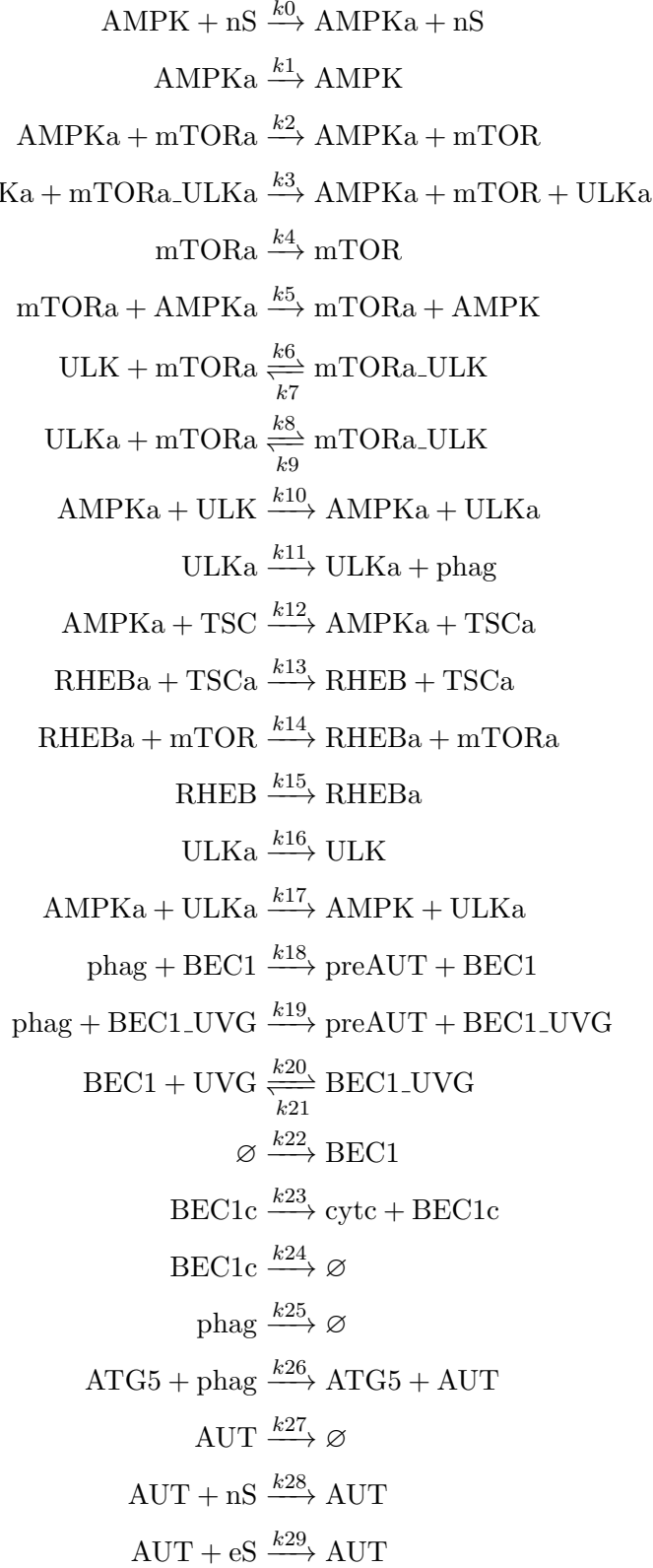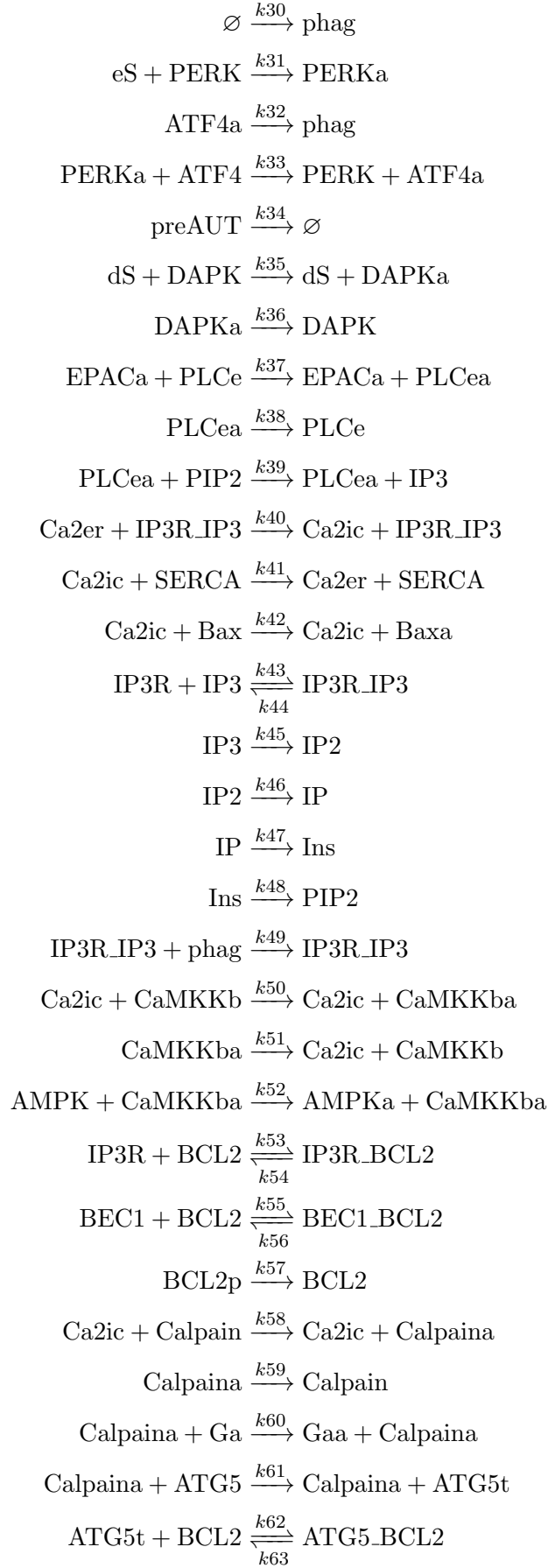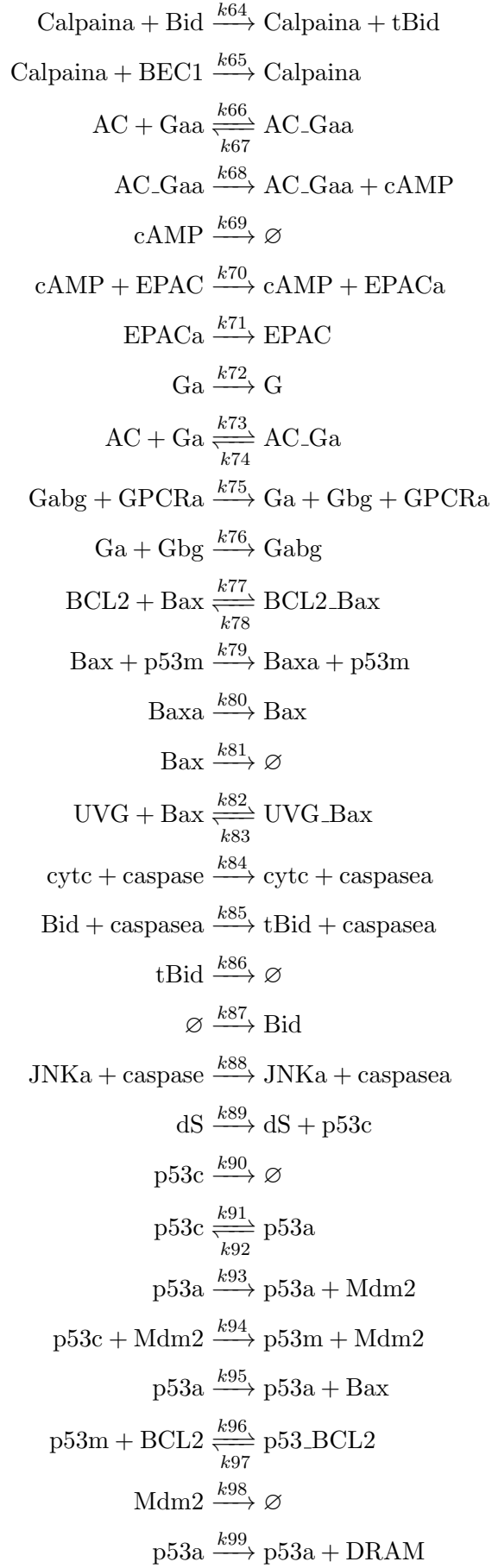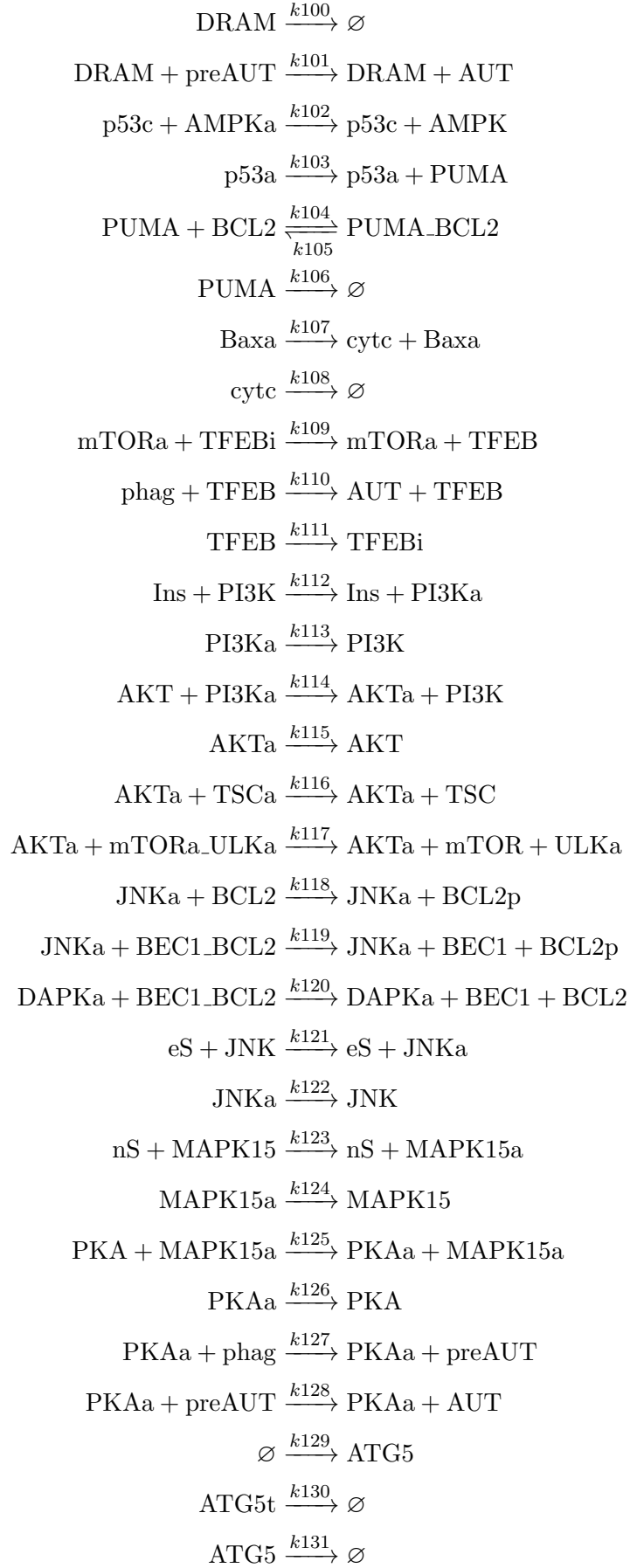# 1 Liu et al. model's original reactions

