SBML Model Report

Model name: “Krohn2011 - Cerebral amyloid- proteostasis regulated by membrane transport protein ABCC1”

December 1, 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 Chelliah[1] and Felix Winter[2] at July 27th 2016 at 8:28 a. m. and last time modified at October tenth 2016 at 2:12 p. m. Table 1 shows 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	52
events	0	constraints	0
reactions	0	function definitions	0
global parameters	14	unit definitions	0
rules	58	initial assignments	0

Model Notes

Krohn2011 - Cerebral amyloid-proteostasis regulated by membrane transport protein ABCC1

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This model is described in the article:Cerebral amyloid-? proteostasis is regulated by the membrane transport protein ABCC1 in mice.Krohn M, Lange C, Hofrichter J, Scheffler K, Stenzel J, Steffen J, Schumacher T, Brning T, Plath AS, Alfen F, Schmidt A, Winter F, Rateitschak K, Wree A, Gsponer J, Walker LC, Pahnke J.J. Clin. Invest. 2011 Oct; 121(10): 3924-3931

Abstract:

In Alzheimer disease (AD), the intracerebral accumulation of amyloid-? (A?) peptides is a critical yet poorly understood process. A? clearance via the blood-brain barrier is reduced by approximately 30% in AD patients, but the underlying mechanisms remain elusive. ABC transporters have been implicated in the regulation of A? levels in the brain. Using a mouse model of AD in which the animals were further genetically modified to lack specific ABC transporters, here we have shown that the transporter ABCC1 has an important role in cerebral A? clearance and accumulation. Deficiency of ABCC1 substantially increased cerebral A? levels without altering the expression of most enzymes that would favor the production of A? from the A? precursor protein. In contrast, activation of ABCC1 using thiethylperazine (a drug approved by the FDA to relieve nausea and vomiting) markedly reduced A? load in a mouse model of AD expressing ABCC1 but not in such mice lacking ABCC1. Thus, by altering the temporal aggregation profile of A?, pharmacological activation of ABC transporters could impede the neurodegenerative cascade that culminates in the dementia of AD.

This model is hosted on BioModels Database and identified by: BIOMD0000000618.

To cite BioModels Database, please use: BioModels Database: An enhanced, curated and annotated resource for published quantitative kinetic models.

2 Unit Definitions

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

2.1 Unit `substance`

Notes Mole is the predefined SBML unit for `substance`.

Definition mol

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 m^2

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
C1	Brain	0000290	3	1	litre	☑	

3.1 Compartment C1

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

Name Brain

SBO:0000290 physical compartment

4 Species

This model contains 52 species. The boundary condition of 52 of these species is set to `true` so that these species' amount cannot be changed by any reaction. Section 7 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 Condition
M	M	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
N	N	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A7	A7	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A8	A8	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A9	A9	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A10	A10	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A11	A11	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A12	A12	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A13	A13	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A14	A14	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A15	A15	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A16	A16	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A17	A17	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A18	A18	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A19	A19	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A20	A20	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A21	A21	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A22	A22	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A23	A23	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A24	A24	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A25	A25	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
A26	A26	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A27	A27	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A28	A28	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A29	A29	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A30	A30	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A31	A31	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A32	A32	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A33	A33	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A34	A34	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A35	A35	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A36	A36	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A37	A37	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A38	A38	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A39	A39	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A40	A40	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A41	A41	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A42	A42	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A43	A43	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A44	A44	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A45	A45	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A46	A46	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A47	A47	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A48	A48	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A49	A49	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A50	A50	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A51	A51	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A52	A52	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
A53	A53	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
A54	A54	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
soluble_obs	soluble_obs	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
insoluble_obs	insoluble_obs	C1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑

5 Parameters

This model contains 14 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
P	P		91.239		☑
c_T	c_T		82.419		☑
s_T	s_T		17.744		☑
e_T	e_T		7.812		☑
k_n	k_n	0000341	0.345		☑
k_sol	k_sol	0000036	0.342		☑
k_insol	k_insol	0000036	0.359		☑
n_n	n_n	0000481	6.000		☑
blocking	blocking		0.000		☐
soluble	soluble	0000406	1.044		☐
insoluble	insoluble	0000406	0.000		☐
R_T	R_T		86.037		☐
a_T	a_T		86.037		☐
I_net	I_net		5.202		☐

6 Rules

This is an overview of 58 rules.

