

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 $\text{pg} \cdot \text{ml}^{-1}$

2.3 Unit ng_ml

Name ng_ml

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

2.4 Unit `pg_ml_hr`

Name `pg_ml_hr`

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

2.5 Unit `first_order_rate_constant`

Name `first_order_rate_constant`

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

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		<input checked="" type="checkbox"/>	

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	ng · ml ⁻¹	<input type="checkbox"/>
h	h		12.00	(3600 s) ⁻¹	<input checked="" type="checkbox"/>
c	c		100.00	pg · ml ⁻¹	<input checked="" type="checkbox"/>
b1	b1		1.29	(3600 s) ⁻¹	<input checked="" type="checkbox"/>
H	H		0.00	dimensionless	<input type="checkbox"/>
x	x		0.00	pg · ml ⁻¹	<input type="checkbox"/>
L	L		22.00	ng · ml ⁻¹	<input type="checkbox"/>
g1	g1		10.00	(3600 s) ⁻¹	<input checked="" type="checkbox"/>
b2	b2		0.97	(3600 s) ⁻¹	<input checked="" type="checkbox"/>
T	T		15.00	pg · ml ⁻¹	<input type="checkbox"/>
g2	g2		0.70	(3600 s) ⁻¹	<input checked="" type="checkbox"/>
b3	b3		1.39		<input checked="" type="checkbox"/>

5 Rules

This is an overview of five rules.

5.1 Rule R

Rule R is a rate rule for parameter R:

$$\frac{d}{dt}R = (c - h \cdot T) \cdot (1 - H) - b1 \cdot R \quad (1)$$

5.2 Rule L

Rule L is a rate rule for parameter L:

$$\frac{d}{dt}L = g1 \cdot R - b2 \cdot L \quad (2)$$

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

5.3 Rule T

Rule T is a rate rule for parameter T:

$$\frac{d}{dt}T = g2 \cdot L - b3 \cdot T \quad (3)$$

5.4 Rule x

Rule x is an assignment rule for parameter x:

$$x = T - \frac{c}{h} \quad (4)$$

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

5.5 Rule H

Rule H is an assignment rule for parameter H:

$$H = \begin{cases} 1 & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

SBML2^{AT}EX 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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