

SBML Model Report

Model name: “Proctor2010 - UCHL1 Protein Aggregation”



May 5, 2016

1 General Overview

This is a document in SBML Level 2 Version 4 format. This model was created by the following two authors: Vijayalakshmi Chelliah¹ and Carole J Proctor² at January seventh 2011 at 12:33 a. m. and last time modified at April eighth 2016 at 4:54 p. m. Table 1 gives an overview of the quantities of all components of this model.

Table 1: Number of components in this model, which are described in the following sections.

Element	Quantity	Element	Quantity
compartment types	0	compartments	1
species types	0	species	136
events	0	constraints	0
reactions	316	function definitions	0
global parameters	92	unit definitions	1
rules	9	initial assignments	0

Model Notes

This a model from the article:

Modelling the Role of UCH-L1 on Protein Aggregation in Age-Related Neurodegeneration.
Proctor CJ, Tangeman PJ, Ardley HC. *PLoS One*. 2010 Oct 6;5(10):e13175 [20949132](https://doi.org/10.1371/journal.pone.0094913) ,

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Abstract:

Overexpression of the de-ubiquitinating enzyme UCH-L1 leads to inclusion formation in response to proteasome impairment. These inclusions contain components of the ubiquitin-proteasome system and -synuclein confirming that the ubiquitin-proteasome system plays an important role in protein aggregation. The processes involved are very complex and so we have chosen to take a systems biology approach to examine the system whereby we combine mathematical modelling with experiments in an iterative process. The experiments show that cells are very heterogeneous with respect to inclusion formation and so we use stochastic simulation. The model shows that the variability is partly due to stochastic effects but also depends on protein expression levels of UCH-L1 within cells. The model also indicates that the aggregation process can start even before any proteasome inhibition is present, but that proteasome inhibition greatly accelerates aggregation progression. This leads to less efficient protein degradation and hence more aggregation suggesting that there is a vicious cycle. However, proteasome inhibition may not necessarily be the initiating event. Our combined modelling and experimental approach show that stochastic effects play an important role in the aggregation process and could explain the variability in the age of disease onset. Furthermore, our model provides a valuable tool, as it can be easily modified and extended to incorporate new experimental data, test hypotheses and make testable predictions.

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To cite BioModels Database, please use: [Li C, Donizelli M, Rodriguez N, Dharuri H, Endler L, Chelliah V, Li L, He E, Henry A, Stefan MI, Snoep JL, Hucka M, Le Novre N, Laibe C \(2010\) BioModels Database: An enhanced, curated and annotated resource for published quantitative kinetic models. BMC Syst Biol., 4:92.](#)

2 Unit Definitions

This is an overview of five unit definitions of which four are predefined by SBML and not mentioned in the model.

2.1 Unit substance

Definition item

2.2 Unit volume

Notes Litre is the predefined SBML unit for volume.

Definition l

2.3 Unit area

Notes Square metre is the predefined SBML unit for area since SBML Level 2 Version 1.

Definition m²

2.4 Unit length

Notes Metre is the predefined SBML unit for length since SBML Level 2 Version 1.

Definition m

2.5 Unit time

Notes Second is the predefined SBML unit for time.

Definition s

3 Compartment

This model contains one compartment.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
cytosol			3	1	litre	<input checked="" type="checkbox"/>	

3.1 Compartment cytosol

This is a three dimensional compartment with a constant size of one litre.

4 Species

This model contains 136 species. The boundary condition of five of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 8 provides further details and the derived rates of change of each species.

Table 3: Properties of each species.

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
NatP		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
MisP		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Ub		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E1		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E2		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Proteasome		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
ROS		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E1_Ub		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E2_Ub		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub2		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub3		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub4		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub5		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub6		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub7		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub8		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
MisP_Ub4-		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
_Proteasome					
MisP_Ub5-		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
_Proteasome					
MisP_Ub6-		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
_Proteasome					
MisP_Ub7-		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
_Proteasome					
MisP_Ub8-		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
_Proteasome					
E3_MisP_Ub_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub2_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub3_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub4_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub5_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub6_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub7_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3_MisP_Ub8_DUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP1		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP2		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP3		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP4		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP5		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
SeqAggP		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
AggP_Proteasome		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
ATP		cytosol	item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
ADP		cytosol	item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
AMP		cytosol	item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
UCHL1		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
UCHL1_Proteasome		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
UCHL1_damaged- _Proteasome		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Lysosome		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
UCHL1_damaged		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Lamp2a		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Lamp2a_UCHL1- _damaged		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Ub_UCHL1		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
SUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
SUB_misfolded		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded_Ub		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded_Ub2		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded_Ub3		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded_Ub4		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
E3SUB.SUB- _misfolded_Ub5		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
E3SUB.SUB- _misfolded_Ub6		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub7		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub8		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub2- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub3- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub4- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub5- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub6- _UCHL1		cytosol	item	\square	\square
E3SUB.SUB- _misfolded_Ub7- _UCHL1		cytosol	item	\square	\square

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
E3SUB.SUB- _misfolded_Ub8- _UCHL1		cytosol	item	\square	\square
SUB_misfolded- _Ub4_Proteasome		cytosol	item	\square	\square
SUB_misfolded- _Ub5_Proteasome		cytosol	item	\square	\square
SUB_misfolded- _Ub6_Proteasome		cytosol	item	\square	\square
SUB_misfolded- _Ub7_Proteasome		cytosol	item	\square	\square
SUB_misfolded- _Ub8_Proteasome		cytosol	item	\square	\square
asyn		cytosol	item	\square	\square
asyn_Proteasome		cytosol	item	\square	\square
asyn_Lamp2a		cytosol	item	\square	\square
asyn_dam		cytosol	item	\square	\square
Parkin		cytosol	item	\square	\square
Parkin_asyn_dam		cytosol	item	\square	\square
Parkin_asyn_dam_Ub		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub2		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub3		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub4		cytosol	item	\square	\square

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
Parkin_asyn_dam- _Ub5		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub6		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub7		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub8		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub2_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub3_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub4_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub5_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub6_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub7_DUB		cytosol	item	\square	\square
Parkin_asyn_dam- _Ub8_DUB		cytosol	item	\square	\square
asyn_dam_Ub4- _Proteasome		cytosol	item	\square	\square

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
asyn_dam_Ub5- _Proteasome		cytosol	item	\square	\square
asyn_dam_Ub6- _Proteasome		cytosol	item	\square	\square
asyn_dam_Ub7- _Proteasome		cytosol	item	\square	\square
asyn_dam_Ub8- _Proteasome		cytosol	item	\square	\square
AggA1		cytosol	item	\square	\square
AggA2		cytosol	item	\square	\square
AggA3		cytosol	item	\square	\square
AggA4		cytosol	item	\square	\square
AggA5		cytosol	item	\square	\square
AggD1		cytosol	item	\square	\square
AggD2		cytosol	item	\square	\square
AggD3		cytosol	item	\square	\square
AggD4		cytosol	item	\square	\square
AggD5		cytosol	item	\square	\square
AggU1		cytosol	item	\square	\square
AggU2		cytosol	item	\square	\square
AggU3		cytosol	item	\square	\square
AggU4		cytosol	item	\square	\square
AggU5		cytosol	item	\square	\square
AggS1		cytosol	item	\square	\square
AggS2		cytosol	item	\square	\square
AggS3		cytosol	item	\square	\square
AggS4		cytosol	item	\square	\square

Id	Name	Compartment	Derived Unit	Constant	Boundary Condi- tion
AggS5		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
Source		cytosol	item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sink		cytosol	item	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
aggasyn		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggasyndam		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggParkin		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggUb		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggE3		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggDUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggMisP		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggUchl1		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggUchl1dam		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
aggSUB		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>
upregUb		cytosol	item	<input type="checkbox"/>	<input type="checkbox"/>

5 Parameters

This model contains 92 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
ksynNatP		0000153	2.400		✓
kmisfold		0000153	$4 \cdot 10^{-5}$		✓
krefold		0000156	$8 \cdot 10^{-5}$		✓
kbinMisPE3		0000153	10^{-4}		✓
krelMisPE3		0000156	$2 \cdot 10^{-4}$		✓
kbinE1Ub		0000009	$2 \cdot 10^{-4}$		✓
kbinE2Ub		0000009	0.001		✓
kmonoUb		0000009	0.001		✓
kpolyUb		0000009	0.010		✓
kactDUB		0000009	10^{-4}		✓
kbinProt		0000009	$5 \cdot 10^{-6}$		✓
kactDUBProt		0000009	10^{-6}		✓
kactProt		0000009	0.010		✓
kagg1		0000009	10^{-12}		✓
kagg2		0000009	10^{-10}		✓
kdisagg1		0000009	10^{-8}		✓
kdisagg2		0000009	$8 \cdot 10^{-9}$		✓
kdisagg3		0000009	$6 \cdot 10^{-9}$		✓
kdisagg4		0000009	$4 \cdot 10^{-9}$		✓
kdisagg5		0000009	$2 \cdot 10^{-9}$		✓
kigrowth1		0000009	$5 \cdot 10^{-9}$		✓
kigrowth2		0000009	$5 \cdot 10^{-9}$		✓
kbinAggProt		0000009	$5 \cdot 10^{-9}$		✓
kbinMisPDUB		0000009	$2 \cdot 10^{-7}$		✓
kgenROS		0000009	0.010		✓
kremROS		0000009	0.001		✓
kubs		0000009	0.009		✓
kubd		0000009	$4.4 \cdot 10^{-9}$		✓
kubss		0000009	0.100		✓
ksynUCHL1		0000009	0.022		✓
kbinUCHL1Prot		0000009	$4 \cdot 10^{-10}$		✓
kdegProtUCHL1		0000009	0.010		✓
kdegLysUCHL1		0000009	$2.7 \cdot 10^{-9}$		✓
kdamUCHL1		0000009	10^{-8}		✓
kbinLamp2aUCHL1dam		0000009	10^{-5}		✓
krelLamp2aUCHL1dam		0000009	$5 \cdot 10^{-5}$		✓
kdegLysUCHL1dam		0000009	$2.7 \cdot 10^{-9}$		✓

Id	Name	SBO	Value	Unit	Constant
kbinUbUchl1		0000009	$3 \cdot 10^{-6}$		<input checked="" type="checkbox"/>
krelUbUchl1		0000009	0.050		<input checked="" type="checkbox"/>
kactUchl1		0000009	10^{-4}		<input checked="" type="checkbox"/>
kbinSUBUchl1		0000009	$4 \cdot 10^{-8}$		<input checked="" type="checkbox"/>
ksynSUB		0000009	0.130		<input checked="" type="checkbox"/>
kmisfoldSUB		0000009	$2 \cdot 10^{-5}$		<input checked="" type="checkbox"/>
krefoldSUB		0000009	$5 \cdot 10^{-5}$		<input checked="" type="checkbox"/>
kbinE3SUB		0000009	$5 \cdot 10^{-4}$		<input checked="" type="checkbox"/>
krelE3SUB		0000009	$2 \cdot 10^{-4}$		<input checked="" type="checkbox"/>
ksynasyn		0000009	0.028		<input checked="" type="checkbox"/>
kbinasynProt		0000009	$1.7 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdegasynProt		0000009	0.010		<input checked="" type="checkbox"/>
kbinasynLamp2a		0000009	$4 \cdot 10^{-8}$		<input checked="" type="checkbox"/>
kCMAasyn		0000009	0.001		<input checked="" type="checkbox"/>
kdamasyn		0000009	$5 \cdot 10^{-8}$		<input checked="" type="checkbox"/>
kbinasynDUB		0000009	$2 \cdot 10^{-7}$		<input checked="" type="checkbox"/>
kbinasynParkin		0000009	10^{-4}		<input checked="" type="checkbox"/>
krelasynParkin		0000009	$2 \cdot 10^{-4}$		<input checked="" type="checkbox"/>
kaggasyn1		0000009	$5 \cdot 10^{-12}$		<input checked="" type="checkbox"/>
kaggasyn2		0000009	$5 \cdot 10^{-10}$		<input checked="" type="checkbox"/>
kdisaggasyn1		0000009	10^{-8}		<input checked="" type="checkbox"/>
kdisaggasyn2		0000009	$8 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyn3		0000009	$6 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyn4		0000009	$4 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyn5		0000009	$2 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kgenROSaggP		0000009	$2 \cdot 10^{-5}$		<input checked="" type="checkbox"/>
kagg1dam		0000009	10^{-5}		<input checked="" type="checkbox"/>
kagg2dam		0000009	0.005		<input checked="" type="checkbox"/>
kdisaggasyndam1		0000009	10^{-8}		<input checked="" type="checkbox"/>
kdisaggasyndam2		0000009	$8 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyndam3		0000009	$6 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyndam4		0000009	$4 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggasyndam5		0000009	$2 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisagguchl1dam1		0000009	10^{-8}		<input checked="" type="checkbox"/>
kdisagguchl1dam2		0000009	$8 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisagguchl1dam3		0000009	$6 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisagguchl1dam4		0000009	$4 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisagguchl1dam5		0000009	$2 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kaggSUB1		0000009	10^{-12}		<input checked="" type="checkbox"/>
kaggSUB2		0000009	10^{-10}		<input checked="" type="checkbox"/>
kdisaggSUB1		0000009	10^{-8}		<input checked="" type="checkbox"/>
kdisaggSUB2		0000009	$8 \cdot 10^{-9}$		<input checked="" type="checkbox"/>

Id	Name	SBO	Value	Unit	Constant
kdisaggSUB3		0000009	$6 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggSUB4		0000009	$4 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kdisaggSUB5		0000009	$2 \cdot 10^{-9}$		<input checked="" type="checkbox"/>
kproteff		0000009	1.000		<input type="checkbox"/>
Tot_MisP		0000360	1.000		<input type="checkbox"/>
Tot_Protein		0000360	1.000		<input type="checkbox"/>
Ub-		0000360	1.000		<input type="checkbox"/>
_Conjugates					
Tot_Ub		0000360	1.000		<input type="checkbox"/>
AggP		0000360	1.000		<input type="checkbox"/>
Tot_asyn_dam		0000360	1.000		<input type="checkbox"/>
Tot_asyn		0000360	1.000		<input type="checkbox"/>
Tot_UCHL1		0000360	1.000		<input type="checkbox"/>
UCHL1-		0000360	1.000		<input type="checkbox"/>
_substrate					

6 Rules

This is an overview of nine rules.

6.1 Rule Tot_MisP

Rule Tot_MisP is an assignment rule for parameter Tot_MisP:

$$\begin{aligned}
 \text{Tot_MisP} = & \text{E3_MisP} + \text{E3_MisP_Ub} + \text{E3_MisP_Ub_DUB} + \text{E3_MisP_Ub2} \\
 & + \text{E3_MisP_Ub2_DUB} + \text{E3_MisP_Ub3} + \text{E3_MisP_Ub3_DUB} + \text{E3_MisP_Ub4} \\
 & + \text{E3_MisP_Ub4_DUB} + \text{E3_MisP_Ub5} + \text{E3_MisP_Ub5_DUB} + \text{E3_MisP_Ub6} \\
 & + \text{E3_MisP_Ub6_DUB} + \text{E3_MisP_Ub7} + \text{E3_MisP_Ub7_DUB} + \text{E3_MisP_Ub8} \\
 & + \text{E3_MisP_Ub8_DUB} + \text{MisP} + \text{MisP_Ub4_Proteasome} + \text{MisP_Ub5_Proteasome} \\
 & + \text{MisP_Ub6_Proteasome} + \text{MisP_Ub7_Proteasome} + \text{MisP_Ub8_Proteasome}
 \end{aligned}
 \tag{1}$$

Derived unit item

6.2 Rule Tot_Protein

Rule Tot_Protein is an assignment rule for parameter Tot_Protein:

$$\text{Tot_Protein} = \text{Tot_MisP} + \text{NatP}
 \tag{2}$$

6.3 Rule Ub_Conjugates

Rule Ub_Conjugates is an assignment rule for parameter Ub_Conjugates:

$$\begin{aligned}
 \text{Ub_Conjugates} = & \text{aggUb} + 4 \cdot \text{asyn_dam_Ub4_Proteasome} + 5 \cdot \text{asyn_dam_Ub5_Proteasome} \\
 & + 6 \cdot \text{asyn_dam_Ub6_Proteasome} + 7 \cdot \text{asyn_dam_Ub7_Proteasome} \\
 & + 8 \cdot \text{asyn_dam_Ub8_Proteasome} + \text{E1_Ub} + \text{E2_Ub} + \text{E3_MisP_Ub} \\
 & + \text{E3_MisP_Ub_DUB} + 2 \cdot \text{E3_MisP_Ub2} + 2 \cdot \text{E3_MisP_Ub2_DUB} \\
 & + 3 \cdot \text{E3_MisP_Ub3} + 3 \cdot \text{E3_MisP_Ub3_DUB} + 4 \cdot \text{E3_MisP_Ub4} + 4 \\
 & \cdot \text{E3_MisP_Ub4_DUB} + 5 \cdot \text{E3_MisP_Ub5} + 5 \cdot \text{E3_MisP_Ub5_DUB} \\
 & + 6 \cdot \text{E3_MisP_Ub6} + 6 \cdot \text{E3_MisP_Ub6_DUB} + 7 \cdot \text{E3_MisP_Ub7} + 7 \\
 & \cdot \text{E3_MisP_Ub7_DUB} + 8 \cdot \text{E3_MisP_Ub8} + 8 \cdot \text{E3_MisP_Ub8_DUB} \\
 & + \text{E3SUB_SUB_misfolded_Ub} + \text{E3SUB_SUB_misfolded_Ub_UCHL1} + 2 \\
 & \cdot \text{E3SUB_SUB_misfolded_Ub2} + 2 \cdot \text{E3SUB_SUB_misfolded_Ub2_UCHL1} \\
 & + 3 \cdot \text{E3SUB_SUB_misfolded_Ub3} + 3 \cdot \text{E3SUB_SUB_misfolded_Ub3_UCHL1} \\
 & + 4 \cdot \text{E3SUB_SUB_misfolded_Ub4} + 4 \cdot \text{E3SUB_SUB_misfolded_Ub4_UCHL1} \\
 & + 5 \cdot \text{E3SUB_SUB_misfolded_Ub5} + 5 \cdot \text{E3SUB_SUB_misfolded_Ub5_UCHL1} \\
 & + 6 \cdot \text{E3SUB_SUB_misfolded_Ub6} + 6 \cdot \text{E3SUB_SUB_misfolded_Ub6_UCHL1} \\
 & + 7 \cdot \text{E3SUB_SUB_misfolded_Ub7} + 7 \cdot \text{E3SUB_SUB_misfolded_Ub7_UCHL1} \\
 & + 8 \cdot \text{E3SUB_SUB_misfolded_Ub8} + 8 \cdot \text{E3SUB_SUB_misfolded_Ub8_UCHL1} \\
 & + \text{E3SUB_SUB_misfolded_Ub_UCHL1} + 4 \cdot \text{MisP_Ub4_Proteasome} \\
 & + 5 \cdot \text{MisP_Ub5_Proteasome} + 6 \cdot \text{MisP_Ub6_Proteasome} \\
 & + 7 \cdot \text{MisP_Ub7_Proteasome} + 8 \cdot \text{MisP_Ub8_Proteasome} \\
 & + \text{Parkin_asyn_dam_Ub} + \text{Parkin_asyn_dam_Ub_DUB} + 2 \\
 & \cdot \text{Parkin_asyn_dam_Ub2} + 2 \cdot \text{Parkin_asyn_dam_Ub2_DUB} + 3 \\
 & \cdot \text{Parkin_asyn_dam_Ub3} + 3 \cdot \text{Parkin_asyn_dam_Ub3_DUB} + 4 \\
 & \cdot \text{Parkin_asyn_dam_Ub4} + 4 \cdot \text{Parkin_asyn_dam_Ub4_DUB} + 5 \\
 & \cdot \text{Parkin_asyn_dam_Ub5} + 5 \cdot \text{Parkin_asyn_dam_Ub5_DUB} + 6 \\
 & \cdot \text{Parkin_asyn_dam_Ub6} + 6 \cdot \text{Parkin_asyn_dam_Ub6_DUB} + 7 \\
 & \cdot \text{Parkin_asyn_dam_Ub7} + 7 \cdot \text{Parkin_asyn_dam_Ub7_DUB} + 8 \\
 & \cdot \text{Parkin_asyn_dam_Ub8} + 8 \cdot \text{Parkin_asyn_dam_Ub8_DUB} + 4 \\
 & \cdot \text{SUB_misfolded_Ub4_Proteasome} + 5 \cdot \text{SUB_misfolded_Ub5_Proteasome} \\
 & + 6 \cdot \text{SUB_misfolded_Ub6_Proteasome} + 7 \cdot \text{SUB_misfolded_Ub7_Proteasome} \\
 & + 8 \cdot \text{SUB_misfolded_Ub8_Proteasome} + \text{Ub_UCHL1} + \text{upregUb}
 \end{aligned} \tag{3}$$

6.4 Rule Tot_Ub

Rule Tot_Ub is an assignment rule for parameter Tot_Ub:

$$\text{Tot_Ub} = \text{Ub_Conjugates} + \text{Ub} \tag{4}$$

6.5 Rule AggP

Rule AggP is an assignment rule for parameter AggP:

$$\begin{aligned} \text{AggP} = & \text{AggA1} + \text{AggA2} + \text{AggA3} + \text{AggA4} + \text{AggA5} + \text{aggasyn} + \text{aggasyndam} \\ & + \text{AggD1} + \text{AggD2} + \text{AggD3} + \text{AggD4} + \text{AggD5} + \text{aggDUB} + \text{aggE3} \\ & + \text{aggMisP} + \text{AggP1} + \text{AggP2} + \text{AggP3} + \text{AggP4} + \text{AggP5} + \text{aggParkin} \\ & + \text{AggS1} + \text{AggS2} + \text{AggS3} + \text{AggS4} + \text{AggS5} + \text{aggSUB} + \text{AggU1} \\ & + \text{AggU2} + \text{AggU3} + \text{AggU4} + \text{AggU5} + \text{aggUb} + \text{aggUchl1} + \text{aggUchl1dam} \end{aligned} \quad (5)$$

Derived unit item

6.6 Rule Tot_asyn_dam

Rule Tot_asyn_dam is an assignment rule for parameter Tot_asyn_dam:

$$\begin{aligned} \text{Tot_asyn_dam} = & \text{asyn_dam} + \text{asyn_dam_Ub4_Proteasome} + \text{asyn_dam_Ub5_Proteasome} \\ & + \text{asyn_dam_Ub6_Proteasome} + \text{asyn_dam_Ub7_Proteasome} \\ & + \text{asyn_dam_Ub8_Proteasome} + \text{asyn_dam_Ub4_Proteasome} \\ & + \text{Parkin_asyn_dam} + \text{Parkin_asyn_dam_Ub} + \text{Parkin_asyn_dam_Ub_DUB} \\ & + \text{Parkin_asyn_dam_Ub2} + \text{Parkin_asyn_dam_Ub2_DUB} \\ & + \text{Parkin_asyn_dam_Ub3} + \text{Parkin_asyn_dam_Ub3_DUB} \\ & + \text{Parkin_asyn_dam_Ub4} + \text{Parkin_asyn_dam_Ub4_DUB} \\ & + \text{Parkin_asyn_dam_Ub5} + \text{Parkin_asyn_dam_Ub5_DUB} \\ & + \text{Parkin_asyn_dam_Ub6} + \text{Parkin_asyn_dam_Ub6_DUB} \\ & + \text{Parkin_asyn_dam_Ub7} + \text{Parkin_asyn_dam_Ub7_DUB} \\ & + \text{Parkin_asyn_dam_Ub8} + \text{Parkin_asyn_dam_Ub8_DUB} \end{aligned} \quad (6)$$

Derived unit item

6.7 Rule Tot_asyn

Rule Tot_asyn is an assignment rule for parameter Tot_asyn:

$$\text{Tot_asyn} = \text{asyn} + \text{asyn_Lamp2a} + \text{asyn_Proteasome} \quad (7)$$

Derived unit item

6.8 Rule UCHL1_substrate

Rule UCHL1_substrate is an assignment rule for parameter UCHL1_substrate:

$$\begin{aligned} \text{UCHL1_substrate} = & \text{E3SUB_SUB_misfolded_Ub_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub2_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub3_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub4_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub5_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub6_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub7_UCHL1} \\ & + \text{E3SUB_SUB_misfolded_Ub8_UCHL1} \\ & + \text{Lamp2a_UCHL1_damaged} + \text{Ub_UCHL1} + \text{UCHL1_damaged} \\ & + \text{UCHL1_damaged_Proteasome} + \text{UCHL1_Proteasome} \end{aligned} \tag{8}$$

Derived unit item

6.9 Rule Tot_UCHL1

Rule Tot_UCHL1 is an assignment rule for parameter Tot_UCHL1:

$$\text{Tot_UCHL1} = \text{UCHL1} + \text{UCHL1_substrate} \tag{9}$$

7 Reactions

This model contains 316 reactions. All reactions are listed in the following table and are subsequently described in detail. If a reaction is affected by a modifier, the identifier of this species is written above the reaction arrow.

Table 5: Overview of all reactions

Nº	Id	Name	Reaction Equation	SBO
1	UbSynthesis		Source \longrightarrow Ub	0000393
2	UbDegradation		Ub + Proteasome \longrightarrow Proteasome	0000179
3	UbUpregulation		MisP \longrightarrow MisP + 3 Ub + 3 upregUb	0000375
4	ProteinSynthesis		Source \longrightarrow NatP	0000393
5	Misfolding		NatP + ROS \longrightarrow MisP + ROS	0000375
6	Refolding		MisP \longrightarrow NatP	0000375
7	MisPE3Binding		MisP + E3 \longrightarrow E3_MisP	0000526
8	MisPE3Release		E3_MisP \longrightarrow MisP + E3	0000180
9	E1UbBinding		E1 + Ub + ATP \longrightarrow E1_Ub + AMP	0000526
10	E2UbBinding		E2 + E1_Ub \longrightarrow E2_Ub + E1	0000526
11	Monoubiquitination		E2_Ub + E3_MisP \longrightarrow E3_MisP_Ub + E2	0000526
12	Polyubiquitination1		E3_MisP_Ub + E2_Ub \longrightarrow E3_MisP_Ub2 + E2	0000526
13	Polyubiquitination2		E3_MisP_Ub2 + E2_Ub \longrightarrow E3_MisP_Ub3 + E2	0000526
14	Polyubiquitination3		E3_MisP_Ub3 + E2_Ub \longrightarrow E3_MisP_Ub4 + E2	0000526
15	Polyubiquitination4		E3_MisP_Ub4 + E2_Ub \longrightarrow E3_MisP_Ub5 + E2	0000526
16	Polyubiquitination5		E3_MisP_Ub5 + E2_Ub \longrightarrow E3_MisP_Ub6 + E2	0000526
17	Polyubiquitination6		E3_MisP_Ub6 + E2_Ub \longrightarrow E3_MisP_Ub7 + E2	0000526
18	Polyubiquitination7		E3_MisP_Ub7 + E2_Ub \longrightarrow E3_MisP_Ub8 + E2	0000526
19	MisPDUBbinding1		E3_MisP_Ub + DUB \longrightarrow E3_MisP_Ub_DUB	0000526
20	MisPDUBbinding2		E3_MisP_Ub2 + DUB \longrightarrow E3_MisP_Ub2_DUB	0000526
21	MisPDUBbinding3		E3_MisP_Ub3 + DUB \longrightarrow E3_MisP_Ub3_DUB	0000526
22	MisPDUBbinding4		E3_MisP_Ub4 + DUB \longrightarrow E3_MisP_Ub4_DUB	0000526
23	MisPDUBbinding5		E3_MisP_Ub5 + DUB \longrightarrow E3_MisP_Ub5_DUB	0000526

Nº	Id	Name	Reaction Equation	SBO
24	MisPDUBbinding6		$E3_MisP_Ub6 + DUB \longrightarrow E3_MisP_Ub6_DUB$	0000526
25	MisPDUBbinding7		$E3_MisP_Ub7 + DUB \longrightarrow E3_MisP_Ub7_DUB$	0000526
26	MisPDUBbinding8		$E3_MisP_Ub8 + DUB \longrightarrow E3_MisP_Ub8_DUB$	0000526
27	Deubiquitination8		$E3_MisP_Ub8_DUB \longrightarrow E3_MisP_Ub7_DUB + Ub$	0000180
28	Deubiquitination7		$E3_MisP_Ub7_DUB \longrightarrow E3_MisP_Ub6_DUB + Ub$	0000180
29	Deubiquitination6		$E3_MisP_Ub6_DUB \longrightarrow E3_MisP_Ub5_DUB + Ub$	0000180
30	Deubiquitination5		$E3_MisP_Ub5_DUB \longrightarrow E3_MisP_Ub4_DUB + Ub$	0000180
31	Deubiquitination4		$E3_MisP_Ub4_DUB \longrightarrow E3_MisP_Ub3_DUB + Ub$	0000180
32	Deubiquitination3		$E3_MisP_Ub3_DUB \longrightarrow E3_MisP_Ub2_DUB + Ub$	0000180
33	Deubiquitination2		$E3_MisP_Ub2_DUB \longrightarrow E3_MisP_Ub_DUB + Ub$	0000180
34	Deubiquitination1		$E3_MisP_Ub_DUB \longrightarrow E3_MisP + DUB + Ub$	0000180
35	ProteasomeBindingUb4		$E3_MisP_Ub4 + Proteasome \longrightarrow E3 + MisP_Ub4_Proteasome$	0000526
36	ProteasomeBindingUb5		$E3_MisP_Ub5 + Proteasome \longrightarrow E3 + MisP_Ub5_Proteasome$	0000526
37	ProteasomeBindingUb6		$E3_MisP_Ub6 + Proteasome \longrightarrow E3 + MisP_Ub6_Proteasome$	0000526
38	ProteasomeBindingUb7		$E3_MisP_Ub7 + Proteasome \longrightarrow E3 + MisP_Ub7_Proteasome$	0000526
39	ProteasomeBindingUb8		$E3_MisP_Ub8 + Proteasome \longrightarrow E3 + MisP_Ub8_Proteasome$	0000526
40	DeubiquitinationBoundMisP5		$MisP_Ub8_Proteasome + DUB \longrightarrow MisP_Ub7_Proteasome + Ub + DUB$	0000180
41	DeubiquitinationBoundMisP4		$MisP_Ub7_Proteasome + DUB \longrightarrow MisP_Ub6_Proteasome + Ub + DUB$	0000180
42	DeubiquitinationBoundMisP3		$MisP_Ub6_Proteasome + DUB \longrightarrow MisP_Ub5_Proteasome + Ub + DUB$	0000180
43	DeubiquitinationBoundMisP2		$MisP_Ub5_Proteasome + DUB \longrightarrow MisP_Ub4_Proteasome + Ub + DUB$	0000180

Nº	Id	Name	Reaction Equation	SBO
44	DeubiquitinationBoundMisP1		MisP_Ub4_Proteasome + DUB \longrightarrow MisP + Proteasome + 4 Ub + DUB	0000180
45	ProteasomeActivity1		MisP_Ub4_Proteasome + ATP \longrightarrow 4 Ub + Proteasome + ADP	0000179
46	ProteasomeActivity2		MisP_Ub5_Proteasome + ATP \longrightarrow 5 Ub + Proteasome + ADP	0000179
47	ProteasomeActivity3		MisP_Ub6_Proteasome + ATP \longrightarrow 6 Ub + Proteasome + ADP	0000179
48	ProteasomeActivity4		MisP_Ub7_Proteasome + ATP \longrightarrow 7 Ub + Proteasome + ADP	0000179
49	ProteasomeActivity5		MisP_Ub8_Proteasome + ATP \longrightarrow 8 Ub + Proteasome + ADP	0000179
50	Aggregation1		2 MisP \longrightarrow AggP1	
51	Aggregation2		MisP + AggP1 \longrightarrow AggP2	
52	Aggregation3		MisP + AggP2 \longrightarrow AggP3	
53	Aggregation4		MisP + AggP3 \longrightarrow AggP4	
54	Aggregation5		MisP + AggP4 \longrightarrow AggP5	
55	Disaggregation1		AggP5 \longrightarrow AggP4 + MisP	
56	Disaggregation2		AggP4 \longrightarrow AggP3 + MisP	
57	Disaggregation3		AggP3 \longrightarrow AggP2 + MisP	
58	Disaggregation4		AggP2 \longrightarrow AggP1 + MisP	
59	Disaggregation5		AggP1 \longrightarrow 2 MisP	
60	InclusionFormation		MisP + AggP5 \longrightarrow SeqAggP + 7 aggMisP	
61	InclusionGrowth1		MisP + SeqAggP \longrightarrow 2 SeqAggP + aggMisP	
62	InclusionGrowth2		E3_MisP + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + aggE3	
63	InclusionGrowth3		E3_MisP_Ub + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + aggUb + aggE3	

Nº	Id	Name	Reaction Equation	SBO
64	InclusionGrowth4		$E3_MisP_Ub2 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 2 aggUb + aggE3$	
65	InclusionGrowth5		$E3_MisP_Ub3 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 3 aggUb + aggE3$	
66	InclusionGrowth6		$E3_MisP_Ub4 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 4 aggUb + aggE3$	
67	InclusionGrowth7		$E3_MisP_Ub5 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 5 aggUb + aggE3$	
68	InclusionGrowth8		$E3_MisP_Ub6 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 6 aggUb + aggE3$	
69	InclusionGrowth9		$E3_MisP_Ub7 + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 7 aggUb + aggE3$	
70	InclusionGrowth10		$E3_MisP_Ub8 + SeqAggP \longrightarrow 2 SeqAggP + 8 aggUb + aggE3$	
71	InclusionGrowth11		$E3_MisP_Ub_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + aggUb + aggE3 + aggDUB$	
72	InclusionGrowth12		$E3_MisP_Ub2_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 2 aggUb + aggE3 + aggDUB$	
73	InclusionGrowth13		$E3_MisP_Ub3_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 3 aggUb + aggE3 + aggDUB$	
74	InclusionGrowth14		$E3_MisP_Ub4_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 4 aggUb + aggE3 + aggDUB$	
75	InclusionGrowth15		$E3_MisP_Ub5_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 5 aggUb + aggE3 + aggDUB$	
76	InclusionGrowth16		$E3_MisP_Ub6_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 6 aggUb + aggE3 + aggDUB$	
77	InclusionGrowth17		$E3_MisP_Ub7_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 7 aggUb + aggE3 + aggDUB$	

Nº	Id	Name	Reaction Equation	SBO
78	InclusionGrowth18		$E3_MisP_Ub8_DUB + SeqAggP \longrightarrow 2 SeqAggP + aggMisP + 8 aggUb + aggE3 + aggDUB$	
79	ProteasomeInhibition1		$AggP1 + Proteasome \longrightarrow AggP_Proteasome$	
80	ProteasomeInhibition2		$AggP2 + Proteasome \longrightarrow AggP_Proteasome$	
81	ProteasomeInhibition3		$AggP3 + Proteasome \longrightarrow AggP_Proteasome$	
82	ProteasomeInhibition4		$AggP4 + Proteasome \longrightarrow AggP_Proteasome$	
83	ProteasomeInhibition5		$AggP5 + Proteasome \longrightarrow AggP_Proteasome$	
84	ROSGenerationSmallAggP1		$AggP1 \longrightarrow AggP1 + ROS$	
85	ROSGenerationSmallAggP2		$AggP2 \longrightarrow AggP2 + ROS$	
86	ROSGenerationSmallAggP3		$AggP3 \longrightarrow AggP3 + ROS$	
87	ROSGenerationSmallAggP4		$AggP4 \longrightarrow AggP4 + ROS$	
88	ROSGenerationSmallAggP5		$AggP5 \longrightarrow AggP5 + ROS$	
89	UCHL1Synthesis		$Source \longrightarrow UCHL1$	
90	UCHL1ProteasomeBinding		$UCHL1 + Proteasome \longrightarrow UCHL1_Proteasome$	
91	UCHL1ProteasomeDegradation		$UCHL1_Proteasome \longrightarrow Proteasome$	
92	UCHL1LysosomalDegradation		$UCHL1 + Lysosome \longrightarrow Lysosome$	
93	UCHL1damage		$UCHL1 + ROS \longrightarrow UCHL1_damaged + ROS$	
94	UCHL1DamgedProteasomeBinding		$UCHL1_damaged + Proteasome \longrightarrow UCHL1_damaged_Proteasome$	
95	UCHL1DamagedProteasomeDegradation		$UCHL1_damaged_Proteasome \longrightarrow Proteasome$	
96	UCHL1DamagedLysosomalDegradation		$UCHL1_damaged + Lysosome \longrightarrow Lysosome$	
97	UCHL1Lamp2abinding		$UCHL1_damaged + Lamp2a \longrightarrow Lamp2a_UCHL1_damaged$	
98	UCHL1Lamp2aRelease		$Lamp2a_UCHL1_damaged \longrightarrow UCHL1_damaged + Lamp2a$	
99	UbUCHL1binding		$Ub + UCHL1 \longrightarrow Ub_UCHL1$	
100	UbUCHL1release		$Ub_UCHL1 \longrightarrow Ub + UCHL1$	
101	SUBsynthesis		$Source \longrightarrow SUB$	
102	SUBmisfolding		$SUB + ROS \longrightarrow SUB_misfolded + ROS$	