6.1 Rule R_T

Rule R_T is an assignment rule for parameter R_T:

$$\mathrm{R\_T} = \mathrm{c\_T} \cdot [\mathrm{M}] \tag{1}$$

6.2 Rule insoluble

Rule insoluble is an assignment rule for parameter insoluble:

$$\begin{aligned}\mathrm{insoluble} = {} & [\mathrm{A15}] \cdot 15 + [\mathrm{A16}] \cdot 16 + 17 \cdot [\mathrm{A17}] + 18 \cdot [\mathrm{A18}] + 19 \cdot [\mathrm{A19}] + 20 \cdot [\mathrm{A20}] + 21 \cdot [\mathrm{A21}] \\ & + 22 \cdot [\mathrm{A22}] + 23 \cdot [\mathrm{A23}] + 24 \cdot [\mathrm{A24}] + 25 \cdot [\mathrm{A25}] + 26 \cdot [\mathrm{A26}] + 27 \cdot [\mathrm{A27}] + 28 \\ & \cdot [\mathrm{A28}] + 29 \cdot [\mathrm{A29}] + 30 \cdot [\mathrm{A30}] + 31 \cdot [\mathrm{A31}] + 32 \cdot [\mathrm{A32}] + 33 \cdot [\mathrm{A33}] + 34 \cdot [\mathrm{A34}] \\ & + 35 \cdot [\mathrm{A35}] + 36 \cdot [\mathrm{A36}] + 37 \cdot [\mathrm{A37}] + 38 \cdot [\mathrm{A38}] + 39 \cdot [\mathrm{A39}] + 40 \cdot [\mathrm{A40}] + 41 \\ & \cdot [\mathrm{A41}] + 42 \cdot [\mathrm{A42}] + 43 \cdot [\mathrm{A43}] + 44 \cdot [\mathrm{A44}] + 45 \cdot [\mathrm{A45}] + 46 \cdot [\mathrm{A46}] + 47 \cdot [\mathrm{A47}] + 48 \\ & \cdot [\mathrm{A48}] + 49 \cdot [\mathrm{A49}] + 50 \cdot [\mathrm{A50}] + 51 \cdot [\mathrm{A51}] + 52 \cdot [\mathrm{A52}] + 53 \cdot [\mathrm{A53}] + 54 \cdot [\mathrm{A54}]\end{aligned} \tag{2}$$

6.3 Rule soluble

Rule soluble is an assignment rule for parameter soluble:

$$\begin{aligned}\text{soluble} = {} & [\text{M}] + [\text{N}] \cdot \text{n\_n} + 7 \cdot [\text{A7}] + 8 \cdot [\text{A8}] + 9 \cdot [\text{A9}] + 10 \\ & \cdot [\text{A10}] + 11 \cdot [\text{A11}] + 12 \cdot [\text{A12}] + 13 \cdot [\text{A13}] + 14 \cdot [\text{A14}]\end{aligned} \tag{3}$$

6.4 Rule blocking

Rule blocking is an assignment rule for parameter blocking:

$$\begin{aligned}\text{blocking} = {} & [\text{A15}] + [\text{A16}] + [\text{A17}] + [\text{A18}] + [\text{A19}] + [\text{A20}] + [\text{A21}] + [\text{A22}] + [\text{A23}] + [\text{A24}] \\ & + [\text{A25}] + [\text{A26}] + [\text{A27}] + [\text{A28}] + [\text{A29}] + [\text{A30}] + [\text{A31}] + [\text{A32}] + [\text{A33}] + [\text{A34}] \\ & + [\text{A35}] + [\text{A36}] + [\text{A37}] + [\text{A38}] + [\text{A39}] + [\text{A40}] + [\text{A41}] + [\text{A42}] + [\text{A43}] + [\text{A44}] \\ & + [\text{A45}] + [\text{A46}] + [\text{A47}] + [\text{A48}] + [\text{A49}] + [\text{A50}] + [\text{A51}] + [\text{A52}] + [\text{A53}] + [\text{A54}]\end{aligned} \tag{4}$$

Derived unit $\text{mol} \cdot \text{l}^{-1}$

6.5 Rule a_T

Rule a_T is an assignment rule for parameter a_T:

$$\text{a\_T} = \text{R\_T} \cdot \frac{\text{s\_T}^{\text{e\_T}}}{\text{s\_T}^{\text{e\_T}} + \text{blocking}^{\text{e\_T}}} \tag{5}$$