The calculations were carried out in $\frac{mol}{cm^3}$, thus the rate coefficients values for the first and second order reactions are taken in $\frac{1}{s}$ and $\frac{cm^3}{mol*s}$ units, respectively.
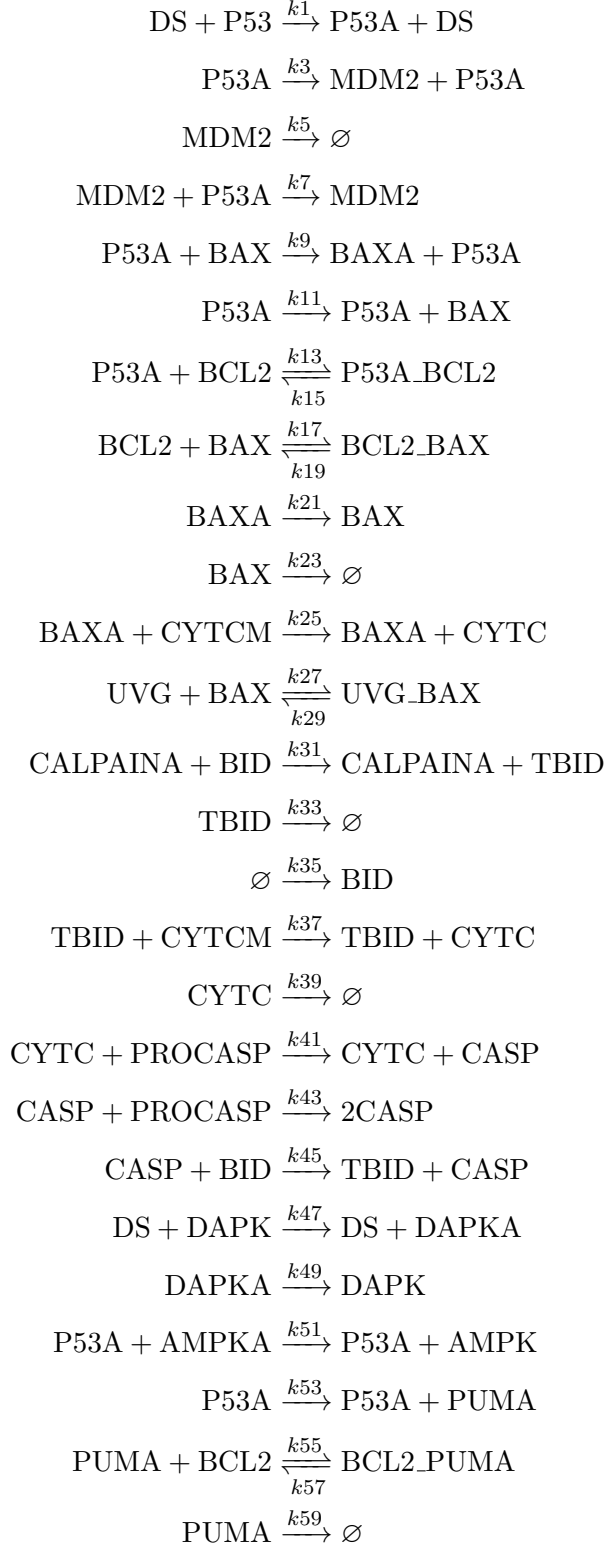
$$\text{AMPK} + \text{nS} \xrightarrow{k0} \text{AMPKa} + \text{nS}$$

