

**S5 Table. Optimized parameter set obtained from fitting the Young CD8<sup>+</sup> T Cell Model to experimental data.** This parameter set was used for all sensitivity analysis performed on the Young CD8<sup>+</sup> T Cell Model.

Parameter	Primary CD8 <sup>+</sup> T cells
$\beta_i^*$	0.047
$\beta_{er}^*$	0.98
$\beta_{mit}$	0.033
$\rho_{er}$	0.015
$\rho_{mit}$	0.08
$k_{PLCact}$	0.0033 s <sup>-1</sup>
$k_{PLCdeact}$	0.042 s <sup>-1</sup>
$k_{IP3prod}$	0.48 μM <sup>-1</sup> s <sup>-1</sup>
$k_{IP3deg}^*$	0.018 μs <sup>-1</sup>
$V_{IP3}$	4.0 μs <sup>-1</sup>
$K_{IP3}$	0.57 μM
$K_{act}$	0.13 μM
$A$	0.079
$K_{inh}$	1 μM
$K_{IP3inh}^*$	1.5 μM
$K_{ERleak}^*$	0.048 s <sup>-1</sup>
$V_{serca}^*$	103.88 μM s <sup>-1</sup>
$K_{serca}$	0.43 μM
$V_{mitin}$	388.6 μM s <sup>-1</sup>
$K_{mitin}$	0.81 μM
$V_{mitout}^*$	244.7 μM s <sup>-1</sup>
$K_{mitout}^*$	4.7 μM
$V_{crac}$	2.4 μM s <sup>-1</sup>

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$K_{soc}^*$	358.8 $\mu\text{M}$
$K_{stim}$	178.1 $\mu\text{M}$
$K_{PMleak}$	1.1e-6 $\text{s}^{-1}$
$V_{pmca}^*$	2.08 $\mu\text{M s}^{-1}$
$K_{pmca}$	0.11 $\mu\text{M}$

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