SBML Model Report

Model name: "Bungay2003_Thrombin_Generation"

May 5, 2016

1 General Overview

This is a document in SBML Level 2 Version 1 format. This model was created by the following three authors: Harish Dharuri[1], Nick Juty[2] and Michael Schubert[3] at January eighth 2008 at 6:06 p. m. and last time modified at May 28th 2014 at 1:24 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	74
events	0	constraints	0
reactions	66	function definitions	0
global parameters	110	unit definitions	1
rules	0	initial assignments	0

Model Notes

This model is from the article:
A mathematical model of lipid-mediated thrombin generation
Bungay Sharene D., Gentry Patricia A., Gentry Rodney D. Mathematical Medicine and Biology Volume

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20, Issue 1, 1 March 2003, Pages 105-29 12974500,
Abstract:
Thrombin is an enzyme that is generated in both vascular and non-vascular systems. In blood coagulation, a fundamental process in all species, thrombin induces the formation of a fibrin clot. A dynamical model of thrombin generation in the presence of lipid surfaces is presented. This model also includes the self-regulating thrombin feedback reactions, the thrombomodulin-protein C-protein S inhibitory system, tissue factor pathway inhibitor (TFPI), and the inhibitor, antithrombin (AT). The dynamics of this complex system were found to be highly lipid dependent, as would be expected from experimental studies. Simulations of this model indicate that a threshold lipid level is required to generate physiologically relevant amounts of thrombin. The dependence of the onset, the peak levels, and the duration of thrombin generation on lipid was saturable. The lipid concentration affects the way in which the inhibitors modulate thrombin production. A novel feature of this model is the inclusion of the dynamical protein C pathway, initiated by thrombin feedback. This inhibitory system exerts its effects on the lipid surface, where its substrates are formed. The maximum impact of TFPI occurs at intermediate vesicle concentrations. Inhibition by AT is only indirectly affected by the lipid since AT irreversibly binds only to solution phase proteins. In a system with normal plasma concentrations of the proteins involved in thrombin formation, the combination of these three inhibitors is sufficient both to effectively stop thrombin generation prior to the exhaustion of its precursor, prothrombin, and to inhibit all thrombin formed. This model can be used to predict thrombin generation under extreme lipid conditions that are difficult to implement experimentally and to examine thrombin generation in non-vascular systems.

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`

Name nano mole

Definition nmol

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`	Cell		3	1	litre	☑	

3.1 Compartment `compartment`

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

Name Cell

4 Species

This model contains 74 species. 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
II_f	II_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
II_l	II_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
mIIa_f	mIIa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
mIIa_l	mIIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
V_f	V_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
V_l	V_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Va_f	Va_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Va_l	Va_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VII_f	VII_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VII_l	VII_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIa_f	VIIa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIa_l	VIIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIII_f	VIII_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIII_l	VIII_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIIa_f	VIIIa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIIa_l	VIIIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IX_f	IX_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IX_l	IX_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IXa_f	IXa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IXa_l	IXa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
X_f	X_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
X_l	X_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
Xa_f	Xa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Xa_l	Xa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
APC_f	APC_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
APC_l	APC_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PS_f	PS_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PS_l	PS_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIIai_f	VIIIai_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIIIai_l	VIIIai_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Vai_f	Vai_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Vai_l	Vai_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PC_f	PC_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
PC_l	PC_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_l	TF_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VIIa_l	TF_VIIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VII_l	TF_VII_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VIIa_IX_l	TF_VIIa_IX_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VIIa_IXa_l	TF_VIIa_IXa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VIIa_X_l	TF_VIIa_X_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VIIa_Xa_l	TF_VIIa_Xa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
TF_VII_Xa_l	TF_VII_Xa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IXa_VIIIa_l	IXa_VIIIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
Xa_Va_l	Xa_Va_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IXa_VIIIa_X_l	IXa_VIIIa_X_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
V_Xa_l	V_Xa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
VIII_Xa_l	VIII_Xa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
IIa_f	IIa_f	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟
V_IIa_l	V_IIa_l	compartment	$\mathrm{nmol} \cdot \mathrm{l}^{-1}$	⊟	⊟

Id	Name	Compartment	Derived Unit	Constant	Boundary Condition
VIII_IIa_l	VIII_IIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
Xa_Va_II_l	Xa_Va_II_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
Xa_Va_mIIa_l	Xa_Va_mIIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
XI_f	XI_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
XI_IIa_l	XI_IIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
XIa_l	XIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
APC_PS_l	APC_PS_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
APC_PS_VIIIa_l	APC_PS_VIIIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
TFPI_f	TFPI_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
AT_f	AT_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
IIa_AT_f	IIa_AT_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
TFPI_Xa_l	TFPI_Xa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
TFPI_Xa_TF_VIIa_l	TFPI_Xa_TF_VIIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
APC_PS_Va_l	APC_PS_Va_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
IXa_AT_f	IXa_AT_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
Xa_AT_f	Xa_AT_f	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
VII_Xa_l	VII_Xa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
V_mIIa_l	V_mIIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
VIII_mIIa_l	VIII_mIIa_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
TM_l	TM_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
IIa_TM_l	IIa_TM_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
IIa_TM_PC_l	IIa_TM_PC_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
mIIa_AT_l	mIIa_AT_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
XIa_IX_l	XIa_IX_l	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟
LIPID	LIPID	compartment	$\mathrm{nmol \cdot l^{-1}}$	⊟	⊟

5 Parameters

This model contains 110 global parameters.

Table 4: Properties of each parameter.

Id	Name	SBO	Value	Unit	Constant
konII			0.004		☑
nva			100.000		☑
koffII			1.000		☑
konmIIa			0.050		☑
koffmIIa			0.475		☑
konV			0.050		☑
koffV			0.145		☑
konVa			0.057		☑
koffVa			0.170		☑
konVII			0.050		☑
koffVII			0.660		☑
konVIIa			0.050		☑
koffVIIa			0.227		☑
konVIII			0.050		☑
koffVIII			0.100		☑
konVIIIa			0.050		☑
koffVIIIa			0.335		☑
konIX			0.050		☑
koffIX			0.115		☑
konIXa			0.050		☑
koffIXa			0.115		☑
konX			0.010		☑
koffX			1.900		☑
konXa			0.029		☑
koffXa			3.300		☑
konAPC			0.050		☑
koffAPC			3.500		☑
konPS			0.050		☑
koffPS			0.200		☑
konVIIIai			0.050		☑
koffVIIIai			0.335		☑
konVai			0.057		☑
koffVai			0.170		☑
konPC			0.050		☑
koffPC			11.500		☑
k1			0.500		☑
k2			0.005		☑

Id	Name	SBO	Value	Unit	Constant
k3			0.005		☑
k4			0.005		☑
k5			0.010		☑
k6			2.090		☑
k7			0.340		☑
k8			0.100		☑
k9			32.500		☑
k10			1.500		☑
k75			1.000		☑
k11			0.050		☑
k12			44.800		☑
k13			15.200		☑
k14			0.100		☑
k15			0.200		☑
k16			1.000		☑
k17			1.000		☑
k18			0.100		☑
k19			10.700		☑
k20			8.300		☑
k21			0.100		☑
k22			1.000		☑
k23			0.043		☑
k24			0.100		☑
k25			2.100		☑
k26			0.023		☑
k27			0.100		☑
k28			6.940		☑
k29			0.230		☑
k30			0.100		☑
k31			13.800		☑
k32			0.900		☑
k33			0.100		☑
k34			100.000		☑
k35			0.100		☑
k36			66.000		☑
k37			13.000		☑
k38			15.000		☑
k39			0.050		☑
k40			44.800		☑
k41			15.200		☑
k42			0.100		☑
k43			10.000		☑

Id	Name	SBO	Value	Unit	Constant
k44			1.430		☑
k45			0.100		☑
k46			1.600		☑
k47			0.400		☑
k48			0.100		☑
k49			1.600		☑
k50			0.400		☑
k51			0.016		☑
k52			$3.3 \cdot 10^{-4}$		☑
k53			0.010		☑
k54			0.001		☑
k55			$4.9 \cdot 10^{-7}$		☑
k56			$2.3 \cdot 10^{-6}$		☑
k57			$6.83 \cdot 10^{-5}$		☑
k58			0.100		☑
k59			6.940		☑
k60			1.035		☑
k61			0.100		☑
k62			13.800		☑
k63			0.900		☑
k64			1.000		☑
k65			0.500		☑
k66			0.100		☑
k67			6.400		☑
k68			3.600		☑
k69			$6.83 \cdot 10^{-6}$		☑
k70			0.100		☑
k71			0.500		☑
k72			0.010		☑
k73			1.417		☑
k74			0.183		☑

6 Reactions

This model contains 66 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

№	Id	Name	Reaction Equation	SBO
1	LB1	Factor II lipid binding	II_f + 100 LIPID ⟶ II_l	
2	LB2	Factor mIIa lipid binding	mIIa_f + 100 LIPID ⟶ mIIa_l	
3	LB3	Factor V lipid binding	V_f + 100 LIPID ⟶ V_l	
4	LB4	Factor Va lipid binding	Va_f + 100 LIPID ⟶ Va_l	
5	LB5	Factor VII lipid binding	VII_f + 100 LIPID ⟶ VII_l	
6	LB6	Factor VIIa lipid binding	VIIa_f + 100 LIPID ⟶ VIIa_l	
7	LB7	Factor VIII lipid binding	VIII_f + 100 LIPID ⟶ VIII_l	
8	LB8	Factor VIIIa lipid binding	VIIIa_f + 100 LIPID ⟶ VIIIa_l	
9	LB9	Factor IX lipid binding	IX_f + 100 LIPID ⟶ IX_l	
10	LB10	Factor IXa lipid binding	IXa_f + 100 LIPID ⟶ IXa_l	
11	LB11	Factor X lipid binding	X_f + 100 LIPID ⟶ X_l	
12	LB12	Factor Xa lipid binding	Xa_f + 100 LIPID ⟶ Xa_l	
13	LB13	APC lipid binding	APC_f + 100 LIPID ⟶ APC_l	
14	LB14	PS lipid binding	PS_f + 100 LIPID ⟶ PS_l	
15	LB15	Factor VIIIai lipid binding	VIIIai_f + 100 LIPID ⟶ VIIIai_l	
16	LB16	Factor Vai lipid binding	Vai_f + 100 LIPID ⟶ Vai_l	
17	LB17	PC lipid binding	PC_f + 100 LIPID ⟶ PC_l	
18	R1	TF_VIIa binding	VIIa_l + TF_l ⟶ TF_VIIa_l	
19	R2	TF_VII binding	VII_l + TF_l ⟶ TF_VII_l	
20	R3	IX_TF_VIIa binding	IX_l + TF_VIIa_l ⟶ TF_VIIa_IX_l	
21	R3b	Factor IX activation	TF_VIIa_IX_l ⟶ TF_VIIa_l + IXa_l	
22	R4	X_TF_VIIa complex formation	X_l + TF_VIIa_l ⟶ TF_VIIa_X_l	
23	R4b	Factor X activation	TF_VIIa_X_l ⟶ TF_VIIa_Xa_l	

№	Id	Name	Reaction Equation	SBO
24	R4c	Factor Xa release	TF_VIIa_Xa_l ⟶ Xa_l + TF_VIIa_l	
25	R5	Xa_TF_VII binding	Xa_l + TF_VII_l ⟶ TF_VII_Xa_l	
26	R5b	TF_VII activation	TF_VII_Xa_l ⟶ Xa_l + TF_VIIa_l	
27	R6	VIIIa_IXa binding	VIIIa_l + IXa_l ⟶ IXa_VIIIa_l	
28	R7	Va_Xa binding	Va_l + Xa_l ⟶ Xa_Va_l	
29	R8	X_IXa_VIIIa complex formation	X_l + IXa_VIIIa_l ⟶ IXa_VIIIa_X_l	
30	R8b	Factor X activation	IXa_VIIIa_X_l ⟶ Xa_l + IXa_VIIIa_l	
31	R9	V_Xa binding	Xa_l + V_l ⟶ V_Xa_l	
32	R9b	Factor V activation	V_Xa_l ⟶ Xa_l + Va_l	
33	R10	Xa_VIII binding	Xa_l + VIII_l ⟶ VIII_Xa_l	
34	R10b	Factor VIII activation	VIII_Xa_l ⟶ Xa_l + VIIIa_l	
35	R11		IIa_f + V_l ⟶ V_IIa_l	
36	R11b		V_IIa_l ⟶ IIa_f + Va_l	
37	R12		IIa_f + VIII_l ⟶ VIII_IIa_l	
38	R12b		VIII_IIa_l ⟶ IIa_f + VIIIa_l	
39	R13		II_l + Xa_Va_l ⟶ Xa_Va_II_l	
40	R14		mIIa_l + Xa_Va_l ⟶ Xa_Va_mIIa_l	
41	R15		Xa_Va_II_l ⟶ Xa_Va_mIIa_l	
42	R15b		Xa_Va_mIIa_l ⟶ IIa_f + Xa_Va_l	
43	R16		Xa_l + VII_l ⟶ VII_Xa_l	
44	R16b		VII_Xa_l ⟶ Xa_l + VIIa_l	
45	R17		IIa_f + XI_f ⟶ XI_IIa_l	
46	R17b		XI_IIa_l ⟶ IIa_f + XIa_l	
47	R18		VIIIa_l + APC_PS_l ⟶ APC_PS_VIIIa_l	
48	R18b		APC_PS_VIIIa_l ⟶ VIIIai_l + APC_PS_l	
49	R19		Va_l + APC_PS_l ⟶ APC_PS_Va_l	
50	R19b		APC_PS_Va_l ⟶ Vai_l + APC_PS_l	
51	R20		Xa_f + TFPI_f ⟶ TFPI_Xa_l	
52	R21		TF_VIIa_l + TFPI_Xa_l ⟶ TFPI_Xa_TF_VIIa_l	

№	Id	Name	Reaction Equation	SBO
53	R22		AT_f + IXa_f ⟶ IXa_AT_f	
54	R23		AT_f + Xa_f ⟶ Xa_AT_f	
55	R24		AT_f + IIa_f ⟶ IIa_AT_f	
56	R25		mIIa_l + V_l ⟶ V_mIIa_l	
57	R25b		V_mIIa_l ⟶ mIIa_l + Va_l	
58	R26		mIIa_l + VIII_l ⟶ VIII_mIIa_l	
59	R26b		VIII_mIIa_l ⟶ mIIa_l + VIIIa_l	
60	R27		TM_l + IIa_f ⟶ IIa_TM_l	
61	R28		PC_l + IIa_TM_l ⟶ IIa_TM_PC_l	
62	R28b		IIa_TM_PC_l ⟶ APC_l + IIa_TM_l	
63	R29		AT_f + mIIa_f ⟶ mIIa_AT_l	
64	R30		PS_l + APC_l ⟶ APC_PS_l	
65	R31		IX_l + XIa_l ⟶ XIa_IX_l	
66	R31b		XIa_IX_l ⟶ IXa_l + XIa_l	

6.1 Reaction LB1

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

Name Factor II lipid binding

Reaction equation

$$\mathrm{II\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{II\_l} \tag{1}$$

Reactants

Table 6: Properties of each reactant.

Id	Name	SBO
II_f	II_f	
LIPID	LIPID	

Product

Table 7: Properties of each product.

Id	Name	SBO
II_l	II_l	

Kinetic Law

Derived unit contains undeclared units

$$v_1 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konII} \cdot [\mathrm{II\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffII} \cdot [\mathrm{II\_l}] \right) \tag{2}$$

6.2 Reaction LB2

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

Name Factor mIIa lipid binding

Reaction equation

$$\mathrm{mIIa\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{mIIa\_l} \tag{3}$$

Reactants

Table 8: Properties of each reactant.