Nº	Id	Name	Reaction Equation	SBO
103	SUBRefolding		$\text{SUB_misfolded} \longrightarrow \text{SUB}$	
104	E3SUBBinding		$\text{SUB_misfolded} + \text{E3SUB} \longrightarrow \text{E3SUB_SUB_misfolded}$	
105	E3SUBRelease		$\text{E3SUB_SUB_misfolded} \longrightarrow \text{SUB_misfolded} + \text{E3SUB}$	
106	SUBMonoubiquitination		$\text{E2_Ub} + \text{E3SUB_SUB_misfolded} \longrightarrow \text{E3SUB_SUB_misfolded_Ub} + \text{E2}$	
107	SUBPolyubiquitination1		$\text{E3SUB_SUB_misfolded_Ub} \longrightarrow \text{E3SUB_SUB_misfolded_Ub2} + \text{E2}$	+
108	SUBPolyubiquitination2		$\text{E3SUB_SUB_misfolded_Ub2} \longrightarrow \text{E3SUB_SUB_misfolded_Ub3} + \text{E2}$	+
109	SUBPolyubiquitination3		$\text{E3SUB_SUB_misfolded_Ub3} \longrightarrow \text{E3SUB_SUB_misfolded_Ub4} + \text{E2}$	+
110	SUBPolyubiquitination4		$\text{E3SUB_SUB_misfolded_Ub4} \longrightarrow \text{E3SUB_SUB_misfolded_Ub5} + \text{E2}$	+
111	SUBPolyubiquitination5		$\text{E3SUB_SUB_misfolded_Ub5} \longrightarrow \text{E3SUB_SUB_misfolded_Ub6} + \text{E2}$	+
112	SUBPolyubiquitination6		$\text{E3SUB_SUB_misfolded_Ub6} \longrightarrow \text{E3SUB_SUB_misfolded_Ub7} + \text{E2}$	+
113	SUBPolyubiquitination7		$\text{E3SUB_SUB_misfolded_Ub7} \longrightarrow \text{E3SUB_SUB_misfolded_Ub8} + \text{E2}$	+
114	SUBUCL1binding1		$\text{E3SUB_SUB_misfolded_Ub} \longrightarrow \text{E3SUB_SUB_misfolded_Ub_UCL1}$	+
115	SUBUCL1binding2		$\text{E3SUB_SUB_misfolded_Ub2} \longrightarrow \text{E3SUB_SUB_misfolded_Ub2_UCL1}$	+
116	SUBUCL1binding3		$\text{E3SUB_SUB_misfolded_Ub3} \longrightarrow \text{E3SUB_SUB_misfolded_Ub3_UCL1}$	+
117	SUBUCL1binding4		$\text{E3SUB_SUB_misfolded_Ub4} \longrightarrow \text{E3SUB_SUB_misfolded_Ub4_UCL1}$	+

Nº	Id	Name	Reaction Equation	SBO
118	SUBUCL1binding5Ub-		E3SUB.SUB_misfolded_Ub5	+
	_UCL1		UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub5_UCL1	
119	SUBUCL1binding6		E3SUB.SUB_misfolded_Ub6	+
			UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub6_UCL1	
120	SUBUCL1binding7		E3SUB.SUB_misfolded_Ub7	+
			UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub7_UCL1	
121	SUBUCL1binding8		E3SUB.SUB_misfolded_Ub8	+
			UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub8_UCL1	
122	SUBDeubiquitination8		E3SUB.SUB_misfolded_Ub8_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub7_UCL1 + Ub	
123	SUBDeubiquitination7		E3SUB.SUB_misfolded_Ub7_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub6_UCL1 + Ub	
124	SUBDeubiquitination6		E3SUB.SUB_misfolded_Ub6_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub5_UCL1 + Ub	
125	SUBDeubiquitination5		E3SUB.SUB_misfolded_Ub5_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub4_UCL1 + Ub	
126	SUBDeubiquitination4		E3SUB.SUB_misfolded_Ub4_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub3_UCL1 + Ub	
127	SUBDeubiquitination3		E3SUB.SUB_misfolded_Ub3_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub2_UCL1 + Ub	
128	SUBDeubiquitination2		E3SUB.SUB_misfolded_Ub2_UCL1 \longrightarrow E3SUB.SUB_misfolded_Ub_UCL1 + Ub	
129	SUBDeubiquitination1		E3SUB.SUB_misfolded_Ub_UCL1 \longrightarrow E3SUB.SUB_misfolded + UCL1 + Ub	
130	SUBProteasomeBindingUb4		E3SUB.SUB_misfolded_Ub4	+
			Proteasome \longrightarrow SUB_misfolded_Ub4_Proteasome + E3SUB	

Nº	Id	Name	Reaction Equation	SBO
131	SUBProteasomeBindingUb5		E3SUB.SUB_misfolded_Ub5 + Proteasome \longrightarrow SUB_misfolded_Ub5_Proteasome + E3SUB	
132	SUBProteasomeBindingUb6		E3SUB.SUB_misfolded_Ub6 + Proteasome \longrightarrow SUB_misfolded_Ub6_Proteasome + E3SUB	
133	SUBProteasomeBindingUb7		E3SUB.SUB_misfolded_Ub7 + Proteasome \longrightarrow SUB_misfolded_Ub7_Proteasome + E3SUB	
134	SUBProteasomeBindingUb8		E3SUB.SUB_misfolded_Ub8 + Proteasome \longrightarrow SUB_misfolded_Ub8_Proteasome + E3SUB	
135	DeubiquitinationBoundSUB8		SUB_misfolded_Ub8_Proteasome + DUB \longrightarrow SUB_misfolded_Ub7_Proteasome + Ub + DUB	
136	DeubiquitinationBoundSUB7		SUB_misfolded_Ub7_Proteasome + DUB \longrightarrow SUB_misfolded_Ub6_Proteasome + Ub + DUB	
137	DeubiquitinationBoundSUB6		SUB_misfolded_Ub6_Proteasome + DUB \longrightarrow SUB_misfolded_Ub5_Proteasome + Ub + DUB	
138	DeubiquitinationBoundSUB5		SUB_misfolded_Ub5_Proteasome + DUB \longrightarrow SUB_misfolded_Ub4_Proteasome + Ub + DUB	
139	DeubiquitinationBoundSUB4		SUB_misfolded_Ub4_Proteasome + DUB \longrightarrow SUB_misfolded + Proteasome + 4 Ub + DUB	
140	SUBDegradationUb4		SUB_misfolded_Ub4_Proteasome + ATP \longrightarrow 4 Ub + Proteasome + ADP	

Nº	Id	Name	Reaction Equation	SBO
141	SUBDegradationUb5		SUB_misfolded_Ub5_Proteasome ATP \longrightarrow 5 Ub + Proteasome + ADP	+
142	SUBDegradationUb6		SUB_misfolded_Ub6_Proteasome ATP \longrightarrow 6 Ub + Proteasome + ADP	+
143	SUBDegradationUb7		SUB_misfolded_Ub7_Proteasome ATP \longrightarrow 7 Ub + Proteasome + ADP	+
144	SUBDegradationUb8		SUB_misfolded_Ub8_Proteasome ATP \longrightarrow 8 Ub + Proteasome + ADP	+
145	asynSynthesis1		Source \longrightarrow asyn	
146	asynProt20Sbinding		asyn + Proteasome \longrightarrow asyn_Proteasome	
147	asynProt20Sdegradation		asyn_Proteasome \longrightarrow Proteasome	
148	asynLamp2aBinding		asyn + Lamp2a \longrightarrow asyn_Lamp2a	
149	asynCMAdegradation		asyn_Lamp2a \longrightarrow Lamp2a	
150	asynDamage		asyn + ROS \longrightarrow asyn_dam + ROS	
151	asyn- _damParkinBinding		asyn_dam + Parkin \longrightarrow Parkin_asyn_dam	
152	asyn- _damParkinRelease		Parkin_asyn_dam \longrightarrow asyn_dam + Parkin	
153	AsynMonoubiquitination		E2_Ub + Parkin_asyn_dam \longrightarrow Parkin_asyn_dam_Ub + E2	
154	AsynPolyubiquitination1		Parkin_asyn_dam_Ub E2_Ub \longrightarrow Parkin_asyn_dam_Ub2 + E2	+
155	AsynPolyubiquitination2		Parkin_asyn_dam_Ub2 E2_Ub \longrightarrow Parkin_asyn_dam_Ub3 + E2	+
156	AsynPolyubiquitination3		Parkin_asyn_dam_Ub3 E2_Ub \longrightarrow Parkin_asyn_dam_Ub4 + E2	+
157	AsynPolyubiquitination4		Parkin_asyn_dam_Ub4 E2_Ub \longrightarrow Parkin_asyn_dam_Ub5 + E2	+

Nº	Id	Name	Reaction Equation	SBO
158	AsynPolyubiquitination5		Parkin_asyn_dam_Ub5 E2_Ub \longrightarrow Parkin_asyn_dam_Ub6 + E2	+
159	AsynPolyubiquitination6		Parkin_asyn_dam_Ub6 E2_Ub \longrightarrow Parkin_asyn_dam_Ub7 + E2	+
160	AsynPolyubiquitination7		Parkin_asyn_dam_Ub7 E2_Ub \longrightarrow Parkin_asyn_dam_Ub8 + E2	+
161	AsynDUBbindingUb8		Parkin_asyn_dam_Ub8 DUB \longrightarrow Parkin_asyn_dam_Ub8_DUB	+
162	AsynDUBbindingUb7		Parkin_asyn_dam_Ub7 DUB \longrightarrow Parkin_asyn_dam_Ub7_DUB	+
163	AsynDUBbindingUb6		Parkin_asyn_dam_Ub6 DUB \longrightarrow Parkin_asyn_dam_Ub6_DUB	+
164	AsynDUBbindingUb5		Parkin_asyn_dam_Ub5 DUB \longrightarrow Parkin_asyn_dam_Ub5_DUB	+
165	AsynDUBbindingUb4		Parkin_asyn_dam_Ub4 DUB \longrightarrow Parkin_asyn_dam_Ub4_DUB	+
166	AsynDUBbindingUb3		Parkin_asyn_dam_Ub3 DUB \longrightarrow Parkin_asyn_dam_Ub3_DUB	+
167	AsynDUBbindingUb2		Parkin_asyn_dam_Ub2 DUB \longrightarrow Parkin_asyn_dam_Ub2_DUB	+
168	AsynDUBbindingUb1		Parkin_asyn_dam_Ub DUB \longrightarrow Parkin_asyn_dam_Ub_DUB	+
169	AsynDeubiquitinationUb8		Parkin_asyn_dam_Ub8_DUB \longrightarrow Parkin_asyn_dam_Ub7_DUB + Ub	
170	AsynDeubiquitinationUb7		Parkin_asyn_dam_Ub7_DUB \longrightarrow Parkin_asyn_dam_Ub6_DUB + Ub	
171	AsynDeubiquitinationUb6		Parkin_asyn_dam_Ub6_DUB \longrightarrow Parkin_asyn_dam_Ub5_DUB + Ub	

Nº	Id	Name	Reaction Equation	SBO
172	AsynDeubiquitinationUb5		Parkin_asyn_dam_Ub5_DUB \longrightarrow Parkin_asyn_dam_Ub4_DUB + Ub	
173	AsynDeubiquitinationUb4		Parkin_asyn_dam_Ub4_DUB \longrightarrow Parkin_asyn_dam_Ub3_DUB + Ub	
174	AsynDeubiquitinationUb3		Parkin_asyn_dam_Ub3_DUB \longrightarrow Parkin_asyn_dam_Ub2_DUB + Ub	
175	AsynDeubiquitinationUb2		Parkin_asyn_dam_Ub2_DUB \longrightarrow Parkin_asyn_dam_Ub_DUB + Ub	
176	AsynDeubiquitinationUb1		Parkin_asyn_dam_Ub_DUB \longrightarrow Parkin_asyn_dam + DUB + Ub	
177	AsynProteasomeBindingUb4		Parkin_asyn_dam_Ub4 Proteasome \longrightarrow asyn_dam_Ub4_Proteasome Parkin	+ +
178	AsynProteasomeBindingUb5		Parkin_asyn_dam_Ub5 Proteasome \longrightarrow asyn_dam_Ub5_Proteasome Parkin	+ +
179	AsynProteasomeBindingUb6		Parkin_asyn_dam_Ub6 Proteasome \longrightarrow asyn_dam_Ub6_Proteasome Parkin	+ +
180	AsynProteasomeBindingUb7		Parkin_asyn_dam_Ub7 Proteasome \longrightarrow asyn_dam_Ub7_Proteasome Parkin	+ +
181	AsynProteasomeBindingUb8		Parkin_asyn_dam_Ub8 Proteasome \longrightarrow asyn_dam_Ub8_Proteasome Parkin	+ +
182	DeubiquitinationBoundasyn- _damUb8		asyn_dam_Ub8_Proteasome DUB \longrightarrow asyn_dam_Ub7_Proteasome + Ub + DUB	+ +
183	DeubiquitinationBoundasynDamUb7		asyn_dam_Ub7_Proteasome DUB \longrightarrow asyn_dam_Ub6_Proteasome + Ub + DUB	+ +

Nº	Id	Name	Reaction Equation	SBO
184	DeubiquitinationBoundasynDamUb6		asyn_dam_Ub6_Proteasome + DUB \longrightarrow asyn_dam_Ub5_Proteasome + Ub + DUB	
185	DeubiquitinationBoundasynDamUb5		asyn_dam_Ub5_Proteasome + DUB \longrightarrow asyn_dam_Ub4_Proteasome + Ub + DUB	
186	DeubiquitinationBoundasynDamUb4		asyn_dam_Ub4_Proteasome + DUB \longrightarrow asyn_dam + Proteasome + 4 Ub + DUB	
187	AsynProteasomeActivityUb4		asyn_dam_Ub4_Proteasome + ATP \longrightarrow 4 Ub + Proteasome + ADP	
188	AsynDegradationUb5		asyn_dam_Ub5_Proteasome + ATP \longrightarrow 5 Ub + Proteasome + ADP	
189	AsynDegradationUb6		asyn_dam_Ub6_Proteasome + ATP \longrightarrow 6 Ub + Proteasome + ADP	
190	AsynDegradationUb7		asyn_dam_Ub7_Proteasome + ATP \longrightarrow 7 Ub + Proteasome + ADP	
191	AsynDegradationUb8		asyn_dam_Ub8_Proteasome + ATP \longrightarrow 8 Ub + Proteasome + ADP	
192	Aggregationasyn1		2 asyn \longrightarrow AggA1	
193	Aggregationasyn2		asyn + AggA1 \longrightarrow AggA2	
194	Aggregationasyn3		asyn + AggA2 \longrightarrow AggA3	
195	Aggregationasyn4		asyn + AggA3 \longrightarrow AggA4	
196	Aggregationasyn5		asyn + AggA4 \longrightarrow AggA5	
197	DisAggregationasyn1		AggA5 \longrightarrow AggA4 + asyn	
198	DisAggregationasyn2		AggA4 \longrightarrow AggA3 + asyn	
199	DisAggregationasyn3		AggA3 \longrightarrow AggA2 + asyn	
200	DisAggregationasyn4		AggA2 \longrightarrow AggA1 + asyn	
201	DisAggregationasyn5		AggA1 \longrightarrow 2 asyn	
202	AggA1ProteasomeInhibition		AggA1 + Proteasome \longrightarrow AggP_Proteasome	
203	AggA2ProteasomeInhibition		AggA2 + Proteasome \longrightarrow AggP_Proteasome	
204	AggA3ProteasomeInhibition		AggA3 + Proteasome \longrightarrow AggP_Proteasome	

Nº	Id	Name	Reaction Equation	SBO
205	AggA4ProteasomeInhibition		$\text{AggA4} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
206	AggA5ProteasomeInhibition		$\text{AggA5} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
207	AsynInclusionFormation		$\text{asyn} + \text{AggA5} \longrightarrow \text{SeqAggP} + 7 \text{aggasyn}$	
208	AsynInclusionGrowth		$\text{SeqAggP} + \text{asyn} \longrightarrow 2 \text{SeqAggP} + \text{aggasyn}$	
209	ROSGenerationSmallAggA1		$\text{AggA1} \longrightarrow \text{AggA1} + \text{ROS}$	
210	ROSGenerationSmallAggA2		$\text{AggA2} \longrightarrow \text{AggA2} + \text{ROS}$	
211	ROSGenerationSmallAggA3		$\text{AggA3} \longrightarrow \text{AggA3} + \text{ROS}$	
212	ROSGenerationSmallAggA4		$\text{AggA4} \longrightarrow \text{AggA4} + \text{ROS}$	
213	ROSGenerationSmallAggA5		$\text{AggA5} \longrightarrow \text{AggA5} + \text{ROS}$	
214	AggregationAsynDam1		$2 \text{asyn_dam} \longrightarrow \text{AggD1}$	
215	AggregationAsynDam2		$\text{asyn_dam} + \text{AggD1} \longrightarrow \text{AggD2}$	
216	AggregationAsynDam3		$\text{asyn_dam} + \text{AggD2} \longrightarrow \text{AggD3}$	
217	AggregationAsynDam4		$\text{asyn_dam} + \text{AggD3} \longrightarrow \text{AggD4}$	
218	AggregationAsynDam5		$\text{asyn_dam} + \text{AggD4} \longrightarrow \text{AggD5}$	
219	DisaggregationAsynDam1		$\text{AggD5} \longrightarrow \text{AggD4} + \text{asyn_dam}$	
220	DisaggregationAsynDam2		$\text{AggD4} \longrightarrow \text{AggD3} + \text{asyn_dam}$	
221	DisaggregationAsynDam3		$\text{AggD3} \longrightarrow \text{AggD2} + \text{asyn_dam}$	
222	DisaggregationAsynDam4		$\text{AggD2} \longrightarrow \text{AggD1} + \text{asyn_dam}$	
223	DisaggregationAsynDam5		$\text{AggD1} \longrightarrow 2 \text{asyn_dam}$	
224	AggD1ProteasomeInhibition		$\text{AggD1} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
225	AggD2ProteasomeInhibition		$\text{AggD2} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
226	AggD3ProteasomeInhibition		$\text{AggD3} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
227	AggD4ProteasomeInhibition		$\text{AggD4} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
228	AggD5ProteasomeInhibition		$\text{AggD5} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
229	AsynDamInclusionFormation		$\text{asyn_dam} + \text{AggD5} \longrightarrow \text{SeqAggP} + 7 \text{aggasyndam}$	
230	AsynDamInclusionGrowth1		$\text{SeqAggP} + \text{asyn_dam} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam}$	
231	AsynDamInclusionGrowth2		$\text{SeqAggP} + \text{Parkin_asyn_dam} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + \text{aggParkin}$	

Nº	Id	Name	Reaction Equation	SBO
232	AsynDamInclusionGrowth3		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + \text{aggUb} + \text{aggParkin}$	
233	AsynDamInclusionGrowth4		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub2} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 2 \text{aggUb} + \text{aggParkin}$	
234	AsynDamInclusionGrowth5		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub3} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 3 \text{aggUb} + \text{aggParkin}$	
235	AsynDamInclusionGrowth6		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub4} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 4 \text{aggUb} + \text{aggParkin}$	
236	AsynDamInclusionGrowth7		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub5} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 5 \text{aggUb} + \text{aggParkin}$	
237	AsynDamInclusionGrowth8		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub6} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 6 \text{aggUb} + \text{aggParkin}$	
238	AsynDamInclusionGrowth9		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub7} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 7 \text{aggUb} + \text{aggParkin}$	
239	AsynDamInclusionGrowth10		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub8} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 8 \text{aggUb} + \text{aggParkin}$	
240	AsynDamInclusionGrowth11		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + \text{aggUb} + \text{aggParkin}$	
241	AsynDamInclusionGrowth12		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub2_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 2 \text{aggUb} + \text{aggParkin}$	
242	AsynDamInclusionGrowth13		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub3_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 3 \text{aggUb} + \text{aggParkin}$	
243	AsynDamInclusionGrowth14		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub4_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 4 \text{aggUb} + \text{aggParkin}$	
244	AsynDamInclusionGrowth15		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub5_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 5 \text{aggUb} + \text{aggParkin}$	
245	AsynDamInclusionGrowth16		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub6_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 6 \text{aggUb} + \text{aggParkin}$	

Nº	Id	Name	Reaction Equation	SBO
246	AsynDamInclusionGrowth17		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub7_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 7 \text{aggUb} + \text{aggParkin}$	
247	AsynDamInclusionGrowth18		$\text{SeqAggP} + \text{Parkin_asyn_dam_Ub8_DUB} \longrightarrow 2 \text{SeqAggP} + \text{aggasyndam} + 8 \text{aggUb} + \text{aggParkin}$	
248	ROSGenerationSmallAggD1		$\text{AggD1} \longrightarrow \text{AggD1} + \text{ROS}$	
249	ROSGenerationSmallAggD2		$\text{AggD2} \longrightarrow \text{AggD2} + \text{ROS}$	
250	ROSGenerationSmallAggD3		$\text{AggD3} \longrightarrow \text{AggD3} + \text{ROS}$	
251	ROSGenerationSmallAggD4		$\text{AggD4} \longrightarrow \text{AggD4} + \text{ROS}$	
252	ROSGenerationSmallAggD5		$\text{AggD5} \longrightarrow \text{AggD5} + \text{ROS}$	
253	AggregationUCHL1Dam1		$2 \text{UCHL1_damaged} \longrightarrow \text{AggU1}$	
254	AggregationUCHL1Dam2		$\text{UCHL1_damaged} + \text{AggU1} \longrightarrow \text{AggU2}$	
255	AggregationUCHL1Dam3		$\text{UCHL1_damaged} + \text{AggU2} \longrightarrow \text{AggU3}$	
256	AggregationUCHL1Dam4		$\text{UCHL1_damaged} + \text{AggU3} \longrightarrow \text{AggU4}$	
257	AggregationUCHL1Dam5		$\text{UCHL1_damaged} + \text{AggU4} \longrightarrow \text{AggU5}$	
258	DisaggregationUCHL1Dam1		$\text{AggU5} \longrightarrow \text{AggU4} + \text{UCHL1_damaged}$	
259	DisaggregationUCHL1Dam2		$\text{AggU4} \longrightarrow \text{AggU3} + \text{UCHL1_damaged}$	
260	DisaggregationUCHL1Dam3		$\text{AggU3} \longrightarrow \text{AggU2} + \text{UCHL1_damaged}$	
261	DisaggregationUCHL1Dam4		$\text{AggU2} \longrightarrow \text{AggU1} + \text{UCHL1_damaged}$	
262	DisaggregationUCHL1Dam5		$\text{AggU1} \longrightarrow 2 \text{UCHL1_damaged}$	
263	AggU1ProteasomeInhibition		$\text{AggU1} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
264	AggU2ProteasomeInhibition		$\text{AggU2} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
265	AggU3ProteasomeInhibition		$\text{AggU3} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
266	AggU4ProteasomeInhibition		$\text{AggU4} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
267	AggU5ProteasomeInhibition		$\text{AggU5} + \text{Proteasome} \longrightarrow \text{AggP_Proteasome}$	
268	UCHL1DamInclusionFormation		$\text{UCHL1_damaged} + \text{AggU5} \longrightarrow \text{SeqAggP} + 7 \text{aggUchl1dam}$	
269	UCHL1DamagedSequestering		$\text{SeqAggP} + \text{UCHL1_damaged} \longrightarrow 2 \text{SeqAggP} + \text{aggUchl1dam}$	

Nº	Id	Name	Reaction Equation	SBO
270	UCHL1DamagedLamp2aSequestering		SeqAggP + Lamp2a_UCHL1_damaged \longrightarrow 2 SeqAggP + aggUchl1dam	
271	ROSGenerationSmallAggU1		AggU1 \longrightarrow AggU1 + ROS	
272	ROSGenerationSmallAggU2		AggU2 \longrightarrow AggU2 + ROS	
273	ROSGenerationSmallAggU3		AggU3 \longrightarrow AggU3 + ROS	
274	ROSGenerationSmallAggU4		AggU4 \longrightarrow AggU4 + ROS	
275	ROSGenerationSmallAggU5		AggU5 \longrightarrow AggU5 + ROS	
276	SUBAggregation1		2 SUB_misfolded \longrightarrow AggS1	
277	SUBAggregation2		SUB_misfolded + AggS1 \longrightarrow AggS2	
278	SUBAggregation3		SUB_misfolded + AggS2 \longrightarrow AggS3	
279	SUBAggregation4		SUB_misfolded + AggS3 \longrightarrow AggS4	
280	SUBAggregation5		SUB_misfolded + AggS4 \longrightarrow AggS5	
281	SUBDisaggregation1		AggS5 \longrightarrow AggS4 + SUB_misfolded	
282	SUBDisaggregation2		AggS4 \longrightarrow AggS3 + SUB_misfolded	
283	SUBDisaggregation3		AggS3 \longrightarrow AggS2 + SUB_misfolded	
284	SUBDisaggregation4		AggS2 \longrightarrow AggS1 + SUB_misfolded	
285	SUBDisaggregation5		AggS1 \longrightarrow 2 SUB_misfolded	
286	AggS1ProteasomeInhibition		AggS1 + Proteasome \longrightarrow AggP_Proteasome	
287	AggS2ProteasomeInhibition		AggS2 + Proteasome \longrightarrow AggP_Proteasome	
288	AggS3ProteasomeInhibition		AggS3 + Proteasome \longrightarrow AggP_Proteasome	
289	AggS4ProteasomeInhibition		AggS4 + Proteasome \longrightarrow AggP_Proteasome	
290	AggS5ProteasomeInhibition		AggS5 + Proteasome \longrightarrow AggP_Proteasome	
291	SUBInclusionFormation		AggS5 + SUB_misfolded \longrightarrow SeqAggP + 7 aggSUB	
292	SUBInclusionGrowth0		SeqAggP + SUB_misfolded \longrightarrow 2 SeqAggP + aggSUB	
293	SUBInclusionGrowth1		E3SUB SUB_misfolded SeqAggP \longrightarrow 2 SeqAggP + aggSUB	+

Nº	Id	Name	Reaction Equation	SBO
294	SUBInclusionGrowth2		E3SUB.SUB_misfolded_Ub SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUb	+
295	SUBInclusionGrowth3		E3SUB.SUB_misfolded_Ub2 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 2 aggUb	+
296	SUBInclusionGrowth4		E3SUB.SUB_misfolded_Ub3 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 3 aggUb	+
297	SUBInclusionGrowth5		E3SUB.SUB_misfolded_Ub4 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 4 aggUb	+
298	SUBInclusionGrowth6		E3SUB.SUB_misfolded_Ub5 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 5 aggUb	+
299	SUBInclusionGrowth7		E3SUB.SUB_misfolded_Ub6 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 6 aggUb	+
300	SUBInclusionGrowth8		E3SUB.SUB_misfolded_Ub7 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 7 aggUb	+
301	SUBInclusionGrowth9		E3SUB.SUB_misfolded_Ub8 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + 8 aggUb	+
302	SUBInclusionGrowth10		E3SUB.SUB_misfolded_Ub_UCHL1 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + aggUb	+
303	SUBInclusionGrowth11		E3SUB.SUB_misfolded_Ub2_UCHL1 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 2 aggUb	+
304	SUBInclusionGrowth12		E3SUB.SUB_misfolded_Ub3_UCHL1 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 3 aggUb	+
305	SUBInclusionGrowth13		E3SUB.SUB_misfolded_Ub4_UCHL1 SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 4 aggUb	+

Nº	Id	Name	Reaction Equation	SBO
306	SUBInclusionGrowth14		$E3SUB_SUB_misfolded_Ub5_UCHL1 + SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 5 aggUb$	
307	SUBInclusionGrowth15		$E3SUB_SUB_misfolded_Ub6_UCHL1 + SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 6 aggUb$	
308	SUBInclusionGrowth16		$E3SUB_SUB_misfolded_Ub7_UCHL1 + SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 7 aggUb$	
309	SUBInclusionGrowth17		$E3SUB_SUB_misfolded_Ub8_UCHL1 + SeqAggP \longrightarrow 2 SeqAggP + aggSUB + aggUchl1 + 8 aggUb$	
310	ROSGenerationSmallAggS1		$AggS1 \longrightarrow AggS1 + ROS$	
311	ROSGenerationSmallAggS2		$AggS2 \longrightarrow AggS2 + ROS$	
312	ROSGenerationSmallAggS3		$AggS3 \longrightarrow AggS3 + ROS$	
313	ROSGenerationSmallAggS4		$AggS4 \longrightarrow AggS4 + ROS$	
314	ROSGenerationSmallAggS5		$AggS5 \longrightarrow AggS5 + ROS$	
315	radicalFormation	radicalFormation	$Source \longrightarrow ROS$	
316	radicalScavenging	radicalScavenging	$ROS \longrightarrow Sink$	

7.1 Reaction UbSynthesis

This is an irreversible reaction of one reactant forming one product.

SBO:0000393 production

Reaction equation



Reactant

Table 6: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 7: Properties of each product.

Id	Name	SBO
Ub		

Kinetic Law

Derived unit contains undeclared units

$$v_1 = k_{\text{ubs}} \cdot \text{Source}$$

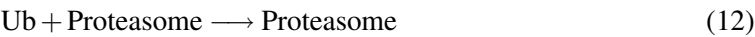
(11)

7.2 Reaction UbDegradation

This is an irreversible reaction of two reactants forming one product.

SBO:0000179 degradation

Reaction equation



Reactants

Table 8: Properties of each reactant.

Id	Name	SBO
Ub		
Proteasome		

Product

Table 9: Properties of each product.

Id	Name	SBO
Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_2 = k_{ubd} \cdot \text{Proteasome} \cdot \text{Ub} \cdot k_{proteff} \quad (13)$$

7.3 Reaction UbUpregulation

This is an irreversible reaction of one reactant forming three products.

SBO:0000375 process

Reaction equation



Reactant

Table 10: Properties of each reactant.

Id	Name	SBO
MisP		

Products

Table 11: Properties of each product.

Id	Name	SBO
MisP		

Id	Name	SBO
Ub		
upregUb		

Kinetic Law

Derived unit contains undeclared units

$$v_3 = \text{kubss} \cdot \frac{\text{MisP}^6}{1500^6 + \text{MisP}^6} \quad (15)$$

7.4 Reaction ProteinSynthesis

This is an irreversible reaction of one reactant forming one product.

SBO:0000393 production

Reaction equation



Reactant

Table 12: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 13: Properties of each product.

Id	Name	SBO
NatP		

Kinetic Law

Derived unit contains undeclared units

$$v_4 = \text{ksynNatP} \cdot \text{Source} \quad (17)$$

7.5 Reaction Misfolding

This is an irreversible reaction of two reactants forming two products.

SBO:0000375 process

Reaction equation



Reactants

Table 14: Properties of each reactant.

Id	Name	SBO
	NatP	
	ROS	

Products

Table 15: Properties of each product.

Id	Name	SBO
	MisP	
	ROS	

Kinetic Law

Derived unit contains undeclared units

$$v_5 = k_{\text{misfold}} \cdot \text{NatP} \cdot \text{ROS}$$

(19)

7.6 Reaction Refolding

This is an irreversible reaction of one reactant forming one product.

SBO:0000375 process

Reaction equation



Reactant

Table 16: Properties of each reactant.

Id	Name	SBO
MisP		

Product

Table 17: Properties of each product.

Id	Name	SBO
NatP		

Kinetic Law

Derived unit contains undeclared units

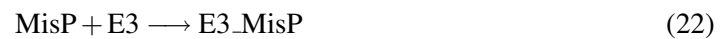
$$v_6 = k_{\text{refold}} \cdot \text{MisP} \quad (21)$$

7.7 Reaction MisPE3Binding

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 18: Properties of each reactant.

Id	Name	SBO
MisP		
E3		

Product

Table 19: Properties of each product.

Id	Name	SBO
E3_MisP		

Id	Name	SBO
----	------	-----

Kinetic Law

Derived unit contains undeclared units

$$v_7 = k_{\text{binMisPE3}} \cdot \text{MisP} \cdot \text{E3} \quad (23)$$

7.8 Reaction MisPE3Release

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 20: Properties of each reactant.

Id	Name	SBO
E3_MisP		

Products

Table 21: Properties of each product.

Id	Name	SBO
MisP		
E3		

Kinetic Law

Derived unit contains undeclared units

$$v_8 = k_{\text{relMisPE3}} \cdot \text{E3_MisP} \quad (25)$$

7.9 Reaction E1UbBinding

This is an irreversible reaction of three reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 22: Properties of each reactant.

Id	Name	SBO
E1		
Ub		
ATP		

Products

Table 23: Properties of each product.

Id	Name	SBO
E1_Ub		
AMP		

Kinetic Law

Derived unit contains undeclared units

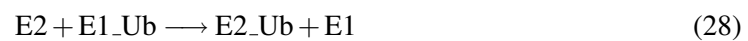
$$v_9 = \frac{k_{binE1Ub} \cdot E1 \cdot Ub \cdot ATP}{5000 + ATP} \quad (27)$$

7.10 Reaction [E2UbBinding](#)

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 24: Properties of each reactant.

Id	Name	SBO
E2		
E1_Ub		

Products

Table 25: Properties of each product.

Id	Name	SBO
E2_Ub		
E1		

Kinetic Law

Derived unit contains undeclared units

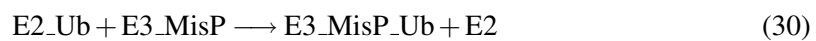
$$v_{10} = k_{\text{binE2Ub}} \cdot E2 \cdot E1_Ub \quad (29)$$

7.11 Reaction Monoubiquitination

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 26: Properties of each reactant.

Id	Name	SBO
E2_Ub		
E3_MisP		

Products

Table 27: Properties of each product.

Id	Name	SBO
E3_MisP_Ub		
E2		

Kinetic Law

Derived unit contains undeclared units

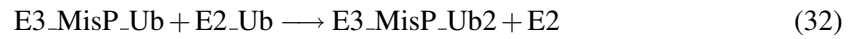
$$v_{11} = k_{\text{monoUb}} \cdot \text{E2_Ub} \cdot \text{E3_MisP} \quad (31)$$

7.12 Reaction Polyubiquitination1

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 28: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub		
E2_Ub		

Products

Table 29: Properties of each product.

Id	Name	SBO
E3_MisP_Ub2		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{12} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub} \cdot \text{E2_Ub} \quad (33)$$

7.13 Reaction Polyubiquitination2

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 30: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub2		
E2_Ub		

Products

Table 31: Properties of each product.

Id	Name	SBO
E3_MisP_Ub3		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{13} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub2} \cdot \text{E2_Ub} \quad (35)$$

7.14 Reaction Polyubiquitination3

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 32: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub3		
E2_Ub		

Products

Table 33: Properties of each product.

Id	Name	SBO
E3_MisP_Ub4		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{14} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub3} \cdot \text{E2_Ub} \quad (37)$$

7.15 Reaction [Polyubiquitination4](#)

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 34: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub4		
E2_Ub		

Products

Table 35: Properties of each product.

Id	Name	SBO
E3_MisP_Ub5		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{15} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub4} \cdot \text{E2_Ub} \quad (39)$$

7.16 Reaction Polyubiquitination5

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 36: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub5		
E2_Ub		

Products

Table 37: Properties of each product.

Id	Name	SBO
E3_MisP_Ub6		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{16} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub5} \cdot \text{E2_Ub} \quad (41)$$

7.17 Reaction Polyubiquitination6

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 38: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6		
E2_Ub		

Products

Table 39: Properties of each product.

Id	Name	SBO
E3_MisP_Ub7		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{17} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub6} \cdot \text{E2_Ub} \quad (43)$$

7.18 Reaction Polyubiquitination7

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 40: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub7		
E2_Ub		

Products

Table 41: Properties of each product.

Id	Name	SBO
E3_MisP_Ub8		
E2		

Kinetic Law

Derived unit contains undeclared units

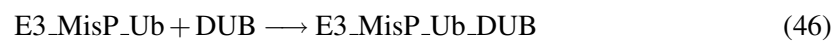
$$v_{18} = k_{\text{polyUb}} \cdot \text{E3_MisP_Ub7} \cdot \text{E2_Ub} \quad (45)$$

7.19 Reaction [MisPDUBbinding1](#)

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 42: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub		
DUB		

Product

Table 43: Properties of each product.

Id	Name	SBO
E3_MisP_Ub_DUB		

Kinetic Law

Derived unit contains undeclared units

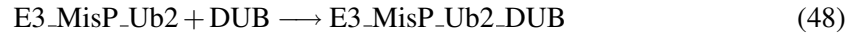
$$v_{19} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub} \cdot \text{DUB} \quad (47)$$

7.20 Reaction `MisPDUBbinding2`

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 44: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub2		
DUB		

Product

Table 45: Properties of each product.

Id	Name	SBO
E3_MisP_Ub2_DUB		

Kinetic Law

Derived unit contains undeclared units

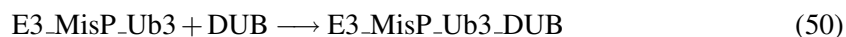
$$v_{20} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub2} \cdot \text{DUB} \quad (49)$$

7.21 Reaction [MisPDUBbinding3](#)

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 46: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub3		
DUB		

Product

Table 47: Properties of each product.

Id	Name	SBO
E3_MisP_Ub3_DUB		

Kinetic Law

Derived unit contains undeclared units

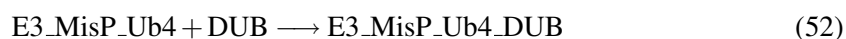
$$v_{21} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub3} \cdot \text{DUB} \quad (51)$$

7.22 Reaction [MisPDUBbinding4](#)

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 48: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub4		
DUB		

Product

Table 49: Properties of each product.