6.6 Rule I_net

Rule I_net is an assignment rule for parameter I_net:

$$\text{I\_net} = \text{P} - \text{a\_T} \tag{6}$$

6.7 Rule insoluble_obs

Rule insoluble_obs is an assignment rule for species insoluble_obs:

$$\text{insoluble\_obs} = \text{insoluble} \tag{7}$$

6.8 Rule soluble_obs

Rule soluble_obs is an assignment rule for species soluble_obs:

$$\text{soluble\_obs} = \text{soluble} \tag{8}$$

6.9 Rule M

Rule M is a rate rule for species M:

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{M} = {} & \mathrm{I\_net} - \mathrm{k\_n}\cdot\mathrm{n\_n}\cdot[\mathrm{M}]^{\mathrm{n\_n}} - \mathrm{k\_sol}\cdot[\mathrm{N}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A7}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A8}]\cdot[\mathrm{M}] - \mathrm{k\_sol} \\ & \cdot[\mathrm{A9}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A10}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A11}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A12}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A13}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A14}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A15}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A16}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A17}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A18}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A19}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A20}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A21}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A22}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A23}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A24}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A25}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A26}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A27}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A28}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A29}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A30}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A31}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A32}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A33}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A34}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A35}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A36}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A37}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A38}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A39}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A40}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A41}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A42}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A43}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A44}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A45}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A46}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A47}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A48}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A49}]\cdot[\mathrm{M}] \\ & - \mathrm{k\_insol}\cdot[\mathrm{A50}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A51}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A52}]\cdot[\mathrm{M}] - \mathrm{k\_insol}\cdot[\mathrm{A53}]\cdot[\mathrm{M}] \end{aligned} \tag{9}$$

6.10 Rule N

Rule N is a rate rule for species N:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{N} = \mathrm{k\_n}\cdot[\mathrm{M}]^{\mathrm{n\_n}} - \mathrm{k\_sol}\cdot[\mathrm{N}]\cdot[\mathrm{M}] \tag{10}$$

6.11 Rule A7

Rule A7 is a rate rule for species A7:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A7} = \mathrm{k\_sol}\cdot[\mathrm{N}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A7}]\cdot[\mathrm{M}] \tag{11}$$

6.12 Rule A8

Rule A8 is a rate rule for species A8:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A8} = \mathrm{k\_sol}\cdot[\mathrm{A7}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A8}]\cdot[\mathrm{M}] \tag{12}$$

6.13 Rule A9

Rule A9 is a rate rule for species A9:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A9} = \mathrm{k\_sol}\cdot[\mathrm{A8}]\cdot[\mathrm{M}] - \mathrm{k\_sol}\cdot[\mathrm{A9}]\cdot[\mathrm{M}] \tag{13}$$

6.14 Rule A10

Rule A10 is a rate rule for species A10:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A10} = \mathrm{k\_sol} \cdot [\mathrm{A9}] \cdot [\mathrm{M}] - \mathrm{k\_sol} \cdot [\mathrm{A10}] \cdot [\mathrm{M}] \tag{14}$$

6.15 Rule A11

Rule A11 is a rate rule for species A11:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A11} = \mathrm{k\_sol} \cdot [\mathrm{A10}] \cdot [\mathrm{M}] - \mathrm{k\_sol} \cdot [\mathrm{A11}] \cdot [\mathrm{M}] \tag{15}$$

6.16 Rule A12

Rule A12 is a rate rule for species A12:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A12} = \mathrm{k\_sol} \cdot [\mathrm{A11}] \cdot [\mathrm{M}] - \mathrm{k\_sol} \cdot [\mathrm{A12}] \cdot [\mathrm{M}] \tag{16}$$

6.17 Rule A13

Rule A13 is a rate rule for species A13:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A13} = \mathrm{k\_sol} \cdot [\mathrm{A12}] \cdot [\mathrm{M}] - \mathrm{k\_sol} \cdot [\mathrm{A13}] \cdot [\mathrm{M}] \tag{17}$$

6.18 Rule A14

Rule A14 is a rate rule for species A14:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A14} = \mathrm{k\_sol} \cdot [\mathrm{A13}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A14}] \cdot [\mathrm{M}] \tag{18}$$

6.19 Rule A15

Rule A15 is a rate rule for species A15:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A15} = \mathrm{k\_insol} \cdot [\mathrm{A14}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A15}] \cdot [\mathrm{M}] \tag{19}$$

6.20 Rule A16

Rule A16 is a rate rule for species A16:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A16} = \mathrm{k\_insol} \cdot [\mathrm{A15}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A16}] \cdot [\mathrm{M}] \tag{20}$$