Id	Name	SBO
mIIa_f	mIIa_f	
LIPID	LIPID	

Product

Table 9: Properties of each product.

Id	Name	SBO
mIIa_l	mIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_2 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konmIIa} \cdot [\mathrm{mIIa\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffmIIa} \cdot [\mathrm{mIIa\_l}] \right) \tag{4}$$

6.3 Reaction LB3

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

Name Factor V lipid binding

Reaction equation

$$\mathrm{V\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{V\_l} \tag{5}$$

Reactants

Table 10: Properties of each reactant.

Id	Name	SBO
V_f	V_f	
LIPID	LIPID	

Product

Table 11: Properties of each product.

Id	Name	SBO
V_l	V_l	

Kinetic Law

Derived unit contains undeclared units

$$v_3 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konV} \cdot [\mathrm{V\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffV} \cdot [\mathrm{V\_l}] \right) \tag{6}$$

6.4 Reaction LB4

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

Name Factor Va lipid binding

Reaction equation

$$\mathrm{Va\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{Va\_l} \tag{7}$$

Reactants

Table 12: Properties of each reactant.

Id	Name	SBO
Va_f	Va_f	
LIPID	LIPID	

Product

Table 13: Properties of each product.

Id	Name	SBO
Va_l	Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_4 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVa} \cdot [\mathrm{Va\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVa} \cdot [\mathrm{Va\_l}] \right) \tag{8}$$

6.5 Reaction LB5

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

Name Factor VII lipid binding

Reaction equation

$$\mathrm{VII\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{VII\_l} \tag{9}$$

Reactants

Table 14: Properties of each reactant.

Id	Name	SBO
VII_f	VII_f	
LIPID	LIPID	

Product

Table 15: Properties of each product.

Id	Name	SBO
VII_l	VII_l	

Kinetic Law

Derived unit contains undeclared units

$$v_5 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVII} \cdot [\mathrm{VII\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVII} \cdot [\mathrm{VII\_l}] \right) \tag{10}$$

6.6 Reaction LB6

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

Name Factor VIIa lipid binding

Reaction equation

$$\mathrm{VIIa\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{VIIa\_l} \tag{11}$$

Reactants

Table 16: Properties of each reactant.

Id	Name	SBO
VIIa_f	VIIa_f	
LIPID	LIPID	

Product

Table 17: Properties of each product.

Id	Name	SBO
VIIa_l	VIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_6 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVIIa} \cdot [\mathrm{VIIa\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVIIa} \cdot [\mathrm{VIIa\_l}] \right) \tag{12}$$

6.7 Reaction LB7

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

Name Factor VIII lipid binding

Reaction equation

$$\mathrm{VIII\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{VIII\_l} \tag{13}$$

Reactants

Table 18: Properties of each reactant.

Id	Name	SBO
VIII_f	VIII_f	
LIPID	LIPID	

Product

Table 19: Properties of each product.

Id	Name	SBO
VIII_l	VIII_l	

Kinetic Law

Derived unit contains undeclared units

$$v_7 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVIII} \cdot [\mathrm{VIII\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVIII} \cdot [\mathrm{VIII\_l}] \right) \tag{14}$$

6.8 Reaction LB8

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

Name Factor VIIIa lipid binding

Reaction equation

$$\mathrm{VIIIa\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{VIIIa\_l} \tag{15}$$

Reactants

Table 20: Properties of each reactant.

Id	Name	SBO
VIIIa_f	VIIIa_f	
LIPID	LIPID	

Product

Table 21: Properties of each product.

Id	Name	SBO
VIIIa_l	VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_8 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVIIIa} \cdot [\mathrm{VIIIa\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVIIIa} \cdot [\mathrm{VIIIa\_l}] \right) \tag{16}$$

6.9 Reaction LB9

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

Name Factor IX lipid binding

Reaction equation

$$\mathrm{IX\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{IX\_l} \tag{17}$$

Reactants

Table 22: Properties of each reactant.

Id	Name	SBO
IX_f	IX_f	
LIPID	LIPID	

Product

Table 23: Properties of each product.

Id	Name	SBO
IX_l	IX_l	

Kinetic Law

Derived unit contains undeclared units

$$v_9 = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konIX} \cdot [\mathrm{IX\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffIX} \cdot [\mathrm{IX\_l}] \right) \tag{18}$$

6.10 Reaction LB10

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

Name Factor IXa lipid binding

Reaction equation

$$\mathrm{IXa\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{IXa\_l} \tag{19}$$

Reactants

Table 24: Properties of each reactant.

Id	Name	SBO
IXa_f	IXa_f	
LIPID	LIPID	

Product

Table 25: Properties of each product.

Id	Name	SBO
IXa_l	IXa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{10} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konIXa} \cdot [\mathrm{IXa\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffIXa} \cdot [\mathrm{IXa\_l}] \right) \tag{20}$$

6.11 Reaction LB11

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

Name Factor X lipid binding

Reaction equation

$$\mathrm{X\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{X\_l} \tag{21}$$

Reactants

Table 26: Properties of each reactant.

Id	Name	SBO
X_f	X_f	
LIPID	LIPID	

Product

Table 27: Properties of each product.

Id	Name	SBO
X_l	X_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{11} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konX} \cdot [\mathrm{X\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffX} \cdot [\mathrm{X\_l}] \right) \tag{22}$$

6.12 Reaction LB12

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

Name Factor Xa lipid binding

Reaction equation

$$\mathrm{Xa\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{Xa\_l} \tag{23}$$

Reactants

Table 28: Properties of each reactant.

Id	Name	SBO
Xa_f	Xa_f	
LIPID	LIPID	

Product

Table 29: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{12} = \frac{\mathrm{konXa} \cdot [\mathrm{Xa\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffXa} \cdot [\mathrm{Xa\_l}] \tag{24}$$

6.13 Reaction LB13

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

Name APC lipid binding

Reaction equation

$$\mathrm{APC\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{APC\_l} \tag{25}$$

Reactants

Table 30: Properties of each reactant.

Id	Name	SBO
APC_f	APC_f	
LIPID	LIPID	

Product

Table 31: Properties of each product.

Id	Name	SBO
APC_l	APC_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{13} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konAPC} \cdot [\mathrm{APC\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffAPC} \cdot [\mathrm{APC\_l}] \right) \tag{26}$$

6.14 Reaction LB14

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

Name PS lipid binding

Reaction equation

$$\mathrm{PS\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{PS\_l} \tag{27}$$

Reactants

Table 32: Properties of each reactant.

Id	Name	SBO
PS_f	PS_f	
LIPID	LIPID	

Product

Table 33: Properties of each product.

Id	Name	SBO
PS_l	PS_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{14} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konPS} \cdot [\mathrm{PS\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffPS} \cdot [\mathrm{PS\_l}] \right) \tag{28}$$

6.15 Reaction LB15

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

Name Factor VIIIai lipid binding

Reaction equation

$$\mathrm{VIIIai\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{VIIIai\_l} \tag{29}$$

Reactants

Table 34: Properties of each reactant.

Id	Name	SBO
VIIIai_f	VIIIai_f	
LIPID	LIPID	

Product

Table 35: Properties of each product.

Id	Name	SBO
VIIIai_1	VIIIai_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{15} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVIIIai} \cdot [\mathrm{VIIIai\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVIIIai} \cdot [\mathrm{VIIIai\_l}] \right) \quad (30)$$

6.16 Reaction LB16

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

Name Factor Vai lipid binding

Reaction equation

$$\mathrm{Vai\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{Vai\_l} \quad (31)$$

Reactants

Table 36: Properties of each reactant.

