**Supplementary Table 1a. Equations of the model**

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| --- |
| BCL Family Module |
| Algebraic Equations |
|  |  |
|  |  |
| Differential Equations |
| Total Mitochondrial Bax |
|  |
| Mitochondrial Bax / Bcl2 Dimer |
|  |
| Bh3 / Bcl2 Dimer |
|  |
| Bh3 Total |
|  |
|  |
| DISC Module |
| Caspase 8 |
|  |
| Death-Induced Signaling Complex (DISC) |
|  |
| cIAP  |
|  |
|  |
| P53 Signaling Module |
| Algebraic Equations |
|  *+* |  |
|  |  |
| Differential Equations |
| P53 |
|  |
| Mdm2 |
|  |
|  |
| Caspase Signaling Module |
|  Algebraic Equations  |
|  |  |
|  |  |
|  Differential Equations |
| Channels Opened on Mitochondria |
|  |
| Smac in Mitochondria |
|  |
| Cytochrome C in Mitochondria |
|  |
| Cytochrome c in cytoplasm |
|  |
| Smac in Cytoplasm |
|  |
| Procaspase 3 |
|  |
| Procaspase 9 |
|  |
| Caspase9  |
|  |
| Caspase 9 / Xiap complex |
|  |
| Activated Caspase 9 |
|  |
| Caspase 3 |
|  |
| Caspase 3 / Xiap complex |
|  |
| Smac / Xiap complex |
|  |

**Table 1b. Parameters and initial conditions of the model**

|  |
| --- |
| Parameters |
| Background rate by which Bax translocate to mitochondria | Bh3 enhanced rate of translocation of Bax to mitochondria  | Rate by which Mitochondrial Bax translocate back to cytoplasm | Rate of association of Baxm:Bcl2 Dimer  |
|  |  |  |  |
| Rate of Dissociation of Baxm:Bcl2 Dimer | Rate of Bh3:Bcl2 Dimer association  | Rate of Dissociation of Bh3:Bcl2 Dimer | Total Bax  |
|  |  |  |  |
| Total Bcl2  | Background Production Rate of Bh3 | p53 enhanced rate of Bh3 production  | Caspase 8 enhanced rate of Bh3 production  |
|  |  |  |  |
| DISC enhanced rate of Bh3 Production  | Rate of Bh3 Degradation | Rate of Caspase 8 Activation by TRAIL | Inactivation rate of Caspase8 |
|  |  |  |  |
| Rate of cIAP enhanced Caspase8 inactivation | Hill constant for cIAP production by Cisplatin | Background production rate of cIAP | Cisplatin enhanced production of cIAP  |
|  |  |  |  |
| Degradation rate of cIAP | Background activation rate of DISC | Inhibition rate of DISC | Inhibition of DISC due to cIAP |
|  |  |  |  |
| Background activation of p53 | Self- Activation of p53  | Background activation of Mdm2 | Activation of Mdm2 due to p53 |
|  |  |  |  |
| Inhibition of p53 due to Mdm2 | Time scale of p53 | Time scale of Mdm2 | Concentration of Cisplatin |
|  |  |  |  |
| Non-linearity factors | Total amount of Xiap in system | Background activation of Caspase 3 | Background production of procaspase 9 |
| , |  |  |  |
| Degradation rate of procaspase9 | Background activation rate of caspase 9 | Rate of Mitochondrial channel opening | Number of Baxm molecules for the mitochondria channel |
|  |  |  |  |
| Rate of Mitochondrial channel closure | Activation rate of Caspase 9 due to Caspase 3 | Degradation rate of Cytochrome C | Degradation rate of Cytoplasmic Smac |
|  |  |  |  |
| Background production rate of procaspase 3 | Degradation rate of procaspase3 | Caspase 9 activation due to cytochrome c | Hill coefficient |
|  |  |  |  |
| Degradation rate of caspase 9 | Degradation rate of active caspase 9 | Activation rate of c3 due to Caspase 9 | Activation rate of c3 due to active Caspase 9 |
|  |  |  |  |
| Activation of Caspase 3 by caspase8 | Degradation rate of Caspase3 | Association rate of caspase3:xiap complex | Dissociation rate of caspase3:xiap complex |
|  |  |  |  |
| Degradation rate of caspase3:xiap complex | Association rate of caspase9:xiap complex | Dissociation rate of caspase9:xiap complex | Degradation rate of caspase9:xiap complex |
|  |  |  |  |
| Association rate of Smac:xiap complex | Dissociation rate of Smac:xiap complex | Degradation rate of Smac:xiap complex |  |
|  |  |  |  |
| Initial Conditions  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |