TNF)(IL10)}^h}{\eta_{(TNF)(IL10)}^h + IL10^h})]C_i$$

7.

$$I\dot{L}10 = \alpha_7 M_i - \mu_9(IL10 - qIL10)$$