SBML Model Report

Model name: “Muller2008_treshold_minimal”

May 6, 2016

1 General Overview

This is a document in SBML Level 2 Version 4 format. This model was created by Michael Schubert[1] at May 16th 2011 at 9:49 a. m. and last time modified at October nineth 2014 at 5:24 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	3
events	0	constraints	0
reactions	0	function definitions	0
global parameters	8	unit definitions	0
rules	4	initial assignments	0

Model Notes

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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.

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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
`compartment_1`	compartment_1		3	1	litre	☑	

3.1 Compartment compartment_1

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

Name compartment_1

4 Species

This model contains three species. The boundary condition of three 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
x	x	compartment_1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
y	y	compartment_1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑
z	z	compartment_1	$\mathrm{mol} \cdot \mathrm{l}^{-1}$	⊟	☑

5 Parameters

This model contains eight global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
r	r		0.200		☑
mu_x	mu_x		4.000		☑
zeta	zeta		0.500		☑
b	b		1.500		☑
mu_z	mu_z		0.400		☐
epsilon	epsilon		0.002		☑
k	k		0.400		☑
mu_z_star	mu_z_star		0.400		☑

6 Rules

This is an overview of four rules.

6.1 Rule x

Rule x is a rate rule for species x:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{x} = \mathrm{r}\cdot[\mathrm{x}]\cdot[\mathrm{y}] + \mathrm{zeta}\cdot\mathrm{mu\_x} - \mathrm{zeta}\cdot[\mathrm{x}] \tag{1}$$

6.2 Rule y

Rule y is a rate rule for species y:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{y} = \mathrm{r}\cdot[\mathrm{x}]\cdot[\mathrm{y}] - \mathrm{b}\cdot[\mathrm{y}]\cdot[\mathrm{z}] - \mathrm{zeta}\cdot[\mathrm{y}] \tag{2}$$

6.3 Rule z

Rule z is a rate rule for species z:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{z} = \mathrm{b}\cdot[\mathrm{y}]\cdot[\mathrm{z}] + \mathrm{zeta}\cdot\mathrm{mu\_z} - \mathrm{zeta}\cdot[\mathrm{z}] \tag{3}$$

6.4 Rule mu_z

Rule mu_z is a rate rule for parameter mu_z:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{mu\_z} = \mathrm{epsilon}\cdot([\mathrm{y}] - \mathrm{k}\cdot(\mathrm{mu\_z} - \mathrm{mu\_z\_star})) \tag{4}$$

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 x

Name x

Initial concentration $4\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule x

One rule determines the species' quantity.

7.2 Species y

Name y

Initial concentration $0.2\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule y

One rule determines the species' quantity.

7.3 Species z

Name z

Initial concentration $0.4\ \mathrm{mol} \cdot \mathrm{l}^{-1}$

Involved in rule z

One rule determines the species' quantity.

SBML2LaTeX was developed by Andreas Dräger[a], Hannes Planatscher[a], Dieudonné M Wouamba[a], Adrian Schröder[a], Michael Hucka[b], Lukas Endler[c], Martin Golebiewski[d] and Andreas Zell[a]. Please see http://www.ra.cs.uni-tuebingen.de/software/SBML2LaTeX for more information.

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