6.21 Rule A17

Rule A17 is a rate rule for species A17:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A17} = \mathrm{k\_insol} \cdot [\mathrm{A16}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A17}] \cdot [\mathrm{M}] \tag{21}$$

6.22 Rule A18

Rule A18 is a rate rule for species A18:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A18} = \mathrm{k\_insol} \cdot [\mathrm{A17}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A18}] \cdot [\mathrm{M}] \tag{22}$$

6.23 Rule A19

Rule A19 is a rate rule for species A19:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A19} = \mathrm{k\_insol} \cdot [\mathrm{A18}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A19}] \cdot [\mathrm{M}] \tag{23}$$

6.24 Rule A20

Rule A20 is a rate rule for species A20:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A20} = \mathrm{k\_insol} \cdot [\mathrm{A19}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A20}] \cdot [\mathrm{M}] \tag{24}$$

6.25 Rule A21

Rule A21 is a rate rule for species A21:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A21} = \mathrm{k\_insol} \cdot [\mathrm{A20}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A21}] \cdot [\mathrm{M}] \tag{25}$$

6.26 Rule A22

Rule A22 is a rate rule for species A22:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A22} = \mathrm{k\_insol} \cdot [\mathrm{A21}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A22}] \cdot [\mathrm{M}] \tag{26}$$

6.27 Rule A23

Rule A23 is a rate rule for species A23:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A23} = \mathrm{k\_insol} \cdot [\mathrm{A22}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A23}] \cdot [\mathrm{M}] \tag{27}$$

6.28 Rule A24

Rule A24 is a rate rule for species A24:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A24} = \mathrm{k\_insol} \cdot [\mathrm{A23}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A24}] \cdot [\mathrm{M}] \tag{28}$$

6.29 Rule A25

Rule A25 is a rate rule for species A25:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A25} = \mathrm{k\_insol} \cdot [\mathrm{A24}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A25}] \cdot [\mathrm{M}] \tag{29}$$

6.30 Rule A26

Rule A26 is a rate rule for species A26:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A26} = \mathrm{k\_insol} \cdot [\mathrm{A25}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A26}] \cdot [\mathrm{M}] \tag{30}$$

6.31 Rule A27

Rule A27 is a rate rule for species A27:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A27} = \mathrm{k\_insol} \cdot [\mathrm{A26}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A27}] \cdot [\mathrm{M}] \tag{31}$$

6.32 Rule A28

Rule A28 is a rate rule for species A28:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A28} = \mathrm{k\_insol} \cdot [\mathrm{A27}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A28}] \cdot [\mathrm{M}] \tag{32}$$

6.33 Rule A29

Rule A29 is a rate rule for species A29:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A29} = \mathrm{k\_insol} \cdot [\mathrm{A28}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A29}] \cdot [\mathrm{M}] \tag{33}$$

6.34 Rule A30

Rule A30 is a rate rule for species A30:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A30} = \mathrm{k\_insol} \cdot [\mathrm{A29}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A30}] \cdot [\mathrm{M}] \tag{34}$$

6.35 Rule A31

Rule A31 is a rate rule for species A31:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A31} = \mathrm{k\_insol} \cdot [\mathrm{A30}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A31}] \cdot [\mathrm{M}] \tag{35}$$

6.36 Rule A32

Rule A32 is a rate rule for species A32:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A32} = \mathrm{k\_insol} \cdot [\mathrm{A31}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A32}] \cdot [\mathrm{M}] \tag{36}$$

6.37 Rule A33

Rule A33 is a rate rule for species A33:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A33} = \mathrm{k\_insol} \cdot [\mathrm{A32}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A33}] \cdot [\mathrm{M}] \tag{37}$$

6.38 Rule A34

Rule A34 is a rate rule for species A34:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A34} = \mathrm{k\_insol} \cdot [\mathrm{A33}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A34}] \cdot [\mathrm{M}] \tag{38}$$

6.39 Rule A35

Rule A35 is a rate rule for species A35:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A35} = \mathrm{k\_insol} \cdot [\mathrm{A34}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A35}] \cdot [\mathrm{M}] \tag{39}$$

6.40 Rule A36

Rule A36 is a rate rule for species A36:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A36} = \mathrm{k\_insol} \cdot [\mathrm{A35}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A36}] \cdot [\mathrm{M}] \tag{40}$$