Id	Name	SBO
E3_MisP_Ub4_DUB		

Kinetic Law

Derived unit contains undeclared units

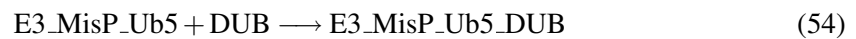
$$v_{22} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub4} \cdot \text{DUB} \quad (53)$$

7.23 Reaction MisPDUBbinding5

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 50: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub5		
DUB		

Product

Table 51: Properties of each product.

Id	Name	SBO
E3_MisP_Ub5_DUB		

Kinetic Law

Derived unit contains undeclared units

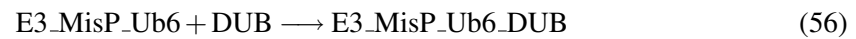
$$v_{23} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub5} \cdot \text{DUB} \quad (55)$$

7.24 Reaction MisPDUBbinding6

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 52: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6		
DUB		

Product

Table 53: Properties of each product.

Id	Name	SBO
E3_MisP_Ub6_DUB		

Kinetic Law

Derived unit contains undeclared units

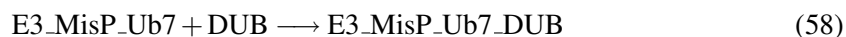
$$v_{24} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub6} \cdot \text{DUB} \quad (57)$$

7.25 Reaction `MisPDUBbinding7`

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 54: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub7		
DUB		

Product

Table 55: Properties of each product.

Id	Name	SBO
E3_MisP_Ub7_DUB		

Kinetic Law

Derived unit contains undeclared units

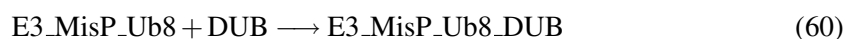
$$v_{25} = k_{\text{binMisPDUB}} \cdot \text{E3_MisP_Ub7} \cdot \text{DUB} \quad (59)$$

7.26 Reaction `MisPDUBbinding8`

This is an irreversible reaction of two reactants forming one product.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 56: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub8		
DUB		

Product

Table 57: Properties of each product.

Id	Name	SBO
E3_MisP_Ub8_DUB		

Kinetic Law

Derived unit contains undeclared units

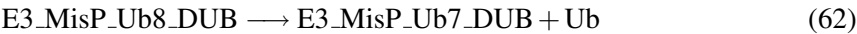
$$v_{26} = k_{binMisPDUB} \cdot E3_MisP_Ub8 \cdot DUB \tag{61}$$

7.27 Reaction Deubiquitination8

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 58: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub8_DUB		

Products

Table 59: Properties of each product.

Id	Name	SBO
E3_MisP_Ub7_DUB		

Id	Name	SBO
Ub		

Kinetic Law

Derived unit contains undeclared units

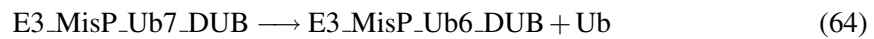
$$v_{27} = k_{actDUB} \cdot E3_MisP_Ub8_DUB \quad (63)$$

7.28 Reaction [Deubiquitination7](#)

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 60: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub7_DUB		

Products

Table 61: Properties of each product.

Id	Name	SBO
E3_MisP_Ub6_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

$$v_{28} = k_{actDUB} \cdot E3_MisP_Ub7_DUB \quad (65)$$

7.29 Reaction [Deubiquitination6](#)

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 62: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6_DUB		

Products

Table 63: Properties of each product.

Id	Name	SBO
E3_MisP_Ub5_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

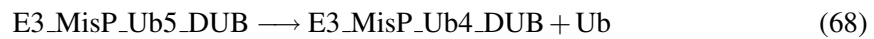
$$v_{29} = k_{\text{actDUB}} \cdot \text{E3_MisP_Ub6_DUB} \quad (67)$$

7.30 Reaction [Deubiquitination5](#)

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 64: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub5_DUB		

Products

Table 65: Properties of each product.

Id	Name	SBO
E3_MisP_Ub4_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

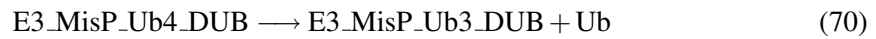
$$v_{30} = k_{actDUB} \cdot E3_MisP_Ub5_DUB \quad (69)$$

7.31 Reaction *Deubiquitination4*

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 66: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub4_DUB		

Products

Table 67: Properties of each product.

Id	Name	SBO
E3_MisP_Ub3_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

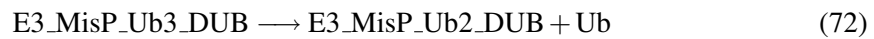
$$v_{31} = k_{actDUB} \cdot E3_MisP_Ub4_DUB \quad (71)$$

7.32 Reaction *Deubiquitination3*

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 68: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub3_DUB		

Products

Table 69: Properties of each product.

Id	Name	SBO
E3_MisP_Ub2_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

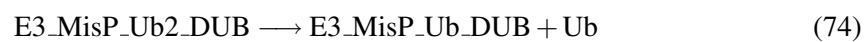
$$v_{32} = k_{actDUB} \cdot E3_MisP_Ub3_DUB \quad (73)$$

7.33 Reaction *Deubiquitination2*

This is an irreversible reaction of one reactant forming two products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 70: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub2_DUB		

Products

Table 71: Properties of each product.

Id	Name	SBO
E3_MisP_Ub_DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

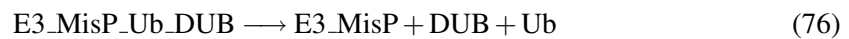
$$v_{33} = k_{actDUB} \cdot E3_MisP_Ub2_DUB \quad (75)$$

7.34 Reaction [Deubiquitination1](#)

This is an irreversible reaction of one reactant forming three products.

SBO:0000180 dissociation

Reaction equation



Reactant

Table 72: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub_DUB		

Products

Table 73: Properties of each product.

Id	Name	SBO
E3_MisP		

Id	Name	SBO
DUB		
Ub		

Kinetic Law

Derived unit contains undeclared units

$$v_{34} = k_{actDUB} \cdot E3_MisP_Ub_DUB \quad (77)$$

7.35 Reaction [ProteasomeBindingUb4](#)

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 74: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub4		
Proteasome		

Products

Table 75: Properties of each product.

Id	Name	SBO
E3		
MisP_Ub4_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{35} = k_{binProt} \cdot E3_MisP_Ub4 \cdot Proteasome \quad (79)$$

7.36 Reaction `ProteasomeBindingUb5`

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 76: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub5		
Proteasome		

Products

Table 77: Properties of each product.

Id	Name	SBO
E3		
MisP_Ub5_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{36} = k_{\text{binProt}} \cdot \text{E3_MisP_Ub5} \cdot \text{Proteasome} \quad (81)$$

7.37 Reaction `ProteasomeBindingUb6`

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 78: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6		
Proteasome		

Products

Table 79: Properties of each product.

Id	Name	SBO
E3		
MisP_Ub6_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{37} = k_{\text{binProt}} \cdot \text{E3_MisP_Ub6} \cdot \text{Proteasome} \quad (83)$$

7.38 Reaction [ProteasomeBindingUb7](#)

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 80: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub7		
Proteasome		

Products

Table 81: Properties of each product.

Id	Name	SBO
E3		
MisP_Ub7_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{38} = k_{\text{binProt}} \cdot \text{E3_MisP_Ub7} \cdot \text{Proteasome} \quad (85)$$

7.39 Reaction `ProteasomeBindingUb8`

This is an irreversible reaction of two reactants forming two products.

SBO:0000526 protein complex formation

Reaction equation



Reactants

Table 82: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub8		
Proteasome		

Products

Table 83: Properties of each product.

Id	Name	SBO
E3		
MisP_Ub8_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{39} = k_{\text{binProt}} \cdot \text{E3_MisP_Ub8} \cdot \text{Proteasome} \quad (87)$$

7.40 Reaction [DeubiquitinationBoundMisP5](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000180 dissociation

Reaction equation



Reactants

Table 84: Properties of each reactant.

Id	Name	SBO
MisP_Ub8_Proteasome		
DUB		

Products

Table 85: Properties of each product.

Id	Name	SBO
MisP_Ub7_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{40} = k_{\text{actDUBProt}} \cdot \text{MisP_Ub8_Proteasome} \cdot \text{DUB} \quad (89)$$

7.41 Reaction [DeubiquitinationBoundMisP4](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000180 dissociation

Reaction equation



Reactants

Table 86: Properties of each reactant.

Id	Name	SBO
MisP_Ub7_Proteasome		
DUB		

Products

Table 87: Properties of each product.

Id	Name	SBO
MisP_Ub6_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{41} = k_{\text{actDUBProt}} \cdot \text{MisP_Ub7_Proteasome} \cdot \text{DUB} \quad (91)$$

7.42 Reaction [DeubiquitinationBoundMisP3](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000180 dissociation

Reaction equation



Reactants

Table 88: Properties of each reactant.

Id	Name	SBO
MisP_Ub6_Proteasome		
DUB		

Products

Table 89: Properties of each product.

Id	Name	SBO
MisP_Ub5_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{42} = k_{\text{actDUBProt}} \cdot \text{MisP_Ub6_Proteasome} \cdot \text{DUB} \quad (93)$$

7.43 Reaction [DeubiquitinationBoundMisP2](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000180 dissociation

Reaction equation



Reactants

Table 90: Properties of each reactant.

Id	Name	SBO
MisP_Ub5_Proteasome		
DUB		

Products

Table 91: Properties of each product.

Id	Name	SBO
MisP_Ub4_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

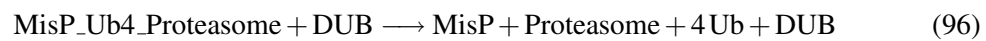
$$v_{43} = k_{\text{actDUBProt}} \cdot \text{MisP_Ub5_Proteasome} \cdot \text{DUB} \quad (95)$$

7.44 Reaction [DeubiquitinationBoundMisP1](#)

This is an irreversible reaction of two reactants forming four products.

SBO:0000180 dissociation

Reaction equation



Reactants

Table 92: Properties of each reactant.

Id	Name	SBO
MisP_Ub4_Proteasome		
DUB		

Products

Table 93: Properties of each product.

Id	Name	SBO
MisP		
Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

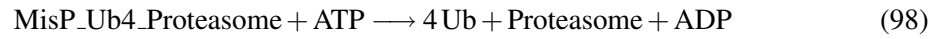
$$v_{44} = k_{\text{actDUBProt}} \cdot \text{MisP_Ub4_Proteasome} \cdot \text{DUB} \quad (97)$$

7.45 Reaction [ProteasomeActivity1](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000179 degradation

Reaction equation



Reactants

Table 94: Properties of each reactant.

Id	Name	SBO
MisP_Ub4_Proteasome		
ATP		

Products

Table 95: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

Derived unit contains undeclared units

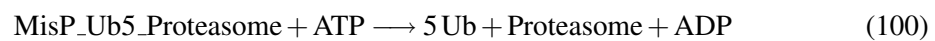
$$v_{45} = \frac{k_{\text{actProt}} \cdot k_{\text{proteff}} \cdot \text{MisP_Ub4_Proteasome} \cdot \text{ATP}}{5000 + \text{ATP}} \quad (99)$$

7.46 Reaction `ProteasomeActivity2`

This is an irreversible reaction of two reactants forming three products.

SBO:0000179 degradation

Reaction equation



Reactants

Table 96: Properties of each reactant.

Id	Name	SBO
	MisP_Ub5_Proteasome	
	ATP	

Products

Table 97: Properties of each product.

Id	Name	SBO
	Ub	
	Proteasome	
	ADP	

Kinetic Law

Derived unit contains undeclared units

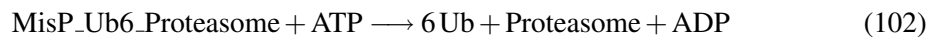
$$v_{46} = \frac{k_{\text{actProt}} \cdot k_{\text{proteff}} \cdot \text{MisP_Ub5_Proteasome} \cdot \text{ATP}}{5000 + \text{ATP}} \quad (101)$$

7.47 Reaction `ProteasomeActivity3`

This is an irreversible reaction of two reactants forming three products.

SBO:0000179 degradation

Reaction equation



Reactants

Table 98: Properties of each reactant.

Id	Name	SBO
	MisP_Ub6_Proteasome	
	ATP	

Products

Table 99: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

Derived unit contains undeclared units

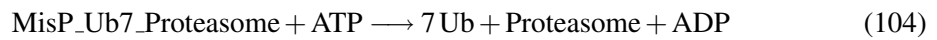
$$v_{47} = \frac{k_{actProt} \cdot k_{proteff} \cdot \text{MisP_Ub6_Proteasome} \cdot \text{ATP}}{5000 + \text{ATP}} \quad (103)$$

7.48 Reaction `ProteasomeActivity4`

This is an irreversible reaction of two reactants forming three products.

SBO:0000179 degradation

Reaction equation



Reactants

Table 100: Properties of each reactant.

Id	Name	SBO
MisP_Ub7_Proteasome		
ATP		

Products

Table 101: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

Derived unit contains undeclared units

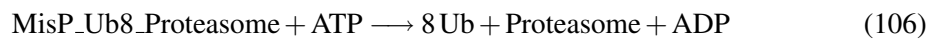
$$v_{48} = \frac{k_{actProt} \cdot k_{proteff} \cdot MisP_Ub7_Proteasome \cdot ATP}{5000 + ATP} \quad (105)$$

7.49 Reaction [ProteasomeActivity5](#)

This is an irreversible reaction of two reactants forming three products.

SBO:0000179 degradation

Reaction equation



Reactants

Table 102: Properties of each reactant.

Id	Name	SBO
MisP_Ub8_Proteasome		
ATP		

Products

Table 103: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

Derived unit contains undeclared units

$$v_{49} = \frac{k_{actProt} \cdot k_{proteff} \cdot MisP_Ub8_Proteasome \cdot ATP}{5000 + ATP} \quad (107)$$

7.50 Reaction [Aggregation1](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 104: Properties of each reactant.

Id	Name	SBO
MisP		

Product

Table 105: Properties of each product.

Id	Name	SBO
AggP1		

Kinetic Law

Derived unit contains undeclared units

$$v_{50} = k_{agg1} \cdot \text{MisP} \cdot (\text{MisP} - 1) \cdot 0.5$$

(109)

7.51 Reaction Aggregation2

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 106: Properties of each reactant.

Id	Name	SBO
MisP		
AggP1		

Product

Table 107: Properties of each product.

Id	Name	SBO
AggP2		

Kinetic Law

Derived unit contains undeclared units

$$v_{51} = k_{agg2} \cdot \text{MisP} \cdot \text{AggP1} \quad (111)$$

7.52 Reaction Aggregation3

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 108: Properties of each reactant.

Id	Name	SBO
MisP		
AggP2		

Product

Table 109: Properties of each product.

Id	Name	SBO
AggP3		

Kinetic Law

Derived unit contains undeclared units

$$v_{52} = k_{agg2} \cdot \text{MisP} \cdot \text{AggP2} \quad (113)$$

7.53 Reaction Aggregation4

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 110: Properties of each reactant.

Id	Name	SBO
MisP		
AggP3		

Product

Table 111: Properties of each product.

Id	Name	SBO
AggP4		

Kinetic Law

Derived unit contains undeclared units

$$v_{53} = kagg2 \cdot MisP \cdot AggP3$$

(115)

7.54 Reaction Aggregation5

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 112: Properties of each reactant.

Id	Name	SBO
MisP		
AggP4		

Product

Table 113: Properties of each product.

Id	Name	SBO
AggP5		

Kinetic Law

Derived unit contains undeclared units

$$v_{54} = kagg2 \cdot MisP \cdot AggP4 \quad (117)$$

7.55 Reaction Disaggregation1

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 114: Properties of each reactant.

Id	Name	SBO
AggP5		

Products

Table 115: Properties of each product.

Id	Name	SBO
AggP4		
MisP		

Kinetic Law

Derived unit contains undeclared units

$$v_{55} = kdisagg5 \cdot AggP5 \quad (119)$$

7.56 Reaction *Disaggregation2*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 116: Properties of each reactant.

Id	Name	SBO
AggP4		

Products

Table 117: Properties of each product.

Id	Name	SBO
AggP3		
MisP		

Kinetic Law

Derived unit contains undeclared units

$$v_{56} = k_{\text{disagg4}} \cdot \text{AggP4} \quad (121)$$

7.57 Reaction *Disaggregation3*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 118: Properties of each reactant.

Id	Name	SBO
AggP3		

Products

Table 119: Properties of each product.

Id	Name	SBO
AggP2		
MisP		

Kinetic Law

Derived unit contains undeclared units

$$v_{57} = k_{\text{disagg3}} \cdot \text{AggP3} \quad (123)$$

7.58 Reaction Disaggregation4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 120: Properties of each reactant.

Id	Name	SBO
AggP2		

Products

Table 121: Properties of each product.

Id	Name	SBO
AggP1		
MisP		

Kinetic Law

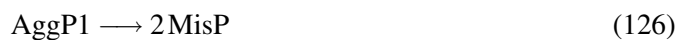
Derived unit contains undeclared units

$$v_{58} = k_{\text{disagg2}} \cdot \text{AggP2} \quad (125)$$

7.59 Reaction Disaggregation5

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 122: Properties of each reactant.

Id	Name	SBO
AggP1		

Product

Table 123: Properties of each product.

Id	Name	SBO
MisP		

Kinetic Law

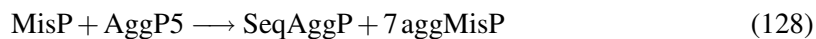
Derived unit contains undeclared units

$$v_{59} = k_{\text{disagg1}} \cdot \text{AggP1} \quad (127)$$

7.60 Reaction InclusionFormation

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 124: Properties of each reactant.

Id	Name	SBO
MisP		
AggP5		

Products

Table 125: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	

Kinetic Law

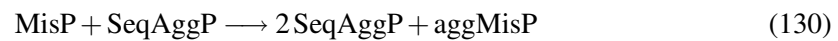
Derived unit contains undeclared units

$$v_{60} = k_{agg2} \cdot \text{MisP} \cdot \text{AggP5} \quad (129)$$

7.61 Reaction *InclusionGrowth1*

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 126: Properties of each reactant.

Id	Name	SBO
	MisP	
	SeqAggP	

Products

Table 127: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	

Kinetic Law

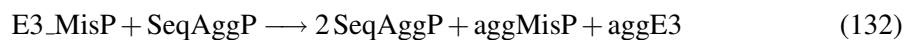
Derived unit contains undeclared units

$$v_{61} = k_{igrowth1} \cdot \text{MisP} \cdot \text{SeqAggP} \quad (131)$$

7.62 Reaction `InclusionGrowth2`

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 128: Properties of each reactant.

Id	Name	SBO
E3_MisP		
SeqAggP		

Products

Table 129: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggE3		

Kinetic Law

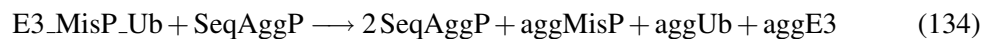
Derived unit contains undeclared units

$$v_{62} = \text{kigrowth2} \cdot \text{E3_MisP} \cdot \text{SeqAggP} \quad (133)$$

7.63 Reaction `InclusionGrowth3`

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 130: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub		
SeqAggP		

Products

Table 131: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		

Kinetic Law

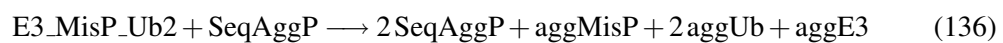
Derived unit contains undeclared units

$$v_{63} = \text{kigrowth2} \cdot \text{E3_MisP_Ub} \cdot \text{SeqAggP} \quad (135)$$

7.64 Reaction `InclusionGrowth4`

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 132: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub2		
SeqAggP		

Products

Table 133: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	

Kinetic Law

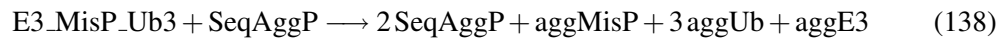
Derived unit contains undeclared units

$$v_{64} = \text{kigrowth2} \cdot \text{E3_MisP_Ub2} \cdot \text{SeqAggP} \quad (137)$$

7.65 Reaction InclusionGrowth5

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 134: Properties of each reactant.

Id	Name	SBO
	E3_MisP_Ub3	
	SeqAggP	

Products

Table 135: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	

Kinetic Law

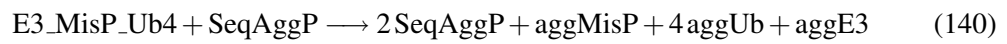
Derived unit contains undeclared units

$$v_{65} = \text{kigrowth2} \cdot \text{E3_MisP_Ub3} \cdot \text{SeqAggP} \quad (139)$$

7.66 Reaction *InclusionGrowth6*

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 136: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub4		
SeqAggP		

Products

Table 137: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		

Kinetic Law

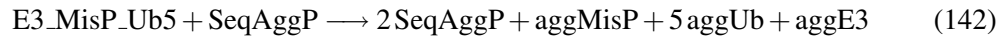
Derived unit contains undeclared units

$$v_{66} = \text{kigrowth2} \cdot \text{E3_MisP_Ub4} \cdot \text{SeqAggP} \quad (141)$$

7.67 Reaction *InclusionGrowth7*

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 138: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub5		
SeqAggP		

Products

Table 139: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		

Kinetic Law

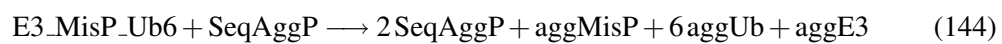
Derived unit contains undeclared units

$$v_{67} = \text{kigrowth2} \cdot \text{E3_MisP_Ub5} \cdot \text{SeqAggP} \quad (143)$$

7.68 Reaction *InclusionGrowth8*

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 140: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6		
SeqAggP		

Products

Table 141: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	

Kinetic Law

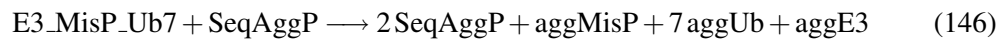
Derived unit contains undeclared units

$$v_{68} = \text{kigrowth2} \cdot \text{E3_MisP_Ub6} \cdot \text{SeqAggP} \quad (145)$$

7.69 Reaction InclusionGrowth9

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 142: Properties of each reactant.

Id	Name	SBO
	E3_MisP_Ub7	
	SeqAggP	

Products

Table 143: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	

Kinetic Law

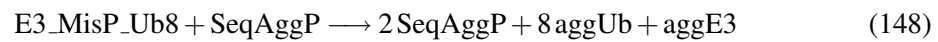
Derived unit contains undeclared units

$$v_{69} = \text{kigrowth2} \cdot \text{E3_MisP_Ub7} \cdot \text{SeqAggP} \quad (147)$$

7.70 Reaction `InclusionGrowth10`

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 144: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub8		
SeqAggP		

Products

Table 145: Properties of each product.

Id	Name	SBO
SeqAggP		
aggUb		
aggE3		

Kinetic Law

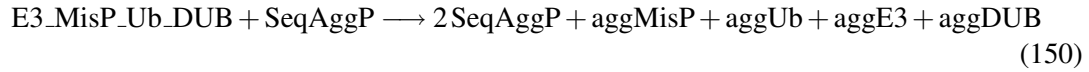
Derived unit contains undeclared units

$$v_{70} = \text{kigrowth2} \cdot \text{E3_MisP_Ub8} \cdot \text{SeqAggP} \quad (149)$$

7.71 Reaction `InclusionGrowth11`

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 146: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub_DUB		
SeqAggP		

Products

Table 147: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		
aggDUB		

Kinetic Law

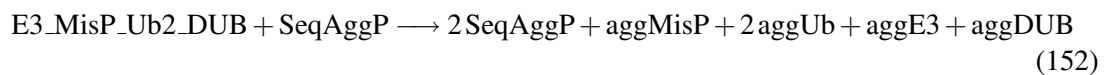
Derived unit contains undeclared units

$$v_{71} = \text{kigrowth2} \cdot \text{E3_MisP_Ub_DUB} \cdot \text{SeqAggP} \quad (151)$$

7.72 Reaction *InclusionGrowth12*

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 148: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub2_DUB		
SeqAggP		

Products

Table 149: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		
aggDUB		

Kinetic Law

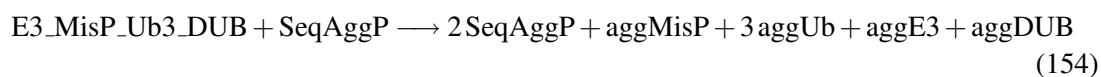
Derived unit contains undeclared units

$$v_{72} = \text{kigrowth2} \cdot \text{E3_MisP_Ub2_DUB} \cdot \text{SeqAggP} \quad (153)$$

7.73 Reaction InclusionGrowth13

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 150: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub3_DUB		
SeqAggP		

Products

Table 151: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	
	aggDUB	

Kinetic Law

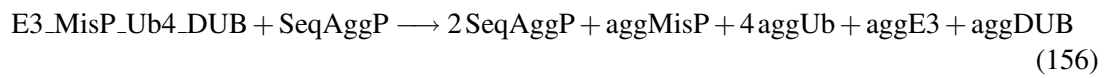
Derived unit contains undeclared units

$$v_{73} = \text{kigrowth2} \cdot \text{E3_MisP_Ub3_DUB} \cdot \text{SeqAggP} \quad (155)$$

7.74 Reaction InclusionGrowth14

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 152: Properties of each reactant.

Id	Name	SBO
	E3_MisP_Ub4_DUB	
	SeqAggP	

Products

Table 153: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	
	aggDUB	

Kinetic Law

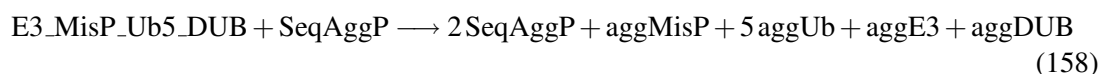
Derived unit contains undeclared units

$$v_{74} = \text{kigrowth2} \cdot \text{E3_MisP_Ub4_DUB} \cdot \text{SeqAggP} \quad (157)$$

7.75 Reaction `InclusionGrowth15`

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 154: Properties of each reactant.

Id	Name	SBO
	E3_MisP_Ub5_DUB	
	SeqAggP	

Products

Table 155: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggMisP	
	aggUb	
	aggE3	
	aggDUB	

Kinetic Law

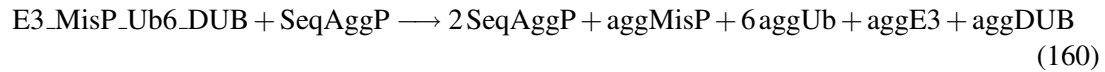
Derived unit contains undeclared units

$$v_{75} = \text{kigrowth2} \cdot \text{E3_MisP_Ub5_DUB} \cdot \text{SeqAggP} \quad (159)$$

7.76 Reaction `InclusionGrowth16`

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 156: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub6_DUB		
SeqAggP		

Products

Table 157: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		
aggDUB		

Kinetic Law

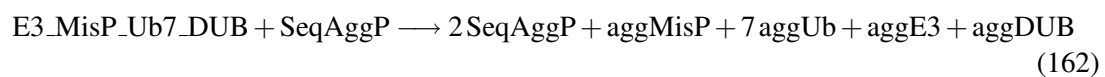
Derived unit contains undeclared units

$$v_{76} = \text{kigrowth2} \cdot \text{E3_MisP_Ub6_DUB} \cdot \text{SeqAggP} \quad (161)$$

7.77 Reaction *InclusionGrowth17*

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 158: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub7_DUB		
SeqAggP		

Products

Table 159: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		
aggDUB		

Kinetic Law

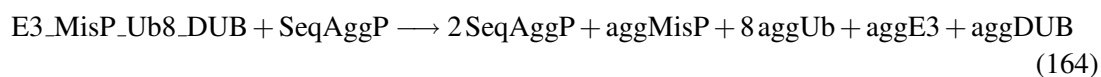
Derived unit contains undeclared units

$$v_{77} = \text{kigrowth2} \cdot \text{E3_MisP_Ub7_DUB} \cdot \text{SeqAggP} \quad (163)$$

7.78 Reaction InclusionGrowth18

This is an irreversible reaction of two reactants forming five products.

Reaction equation



Reactants

Table 160: Properties of each reactant.

Id	Name	SBO
E3_MisP_Ub8_DUB		
SeqAggP		

Products

Table 161: Properties of each product.

Id	Name	SBO
SeqAggP		
aggMisP		
aggUb		
aggE3		
aggDUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{78} = \text{kigrowth2} \cdot \text{E3_MisP_Ub8_DUB} \cdot \text{SeqAggP} \quad (165)$$

7.79 Reaction [ProteasomeInhibition1](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 162: Properties of each reactant.

Id	Name	SBO
AggP1		
Proteasome		

Product

Table 163: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{79} = \text{kbinAggProt} \cdot \text{AggP1} \cdot \text{Proteasome} \quad (167)$$

7.80 Reaction `ProteasomeInhibition2`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 164: Properties of each reactant.

Id	Name	SBO
AggP2		
Proteasome		

Product

Table 165: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{80} = k_{\text{binAggProt}} \cdot \text{AggP2} \cdot \text{Proteasome} \quad (169)$$

7.81 Reaction `ProteasomeInhibition3`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 166: Properties of each reactant.

Id	Name	SBO
AggP3		

Id	Name	SBO
	Proteasome	

Product

Table 167: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{81} = k_{\text{binAggProt}} \cdot \text{AggP3} \cdot \text{Proteasome} \quad (171)$$

7.82 Reaction [ProteasomeInhibition4](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 168: Properties of each reactant.

Id	Name	SBO
	AggP4	
	Proteasome	

Product

Table 169: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{82} = k_{\text{binAggProt}} \cdot \text{AggP4} \cdot \text{Proteasome} \quad (173)$$

7.83 Reaction `ProteasomeInhibition5`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 170: Properties of each reactant.

Id	Name	SBO
AggP5		
Proteasome		

Product

Table 171: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{83} = k_{\text{binAggProt}} \cdot \text{AggP5} \cdot \text{Proteasome} \quad (175)$$

7.84 Reaction `ROSGenerationSmallAggP1`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 172: Properties of each reactant.

Id	Name	SBO
AggP1		

Products

Table 173: Properties of each product.

Id	Name	SBO
AggP1		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{84} = k_{\text{genROS}} \text{AggP} \cdot \text{AggP1} \quad (177)$$

7.85 Reaction `ROSgenerationSmallAggP2`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 174: Properties of each reactant.

Id	Name	SBO
AggP2		

Products

Table 175: Properties of each product.

Id	Name	SBO
AggP2		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{85} = k_{\text{genROS}} \text{AggP} \cdot \text{AggP2} \quad (179)$$

7.86 Reaction ROSgenerationSmallAggP3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 176: Properties of each reactant.

Id	Name	SBO
AggP3		

Products

Table 177: Properties of each product.

Id	Name	SBO
AggP3		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{86} = k_{\text{genROS}} \text{AggP} \cdot \text{AggP3} \quad (181)$$

7.87 Reaction ROSgenerationSmallAggP4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 178: Properties of each reactant.

Id	Name	SBO
AggP4		

Products

Table 179: Properties of each product.

Id	Name	SBO
AggP4		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{87} = k_{genROS} AggP \cdot AggP4$$

(183)

7.88 Reaction ROSgenerationSmallAggP5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 180: Properties of each reactant.

Id	Name	SBO
AggP5		

Products

Table 181: Properties of each product.

Id	Name	SBO
AggP5		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{88} = k_{\text{genROS}} \text{AggP} \cdot \text{AggP5} \quad (185)$$

7.89 Reaction UCHL1Synthesis

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 182: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 183: Properties of each product.

Id	Name	SBO
UCHL1		

Kinetic Law

Derived unit contains undeclared units

$$v_{89} = k_{\text{synUCHL1}} \cdot \text{Source} \quad (187)$$

7.90 Reaction UCHL1ProteasomeBinding

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 184: Properties of each reactant.

Id	Name	SBO
UCHL1		
Proteasome		

Product

Table 185: Properties of each product.

Id	Name	SBO
UCHL1_Proteasome		

Kinetic Law

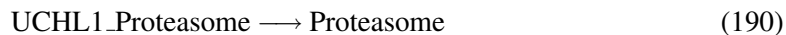
Derived unit contains undeclared units

$$v_{90} = k_{\text{binUCHL1Prot}} \cdot \text{UCHL1} \cdot \text{Proteasome} \quad (189)$$

7.91 Reaction UCHL1ProteasomeDegradation

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 186: Properties of each reactant.

Id	Name	SBO
UCHL1_Proteasome		

Product

Table 187: Properties of each product.

Id	Name	SBO
	Proteasome	

Kinetic Law

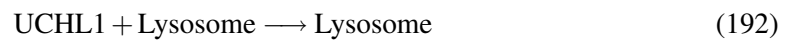
Derived unit contains undeclared units

$$v_{91} = kdegProtUCHL1 \cdot UCHL1_Proteasome \cdot kproteff \quad (191)$$

7.92 Reaction UCHL1LysosomalDegradation

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 188: Properties of each reactant.

Id	Name	SBO
	UCHL1	
	Lysosome	

Product

Table 189: Properties of each product.

Id	Name	SBO
	Lysosome	

Kinetic Law

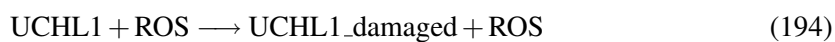
Derived unit contains undeclared units

$$v_{92} = kdegLysUCHL1 \cdot UCHL1 \cdot Lysosome \quad (193)$$

7.93 Reaction UCHL1damage

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 190: Properties of each reactant.

Id	Name	SBO
UCHL1		
ROS		

Products

Table 191: Properties of each product.

Id	Name	SBO
UCHL1_damaged		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{93} = k_{\text{damUCHL1}} \cdot \text{UCHL1} \cdot \text{ROS} \quad (195)$$

7.94 Reaction UCHL1DamgedProteasomeBinding

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 192: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		
Proteasome		

Product

Table 193: Properties of each product.

Id	Name	SBO
UCHL1_damaged_Proteasome		

Kinetic Law**Derived unit** contains undeclared units

$$v_{94} = k_{\text{binUCHL1Prot}} \cdot \text{UCHL1_damaged} \cdot \text{Proteasome} \quad (197)$$

7.95 Reaction UCHL1DamagedProteasomeDegradation

This is an irreversible reaction of one reactant forming one product.

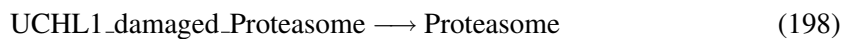
Reaction equation**Reactant**

Table 194: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged_Proteasome		

Product

Table 195: Properties of each product.

Id	Name	SBO
Proteasome		

Kinetic Law

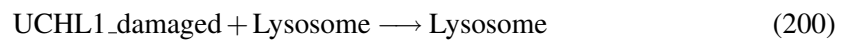
Derived unit contains undeclared units

$$v_{95} = kdegProtUCHL1 \cdot UCHL1_damaged_Proteasome \cdot kproteff \quad (199)$$

7.96 Reaction UCHL1DamagedLysosomalDegradation

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 196: Properties of each reactant.

Id	Name	SBO
	UCHL1_damaged	
	Lysosome	

Product

Table 197: Properties of each product.

Id	Name	SBO
	Lysosome	

Kinetic Law

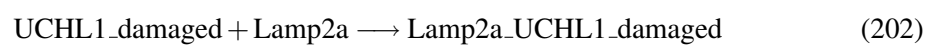
Derived unit contains undeclared units

$$v_{96} = kdegLysUCHL1dam \cdot UCHL1_damaged \cdot Lysosome \quad (201)$$

7.97 Reaction UCHL1Lamp2abinding

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 198: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		
Lamp2a		

Product

Table 199: Properties of each product.

Id	Name	SBO
Lamp2a_UCHL1_damaged		

Kinetic Law

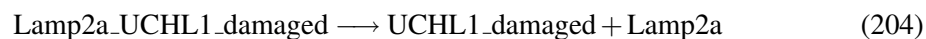
Derived unit contains undeclared units

$$v_{97} = k_{\text{binLamp2aUCHL1dam}} \cdot \text{UCHL1_damaged} \cdot \text{Lamp2a} \quad (203)$$

7.98 Reaction UCHL1Lamp2aRelease

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 200: Properties of each reactant.

Id	Name	SBO
Lamp2a_UCHL1_damaged		

Products

Table 201: Properties of each product.

Id	Name	SBO
UCHL1_damaged		
Lamp2a		

Kinetic Law

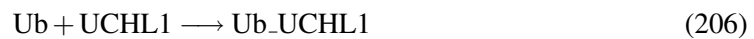
Derived unit contains undeclared units

$$v_{98} = k_{relLamp2aUCHL1dam} \cdot Lamp2a_UCHL1_damaged \quad (205)$$

7.99 Reaction UbUCHL1binding

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 202: Properties of each reactant.

Id	Name	SBO
Ub		
UCHL1		

Product

Table 203: Properties of each product.

Id	Name	SBO
Ub_UCHL1		

Kinetic Law

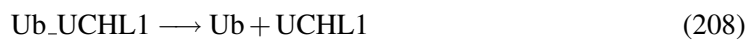
Derived unit contains undeclared units

$$v_{99} = k_{binUbUCHL1} \cdot Ub \cdot UCHL1 \quad (207)$$

7.100 Reaction UbUCHL1release

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 204: Properties of each reactant.

Id	Name	SBO
Ub_UCHL1		

Products

Table 205: Properties of each product.

