

Table S5 Ordinary differential equations used for each cytoplasmic reaction

$$d \text{ cBax_mRNA} / dt = -d_{\text{mbax}} * \text{cBax_mRNA}$$

$$d \text{ Bax_c} / dt = s_{\text{bax}} * \text{cBax_mRNA} - d_{\text{bax}} * \text{Bax_c} - k_{1f} * \text{Bax_c} * \text{tBid} + k_{1r} * \text{Bax:tBid} - k_{13f} * \text{Bcl-2_c} * \text{Bax_c} + k_{13r} * \text{Bcl-2:Bax}$$

$$d \text{ Bax_m} / dt = -d_{\text{bax}} * \text{Bax_m} + k_{1c} * \text{Bax:tBid} - k_{13f} * \text{Bcl-2_c} * \text{Bax_m} + k_{13r} * \text{Bcl-2:Bax_m}$$

$$d \text{ cBcl-2_mRNA} / dt = -d_{\text{mbcl}} * \text{cBcl-2_mRNA}$$

$$d \text{ Bcl-2_c} / dt = s_{\text{bcl}} * \text{cBcl-2_mRNA} - d_{\text{bcl}} * \text{Bcl-2_c} - k_{13f} * \text{Bcl-2_c} * \text{Bax_c} + k_{13r} * \text{Bcl-2:Bax} - k_{13f} * \text{Bcl-2_c} * \text{Bax:tBid} + k_{13r} * \text{Bcl-2:Bax:tBid} - k_{13f} * \text{Bcl-2_c} * \text{Bax_m} + k_{13r} * \text{Bcl-2:Bax_m}$$

$$d \text{ Bcl-2:Bax} / dt = -d_{\text{bcl}} * \text{Bcl-2:Bax} + k_{13f} * \text{Bcl-2_c} * \text{Bax_c} - k_{13r} * \text{Bcl-2:Bax}$$

$$d \text{ Bcl-2:Bax_m} / dt = -d_{\text{bcl}} * \text{Bcl-2:Bax_m} + k_{13f} * \text{Bcl-2_c} * \text{Bax_m} - k_{13r} * \text{Bcl-2:Bax_m}$$

$$d \text{ cp21_mRNA} / dt = -d_{\text{mp21}} * \text{cp21_mRNA}$$

$$d \text{ p21_c} / dt = s_{\text{p21}} * \text{cp21_mRNA} - d_{\text{p21}} * \text{p21} - k_{12f} * \text{p21} * \text{Proc-3} + k_{12r} * \text{p21:Proc-3} - k_{18f} * \text{p21} * \text{Casp-3} + k_{18r} * \text{p21:Casp-3}$$

$$d \text{ PIDD_mRNA} / dt = -d_{\text{mpid}} * \text{cPIDD_mRNA}$$

$$d \text{ PIDD_c} / dt = s_{\text{pidd}} * \text{cPIDD_mRNA} - d_{\text{pidd}} * \text{PIDD_c} - k_{14f} * \text{PIDD_c} * \text{Proc-2} + k_{14r} * \text{PIDD:Proc-2} + k_{15} * \text{PIDD:Proc-2}$$

$$d \text{ Proc-2} / dt = s_{\text{pro2}} - d_{\text{pro2}} * \text{Proc-2} - k_{14f} * \text{PIDD_c} * \text{Proc-2} + k_{14r} * \text{PIDD:Proc-2}$$

$$d \text{ PIDD:Proc-2} / dt = k_{14f} * \text{PIDD_c} * \text{Proc-2} - k_{14r} * \text{PIDD:Proc-2} - k_{15} * \text{PIDD:Proc-2}$$

$$d \text{ Casp-2} / dt = -d_{\text{pro2}} * \text{Casp-2} + k_{15} * \text{PIDD:Proc-2} - k_{16f} * \text{Casp-2} * \text{Bid} + k_{16r} * \text{Casp-2:Bid} + k_{17} * \text{Casp-2:Bid}$$