$$\text{AMPKa} \xrightarrow{k1} \text{AMPK}$$

$$\text{AMPKa} + \text{mTORa} \xrightarrow{k2} \text{AMPKa} + \text{mTOR}$$

$$\text{AMPKa} + \text{mTORa\_ULKa} \xrightarrow{k3} \text{AMPKa} + \text{mTOR} + \text{ULKa}$$

$$\text{mTORa} \xrightarrow{k4} \text{mTOR}$$

$$\text{mTORa} + \text{AMPKa} \xrightarrow{k5} \text{mTORa} + \text{AMPK}$$

$$\text{ULK} + \text{mTORa} \underset{k7}{\overset{k6}{\rightleftharpoons}} \text{mTORa\_ULK}$$

$$\text{ULKa} + \text{mTORa} \underset{k9}{\overset{k8}{\rightleftharpoons}} \text{mTORa\_ULK}$$

$$\text{AMPKa} + \text{ULK} \xrightarrow{k10} \text{AMPKa} + \text{ULKa}$$

$$\text{ULKa} \xrightarrow{k11} \text{ULKa} + \text{phag}$$

$$\text{AMPKa} + \text{TSC} \xrightarrow{k12} \text{AMPKa} + \text{TSCa}$$

$$\text{RHEBa} + \text{TSCa} \xrightarrow{k13} \text{RHEB} + \text{TSCa}$$

$$\text{RHEBa} + \text{mTOR} \xrightarrow{k14} \text{RHEBa} + \text{mTORa}$$

$$\text{RHEB} \xrightarrow{k15} \text{RHEBa}$$

$$\text{ULKa} \xrightarrow{k16} \text{ULK}$$

$$\text{AMPKa} + \text{ULKa} \xrightarrow{k17} \text{AMPK} + \text{ULKa}$$

$$\text{phag} + \text{BEC1} \xrightarrow{k18} \text{preAUT} + \text{BEC1}$$

$$\text{phag} + \text{BEC1\_UVG} \xrightarrow{k19} \text{preAUT} + \text{BEC1\_UVG}$$