Id	Name	SBO
Ub		
UCHL1		

Kinetic Law

Derived unit contains undeclared units

$$v_{100} = k_{\text{relUbUCHL1}} \cdot \text{Ub_UCHL1} \quad (209)$$

7.101 Reaction SUBsynthesis

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 206: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 207: Properties of each product.

Id	Name	SBO
SUB		

Kinetic Law

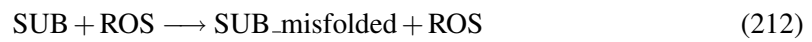
Derived unit contains undeclared units

$$v_{101} = k_{\text{synSUB}} \cdot \text{Source} \quad (211)$$

7.102 Reaction SUBmisfolding

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 208: Properties of each reactant.

Id	Name	SBO
SUB		
ROS		

Products

Table 209: Properties of each product.

Id	Name	SBO
SUB_misfolded		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{102} = k_{\text{misfoldSUB}} \cdot \text{SUB} \cdot \text{ROS} \quad (213)$$

7.103 Reaction SUBRefolding

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 210: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		

Product

Table 211: Properties of each product.

Id	Name	SBO
SUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{103} = k_{\text{refoldSUB}} \cdot \text{SUB_misfolded} \quad (215)$$

7.104 Reaction E3SUBBinding

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 212: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		
E3SUB		

Product

Table 213: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded		

Kinetic Law

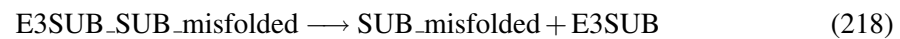
Derived unit contains undeclared units

$$v_{104} = k_{\text{binE3SUB}} \cdot \text{SUB_misfolded} \cdot \text{E3SUB} \quad (217)$$

7.105 Reaction E3SUBRelease

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 214: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded		

Products

Table 215: Properties of each product.

Id	Name	SBO
SUB_misfolded		
E3SUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{105} = k_{\text{relE3SUB}} \cdot \text{E3SUB.SUB_misfolded} \quad (219)$$

7.106 Reaction SUBMonoubiquitination

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 216: Properties of each reactant.

Id	Name	SBO
E2_Ub		
E3SUB.SUB_misfolded		

Products

Table 217: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{106} = k_{\text{monoUb}} \cdot \text{E2_Ub} \cdot \text{E3SUB_SUB_misfolded} \quad (221)$$

7.107 Reaction SUBPolyubiquitination1

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 218: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub		
E2_Ub		

Products

Table 219: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub2		
E2		

Kinetic Law

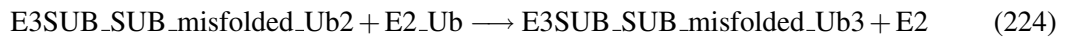
Derived unit contains undeclared units

$$v_{107} = k_{\text{polyUb}} \cdot \text{E3SUB.SUB_misfolded_Ub} \cdot \text{E2_Ub} \quad (223)$$

7.108 Reaction SUBPolyubiquitination2

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 220: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub2		
E2_Ub		

Products

Table 221: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub3		

Id	Name	SBO
E2		

Kinetic Law

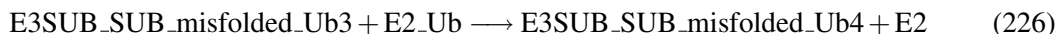
Derived unit contains undeclared units

$$v_{108} = k_{\text{polyUb}} \cdot \text{E3SUB_SUB_misfolded_Ub2} \cdot \text{E2_Ub} \quad (225)$$

7.109 Reaction SUBPolyubiquitination3

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 222: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub3		
E2_Ub		

Products

Table 223: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub4		
E2		

Kinetic Law

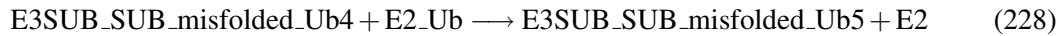
Derived unit contains undeclared units

$$v_{109} = k_{\text{polyUb}} \cdot \text{E3SUB_SUB_misfolded_Ub3} \cdot \text{E2_Ub} \quad (227)$$

7.110 Reaction SUBPolyubiquitination4

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 224: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub4		
E2_Ub		

Products

Table 225: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub5		
E2		

Kinetic Law

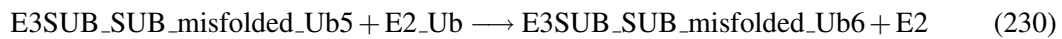
Derived unit contains undeclared units

$$v_{110} = k_{\text{polyUb}} \cdot \text{E3SUB_SUB_misfolded_Ub4} \cdot \text{E2_Ub} \quad (229)$$

7.111 Reaction SUBPolyubiquitination5

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 226: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub5		
E2_Ub		

Products

Table 227: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub6		
E2		

Kinetic Law

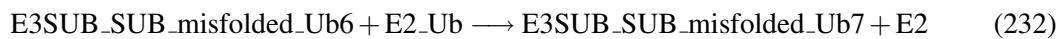
Derived unit contains undeclared units

$$v_{111} = k_{\text{polyUb}} \cdot \text{E3SUB.SUB_misfolded_Ub5} \cdot \text{E2_Ub} \quad (231)$$

7.112 Reaction SUBPolyubiquitination6

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 228: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub6		
E2_Ub		

Products

Table 229: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub7		
E2		

Kinetic Law

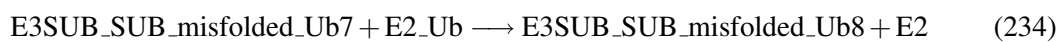
Derived unit contains undeclared units

$$v_{112} = k_{\text{polyUb}} \cdot \text{E3SUB.SUB_misfolded_Ub6} \cdot \text{E2_Ub} \quad (233)$$

7.113 Reaction SUBPolyubiquitination7

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 230: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7		
E2_Ub		

Products

Table 231: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub8		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{113} = k_{\text{polyUb}} \cdot \text{E3SUB_SUB_misfolded_Ub7} \cdot \text{E2_Ub} \quad (235)$$

7.114 Reaction SUBUCL1binding1

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 232: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub		
UCHL1		

Product

Table 233: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub_UCHL1		

Kinetic Law

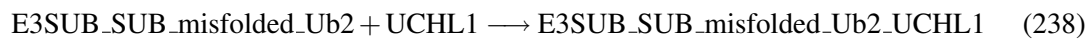
Derived unit contains undeclared units

$$v_{114} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB.SUB_misfolded_Ub} \cdot \text{UCHL1} \quad (237)$$

7.115 Reaction SUBUCHL1binding2

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 234: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub2		
UCHL1		

Product

Table 235: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub2_UCHL1		

Kinetic Law

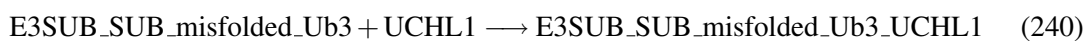
Derived unit contains undeclared units

$$v_{115} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub2} \cdot \text{UCHL1} \quad (239)$$

7.116 Reaction SUBUCHL1binding3

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 236: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub3		
UCHL1		

Product

Table 237: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub3_UCHL1		

Kinetic Law

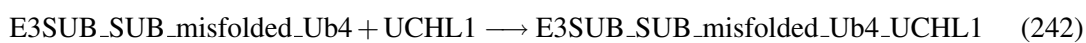
Derived unit contains undeclared units

$$v_{116} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub3} \cdot \text{UCHL1} \quad (241)$$

7.117 Reaction SUBUCHL1binding4

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 238: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub4		
UCHL1		

Product

Table 239: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub4_UCHL1		

Kinetic Law

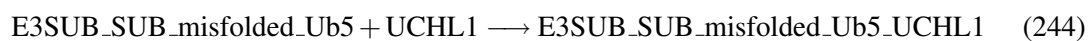
Derived unit contains undeclared units

$$v_{117} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB.SUB_misfolded_Ub4} \cdot \text{UCHL1} \quad (243)$$

7.118 Reaction SUBUCHL1binding5Ub_UCHL1

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 240: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub5		
UCHL1		

Product

Table 241: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub5_UCHL1		

Kinetic Law

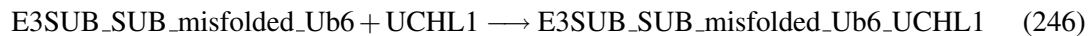
Derived unit contains undeclared units

$$v_{118} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub5} \cdot \text{UCHL1} \quad (245)$$

7.119 Reaction SUBUCHL1binding6

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 242: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub6		
UCHL1		

Product

Table 243: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub6_UCHL1		

Kinetic Law

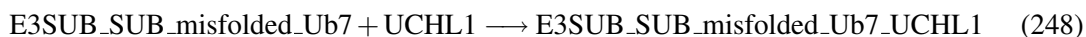
Derived unit contains undeclared units

$$v_{119} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub6} \cdot \text{UCHL1} \quad (247)$$

7.120 Reaction SUBUCHL1binding7

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 244: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7		
UCHL1		

Product

Table 245: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7_UCHL1		

Kinetic Law

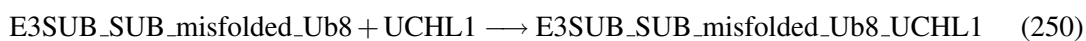
Derived unit contains undeclared units

$$v_{120} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub7} \cdot \text{UCHL1} \quad (249)$$

7.121 Reaction SUBUCHL1binding8

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 246: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub8		
UCHL1		

Product

Table 247: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub8_UCHL1		

Kinetic Law

Derived unit contains undeclared units

$$v_{121} = k_{\text{binSUBUCHL1}} \cdot \text{E3SUB_SUB_misfolded_Ub8_UCHL1} \quad (251)$$

7.122 Reaction SUBDeubiquitination8

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 248: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub8_UCHL1		

Products

Table 249: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7_UCHL1		
Ub		

Kinetic Law

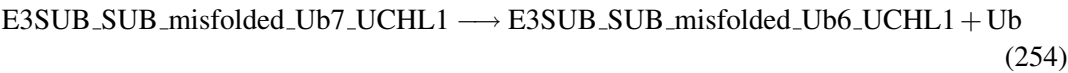
Derived unit contains undeclared units

$$v_{122} = k_{\text{actUchl1}} \cdot \text{E3SUB_SUB_misfolded_Ub8_UCHL1} \quad (253)$$

7.123 Reaction SUBDeubiquitination7

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 250: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7_UCHL1		

Products

Table 251: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub6_UCHL1		
Ub		

Kinetic Law

Derived unit contains undeclared units

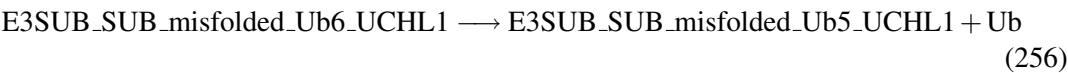
$$v_{123} = k_{actUchl1} \cdot \text{E3SUB_SUB_misfolded_Ub7_UCHL1}$$

(255)

7.124 Reaction SUBDeubiquitination6

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 252: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub6_UCHL1		

Products

Table 253: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub5_UCHL1		
Ub		

Kinetic Law

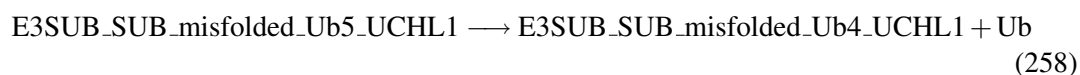
Derived unit contains undeclared units

$$v_{124} = k_{actUchl1} \cdot E3SUB.SUB_misfolded_Ub6_UCHL1 \quad (257)$$

7.125 Reaction SUBDeubiquitination5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 254: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub5_UCHL1		

Products

Table 255: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub4_UCHL1		

Id	Name	SBO
Ub		

Kinetic Law

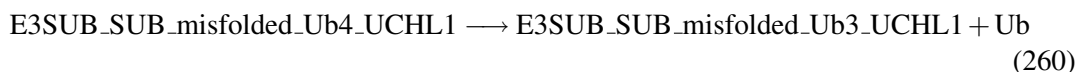
Derived unit contains undeclared units

$$v_{125} = k_{actUchl1} \cdot E3SUB_SUB_misfolded_Ub5_UCHL1 \quad (259)$$

7.126 Reaction SUBDeubiquitination4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 256: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub4_UCHL1		

Products

Table 257: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub3_UCHL1		
Ub		

Kinetic Law

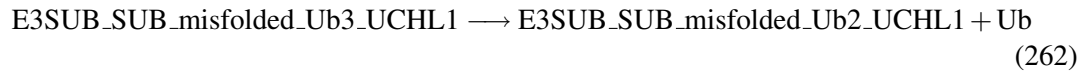
Derived unit contains undeclared units

$$v_{126} = k_{actUchl1} \cdot E3SUB_SUB_misfolded_Ub4_UCHL1 \quad (261)$$

7.127 Reaction SUBDeubiquitination3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 258: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub3_UHL1		

Products

Table 259: Properties of each product.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub2_UHL1		
Ub		

Kinetic Law

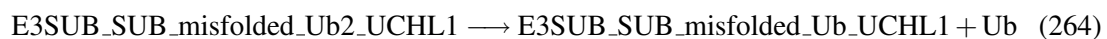
Derived unit contains undeclared units

$$v_{127} = k_{\text{actUhl1}} \cdot \text{E3SUB_SUB_misfolded_Ub3_UHL1} \quad (263)$$

7.128 Reaction SUBDeubiquitination2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 260: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub2_UHL1		

Products

Table 261: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub_UCHL1		
Ub		

Kinetic Law

Derived unit contains undeclared units

$$v_{128} = k_{actUchl1} \cdot E3SUB.SUB_misfolded_Ub2_UCHL1 \quad (265)$$

7.129 Reaction SUBDeubiquitination1

This is an irreversible reaction of one reactant forming three products.

Reaction equation



Reactant

Table 262: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub_UCHL1		

Products

Table 263: Properties of each product.

Id	Name	SBO
E3SUB.SUB_misfolded		
UCHL1		
Ub		

Kinetic Law

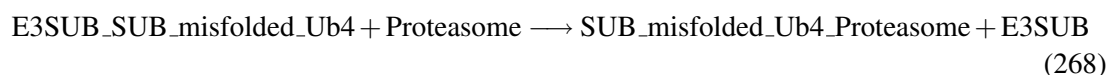
Derived unit contains undeclared units

$$v_{129} = k_{actUchl1} \cdot E3SUB.SUB_misfolded_Ub_UCHL1 \quad (267)$$

7.130 Reaction SUBProteasomeBindingUb4

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 264: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub4		
Proteasome		

Products

Table 265: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub4_Proteasome		
E3SUB		

Kinetic Law

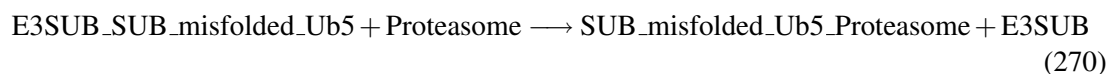
Derived unit contains undeclared units

$$v_{130} = k_{\text{binProt}} \cdot \text{E3SUB_SUB_misfolded_Ub4} \cdot \text{Proteasome} \quad (269)$$

7.131 Reaction SUBProteasomeBindingUb5

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 266: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub5		
Proteasome		

Products

Table 267: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub5.Proteasome		
E3SUB		

Kinetic Law

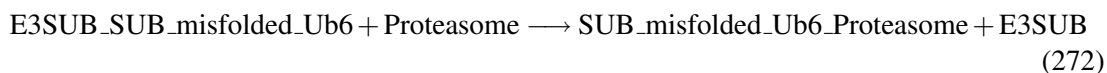
Derived unit contains undeclared units

$$v_{131} = k_{\text{binProt}} \cdot \text{E3SUB.SUB_misfolded_Ub5} \cdot \text{Proteasome} \quad (271)$$

7.132 Reaction SUBProteasomeBindingUb6

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 268: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub6		
Proteasome		

Products

Table 269: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub6_Proteasome		
E3SUB		

Kinetic Law

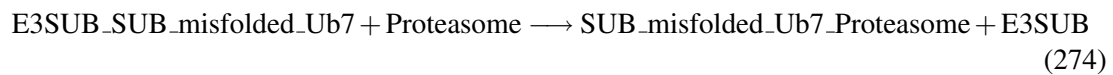
Derived unit contains undeclared units

$$v_{132} = k_{\text{binProt}} \cdot \text{E3SUB_SUB_misfolded_Ub6} \cdot \text{Proteasome} \quad (273)$$

7.133 Reaction SUBProteasomeBindingUb7

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 270: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7		
Proteasome		

Products

Table 271: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub7_Proteasome		
E3SUB		

Kinetic Law

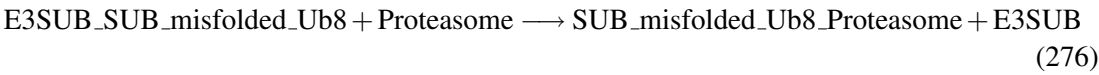
Derived unit contains undeclared units

$$v_{133} = k_{\text{binProt}} \cdot \text{E3SUB_SUB_misfolded_Ub7} \cdot \text{Proteasome} \quad (275)$$

7.134 Reaction SUBProteasomeBindingUb8

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 272: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub8		
Proteasome		

Products

Table 273: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub8_Proteasome		
E3SUB		

Kinetic Law

Derived unit contains undeclared units

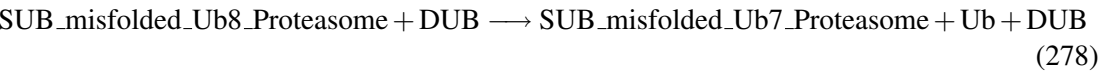
$$v_{134} = k_{\text{binProt}} \cdot \text{E3SUB_SUB_misfolded_Ub8} \cdot \text{Proteasome}$$

(277)

7.135 Reaction DeubiquitinationBoundSUB8

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 274: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub8_Proteasome		
DUB		

Products

Table 275: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub7_Proteasome		
Ub		
DUB		

Kinetic Law

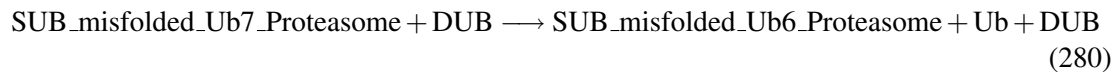
Derived unit contains undeclared units

$$v_{135} = k_{\text{actDUBProt}} \cdot \text{SUB_misfolded_Ub8_Proteasome} \cdot \text{DUB} \quad (279)$$

7.136 Reaction [DeubiquitinationBoundSUB7](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 276: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub7_Proteasome		
DUB		

Products

Table 277: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub6_Proteasome		
Ub		
DUB		

Kinetic Law

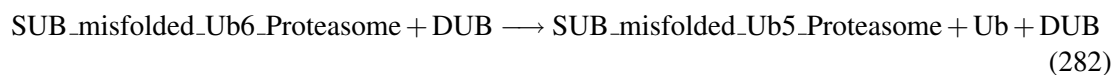
Derived unit contains undeclared units

$$v_{136} = k_{actDUBProt} \cdot SUB_misfolded_Ub7_Proteasome \cdot DUB \quad (281)$$

7.137 Reaction [DeubiquitinationBoundSUB6](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 278: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub6_Proteasome		
DUB		

Products

Table 279: Properties of each product.

Id	Name	SBO
SUB_misfolded_Ub5_Proteasome		
Ub		
DUB		

Kinetic Law

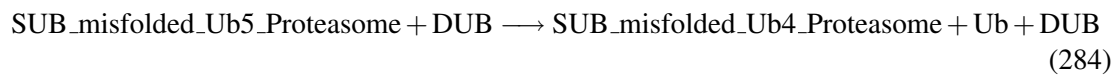
Derived unit contains undeclared units

$$v_{137} = k_{\text{actDUBProt}} \cdot \text{SUB_misfolded_Ub6_Proteasome} \cdot \text{DUB} \quad (283)$$

7.138 Reaction [DeubiquitinationBoundSUB5](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 280: Properties of each reactant.

Id	Name	SBO
	SUB_misfolded_Ub5_Proteasome	
	DUB	

Products

Table 281: Properties of each product.

Id	Name	SBO
	SUB_misfolded_Ub4_Proteasome	
	Ub	
	DUB	

Kinetic Law

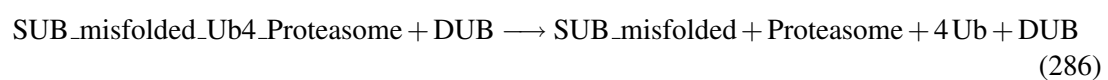
Derived unit contains undeclared units

$$v_{138} = k_{\text{actDUBProt}} \cdot \text{SUB_misfolded_Ub5_Proteasome} \cdot \text{DUB} \quad (285)$$

7.139 Reaction [DeubiquitinationBoundSUB4](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 282: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub4_Proteasome		
DUB		

Products

Table 283: Properties of each product.

Id	Name	SBO
SUB_misfolded		
Proteasome		
Ub		
DUB		

Kinetic Law

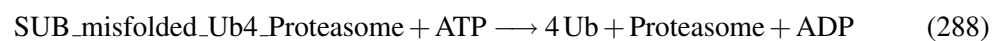
Derived unit contains undeclared units

$$v_{139} = k_{\text{actDUBProt}} \cdot \text{SUB_misfolded_Ub4_Proteasome} \cdot \text{DUB} \quad (287)$$

7.140 Reaction SUBDegradationUb4

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 284: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub4_Proteasome		
ATP		

Products

Table 285: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

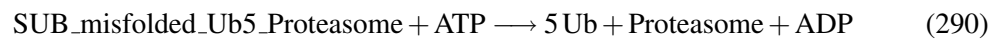
Derived unit contains undeclared units

$$v_{140} = \frac{k_{actProt} \cdot SUB_misfolded_Ub4_Proteasome \cdot k_{proteff} \cdot ATP}{5000 + ATP} \quad (289)$$

7.141 Reaction SUBDegradationUb5

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 286: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub5_Proteasome		
ATP		

Products

Table 287: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

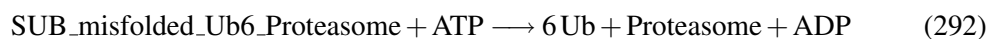
Derived unit contains undeclared units

$$v_{141} = \frac{k_{actProt} \cdot SUB_misfolded_Ub5_Proteasome \cdot k_{proteff} \cdot ATP}{5000 + ATP} \quad (291)$$

7.142 Reaction SUBDegradationUb6

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 288: Properties of each reactant.

Id	Name	SBO
	SUB_misfolded_Ub6_Proteasome	
	ATP	

Products

Table 289: Properties of each product.

Id	Name	SBO
	Ub	
	Proteasome	
	ADP	

Kinetic Law

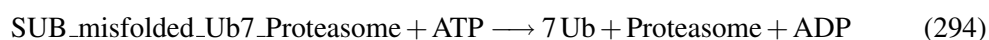
Derived unit contains undeclared units

$$v_{142} = \frac{k_{actProt} \cdot SUB_misfolded_Ub6_Proteasome \cdot k_{proteff} \cdot ATP}{5000 + ATP} \quad (293)$$

7.143 Reaction SUBDegradationUb7

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 290: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub7_Proteasome		
ATP		

Products

Table 291: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

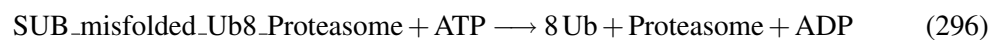
Derived unit contains undeclared units

$$v_{143} = \frac{k_{actProt} \cdot SUB_misfolded_Ub7_Proteasome \cdot k_{proteff} \cdot ATP}{5000 + ATP} \quad (295)$$

7.144 Reaction SUBDegradationUb8

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 292: Properties of each reactant.

Id	Name	SBO
SUB_misfolded_Ub8_Proteasome		
ATP		

Products

Table 293: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

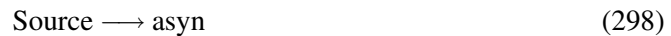
Derived unit contains undeclared units

$$v_{144} = \frac{k_{actProt} \cdot SUB_misfolded_Ub8_Proteasome \cdot k_{proteff} \cdot ATP}{5000 + ATP} \quad (297)$$

7.145 Reaction `asynSynthesis1`

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 294: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 295: Properties of each product.

Id	Name	SBO
asyn		

Kinetic Law

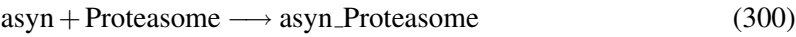
Derived unit contains undeclared units

$$v_{145} = k_{synasyn} \cdot \text{Source} \quad (299)$$

7.146 Reaction [asynProt20Sbinding](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 296: Properties of each reactant.

Id	Name	SBO
asyn		
Proteasome		

Product

Table 297: Properties of each product.

Id	Name	SBO
asyn_Proteasome		

Kinetic Law

Derived unit contains undeclared units

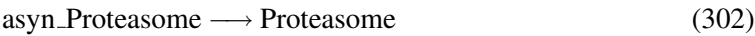
$$v_{146} = k_{\text{binasynProt}} \cdot \text{asyn} \cdot \text{Proteasome}$$

(301)

7.147 Reaction [asynProt20Sdegradation](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 298: Properties of each reactant.

Id	Name	SBO
asyn_Proteasome		

Product

Table 299: Properties of each product.

Id	Name	SBO
	Proteasome	

Kinetic Law

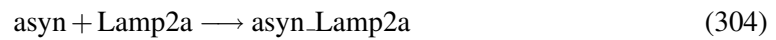
Derived unit contains undeclared units

$$v_{147} = kdegasynProt \cdot kproteff \cdot asyn_Proteasome \quad (303)$$

7.148 Reaction [asynLamp2aBinding](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 300: Properties of each reactant.

Id	Name	SBO
	asyn	
	Lamp2a	

Product

Table 301: Properties of each product.

Id	Name	SBO
	asyn_Lamp2a	

Kinetic Law

Derived unit contains undeclared units

$$v_{148} = kbinasynLamp2a \cdot asyn \cdot Lamp2a \quad (305)$$

7.149 Reaction `asynCMAdegradation`

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 302: Properties of each reactant.

Id	Name	SBO
asyn_Lamp2a		

Product

Table 303: Properties of each product.

Id	Name	SBO
Lamp2a		

Kinetic Law

Derived unit contains undeclared units

$$v_{149} = kCMAasyn \cdot \text{asyn_Lamp2a}$$

(307)

7.150 Reaction `asynDamage`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 304: Properties of each reactant.

Id	Name	SBO
asyn		
ROS		

Products

Table 305: Properties of each product.

Id	Name	SBO
asyn_dam		
ROS		

Kinetic Law

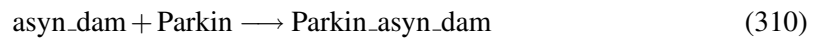
Derived unit contains undeclared units

$$v_{150} = k_{damasyn} \cdot ROS \cdot asyn \quad (309)$$

7.151 Reaction [asyn_damParkinBinding](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 306: Properties of each reactant.

Id	Name	SBO
asyn_dam		
Parkin		

Product

Table 307: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam		

Kinetic Law

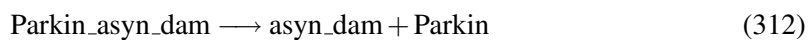
Derived unit contains undeclared units

$$v_{151} = k_{binasynParkin} \cdot asyn_dam \cdot Parkin \quad (311)$$

7.152 Reaction `asyn_damParkinRelease`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 308: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam		

Products

Table 309: Properties of each product.

Id	Name	SBO
asyn_dam		
Parkin		

Kinetic Law

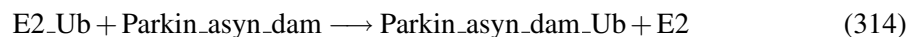
Derived unit contains undeclared units

$$v_{152} = k_{\text{relasynParkin}} \cdot \text{Parkin_asyn_dam} \quad (313)$$

7.153 Reaction `AsynMonoubiquitination`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 310: Properties of each reactant.

Id	Name	SBO
E2_Ub		

Id	Name	SBO
Parkin_asyn_dam		

Products

Table 311: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub		
E2		

Kinetic Law

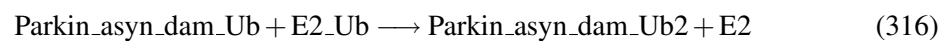
Derived unit contains undeclared units

$$v_{153} = k_{\text{monoUb}} \cdot E2_Ub \cdot \text{Parkin_asyn_dam} \quad (315)$$

7.154 Reaction [AsynPolyubiquitination1](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 312: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub		
E2_Ub		

Products

Table 313: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub2		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{154} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub} \cdot \text{E2_Ub} \quad (317)$$

7.155 Reaction `AsynPolyubiquitination2`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 314: Properties of each reactant.

Id	Name	SBO
	Parkin_asyn_dam_Ub2	
	E2_Ub	

Products

Table 315: Properties of each product.

Id	Name	SBO
	Parkin_asyn_dam_Ub3	
	E2	

Kinetic Law

Derived unit contains undeclared units

$$v_{155} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub2} \cdot \text{E2_Ub} \quad (319)$$

7.156 Reaction `AsynPolyubiquitination3`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 316: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub3		
E2_Ub		

Products

Table 317: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub4		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{156} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub3} \cdot \text{E2_Ub} \quad (321)$$

7.157 Reaction [AsynPolyubiquitination4](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 318: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub4		
E2_Ub		

Products

Table 319: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub5		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{157} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub4} \cdot \text{E2_Ub} \quad (323)$$

7.158 Reaction AsynPolyubiquitination5

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 320: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub5		
E2_Ub		

Products

Table 321: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub6		
E2		

Kinetic Law

Derived unit contains undeclared units

$$v_{158} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub5} \cdot \text{E2_Ub} \quad (325)$$

7.159 Reaction `AsynPolyubiquitination6`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 322: Properties of each reactant.

Id	Name	SBO
<hr/>		
Parkin_asyn_dam_Ub6		
E2_Ub		
<hr/>		

Products

Table 323: Properties of each product.

Id	Name	SBO
<hr/>		
Parkin_asyn_dam_Ub7		
E2		
<hr/>		

Kinetic Law

Derived unit contains undeclared units

$$v_{159} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub6} \cdot \text{E2_Ub} \quad (327)$$

7.160 Reaction `AsynPolyubiquitination7`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 324: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub7		
E2_Ub		

Products

Table 325: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub8		
E2		

Kinetic Law

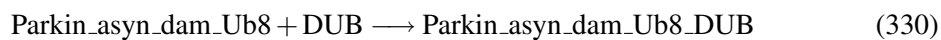
Derived unit contains undeclared units

$$v_{160} = k_{\text{polyUb}} \cdot \text{Parkin_asyn_dam_Ub7} \cdot \text{E2_Ub} \quad (329)$$

7.161 Reaction `AsynDUBbindingUb8`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 326: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub8		
DUB		

Product

Table 327: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub8_DUB		

Id	Name	SBO
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Kinetic Law

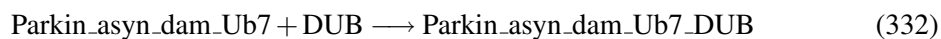
Derived unit contains undeclared units

$$v_{161} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub8} \cdot \text{DUB} \quad (331)$$

7.162 Reaction `AsynDUBbindingUb7`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 328: Properties of each reactant.

Id	Name	SBO
	<code>Parkin_asyn_dam_Ub7</code>	
	<code>DUB</code>	

Product

Table 329: Properties of each product.

Id	Name	SBO
	<code>Parkin_asyn_dam_Ub7_DUB</code>	

Kinetic Law

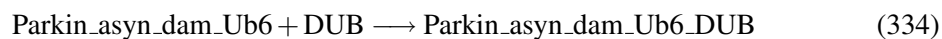
Derived unit contains undeclared units

$$v_{162} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub7} \cdot \text{DUB} \quad (333)$$

7.163 Reaction `AsynDUBbindingUb6`

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 330: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub6		
DUB		

Product

Table 331: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub6_DUB		

Kinetic Law

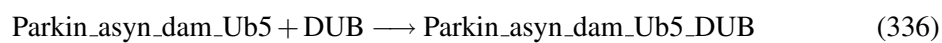
Derived unit contains undeclared units

$$v_{163} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub6} \cdot \text{DUB} \quad (335)$$

7.164 Reaction [AsynDUBbindingUb5](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 332: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub5		
DUB		

Product

Table 333: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub5_DUB		

Kinetic Law

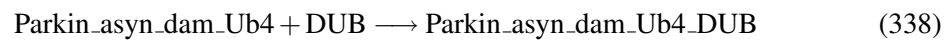
Derived unit contains undeclared units

$$v_{164} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub5} \cdot \text{DUB} \quad (337)$$

7.165 Reaction AsynDUBbindingUb4

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 334: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub4		
DUB		

Product

Table 335: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub4_DUB		

Kinetic Law

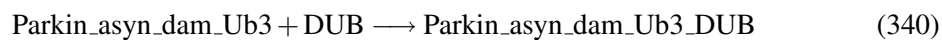
Derived unit contains undeclared units

$$v_{165} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub4} \cdot \text{DUB} \quad (339)$$

7.166 Reaction [AsynDUBbindingUb3](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 336: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub3		
DUB		

Product

Table 337: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub3_DUB		

Kinetic Law

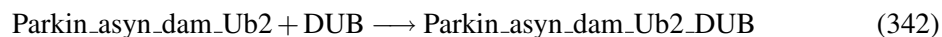
Derived unit contains undeclared units

$$v_{166} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub3} \cdot \text{DUB} \quad (341)$$

7.167 Reaction [AsynDUBbindingUb2](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 338: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub2		

Id	Name	SBO
DUB		

Product

Table 339: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub2_DUB		

Kinetic Law

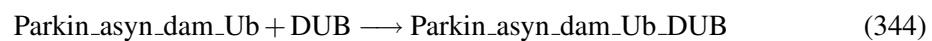
Derived unit contains undeclared units

$$v_{167} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub2} \cdot \text{DUB} \quad (343)$$

7.168 Reaction [AsynDUBbindingUb1](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 340: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub		
DUB		

Product

Table 341: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub_DUB		

Kinetic Law

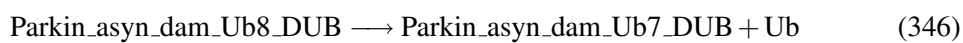
Derived unit contains undeclared units

$$v_{168} = k_{\text{binasynDUB}} \cdot \text{Parkin_asyn_dam_Ub} \cdot \text{DUB} \quad (345)$$

7.169 Reaction `AsynDeubiquitinationUb8`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 342: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub8_DUB		

Products

Table 343: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub7_DUB		
Ub		

Kinetic Law

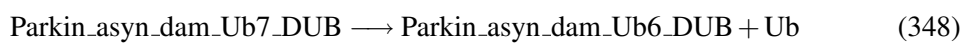
Derived unit contains undeclared units

$$v_{169} = k_{\text{actDUB}} \cdot \text{Parkin_asyn_dam_Ub8_DUB} \quad (347)$$

7.170 Reaction `AsynDeubiquitinationUb7`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 344: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub7_DUB		

Products

Table 345: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub6_DUB		
Ub		

Kinetic Law

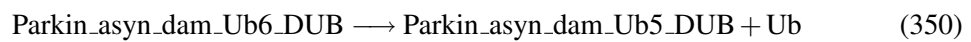
Derived unit contains undeclared units

$$v_{170} = k_{actDUB} \cdot \text{Parkin_asyn_dam_Ub7_DUB} \quad (349)$$

7.171 Reaction [AsynDeubiquitinationUb6](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 346: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub6_DUB		

Products

Table 347: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub5_DUB		
Ub		

Kinetic Law

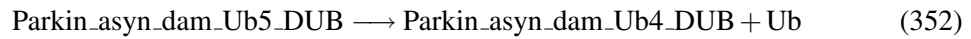
Derived unit contains undeclared units

$$v_{171} = k_{actDUB} \cdot \text{Parkin_asyn_dam_Ub6_DUB} \quad (351)$$

7.172 Reaction AsynDeubiquitinationUb5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 348: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub5_DUB		

Products

Table 349: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub4_DUB		
Ub		

Kinetic Law

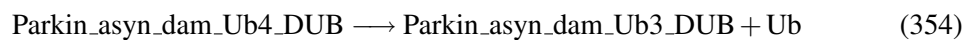
Derived unit contains undeclared units

$$v_{172} = k_{actDUB} \cdot \text{Parkin_asyn_dam_Ub5_DUB} \quad (353)$$

7.173 Reaction *AsynDeubiquitinationUb4*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 350: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub4_DUB		

Products

Table 351: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub3_DUB		
Ub		

Kinetic Law

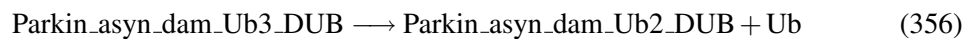
Derived unit contains undeclared units

$$v_{173} = k_{\text{actDUB}} \cdot \text{Parkin_asyn_dam_Ub4_DUB} \quad (355)$$

7.174 Reaction *AsynDeubiquitinationUb3*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 352: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub3_DUB		

Products

Table 353: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub2_DUB		
Ub		

Kinetic Law

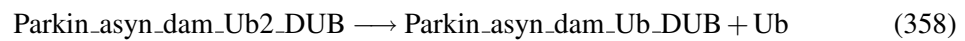
Derived unit contains undeclared units

$$v_{174} = k_{actDUB} \cdot \text{Parkin_asyn_dam_Ub3_DUB} \quad (357)$$

7.175 Reaction [AsynDeubiquitinationUb2](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 354: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub2_DUB		

Products

Table 355: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam_Ub_DUB		
Ub		

Kinetic Law

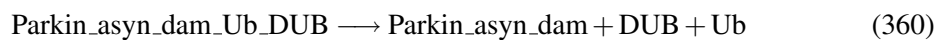
Derived unit contains undeclared units

$$v_{175} = k_{actDUB} \cdot \text{Parkin_asyn_dam_Ub2_DUB} \quad (359)$$

7.176 Reaction [AsynDeubiquitinationUb1](#)

This is an irreversible reaction of one reactant forming three products.

