

Supplementary Figure S1

Reaction Rates

$$\begin{aligned}
 f([Bnip3]_{activation}) &= k_f^{Bnip3Activation} [Bnip3_{inactive}] [ROS] \\
 f([Bnip3:LC3]_{binding}) &= k_f^{Bnip3LC3binding} [Bnip3:LIR] [LC3] - k_r^{Bnip3LC3binding} [Bnip3:LIR] \\
 f([BH3:Bcl2]_{binding}) &= k_f^{BH3Bcl2binding} [BH3] [Bcl2] - k_r^{BH3Bcl2binding} [BH3:Bcl2] \\
 f([Mitophagy]_{activation}) &= k_f^{MitophagyActivation} [Bnip3:LC3] [CytoC_m] \\
 f([MOMP:ROS:CytoC]_{release}) &= k_f^{MOMP:ROS:CytoCrelease} [BH3:Bax] [CytoC_m] \\
 f([mitochondrialApoptosis]) &= k_f^{MitochondrialApoptosis} [Caspase3] [CytoC_r] \\
 f([BH3:Bax]_{activation}) &= k_f^{BH3BaxActivation} [BH3] [Bax] \\
 f([Bcl2Bnip3]_{binding}) &= k_f^{Bcl2Bnip3Binding} [Bcl2] [Bnip3_{active}] - k_r^{Bcl2Bnip3Binding} [Bnip3:Bcl2] \\
 f([LIR]_{phosphorylation}) &= k_f^{LIRPhosphorylation} [Bnip3:Bcl2] - k_r^{LIRPhosphorylation} [Bnip3:LIR]
 \end{aligned}$$

Differential Equations

$$\begin{aligned}
 \frac{d[ROS]}{dt} &= [Bnip3]_{activation} + [MOMP:ROS:CytoC]_{release} \\
 \frac{d[Bnip3:Bcl2]}{dt} &= [Bcl2Bnip3]_{binding} - [LIR]_{phosphorylation} \\
 \frac{d[Bnip3:LC3]}{dt} &= [Bnip3:LC3]_{binding} - [Mitophagy]_{activation} \\
 \frac{d[Bcl2]}{dt} &= -[BH3:Bcl2]_{binding} - [Bcl2Bnip3]_{binding} \\
 \frac{d[Bnip3_{active}]}{dt} &= [Bnip3]_{activation} - [Bcl2Bnip3]_{binding} \\
 \frac{d[BH3:Bax]}{dt} &= -[MOMP:ROS:CytoC]_{release} + [BH3:Bax]_{activation} \\
 \frac{d[CytoC_r]}{dt} &= [MOMP:ROS:CytoC]_{release} - [mitochondrialApoptosis] \\
 \frac{d[Bnip3:LIR]}{dt} &= -[Bnip3:LC3]_{binding} + [LIR]_{phosphorylation} \\
 \frac{d[CytoC_m]}{dt} &= -[Mitophagy]_{activation} - [MOMP:ROS:CytoC]_{release} \\
 \frac{d[BH3:Bcl2]}{dt} &= [BH3:Bcl2]_{binding} \\
 \frac{d[BH3]}{dt} &= -[BH3:Bcl2]_{binding} \\
 \frac{d[Bnip3_{inactive}]}{dt} &= -[Bnip3]_{activation} \\
 \frac{d[Bax]}{dt} &= -[BH3:Bax]_{activation} \\
 \frac{d[Caspase3]}{dt} &= -[mitochondrialApoptosis] \\
 \frac{d[mitophagy]}{dt} &= [Mitophagy]_{activation} \\
 \frac{d[mitochondrialApoptosis]}{dt} &= [mitochondrialApoptosis]
 \end{aligned}$$