Tabelle 1: Reaktionen und Parameter für ein Modell, das einige zentrale Vorgänge in Leukozyten beschreibt, die hauptsächlich durch die Peroxidase bestimmt werden (per3+, coI, coII und coIII sind Formen der Peroxidase, MLTH ist Melatonin)

Reaktion	Reaktionsgeschwindigkeit (R_i)	Konstante
Reaktionen im Phagosom:		
1. $H_2O_2 + per^{3+} \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} coI$	$k_1[H_2O_2]_p[Per^{3+}]_p - k_{-1}[coI]_p$	k_1= 5.0×10^7 M^{-1} s^{-1}
		k_{-1} = 58 s^{-1}
2. $coI + MLTH \xrightarrow{k_2} coII + MLT^{\cdot}$	$k_2[coI]_p[MLTH]_p$	k_2= 1.0×10^7 M^{-1} s^{-1}
3. $coII + MLTH \xrightarrow{k_3} per^{3+} + MLT^{\cdot}$	$k_3[coII]_p[MLTH]_p$	k_3= 4.0×10^3 M^{-1} s^{-1}
4. $per^{3+} + O_2^- \xrightarrow{k_4} coIII$	$k_4[per^{3+}]_p[O_2^-]_p$	k_4= 1.1×10^6 M^{-1} s^{-1}
5. $2H^+ + 2O_2^- \xrightarrow{k_5} H_2O_2 + O_2$	$k_5[O_2^-]_p^2$	k_5= 1.0×10^7 M^{-1} s^{-1}
6. $coIII + O_2^- \xrightarrow{k_6} coI + O_2$	$k_6[coIII]_p[O_2^-]_p$	k_6= 1.0×10^5 M^{-1} s^{-1}
Reaktionen im Cytoplasma:		
7. $NADPH + O_2 \xrightarrow{k_7} NADP^+ + H_2O_2$	$k_7[NADPH]_c[O_2]_c$	k_7= 1 M^{-1} s^{-1}
8. $NADP^{\cdot} + O_2 \xrightarrow{k_8} NADP^+ + O_2^-$	$k_8[NADP^{\cdot}]_c[O_2]_c$	k_8= 5.0×10^7 M^{-1} s^{-1}
9. $2H^+ + 2O_2^- \xrightarrow{k_9} H_2O_2 + O_2$	$k_9[O_2^-]_c^2$	k_9= 5.0×10^8 M^{-1} s^{-1}
10. $MLT^{\cdot} + NADPH \xrightarrow{k_{10}} MLTH + NADP^{\cdot}$	$k_{10}[MLT^{\cdot}]_c[NADPH]_c$	k_{10}= 1.0×10^7 M^{-1} s^{-1}
11. $2NADP^{\cdot} \xrightarrow{k_{11}} (NADP)_2$	$k_{11}[NADP^{\cdot}]_c^2$	k_{11}= 6.0×10^7 M^{-1} s^{-1}
12. $\xrightarrow{k_{12}} NADPH$	k_{12}	k_{12} = 25 μM s^{-1}
13. $\underset{k_{-13}}{\overset{k_{13}}{\rightleftharpoons}} O_2(cytoplasma)$	$k_{13} - k_{-13}[O_2]_c$	k_{13}= 12.5 μM s^{-1}
		k_{-13} = 4.5×10^{-2} s^{-1}
Diffusionsterme:		
14. O_2 $(phagosom) \underset{k_{14}}{\overset{k_{14}}{\rightleftharpoons}} O_2$ $(cytoplasma)$	$k_{14}([O_2]_p - [O_2]_c)$	k_{14} = 30 s^{-1}
15. H_2O_2 $(phagosom) \underset{k_{15}}{\overset{k_{15}}{\rightleftharpoons}} H_2O_2$ $(cytoplasma)$	$k_{15}([H_2O_2]_p - [H_2O_2]_c)$	k_{15} = 30 s^{-1}
16. $MLTH$ $(phagosom) \underset{k_{16}}{\overset{k_{16}}{\rightleftharpoons}} MLTH$ $(cytoplasma)$	$k_{16}([MLTH]_p - [MLTH]_c)$	k_{16} = 10 s^{-1}
17. $MLT^{\cdot}$ $(phagosom) \underset{k_{17}}{\overset{k_{17}}{\rightleftharpoons}} MLT^{\cdot}$ $(cytoplasma)$	$k_{17}([MLT^{\cdot}]_p - [MLT^{\cdot}]_c)$	k_{17} = 10 s^{-1}
18. O_2^- $(phagosom) \underset{k_{18}}{\overset{k_{18}}{\rightleftharpoons}} O_2^-$ $(cytoplasma)$	$k_{18}([O_2^-]_p - [O_2^-]_c)$	k_{18} = < 0.01 s^{-1}
NADPH oxidase:		
19. $NADPH$ $(cytoplasma) + 2O_2$ $(phagosom)$ $\longrightarrow NADP^+$ $(cytoplasma) + 2O_2^-$ $(phagosom)$	$\frac{V\alpha(1+\alpha)}{(L+(1+\alpha)^2)} \frac{[O_2]_p}{K_O+[O_2]_p}$; $\alpha = \frac{[NADPH]_c}{K_{NADPH}}$	V= 288 μM s^{-1} L = 550 K_O = 1.5 μM K_{NADPH} = 60 μM

Tabelle 2: Differentialgleichungen

Phagosom:

$$\frac{d[per^{3+}]_p}{dt} = -R_1 + R_3 - R_4$$

$$\frac{d[coI]_p}{dt} = R_1 - R_2 + R_6$$

$$\frac{d[coII]_p}{dt} = R_2 - R_3$$

$$\frac{d[coIII]_p}{dt} = R_4 - R_6$$

$$\frac{d[H_2O_2]_p}{dt} = -R_1 + R_5 - R_{15}$$

$$\frac{d[O_2^-]_p}{dt} = -R_4 - 2R_5 - R_6 - R_{18} + 2R_{19}$$

$$\frac{d[O_2]_p}{dt} = R_5 + R_6 - R_{14} - 2R_{19}$$

$$\frac{d[MLTH]_p}{dt} = -R_2 - R_3 - R_{16}$$

$$\frac{d[MLT^{\cdot}]_p}{dt} = R_2 + R_3 - R_{17}$$

Cytoplasma:

$$\frac{d[NADPH]_c}{dt} = -R_7 - R_{10} + R_{12} - R_{19}$$

$$\frac{d[NADP^{\cdot}]_c}{dt} = -R_8 + R_{10} - 2R_{11}$$

$$\frac{d[H_2O_2]_c}{dt} = R_7 + R_9 + fR_{15}$$

$$\frac{d[O_2^-]_c}{dt} = R_8 - 2R_9 + fR_{18}$$

$$\frac{d[O_2]_c}{dt} = -R_7 - R_8 + R_9 + R_{13} + fR_{14}$$

$$\frac{d[MLTH]_c}{dt} = R_{10} + fR_{16}$$

$$\frac{d[MLT^{\cdot}]_c}{dt} = -R_{10} + fR_{17}$$