$$\text{BEC1} + \text{UVG} \underset{k21}{\overset{k20}{\rightleftharpoons}} \text{BEC1\_UVG}$$

$$\varnothing \xrightarrow{k22} \text{BEC1}$$

$$\text{BEC1c} \xrightarrow{k23} \text{cytc} + \text{BEC1c}$$

$$\text{BEC1c} \xrightarrow{k24} \varnothing$$

$$\text{phag} \xrightarrow{k25} \varnothing$$

$$\text{ATG5} + \text{phag} \xrightarrow{k26} \text{ATG5} + \text{AUT}$$

$$\text{AUT} \xrightarrow{k27} \varnothing$$

$$\text{AUT} + \text{nS} \xrightarrow{k28} \text{AUT}$$

$$\text{AUT} + \text{eS} \xrightarrow{k29} \text{AUT}$$

$$\varnothing \xrightarrow{k30} \text{phag}$$

$$\text{eS} + \text{PERK} \xrightarrow{k31} \text{PERKa}$$

$$\text{ATF4a} \xrightarrow{k32} \text{phag}$$

$$\text{PERKa} + \text{ATF4} \xrightarrow{k33} \text{PERK} + \text{ATF4a}$$

$$\text{preAUT} \xrightarrow{k34} \varnothing$$

$$\text{dS} + \text{DAPK} \xrightarrow{k35} \text{dS} + \text{DAPKa}$$

$$\text{DAPKa} \xrightarrow{k36} \text{DAPK}$$

$$\text{EPACa} + \text{PLCe} \xrightarrow{k37} \text{EPACa} + \text{PLCea}$$

$$\text{PLCea} \xrightarrow{k38} \text{PLCe}$$

$$\text{PLCea} + \text{PIP2} \xrightarrow{k39} \text{PLCea} + \text{IP3}$$

$$\text{Ca2er} + \text{IP3R\_IP3} \xrightarrow{k40} \text{Ca2ic} + \text{IP3R\_IP3}$$

$$\text{Ca2ic} + \text{SERCA} \xrightarrow{k41} \text{Ca2er} + \text{SERCA}$$

$$\text{Ca2ic} + \text{Bax} \xrightarrow{k42} \text{Ca2ic} + \text{Baxa}$$

$$\text{IP3R} + \text{IP3} \underset{k44}{\overset{k43}{\rightleftharpoons}} \text{IP3R\_IP3}$$

$$\text{IP3} \xrightarrow{k45} \text{IP2}$$

$$\text{IP2} \xrightarrow{k46} \text{IP}$$

$$\text{IP} \xrightarrow{k47} \text{Ins}$$

$$\text{Ins} \xrightarrow{k48} \text{PIP2}$$

$$\text{IP3R\_IP3} + \text{phag} \xrightarrow{k49} \text{IP3R\_IP3}$$

$$\text{Ca2ic} + \text{CaMKKb} \xrightarrow{k50} \text{Ca2ic} + \text{CaMKKba}$$

$$\text{CaMKKba} \xrightarrow{k51} \text{Ca2ic} + \text{CaMKKb}$$

$$\text{AMPK} + \text{CaMKKba} \xrightarrow{k52} \text{AMPKa} + \text{CaMKKba}$$

$$\text{IP3R} + \text{BCL2} \underset{k54}{\overset{k53}{\rightleftharpoons}} \text{IP3R\_BCL2}$$

$$\text{BEC1} + \text{BCL2} \underset{k56}{\overset{k55}{\rightleftharpoons}} \text{BEC1\_BCL2}$$

$$\text{BCL2p} \xrightarrow{k57} \text{BCL2}$$

$$\text{Ca2ic} + \text{Calpain} \xrightarrow{k58} \text{Ca2ic} + \text{Calpaina}$$

$$\text{Calpaina} \xrightarrow{k59} \text{Calpain}$$

$$\text{Calpaina} + \text{Ga} \xrightarrow{k60} \text{Gaa} + \text{Calpaina}$$

$$\text{Calpaina} + \text{ATG5} \xrightarrow{k61} \text{Calpaina} + \text{ATG5t}$$

$$\text{ATG5t} + \text{BCL2} \underset{k63}{\overset{k62}{\rightleftharpoons}} \text{ATG5\_BCL2}$$

$$\text{Calpaina} + \text{Bid} \xrightarrow{k64} \text{Calpaina} + \text{tBid}$$

$$\text{Calpaina} + \text{BEC1} \xrightarrow{k65} \text{Calpaina}$$

$$\text{AC} + \text{Gaa} \underset{k67}{\overset{k66}{\rightleftharpoons}} \text{AC\_Gaa}$$

$$\text{AC\_Gaa} \xrightarrow{k68} \text{AC\_Gaa} + \text{cAMP}$$

$$\text{cAMP} \xrightarrow{k69} \varnothing$$

$$\text{cAMP} + \text{EPAC} \xrightarrow{k70} \text{cAMP} + \text{EPACa}$$

$$\text{EPACa} \xrightarrow{k71} \text{EPAC}$$

$$\text{Ga} \xrightarrow{k72} \text{G}$$

$$\text{AC} + \text{Ga} \underset{k74}{\overset{k73}{\rightleftharpoons}} \text{AC\_Ga}$$

