

Supplementary Tables

Table S1: Initial conditions and synthesis/degradation rates. See ¹ for reaction equations; * indicates a unitless constant.

	Initial conditions	HeLa Base case initial condition (molecules/cell)	Synthesis rate (molecules/s)	Degradation rate (1/s)	Coefficient of variation
1	Ligand	1000*	0	2.9E-6	0
2	Receptor	1000	0.00044	2.9E-6	0.25
3	Ligand:Receptor	0	0	2.9E-6	N/A
4	Receptor*	0	0	2.9E-6	N/A
5	Flip	2000	0.00087	2.9E-6	0.25
6	Flip:Receptor*	0	0	2.9E-6	N/A
7	Caspase-8	10000	0.00435	2.9E-6	0.25
8	Caspase-8:Receptor*	0	0	2.9E-6	N/A
9	Caspase-8*	0	0	2.9E-6	N/A
10	Bar	1000	0.00044	2.9E-6	0.25
11	Caspase-8*:Bar	0	0	2.9E-6	N/A
12	Caspase-3	10000	0.00435	2.9E-6	0.282
13	Caspase-8*:Caspase-3	0	0	2.9E-6	N/A
14	Caspase-3*	0	0	2.9E-6	N/A
15	Caspase-6	10000	0.00435	2.9E-6	0.25
16	Caspase-3*:Caspase-6	0	0	2.9E-6	N/A
17	Caspase-6*	0	0	2.9E-6	N/A
18	Caspase-6*:Caspase-8	0	0	2.9E-6	N/A
19	XIAP	100000	0.04350	2.9E-6	0.288
20	XIAP:Caspase-3*	0	0	2.9E-6	N/A
21	PARP	1000000	0.43500	2.9E-6	0.25
22	Caspase-3*:PARP	0	0	2.9E-6	N/A
23	cPARP	0	0	0	N/A
24	Bid	60000	0.02610	2.9E-6	0.288
25	Caspase-8*:Bid	0	0	2.9E-6	N/A
26	tBid	0	0	2.9E-6	N/A
27	Mcl-1	20000	0.00870	0.0001	0.25
28	tBid:Mcl-1	0	0	2.9E-6	N/A
29	Bax	80000	0.03480	2.9E-6	0.271
30	tBid:Bax	0	0	2.9E-6	N/A
31	Bax*	0	0	2.9E-6	N/A
32	Bax*_m	0	0	2.9E-6	N/A
33	Bcl-2	30000	0.00870	2.9E-6	0.294
34	Bax*_m:Bcl-2	0	0	2.9E-6	N/A
35	Bax*2_m	0	0	2.9E-6	N/A
36	Bax*2_m:Bcl-2	0	0	2.9E-6	N/A
37	Bax*4_m	0	0	2.9E-6	N/A
38	Bax*4_m:Bcl-2	0	0	2.9E-6	N/A
39	Pore	500000	0.21750	2.9E-6	0.25
40	Bax*4:Pore	0	0	2.9E-6	N/A
41	Pore*	0	0	0.0001	N/A
42	CytoC_m	500000	0.21750	2.9E-6	0.25
43	M*:CytoC_m	0	0	2.9E-6	N/A
44	CytoC_r	0	0	2.9E-6	N/A
45	Smac	100000	0.04350	2.9E-6	0.25
46	M*:Smac	0	0	2.9E-6	N/A
47	Smac_r	0	0	2.9E-6	N/A
48	CytoC	0	0	2.9E-6	N/A
49	Apaf	100000	0.04350	2.9E-6	0.25
50	Apaf:CytoC	0	0	2.9E-6	N/A
51	Apaf*	0	0	2.9E-6	N/A
52	Caspase-9	100000	0.04350	2.9E-6	0.25
53	Apoptosome	0	0	2.9E-6	N/A
54	Apoptosome:Caspase-3	0	0	2.9E-6	N/A
55	Smac	0	0	2.9E-6	N/A
56	Apoptosome:XIAP	0	0	2.9E-6	N/A
57	Smac:XIAP	0	0	2.9E-6	N/A
58	Caspase-3*_Ub	0	0	2.9E-6	N/A

Table S2: Kinetic rate parameters. See ¹ for reaction equations. * indicates units of 1/s.

forward rates	1/(s*molec/cell)	reverse rates	1/s	catalytic rates	1/s
k1	4.00E-07*	kr1	1.00E-06	kc1	1E-02
k2	1.00E-06	kr2	0.001	kc2	0
k3	1.00E-07	kr3	0.001	kc3	1
k4	1.00E-06	kr4	0.001	kc4	0
k5	1.00E-07	kr5	0.001	kc5	1
k6	1.00E-07	kr6	0.001	kc6	1
k7	1.00E-07	kr7	0.001	kc7	1
k8	2.00E-06	kr8	0.001	kc8	0.1
k9	1.00E-06	kr9	0.001	kc9	20
k10	1.00E-07	kr10	0.001	kc10	1
k11	1.00E-06	kr11	0.001	kc11	0
k12	1.00E-07	kr12	0.001	kc12	1
k13	0.01	kr13	1	kc13	0
k14	1.00E-06	kr14	0.001	kc14	0
k15	1.00E-06	kr15	0.001	kc15	0
k16	1.00E-06	kr16	0.001	kc16	0
k17	1.00E-06	kr17	0.001	kc17	0
k18	1.00E-06	kr18	0.001	kc18	0
k19	1.00E-06	kr19	0.001	kc19	1
k20	2.00E-06	kr20	0.001	kc20	10
k21	2.00E-06	kr21	0.001	kc21	10
k22	1	kr22	0.01	kc22	0
k23	5.00E-07	kr23	0.001	kc23	1
k24	5.00E-08	kr24	0.001	kc24	0
k25	5.00E-09	kr25	0.001	kc25	1
k26	1	kr26	0.01	kc26	0
k27	2.00E-06	kr27	0.001	kc27	0
k28	7.00E-06	kr28	0.001	kc28	0
k29	5.00E-08	kr29	0.001	kc29	1
k30	6.00E-07	kr30	0.001	kc30	0
k31	0.01	kr31	0	kc31	0

Supplementary Tables References

¹ J. G. Albeck, J. M. Burke, S. L. Spencer et al., *PLoS Biol* **6** (12), 2831 (2008).