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

|  |  |
| --- | --- |
| 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 | | | | | |
|  | |  | |  |  |
|  | |  | |  |  |
|  | |  | |  |  |