SBML Model Report

Model name: "Smith1980_HypothalamicRegulation"

May 6, 2016

1 General Overview

This is a document in SBML Level 2 Version 3 format. Table 1 provides 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	0
events	0	constraints	0
reactions	0	function definitions	0
global parameters	12	unit definitions	6
rules	5	initial assignments	0

Model Notes

This a model from the article:
Hypothalamic regulation of pituitary secretion of luteinizing hormone.II. Feedback control of gonadotropin secretion.
Smith WR Bull Math Biol. (1980) 42(1): 57-78 6986927 ,
Abstract:
No Abstract Available

This model was taken from the CellML repository and automatically converted to SBML. The original model was: **smith,1980,version02**

The original CellML model was created by:
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2 Unit Definitions

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

2.1 Unit `hour`

Name hour

Definition 3600 s

2.2 Unit `pg_ml`

Name pg_ml

Definition $\mathrm{pg} \cdot \mathrm{ml}^{-1}$

2.3 Unit `ng_ml`

Name ng_ml

Definition $\mathrm{ng} \cdot \mathrm{ml}^{-1}$

2.4 Unit pg_ml_hr

Name pg_ml_hr

Definition $\mathrm{pg} \cdot \mathrm{ml}^{-1} \cdot (3600\ \mathrm{s})^{-1}$

2.5 Unit first_order_rate_constant

Name first_order_rate_constant

Definition $(3600\ \mathrm{s})^{-1}$

2.6 Unit time

Name time

Definition 3600 s

2.7 Unit substance

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

Definition mol

2.8 Unit volume

Notes Litre is the predefined SBML unit for `volume`.

Definition l

2.9 Unit area

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

Definition m^2

2.10 Unit length

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

Definition m

3 Compartment

This model contains one compartment.

Table 2: Properties of all compartments.

Id	Name	SBO	Spatial Dimensions	Size	Unit	Constant	Outside
`Compartment`			3	1		☑	

3.1 Compartment `Compartment`

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

4 Parameters

This model contains twelve global parameters.

Table 3: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
`R`	R		0.50	$\mathrm{ng \cdot ml^{-1}}$	⊟
`h`	h		12.00	$(3600\ \mathrm{s})^{-1}$	☑
`c`	c		100.00	$\mathrm{pg \cdot ml^{-1} \cdot (3600\ s)^{-1}}$	☑
`b1`	b1		1.29	$(3600\ \mathrm{s})^{-1}$	☑
`H`	H		0.00	dimensionless	⊟
`x`	x		0.00	$\mathrm{pg \cdot ml^{-1}}$	⊟
`L`	L		22.00	$\mathrm{ng \cdot ml^{-1}}$	⊟
`g1`	g1		10.00	$(3600\ \mathrm{s})^{-1}$	☑
`b2`	b2		0.97	$(3600\ \mathrm{s})^{-1}$	☑
`T`	T		15.00	$\mathrm{pg \cdot ml^{-1}}$	⊟
`g2`	g2		0.70	$(3600\ \mathrm{s})^{-1}$	☑
`b3`	b3		1.39		☑

5 Rules

This is an overview of five rules.

5.1 Rule `R`

Rule `R` is a rate rule for parameter `R`:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{R} = (\mathrm{c} - \mathrm{h} \cdot \mathrm{T}) \cdot (1 - \mathrm{H}) - \mathrm{b1} \cdot \mathrm{R} \tag{1}$$

5.2 Rule L

Rule L is a rate rule for parameter L:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{L} = \mathrm{g1} \cdot \mathrm{R} - \mathrm{b2} \cdot \mathrm{L} \tag{2}$$

Derived unit $(3600\ \mathrm{s})^{-1} \cdot \mathrm{ng} \cdot \mathrm{ml}^{-1}$

5.3 Rule T

Rule T is a rate rule for parameter T:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{T} = \mathrm{g2} \cdot \mathrm{L} - \mathrm{b3} \cdot \mathrm{T} \tag{3}$$

5.4 Rule x

Rule x is an assignment rule for parameter x:

$$\mathrm{x} = \mathrm{T} - \frac{\mathrm{c}}{\mathrm{h}} \tag{4}$$

Derived unit $\mathrm{pg} \cdot \mathrm{ml}^{-1}$

5.5 Rule H

Rule H is an assignment rule for parameter H:

$$\mathrm{H} = \begin{cases} 1 & \text{if } \mathrm{x} > 0 \\ 0 & \text{otherwise} \end{cases} \tag{5}$$

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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