Reaction equation



Reactant

Table 356: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub_DUB		

Products

Table 357: Properties of each product.

Id	Name	SBO
Parkin_asyn_dam		
DUB		
Ub		

Kinetic Law

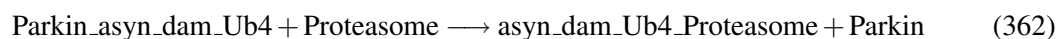
Derived unit contains undeclared units

$$v_{176} = k_{\text{actDUB}} \cdot \text{Parkin_asyn_dam_Ub_DUB} \quad (361)$$

7.177 Reaction [AsynProteasomeBindingUb4](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 358: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub4		
Proteasome		

Products

Table 359: Properties of each product.

Id	Name	SBO
asyn_dam_Ub4_Proteasome		
Parkin		

Kinetic Law

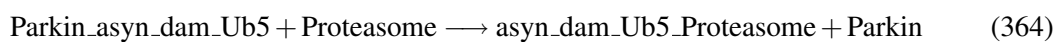
Derived unit contains undeclared units

$$v_{177} = k_{\text{binProt}} \cdot \text{Parkin_asyn_dam_Ub4} \cdot \text{Proteasome} \quad (363)$$

7.178 Reaction `AsynProteasomeBindingUb5`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 360: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub5		
Proteasome		

Products

Table 361: Properties of each product.

Id	Name	SBO
asyn_dam_Ub5_Proteasome		

Id	Name	SBO
Parkin		

Kinetic Law

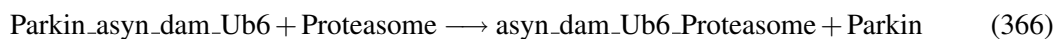
Derived unit contains undeclared units

$$v_{178} = k_{\text{binProt}} \cdot \text{Parkin_asyn_dam_Ub5} \cdot \text{Proteasome} \quad (365)$$

7.179 Reaction [AsynProteasomeBindingUb6](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 362: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub6		
Proteasome		

Products

Table 363: Properties of each product.

Id	Name	SBO
asyn_dam_Ub6_Proteasome		
Parkin		

Kinetic Law

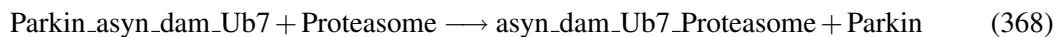
Derived unit contains undeclared units

$$v_{179} = k_{\text{binProt}} \cdot \text{Parkin_asyn_dam_Ub6} \cdot \text{Proteasome} \quad (367)$$

7.180 Reaction [AsynProteasomeBindingUb7](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 364: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub7		
Proteasome		

Products

Table 365: Properties of each product.

Id	Name	SBO
asyn_dam_Ub7_Proteasome		
Parkin		

Kinetic Law

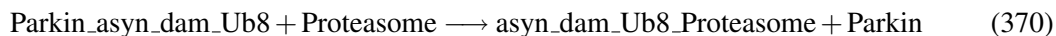
Derived unit contains undeclared units

$$v_{180} = k_{\text{binProt}} \cdot \text{Parkin_asyn_dam_Ub7} \cdot \text{Proteasome} \quad (369)$$

7.181 Reaction AsynProteasomeBindingUb8

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 366: Properties of each reactant.

Id	Name	SBO
Parkin_asyn_dam_Ub8		
Proteasome		

Products

Table 367: Properties of each product.

Id	Name	SBO
asyn_dam_Ub8_Proteasome		
Parkin		

Kinetic Law

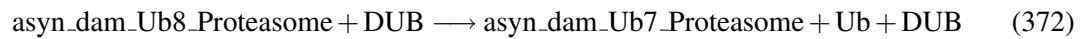
Derived unit contains undeclared units

$$v_{181} = k_{\text{binProt}} \cdot \text{Parkin_asyn_dam_Ub8} \cdot \text{Proteasome} \quad (371)$$

7.182 Reaction [DeubiquitinationBoundasyn_damUb8](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 368: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub8_Proteasome		
DUB		

Products

Table 369: Properties of each product.

Id	Name	SBO
asyn_dam_Ub7_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{182} = k_{\text{actDUBProt}} \cdot \text{asyn_dam_Ub8_Proteasome} \cdot \text{DUB} \quad (373)$$

7.183 Reaction [DeubiquitinationBoundasynDamUb7](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 370: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub7_Proteasome		
DUB		

Products

Table 371: Properties of each product.

Id	Name	SBO
asyn_dam_Ub6_Proteasome		
Ub		
DUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{183} = k_{\text{actDUBProt}} \cdot \text{asyn_dam_Ub7_Proteasome} \cdot \text{DUB} \quad (375)$$

7.184 Reaction [DeubiquitinationBoundasynDamUb6](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 372: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub6_Proteasome		
DUB		

Products

Table 373: Properties of each product.

Id	Name	SBO
asyn_dam_Ub5_Proteasome		
Ub		
DUB		

Kinetic Law

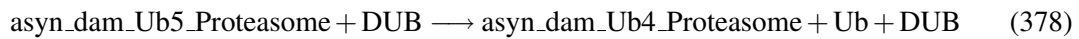
Derived unit contains undeclared units

$$v_{184} = k_{\text{actDUBProt}} \cdot \text{asyn_dam_Ub6_Proteasome} \cdot \text{DUB} \quad (377)$$

7.185 Reaction [DeubiquitinationBoundasynDamUb5](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 374: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub5_Proteasome		
DUB		

Products

Table 375: Properties of each product.

Id	Name	SBO
asyn_dam_Ub4_Proteasome		
Ub		
DUB		

Kinetic Law

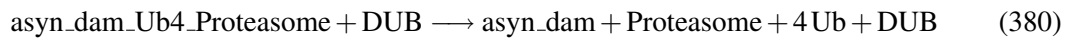
Derived unit contains undeclared units

$$v_{185} = k_{\text{actDUBProt}} \cdot \text{asyn_dam_Ub5_Proteasome} \cdot \text{DUB} \quad (379)$$

7.186 Reaction [DeubiquitinationBoundasynDamUb4](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 376: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub4_Proteasome		
DUB		

Products

Table 377: Properties of each product.

Id	Name	SBO
asyn_dam		
Proteasome		
Ub		
DUB		

Kinetic Law

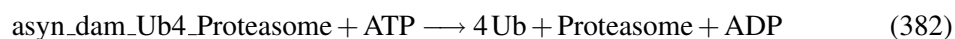
Derived unit contains undeclared units

$$v_{186} = k_{actDUBProt} \cdot asyn_dam_Ub4_Proteasome \cdot DUB \quad (381)$$

7.187 Reaction [AsynProteasomeActivityUb4](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 378: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub4_Proteasome		
ATP		

Products

Table 379: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

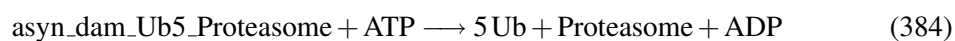
Derived unit contains undeclared units

$$v_{187} = \frac{k_{actProt} \cdot k_{proteff} \cdot asyn_dam_Ub4_Proteasome \cdot ATP}{5000 + ATP} \quad (383)$$

7.188 Reaction [AsynDegradationUb5](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 380: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub5_Proteasome		
ATP		

Products

Table 381: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

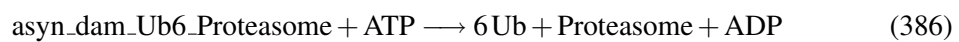
Derived unit contains undeclared units

$$v_{188} = \frac{k_{actProt} \cdot k_{proteff} \cdot asyn_dam_Ub5_Proteasome \cdot ATP}{5000 + ATP} \quad (385)$$

7.189 Reaction AsynDegradationUb6

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 382: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub6_Proteasome		
ATP		

Products

Table 383: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

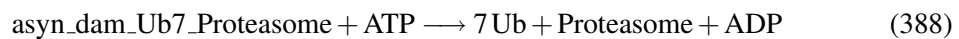
Derived unit contains undeclared units

$$v_{189} = \frac{k_{actProt} \cdot k_{proteff} \cdot asyn_dam_Ub6_Proteasome \cdot ATP}{5000 + ATP} \quad (387)$$

7.190 Reaction *AsynDegradationUb7*

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 384: Properties of each reactant.

Id	Name	SBO
asyn_dam_Ub7_Proteasome		
ATP		

Products

Table 385: Properties of each product.

Id	Name	SBO
Ub		
Proteasome		
ADP		

Kinetic Law

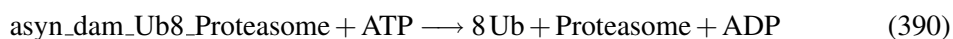
Derived unit contains undeclared units

$$v_{190} = \frac{k_{actProt} \cdot k_{proteff} \cdot asyn_dam_Ub7_Proteasome \cdot ATP}{5000 + ATP} \quad (389)$$

7.191 Reaction [AsynDegradationUb8](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 386: Properties of each reactant.

Id	Name	SBO
	asyn_dam_Ub8_Proteasome	
	ATP	

Products

Table 387: Properties of each product.

Id	Name	SBO
	Ub	
	Proteasome	
	ADP	

Kinetic Law

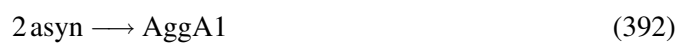
Derived unit contains undeclared units

$$v_{191} = \frac{k_{actProt} \cdot k_{proteff} \cdot asyn_dam_Ub8_Proteasome \cdot ATP}{5000 + ATP} \quad (391)$$

7.192 Reaction [Aggregationasyn1](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 388: Properties of each reactant.

Id	Name	SBO
asyn		

Product

Table 389: Properties of each product.

Id	Name	SBO
AggA1		

Kinetic Law

Derived unit contains undeclared units

$$v_{192} = kaggasyn1 \cdot asyn \cdot (asyn - 1) \cdot 0.5 \quad (393)$$

7.193 Reaction Aggregationasyn2

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 390: Properties of each reactant.

Id	Name	SBO
asyn		
AggA1		

Product

Table 391: Properties of each product.

Id	Name	SBO
AggA2		

Kinetic Law

Derived unit contains undeclared units

$$v_{193} = kaggasyn2 \cdot asyn \cdot AggA1 \quad (395)$$

7.194 Reaction Aggregation $asyn3$

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 392: Properties of each reactant.

Id	Name	SBO
$asyn$		
$AggA2$		

Product

Table 393: Properties of each product.

Id	Name	SBO
$AggA3$		

Kinetic Law

Derived unit contains undeclared units

$$v_{194} = kaggasyn2 \cdot asyn \cdot AggA2 \quad (397)$$

7.195 Reaction Aggregation $asyn4$

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 394: Properties of each reactant.

Id	Name	SBO
asyn		
AggA3		

Product

Table 395: Properties of each product.

Id	Name	SBO
AggA4		

Kinetic Law

Derived unit contains undeclared units

$$v_{195} = kaggasyn2 \cdot asyn \cdot AggA3 \quad (399)$$

7.196 Reaction Aggregationasyn5

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 396: Properties of each reactant.

Id	Name	SBO
asyn		
AggA4		

Product

Table 397: Properties of each product.

Id	Name	SBO
AggA5		

Kinetic Law**Derived unit** contains undeclared units

$$v_{196} = kaggasyn2 \cdot asyn \cdot AggA4 \quad (401)$$

7.197 Reaction *DisAggregationasyn1*

This is an irreversible reaction of one reactant forming two products.

Reaction equation**Reactant**

Table 398: Properties of each reactant.

Id	Name	SBO
AggA5		

Products

Table 399: Properties of each product.

Id	Name	SBO
AggA4		
asyn		

Kinetic Law**Derived unit** contains undeclared units

$$v_{197} = kdisaggasyn5 \cdot AggA5 \quad (403)$$

7.198 Reaction *DisAggregationasyn2*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 400: Properties of each reactant.

Id	Name	SBO
AggA4		

Products

Table 401: Properties of each product.

Id	Name	SBO
AggA3		
asyn		

Kinetic Law

Derived unit contains undeclared units

$$v_{198} = k_{\text{disaggasyn4}} \cdot \text{AggA4}$$

(405)

7.199 Reaction DisAggregationasyn3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 402: Properties of each reactant.

Id	Name	SBO
AggA3		

Products

Table 403: Properties of each product.

Id	Name	SBO
AggA2		
asyn		

Kinetic Law

Derived unit contains undeclared units

$$v_{199} = k_{\text{disaggasyn3}} \cdot \text{AggA3} \quad (407)$$

7.200 Reaction *DisAggregationasyn4*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 404: Properties of each reactant.

Id	Name	SBO
AggA2		

Products

Table 405: Properties of each product.

Id	Name	SBO
AggA1		
asyn		

Kinetic Law

Derived unit contains undeclared units

$$v_{200} = k_{\text{disaggasyn2}} \cdot \text{AggA2} \quad (409)$$

7.201 Reaction [DisAggregationasyn5](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 406: Properties of each reactant.

Id	Name	SBO
AggA1		

Product

Table 407: Properties of each product.

Id	Name	SBO
asyn		

Kinetic Law

Derived unit contains undeclared units

$$v_{201} = k_{\text{disaggasyn1}} \cdot \text{AggA1} \quad (411)$$

7.202 Reaction [AggA1ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 408: Properties of each reactant.

Id	Name	SBO
AggA1		
Proteasome		

Product

Table 409: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{202} = k_{\text{binAggProt}} \cdot \text{AggA1} \cdot \text{Proteasome} \quad (413)$$

7.203 Reaction [AggA2ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 410: Properties of each reactant.

Id	Name	SBO
AggA2		
Proteasome		

Product

Table 411: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{203} = k_{\text{binAggProt}} \cdot \text{AggA2} \cdot \text{Proteasome} \quad (415)$$

7.204 Reaction [AggA3ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 412: Properties of each reactant.

Id	Name	SBO
AggA3		
Proteasome		

Product

Table 413: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{204} = k_{\text{binAggProt}} \cdot \text{AggA3} \cdot \text{Proteasome} \quad (417)$$

7.205 Reaction [AggA4ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 414: Properties of each reactant.

Id	Name	SBO
AggA4		

Id	Name	SBO
	Proteasome	

Product

Table 415: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{205} = k_{\text{binAggProt}} \cdot \text{AggA4} \cdot \text{Proteasome} \quad (419)$$

7.206 Reaction [AggA5ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 416: Properties of each reactant.

Id	Name	SBO
	AggA5	
	Proteasome	

Product

Table 417: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

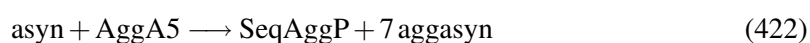
Derived unit contains undeclared units

$$v_{206} = k_{\text{binAggProt}} \cdot \text{AggA5} \cdot \text{Proteasome} \quad (421)$$

7.207 Reaction `AsynInclusionFormation`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 418: Properties of each reactant.

Id	Name	SBO
asyn		
AggA5		

Products

Table 419: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyn		

Kinetic Law

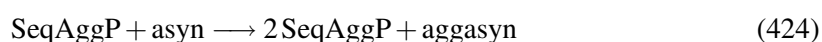
Derived unit contains undeclared units

$$v_{207} = k_{\text{aggasyn2}} \cdot \text{asyn} \cdot \text{AggA5} \quad (423)$$

7.208 Reaction `AsynInclusionGrowth`

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 420: Properties of each reactant.

Id	Name	SBO
SeqAggP		
asyn		

Products

Table 421: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyn		

Kinetic Law

Derived unit contains undeclared units

$$v_{208} = \text{kigrowth1} \cdot \text{SeqAggP} \cdot \text{asyn} \quad (425)$$

7.209 Reaction [ROSGenerationSmallAggA1](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 422: Properties of each reactant.

Id	Name	SBO
AggA1		

Products

Table 423: Properties of each product.

Id	Name	SBO
AggA1		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{209} = k_{\text{genROS}} \text{AggP} \cdot \text{AggA1} \quad (427)$$

7.210 Reaction ROSgenerationSmallAggA2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 424: Properties of each reactant.

Id	Name	SBO
AggA2		

Products

Table 425: Properties of each product.

Id	Name	SBO
AggA2		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{210} = k_{\text{genROS}} \text{AggP} \cdot \text{AggA2} \quad (429)$$

7.211 Reaction ROSgenerationSmallAggA3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 426: Properties of each reactant.

Id	Name	SBO
AggA3		

Products

Table 427: Properties of each product.

Id	Name	SBO
AggA3		
ROS		

Kinetic Law

Derived unit contains undeclared units

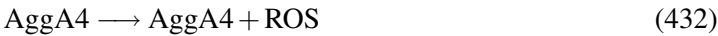
$$v_{211} = k_{genROS} AggP \cdot AggA3$$

(431)

7.212 Reaction ROSgenerationSmallAggA4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 428: Properties of each reactant.

Id	Name	SBO
AggA4		

Products

Table 429: Properties of each product.

Id	Name	SBO
AggA4		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{212} = k_{\text{genROS}} \text{AggP} \cdot \text{AggA4} \quad (433)$$

7.213 Reaction ROSgenerationSmallAggA5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 430: Properties of each reactant.

Id	Name	SBO
AggA5		

Products

Table 431: Properties of each product.

Id	Name	SBO
AggA5		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{213} = k_{\text{genROS}} \text{AggP} \cdot \text{AggA5} \quad (435)$$

7.214 Reaction [AggregationAsynDam1](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 432: Properties of each reactant.

Id	Name	SBO
<hr/>		
	asyn_dam	
<hr/>		

Product

Table 433: Properties of each product.

Id	Name	SBO
<hr/>		
	AggD1	
<hr/>		

Kinetic Law

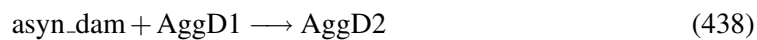
Derived unit contains undeclared units

$$v_{214} = k_{agg1dam} \cdot \text{asyn_dam} \cdot (\text{asyn_dam} - 1) \cdot 0.5 \quad (437)$$

7.215 Reaction [AggregationAsynDam2](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 434: Properties of each reactant.

Id	Name	SBO
<hr/>		
	asyn_dam	
	AggD1	
<hr/>		

Product

Table 435: Properties of each product.

Id	Name	SBO
AggD2		

Kinetic Law

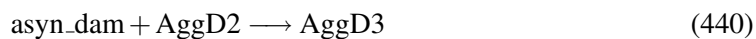
Derived unit contains undeclared units

$$v_{215} = k_{agg2dam} \cdot asyn_dam \cdot AggD1 \quad (439)$$

7.216 Reaction AggregationAsynDam3

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 436: Properties of each reactant.

Id	Name	SBO
asyn_dam		
AggD2		

Product

Table 437: Properties of each product.

Id	Name	SBO
AggD3		

Kinetic Law

Derived unit contains undeclared units

$$v_{216} = k_{agg2dam} \cdot asyn_dam \cdot AggD2 \quad (441)$$

7.217 Reaction [AggregationAsynDam4](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 438: Properties of each reactant.

Id	Name	SBO
	asyn_dam	
	AggD3	

Product

Table 439: Properties of each product.

Id	Name	SBO
	AggD4	

Kinetic Law

Derived unit contains undeclared units

$$v_{217} = k_{\text{agg2dam}} \cdot \text{asyn_dam} \cdot \text{AggD3} \quad (443)$$

7.218 Reaction [AggregationAsynDam5](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 440: Properties of each reactant.

Id	Name	SBO
	asyn_dam	

Id	Name	SBO
AggD4		

Product

Table 441: Properties of each product.

Id	Name	SBO
AggD5		

Kinetic Law

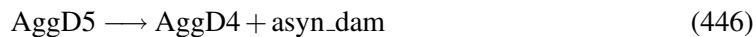
Derived unit contains undeclared units

$$v_{218} = kagg2dam \cdot asyn_dam \cdot AggD4 \quad (445)$$

7.219 Reaction [DisaggregationAsynDam1](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 442: Properties of each reactant.

Id	Name	SBO
AggD5		

Products

Table 443: Properties of each product.

Id	Name	SBO
AggD4		
asyn_dam		

Kinetic Law

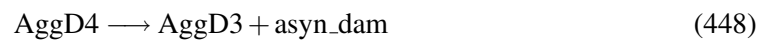
Derived unit contains undeclared units

$$v_{219} = k_{\text{disaggasyndam5}} \cdot \text{AggD5} \quad (447)$$

7.220 Reaction `DisaggregationAsynDam2`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 444: Properties of each reactant.

Id	Name	SBO
AggD4		

Products

Table 445: Properties of each product.

Id	Name	SBO
AggD3		
asyn_dam		

Kinetic Law

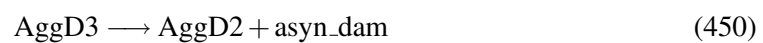
Derived unit contains undeclared units

$$v_{220} = k_{\text{disaggasyndam4}} \cdot \text{AggD4} \quad (449)$$

7.221 Reaction `DisaggregationAsynDam3`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 446: Properties of each reactant.

Id	Name	SBO
AggD3		

Products

Table 447: Properties of each product.

Id	Name	SBO
AggD2		
asyn_dam		

Kinetic Law

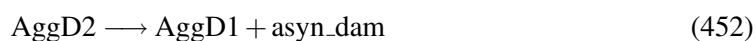
Derived unit contains undeclared units

$$v_{221} = k_{\text{disaggasyn_dam3}} \cdot \text{AggD3} \quad (451)$$

7.222 Reaction [DisaggregationAsynDam4](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 448: Properties of each reactant.

Id	Name	SBO
AggD2		

Products

Table 449: Properties of each product.

Id	Name	SBO
AggD1		
asyn_dam		

Kinetic Law

Derived unit contains undeclared units

$$v_{222} = k_{\text{disaggasyndam2}} \cdot \text{AggD2} \quad (453)$$

7.223 Reaction [DisaggregationAsynDam5](#)

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 450: Properties of each reactant.

Id	Name	SBO
AggD1		

Product

Table 451: Properties of each product.

Id	Name	SBO
asyn_dam		

Kinetic Law

Derived unit contains undeclared units

$$v_{223} = k_{\text{disaggasyndam1}} \cdot \text{AggD1} \quad (455)$$

7.224 Reaction [AggD1ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 452: Properties of each reactant.

Id	Name	SBO
AggD1		
Proteasome		

Product

Table 453: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{224} = k_{\text{binAggProt}} \cdot \text{AggD1} \cdot \text{Proteasome} \quad (457)$$

7.225 Reaction [AggD2ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 454: Properties of each reactant.

Id	Name	SBO
AggD2		
Proteasome		

Product

Table 455: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{225} = k_{\text{binAggProt}} \cdot \text{AggD2} \cdot \text{Proteasome} \quad (459)$$

7.226 Reaction AggD3ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 456: Properties of each reactant.

Id	Name	SBO
AggD3		
Proteasome		

Product

Table 457: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{226} = k_{\text{binAggProt}} \cdot \text{AggD3} \cdot \text{Proteasome} \quad (461)$$

7.227 Reaction AggD4ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 458: Properties of each reactant.

Id	Name	SBO
AggD4		
Proteasome		

Product

Table 459: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{227} = k_{\text{binAggProt}} \cdot \text{AggD4} \cdot \text{Proteasome} \quad (463)$$

7.228 Reaction AggD5ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 460: Properties of each reactant.

Id	Name	SBO
AggD5		

Id	Name	SBO
	Proteasome	

Product

Table 461: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

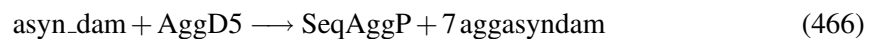
Derived unit contains undeclared units

$$v_{228} = k_{\text{binAggProt}} \cdot \text{AggD5} \cdot \text{Proteasome} \quad (465)$$

7.229 Reaction [AsynDamInclusionFormation](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 462: Properties of each reactant.

Id	Name	SBO
	asyn_dam	
	AggD5	

Products

Table 463: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	

Kinetic Law

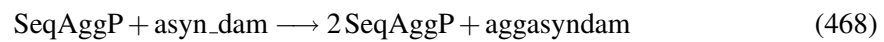
Derived unit contains undeclared units

$$v_{229} = kagg2dam \cdot asyn_dam \cdot AggD5 \quad (467)$$

7.230 Reaction [AsynDamInclusionGrowth1](#)

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 464: Properties of each reactant.

Id	Name	SBO
SeqAggP		
asyn_dam		

Products

Table 465: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		

Kinetic Law

Derived unit contains undeclared units

$$v_{230} = kigrowth1 \cdot SeqAggP \cdot asyn_dam \quad (469)$$

7.231 Reaction [AsynDamInclusionGrowth2](#)

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 466: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam		

Products

Table 467: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggParkin		

Kinetic Law

Derived unit contains undeclared units

$$v_{231} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam} \quad (471)$$

7.232 Reaction [AsynDamInclusionGrowth3](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 468: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub		

Products

Table 469: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

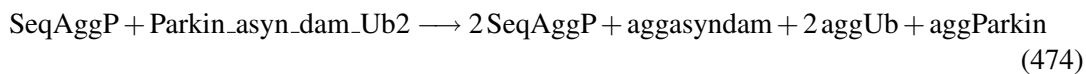
Derived unit contains undeclared units

$$v_{232} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub} \quad (473)$$

7.233 Reaction AsynDamInclusionGrowth4

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 470: Properties of each reactant.

Id	Name	SBO
	SeqAggP	
	Parkin_asyn_dam_Ub2	

Products

Table 471: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

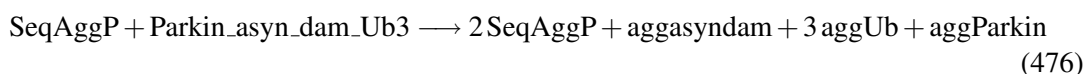
Derived unit contains undeclared units

$$v_{233} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub2} \quad (475)$$

7.234 Reaction [AsynDamInclusionGrowth5](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 472: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub3		

Products

Table 473: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

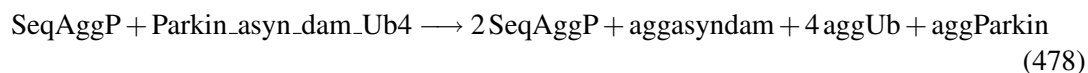
Derived unit contains undeclared units

$$v_{234} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub3} \quad (477)$$

7.235 Reaction [AsynDamInclusionGrowth6](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 474: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub4		

Products

Table 475: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

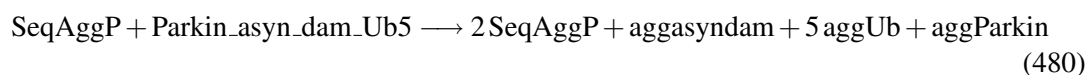
Derived unit contains undeclared units

$$v_{235} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub4} \quad (479)$$

7.236 Reaction [AsynDamInclusionGrowth7](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 476: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub5		

Products

Table 477: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

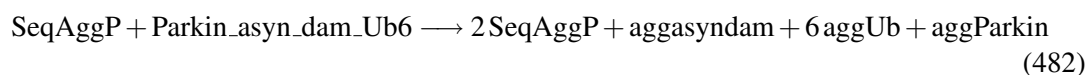
Derived unit contains undeclared units

$$v_{236} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub5} \quad (481)$$

7.237 Reaction AsynDamInclusionGrowth8

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 478: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub6		

Products

Table 479: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

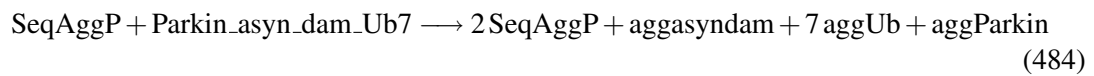
Derived unit contains undeclared units

$$v_{237} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub6} \quad (483)$$

7.238 Reaction AsynDamInclusionGrowth9

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 480: Properties of each reactant.

Id	Name	SBO
	SeqAggP	
	Parkin_asyn_dam_Ub7	

Products

Table 481: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

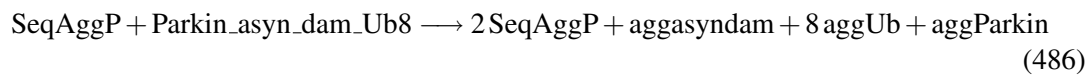
Derived unit contains undeclared units

$$v_{238} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub7} \quad (485)$$

7.239 Reaction [AsynDamInclusionGrowth10](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 482: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub8		

Products

Table 483: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

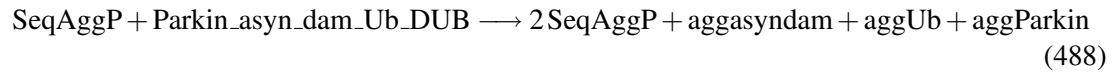
Derived unit contains undeclared units

$$v_{239} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub8} \quad (487)$$

7.240 Reaction [AsynDamInclusionGrowth11](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 484: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub_DUB		

Products

Table 485: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

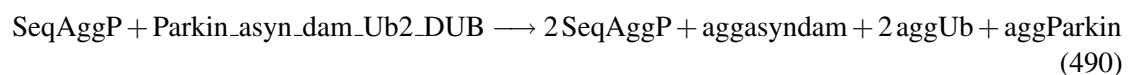
Derived unit contains undeclared units

$$v_{240} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub_DUB} \quad (489)$$

7.241 Reaction AsynDamInclusionGrowth12

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 486: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub2_DUB		

Products

Table 487: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

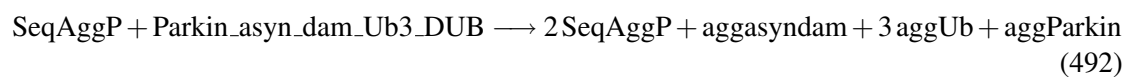
Derived unit contains undeclared units

$$v_{241} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub2_DUB} \quad (491)$$

7.242 Reaction AsynDamInclusionGrowth13

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 488: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub3_DUB		

Products

Table 489: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

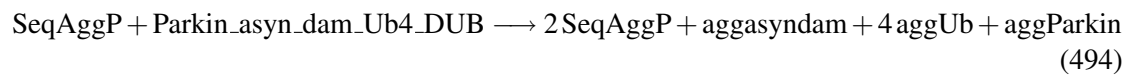
Derived unit contains undeclared units

$$v_{242} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub3_DUB} \quad (493)$$

7.243 Reaction AsynDamInclusionGrowth14

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 490: Properties of each reactant.

Id	Name	SBO
	SeqAggP	
	Parkin_asyn_dam_Ub4_DUB	

Products

Table 491: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggasyndam	
	aggUb	
	aggParkin	

Kinetic Law

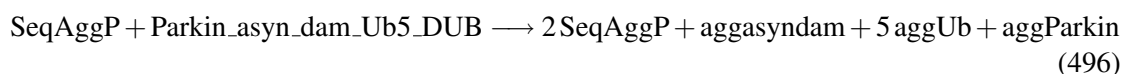
Derived unit contains undeclared units

$$v_{243} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub4_DUB} \quad (495)$$

7.244 Reaction [AsynDamInclusionGrowth15](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 492: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub5_DUB		

Products

Table 493: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

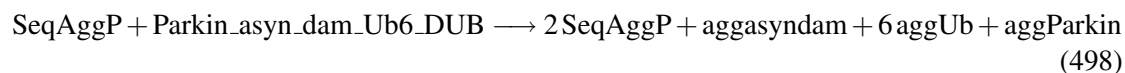
Derived unit contains undeclared units

$$v_{244} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub5_DUB} \quad (497)$$

7.245 Reaction [AsynDamInclusionGrowth16](#)

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 494: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub6_DUB		

Products

Table 495: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

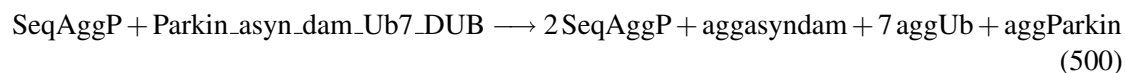
Derived unit contains undeclared units

$$v_{245} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub6_DUB} \quad (499)$$

7.246 Reaction AsynDamInclusionGrowth17

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 496: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub7_DUB		

Products

Table 497: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

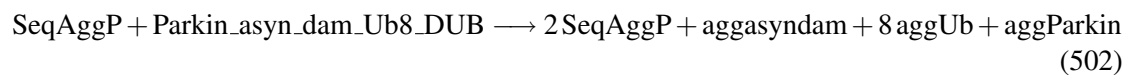
Derived unit contains undeclared units

$$v_{246} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub7_DUB} \quad (501)$$

7.247 Reaction AsynDamInclusionGrowth18

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 498: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Parkin_asyn_dam_Ub8_DUB		

Products

Table 499: Properties of each product.

Id	Name	SBO
SeqAggP		
aggasyndam		
aggUb		
aggParkin		

Kinetic Law

Derived unit contains undeclared units

$$v_{247} = \text{kigrowth2} \cdot \text{SeqAggP} \cdot \text{Parkin_asyn_dam_Ub8_DUB} \quad (503)$$

7.248 Reaction ROSgenerationSmallAggD1

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 500: Properties of each reactant.

Id	Name	SBO
AggD1		

Products

Table 501: Properties of each product.

Id	Name	SBO
AggD1		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{248} = \text{kgenROSAggP} \cdot \text{AggD1} \quad (505)$$

7.249 Reaction ROSgenerationSmallAggD2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 502: Properties of each reactant.

Id	Name	SBO
AggD2		

Products

Table 503: Properties of each product.

Id	Name	SBO
AggD2		
ROS		

Kinetic Law

Derived unit contains undeclared units

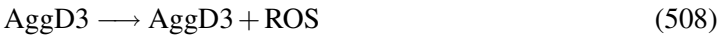
$$v_{249} = k_{genROS} AggP \cdot AggD2$$

(507)

7.250 Reaction ROSgenerationSmallAggD3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 504: Properties of each reactant.

Id	Name	SBO
AggD3		

Products

Table 505: Properties of each product.

Id	Name	SBO
AggD3		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{250} = k_{\text{genROS}} \text{AggP} \cdot \text{AggD3} \tag{509}$$

7.251 Reaction ROSgenerationSmallAggD4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 506: Properties of each reactant.

Id	Name	SBO
AggD4		

Products

Table 507: Properties of each product.

Id	Name	SBO
AggD4		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{251} = k_{\text{genROS}} \text{AggP} \cdot \text{AggD4} \tag{511}$$

7.252 Reaction `ROSgenerationSmallAggD5`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 508: Properties of each reactant.

Id	Name	SBO
AggD5		

Products

Table 509: Properties of each product.

Id	Name	SBO
AggD5		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{252} = k_{\text{genROS}} \cdot \text{AggD5} \quad (513)$$

7.253 Reaction `AggregationUCHL1Dam1`

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 510: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		

Product

Table 511: Properties of each product.

Id	Name	SBO
AggU1		

Kinetic Law

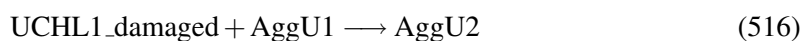
Derived unit contains undeclared units

$$v_{253} = kagg1dam \cdot UCHL1_damaged \cdot (UCHL1_damaged - 1) \cdot 0.5 \quad (515)$$

7.254 Reaction AggregationUCHL1Dam2

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 512: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		
AggU1		

Product

Table 513: Properties of each product.

Id	Name	SBO
AggU2		

Kinetic Law

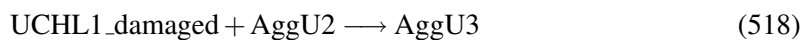
Derived unit contains undeclared units

$$v_{254} = kagg2dam \cdot UCHL1_damaged \cdot AggU1 \quad (517)$$

7.255 Reaction AggregationUCHL1Dam3

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 514: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		
AggU2		

Product

Table 515: Properties of each product.

Id	Name	SBO
AggU3		

Kinetic Law

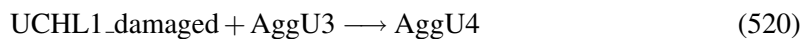
Derived unit contains undeclared units

$$v_{255} = k_{agg2dam} \cdot \text{UCHL1_damaged} \cdot \text{AggU2} \quad (519)$$

7.256 Reaction AggregationUCHL1Dam4

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 516: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		

Id	Name	SBO
AggU3		

Product

Table 517: Properties of each product.

Id	Name	SBO
AggU4		

Kinetic Law

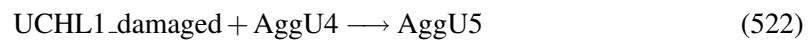
Derived unit contains undeclared units

$$v_{256} = kagg2dam \cdot UCHL1_damaged \cdot AggU3 \quad (521)$$

7.257 Reaction AggregationUCHL1Dam5

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 518: Properties of each reactant.

Id	Name	SBO
UCHL1_damaged		
AggU4		

Product

Table 519: Properties of each product.

Id	Name	SBO
AggU5		

Kinetic Law

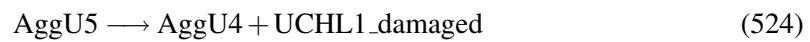
Derived unit contains undeclared units

$$v_{257} = kagg2dam \cdot UCHL1_damaged \cdot AggU4 \quad (523)$$

7.258 Reaction [DisaggregationUCHL1Dam1](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 520: Properties of each reactant.