Id	Name	SBO
Vai_f	Vai_f	
LIPID	LIPID	

Product

Table 37: Properties of each product.

Id	Name	SBO
Vai_1	Vai_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{16} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konVai} \cdot [\mathrm{Vai\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffVai} \cdot [\mathrm{Vai\_l}] \right) \quad (32)$$

6.17 Reaction LB17

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

Name PC lipid binding

Reaction equation

$$\mathrm{PC\_f} + 100\,\mathrm{LIPID} \longrightarrow \mathrm{PC\_l} \tag{33}$$

Reactants

Table 38: Properties of each reactant.

Id	Name	SBO
PC_f	PC_f	
LIPID	LIPID	

Product

Table 39: Properties of each product.

Id	Name	SBO
PC_l	PC_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{17} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \left(\frac{\mathrm{konPC} \cdot [\mathrm{PC\_f}] \cdot [\mathrm{LIPID}]}{\mathrm{nva}} - \mathrm{koffPC} \cdot [\mathrm{PC\_l}] \right) \tag{34}$$

6.18 Reaction R1

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

Name TF_VIIa binding

Reaction equation

$$\mathrm{VIIa\_l} + \mathrm{TF\_l} \longrightarrow \mathrm{TF\_VIIa\_l} \tag{35}$$

Reactants

Table 40: Properties of each reactant.

Id	Name	SBO
VIIa_l	VIIa_l	
TF_l	TF_l	

Product

Table 41: Properties of each product.

Id	Name	SBO
TF_VIIa_l	TF_VIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{18} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k1} \cdot [\mathrm{TF\_l}] \cdot [\mathrm{VIIa\_l}] - \mathrm{k2} \cdot [\mathrm{TF\_VIIa\_l}]) \tag{36}$$

6.19 Reaction R2

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

Name TF_VII binding

Reaction equation

$$\mathrm{VII\_l} + \mathrm{TF\_l} \longrightarrow \mathrm{TF\_VII\_l} \tag{37}$$

Reactants

Table 42: Properties of each reactant.

Id	Name	SBO
VII_l	VII_l	
TF_l	TF_l	

Product

Table 43: Properties of each product.

Id	Name	SBO
TF_VII_1	TF_VII_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{19} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k3} \cdot [\mathrm{TF\_1}] \cdot [\mathrm{VII\_1}] - \mathrm{k4} \cdot [\mathrm{TF\_VII\_1}]) \tag{38}$$

6.20 Reaction R3

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

Name IX_TF_VIIa binding

Reaction equation

$$\mathrm{IX\_1} + \mathrm{TF\_VIIa\_1} \longrightarrow \mathrm{TF\_VIIa\_IX\_1} \tag{39}$$

Reactants

Table 44: Properties of each reactant.

Id	Name	SBO
IX_1	IX_1	
TF_VIIa_1	TF_VIIa_1	

Product

Table 45: Properties of each product.

Id	Name	SBO
TF_VIIa_IX_1	TF_VIIa_IX_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{20} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k5} \cdot [\mathrm{TF\_VIIa\_1}] \cdot [\mathrm{IX\_1}] - \mathrm{k6} \cdot [\mathrm{TF\_VIIa\_IX\_1}]) \tag{40}$$

6.21 Reaction R3b

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

Name Factor IX activation

Reaction equation

$$\text{TF\_VIIa\_IX\_l} \longrightarrow \text{TF\_VIIa\_l} + \text{IXa\_l} \tag{41}$$

Reactant

Table 46: Properties of each reactant.

Id	Name	SBO
TF_VIIa_IX_l	TF_VIIa_IX_l	

Products

Table 47: Properties of each product.

Id	Name	SBO
TF_VIIa_l	TF_VIIa_l	
IXa_l	IXa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{21} = \text{vol}(\text{compartment}) \cdot \text{k7} \cdot [\text{TF\_VIIa\_IX\_l}] \tag{42}$$

6.22 Reaction R4

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

Name X_TF_VIIa complex formation

Reaction equation

$$\text{X\_l} + \text{TF\_VIIa\_l} \longrightarrow \text{TF\_VIIa\_X\_l} \tag{43}$$

Reactants

Table 48: Properties of each reactant.

Id	Name	SBO
X_l	X_l	
TF_VIIa_l	TF_VIIa_l	

Product

Table 49: Properties of each product.

Id	Name	SBO
TF_VIIa_X_l	TF_VIIa_X_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{22} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k8} \cdot [\mathrm{TF\_VIIa\_l}] \cdot [\mathrm{X\_l}] - \mathrm{k9} \cdot [\mathrm{TF\_VIIa\_X\_l}]) \tag{44}$$

6.23 Reaction R4b

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

Name Factor X activation

Reaction equation

$$\mathrm{TF\_VIIa\_X\_l} \longrightarrow \mathrm{TF\_VIIa\_Xa\_l} \tag{45}$$

Reactant

Table 50: Properties of each reactant.

Id	Name	SBO
TF_VIIa_X_l	TF_VIIa_X_l	

Product

Table 51: Properties of each product.

Id	Name	SBO
TF_VIIa_Xa_l	TF_VIIa_Xa_l	

Id	Name	SBO

Kinetic Law

Derived unit contains undeclared units

$$v_{23} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k10} \cdot [\mathrm{TF\_VIIa\_X\_l}] \tag{46}$$

6.24 Reaction R4c

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

Name Factor Xa release

Reaction equation

$$\mathrm{TF\_VIIa\_Xa\_l} \longrightarrow \mathrm{Xa\_l} + \mathrm{TF\_VIIa\_l} \tag{47}$$

Reactant

Table 52: Properties of each reactant.

Id	Name	SBO
TF_VIIa_Xa_l	TF_VIIa_Xa_l	

Products

Table 53: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	
TF_VIIa_l	TF_VIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{24} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k75} \cdot [\mathrm{TF\_VIIa\_Xa\_l}] \tag{48}$$

6.25 Reaction R5

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

Name Xa_TF_VII binding

Reaction equation

$$\text{Xa\_l} + \text{TF\_VII\_l} \longrightarrow \text{TF\_VII\_Xa\_l} \tag{49}$$

Reactants

Table 54: Properties of each reactant.

Id	Name	SBO
Xa_l	Xa_l	
TF_VII_l	TF_VII_l	

Product

Table 55: Properties of each product.

Id	Name	SBO
TF_VII_Xa_l	TF_VII_Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{25} = \text{vol}\,(\text{compartment}) \cdot (\text{k11} \cdot [\text{TF\_VII\_l}] \cdot [\text{Xa\_l}] - \text{k12} \cdot [\text{TF\_VII\_Xa\_l}]) \tag{50}$$

6.26 Reaction R5b

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

Name TF_VII activation

Reaction equation

$$\text{TF\_VII\_Xa\_l} \longrightarrow \text{Xa\_l} + \text{TF\_VIIa\_l} \tag{51}$$

Reactant

Table 56: Properties of each reactant.

Id	Name	SBO
TF_VII_Xa_l	TF_VII_Xa_l	

Products

Table 57: Properties of each product.

Id	Name	SBO
Xa_1	Xa_1	
TF_VIIa_1	TF_VIIa_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{26} = \text{vol}\,(\text{compartment}) \cdot \text{k13} \cdot [\text{TF\_VII\_Xa\_1}] \tag{52}$$

6.27 Reaction R6

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

Name VIIIa_IXa binding

Reaction equation

$$\text{VIIIa\_1} + \text{IXa\_1} \longrightarrow \text{IXa\_VIIIa\_1} \tag{53}$$

Reactants

Table 58: Properties of each reactant.

Id	Name	SBO
VIIIa_1	VIIIa_1	
IXa_1	IXa_1	

Product

Table 59: Properties of each product.