$$\text{Gabg} + \text{GPCRa} \xrightarrow{k75} \text{Ga} + \text{Gbg} + \text{GPCRa}$$

$$\text{Ga} + \text{Gbg} \xrightarrow{k76} \text{Gabg}$$

$$\text{BCL2} + \text{Bax} \underset{k78}{\overset{k77}{\rightleftharpoons}} \text{BCL2\_Bax}$$

$$\text{Bax} + \text{p53m} \xrightarrow{k79} \text{Baxa} + \text{p53m}$$

$$\text{Baxa} \xrightarrow{k80} \text{Bax}$$

$$\text{Bax} \xrightarrow{k81} \varnothing$$

$$\text{UVG} + \text{Bax} \underset{k83}{\overset{k82}{\rightleftharpoons}} \text{UVG\_Bax}$$

$$\text{cytc} + \text{caspase} \xrightarrow{k84} \text{cytc} + \text{caspasea}$$

$$\text{Bid} + \text{caspasea} \xrightarrow{k85} \text{tBid} + \text{caspasea}$$

$$\text{tBid} \xrightarrow{k86} \varnothing$$

$$\varnothing \xrightarrow{k87} \text{Bid}$$

$$\text{JNKa} + \text{caspase} \xrightarrow{k88} \text{JNKa} + \text{caspasea}$$

$$\text{dS} \xrightarrow{k89} \text{dS} + \text{p53c}$$

$$\text{p53c} \xrightarrow{k90} \varnothing$$

$$\text{p53c} \underset{k92}{\overset{k91}{\rightleftharpoons}} \text{p53a}$$

$$\text{p53a} \xrightarrow{k93} \text{p53a} + \text{Mdm2}$$

$$\text{p53c} + \text{Mdm2} \xrightarrow{k94} \text{p53m} + \text{Mdm2}$$

$$\text{p53a} \xrightarrow{k95} \text{p53a} + \text{Bax}$$

$$\text{p53m} + \text{BCL2} \underset{k97}{\overset{k96}{\rightleftharpoons}} \text{p53\_BCL2}$$

$$\text{Mdm2} \xrightarrow{k98} \varnothing$$

$$\text{p53a} \xrightarrow{k99} \text{p53a} + \text{DRAM}$$

$$\text{DRAM} \xrightarrow{k100} \varnothing$$

$$\text{DRAM} + \text{preAUT} \xrightarrow{k101} \text{DRAM} + \text{AUT}$$

$$\text{p53c} + \text{AMPKa} \xrightarrow{k102} \text{p53c} + \text{AMPK}$$

$$\text{p53a} \xrightarrow{k103} \text{p53a} + \text{PUMA}$$

$$\text{PUMA} + \text{BCL2} \underset{k105}{\overset{k104}{\rightleftharpoons}} \text{PUMA\_BCL2}$$

$$\text{PUMA} \xrightarrow{k106} \varnothing$$

$$\text{Baxa} \xrightarrow{k107} \text{cytc} + \text{Baxa}$$

$$\text{cytc} \xrightarrow{k108} \varnothing$$

$$\text{mTORa} + \text{TFEBi} \xrightarrow{k109} \text{mTORa} + \text{TFEB}$$

$$\text{phag} + \text{TFEB} \xrightarrow{k110} \text{AUT} + \text{TFEB}$$

$$\text{TFEB} \xrightarrow{k111} \text{TFEBi}$$

$$\text{Ins} + \text{PI3K} \xrightarrow{k112} \text{Ins} + \text{PI3Ka}$$

$$\text{PI3Ka} \xrightarrow{k113} \text{PI3K}$$

$$\text{AKT} + \text{PI3Ka} \xrightarrow{k114} \text{AKTa} + \text{PI3K}$$

$$\text{AKTa} \xrightarrow{k115} \text{AKT}$$

$$\text{AKTa} + \text{TSCa} \xrightarrow{k116} \text{AKTa} + \text{TSC}$$

$$\text{AKTa} + \text{mTORa\_ULKa} \xrightarrow{k117} \text{AKTa} + \text{mTOR} + \text{ULKa}$$

$$\text{JNKa} + \text{BCL2} \xrightarrow{k118} \text{JNKa} + \text{BCL2p}$$

$$\text{JNKa} + \text{BEC1\_BCL2} \xrightarrow{k119} \text{JNKa} + \text{BEC1} + \text{BCL2p}$$

$$\text{DAPKa} + \text{BEC1\_BCL2} \xrightarrow{k120} \text{DAPKa} + \text{BEC1} + \text{BCL2}$$

$$\text{eS} + \text{JNK} \xrightarrow{k121} \text{eS} + \text{JNKa}$$

$$\text{JNKa} \xrightarrow{k122} \text{JNK}$$

$$\text{nS} + \text{MAPK15} \xrightarrow{k123} \text{nS} + \text{MAPK15a}$$

$$\text{MAPK15a} \xrightarrow{k124} \text{MAPK15}$$

$$\text{PKA} + \text{MAPK15a} \xrightarrow{k125} \text{PKAa} + \text{MAPK15a}$$

$$\text{PKAa} \xrightarrow{k126} \text{PKA}$$

$$\text{PKAa} + \text{phag} \xrightarrow{k127} \text{PKAa} + \text{preAUT}$$

$$\text{PKAa} + \text{preAUT} \xrightarrow{k128} \text{PKAa} + \text{AUT}$$

$$\varnothing \xrightarrow{k129} \text{ATG5}$$

$$\text{ATG5t} \xrightarrow{k130} \varnothing$$

$$\text{ATG5} \xrightarrow{k131} \varnothing$$

2 Revised reactions

The calculations were carried out in $\frac{mol}{cm^3}$, thus the rate coefficients values for the first and second order reactions are taken in $\frac{1}{s}$ and $\frac{cm^3}{mol*s}$ units, respectively.