6.41 Rule A37

Rule A37 is a rate rule for species A37:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A37} = \mathrm{k\_insol} \cdot [\mathrm{A36}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A37}] \cdot [\mathrm{M}] \tag{41}$$

6.42 Rule A38

Rule A38 is a rate rule for species A38:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A38} = \mathrm{k\_insol} \cdot [\mathrm{A37}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A38}] \cdot [\mathrm{M}] \tag{42}$$

6.43 Rule A39

Rule A39 is a rate rule for species A39:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A39} = \mathrm{k\_insol} \cdot [\mathrm{A38}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A39}] \cdot [\mathrm{M}] \tag{43}$$

6.44 Rule A40

Rule A40 is a rate rule for species A40:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A40} = \mathrm{k\_insol} \cdot [\mathrm{A39}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A40}] \cdot [\mathrm{M}] \tag{44}$$

6.45 Rule A41

Rule A41 is a rate rule for species A41:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A41} = \mathrm{k\_insol} \cdot [\mathrm{A40}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A41}] \cdot [\mathrm{M}] \tag{45}$$

6.46 Rule A42

Rule A42 is a rate rule for species A42:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A42} = \mathrm{k\_insol} \cdot [\mathrm{A41}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A42}] \cdot [\mathrm{M}] \tag{46}$$

6.47 Rule A43

Rule A43 is a rate rule for species A43:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A43} = \mathrm{k\_insol} \cdot [\mathrm{A42}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A43}] \cdot [\mathrm{M}] \tag{47}$$

6.48 Rule A44

Rule A44 is a rate rule for species A44:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A44} = \mathrm{k\_insol} \cdot [\mathrm{A43}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A44}] \cdot [\mathrm{M}] \tag{48}$$

6.49 Rule A45

Rule A45 is a rate rule for species A45:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A45} = \mathrm{k\_insol} \cdot [\mathrm{A44}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A45}] \cdot [\mathrm{M}] \tag{49}$$

6.50 Rule A46

Rule A46 is a rate rule for species A46:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A46} = \mathrm{k\_insol} \cdot [\mathrm{A45}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A46}] \cdot [\mathrm{M}] \tag{50}$$

6.51 Rule A47

Rule A47 is a rate rule for species A47:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A47} = \mathrm{k\_insol} \cdot [\mathrm{A46}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A47}] \cdot [\mathrm{M}] \tag{51}$$

6.52 Rule A48

Rule A48 is a rate rule for species A48:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A48} = \mathrm{k\_insol} \cdot [\mathrm{A47}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A48}] \cdot [\mathrm{M}] \tag{52}$$

6.53 Rule A49

Rule A49 is a rate rule for species A49:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A49} = \mathrm{k\_insol} \cdot [\mathrm{A48}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A49}] \cdot [\mathrm{M}] \tag{53}$$

6.54 Rule A50

Rule A50 is a rate rule for species A50:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A50} = \mathrm{k\_insol} \cdot [\mathrm{A49}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A50}] \cdot [\mathrm{M}] \tag{54}$$

6.55 Rule A51

Rule A51 is a rate rule for species A51:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A51} = \mathrm{k\_insol} \cdot [\mathrm{A50}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A51}] \cdot [\mathrm{M}] \tag{55}$$

6.56 Rule A52

Rule A52 is a rate rule for species A52:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A52} = \mathrm{k\_insol} \cdot [\mathrm{A51}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A52}] \cdot [\mathrm{M}] \tag{56}$$

6.57 Rule A53

Rule A53 is a rate rule for species A53:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A53} = \mathrm{k\_insol} \cdot [\mathrm{A52}] \cdot [\mathrm{M}] - \mathrm{k\_insol} \cdot [\mathrm{A53}] \cdot [\mathrm{M}] \tag{57}$$

6.58 Rule A54

Rule A54 is a rate rule for species A54:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{A54} = \mathrm{k\_insol} \cdot [\mathrm{A53}] \cdot [\mathrm{M}] \tag{58}$$

7 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.

7.1 Species M

Name M

Notes amyloid- monomers

Initial concentration $1.04389999999997\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule M

One rule determines the species' quantity.

7.2 Species N

Name N

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule N

One rule determines the species' quantity.

7.3 Species A7

Name A7

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A7

One rule determines the species' quantity.

7.4 Species A8

Name A8

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A8

One rule determines the species' quantity.

7.5 Species A9

Name A9

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A9

One rule determines the species' quantity.

7.6 Species A10

Name A10

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A10

One rule determines the species' quantity.