Id	Name	SBO
IXa_VIIIa_1	IXa_VIIIa_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{27} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k14} \cdot [\mathrm{IXa\_l}] \cdot [\mathrm{VIIIa\_l}] - \mathrm{k15} \cdot [\mathrm{IXa\_VIIIa\_l}]) \tag{54}$$

6.28 Reaction R7

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

Name Va_Xa binding

Reaction equation

$$\mathrm{Va\_l} + \mathrm{Xa\_l} \longrightarrow \mathrm{Xa\_Va\_l} \tag{55}$$

Reactants

Table 60: Properties of each reactant.

Id	Name	SBO
Va_l	Va_l	
Xa_l	Xa_l	

Product

Table 61: Properties of each product.

Id	Name	SBO
Xa_Va_l	Xa_Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{28} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k16} \cdot [\mathrm{Xa\_l}] \cdot [\mathrm{Va\_l}] - \mathrm{k17} \cdot [\mathrm{Xa\_Va\_l}]) \tag{56}$$

6.29 Reaction R8

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

Name X_IXa_VIIIa complex formation

Reaction equation

$$\mathrm{X\_l} + \mathrm{IXa\_VIIIa\_l} \longrightarrow \mathrm{IXa\_VIIIa\_X\_l} \tag{57}$$

Reactants

Table 62: Properties of each reactant.

Id	Name	SBO
X_l	X_l	
IXa_VIIIa_l	IXa_VIIIa_l	

Product

Table 63: Properties of each product.

Id	Name	SBO
IXa_VIIIa_X_l	IXa_VIIIa_X_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{29} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k18} \cdot [\mathrm{IXa\_VIIIa\_l}] \cdot [\mathrm{X\_l}] - \mathrm{k19} \cdot [\mathrm{IXa\_VIIIa\_X\_l}]) \tag{58}$$

6.30 Reaction R8b

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

Name Factor X activation

Reaction equation

$$\mathrm{IXa\_VIIIa\_X\_l} \longrightarrow \mathrm{Xa\_l} + \mathrm{IXa\_VIIIa\_l} \tag{59}$$

Reactant

Table 64: Properties of each reactant.

Id	Name	SBO
IXa_VIIIa_X_l	IXa_VIIIa_X_l	

Products

Table 65: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	

Id	Name	SBO
IXa_VIIIa_l	IXa_VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{30} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k20} \cdot [\mathrm{IXa\_VIIIa\_X\_l}] \tag{60}$$

6.31 Reaction R9

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

Name V_Xa binding

Reaction equation

$$\mathrm{Xa\_l} + \mathrm{V\_l} \longrightarrow \mathrm{V\_Xa\_l} \tag{61}$$

Reactants

Table 66: Properties of each reactant.

Id	Name	SBO
Xa_l	Xa_l	
V_l	V_l	

Product

Table 67: Properties of each product.

Id	Name	SBO
V_Xa_l	V_Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{31} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k21} \cdot [\mathrm{V\_l}] \cdot [\mathrm{Xa\_l}] - \mathrm{k22} \cdot [\mathrm{V\_Xa\_l}]) \tag{62}$$

6.32 Reaction R9b

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

Name Factor V activation

Reaction equation

$$\mathrm{V\_Xa\_l} \longrightarrow \mathrm{Xa\_l} + \mathrm{Va\_l} \tag{63}$$

Reactant

Table 68: Properties of each reactant.

Id	Name	SBO
V_Xa_l	V_Xa_l	

Products

Table 69: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	
Va_l	Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{32} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k23} \cdot [\mathrm{V\_Xa\_l}] \tag{64}$$

6.33 Reaction R10

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

Name Xa_VIII binding

Reaction equation

$$\mathrm{Xa\_l} + \mathrm{VIII\_l} \longrightarrow \mathrm{VIII\_Xa\_l} \tag{65}$$

Reactants

Table 70: Properties of each reactant.

Id	Name	SBO
Xa_l	Xa_l	

Id	Name	SBO
VIII_l	VIII_l	

Product

Table 71: Properties of each product.

Id	Name	SBO
VIII_Xa_l	VIII_Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{33} = \mathrm{k24} \cdot [\mathrm{VIII\_l}] \cdot [\mathrm{Xa\_l}] - \mathrm{k25} \cdot [\mathrm{VIII\_Xa\_l}] \tag{66}$$

6.34 Reaction R10b

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

Name Factor VIII activation

Reaction equation

$$\mathrm{VIII\_Xa\_l} \longrightarrow \mathrm{Xa\_l} + \mathrm{VIIIa\_l} \tag{67}$$

Reactant

Table 72: Properties of each reactant.

Id	Name	SBO
VIII_Xa_l	VIII_Xa_l	

Products

Table 73: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	
VIIIa_l	VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{34} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k26} \cdot [\mathrm{VIII\_Xa\_l}] \tag{68}$$

6.35 Reaction R11

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

Reaction equation

$$\mathrm{IIa\_f} + \mathrm{V\_l} \longrightarrow \mathrm{V\_IIa\_l} \tag{69}$$

Reactants

Table 74: Properties of each reactant.

Id	Name	SBO
IIa_f	IIa_f	
V_l	V_l	

Product

Table 75: Properties of each product.

Id	Name	SBO
V_IIa_l	V_IIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{35} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k27} \cdot [\mathrm{V\_l}] \cdot [\mathrm{IIa\_f}] - \mathrm{k28} \cdot [\mathrm{V\_IIa\_l}]) \tag{70}$$

6.36 Reaction R11b

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

Reaction equation

$$\mathrm{V\_IIa\_l} \longrightarrow \mathrm{IIa\_f} + \mathrm{Va\_l} \tag{71}$$

Reactant

Table 76: Properties of each reactant.

Id	Name	SBO
V_IIa_l	V_IIa_l	

Products

Table 77: Properties of each product.

Id	Name	SBO
IIa_f	IIa_f	
Va_l	Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{36} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k29} \cdot [\mathrm{V\_IIa\_l}] \tag{72}$$

6.37 Reaction R12

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

Reaction equation

$$\mathrm{IIa\_f} + \mathrm{VIII\_l} \longrightarrow \mathrm{VIII\_IIa\_l} \tag{73}$$

Reactants

Table 78: Properties of each reactant.

Id	Name	SBO
IIa_f	IIa_f	
VIII_l	VIII_l	

Product

Table 79: Properties of each product.

Id	Name	SBO
VIII_IIa_l	VIII_IIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{37} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k30} \cdot [\mathrm{VIII\_l}] \cdot [\mathrm{IIa\_f}] - \mathrm{k31} \cdot [\mathrm{VIII\_IIa\_l}]) \tag{74}$$

6.38 Reaction R12b

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

Reaction equation

$$\mathrm{VIII\_IIa\_l} \longrightarrow \mathrm{IIa\_f} + \mathrm{VIIIa\_l} \tag{75}$$

Reactant

Table 80: Properties of each reactant.

Id	Name	SBO
VIII_IIa_l	VIII_IIa_l	

Products

Table 81: Properties of each product.

Id	Name	SBO
IIa_f	IIa_f	
VIIIa_l	VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{38} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k32} \cdot [\mathrm{VIII\_IIa\_l}] \tag{76}$$

6.39 Reaction R13

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

Reaction equation

$$\text{II\_l} + \text{Xa\_Va\_l} \longrightarrow \text{Xa\_Va\_II\_l} \tag{77}$$

Reactants

Table 82: Properties of each reactant.

Id	Name	SBO
II_l	II_l	
Xa_Va_l	Xa_Va_l	

Product

Table 83: Properties of each product.

Id	Name	SBO
Xa_Va_II_l	Xa_Va_II_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{39} = \text{vol}\,(\text{compartment}) \cdot (\text{k33} \cdot [\text{Xa\_Va\_l}] \cdot [\text{II\_l}] - \text{k34} \cdot [\text{Xa\_Va\_II\_l}]) \tag{78}$$

6.40 Reaction R14

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

Reaction equation

$$\text{mIIa\_l} + \text{Xa\_Va\_l} \longrightarrow \text{Xa\_Va\_mIIa\_l} \tag{79}$$

Reactants

Table 84: Properties of each reactant.