$$d \text{ Bid} / dt = s_{\text{bid}} - d_{\text{bid}} * \text{Bid} - k_{16f} * \text{Casp-2} * \text{Bid} + k_{16r} * \text{Casp-2:Bid}$$

$$d \text{ Casp-2:Bid} / dt = k_{16f} * \text{Casp-2} * \text{Bid} - k_{16r} * \text{Casp-2:Bid} - k_{17} * \text{Casp-2:Bid}$$

$$d \text{ tBid} / dt = -d_{\text{bid}} * \text{tBid} + k_{17} * \text{Casp-2:Bid} - k_{1f} * \text{Bax_c} * \text{tBid} + k_{1r} * \text{Bax:tBid} + k_{1c} * \text{Bax:tBid}$$

$$d \text{ Bax:tBid} / dt = k_{1f} * \text{Bax_c} * \text{tBid} - k_{1r} * \text{Bax:tBid} - k_{1c} * \text{Bax:tBid} - k_{13f} * \text{Bcl-2_c} * \text{Bax:tBid} + k_{13r} * \text{Bcl-2:Bax:tBid}$$

$$d \text{ Bcl-2:Bax:tBid} / dt = k_{13f} * \text{Bcl-2_c} * \text{Bax:tBid} - k_{13r} * \text{Bcl-2:Bax:tBid}$$

$$d \text{ M_c} / dt = -(mf3 * \text{Bax_m}^4 * \text{M_c}) / (mJ3^4 + \text{Bax_m}^4) + mr3 * \text{M_o}$$

$$d \text{ M_o} / dt = (mf3 * \text{Bax_m}^4 * \text{M_c}) / (mJ3^4 + \text{Bax_m}^4) - mr3 * \text{M_o} - mf1 * \text{M_o} * \text{SMAC_m} + mr1 * \text{M_o:SMAC_m} + mk1 * \text{M_o:SMAC_m} - mf1 * \text{M_o} * \text{Cytic_m} + mr1 * \text{M_o:Cytic_m} + mk1 * \text{M_o:Cytic_m}$$

$$d \text{ Cytc_m} / dt = -mf1 * \text{M_o} * \text{Cytic_m} + mr1 * \text{M_o:Cytic_m}$$

$$d \text{ Cytc_r} / dt = mk1 * \text{M_o:Cytic_m} - mk2 * \text{Cytic_r} + mk2 * \text{Cytic_c}$$

$$d \text{ Cytc_c} / dt = mk2 * \text{Cytic_r} - mk2 * \text{Cytic_c} - k_{5f} * \text{Cytic_c} * \text{Apaf-ATP} + k_{5r} * \text{Apop}$$

$$d \text{ M_o:Cytic_m} / dt = mf1 * \text{M_o} * \text{Cytic_m} - mr1 * \text{M_o:Cytic_m} - mk1 * \text{M_o:Cytic_m}$$

$$d \text{ SMAC_m} / dt = -mf1 * \text{M_o} * \text{SMAC_m} + mr1 * \text{M_o:SMAC_m}$$

$$d \text{ SMAC_r} / dt = mk1 * \text{M_o:SMAC_m} - mk2 * \text{SMAC_r} + mk2 * \text{SMAC_c}$$

$$d \text{ SMAC_c} / dt = mk2 * \text{SMAC_r} - mk2 * \text{SMAC_c} - k_{4f} * \text{SMAC_c} * \text{XIAP} + k_{4r} * \text{XIAP:SMAC}$$

$$d \text{ M_o:SMAC_m} / dt = mf1 * \text{M_o} * \text{SMAC_m} - mr1 * \text{M_o:SMAC_m} - mk1 * \text{M_o:SMAC_m}$$

$$d \text{ Apaf-1} / dt = -k_{5f} * \text{Cytic_c} * \text{Apaf-ATP} + k_{5r} * \text{Apop}$$

$$d \text{ ATP} / dt = -k_{5f} * \text{Cytic_c} * \text{Apaf-ATP} + k_{5r} * \text{Apop}$$