$$DS + P53 \xrightarrow{k1} P53A + DS$$

$$P53A \xrightarrow{k3} MDM2 + P53A$$

$$MDM2 \xrightarrow{k5} \varnothing$$

$$MDM2 + P53A \xrightarrow{k7} MDM2$$

$$P53A + BAX \xrightarrow{k9} BAXA + P53A$$

$$P53A \xrightarrow{k11} P53A + BAX$$

$$P53A + BCL2 \xrightleftharpoons[k15]{k13} P53A\_BCL2$$

$$BCL2 + BAX \xrightleftharpoons[k19]{k17} BCL2\_BAX$$

$$BAXA \xrightarrow{k21} BAX$$

$$BAX \xrightarrow{k23} \varnothing$$

$$BAXA + CYTCM \xrightarrow{k25} BAXA + CYTC$$

$$UVG + BAX \xrightleftharpoons[k29]{k27} UVG\_BAX$$

$$CALPAINA + BID \xrightarrow{k31} CALPAINA + TBID$$

$$TBID \xrightarrow{k33} \varnothing$$

$$\varnothing \xrightarrow{k35} BID$$

$$TBID + CYTCM \xrightarrow{k37} TBID + CYTC$$

$$CYTC \xrightarrow{k39} \varnothing$$

$$CYTC + PROCASP \xrightarrow{k41} CYTC + CASP$$

$$CASP + PROCASP \xrightarrow{k43} 2CASP$$

$$CASP + BID \xrightarrow{k45} TBID + CASP$$

$$DS + DAPK \xrightarrow{k47} DS + DAPKA$$

$$DAPKA \xrightarrow{k49} DAPK$$

$$P53A + AMPKA \xrightarrow{k51} P53A + AMPK$$

$$P53A \xrightarrow{k53} P53A + PUMA$$

$$PUMA + BCL2 \xrightleftharpoons[k57]{k55} BCL2\_PUMA$$

$$PUMA \xrightarrow{k59} \varnothing$$

$$DAPKA + BEC1\_BCL2 \xrightarrow{k61} DAPKA + BEC1 + BCL2$$

$$TG + SERCA \underset{k65}{\overset{k63}{\rightleftharpoons}} TG\_SERCA$$

$$CA2IC + SERCA \xrightarrow{k67} CA2ER + SERCA$$

$$CCH + PLCE \xrightarrow{k69} PLCEA$$

$$EPACA + PLCE \xrightarrow{k71} EPACA + PLCEA$$

$$PLCEA \xrightarrow{k73} PLCE$$

$$PLCEA + PIP2 \xrightarrow{k75} PLCEA + IP3$$

$$IP3R + IP3 \underset{k79}{\overset{k77}{\rightleftharpoons}} IP3R\_IP3$$

$$CA2ER + IP3R_{IP3} \xrightarrow{k81} CA2IC + IP3R\_IP3$$

$$IP3R\_IP3 + PHAG \xrightarrow{k83} IP3R\_IP3$$

$$IP3 \xrightarrow{k85} PIP2$$

$$CA2IC + CAMKKB \xrightarrow{k87} CA2IC + CAMKKBA$$

$$AMPK + CAMKKBA \xrightarrow{k89} AMPKA + CAMKKBA$$

$$CA2IC + CALPAIN \xrightarrow{k91} CA2IC + CALPAINA$$

$$CALPAINA \xrightarrow{k93} CALPAIN$$

$$CALPAINA + GA \xrightarrow{k95} GAA + CALPAINA$$

$$AC + GAA \underset{k99}{\overset{k97}{\rightleftharpoons}} AC\_GAA$$

$$AC_{GAA} \xrightarrow{k101} AC_{GAA} + CAMP$$

$$CAMP \xrightarrow{k103} \varnothing$$

$$CAMP + EPAC \xrightarrow{k105} CAMP + EPACA$$

$$EPACA \xrightarrow{k107} EPAC$$

$$GAA \xrightarrow{k109} GA$$

$$GABC + GPCRA \xrightarrow{k111} GAA + GBC + GPCRA$$

$$GA + GBC \xrightarrow{k113} GABC$$

$$RAP + MTOR \underset{k117}{\overset{k115}{\rightleftharpoons}} MTOR\_RAP$$

$$RAP + MTORA \underset{k121}{\overset{k119}{\rightleftharpoons}} MTOR\_RAP$$

$$AMPKA + MTORA \xrightarrow{k123} AMPKA + MTOR$$

$$MTORA \xrightarrow{k125} MTOR$$

$$MTORA + AMPKA \xrightarrow{k127} MTORA + AMPK$$

$$ULKA + MTORA \xrightarrow{k129} MTORA + ULK$$

$$\text{ULKA} + \text{MTORA} \xrightarrow{k131} \text{MTOR} + \text{ULKA}$$

$$\text{AMPKA} + \text{TSC} \xrightarrow{k133} \text{AMPKA} + \text{TSCA}$$

$$\text{RHEBA} + \text{TSCA} \xrightarrow{k135} \text{RHEB} + \text{TSCA}$$

$$\text{RHEBA} + \text{MTOR} \xrightarrow{k137} \text{RHEBA} + \text{MTORA}$$

$$\text{RHEB} \xrightarrow{k139} \text{RHEBA}$$

$$\text{AKTA} \xrightarrow{k141} \text{AKT}$$

$$\text{AKTA} + \text{TSCA} \xrightarrow{k143} \text{AKTA} + \text{TSC}$$

$$\text{ATG5T} + \text{BCL2} \underset{k147}{\overset{k145}{\rightleftharpoons}} \text{ATG5\_BCL2}$$