Id	Name	SBO
mIIa_l	mIIa_l	
Xa_Va_l	Xa_Va_l	

Product

Table 85: Properties of each product.

Id	Name	SBO
Xa_Va_mIIa_l	Xa_Va_mIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{40} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k35} \cdot [\mathrm{Xa\_Va\_l}] \cdot [\mathrm{mIIa\_l}] - \mathrm{k36} \cdot [\mathrm{Xa\_Va\_mIIa\_l}]) \tag{80}$$

6.41 Reaction R15

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

Reaction equation

$$\mathrm{Xa\_Va\_II\_l} \longrightarrow \mathrm{Xa\_Va\_mIIa\_l} \tag{81}$$

Reactant

Table 86: Properties of each reactant.

Id	Name	SBO
Xa_Va_II_l	Xa_Va_II_l	

Product

Table 87: Properties of each product.

Id	Name	SBO
Xa_Va_mIIa_l	Xa_Va_mIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{41} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k37} \cdot [\mathrm{Xa\_Va\_II\_l}] \tag{82}$$

6.42 Reaction R15b

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

Reaction equation

$$\text{Xa\_Va\_mIIa\_l} \longrightarrow \text{IIa\_f} + \text{Xa\_Va\_l} \tag{83}$$

Reactant

Table 88: Properties of each reactant.

Id	Name	SBO
Xa_Va_mIIa_l	Xa_Va_mIIa_l	

Products

Table 89: Properties of each product.

Id	Name	SBO
IIa_f	IIa_f	
Xa_Va_l	Xa_Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{42} = \text{vol}\,(\text{compartment}) \cdot \text{k38} \cdot [\text{Xa\_Va\_mIIa\_l}] \tag{84}$$

6.43 Reaction R16

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

Reaction equation

$$\text{Xa\_l} + \text{VII\_l} \longrightarrow \text{VII\_Xa\_l} \tag{85}$$

Reactants

Table 90: Properties of each reactant.

Id	Name	SBO
Xa_l	Xa_l	

Id	Name	SBO
VII_l	VII_l	

Product

Table 91: Properties of each product.

Id	Name	SBO
VII_Xa_l	VII_Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{43} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k39} \cdot [\mathrm{VII\_l}] \cdot [\mathrm{Xa\_l}] - \mathrm{k40} \cdot [\mathrm{VII\_Xa\_l}]) \tag{86}$$

6.44 Reaction R16b

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

Reaction equation

$$\mathrm{VII\_Xa\_l} \longrightarrow \mathrm{Xa\_l} + \mathrm{VIIa\_l} \tag{87}$$

Reactant

Table 92: Properties of each reactant.

Id	Name	SBO
VII_Xa_l	VII_Xa_l	

Products

Table 93: Properties of each product.

Id	Name	SBO
Xa_l	Xa_l	
VIIa_l	VIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{44} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k41} \cdot [\mathrm{VII\_Xa\_l}] \tag{88}$$

6.45 Reaction R17

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

Reaction equation

$$\mathrm{IIa\_f} + \mathrm{XI\_f} \longrightarrow \mathrm{XI\_IIa\_l} \tag{89}$$

Reactants

Table 94: Properties of each reactant.

Id	Name	SBO
IIa_f	IIa_f	
XI_f	XI_f	

Product

Table 95: Properties of each product.

Id	Name	SBO
XI_IIa_l	XI_IIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{45} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k42} \cdot [\mathrm{XI\_f}] \cdot [\mathrm{IIa\_f}] - \mathrm{k43} \cdot [\mathrm{XI\_IIa\_l}]) \tag{90}$$

6.46 Reaction R17b

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

Reaction equation

$$\mathrm{XI\_IIa\_l} \longrightarrow \mathrm{IIa\_f} + \mathrm{XIa\_l} \tag{91}$$

Reactant

Table 96: Properties of each reactant.

Id	Name	SBO
XI_IIa_l	XI_IIa_l	

Products

Table 97: Properties of each product.

Id	Name	SBO
IIa_f	IIa_f	
XIa_l	XIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{46} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k44} \cdot [\mathrm{XI\_IIa\_l}] \tag{92}$$

6.47 Reaction R18

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

Reaction equation

$$\mathrm{VIIIa\_l} + \mathrm{APC\_PS\_l} \longrightarrow \mathrm{APC\_PS\_VIIIa\_l} \tag{93}$$

Reactants

Table 98: Properties of each reactant.

Id	Name	SBO
VIIIa_l	VIIIa_l	
APC_PS_l	APC_PS_l	

Product

Table 99: Properties of each product.

Id	Name	SBO
APC_PS_VIIIa_l	APC_PS_VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{47} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k45} \cdot [\mathrm{APC\_PS\_l}] \cdot [\mathrm{VIIIa\_l}] - \mathrm{k46} \cdot [\mathrm{APC\_PS\_VIIIa\_l}]) \quad (94)$$

6.48 Reaction R18b

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

Reaction equation

$$\mathrm{APC\_PS\_VIIIa\_l} \longrightarrow \mathrm{VIIIai\_l} + \mathrm{APC\_PS\_l} \quad (95)$$

Reactant

Table 100: Properties of each reactant.

Id	Name	SBO
APC_PS_VIIIa_l	APC_PS_VIIIa_l	

Products

Table 101: Properties of each product.

Id	Name	SBO
VIIIai_l	VIIIai_l	
APC_PS_l	APC_PS_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{48} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k47} \cdot [\mathrm{APC\_PS\_VIIIa\_l}] \quad (96)$$

6.49 Reaction R19

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

Reaction equation

$$\text{Va\_1} + \text{APC\_PS\_1} \longrightarrow \text{APC\_PS\_Va\_1} \tag{97}$$

Reactants

Table 102: Properties of each reactant.

Id	Name	SBO
Va_1	Va_1	
APC_PS_1	APC_PS_1	

Product

Table 103: Properties of each product.

Id	Name	SBO
APC_PS_Va_1	APC_PS_Va_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{49} = \text{vol}\,(\text{compartment}) \cdot (\text{k48} \cdot [\text{APC\_PS\_1}] \cdot [\text{Va\_1}] - \text{k49} \cdot [\text{APC\_PS\_Va\_1}]) \tag{98}$$

6.50 Reaction R19b

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

Reaction equation

$$\text{APC\_PS\_Va\_1} \longrightarrow \text{Vai\_1} + \text{APC\_PS\_1} \tag{99}$$

Reactant

Table 104: Properties of each reactant.

Id	Name	SBO
APC_PS_Va_1	APC_PS_Va_1	

Products

Table 105: Properties of each product.

Id	Name	SBO
Vai_l	Vai_l	
APC_PS_l	APC_PS_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{50} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k50} \cdot [\mathrm{APC\_PS\_Va\_l}] \tag{100}$$

6.51 Reaction R20

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

Reaction equation

$$\mathrm{Xa\_f} + \mathrm{TFPI\_f} \longrightarrow \mathrm{TFPI\_Xa\_l} \tag{101}$$

Reactants

Table 106: Properties of each reactant.

Id	Name	SBO
Xa_f	Xa_f	
TFPI_f	TFPI_f	

Product

Table 107: Properties of each product.

Id	Name	SBO
TFPI_Xa_l	TFPI_Xa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{51} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k51} \cdot [\mathrm{TFPI\_f}] \cdot [\mathrm{Xa\_f}] - \mathrm{k52} \cdot [\mathrm{TFPI\_Xa\_l}]) \tag{102}$$

6.52 Reaction R21

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

Reaction equation

$$\text{TF\_VIIa\_l} + \text{TFPI\_Xa\_l} \longrightarrow \text{TFPI\_Xa\_TF\_VIIa\_l} \tag{103}$$

Reactants

Table 108: Properties of each reactant.