$$d \text{ Apop} / dt = k_{5f} * \text{Cytic_c} * \text{Apaf-ATP} - k_{5r} * \text{Apop} - k_{6f} * \text{Apop} * \text{Proc-9} + k_{6r} * \text{Apop:Proc-9}$$

$$\begin{aligned}
d \text{Proc-9} / dt &= -k6f * \text{Apop} * \text{Proc-9} + k6r * \text{Apop} : \text{Proc-9} - k7f * \text{Apop} : \text{Proc-9} * \text{Proc-9} + k7r * \text{Apop} : \text{Proc-9}_2 \\
&\quad - k11f * \text{Proc-9} * \text{XIAP} + k11r * \text{XIAP} : \text{Proc-9} \\
d \text{Apop} : \text{Proc-9} / dt &= k6f * \text{Apop} * \text{Proc-9} - k6r * \text{Apop} : \text{Proc-9} - k7f * \text{Apop} : \text{Proc-9} * \text{Proc-9} + k7r * \text{Apop} : \text{Proc-9}_2 \\
&\quad + k8 * \text{Apop} : \text{Proc-9}_2 \\
d \text{Apop} : \text{Proc-9}_2 / dt &= k7f * \text{Apop} : \text{Proc-9} * \text{Proc-9} - k7r * \text{Apop} : \text{Proc-9}_2 - k8 * \text{Apop} : \text{Proc-9}_2 \\
d \text{Casp-9} / dt &= k8 * \text{Apop} : \text{Proc-9}_2 - k9f * \text{Casp-9} * \text{Proc-3} + k9r * \text{Casp-9} : \text{Proc-3} + k10 * \text{Casp-9} : \text{Proc-3} \\
d \text{Proc-3} / dt &= -k9f * \text{Casp-9} * \text{Proc-3} + k9r * \text{Casp-9} : \text{Proc-3} - k12f * p21 * \text{Proc-3} + k12r * p21 : \text{Proc-3} \\
d \text{Casp-9} : \text{Proc-3} / dt &= k9f * \text{Casp-9} * \text{Proc-3} - k9r * \text{Casp-9} : \text{Proc-3} - k10 * \text{Casp-9} : \text{Proc-3} \\
d \text{Casp-3} / dt &= k10 * \text{Casp-9} : \text{Proc-3} - k12f * \text{Casp-3} * \text{XIAP} + k12r * \text{XIAP} : \text{Casp-3} - k18f * p21 * \text{Casp-3} \\
&\quad + k18r * p21 : \text{Casp-3} + k19 * p21 : \text{Casp-3} \\
d p21 : \text{Casp-3} / dt &= k18f * p21 * \text{Casp-3} - k18r * p21 : \text{Casp-3} - k19 * p21 : \text{Casp-3} \\
d p21 : \text{Proc-3} / dt &= k12f * p21 * \text{Proc-3} - k12r * p21 : \text{Proc-3} \\
d \text{XIAP} / dt &= -k4f * \text{SMAC}_c * \text{XIAP} + k4r * \text{XIAP} : \text{SMAC} - k11f * \text{Proc-9} * \text{XIAP} + k11r * \text{XIAP} : \text{Proc-9} \\
&\quad - k12f * \text{Casp-3} * \text{XIAP} + k12r * \text{XIAP} : \text{Casp-3} \\
d \text{Casp-3} : \text{XIAP} / dt &= k12f * \text{Casp-3} * \text{XIAP} - k12r * \text{XIAP} : \text{Casp-3} \\
d \text{Proc-9} : \text{XIAP} / dt &= k11f * \text{Proc-9} * \text{XIAP} - k11r * \text{XIAP} : \text{Proc-9} \\
d \text{SMAC}_\text{XIAP} / dt &= k4f * \text{SMAC}_c * \text{XIAP} - k4r * \text{XIAP} : \text{SMAC}
\end{aligned}$$