Id	Name	SBO
AggU5		

Products

Table 521: Properties of each product.

Id	Name	SBO
AggU4		
UCHL1_damaged		

Kinetic Law

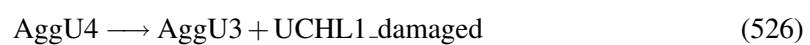
Derived unit contains undeclared units

$$v_{258} = kdisagguchl1dam5 \cdot AggU5 \quad (525)$$

7.259 Reaction [DisaggregationUCHL1Dam2](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 522: Properties of each reactant.

Id	Name	SBO
AggU4		

Products

Table 523: Properties of each product.

Id	Name	SBO
AggU3		
UCHL1_damaged		

Kinetic Law

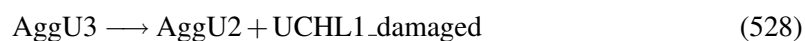
Derived unit contains undeclared units

$$v_{259} = k_{\text{disagguchl1dam4}} \cdot \text{AggU4} \quad (527)$$

7.260 Reaction *DisaggregationUCHL1Dam3*

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 524: Properties of each reactant.

Id	Name	SBO
AggU3		

Products

Table 525: Properties of each product.

Id	Name	SBO
AggU2		
UHL1_damaged		

Kinetic Law

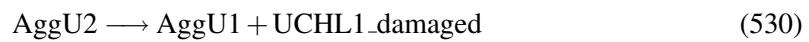
Derived unit contains undeclared units

$$v_{260} = k_{\text{disagguchl1dam3}} \cdot \text{AggU3} \quad (529)$$

7.261 Reaction DisaggregationUHL1Dam4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 526: Properties of each reactant.

Id	Name	SBO
AggU2		

Products

Table 527: Properties of each product.

Id	Name	SBO
AggU1		
UHL1_damaged		

Kinetic Law

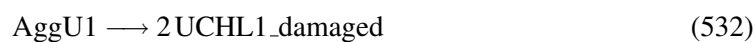
Derived unit contains undeclared units

$$v_{261} = k_{\text{disagguchl1dam2}} \cdot \text{AggU2} \quad (531)$$

7.262 Reaction DisaggregationUCHL1Dam5

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 528: Properties of each reactant.

Id	Name	SBO
AggU1		

Product

Table 529: Properties of each product.

Id	Name	SBO
UCHL1_damaged		

Kinetic Law

Derived unit contains undeclared units

$$v_{262} = k_{\text{disagguchl1dam1}} \cdot \text{AggU1} \quad (533)$$

7.263 Reaction AggU1ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 530: Properties of each reactant.

Id	Name	SBO
AggU1		
Proteasome		

Product

Table 531: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{263} = k_{\text{binAggProt}} \cdot \text{AggU1} \cdot \text{Proteasome} \quad (535)$$

7.264 Reaction [AggU2ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 532: Properties of each reactant.

Id	Name	SBO
AggU2		
Proteasome		

Product

Table 533: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{264} = k_{\text{binAggProt}} \cdot \text{AggU2} \cdot \text{Proteasome} \quad (537)$$

7.265 Reaction AggU3ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 534: Properties of each reactant.

Id	Name	SBO
AggU3		
Proteasome		

Product

Table 535: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{265} = k_{\text{binAggProt}} \cdot \text{AggU3} \cdot \text{Proteasome} \quad (539)$$

7.266 Reaction AggU4ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 536: Properties of each reactant.

Id	Name	SBO
AggU4		

Id	Name	SBO
	Proteasome	

Product

Table 537: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{266} = k_{\text{binAggProt}} \cdot \text{AggU4} \cdot \text{Proteasome} \quad (541)$$

7.267 Reaction [AggU5ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 538: Properties of each reactant.

Id	Name	SBO
	AggU5	
	Proteasome	

Product

Table 539: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{267} = k_{\text{binAggProt}} \cdot \text{AggU5} \cdot \text{Proteasome} \quad (543)$$

7.268 Reaction UCHL1DamInclusionFormation

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 540: Properties of each reactant.

Id	Name	SBO
	UCHL1_damaged	
	AggU5	

Products

Table 541: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggUchl1dam	

Kinetic Law

Derived unit contains undeclared units

$$v_{268} = k_{\text{agg2dam}} \cdot \text{UCHL1_damaged} \cdot \text{AggU5} \quad (545)$$

7.269 Reaction UCHL1DamagedSequestering

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 542: Properties of each reactant.

Id	Name	SBO
SeqAggP		
UChL1_damaged		

Products

Table 543: Properties of each product.

Id	Name	SBO
SeqAggP		
aggUchl1dam		

Kinetic Law

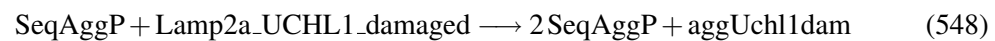
Derived unit contains undeclared units

$$v_{269} = \text{kigrowth1} \cdot \text{SeqAggP} \cdot \text{UChL1_damaged} \quad (547)$$

7.270 Reaction UChL1DamagedLamp2aSequestering

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 544: Properties of each reactant.

Id	Name	SBO
SeqAggP		
Lamp2a_UChL1_damaged		

Products

Table 545: Properties of each product.

Id	Name	SBO
SeqAggP		
aggUchl1dam		

Kinetic Law

Derived unit contains undeclared units

$$v_{270} = \text{kigrowth1} \cdot \text{SeqAggP} \cdot \text{Lamp2a_UCHL1_damaged} \quad (549)$$

7.271 Reaction ROSgenerationSmallAggU1

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 546: Properties of each reactant.

Id	Name	SBO
AggU1		

Products

Table 547: Properties of each product.

Id	Name	SBO
AggU1		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{271} = \text{kgenROSAggP} \cdot \text{AggU1} \quad (551)$$

7.272 Reaction ROSgenerationSmallAggU2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 548: Properties of each reactant.

Id	Name	SBO
AggU2		

Products

Table 549: Properties of each product.

Id	Name	SBO
AggU2		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{272} = k_{genROS} AggP \cdot AggU2$$

(553)

7.273 Reaction ROSgenerationSmallAggU3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 550: Properties of each reactant.

Id	Name	SBO
AggU3		

Products

Table 551: Properties of each product.

Id	Name	SBO
AggU3		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{273} = k_{\text{genROS}} \text{AggP} \cdot \text{AggU3} \quad (555)$$

7.274 Reaction ROSgenerationSmallAggU4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 552: Properties of each reactant.

Id	Name	SBO
AggU4		

Products

Table 553: Properties of each product.

Id	Name	SBO
AggU4		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{274} = k_{\text{genROS}} \text{AggP} \cdot \text{AggU4} \quad (557)$$

7.275 Reaction ROSgenerationSmallAggU5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 554: Properties of each reactant.

Id	Name	SBO
AggU5		

Products

Table 555: Properties of each product.

Id	Name	SBO
AggU5		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{275} = k_{genROS} AggP \cdot AggU5$$

(559)

7.276 Reaction SUBAggregation1

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 556: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		

Product

Table 557: Properties of each product.

Id	Name	SBO
AggS1		

Kinetic Law

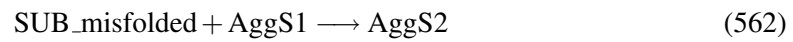
Derived unit contains undeclared units

$$v_{276} = k_{aggSUB1} \cdot SUB_misfolded \cdot (SUB_misfolded - 1) \cdot 0.5 \quad (561)$$

7.277 Reaction SUBAggregation2

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 558: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		
AggS1		

Product

Table 559: Properties of each product.

Id	Name	SBO
AggS2		

Kinetic Law

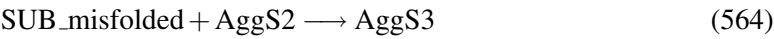
Derived unit contains undeclared units

$$v_{277} = k_{aggSUB2} \cdot SUB_misfolded \cdot AggS1 \quad (563)$$

7.278 Reaction SUBAggregation3

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 560: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		
AggS2		

Product

Table 561: Properties of each product.

Id	Name	SBO
AggS3		

Kinetic Law

Derived unit contains undeclared units

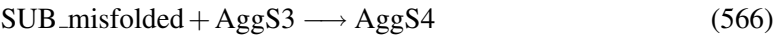
$$v_{278} = kaggSUB2 \cdot SUB_misfolded \cdot AggS2$$

(565)

7.279 Reaction SUBAggregation4

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 562: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		

Id	Name	SBO
AggS3		

Product

Table 563: Properties of each product.

Id	Name	SBO
AggS4		

Kinetic Law

Derived unit contains undeclared units

$$v_{279} = k_{aggSUB2} \cdot SUB_misfolded \cdot AggS3 \quad (567)$$

7.280 Reaction SUBAggregation5

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 564: Properties of each reactant.

Id	Name	SBO
SUB_misfolded		
AggS4		

Product

Table 565: Properties of each product.

Id	Name	SBO
AggS5		

Kinetic Law

Derived unit contains undeclared units

$$v_{280} = kaggSUB2 \cdot SUB_misfolded \cdot AggS4 \tag{569}$$

7.281 Reaction SUBDisaggregation1

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 566: Properties of each reactant.

Id	Name	SBO
AggS5		

Products

Table 567: Properties of each product.

Id	Name	SBO
AggS4		
SUB_misfolded		

Kinetic Law

Derived unit contains undeclared units

$$v_{281} = kdisaggSUB5 \cdot AggS5 \tag{571}$$

7.282 Reaction SUBDisaggregation2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 568: Properties of each reactant.

Id	Name	SBO
AggS4		

Products

Table 569: Properties of each product.

Id	Name	SBO
AggS3		
SUB_misfolded		

Kinetic Law

Derived unit contains undeclared units

$$v_{282} = k_{\text{disaggSUB4}} \cdot \text{AggS4} \quad (573)$$

7.283 Reaction SUBDisaggregation3

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 570: Properties of each reactant.

Id	Name	SBO
AggS3		

Products

Table 571: Properties of each product.

Id	Name	SBO
AggS2		
SUB_misfolded		

Kinetic Law

Derived unit contains undeclared units

$$v_{283} = k_{\text{disaggSUB3}} \cdot \text{AggS3} \quad (575)$$

7.284 Reaction SUBDisaggregation4

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 572: Properties of each reactant.

Id	Name	SBO
AggS2		

Products

Table 573: Properties of each product.

Id	Name	SBO
AggS1		
SUB_misfolded		

Kinetic Law

Derived unit contains undeclared units

$$v_{284} = k_{\text{disaggSUB2}} \cdot \text{AggS2} \quad (577)$$

7.285 Reaction SUBDisaggregation5

This is an irreversible reaction of one reactant forming one product.

Reaction equation



Reactant

Table 574: Properties of each reactant.

Id	Name	SBO
AggS1		

Product

Table 575: Properties of each product.

Id	Name	SBO
SUB_misfolded		

Kinetic Law

Derived unit contains undeclared units

$$v_{285} = k_{\text{disaggSUB1}} \cdot \text{AggS1} \quad (579)$$

7.286 Reaction AggS1ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 576: Properties of each reactant.

Id	Name	SBO
AggS1		
Proteasome		

Product

Table 577: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{286} = k_{\text{binAggProt}} \cdot \text{AggS1} \cdot \text{Proteasome} \quad (581)$$

7.287 Reaction AggS2ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 578: Properties of each reactant.

Id	Name	SBO
AggS2		
Proteasome		

Product

Table 579: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

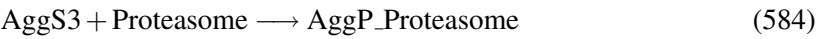
Derived unit contains undeclared units

$$v_{287} = k_{\text{binAggProt}} \cdot \text{AggS2} \cdot \text{Proteasome} \quad (583)$$

7.288 Reaction AggS3ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 580: Properties of each reactant.

Id	Name	SBO
AggS3		
Proteasome		

Product

Table 581: Properties of each product.

Id	Name	SBO
AggP_Proteasome		

Kinetic Law

Derived unit contains undeclared units

$$v_{288} = k_{\text{binAggProt}} \cdot \text{AggS3} \cdot \text{Proteasome}$$

(585)

7.289 Reaction AggS4ProteasomeInhibition

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 582: Properties of each reactant.

Id	Name	SBO
AggS4		

Id	Name	SBO
	Proteasome	

Product

Table 583: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

Derived unit contains undeclared units

$$v_{289} = k_{\text{binAggProt}} \cdot \text{AggS4} \cdot \text{Proteasome} \quad (587)$$

7.290 Reaction [AggS5ProteasomeInhibition](#)

This is an irreversible reaction of two reactants forming one product.

Reaction equation



Reactants

Table 584: Properties of each reactant.

Id	Name	SBO
	AggS5	
	Proteasome	

Product

Table 585: Properties of each product.

Id	Name	SBO
	AggP_Proteasome	

Kinetic Law

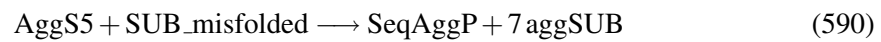
Derived unit contains undeclared units

$$v_{290} = k_{\text{binAggProt}} \cdot \text{AggS5} \cdot \text{Proteasome} \quad (589)$$

7.291 Reaction SUBInclusionFormation

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 586: Properties of each reactant.

Id	Name	SBO
AggS5		
SUB_misfolded		

Products

Table 587: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		

Kinetic Law

Derived unit contains undeclared units

$$v_{291} = k_{\text{aggSUB2}} \cdot \text{AggS5} \cdot \text{SUB_misfolded} \quad (591)$$

7.292 Reaction SUBInclusionGrowth0

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 588: Properties of each reactant.

Id	Name	SBO
SeqAggP		
SUB_misfolded		

Products

Table 589: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		

Kinetic Law

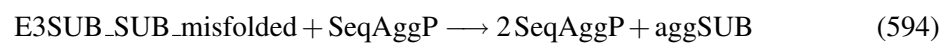
Derived unit contains undeclared units

$$v_{292} = \text{kigrowth1} \cdot \text{SeqAggP} \cdot \text{SUB_misfolded} \quad (593)$$

7.293 Reaction SUBInclusionGrowth1

This is an irreversible reaction of two reactants forming two products.

Reaction equation



Reactants

Table 590: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded		
SeqAggP		

Products

Table 591: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	

Kinetic Law

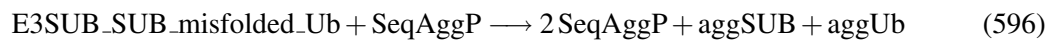
Derived unit contains undeclared units

$$v_{293} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded} \cdot \text{SeqAggP} \quad (595)$$

7.294 Reaction SUBInclusionGrowth2

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 592: Properties of each reactant.

Id	Name	SBO
	E3SUB_SUB_misfolded_Ub	
	SeqAggP	

Products

Table 593: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUb	

Kinetic Law

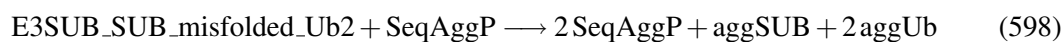
Derived unit contains undeclared units

$$v_{294} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub} \cdot \text{SeqAggP} \quad (597)$$

7.295 Reaction SUBInclusionGrowth3

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 594: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub2		
SeqAggP		

Products

Table 595: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUb		

Kinetic Law

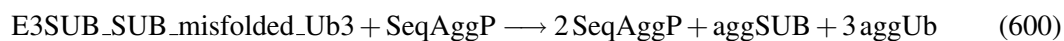
Derived unit contains undeclared units

$$v_{295} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub2} \cdot \text{SeqAggP} \quad (599)$$

7.296 Reaction SUBInclusionGrowth4

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 596: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub3		
SeqAggP		

Products

Table 597: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUb		

Kinetic Law

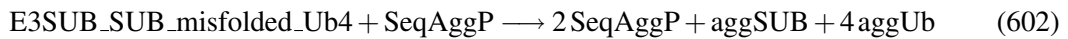
Derived unit contains undeclared units

$$v_{296} = \text{kigrowth2} \cdot \text{E3SUB.SUB_misfolded_Ub3} \cdot \text{SeqAggP} \quad (601)$$

7.297 Reaction SUBInclusionGrowth5

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 598: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub4		
SeqAggP		

Products

Table 599: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUb	

Kinetic Law

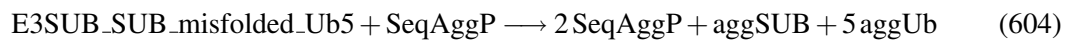
Derived unit contains undeclared units

$$v_{297} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub4} \cdot \text{SeqAggP} \quad (603)$$

7.298 Reaction SUBInclusionGrowth6

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 600: Properties of each reactant.

Id	Name	SBO
	E3SUB_SUB_misfolded_Ub5	
	SeqAggP	

Products

Table 601: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUb	

Kinetic Law

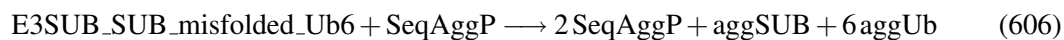
Derived unit contains undeclared units

$$v_{298} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub5} \cdot \text{SeqAggP} \quad (605)$$

7.299 Reaction SUBInclusionGrowth7

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 602: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub6		
SeqAggP		

Products

Table 603: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUb		

Kinetic Law

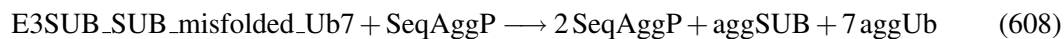
Derived unit contains undeclared units

$$v_{299} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub6} \cdot \text{SeqAggP} \quad (607)$$

7.300 Reaction SUBInclusionGrowth8

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 604: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub7		
SeqAggP		

Products

Table 605: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUb		

Kinetic Law

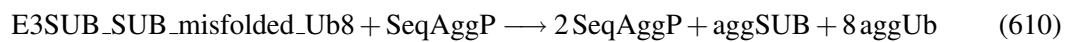
Derived unit contains undeclared units

$$v_{300} = \text{kigrowth2} \cdot \text{E3SUB.SUB_misfolded_Ub7} \cdot \text{SeqAggP} \quad (609)$$

7.301 Reaction SUBInclusionGrowth9

This is an irreversible reaction of two reactants forming three products.

Reaction equation



Reactants

Table 606: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub8		
SeqAggP		

Products

Table 607: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUb	

Kinetic Law

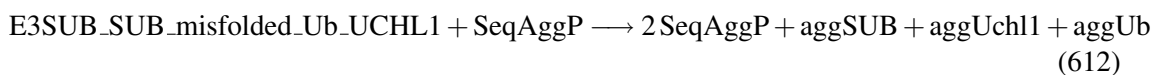
Derived unit contains undeclared units

$$v_{301} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub8} \cdot \text{SeqAggP} \quad (611)$$

7.302 Reaction SUBInclusionGrowth10

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 608: Properties of each reactant.

Id	Name	SBO
	E3SUB_SUB_misfolded_Ub_UCHL1	
	SeqAggP	

Products

Table 609: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUchl1	
	aggUb	

Kinetic Law

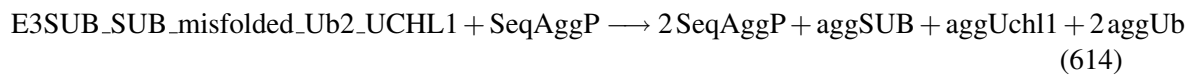
Derived unit contains undeclared units

$$v_{302} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub_UCHL1} \cdot \text{SeqAggP} \quad (613)$$

7.303 Reaction SUBInclusionGrowth11

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 610: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub2_UCHL1		
SeqAggP		

Products

Table 611: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUchl1		
aggUb		

Kinetic Law

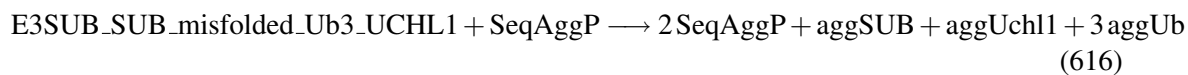
Derived unit contains undeclared units

$$v_{303} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub2_UCHL1} \cdot \text{SeqAggP} \quad (615)$$

7.304 Reaction SUBInclusionGrowth12

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 612: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub3_UHL1		
SeqAggP		

Products

Table 613: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUchl1		
aggUb		

Kinetic Law

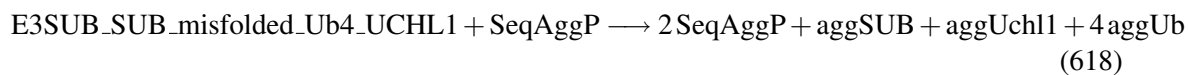
Derived unit contains undeclared units

$$v_{304} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub3_UHL1} \cdot \text{SeqAggP} \quad (617)$$

7.305 Reaction SUBInclusionGrowth13

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 614: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub4_UCHL1		
SeqAggP		

Products

Table 615: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUchl1		
aggUb		

Kinetic Law

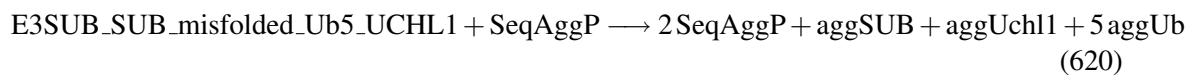
Derived unit contains undeclared units

$$v_{305} = \text{kigrowth2} \cdot \text{E3SUB.SUB_misfolded_Ub4_UCHL1} \cdot \text{SeqAggP} \quad (619)$$

7.306 Reaction SUBInclusionGrowth14

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 616: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub5_UCHL1		
SeqAggP		

Products

Table 617: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUchl1	
	aggUb	

Kinetic Law

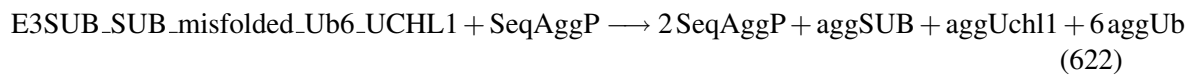
Derived unit contains undeclared units

$$v_{306} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub5_UCHL1} \cdot \text{SeqAggP} \quad (621)$$

7.307 Reaction SUBInclusionGrowth15

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 618: Properties of each reactant.

Id	Name	SBO
	E3SUB_SUB_misfolded_Ub6_UCHL1	
	SeqAggP	

Products

Table 619: Properties of each product.

Id	Name	SBO
	SeqAggP	
	aggSUB	
	aggUchl1	
	aggUb	

Kinetic Law

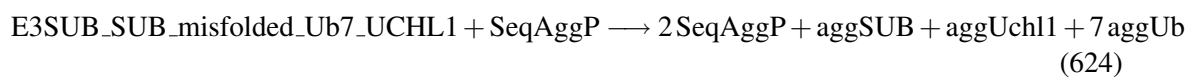
Derived unit contains undeclared units

$$v_{307} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub6_UCHL1} \cdot \text{SeqAggP} \quad (623)$$

7.308 Reaction SUBInclusionGrowth16

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 620: Properties of each reactant.

Id	Name	SBO
E3SUB_SUB_misfolded_Ub7_UCHL1		
SeqAggP		

Products

Table 621: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUchl1		
aggUb		

Kinetic Law

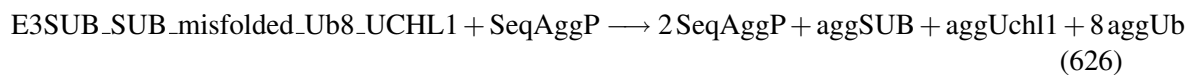
Derived unit contains undeclared units

$$v_{308} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub7_UCHL1} \cdot \text{SeqAggP} \quad (625)$$

7.309 Reaction SUBInclusionGrowth17

This is an irreversible reaction of two reactants forming four products.

Reaction equation



Reactants

Table 622: Properties of each reactant.

Id	Name	SBO
E3SUB.SUB_misfolded_Ub8_UHL1		
SeqAggP		

Products

Table 623: Properties of each product.

Id	Name	SBO
SeqAggP		
aggSUB		
aggUchl1		
aggUb		

Kinetic Law

Derived unit contains undeclared units

$$v_{309} = \text{kigrowth2} \cdot \text{E3SUB_SUB_misfolded_Ub8_UHL1} \cdot \text{SeqAggP} \quad (627)$$

7.310 Reaction [ROSgenerationSmallAggS1](#)

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 624: Properties of each reactant.

Id	Name	SBO
AggS1		

Products

Table 625: Properties of each product.

Id	Name	SBO
AggS1		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{310} = k_{\text{genROS}} \text{AggP} \cdot \text{AggS1} \quad (629)$$

7.311 Reaction ROSgenerationSmallAggS2

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 626: Properties of each reactant.

Id	Name	SBO
AggS2		

Products

Table 627: Properties of each product.

Id	Name	SBO
AggS2		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{311} = k_{\text{genROS}} \text{AggP} \cdot \text{AggS2} \quad (631)$$

7.312 Reaction `ROSgenerationSmallAggS3`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 628: Properties of each reactant.

Id	Name	SBO
AggS3		

Products

Table 629: Properties of each product.

Id	Name	SBO
AggS3		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{312} = k_{\text{genROS}} \text{AggP} \cdot \text{AggS3} \quad (633)$$

7.313 Reaction `ROSgenerationSmallAggS4`

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 630: Properties of each reactant.

Id	Name	SBO
AggS4		

Products

Table 631: Properties of each product.

Id	Name	SBO
AggS4		
ROS		

Kinetic Law

Derived unit contains undeclared units

$$v_{313} = k_{genROS} AggP \cdot AggS4 \tag{635}$$

7.314 Reaction ROSgenerationSmallAggS5

This is an irreversible reaction of one reactant forming two products.

Reaction equation



Reactant

Table 632: Properties of each reactant.

Id	Name	SBO
AggS5		

Products

Table 633: Properties of each product.

Id	Name	SBO
AggS5		
ROS		

Kinetic Law**Derived unit** contains undeclared units

$$v_{314} = k_{\text{genROS}} \text{AggP} \cdot \text{AggS5} \quad (637)$$

7.315 Reaction radicalFormation

This is an irreversible reaction of one reactant forming one product.

Name radicalFormation**Reaction equation****Reactant**

Table 634: Properties of each reactant.

Id	Name	SBO
Source		

Product

Table 635: Properties of each product.

Id	Name	SBO
ROS		

Kinetic Law**Derived unit** contains undeclared units

$$v_{315} = k_{\text{genROS}} \cdot \text{Source} \quad (639)$$

7.316 Reaction `radicalScavenging`

This is an irreversible reaction of one reactant forming one product.

Name `radicalScavenging`

Reaction equation



Reactant

Table 636: Properties of each reactant.

Id	Name	SBO
ROS		

Product

Table 637: Properties of each product.

Id	Name	SBO
Sink		

Kinetic Law

Derived unit contains undeclared units

$$v_{316} = \text{kremROS} \cdot \text{ROS} \quad (641)$$

8 Derived Rate Equations

When interpreted as an ordinary differential equation framework, this model implies the following set of equations for the rates of change of each species.

Identifiers for kinetic laws highlighted in gray cannot be verified to evaluate to units of SBML substance per time. As a result, some SBML interpreters may not be able to verify the consistency of the units on quantities in the model. Please check if

- parameters without an unit definition are involved or
- volume correction is necessary because the `hasOnlySubstanceUnits` flag may be set to `false` and `spacialDimensions` > 0 for certain species.

8.1 Species NatP

SBO:0000245 macromolecule

Initial amount 6000 item

This species takes part in three reactions (as a reactant in [Misfolding](#) and as a product in [ProteinSynthesis](#), [Refolding](#)).

$$\frac{d}{dt}\text{NatP} = v_4 + v_6 - v_5 \quad (642)$$

8.2 Species MisP

SBO:0000245 macromolecule

Initial amount 80 item

This species takes part in 19 reactions (as a reactant in [UbUpregulation](#), [Refolding](#), [MisPE3Binding](#), [Aggregation1](#), [Aggregation2](#), [Aggregation3](#), [Aggregation4](#), [Aggregation5](#), [InclusionFormation](#), [InclusionGrowth1](#) and as a product in [UbUpregulation](#), [Misfolding](#), [MisPE3Release](#), [DeubiquitinationBoundMisP1](#), [Disaggregation1](#), [Disaggregation2](#), [Disaggregation3](#), [Disaggregation4](#), [Disaggregation5](#)).

$$\begin{aligned} \frac{d}{dt}\text{MisP} = & v_3 + v_5 + v_8 + v_{44} + v_{55} + v_{56} + v_{57} + v_{58} + 2 v_{59} - v_3 \\ & - v_6 - v_7 - 2 v_{50} - v_{51} - v_{52} - v_{53} - v_{54} - v_{60} - v_{61} \end{aligned} \quad (643)$$

8.3 Species Ub

SBO:0000245 macromolecule

Initial amount 1500 item

This species takes part in 60 reactions (as a reactant in [UbDegradation](#), [E1UbBinding](#), [UbUchL1binding](#) and as a product in [UbSynthesis](#), [UbUpregulation](#), [Deubiquitination8](#), [Deubiquitination7](#), [Deubiquitination6](#), [Deubiquitination5](#), [Deubiquitination4](#), [Deubiquitination3](#), [Deubiquitination2](#), [Deubiquitination1](#), [DeubiquitinationBoundMisP5](#), [DeubiquitinationBoundMisP4](#), [DeubiquitinationBoundMisP3](#), [DeubiquitinationBoundMisP2](#), [DeubiquitinationBoundMisP1](#), [ProteasomeActivity1](#), [ProteasomeActivity2](#), [ProteasomeActivity3](#), [ProteasomeActivity4](#), [ProteasomeActivity5](#), [UbUchL1release](#), [SUBDeubiquitination8](#), [SUBDeubiquitination7](#), [SUBDeubiquitination6](#), [SUBDeubiquitination5](#), [SUBDeubiquitination4](#), [SUBDeubiquitination3](#), [SUBDeubiquitination2](#), [SUBDeubiquitination1](#), [DeubiquitinationBoundSUB8](#), [DeubiquitinationBoundSUB7](#), [DeubiquitinationBoundSUB6](#), [DeubiquitinationBoundSUB5](#), [DeubiquitinationBoundSUB4](#), [SUBDegradationUb4](#), [SUBDegradationUb5](#), [SUBDegradationUb6](#), [SUBDegradationUb7](#), [SUBDegradationUb8](#), [AsynDeubiquitinationUb8](#), [AsynDeubiquitinationUb7](#), [AsynDeubiquitinationUb6](#), [AsynDeubiquitinationUb5](#), [AsynDeubiquitinationUb4](#), [AsynDeubiquitinationUb3](#), [AsynDeubiquitinationUb2](#), [AsynDeubiquitinationUb1](#)).

DeubiquitinationBoundasyn_damUb8, DeubiquitinationBoundasynDamUb7, DeubiquitinationBoundasynDamUb5, DeubiquitinationBoundasynDamUb4, AsynProteasomeActivityUb4, AsynDegradationUb5, AsynDegradationUb6, AsynDegradationUb7, AsynDegradationUb8).

$$\begin{aligned} \frac{d}{dt} \text{Ub} = & v_1 + 3 v_3 + v_{27} + v_{28} + v_{29} + v_{30} + v_{31} + v_{32} + v_{33} + v_{34} + v_{40} \\ & + v_{41} + v_{42} + v_{43} + 4 v_{44} + 4 v_{45} + 5 v_{46} + 6 v_{47} + 7 v_{48} + 8 v_{49} + v_{100} \\ & + v_{122} + v_{123} + v_{124} + v_{125} + v_{126} + v_{127} + v_{128} + v_{129} + v_{135} + v_{136} \\ & + v_{137} + v_{138} + 4 v_{139} + 4 v_{140} + 5 v_{141} + 6 v_{142} + 7 v_{143} + 8 v_{144} + v_{169} \\ & + v_{170} + v_{171} + v_{172} + v_{173} + v_{174} + v_{175} + v_{176} + v_{182} + v_{183} + v_{184} \\ & + v_{185} + 4 v_{186} + 4 v_{187} + 5 v_{188} + 6 v_{189} + 7 v_{190} + 8 v_{191} - v_2 - v_9 - v_{99} \end{aligned} \quad (644)$$

8.4 Species E1

SBO:0000014 enzyme

Initial amount 105 item

This species takes part in two reactions (as a reactant in [E1UbBinding](#) and as a product in [E2UbBinding](#)).

$$\frac{d}{dt} \text{E1} = v_{10} - v_9 \quad (645)$$

8.5 Species E2

SBO:0000014 enzyme

Initial amount 50 item

This species takes part in 25 reactions (as a reactant in [E2UbBinding](#) and as a product in [Monoubiquitination](#), [Polyubiquitination1](#), [Polyubiquitination2](#), [Polyubiquitination3](#), [Polyubiquitination4](#), [Polyubiquitination5](#), [Polyubiquitination6](#), [Polyubiquitination7](#), [SUBMonoubiquitination](#), [SUBPolyubiquitination1](#), [SUBPolyubiquitination2](#), [SUBPolyubiquitination3](#), [SUBPolyubiquitination4](#), [SUBPolyubiquitination5](#), [SUBPolyubiquitination6](#), [SUBPolyubiquitination7](#), [AsynMonoubiquitination](#), [AsynPolyubiquitination1](#), [AsynPolyubiquitination2](#), [AsynPolyubiquitination3](#), [AsynPolyubiquitination4](#), [AsynPolyubiquitination5](#), [AsynPolyubiquitination6](#), [AsynPolyubiquitination7](#)).

$$\begin{aligned} \frac{d}{dt} \text{E2} = & v_{11} + v_{12} + v_{13} + v_{14} + v_{15} + v_{16} + v_{17} + v_{18} + v_{106} \\ & + v_{107} + v_{108} + v_{109} + v_{110} + v_{111} + v_{112} + v_{113} + v_{153} \\ & + v_{154} + v_{155} + v_{156} + v_{157} + v_{158} + v_{159} + v_{160} - v_{10} \end{aligned} \quad (646)$$

8.6 Species E3

SBO:0000014 enzyme

Initial amount 300 item

This species takes part in seven reactions (as a reactant in [MisPE3Binding](#) and as a product in [MisPE3Release](#), [ProteasomeBindingUb4](#), [ProteasomeBindingUb5](#), [ProteasomeBindingUb6](#), [ProteasomeBindingUb7](#), [ProteasomeBindingUb8](#)).

$$\frac{d}{dt}E3 = v_8 + v_{35} + v_{36} + v_{37} + v_{38} + v_{39} - v_7 \quad (647)$$

8.7 Species E3_MisP

SBO:0000296 macromolecular complex

Initial amount 2 item

This species takes part in five reactions (as a reactant in [MisPE3Release](#), [Monoubiquitination](#), [InclusionGrowth2](#) and as a product in [MisPE3Binding](#), [Deubiquitination1](#)).

$$\frac{d}{dt}E3_MisP = v_7 + v_{34} - v_8 - v_{11} - v_{62} \quad (648)$$

8.8 Species DUB

SBO:0000014 enzyme

Initial amount 160 item

This species takes part in 48 reactions (as a reactant in [MisPDUBbinding1](#), [MisPDUBbinding2](#), [MisPDUBbinding3](#), [MisPDUBbinding4](#), [MisPDUBbinding5](#), [MisPDUBbinding6](#), [MisPDUBbinding7](#), [MisPDUBbinding8](#), [DeubiquitinationBoundMisP5](#), [DeubiquitinationBoundMisP4](#), [DeubiquitinationBoundMisP3](#), [DeubiquitinationBoundMisP2](#), [DeubiquitinationBoundMisP1](#), [DeubiquitinationBoundSUB8](#), [DeubiquitinationBoundSUB7](#), [DeubiquitinationBoundSUB6](#), [DeubiquitinationBoundSUB5](#), [DeubiquitinationBoundSUB4](#), [AsynDUBbindingUb8](#), [AsynDUBbindingUb7](#), [AsynDUBbindingUb6](#), [AsynDUBbindingUb5](#), [AsynDUBbindingUb4](#), [AsynDUBbindingUb3](#), [AsynDUBbindingUb2](#), [AsynDUBbindingUb1](#), [DeubiquitinationBoundasyn_damUb8](#), [DeubiquitinationBoundasynDamUb7](#), [DeubiquitinationBoundasynDamUb6](#), [DeubiquitinationBoundasynDamUb5](#), [DeubiquitinationBoundasynDamUb4](#) and as a product in [Deubiquitination1](#), [DeubiquitinationBoundMisP5](#), [DeubiquitinationBoundMisP4](#), [DeubiquitinationBoundMisP3](#), [DeubiquitinationBoundMisP2](#), [DeubiquitinationBoundMisP1](#), [DeubiquitinationBoundSUB8](#), [DeubiquitinationBoundSUB7](#), [DeubiquitinationBoundSUB6](#), [DeubiquitinationBoundSUB5](#), [DeubiquitinationBoundSUB4](#), [AsynDeubiquitinationUb1](#), [DeubiquitinationBoundasyn_damUb8](#), [DeubiquitinationBoundasynDamUb7](#), [DeubiquitinationBoundasynDamUb6](#), [DeubiquitinationBoundasynDamUb5](#), [DeubiquitinationBoundasynDamUb4](#)).

$$\begin{aligned}
\frac{d}{dt} \text{DUB} = & v_{34} + v_{40} + v_{41} + v_{42} + v_{43} + v_{44} + v_{135} + v_{136} + v_{137} + v_{138} \\
& + v_{139} + v_{176} + v_{182} + v_{183} + v_{184} + v_{185} + v_{186} - v_{19} - v_{20} - v_{21} \\
& - v_{22} - v_{23} - v_{24} - v_{25} - v_{26} - v_{40} - v_{41} - v_{42} - v_{43} - v_{44} \\
& - v_{135} - v_{136} - v_{137} - v_{138} - v_{139} - v_{161} - v_{162} - v_{163} - v_{164} \\
& - v_{165} - v_{166} - v_{167} - v_{168} - v_{182} - v_{183} - v_{184} - v_{185} - v_{186}
\end{aligned} \tag{649}$$