Id	Name	SBO
TF_VIIa_l	TF_VIIa_l	
TFPI_Xa_l	TFPI_Xa_l	

Product

Table 109: Properties of each product.

Id	Name	SBO
TFPI_Xa_TF_VIIa_l	TFPI_Xa_TF_VIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{52} = \text{vol}\,(\text{compartment}) \cdot (\text{k53} \cdot [\text{TFPI\_Xa\_l}] \cdot [\text{TF\_VIIa\_l}] - \text{k54} \cdot [\text{TFPI\_Xa\_TF\_VIIa\_l}]) \tag{104}$$

6.53 Reaction R22

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

Reaction equation

$$\text{AT\_f} + \text{IXa\_f} \longrightarrow \text{IXa\_AT\_f} \tag{105}$$

Reactants

Table 110: Properties of each reactant.

Id	Name	SBO
AT_f	AT_f	

Id	Name	SBO
IXa_f	IXa_f	

Product

Table 111: Properties of each product.

Id	Name	SBO
IXa_AT_f	IXa_AT_f	

Kinetic Law

Derived unit contains undeclared units

$$v_{53} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k55} \cdot [\mathrm{IXa\_f}] \cdot [\mathrm{AT\_f}] \tag{106}$$

6.54 Reaction R23

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

Reaction equation

$$\mathrm{AT\_f} + \mathrm{Xa\_f} \longrightarrow \mathrm{Xa\_AT\_f} \tag{107}$$

Reactants

Table 112: Properties of each reactant.

Id	Name	SBO
AT_f	AT_f	
Xa_f	Xa_f	

Product

Table 113: Properties of each product.

Id	Name	SBO
Xa_AT_f	Xa_AT_f	

Kinetic Law

Derived unit contains undeclared units

$$v_{54} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k56} \cdot [\mathrm{Xa\_f}] \cdot [\mathrm{AT\_f}] \tag{108}$$

6.55 Reaction R24

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

Reaction equation

$$\mathrm{AT\_f} + \mathrm{IIa\_f} \longrightarrow \mathrm{IIa\_AT\_f} \tag{109}$$

Reactants

Table 114: Properties of each reactant.

Id	Name	SBO
AT_f	AT_f	
IIa_f	IIa_f	

Product

Table 115: Properties of each product.

Id	Name	SBO
IIa_AT_f	IIa_AT_f	

Kinetic Law

Derived unit contains undeclared units

$$v_{55} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k57} \cdot [\mathrm{IIa\_f}] \cdot [\mathrm{AT\_f}] \tag{110}$$

6.56 Reaction R25

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

Reaction equation

$$\mathrm{mIIa\_l} + \mathrm{V\_l} \longrightarrow \mathrm{V\_mIIa\_l} \tag{111}$$

Reactants

Table 116: Properties of each reactant.

Id	Name	SBO
mIIa_l	mIIa_l	
V_l	V_l	

Product

Table 117: Properties of each product.

Id	Name	SBO
V_mIIa_l	V_mIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{56} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k58} \cdot [\mathrm{V\_l}] \cdot [\mathrm{mIIa\_l}] - \mathrm{k59} \cdot [\mathrm{V\_mIIa\_l}]) \tag{112}$$

6.57 Reaction R25b

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

Reaction equation

$$\mathrm{V\_mIIa\_l} \longrightarrow \mathrm{mIIa\_l} + \mathrm{Va\_l} \tag{113}$$

Reactant

Table 118: Properties of each reactant.

Id	Name	SBO
V_mIIa_l	V_mIIa_l	

Products

Table 119: Properties of each product.

Id	Name	SBO
mIIa_l	mIIa_l	
Va_l	Va_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{57} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k60} \cdot [\mathrm{V\_mIIa\_l}] \tag{114}$$

6.58 Reaction R26

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

Reaction equation

$$\mathrm{mIIa\_l} + \mathrm{VIII\_l} \longrightarrow \mathrm{VIII\_mIIa\_l} \tag{115}$$

Reactants

Table 120: Properties of each reactant.

Id	Name	SBO
mIIa_l	mIIa_l	
VIII_l	VIII_l	

Product

Table 121: Properties of each product.

Id	Name	SBO
VIII_mIIa_l	VIII_mIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{58} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k61} \cdot [\mathrm{VIII\_l}] \cdot [\mathrm{mIIa\_l}] - \mathrm{k62} \cdot [\mathrm{VIII\_mIIa\_l}]) \tag{116}$$

6.59 Reaction R26b

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

Reaction equation

$$\text{VIII\_mIIa\_l} \longrightarrow \text{mIIa\_l} + \text{VIIIa\_l} \tag{117}$$

Reactant

Table 122: Properties of each reactant.

Id	Name	SBO
VIII_mIIa_l	VIII_mIIa_l	

Products

Table 123: Properties of each product.

Id	Name	SBO
mIIa_l	mIIa_l	
VIIIa_l	VIIIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{59} = \text{vol}\left(\text{compartment}\right) \cdot \text{k63} \cdot [\text{VIII\_mIIa\_l}] \tag{118}$$

6.60 Reaction R27

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

Reaction equation

$$\text{TM\_l} + \text{IIa\_f} \longrightarrow \text{IIa\_TM\_l} \tag{119}$$

Reactants

Table 124: Properties of each reactant.

Id	Name	SBO
TM_l	TM_l	

Id	Name	SBO
IIa_f	IIa_f	

Product

Table 125: Properties of each product.

Id	Name	SBO
IIa_TM_l	IIa_TM_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{60} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k64} \cdot [\mathrm{IIa\_f}] \cdot [\mathrm{TM\_l}] - \mathrm{k65} \cdot [\mathrm{IIa\_TM\_l}]) \tag{120}$$

6.61 Reaction R28

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

Reaction equation

$$\mathrm{PC\_l} + \mathrm{IIa\_TM\_l} \longrightarrow \mathrm{IIa\_TM\_PC\_l} \tag{121}$$

Reactants

Table 126: Properties of each reactant.

Id	Name	SBO
PC_l	PC_l	
IIa_TM_l	IIa_TM_l	

Product

Table 127: Properties of each product.

Id	Name	SBO
IIa_TM_PC_l	IIa_TM_PC_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{61} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k66} \cdot [\mathrm{IIa\_TM\_l}] \cdot [\mathrm{PC\_l}] - \mathrm{k67} \cdot [\mathrm{IIa\_TM\_PC\_l}]) \tag{122}$$

6.62 Reaction R28b

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

Reaction equation

$$\mathrm{IIa\_TM\_PC\_l} \longrightarrow \mathrm{APC\_l} + \mathrm{IIa\_TM\_l} \tag{123}$$

Reactant

Table 128: Properties of each reactant.

Id	Name	SBO
IIa_TM_PC_l	IIa_TM_PC_l	

Products

Table 129: Properties of each product.

Id	Name	SBO
APC_l	APC_l	
IIa_TM_l	IIa_TM_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{62} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k68} \cdot [\mathrm{IIa\_TM\_PC\_l}] \tag{124}$$

6.63 Reaction R29

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

Reaction equation

$$\mathrm{AT\_f} + \mathrm{mIIa\_f} \longrightarrow \mathrm{mIIa\_AT\_l} \tag{125}$$

Reactants

Table 130: Properties of each reactant.

Id	Name	SBO
AT_f	AT_f	
mIIa_f	mIIa_f	

Product

Table 131: Properties of each product.

Id	Name	SBO
mIIa_AT_l	mIIa_AT_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{63} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k69} \cdot [\mathrm{mIIa\_f}] \cdot [\mathrm{AT\_f}] \tag{126}$$

6.64 Reaction R30

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

Reaction equation

$$\mathrm{PS\_l} + \mathrm{APC\_l} \longrightarrow \mathrm{APC\_PS\_l} \tag{127}$$

Reactants

Table 132: Properties of each reactant.

Id	Name	SBO
PS_l	PS_l	
APC_l	APC_l	

Product

Table 133: Properties of each product.