$$\text{CALPAINA} + \text{ATG5} \xrightarrow{k149} \text{CALPAINA} + \text{ATG5T}$$

$$\text{CALPAINA} + \text{BEC1} \xrightarrow{k151} \text{CALPAINA}$$

$$\text{IP3R} + \text{BCL2} \underset{k155}{\overset{k153}{\rightleftharpoons}} \text{IP3R\_BCL2}$$

$$\text{BEC1} + \text{BCL2} \underset{k159}{\overset{k157}{\rightleftharpoons}} \text{BEC1\_BCL2}$$

$$\text{ULKA} \xrightarrow{k161} \text{ULKA} + \text{PHAG}$$

$$\text{AMPKA} + \text{ULK} \xrightarrow{k163} \text{AMPKA} + \text{ULKA}$$

$$\text{AMPK} + \text{NS} \xrightarrow{k165} \text{AMPKA} + \text{NS}$$

$$\text{AMPKA} \xrightarrow{k167} \text{AMPK}$$

$$\text{ULKA} \xrightarrow{k169} \text{ULK}$$

$$\text{AMPKA} + \text{ULKA} \xrightarrow{k171} \text{AMPK} + \text{ULKA}$$

$$\text{PHAG} + \text{BEC1} \xrightarrow{k173} \text{PREAUT} + \text{BEC1}$$

$$\text{PHAG} + \text{BEC1\_UVG} \xrightarrow{k175} \text{PREAUT} + \text{BEC1\_UVG}$$

$$\text{BEC1A} + \text{UVG} \underset{k179}{\overset{k177}{\rightleftharpoons}} \text{BEC1\_UVG}$$

$$\varnothing \xrightarrow{k181} \text{BEC1}$$

$$\text{PHAG} \xrightarrow{k183} \varnothing$$

$$\text{ATG5} + \text{PHAG} \xrightarrow{k185} \text{ATG5} + \text{AUT}$$

$$\text{AUT} \xrightarrow{k187} \varnothing$$

$$\text{AUT} + \text{NS} \xrightarrow{k189} \text{AUT}$$

$$\text{AUT} + \text{DS} \xrightarrow{k191} \text{AUT}$$

$$\varnothing \xrightarrow{k193} \text{PHAG}$$

$$\text{PREAUT} \xrightarrow{k195} \varnothing$$

$$\text{P53A} \xrightarrow{k197} \text{P53A} + \text{DRAM}$$

$$\text{DRAM} \xrightarrow{k199} \varnothing$$

$$\text{DRAM} + \text{PREAUT} \xrightarrow{k201} \text{DRAM} + \text{AUT}$$

$$\varnothing \xrightarrow{k203} \text{ATG5}$$

$$\text{ATG5T} \xrightarrow{k205} \varnothing$$

$$\text{ATG5} \xrightarrow{k207} \varnothing$$

$$\text{CAMP} + \text{PKA} \xrightarrow{k209} \text{PKAA} + \text{CAMP}$$

$$\text{PKAA} + \text{PHAG} \xrightarrow{k211} \text{PKAA}$$

$$\text{PKAA} \xrightarrow{k213} \text{PKA}$$

$$\text{PKC\_CA2IC} + \text{PLCEA} \xrightarrow{k215} \text{PLCE} + \text{PKC\_CA2IC}$$

$$\text{PKC} + \text{CA2IC} \xrightarrow{k217} \text{PKC}_{\text{CA2IC}}$$

$$\text{BEC1} + \text{ULKA} \xrightarrow{k219} \text{BEC1A} + \text{ULKA}$$

$$\text{INSULIN} + \text{PI3K} \xrightarrow{k221} \text{PI3KA} + \text{INSULIN}$$

$$\text{PI3KA} \xrightarrow{k223} \text{PI3K}$$

$$\text{PI3KA} + \text{AKT} \xrightarrow{k225} \text{AKTA} + \text{PI3K}$$

Table S1: List of the species found in the models, and their full names

Short Notation	Full Name
AMPK	AMP-activated protein kinase
nS	Nuclear Stress
AMPKa	Active AMP-activated protein kinase
mTORa	Active mammalian target of rapamycin
mTOR	mammalian target of rapamycin
mTOR_ULK	mTOR ULK complex
ULKa	Active Unc-51 like autophagy activating kinase
ULK	Unc-51 like autophagy activating kinase
phag	Phagophore
TSC	Tuberous sclerosis complex
TSCa	Active tuberous sclerosis complex
RHEBa	Active Ras homolog enriched in brain
RHEB	Ras homolog enriched in brain
BEC1	Beclin 1
preAUT	Pre-autophagosome
BEC1_UVG	Beclin 1 UVRAG complex
UVG	UV radiation resistance-associated gene
BEC1c	Cytosolic Beclin 1
cytc	Cytochrome c