8.9 Species Proteasome

SBO:0000296 macromolecular complex

Initial amount 1500 item

This species takes part in 66 reactions (as a reactant in UbDegradation, ProteasomeBindingUb4, ProteasomeBindingUb5, ProteasomeBindingUb6, ProteasomeBindingUb7, ProteasomeBindingUb8, ProteasomeInhibition1, ProteasomeInhibition2, ProteasomeInhibition3, ProteasomeInhibition4, ProteasomeInhibition5, UCHL1ProteasomeBinding, UCHL1DamgedProteasomeBinding, SUBProteasomeBindingUb4, SUBProteasomeBindingUb5, SUBProteasomeBindingUb6, SUBProteasomeBindingUb8, asynProt20Sbinding, AsynProteasomeBindingUb4, AsynProteasomeBindingUb5, AsynProteasomeBindingUb6, AsynProteasomeBindingUb7, AsynProteasomeBindingUb8, AggA1ProteasomeInhibition, AggA2ProteasomeInhibition, AggA3ProteasomeInhibition, AggA4ProteasomeInhibition, AggA5ProteasomeInhibition, AggD1ProteasomeInhibition, AggD2ProteasomeInhibition, AggD3ProteasomeInhibition, AggD4ProteasomeInhibition, AggD5ProteasomeInhibition, AggU1ProteasomeInhibition, AggU2ProteasomeInhibition, AggU3ProteasomeInhibition, AggU4ProteasomeInhibition, AggU5ProteasomeInhibition, AggS1ProteasomeInhibition, AggS2ProteasomeInhibition, AggS3ProteasomeInhibition, AggS4ProteasomeInhibition, AggS5ProteasomeInhibition and as a product in UbDegradation, DeubiquitinationBoundMisP1, ProteasomeActivity1, ProteasomeActivity2, ProteasomeActivity3, ProteasomeActivity4, ProteasomeActivity5, UCHL1ProteasomeDegradation, UCHL1DamagedProteasomeDegradation, DeubiquitinationBoundSUB4, SUBDegradationUb4, SUBDegradationUb5, SUBDegradationUb6, SUBDegradationUb7, SUBDegradationUb8, asynProt20Sdegradation, DeubiquitinationBoundasynDamUB, AsynProteasomeActivityUb4, AsynDegradationUb5, AsynDegradationUb6, AsynDegradationUb7, AsynDegradationUb8).

$$\begin{aligned}
\frac{d}{dt} \text{Proteasome} = & v_2 + v_{44} + v_{45} + v_{46} + v_{47} + v_{48} + v_{49} + v_{91} + v_{95} + v_{139} \\
& + v_{140} + v_{141} + v_{142} + v_{143} + v_{144} + v_{147} + v_{186} + v_{187} + v_{188} \\
& + v_{189} + v_{190} + v_{191} - v_2 - v_{35} - v_{36} - v_{37} - v_{38} - v_{39} - v_{79} \\
& - v_{80} - v_{81} - v_{82} - v_{83} - v_{90} - v_{94} - v_{130} - v_{131} - v_{132} - v_{133} \\
& - v_{134} - v_{146} - v_{177} - v_{178} - v_{179} - v_{180} - v_{181} - v_{202} - v_{203} \\
& - v_{204} - v_{205} - v_{206} - v_{224} - v_{225} - v_{226} - v_{227} - v_{228} - v_{263} \\
& - v_{264} - v_{265} - v_{266} - v_{267} - v_{286} - v_{287} - v_{288} - v_{289} - v_{290}
\end{aligned} \tag{650}$$

8.10 Species ROS

SBO:0000245 macromolecule

Initial amount 10 item

This species takes part in 35 reactions (as a reactant in [Misfolding](#), [UCHL1damage](#), [SUBmisfolding](#), [asynDamage](#), [radicalScavenging](#) and as a product in [Misfolding](#), [ROSGenerationSmallAggP1](#), [ROSGenerationSmallAggP2](#), [ROSGenerationSmallAggP3](#), [ROSGenerationSmallAggP4](#), [ROSGenerationSmallAggA1](#), [ROSGenerationSmallAggA2](#), [ROSGenerationSmallAggA3](#), [ROSGenerationSmallAggA4](#), [ROSGenerationSmallAggA5](#), [ROSGenerationSmallAggD2](#), [ROSGenerationSmallAggD3](#), [ROSGenerationSmallAggD4](#), [ROSGenerationSmallAggU1](#), [ROSGenerationSmallAggU2](#), [ROSGenerationSmallAggU3](#), [ROSGenerationSmallAggU5](#), [ROSGenerationSmallAggS1](#), [ROSGenerationSmallAggS2](#), [ROSGenerationSmallAggS4](#), [ROSGenerationSmallAggS5](#), [radicalFormation](#)).

$$\begin{aligned} \frac{d}{dt} \text{ROS} = & v_5 + v_{84} + v_{85} + v_{86} + v_{87} + v_{88} + v_{93} + v_{102} + v_{150} + v_{209} \\ & + v_{210} + v_{211} + v_{212} + v_{213} + v_{248} + v_{249} + v_{250} + v_{251} \\ & + v_{252} + v_{271} + v_{272} + v_{273} + v_{274} + v_{275} + v_{310} + v_{311} \\ & + v_{312} + v_{313} + v_{314} + v_{315} - v_5 - v_{93} - v_{102} - v_{150} - v_{316} \end{aligned} \quad (651)$$

8.11 Species E1_Ub

SBO:0000296 macromolecular complex

Initial amount 795 item

This species takes part in two reactions (as a reactant in [E2UbBinding](#) and as a product in [E1UbBinding](#)).

$$\frac{d}{dt} \text{E1_Ub} = v_9 - v_{10} \quad (652)$$

8.12 Species E2_Ub

SBO:0000296 macromolecular complex

Initial amount 950 item

This species takes part in 25 reactions (as a reactant in [Monoubiquitination](#), [Polyubiquitination1](#), [Polyubiquitination2](#), [Polyubiquitination3](#), [Polyubiquitination4](#), [Polyubiquitination5](#), [Polyubiquitination6](#), [Polyubiquitination7](#), [SUBMonoubiquitination](#), [SUBPolyubiquitination1](#), [SUBPolyubiquitination2](#), [SUBPolyubiquitination3](#), [SUBPolyubiquitination4](#), [SUBPolyubiquitination6](#), [SUBPolyubiquitination7](#), [AsynMonoubiquitination](#), [AsynPolyubiquitination1](#), [AsynPolyubiquitination2](#), [AsynPolyubiquitination3](#), [AsynPolyubiquitination4](#), [AsynPolyubiquitination6](#), [AsynPolyubiquitination7](#) and as a product in [E2UbBinding](#)).

$$\begin{aligned} \frac{d}{dt}E2_Ub = & v_{10} - v_{11} - v_{12} - v_{13} - v_{14} - v_{15} - v_{16} - v_{17} - v_{18} \\ & - v_{106} - v_{107} - v_{108} - v_{109} - v_{110} - v_{111} - v_{112} - v_{113} \\ & - v_{153} - v_{154} - v_{155} - v_{156} - v_{157} - v_{158} - v_{159} - v_{160} \end{aligned} \quad (653)$$

8.13 Species E3_MisP_Ub

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [Polyubiquitination1](#), [MisPDUBbinding1](#), [InclusionGrowth3](#) and as a product in [Monoubiquitination](#)).

$$\frac{d}{dt}E3_MisP_Ub = v_{11} - v_{12} - v_{19} - v_{63} \quad (654)$$

8.14 Species E3_MisP_Ub2

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [Polyubiquitination2](#), [MisPDUBbinding2](#), [InclusionGrowth4](#) and as a product in [Polyubiquitination1](#)).

$$\frac{d}{dt}E3_MisP_Ub2 = v_{12} - v_{13} - v_{20} - v_{64} \quad (655)$$

8.15 Species E3_MisP_Ub3

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [Polyubiquitination3](#), [MisPDUBbinding3](#), [InclusionGrowth5](#) and as a product in [Polyubiquitination2](#)).

$$\frac{d}{dt}E3_MisP_Ub3 = v_{13} - v_{14} - v_{21} - v_{65} \quad (656)$$

8.16 Species E3_MisP_Ub4

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [Polyubiquitination4](#), [MisPDUBbinding4](#), [ProteasomeBindingUb4](#), [InclusionGrowth6](#) and as a product in [Polyubiquitination3](#)).

$$\frac{d}{dt}E3_MisP_Ub4 = v_{14} - v_{15} - v_{22} - v_{35} - v_{66} \quad (657)$$

8.17 Species E3_MisP_Ub5

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [Polyubiquitination5](#), [MisPDUBbinding5](#), [ProteasomeBindingUb5](#), [InclusionGrowth7](#) and as a product in [Polyubiquitination4](#)).

$$\frac{d}{dt}E3_MisP_Ub5 = v_{15} - v_{16} - v_{23} - v_{36} - v_{67} \quad (658)$$

8.18 Species E3_MisP_Ub6

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [Polyubiquitination6](#), [MisPDUBbinding6](#), [ProteasomeBindingUb6](#), [InclusionGrowth8](#) and as a product in [Polyubiquitination5](#)).

$$\frac{d}{dt}E3_MisP_Ub6 = v_{16} - v_{17} - v_{24} - v_{37} - v_{68} \quad (659)$$

8.19 Species E3_MisP_Ub7

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [Polyubiquitination7](#), [MisPDUBbinding7](#), [ProteasomeBindingUb7](#), [InclusionGrowth9](#) and as a product in [Polyubiquitination6](#)).

$$\frac{d}{dt}E3_MisP_Ub7 = v_{17} - v_{18} - v_{25} - v_{38} - v_{69} \quad (660)$$

8.20 Species E3_MisP_Ub8

SBO:0000296 macromolecular complex

Initial amount 300 item

This species takes part in four reactions (as a reactant in [MisPDUBbinding8](#), [ProteasomeBindingUb8](#), [InclusionGrowth10](#) and as a product in [Polyubiquitination7](#)).

$$\frac{d}{dt}E3_MisP_Ub8 = v_{18} - v_{26} - v_{39} - v_{70} \quad (661)$$

8.21 Species MisP_Ub4_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundMisP1](#), [ProteasomeActivity1](#) and as a product in [ProteasomeBindingUb4](#), [DeubiquitinationBoundMisP2](#)).

$$\frac{d}{dt}\text{MisP_Ub4_Proteasome} = v_{35} + v_{43} - v_{44} - v_{45} \quad (662)$$

8.22 Species MisP_Ub5_Proteasome

SBO:0000296 macromolecular complex

Initial amount 1 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundMisP2](#), [ProteasomeActivity2](#) and as a product in [ProteasomeBindingUb5](#), [DeubiquitinationBoundMisP3](#)).

$$\frac{d}{dt}\text{MisP_Ub5_Proteasome} = v_{36} + v_{42} - v_{43} - v_{46} \quad (663)$$

8.23 Species MisP_Ub6_Proteasome

SBO:0000296 macromolecular complex

Initial amount 2 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundMisP3](#), [ProteasomeActivity3](#) and as a product in [ProteasomeBindingUb6](#), [DeubiquitinationBoundMisP4](#)).

$$\frac{d}{dt}\text{MisP_Ub6_Proteasome} = v_{37} + v_{41} - v_{42} - v_{47} \quad (664)$$

8.24 Species MisP_Ub7_Proteasome

SBO:0000296 macromolecular complex

Initial amount 10 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundMisP4](#), [ProteasomeActivity4](#) and as a product in [ProteasomeBindingUb7](#), [DeubiquitinationBoundMisP5](#)).

$$\frac{d}{dt}\text{MisP_Ub7_Proteasome} = v_{38} + v_{40} - v_{41} - v_{48} \quad (665)$$

8.25 Species [MisP_Ub8_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 350 item

This species takes part in three reactions (as a reactant in [DeubiquitinationBoundMisP5](#), [ProteasomeActivity5](#) and as a product in [ProteasomeBindingUb8](#)).

$$\frac{d}{dt}\text{MisP_Ub8_Proteasome} = v_{39} - v_{40} - v_{49} \quad (666)$$

8.26 Species [E3_MisP_Ub_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination1](#), [InclusionGrowth11](#) and as a product in [MisPDUBbinding1](#), [Deubiquitination2](#)).

$$\frac{d}{dt}\text{E3_MisP_Ub_DUB} = v_{19} + v_{33} - v_{34} - v_{71} \quad (667)$$

8.27 Species [E3_MisP_Ub2_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination2](#), [InclusionGrowth12](#) and as a product in [MisPDUBbinding2](#), [Deubiquitination3](#)).

$$\frac{d}{dt}\text{E3_MisP_Ub2_DUB} = v_{20} + v_{32} - v_{33} - v_{72} \quad (668)$$

8.28 Species [E3_MisP_Ub3_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination3](#), [InclusionGrowth13](#) and as a product in [MisPDUBbinding3](#), [Deubiquitination4](#)).

$$\frac{d}{dt}\text{E3_MisP_Ub3_DUB} = v_{21} + v_{31} - v_{32} - v_{73} \quad (669)$$

8.29 Species E3_MisP_Ub4_DUB

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination4](#), [InclusionGrowth14](#) and as a product in [MisPDUBbinding4](#), [Deubiquitination5](#)).

$$\frac{d}{dt}E3_MisP_Ub4_DUB = v_{22} + v_{30} - v_{31} - v_{74} \quad (670)$$

8.30 Species E3_MisP_Ub5_DUB

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination5](#), [InclusionGrowth15](#) and as a product in [MisPDUBbinding5](#), [Deubiquitination6](#)).

$$\frac{d}{dt}E3_MisP_Ub5_DUB = v_{23} + v_{29} - v_{30} - v_{75} \quad (671)$$

8.31 Species E3_MisP_Ub6_DUB

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination6](#), [InclusionGrowth16](#) and as a product in [MisPDUBbinding6](#), [Deubiquitination7](#)).

$$\frac{d}{dt}E3_MisP_Ub6_DUB = v_{24} + v_{28} - v_{29} - v_{76} \quad (672)$$

8.32 Species E3_MisP_Ub7_DUB

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in four reactions (as a reactant in [Deubiquitination7](#), [InclusionGrowth17](#) and as a product in [MisPDUBbinding7](#), [Deubiquitination8](#)).

$$\frac{d}{dt}E3_MisP_Ub7_DUB = v_{25} + v_{27} - v_{28} - v_{77} \quad (673)$$

8.33 Species E3_MisP_Ub8_DUB

SBO:0000296 macromolecular complex

Initial amount 100 item

This species takes part in three reactions (as a reactant in [Deubiquitination8](#), [InclusionGrowth18](#) and as a product in [MisPDUBbinding8](#)).

$$\frac{d}{dt} \text{E3_MisP_Ub8_DUB} = v_{26} - v_{27} - v_{78} \quad (674)$$

8.34 Species AggP1

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregation2](#), [Disaggregation5](#), [ProteasomeInhibition1](#), [ROSGenerationSmallAggP1](#) and as a product in [Aggregation1](#), [Disaggregation4](#), [ROSGenerationSmallAggP1](#)).

$$\frac{d}{dt} \text{AggP1} = v_{50} + v_{58} + v_{84} - v_{51} - v_{59} - v_{79} - v_{84} \quad (675)$$

8.35 Species AggP2

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregation3](#), [Disaggregation4](#), [ProteasomeInhibition2](#), [ROSGenerationSmallAggP2](#) and as a product in [Aggregation2](#), [Disaggregation3](#), [ROSGenerationSmallAggP2](#)).

$$\frac{d}{dt} \text{AggP2} = v_{51} + v_{57} + v_{85} - v_{52} - v_{58} - v_{80} - v_{85} \quad (676)$$

8.36 Species AggP3

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregation4](#), [Disaggregation3](#), [ProteasomeInhibition3](#), [ROSGenerationSmallAggP3](#) and as a product in [Aggregation3](#), [Disaggregation2](#), [ROSGenerationSmallAggP3](#)).

$$\frac{d}{dt} \text{AggP3} = v_{52} + v_{56} + v_{86} - v_{53} - v_{57} - v_{81} - v_{86} \quad (677)$$

8.37 Species AggP4

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregation5](#), [Disaggregation2](#), [ProteasomeInhibition4](#), [ROSGenerationSmallAggP4](#) and as a product in [Aggregation4](#), [Disaggregation1](#), [ROSGenerationSmallAggP4](#)).

$$\frac{d}{dt}\text{AggP4} = v_{53} + v_{55} + v_{87} - v_{54} - v_{56} - v_{82} - v_{87} \quad (678)$$

8.38 Species AggP5

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in six reactions (as a reactant in [Disaggregation1](#), [InclusionFormation](#), [ProteasomeInhibition5](#), [ROSGenerationSmallAggP5](#) and as a product in [Aggregation5](#), [ROSGenerationSmallAggP5](#)).

$$\frac{d}{dt}\text{AggP5} = v_{54} + v_{88} - v_{55} - v_{60} - v_{83} - v_{88} \quad (679)$$

8.39 Species SeqAggP

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 119 reactions (as a reactant in [InclusionGrowth1](#), [InclusionGrowth2](#), [InclusionGrowth3](#), [InclusionGrowth4](#), [InclusionGrowth5](#), [InclusionGrowth6](#), [InclusionGrowth7](#), [InclusionGrowth8](#), [InclusionGrowth9](#), [InclusionGrowth10](#), [InclusionGrowth11](#), [InclusionGrowth12](#), [InclusionGrowth13](#), [InclusionGrowth14](#), [InclusionGrowth15](#), [InclusionGrowth16](#), [InclusionGrowth17](#), [InclusionGrowth18](#), [AsynInclusionGrowth](#), [AsynDamInclusionGrowth1](#), [AsynDamInclusionGrowth2](#), [AsynDamInclusionGrowth3](#), [AsynDamInclusionGrowth4](#), [AsynDamInclusionGrowth5](#), [AsynDamInclusionGrowth6](#), [AsynDamInclusionGrowth7](#), [AsynDamInclusionGrowth8](#), [AsynDamInclusionGrowth9](#), [AsynDamInclusionGrowth10](#), [AsynDamInclusionGrowth11](#), [AsynDamInclusionGrowth12](#), [AsynDamInclusionGrowth13](#), [AsynDamInclusionGrowth14](#), [AsynDamInclusionGrowth15](#), [AsynDamInclusionGrowth16](#), [AsynDamInclusionGrowth17](#), [AsynDamInclusionGrowth18](#), [UCHL1DamagedSequestering](#), [UCHL1DamagedLamp2aSequestering](#), [SUBInclusionGrowth0](#), [SUBInclusionGrowth1](#), [SUBInclusionGrowth2](#), [SUBInclusionGrowth3](#), [SUBInclusionGrowth4](#), [SUBInclusionGrowth5](#), [SUBInclusionGrowth6](#), [SUBInclusionGrowth7](#), [SUBInclusionGrowth8](#), [SUBInclusionGrowth9](#), [SUBInclusionGrowth10](#), [SUBInclusionGrowth11](#), [SUBInclusionGrowth12](#), [SUBInclusionGrowth13](#), [SUBInclusionGrowth14](#), [SUBInclusionGrowth15](#), [SUBInclusionGrowth16](#), [SUBInclusionGrowth17](#) and as a product in [InclusionFormation](#), [InclusionGrowth1](#), [InclusionGrowth2](#), [InclusionGrowth3](#),

InclusionGrowth4, InclusionGrowth5, InclusionGrowth6, InclusionGrowth7, InclusionGrowth8, InclusionGrowth9, InclusionGrowth10, InclusionGrowth11, InclusionGrowth12, InclusionGrowth13, InclusionGrowth14, InclusionGrowth15, InclusionGrowth16, InclusionGrowth17, InclusionGrowth18, AsynInclusionFormation, AsynInclusionGrowth, AsynDamInclusionFormation, AsynDamInclusionGrowth, AsynDamInclusionGrowth2, AsynDamInclusionGrowth3, AsynDamInclusionGrowth4, AsynDamInclusionGrowth5, AsynDamInclusionGrowth6, AsynDamInclusionGrowth7, AsynDamInclusionGrowth8, AsynDamInclusionGrowth9, AsynDamInclusionGrowth10, AsynDamInclusionGrowth11, AsynDamInclusionGrowth12, AsynDamInclusionGrowth13, AsynDamInclusionGrowth14, AsynDamInclusionGrowth15, AsynDamInclusionGrowth16, AsynDamInclusionGrowth17, AsynDamInclusionGrowth18, UCHL1DamInclusionFormation, UCHL1DamagedSequestering, UCHL1DamagedLamp2aSequestering, SUBInclusionFormation, SUBInclusionGrowth0, SUBInclusionGrowth1, SUBInclusionGrowth2, SUBInclusionGrowth3, SUBInclusionGrowth4, SUBInclusionGrowth5, SUBInclusionGrowth6, SUBInclusionGrowth7, SUBInclusionGrowth8, SUBInclusionGrowth9, SUBInclusionGrowth10, SUBInclusionGrowth11, SUBInclusionGrowth12, SUBInclusionGrowth13, SUBInclusionGrowth14, SUBInclusionGrowth15, SUBInclusionGrowth16, SUBInclusionGrowth17).

$$\begin{aligned} \frac{d}{dt} \text{SeqAggP} = & v_{60} + 2 v_{61} + 2 v_{62} + 2 v_{63} + 2 v_{64} + 2 v_{65} + 2 v_{66} + 2 v_{67} + 2 v_{68} \\ & + 2 v_{69} + 2 v_{70} + 2 v_{71} + 2 v_{72} + 2 v_{73} + 2 v_{74} + 2 v_{75} + 2 v_{76} + 2 v_{77} \\ & + 2 v_{78} + v_{207} + 2 v_{208} + v_{229} + 2 v_{230} + 2 v_{231} + 2 v_{232} + 2 v_{233} + 2 v_{234} \\ & + 2 v_{235} + 2 v_{236} + 2 v_{237} + 2 v_{238} + 2 v_{239} + 2 v_{240} + 2 v_{241} + 2 v_{242} \\ & + 2 v_{243} + 2 v_{244} + 2 v_{245} + 2 v_{246} + 2 v_{247} + v_{268} + 2 v_{269} + 2 v_{270} \\ & + v_{291} + 2 v_{292} + 2 v_{293} + 2 v_{294} + 2 v_{295} + 2 v_{296} + 2 v_{297} + 2 v_{298} \\ & + 2 v_{299} + 2 v_{300} + 2 v_{301} + 2 v_{302} + 2 v_{303} + 2 v_{304} + 2 v_{305} + 2 v_{306} \\ & + 2 v_{307} + 2 v_{308} + 2 v_{309} - v_{61} - v_{62} - v_{63} - v_{64} - v_{65} - v_{66} - v_{67} \\ & - v_{68} - v_{69} - v_{70} - v_{71} - v_{72} - v_{73} - v_{74} - v_{75} - v_{76} - v_{77} - v_{78} \\ & - v_{208} - v_{230} - v_{231} - v_{232} - v_{233} - v_{234} - v_{235} - v_{236} - v_{237} - v_{238} \\ & - v_{239} - v_{240} - v_{241} - v_{242} - v_{243} - v_{244} - v_{245} - v_{246} - v_{247} - v_{269} \\ & - v_{270} - v_{292} - v_{293} - v_{294} - v_{295} - v_{296} - v_{297} - v_{298} - v_{299} - v_{300} \\ & - v_{301} - v_{302} - v_{303} - v_{304} - v_{305} - v_{306} - v_{307} - v_{308} - v_{309} \end{aligned} \quad (680)$$

8.40 Species AggP_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in 25 reactions (as a product in [ProteasomeInhibition1](#), [ProteasomeInhibition2](#), [ProteasomeInhibition3](#), [ProteasomeInhibition4](#), [ProteasomeInhibition5](#), [AggA1ProteasomeInhibition](#), [AggA2ProteasomeInhibition](#), [AggA3ProteasomeInhibition](#), [AggA4ProteasomeInhibition](#), [AggA5ProteasomeInhibition](#), [AggD1ProteasomeInhibition](#), [AggD2ProteasomeInhibition](#), [AggD3ProteasomeInhibition](#), [AggD4ProteasomeInhibition](#), [AggD5ProteasomeInhibition](#),

AggU1ProteasomeInhibition, AggU2ProteasomeInhibition, AggU3ProteasomeInhibition, AggU4ProteasomeInhibition, AggU5ProteasomeInhibition, AggS1ProteasomeInhibition, AggS2ProteasomeInhibition, AggS3ProteasomeInhibition, AggS4ProteasomeInhibition, AggS5ProteasomeInhibition).

$$\begin{aligned} \frac{d}{dt} \text{AggP_Proteasome} = & v_{79} + v_{80} + v_{81} + v_{82} + v_{83} + v_{202} + v_{203} + v_{204} + v_{205} \\ & + v_{206} + v_{224} + v_{225} + v_{226} + v_{227} + v_{228} + v_{263} + v_{264} \\ & + v_{265} + v_{266} + v_{267} + v_{286} + v_{287} + v_{288} + v_{289} + v_{290} \end{aligned} \quad (681)$$

8.41 Species ATP

SBO:0000247 simple chemical

Initial amount 10000 item

This species takes part in 16 reactions (as a reactant in [E1UbBinding](#), [ProteasomeActivity1](#), [ProteasomeActivity2](#), [ProteasomeActivity3](#), [ProteasomeActivity4](#), [ProteasomeActivity5](#), [SUBDegradationUb4](#), [SUBDegradationUb5](#), [SUBDegradationUb6](#), [SUBDegradationUb7](#), [SUBDegradationUb8](#), [AsynProteasomeActivityUb4](#), [AsynDegradationUb5](#), [AsynDegradationUb6](#), [AsynDegradationUb7](#), [AsynDegradationUb8](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ATP} = 0 \quad (682)$$

8.42 Species ADP

SBO:0000247 simple chemical

Initial amount 1000 item

This species takes part in 15 reactions (as a product in [ProteasomeActivity1](#), [ProteasomeActivity2](#), [ProteasomeActivity3](#), [ProteasomeActivity4](#), [ProteasomeActivity5](#), [SUBDegradationUb4](#), [SUBDegradationUb5](#), [SUBDegradationUb6](#), [SUBDegradationUb7](#), [SUBDegradationUb8](#), [AsynProteasomeActivityUb4](#), [AsynDegradationUb5](#), [AsynDegradationUb6](#), [AsynDegradationUb7](#), [AsynDegradationUb8](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt} \text{ADP} = 0 \quad (683)$$

8.43 Species AMP

SBO:0000247 simple chemical

Initial amount 1000 item

This species takes part in one reaction (as a product in [E1UbBinding](#)), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{AMP} = 0 \quad (684)$$

8.44 Species UCHL1

SBO:0000245 macromolecule

Initial amount 5785 item

This species takes part in 15 reactions (as a reactant in [UCHL1ProteasomeBinding](#), [UCHL1LysosomalDegradation](#), [UCHL1damage](#), [UbUCHL1binding](#), [SUBUCHL1binding1](#), [SUBUCHL1binding2](#), [SUBUCHL1binding3](#), [SUBUCHL1binding4](#), [SUBUCHL1binding5Ub_UCHL1](#), [SUBUCHL1binding6](#), [SUBUCHL1binding7](#), [SUBUCHL1binding8](#) and as a product in [UCHL1Synthesis](#), [UbUCHL1release](#), [SUBDeubiquitination1](#)).

$$\begin{aligned} \frac{d}{dt}\text{UCHL1} = & v_{89} + v_{100} + v_{129} - v_{90} - v_{92} - v_{93} - v_{99} - v_{114} \\ & - v_{115} - v_{116} - v_{117} - v_{118} - v_{119} - v_{120} - v_{121} \end{aligned} \quad (685)$$

8.45 Species UCHL1_Proteasome

SBO:0000296 macromolecular complex

Initial amount 10 item

This species takes part in two reactions (as a reactant in [UCHL1ProteasomeDegradation](#) and as a product in [UCHL1ProteasomeBinding](#)).

$$\frac{d}{dt}\text{UCHL1_Proteasome} = v_{90} - v_{91} \quad (686)$$

8.46 Species UCHL1_damaged_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in two reactions (as a reactant in [UCHL1DamagedProteasomeDegradation](#) and as a product in [UCHL1DamgedProteasomeBinding](#)).

$$\frac{d}{dt}\text{UCHL1_damaged_Proteasome} = v_{94} - v_{95} \quad (687)$$

8.47 Species Lysosome

SBO:0000290 physical compartment

Initial amount 1200 item

This species takes part in four reactions (as a reactant in [UCHL1LysosomalDegradation](#), [UCHL1DamagedLysosomalDegradation](#) and as a product in [UCHL1LysosomalDegradation](#), [UCHL1DamagedLysosomalDegradation](#)).

$$\frac{d}{dt}\text{Lysosome} = v_{92} + v_{96} - v_{92} - v_{96} \quad (688)$$

8.48 Species UCHL1_damaged

SBO:0000245 macromolecule

Initial amount 0 item

This species takes part in 17 reactions (as a reactant in [UCHL1DamgedProteasomeBinding](#), [UCHL1DamagedLysosomalDegradation](#), [UCHL1Lamp2abinding](#), [AggregationUCHL1Dam1](#), [AggregationUCHL1Dam2](#), [AggregationUCHL1Dam3](#), [AggregationUCHL1Dam4](#), [AggregationUCHL1Dam5](#), [UCHL1DamInclusionFormation](#), [UCHL1DamagedSequestering](#) and as a product in [UCHL1damage](#), [UCHL1Lamp2aRelease](#), [DisaggregationUCHL1Dam1](#), [DisaggregationUCHL1Dam2](#), [DisaggregationUCHL1Dam3](#), [DisaggregationUCHL1Dam4](#), [DisaggregationUCHL1Dam5](#)).

$$\begin{aligned} \frac{d}{dt}\text{UCHL1_damaged} = & v_{93} + v_{98} + v_{258} + v_{259} + v_{260} + v_{261} + 2 v_{262} - v_{94} - v_{96} \\ & - v_{97} - 2 v_{253} - v_{254} - v_{255} - v_{256} - v_{257} - v_{268} - v_{269} \end{aligned} \quad (689)$$

8.49 Species Lamp2a

SBO:0000245 macromolecule

Initial amount 200 item

This species takes part in four reactions (as a reactant in [UCHL1Lamp2abinding](#), [asynLamp2aBinding](#) and as a product in [UCHL1Lamp2aRelease](#), [asynCMAdegradation](#)).

$$\frac{d}{dt}\text{Lamp2a} = v_{98} + v_{149} - v_{97} - v_{148} \quad (690)$$

8.50 Species Lamp2a_UCHL1_damaged

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in three reactions (as a reactant in [UCHL1Lamp2aRelease](#), [UCHL1DamagedLamp2aSequestering](#) and as a product in [UCHL1Lamp2abinding](#)).

$$\frac{d}{dt}\text{Lamp2a_UCHL1_damaged} = v_{97} - v_{98} - v_{270} \quad (691)$$

8.51 Species Ub_UCHL1

SBO:0000296 macromolecular complex

Initial amount 500 item

This species takes part in two reactions (as a reactant in [UbUCHL1release](#) and as a product in [UbUCHL1binding](#)).

$$\frac{d}{dt}\text{Ub_UCHL1} = v_{99} - v_{100} \quad (692)$$

8.52 Species SUB

SBO:0000245 macromolecule

Initial amount 815 item

This species takes part in three reactions (as a reactant in [SUBmisfolding](#) and as a product in [SUBsynthesis](#), [SUBrefolding](#)).

$$\frac{d}{dt}\text{SUB} = v_{101} + v_{103} - v_{102} \quad (693)$$

8.53 Species SUB_misfolded

SBO:0000245 macromolecule

Initial amount 5 item

This species takes part in 17 reactions (as a reactant in [SUBrefolding](#), [E3SUBBinding](#), [SUBAggregation1](#), [SUBAggregation2](#), [SUBAggregation3](#), [SUBAggregation4](#), [SUBAggregation5](#), [SUBInclusionFormation](#), [SUBInclusionGrowth0](#) and as a product in [SUBmisfolding](#), [E3SUBRelease](#), [DeubiquitinationBoundSUB4](#), [SUBDisaggregation1](#), [SUBDisaggregation2](#), [SUBDisaggregation3](#), [SUBDisaggregation4](#), [SUBDisaggregation5](#)).

$$\begin{aligned} \frac{d}{dt}\text{SUB_misfolded} = & v_{102} + v_{105} + v_{139} + v_{281} + v_{282} + v_{283} + v_{284} + 2 v_{285} - v_{103} \\ & - v_{104} - 2 v_{276} - v_{277} - v_{278} - v_{279} - v_{280} - v_{291} - v_{292} \end{aligned} \quad (694)$$

8.54 Species E3SUB

SBO:0000014 enzyme

Initial amount 160 item

This species takes part in seven reactions (as a reactant in [E3SUBBinding](#) and as a product in [E3SUBRelease](#), [SUBProteasomeBindingUb4](#), [SUBProteasomeBindingUb5](#), [SUBProteasomeBindingUb6](#), [SUBProteasomeBindingUb7](#), [SUBProteasomeBindingUb8](#)).

$$\frac{d}{dt}\text{E3SUB} = v_{105} + v_{130} + v_{131} + v_{132} + v_{133} + v_{134} - v_{104} \quad (695)$$

8.55 Species E3SUB.SUB_misfolded

SBO:0000014 enzyme

Initial amount 5 item

This species takes part in five reactions (as a reactant in [E3SUBRelease](#), [SUBMonoubiquitination](#), [SUBInclusionGrowth1](#) and as a product in [E3SUBBinding](#), [SUBDeubiquitination1](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded} = v_{104} + v_{129} - v_{105} - v_{106} - v_{293} \quad (696)$$

8.56 Species E3SUB.SUB_misfolded_Ub

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [SUBPolyubiquitination1](#), [SUBUCL1binding1](#), [SUBInclusionGrowth2](#) and as a product in [SUBMonoubiquitination](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub} = v_{106} - v_{107} - v_{114} - v_{294} \quad (697)$$

8.57 Species E3SUB.SUB_misfolded_Ub2

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [SUBPolyubiquitination2](#), [SUBUCL1binding2](#), [SUBInclusionGrowth3](#) and as a product in [SUBPolyubiquitination1](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub2} = v_{107} - v_{108} - v_{115} - v_{295} \quad (698)$$

8.58 Species E3SUB.SUB_misfolded_Ub3

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [SUBPolyubiquitination3](#), [SUBUCL1binding3](#), [SUBInclusionGrowth4](#) and as a product in [SUBPolyubiquitination2](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub3} = v_{108} - v_{109} - v_{116} - v_{296} \quad (699)$$

8.59 Species E3SUB_SUB_misfolded_Ub4

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in SUBPolyubiquitination4, SUBUCL1binding4, SUBProteasomeBindingUb4, SUBInclusionGrowth5 and as a product in SUBPolyubiquitination3).

$$\frac{d}{dt} \text{E3SUB_SUB_misfolded_Ub4} = v_{109} - v_{110} - v_{117} - v_{130} - v_{297} \quad (700)$$

8.60 Species E3SUB_SUB_misfolded_Ub5

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in SUBPolyubiquitination5, SUBUCL1binding5Ub-UCL1, SUBProteasomeBindingUb5, SUBInclusionGrowth6 and as a product in SUBPolyubiquitination4).

$$\frac{d}{dt} \text{E3SUB_SUB_misfolded_Ub5} = v_{110} - v_{111} - v_{118} - v_{131} - v_{298} \quad (701)$$

8.61 Species E3SUB_SUB_misfolded_Ub6

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in SUBPolyubiquitination6, SUBUCL1binding6, SUBProteasomeBindingUb6, SUBInclusionGrowth7 and as a product in SUBPolyubiquitination5).

$$\frac{d}{dt} \text{E3SUB_SUB_misfolded_Ub6} = v_{111} - v_{112} - v_{119} - v_{132} - v_{299} \quad (702)$$

8.62 Species E3SUB_SUB_misfolded_Ub7

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in SUBPolyubiquitination7, SUBUCL1binding7, SUBProteasomeBindingUb7, SUBInclusionGrowth8 and as a product in SUBPolyubiquitination6).

$$\frac{d}{dt} \text{E3SUB_SUB_misfolded_Ub7} = v_{112} - v_{113} - v_{120} - v_{133} - v_{300} \quad (703)$$

8.63 Species E3SUB.SUB_misfolded_Ub8

SBO:0000296 macromolecular complex

Initial amount 15 item

This species takes part in four reactions (as a reactant in [SUBUCL1binding8](#), [SUBProteasomeBindingUb8](#), [SUBInclusionGrowth9](#) and as a product in [SUBPolyubiquitination7](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub8} = v_{113} - v_{121} - v_{134} - v_{301} \quad (704)$$

8.64 Species E3SUB.SUB_misfolded_Ub_UCL1

SBO:0000296 macromolecular complex

Initial amount 20 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination1](#), [SUBInclusionGrowth10](#) and as a product in [SUBUCL1binding1](#), [SUBDeubiquitination2](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub_UCL1} = v_{114} + v_{128} - v_{129} - v_{302} \quad (705)$$

8.65 Species E3SUB.SUB_misfolded_Ub2_UCL1

SBO:0000296 macromolecular complex

Initial amount 20 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination2](#), [SUBInclusionGrowth11](#) and as a product in [SUBUCL1binding2](#), [SUBDeubiquitination3](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub2_UCL1} = v_{115} + v_{127} - v_{128} - v_{303} \quad (706)$$