7.7 Species A11

Name A11

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A11

One rule determines the species' quantity.

7.8 Species A12

Name A12

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A12

One rule determines the species' quantity.

7.9 Species A13

Name A13

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A13

One rule determines the species' quantity.

7.10 Species A14

Name A14

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A14

One rule determines the species' quantity.

7.11 Species A15

Name A15

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A15

One rule determines the species' quantity.

7.12 Species A16

Name A16

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A16

One rule determines the species' quantity.

7.13 Species A17

Name A17

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A17

One rule determines the species' quantity.

7.14 Species A18

Name A18

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A18

One rule determines the species' quantity.

7.15 Species A19

Name A19

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A19

One rule determines the species' quantity.

7.16 Species A20

Name A20

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A20

One rule determines the species' quantity.

7.17 Species A21

Name A21

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A21

One rule determines the species' quantity.

7.18 Species A22

Name A22

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A22

One rule determines the species' quantity.

7.19 Species A23

Name A23

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A23

One rule determines the species' quantity.

7.20 Species A24

Name A24

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A24

One rule determines the species' quantity.

7.21 Species A25

Name A25

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A25

One rule determines the species' quantity.

7.22 Species A26

Name A26

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A26

One rule determines the species' quantity.

7.23 Species A27

Name A27

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A27

One rule determines the species' quantity.

7.24 Species A28

Name A28

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A28

One rule determines the species' quantity.

7.25 Species A29

Name A29

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A29

One rule determines the species' quantity.

7.26 Species A30

Name A30

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A30

One rule determines the species' quantity.

7.27 Species A31

Name A31

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A31

One rule determines the species' quantity.

7.28 Species A32

Name A32

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A32

One rule determines the species' quantity.

7.29 Species A33

Name A33

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A33

One rule determines the species' quantity.

7.30 Species A34

Name A34

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A34

One rule determines the species' quantity.

7.31 Species A35

Name A35

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A35

One rule determines the species' quantity.

7.32 Species A36

Name A36

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A36

One rule determines the species' quantity.

7.33 Species A37

Name A37

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A37

One rule determines the species' quantity.

7.34 Species A38

Name A38

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A38

One rule determines the species' quantity.

7.35 Species A39

Name A39

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A39

One rule determines the species' quantity.

7.36 Species A40

Name A40

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A40

One rule determines the species' quantity.

7.37 Species A41

Name A41

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A41

One rule determines the species' quantity.

7.38 Species A42

Name A42

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A42

One rule determines the species' quantity.

7.39 Species A43

Name A43

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A43

One rule determines the species' quantity.

7.40 Species A44

Name A44

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A44

One rule determines the species' quantity.

7.41 Species A45

Name A45

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A45

One rule determines the species' quantity.

7.42 Species A46

Name A46

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A46

One rule determines the species' quantity.

7.43 Species A47

Name A47

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A47

One rule determines the species' quantity.

7.44 Species A48

Name A48

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A48

One rule determines the species' quantity.

7.45 Species A49

Name A49

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A49

One rule determines the species' quantity.

7.46 Species A50

Name A50

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A50

One rule determines the species' quantity.

7.47 Species A51

Name A51

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A51

One rule determines the species' quantity.

7.48 Species A52

Name A52

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A52

One rule determines the species' quantity.

7.49 Species A53

Name A53

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A53

One rule determines the species' quantity.

7.50 Species A54

Name A54

SBO:0000543 protein aggregate

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule A54

One rule determines the species' quantity.

7.51 Species soluble_obs

Name soluble_obs

SBO:0000406 observable

Initial concentration $1.04389999999997\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule soluble_obs

One rule determines the species' quantity.

7.52 Species insoluble_obs

Name insoluble_obs

SBO:0000406 observable

Initial concentration $0\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule insoluble_obs

One rule determines the species' quantity.

A Glossary of Systems Biology Ontology Terms

SBO:0000036 forward bimolecular rate constant, continuous case: Numerical parameter that quantifies the forward velocity of a chemical reaction involving two reactants. This parameter encompasses all the contributions to the velocity except the quantity of the reactants. It is to be used in a reaction modelled using a continuous framework

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:0000341 association rate constant: Rate with which components associate into a complex

SBO:0000406 observable: An entity that can be measured quantitativel

SBO:0000481 stoichiometric coefficient: The stoichiometric coefficient represents the degree to which a chemical species participates in a reaction. It corresponds to the number of molecules of a reactant that are consumed or produced with each occurrence of a reaction event

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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