Table S1: List of the species found in the models, and their full names

Short Notation	Full Name
ATG5	Autophagy-related protein 5
AUT	Autophagosome
eS	ER Stress
PERK	Protein kinase R-like endoplasmic reticulum kinase
PERKa	Active PERK
ATF4a	Active Activating Transcription Factor 4
ATF4	Activating Transcription Factor 4
dS	DNA Stress
DAPK	Death-associated protein kinase
DAPKa	Active death-associated protein kinase
EPACa	Active exchange protein directly activated by cAMP
PLCe	Phospholipase C epsilon
PLCea	Active phospholipase C epsilon
PIP2	Phosphatidylinositol 4,5-bisphosphate
IP3	Inositol trisphosphate
Ca2er	Endoplasmic reticulum calcium ion
IP3R_IP3	IP3 receptor IP3 complex
Ca2ic	Intracellular calcium
SERCA	Sarcoplasmic/endoplasmic reticulum calcium ATPase
Bax	Bcl-2-associated X protein
Baxa	Active Bcl-2-associated X protein
IP3R	IP3 receptor
IP2	Inositol bisphosphate
IP	Inositol phosphate
Ins	Insulin
CaMKKb	Calcium/calmodulin-dependent protein kinase kinase beta
CaMKKba	Active calcium/calmodulin-dependent protein kinase kinase b
BCL2	B-cell lymphoma 2
IP3R_BCL2	IP3 receptor BCL2 complex
BEC1_BCL2	Beclin 1 BCL2 complex
BCL2p	Phosphorylated BCL2
Calpain	Calpain
Calpaina	Active calpain
Ga	G protein alpha subunit
Gaa	Active G protein alpha subunit
ATG5t	truncated ATG5
ATG5_BCL2	ATG5 BCL2 complex
Bid	BH3 interacting-domain death agonist
tBid	Truncated Bid

Table S1: List of the species found in the models, and their full names

Short Notation	Full Name
AC	Adenylate cyclase
AC_Gaa	Adenylate cyclase G protein alpha subunit complex
cAMP	Cyclic adenosine monophosphate
EPAC	Exchange protein directly activated by cAMP
G	G protein
AC_Ga	Adenylate cyclase G protein alpha subunit complex
Gabg	G protein alpha, beta, gamma subunits
GPCRa	Active G protein-coupled receptor
Gbg	G protein beta and gamma subunits
BCL2_Bax	BCL2 Bax complex
p53m	Mitochondrial p53
UVG_Bax	UVG bound to Bax
caspase	Procaspase
caspasea	Cleaved caspase
JNKa	Active c-Jun N-terminal kinase
p53c	Cytosolic p53
p53a	Active p53
Mdm2	Mouse double minute 2 homolog
p53_BCL2	p53 BCL2 complex
DRAM	DNA damage-regulated autophagy modulator
PUMA	p53 upregulated modulator of apoptosis
PUMA_BCL2	PUMA BCL2 complex
TFEBi	Inactive transcription factor EB
TFEB	Transcription factor EB
PI3K	Phosphoinositide 3-kinase
PI3Ka	Active phosphoinositide 3-kinase
AKT	Protein kinase B
AKTa	Active protein kinase B
JNK	c-Jun N-terminal kinase
MAPK15	Mitogen-activated protein kinase 15
MAPK15a	Active mitogen-activated protein kinase 15
PKA	Protein kinase A
PKAa	Active protein kinase A

3 Initial protein concentrations

Table S2: Initial species concentration ranges in nM

species	min	max	source
AC	100	400	[1, 2]
AC_Ga	0	100	assumed
AC_Gaa	0	100	assumed
AKT	0	100	[3, 4]
AKTa	50	200	[3, 4]
AMPK	187.5	750	[5, 6]
AMPKa	0	100	[5, 6]
ATG5	100	400	[7]
ATG5_BCL2	0	100	assumed
ATG5t	15	60	assumed
AUT	0	100	[8]
BCL2	25	100	[9, 10]
BCL2_Bax	10	40	[9]
BCL2_PUMA	25	100	[9]
BEC1	50	200	[11]
BEC1_BCL2	0	100	assumed
BEC1_UVG	0	100	assumed
Bax	10	40	[9, 10]
Baxa	0	0	[9, 10]
Bid	10	40	[9, 10]
Ca2er	500	2000	[12, 13, 14]
Ca2ic	50	200	[12, 13, 14]
CaMKKb	50	200	[12]
CaMKKba	0	100	[12]
Calpain	10	40	[15]
Calpaina	0	100	[15]
DAPK	50	200	[11]
DAPKa	0	100	[11]
DRAM	0	100	[11]
EPAC	5	20	assumed
EPACa	0	100	assumed
GPCRa	5	20	[16]
Ga	5	20	[16, 17, 13]
Gaa	0	100	[16, 17, 13]
Gabc	0	100	[16, 17, 13]
Gbc	5	20	[16, 17, 13]
IP3	65	260	[12]
IP3R	5	20	[12]
IP3R_BCL2	0	100	assumed

IP3R_IP3	0	100	assumed
MDM2	0	100	[18, 19]
P53a_BCL2	0	100	assumed
PLCea	0	100	[12]
PLCe	5	20	[12, 14, 20]
PIP2	250	1000	[12]
PKA	75	300	[2]
PKAa	0	100	assumed
PUMA	0	100	assumed
RHEB	0	100	assumed
RHEBa	150	600	assumed
SERCA	0	100	[12]
TSC	112.5	450	[5, 6]
TSCa	0	100	[5, 6]
ULK	35	140	[8]
ULKa	0	100	assumed
UVG	50	200	assumed
UVG_Bax	0	100	assumed
cAMP	0	100	[1, 2]
casp	0	0	assumed
cytc	0	100	[9, 10]
cytcm	10	40	[9, 10]
mTOR	0	100	[5, 11]
mTORa	187.5	750	[5, 11]
mTORa_ULK	0	100	assumed
mTORa_ULKa	0	100	assumed
p53	12.5	50	[18, 19]
p53a	0	100	assumed
phag	0	100	assumed
preAUT	0	100	assumed
procasp	12	48	[9, 21]
tBid	0	100	[9]

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