8.66 Species E3SUB.SUB_misfolded_Ub3_UCL1

SBO:0000296 macromolecular complex

Initial amount 25 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination3](#), [SUBInclusionGrowth12](#) and as a product in [SUBUCL1binding3](#), [SUBDeubiquitination4](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub3_UCL1} = v_{116} + v_{126} - v_{127} - v_{304} \quad (707)$$

8.67 Species E3SUB.SUB_misfolded_Ub4_UCHL1

SBO:0000296 macromolecular complex

Initial amount 25 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination4](#), [SUBInclusionGrowth13](#) and as a product in [SUBUCHL1binding4](#), [SUBDeubiquitination5](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub4_UCHL1} = v_{117} + v_{125} - v_{126} - v_{305} \quad (708)$$

8.68 Species E3SUB.SUB_misfolded_Ub5_UCHL1

SBO:0000296 macromolecular complex

Initial amount 30 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination5](#), [SUBInclusionGrowth14](#) and as a product in [SUBUCHL1binding5Ub_UCHL1](#), [SUBDeubiquitination6](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub5_UCHL1} = v_{118} + v_{124} - v_{125} - v_{306} \quad (709)$$

8.69 Species E3SUB.SUB_misfolded_Ub6_UCHL1

SBO:0000296 macromolecular complex

Initial amount 30 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination6](#), [SUBInclusionGrowth15](#) and as a product in [SUBUCHL1binding6](#), [SUBDeubiquitination7](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub6_UCHL1} = v_{119} + v_{123} - v_{124} - v_{307} \quad (710)$$

8.70 Species E3SUB.SUB_misfolded_Ub7_UCHL1

SBO:0000296 macromolecular complex

Initial amount 40 item

This species takes part in four reactions (as a reactant in [SUBDeubiquitination7](#), [SUBInclusionGrowth16](#) and as a product in [SUBUCHL1binding7](#), [SUBDeubiquitination8](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub7_UCHL1} = v_{120} + v_{122} - v_{123} - v_{308} \quad (711)$$

8.71 Species E3SUB.SUB_misfolded_Ub8_UCHL1

SBO:0000296 macromolecular complex

Initial amount 40 item

This species takes part in three reactions (as a reactant in [SUBDeubiquitination8](#), [SUBInclusionGrowth17](#) and as a product in [SUBUCHL1binding8](#)).

$$\frac{d}{dt} \text{E3SUB.SUB_misfolded_Ub8_UCHL1} = v_{121} - v_{122} - v_{309} \quad (712)$$

8.72 Species SUB_misfolded_Ub4_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundSUB4](#), [SUBDegradationUb4](#) and as a product in [SUBProteasomeBindingUb4](#), [DeubiquitinationBoundSUB5](#)).

$$\frac{d}{dt} \text{SUB_misfolded_Ub4_Proteasome} = v_{130} + v_{138} - v_{139} - v_{140} \quad (713)$$

8.73 Species SUB_misfolded_Ub5_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundSUB5](#), [SUBDegradationUb5](#) and as a product in [SUBProteasomeBindingUb5](#), [DeubiquitinationBoundSUB6](#)).

$$\frac{d}{dt} \text{SUB_misfolded_Ub5_Proteasome} = v_{131} + v_{137} - v_{138} - v_{141} \quad (714)$$

8.74 Species SUB_misfolded_Ub6_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundSUB6](#), [SUBDegradationUb6](#) and as a product in [SUBProteasomeBindingUb6](#), [DeubiquitinationBoundSUB7](#)).

$$\frac{d}{dt} \text{SUB_misfolded_Ub6_Proteasome} = v_{132} + v_{136} - v_{137} - v_{142} \quad (715)$$

8.75 Species SUB_misfolded_Ub7_Proteasome

SBO:0000296 macromolecular complex

Initial amount 5 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundSUB7](#), [SUBDegradationUb7](#) and as a product in [SUBProteasomeBindingUb7](#), [DeubiquitinationBoundSUB8](#)).

$$\frac{d}{dt} \text{SUB_misfolded_Ub7_Proteasome} = v_{133} + v_{135} - v_{136} - v_{143} \quad (716)$$

8.76 Species SUB_misfolded_Ub8_Proteasome

SBO:0000296 macromolecular complex

Initial amount 20 item

This species takes part in three reactions (as a reactant in [DeubiquitinationBoundSUB8](#), [SUBDegradationUb8](#) and as a product in [SUBProteasomeBindingUb8](#)).

$$\frac{d}{dt} \text{SUB_misfolded_Ub8_Proteasome} = v_{134} - v_{135} - v_{144} \quad (717)$$

8.77 Species asyn

SBO:0000245 macromolecule

Initial amount 3000 item

This species takes part in 16 reactions (as a reactant in [asynProt20Sbinding](#), [asynLamp2aBinding](#), [asynDamage](#), [Aggregationasyn1](#), [Aggregationasyn2](#), [Aggregationasyn3](#), [Aggregationasyn4](#), [Aggregationasyn5](#), [AsynInclusionFormation](#), [AsynInclusionGrowth](#) and as a product in [asynSynthesis1](#), [DisAggregationasyn1](#), [DisAggregationasyn2](#), [DisAggregationasyn3](#), [DisAggregationasyn4](#), [DisAggregationasyn5](#)).

$$\begin{aligned} \frac{d}{dt} \text{asyn} = & v_{145} + v_{197} + v_{198} + v_{199} + v_{200} + 2 v_{201} - v_{146} - v_{148} \\ & - v_{150} - 2 v_{192} - v_{193} - v_{194} - v_{195} - v_{196} - v_{207} - v_{208} \end{aligned} \quad (718)$$

8.78 Species asyn_Proteasome

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in two reactions (as a reactant in [asynProt20Sdegradation](#) and as a product in [asynProt20Sbinding](#)).

$$\frac{d}{dt} \text{asyn_Proteasome} = v_{146} - v_{147} \quad (719)$$

8.79 Species `asyn_Lamp2a`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in two reactions (as a reactant in `asynCMAdegradation` and as a product in `asynLamp2aBinding`).

$$\frac{d}{dt}\text{asyn_Lamp2a} = v_{148} - v_{149} \quad (720)$$

8.80 Species `asyn_dam`

SBO:0000245 macromolecule

Initial amount 0 item

This species takes part in 16 reactions (as a reactant in `asyn_damParkinBinding`, `AggregationAsynDam1`, `AggregationAsynDam2`, `AggregationAsynDam3`, `AggregationAsynDam4`, `AggregationAsynDam5`, `AsynDamInclusionFormation`, `AsynDamInclusionGrowth1` and as a product in `asynDamage`, `asyn_damParkinRelease`, `DeubiquitinationBoundasynDamUb4`, `DisaggregationAsynDam1`, `DisaggregationAsynDam2`, `DisaggregationAsynDam3`, `DisaggregationAsynDam4`, `DisaggregationAsynDam5`).

$$\begin{aligned} \frac{d}{dt}\text{asyn_dam} = & v_{150} + v_{152} + v_{186} + v_{219} + v_{220} + v_{221} + v_{222} + 2 v_{223} \\ & - v_{151} - 2 v_{214} - v_{215} - v_{216} - v_{217} - v_{218} - v_{229} - v_{230} \end{aligned} \quad (721)$$

8.81 Species `Parkin`

SBO:0000245 macromolecule

Initial amount 4800 item

This species takes part in seven reactions (as a reactant in `asyn_damParkinBinding` and as a product in `asyn_damParkinRelease`, `AsynProteasomeBindingUb4`, `AsynProteasomeBindingUb5`, `AsynProteasomeBindingUb6`, `AsynProteasomeBindingUb7`, `AsynProteasomeBindingUb8`).

$$\frac{d}{dt}\text{Parkin} = v_{152} + v_{177} + v_{178} + v_{179} + v_{180} + v_{181} - v_{151} \quad (722)$$

8.82 Species `Parkin_asyn_dam`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in `asyn_damParkinRelease`, `AsynMonoubiquitination`, `AsynDamInclusionGrowth2` and as a product in `asyn_damParkinBinding`, `AsynDeubiquitinationUb1`).

$$\frac{d}{dt}\text{Parkin_asyn_dam} = v_{151} + v_{176} - v_{152} - v_{153} - v_{231} \quad (723)$$

8.83 Species `Parkin_asyn_dam_Ub`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynPolyubiquitination1](#), [AsynDUBbindingUb1](#), [AsynDamInclusionGrowth3](#) and as a product in [AsynMonoubiquitination](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub} = v_{153} - v_{154} - v_{168} - v_{232} \quad (724)$$

8.84 Species `Parkin_asyn_dam_Ub2`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynPolyubiquitination2](#), [AsynDUBbindingUb2](#), [AsynDamInclusionGrowth4](#) and as a product in [AsynPolyubiquitination1](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub2} = v_{154} - v_{155} - v_{167} - v_{233} \quad (725)$$

8.85 Species `Parkin_asyn_dam_Ub3`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynPolyubiquitination3](#), [AsynDUBbindingUb3](#), [AsynDamInclusionGrowth5](#) and as a product in [AsynPolyubiquitination2](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub3} = v_{155} - v_{156} - v_{166} - v_{234} \quad (726)$$

8.86 Species `Parkin_asyn_dam_Ub4`

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [AsynPolyubiquitination4](#), [AsynDUBbindingUb4](#), [AsynProteasomeBindingUb4](#), [AsynDamInclusionGrowth6](#) and as a product in [AsynPolyubiquitination3](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub4} = v_{156} - v_{157} - v_{165} - v_{177} - v_{235} \quad (727)$$

8.87 Species [Parkin_asyn_dam_Ub5](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [AsynPolyubiquitination5](#), [AsynDUBbindingUb5](#), [AsynProteasomeBindingUb5](#), [AsynDamInclusionGrowth7](#) and as a product in [AsynPolyubiquitination4](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub5} = v_{157} - v_{158} - v_{164} - v_{178} - v_{236} \quad (728)$$

8.88 Species [Parkin_asyn_dam_Ub6](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [AsynPolyubiquitination6](#), [AsynDUBbindingUb6](#), [AsynProteasomeBindingUb6](#), [AsynDamInclusionGrowth8](#) and as a product in [AsynPolyubiquitination5](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub6} = v_{158} - v_{159} - v_{163} - v_{179} - v_{237} \quad (729)$$

8.89 Species [Parkin_asyn_dam_Ub7](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in five reactions (as a reactant in [AsynPolyubiquitination7](#), [AsynDUBbindingUb7](#), [AsynProteasomeBindingUb7](#), [AsynDamInclusionGrowth9](#) and as a product in [AsynPolyubiquitination6](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub7} = v_{159} - v_{160} - v_{162} - v_{180} - v_{238} \quad (730)$$

8.90 Species [Parkin_asyn_dam_Ub8](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDUBbindingUb8](#), [AsynProteasomeBindingUb8](#), [AsynDamInclusionGrowth10](#) and as a product in [AsynPolyubiquitination7](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub8} = v_{160} - v_{161} - v_{181} - v_{239} \quad (731)$$

8.91 Species [Parkin_asyn_dam_Ub_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb1](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb1](#), [AsynDeubiquitinationUb2](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub_DUB} = v_{168} + v_{175} - v_{176} - v_{240} \quad (732)$$

8.92 Species [Parkin_asyn_dam_Ub2_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb2](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb2](#), [AsynDeubiquitinationUb3](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub2_DUB} = v_{167} + v_{174} - v_{175} - v_{241} \quad (733)$$

8.93 Species [Parkin_asyn_dam_Ub3_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb3](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb3](#), [AsynDeubiquitinationUb4](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub3_DUB} = v_{166} + v_{173} - v_{174} - v_{242} \quad (734)$$

8.94 Species [Parkin_asyn_dam_Ub4_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb4](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb4](#), [AsynDeubiquitinationUb5](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub4_DUB} = v_{165} + v_{172} - v_{173} - v_{243} \quad (735)$$

8.95 Species [Parkin_asyn_dam_Ub5_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb5](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb5](#), [AsynDeubiquitinationUb6](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub5_DUB} = v_{164} + v_{171} - v_{172} - v_{244} \quad (736)$$

8.96 Species [Parkin_asyn_dam_Ub6_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb6](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb6](#), [AsynDeubiquitinationUb7](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub6_DUB} = v_{163} + v_{170} - v_{171} - v_{245} \quad (737)$$

8.97 Species [Parkin_asyn_dam_Ub7_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [AsynDeubiquitinationUb7](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb7](#), [AsynDeubiquitinationUb8](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub7_DUB} = v_{162} + v_{169} - v_{170} - v_{246} \quad (738)$$

8.98 Species [Parkin_asyn_dam_Ub8_DUB](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in three reactions (as a reactant in [AsynDeubiquitinationUb8](#), [AsynDamInclusionGrowth1](#) and as a product in [AsynDUBbindingUb8](#)).

$$\frac{d}{dt}\text{Parkin_asyn_dam_Ub8_DUB} = v_{161} - v_{169} - v_{247} \quad (739)$$

8.99 Species [asyn_dam_Ub4_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundasynDamUb4](#), [AsynProteasomeActivityUb4](#) and as a product in [AsynProteasomeBindingUb4](#), [DeubiquitinationBoundasynDamUb4](#)).

$$\frac{d}{dt}\text{asyn_dam_Ub4_Proteasome} = v_{177} + v_{185} - v_{186} - v_{187} \quad (740)$$

8.100 Species [asyn_dam_Ub5_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundasynDamUb5](#), [AsynDegradationUb5](#) and as a product in [AsynProteasomeBindingUb5](#), [DeubiquitinationBoundasynDamUb5](#)).

$$\frac{d}{dt}\text{asyn_dam_Ub5_Proteasome} = v_{178} + v_{184} - v_{185} - v_{188} \quad (741)$$

8.101 Species [asyn_dam_Ub6_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundasynDamUb6](#), [AsynDegradationUb6](#) and as a product in [AsynProteasomeBindingUb6](#), [DeubiquitinationBoundasynDamUb6](#)).

$$\frac{d}{dt}\text{asyn_dam_Ub6_Proteasome} = v_{179} + v_{183} - v_{184} - v_{189} \quad (742)$$

8.102 Species [asyn_dam_Ub7_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in four reactions (as a reactant in [DeubiquitinationBoundasynDamUb7](#), [AsynDegradationUb7](#) and as a product in [AsynProteasomeBindingUb7](#), [DeubiquitinationBoundasynDamUb7](#)).

$$\frac{d}{dt}\text{asyn_dam_Ub7_Proteasome} = v_{180} + v_{182} - v_{183} - v_{190} \quad (743)$$

8.103 Species [asyn_dam_Ub8_Proteasome](#)

SBO:0000296 macromolecular complex

Initial amount 0 item

This species takes part in three reactions (as a reactant in [DeubiquitinationBoundasyn_damUb8](#), [AsynDegradationUb8](#) and as a product in [AsynProteasomeBindingUb8](#)).

$$\frac{d}{dt}\text{asyn_dam_Ub8_Proteasome} = v_{181} - v_{182} - v_{191} \quad (744)$$

8.104 Species [AggA1](#)

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregationasyn2](#), [DisAggregationasyn5](#), [AggA1ProteasomeInhibition](#), [ROSgenerationSmallAggA1](#) and as a product in [Aggregationasyn1](#), [DisAggregationasyn4](#), [ROSgenerationSmallAggA1](#)).

$$\frac{d}{dt}\text{AggA1} = v_{192} + v_{200} + v_{209} - v_{193} - v_{201} - v_{202} - v_{209} \quad (745)$$

8.105 Species [AggA2](#)

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregationasyn3](#), [DisAggregationasyn4](#), [AggA2ProteasomeInhibition](#), [ROSgenerationSmallAggA2](#) and as a product in [Aggregationasyn2](#), [DisAggregationasyn3](#), [ROSgenerationSmallAggA2](#)).

$$\frac{d}{dt}\text{AggA2} = v_{193} + v_{199} + v_{210} - v_{194} - v_{200} - v_{203} - v_{210} \quad (746)$$

8.106 Species [AggA3](#)

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregationasyn4](#), [DisAggregationasyn3](#), [AggA3ProteasomeInhibition](#), [ROSgenerationSmallAggA3](#) and as a product in [Aggregationasyn3](#), [DisAggregationasyn2](#), [ROSgenerationSmallAggA3](#)).

$$\frac{d}{dt}\text{AggA3} = v_{194} + v_{198} + v_{211} - v_{195} - v_{199} - v_{204} - v_{211} \quad (747)$$

8.107 Species AggA4

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [Aggregationasyn5](#), [DisAggregationasyn2](#), [AggA4ProteasomeInhibition](#), [ROSGenerationSmallAggA4](#) and as a product in [Aggregationasyn4](#), [DisAggregationasyn1](#), [ROSGenerationSmallAggA4](#)).

$$\frac{d}{dt}\text{AggA4} = v_{195} + v_{197} + v_{212} - v_{196} - v_{198} - v_{205} - v_{212} \quad (748)$$

8.108 Species AggA5

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in six reactions (as a reactant in [DisAggregationasyn1](#), [AggA5ProteasomeInhibition](#), [AsynInclusionFormation](#), [ROSGenerationSmallAggA5](#) and as a product in [Aggregationasyn5](#), [ROSGenerationSmallAggA5](#)).

$$\frac{d}{dt}\text{AggA5} = v_{196} + v_{213} - v_{197} - v_{206} - v_{207} - v_{213} \quad (749)$$

8.109 Species AggD1

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationAsynDam2](#), [DisaggregationAsynDam5](#), [AggD1ProteasomeInhibition](#), [ROSGenerationSmallAggD1](#) and as a product in [AggregationAsynDam1](#), [DisaggregationAsynDam4](#), [ROSGenerationSmallAggD1](#)).

$$\frac{d}{dt}\text{AggD1} = v_{214} + v_{222} + v_{248} - v_{215} - v_{223} - v_{224} - v_{248} \quad (750)$$

8.110 Species AggD2

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationAsynDam3](#), [DisaggregationAsynDam4](#), [AggD2ProteasomeInhibition](#), [ROSGenerationSmallAggD2](#) and as a product in [AggregationAsynDam2](#), [DisaggregationAsynDam3](#), [ROSGenerationSmallAggD2](#)).

$$\frac{d}{dt}\text{AggD2} = v_{215} + v_{221} + v_{249} - v_{216} - v_{222} - v_{225} - v_{249} \quad (751)$$

8.111 Species AggD3

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationAsynDam4](#), [DisaggregationAsynDam3](#), [AggD3ProteasomeInhibition](#), [ROSGenerationSmallAggD3](#) and as a product in [AggregationAsynDam3](#), [DisaggregationAsynDam2](#), [ROSGenerationSmallAggD3](#)).

$$\frac{d}{dt}\text{AggD3} = v_{216} + v_{220} + v_{250} - v_{217} - v_{221} - v_{226} - v_{250} \quad (752)$$

8.112 Species AggD4

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationAsynDam5](#), [DisaggregationAsynDam2](#), [AggD4ProteasomeInhibition](#), [ROSGenerationSmallAggD4](#) and as a product in [AggregationAsynDam4](#), [DisaggregationAsynDam1](#), [ROSGenerationSmallAggD4](#)).

$$\frac{d}{dt}\text{AggD4} = v_{217} + v_{219} + v_{251} - v_{218} - v_{220} - v_{227} - v_{251} \quad (753)$$

8.113 Species AggD5

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in six reactions (as a reactant in [DisaggregationAsynDam1](#), [AggD5ProteasomeInhibition](#), [AsynDamInclusionFormation](#), [ROSGenerationSmallAggD5](#) and as a product in [AggregationAsynDam5](#), [ROSGenerationSmallAggD5](#)).

$$\frac{d}{dt}\text{AggD5} = v_{218} + v_{252} - v_{219} - v_{228} - v_{229} - v_{252} \quad (754)$$

8.114 Species AggU1

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationUCHL1Dam2](#), [DisaggregationUCHL1Dam5](#), [AggU1ProteasomeInhibition](#), [ROSGenerationSmallAggU1](#) and as a product in [AggregationUCHL1Dam1](#), [DisaggregationUCHL1Dam4](#), [ROSGenerationSmallAggU1](#)).

$$\frac{d}{dt}\text{AggU1} = v_{253} + v_{261} + v_{271} - v_{254} - v_{262} - v_{263} - v_{271} \quad (755)$$

8.115 Species AggU2

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationUCHL1Dam3](#), [DisaggregationUCHL1Dam4](#), [AggU2ProteasomeInhibition](#), [ROSGenerationSmallAggU2](#) and as a product in [AggregationUCHL1Dam2](#), [DisaggregationUCHL1Dam3](#), [ROSGenerationSmallAggU2](#)).

$$\frac{d}{dt}\text{AggU2} = v_{254} + v_{260} + v_{272} - v_{255} - v_{261} - v_{264} - v_{272} \quad (756)$$

8.116 Species AggU3

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationUCHL1Dam4](#), [DisaggregationUCHL1Dam3](#), [AggU3ProteasomeInhibition](#), [ROSGenerationSmallAggU3](#) and as a product in [AggregationUCHL1Dam3](#), [DisaggregationUCHL1Dam2](#), [ROSGenerationSmallAggU3](#)).

$$\frac{d}{dt}\text{AggU3} = v_{255} + v_{259} + v_{273} - v_{256} - v_{260} - v_{265} - v_{273} \quad (757)$$

8.117 Species AggU4

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [AggregationUCHL1Dam5](#), [DisaggregationUCHL1Dam2](#), [AggU4ProteasomeInhibition](#), [ROSGenerationSmallAggU4](#) and as a product in [AggregationUCHL1Dam4](#), [DisaggregationUCHL1Dam1](#), [ROSGenerationSmallAggU4](#)).

$$\frac{d}{dt}\text{AggU4} = v_{256} + v_{258} + v_{274} - v_{257} - v_{259} - v_{266} - v_{274} \quad (758)$$

8.118 Species AggU5

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in six reactions (as a reactant in [DisaggregationUCHL1Dam1](#), [AggU5ProteasomeInhibition](#), [UCHL1DamInclusionFormation](#), [ROSGenerationSmallAggU5](#) and as a product in [AggregationUCHL1Dam5](#), [ROSGenerationSmallAggU5](#)).

$$\frac{d}{dt}\text{AggU5} = v_{257} + v_{275} - v_{258} - v_{267} - v_{268} - v_{275} \quad (759)$$

8.119 Species AggS1

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [SUBAggregation2](#), [SUBDisaggregation5](#), [AggS1ProteasomeInhibition](#), [ROSGenerationSmallAggS1](#) and as a product in [SUBAggregation1](#), [SUBDisaggregation4](#), [ROSGenerationSmallAggS1](#)).

$$\frac{d}{dt} \text{AggS1} = v_{276} + v_{284} + v_{310} - v_{277} - v_{285} - v_{286} - v_{310} \quad (760)$$

8.120 Species AggS2

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [SUBAggregation3](#), [SUBDisaggregation4](#), [AggS2ProteasomeInhibition](#), [ROSGenerationSmallAggS2](#) and as a product in [SUBAggregation2](#), [SUBDisaggregation3](#), [ROSGenerationSmallAggS2](#)).

$$\frac{d}{dt} \text{AggS2} = v_{277} + v_{283} + v_{311} - v_{278} - v_{284} - v_{287} - v_{311} \quad (761)$$

8.121 Species AggS3

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [SUBAggregation4](#), [SUBDisaggregation3](#), [AggS3ProteasomeInhibition](#), [ROSGenerationSmallAggS3](#) and as a product in [SUBAggregation3](#), [SUBDisaggregation2](#), [ROSGenerationSmallAggS3](#)).

$$\frac{d}{dt} \text{AggS3} = v_{278} + v_{282} + v_{312} - v_{279} - v_{283} - v_{288} - v_{312} \quad (762)$$

8.122 Species AggS4

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in seven reactions (as a reactant in [SUBAggregation5](#), [SUBDisaggregation2](#), [AggS4ProteasomeInhibition](#), [ROSGenerationSmallAggS4](#) and as a product in [SUBAggregation4](#), [SUBDisaggregation1](#), [ROSGenerationSmallAggS4](#)).

$$\frac{d}{dt} \text{AggS4} = v_{279} + v_{281} + v_{313} - v_{280} - v_{282} - v_{289} - v_{313} \quad (763)$$

8.123 Species AggS5

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in six reactions (as a reactant in [SUBDisaggregation1](#), [AggS5ProteasomeInhibition](#), [SUBInclusionFormation](#), [ROSGenerationSmallAggS5](#) and as a product in [SUBAggregation5](#), [ROSGenerationSmallAggS5](#)).

$$\frac{d}{dt}\text{AggS5} = v_{280} + v_{314} - v_{281} - v_{290} - v_{291} - v_{314} \quad (764)$$

8.124 Species Source

SBO:0000291 empty set

Initial amount 1 item

This species takes part in six reactions (as a reactant in [UbSynthesis](#), [ProteinSynthesis](#), [UCHL1Synthesis](#), [SUBsynthesis](#), [asynSynthesis1](#), [radicalFormation](#)), which do not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{Source} = 0 \quad (765)$$

8.125 Species Sink

SBO:0000291 empty set

Initial amount 1 item

This species takes part in one reaction (as a product in [radicalScavenging](#)), which does not influence its rate of change because this constant species is on the boundary of the reaction system:

$$\frac{d}{dt}\text{Sink} = 0 \quad (766)$$

8.126 Species aggasyn

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in two reactions (as a product in [AsynInclusionFormation](#), [AsynInclusionGrowth](#)).

$$\frac{d}{dt}\text{aggasyn} = 7 v_{207} + v_{208} \quad (767)$$

8.127 Species `aggasyndam`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 19 reactions (as a product in `AsynDamInclusionFormation`, `AsynDamInclusionGrowth1`, `AsynDamInclusionGrowth2`, `AsynDamInclusionGrowth3`, `AsynDamInclusionGrowth4`, `AsynDamInclusionGrowth5`, `AsynDamInclusionGrowth6`, `AsynDamInclusionGrowth7`, `AsynDamInclusionGrowth8`, `AsynDamInclusionGrowth9`, `AsynDamInclusionGrowth10`, `AsynDamInclusionGrowth11`, `AsynDamInclusionGrowth12`, `AsynDamInclusionGrowth13`, `AsynDamInclusionGrowth14`, `AsynDamInclusionGrowth15`, `AsynDamInclusionGrowth16`, `AsynDamInclusionGrowth17`, `AsynDamInclusionGrowth18`).

$$\frac{d}{dt}\text{aggasyndam} = 7 v_{229} + v_{230} + v_{231} + v_{232} + v_{233} + v_{234} + v_{235} + v_{236} + v_{237} + v_{238} \\ + v_{239} + v_{240} + v_{241} + v_{242} + v_{243} + v_{244} + v_{245} + v_{246} + v_{247} \quad (768)$$

8.128 Species `aggParkin`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 17 reactions (as a product in `AsynDamInclusionGrowth2`, `AsynDamInclusionGrowth3`, `AsynDamInclusionGrowth4`, `AsynDamInclusionGrowth5`, `AsynDamInclusionGrowth6`, `AsynDamInclusionGrowth7`, `AsynDamInclusionGrowth8`, `AsynDamInclusionGrowth9`, `AsynDamInclusionGrowth10`, `AsynDamInclusionGrowth11`, `AsynDamInclusionGrowth12`, `AsynDamInclusionGrowth13`, `AsynDamInclusionGrowth14`, `AsynDamInclusionGrowth15`, `AsynDamInclusionGrowth16`, `AsynDamInclusionGrowth17`, `AsynDamInclusionGrowth18`).

$$\frac{d}{dt}\text{aggParkin} = v_{231} + v_{232} + v_{233} + v_{234} + v_{235} + v_{236} + v_{237} + v_{238} + v_{239} \\ + v_{240} + v_{241} + v_{242} + v_{243} + v_{244} + v_{245} + v_{246} + v_{247} \quad (769)$$

8.129 Species `aggUb`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 48 reactions (as a product in `InclusionGrowth3`, `InclusionGrowth4`, `InclusionGrowth5`, `InclusionGrowth6`, `InclusionGrowth7`, `InclusionGrowth8`, `InclusionGrowth9`, `InclusionGrowth10`, `InclusionGrowth11`, `InclusionGrowth12`, `InclusionGrowth13`, `InclusionGrowth14`, `InclusionGrowth15`, `InclusionGrowth16`, `InclusionGrowth17`, `InclusionGrowth18`, `AsynDamInclusionGrowth1`, `AsynDamInclusionGrowth4`, `AsynDamInclusionGrowth5`, `AsynDamInclusionGrowth6`, `AsynDamInclusionGrowth7`, `AsynDamInclusionGrowth8`, `AsynDamInclusionGrowth9`, `AsynDamInclusionGrowth10`, `AsynDamInclusionGrowth11`, `AsynDamInclusionGrowth12`, `AsynDamInclusionGrowth13`, `AsynDamInclusionGrowth14`, `AsynDamInclusionGrowth15`, `AsynDamInclusionGrowth16`, `AsynDamInclusionGrowth17`, `AsynDamInclusionGrowth18`).

AsynDamInclusionGrowth11, AsynDamInclusionGrowth12, AsynDamInclusionGrowth13, AsynDamInclusionGrowth14, AsynDamInclusionGrowth15, AsynDamInclusionGrowth16, AsynDamInclusionGrowth17, AsynDamInclusionGrowth18, SUBInclusionGrowth2, SUBInclusionGrowth3, SUBInclusionGrowth4, SUBInclusionGrowth5, SUBInclusionGrowth6, SUBInclusionGrowth7, SUBInclusionGrowth8, SUBInclusionGrowth9, SUBInclusionGrowth10, SUBInclusionGrowth11, SUBInclusionGrowth12, SUBInclusionGrowth13, SUBInclusionGrowth14, SUBInclusionGrowth15, SUBInclusionGrowth16, SUBInclusionGrowth17).

$$\begin{aligned} \frac{d}{dt} \text{aggUb} = & v_{63} + 2 v_{64} + 3 v_{65} + 4 v_{66} + 5 v_{67} + 6 v_{68} + 7 v_{69} + 8 v_{70} + v_{71} + 2 v_{72} + 3 v_{73} \\ & + 4 v_{74} + 5 v_{75} + 6 v_{76} + 7 v_{77} + 8 v_{78} + v_{232} + 2 v_{233} + 3 v_{234} + 4 v_{235} + 5 v_{236} \\ & + 6 v_{237} + 7 v_{238} + 8 v_{239} + v_{240} + 2 v_{241} + 3 v_{242} + 4 v_{243} + 5 v_{244} + 6 v_{245} \\ & + 7 v_{246} + 8 v_{247} + v_{294} + 2 v_{295} + 3 v_{296} + 4 v_{297} + 5 v_{298} + 6 v_{299} + 7 v_{300} \\ & + 8 v_{301} + v_{302} + 2 v_{303} + 3 v_{304} + 4 v_{305} + 5 v_{306} + 6 v_{307} + 7 v_{308} + 8 v_{309} \end{aligned} \quad (770)$$

8.130 Species `aggE3`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 17 reactions (as a product in `InclusionGrowth2`, `InclusionGrowth3`, `InclusionGrowth4`, `InclusionGrowth5`, `InclusionGrowth6`, `InclusionGrowth7`, `InclusionGrowth8`, `InclusionGrowth9`, `InclusionGrowth10`, `InclusionGrowth11`, `InclusionGrowth12`, `InclusionGrowth13`, `InclusionGrowth14`, `InclusionGrowth15`, `InclusionGrowth16`, `InclusionGrowth17`, `InclusionGrowth18`).

$$\begin{aligned} \frac{d}{dt} \text{aggE3} = & v_{62} + v_{63} + v_{64} + v_{65} + v_{66} + v_{67} + v_{68} + v_{69} + v_{70} \\ & + v_{71} + v_{72} + v_{73} + v_{74} + v_{75} + v_{76} + v_{77} + v_{78} \end{aligned} \quad (771)$$

8.131 Species `aggDUB`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in eight reactions (as a product in `InclusionGrowth11`, `InclusionGrowth12`, `InclusionGrowth13`, `InclusionGrowth14`, `InclusionGrowth15`, `InclusionGrowth16`, `InclusionGrowth17`, `InclusionGrowth18`).

$$\frac{d}{dt} \text{aggDUB} = v_{71} + v_{72} + v_{73} + v_{74} + v_{75} + v_{76} + v_{77} + v_{78} \quad (772)$$

8.132 Species `aggMisP`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 18 reactions (as a product in `InclusionFormation`, `InclusionGrowth1`, `InclusionGrowth2`, `InclusionGrowth3`, `InclusionGrowth4`, `InclusionGrowth5`, `InclusionGrowth6`, `InclusionGrowth7`, `InclusionGrowth8`, `InclusionGrowth9`, `InclusionGrowth11`, `InclusionGrowth12`, `InclusionGrowth13`, `InclusionGrowth14`, `InclusionGrowth15`, `InclusionGrowth16`, `InclusionGrowth17`, `InclusionGrowth18`).

$$\frac{d}{dt}\text{aggMisP} = 7 v_{60} + v_{61} + v_{62} + v_{63} + v_{64} + v_{65} + v_{66} + v_{67} + v_{68} + v_{69} + v_{71} + v_{72} + v_{73} + v_{74} + v_{75} + v_{76} + v_{77} + v_{78} \quad (773)$$

8.133 Species `aggUchl1`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in eight reactions (as a product in `SUBInclusionGrowth10`, `SUBInclusionGrowth11`, `SUBInclusionGrowth12`, `SUBInclusionGrowth13`, `SUBInclusionGrowth14`, `SUBInclusionGrowth15`, `SUBInclusionGrowth16`, `SUBInclusionGrowth17`).

$$\frac{d}{dt}\text{aggUchl1} = v_{302} + v_{303} + v_{304} + v_{305} + v_{306} + v_{307} + v_{308} + v_{309} \quad (774)$$

8.134 Species `aggUchl1dam`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in three reactions (as a product in `Uchl1DamInclusionFormation`, `Uchl1DamagedSequestering`, `Uchl1DamagedLamp2aSequestering`).

$$\frac{d}{dt}\text{aggUchl1dam} = 7 v_{268} + v_{269} + v_{270} \quad (775)$$

8.135 Species `aggSUB`

SBO:0000543 protein aggregate

Initial amount 0 item

This species takes part in 19 reactions (as a product in [SUBInclusionFormation](#), [SUBInclusionGrowth0](#), [SUBInclusionGrowth1](#), [SUBInclusionGrowth2](#), [SUBInclusionGrowth3](#), [SUBInclusionGrowth4](#), [SUBInclusionGrowth5](#), [SUBInclusionGrowth6](#), [SUBInclusionGrowth7](#), [SUBInclusionGrowth8](#), [SUBInclusionGrowth9](#), [SUBInclusionGrowth10](#), [SUBInclusionGrowth11](#), [SUBInclusionGrowth12](#), [SUBInclusionGrowth13](#), [SUBInclusionGrowth14](#), [SUBInclusionGrowth15](#), [SUBInclusionGrowth16](#), [SUBInclusionGrowth17](#)).

$$\frac{d}{dt}\text{aggSUB} = 7 v_{291} + v_{292} + v_{293} + v_{294} + v_{295} + v_{296} + v_{297} + v_{298} + v_{299} + v_{300} + v_{301} + v_{302} + v_{303} + v_{304} + v_{305} + v_{306} + v_{307} + v_{308} + v_{309} \quad (776)$$

8.136 Species [upregUb](#)

SBO:0000245 macromolecule

Initial amount 0 item

This species takes part in one reaction (as a product in [UbUpregulation](#)).

$$\frac{d}{dt}\text{upregUb} = 3 v_3 \quad (777)$$

A Glossary of Systems Biology Ontology Terms

SBO:0000009 kinetic constant: Numerical parameter that quantifies the velocity of a chemical reaction

SBO:0000014 enzyme: A protein that catalyzes a chemical reaction. The word comes from en “a” or “i”) and simo “leave” or “yeas”)

SBO:0000153 forward rate constant: Numerical parameter that quantifies the forward velocity of a chemical reaction. This parameter encompasses all the contributions to the velocity except the quantity of the reactants

SBO:0000156 reverse rate constant: Numerical parameter that quantifies the forward velocity of a chemical reaction. This parameter encompasses all the contributions to the velocity except the quantity of the reactants.

SBO:0000179 degradation: Complete disappearance of a physical entity

SBO:0000180 dissociation: Transformation of a non-covalent complex that results in the formation of several independent biochemical entitie

SBO:0000245 macromolecule: Molecular entity mainly built-up by the repetition of pseudo-identical units. CHEBI:3383

SBO:0000247 simple chemical: Simple, non-repetitive chemical entity

SBO:0000290 physical compartment: Specific location of space, that can be bounded or not.
A physical compartment can have 1, 2 or 3 dimensions

SBO:0000291 empty set: Entity defined by the absence of any actual object. An empty set is often used to represent the source of a creation process or the result of a degradation process.

SBO:0000296 macromolecular complex: Non-covalent complex of one or more macromolecules and zero or more simple chemicals

SBO:0000360 quantity of an entity pool: The enumeration of co-localised, identical biochemical entities of a specific state, which constitute a pool. The form of enumeration may be purely numerical, or may be given in relation to another dimension such as length or volume

SBO:0000375 process: A sequential series of actions, motions, or occurrences, such as chemical reactions, that affect one or more entities in a phenomenologically characteristic manner

SBO:0000393 production: Generation of a material or conceptual entity.

SBO:0000526 protein complex formation: The process by which two or more proteins interact non-covalently to form a protein complex (SBO:0000297)

SBO:0000543 protein aggregate: A nonspecific coalescence of misfolded proteins which may or may not form a precipitate, depending upon particle size

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