Id	Name	SBO
APC_PS_1	APC_PS_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{64} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k70} \cdot [\mathrm{APC\_1}] \cdot [\mathrm{PS\_1}] - \mathrm{k71} \cdot [\mathrm{APC\_PS\_1}]) \tag{128}$$

6.65 Reaction R31

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

Reaction equation

$$\mathrm{IX\_1} + \mathrm{XIa\_1} \longrightarrow \mathrm{XIa\_IX\_1} \tag{129}$$

Reactants

Table 134: Properties of each reactant.

Id	Name	SBO
IX_1	IX_1	
XIa_1	XIa_1	

Product

Table 135: Properties of each product.

Id	Name	SBO
XIa_IX_1	XIa_IX_1	

Kinetic Law

Derived unit contains undeclared units

$$v_{65} = \mathrm{vol}\,(\mathrm{compartment}) \cdot (\mathrm{k72} \cdot [\mathrm{XIa\_1}] \cdot [\mathrm{IX\_1}] - \mathrm{k73} \cdot [\mathrm{XIa\_IX\_1}]) \tag{130}$$

6.66 Reaction R31b

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

Reaction equation

$$\mathrm{XIa\_IX\_l} \longrightarrow \mathrm{IXa\_l} + \mathrm{XIa\_l} \tag{131}$$

Reactant

Table 136: Properties of each reactant.

Id	Name	SBO
XIa_IX_l	XIa_IX_l	

Products

Table 137: Properties of each product.

Id	Name	SBO
IXa_l	IXa_l	
XIa_l	XIa_l	

Kinetic Law

Derived unit contains undeclared units

$$v_{66} = \mathrm{vol}\,(\mathrm{compartment}) \cdot \mathrm{k74} \cdot [\mathrm{XIa\_IX\_l}] \tag{132}$$

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.

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.

7.1 Species II_f

Name II_f

Initial concentration $1400\ \mathrm{nmol} \cdot \mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{II\_f} = -v_1 \tag{133}$$

7.2 Species II_l

Name II_l

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

This species takes part in two reactions (as a reactant in R13 and as a product in LB1).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{II\_l} = v_1 - v_{39} \tag{134}$$

7.3 Species mIIa_f

Name mIIa_f

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

This species takes part in two reactions (as a reactant in LB2, R29).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{mIIa\_f} = -v_2 - v_{63} \tag{135}$$

7.4 Species mIIa_l

Name mIIa_l

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

This species takes part in six reactions (as a reactant in R14, R25, R26 and as a product in LB2, R25b, R26b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{mIIa\_l} = v_2 + v_{57} + v_{59} - v_{40} - v_{56} - v_{58} \tag{136}$$

7.5 Species V_f

Name V_f

Initial concentration $20\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{V\_f} = -v_3 \tag{137}$$

7.6 Species V_l

Name V_l

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

This species takes part in four reactions (as a reactant in R9, R11, R25 and as a product in LB3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{V\_l} = v_3 - v_{31} - v_{35} - v_{56} \tag{138}$$

7.7 Species Va_f

Name Va_f

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

This species takes part in one reaction (as a reactant in LB4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Va\_f} = -v_4 \tag{139}$$

7.8 Species Va_l

Name Va_l

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

This species takes part in six reactions (as a reactant in R7, R19 and as a product in LB4, R9b, R11b, R25b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Va\_l} = v_4 + v_{32} + v_{36} + v_{57} - v_{28} - v_{49} \tag{140}$$

7.9 Species VII_f

Name VII_f

Initial concentration $10\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB5).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VII\_f} = -v_5 \tag{141}$$

7.10 Species VII_l

Name VII_l

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

This species takes part in three reactions (as a reactant in R2, R16 and as a product in LB5).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VII\_l} = v_5 - v_{19} - v_{43} \tag{142}$$

7.11 Species VIIa_f

Name VIIa_f

Initial concentration $0.1\ \mathrm{nmol \cdot l^{-1}}$

This species takes part in one reaction (as a reactant in LB6).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIa\_f} = -v_6 \tag{143}$$

7.12 Species VIIa_l

Name VIIa_l

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

This species takes part in three reactions (as a reactant in R1 and as a product in LB6, R16b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIa\_l} = v_6 + v_{44} - v_{18} \tag{144}$$

7.13 Species VIII_f

Name VIII_f

Initial concentration $0.7\ \mathrm{nmol \cdot l^{-1}}$

This species takes part in one reaction (as a reactant in LB7).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIII\_f} = -v_7 \tag{145}$$

7.14 Species VIII_l

Name VIII_l

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

This species takes part in four reactions (as a reactant in R10, R12, R26 and as a product in LB7).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIII\_l} = v_7 - v_{33} - v_{37} - v_{58} \tag{146}$$

7.15 Species VIIIa_f

Name VIIIa_f

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

This species takes part in one reaction (as a reactant in LB8).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIIa\_f} = -v_8 \tag{147}$$

7.16 Species VIIIa_l

Name VIIIa_l

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

This species takes part in six reactions (as a reactant in R6, R18 and as a product in LB8, R10b, R12b, R26b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIIa\_l} = v_8 + v_{34} + v_{38} + v_{59} - v_{27} - v_{47} \tag{148}$$

7.17 Species IX_f

Name IX_f

Initial concentration $90\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB9).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IX\_f} = -v_9 \tag{149}$$

7.18 Species IX_l

Name IX_l

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

This species takes part in three reactions (as a reactant in R3, R31 and as a product in LB9).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IX\_l} = v_9 - v_{20} - v_{65} \tag{150}$$

7.19 Species IXa_f

Name IXa_f

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

This species takes part in two reactions (as a reactant in LB10, R22).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IXa\_f} = -v_{10} - v_{53} \tag{151}$$

7.20 Species IXa_l

Name IXa_l

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

This species takes part in four reactions (as a reactant in R6 and as a product in LB10, R3b, R31b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IXa\_l} = v_{10} + v_{21} + v_{66} - v_{27} \tag{152}$$

7.21 Species X_f

Name X_f

Initial concentration $170\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB11).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{X\_f} = -v_{11} \tag{153}$$

7.22 Species X_l

Name X_l

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

This species takes part in three reactions (as a reactant in R4, R8 and as a product in LB11).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{X\_l} = v_{11} - v_{22} - v_{29} \tag{154}$$

7.23 Species Xa_f

Name Xa_f

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

This species takes part in three reactions (as a reactant in LB12, R20, R23).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_f} = -v_{12} - v_{51} - v_{54} \tag{155}$$

7.24 Species Xa_l

Name Xa_l

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

This species takes part in twelve reactions (as a reactant in R5, R7, R9, R10, R16 and as a product in LB12, R4c, R5b, R8b, R9b, R10b, R16b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_l} = v_{12} + v_{24} + v_{26} + v_{30} + v_{32} + v_{34} + v_{44} - v_{25} - v_{28} - v_{31} - v_{33} - v_{43} \tag{156}$$

7.25 Species APC_f

Name APC_f

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

This species takes part in one reaction (as a reactant in LB13).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{APC\_f} = -v_{13} \tag{157}$$

7.26 Species APC_l

Name APC_l

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

This species takes part in three reactions (as a reactant in R30 and as a product in LB13, R28b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{APC\_l} = v_{13} + v_{62} - v_{64} \tag{158}$$

7.27 Species PS_f

Name PS_f

Initial concentration $300\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in LB14).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{PS\_f} = -v_{14} \tag{159}$$

7.28 Species PS_l

Name PS_l

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

This species takes part in two reactions (as a reactant in R30 and as a product in LB14).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{PS\_l} = v_{14} - v_{64} \tag{160}$$

7.29 Species VIIIai_f

Name VIIIai_f

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

This species takes part in one reaction (as a reactant in LB15).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIIai\_f} = -v_{15} \tag{161}$$

7.30 Species VIIIai_l

Name VIIIai_l

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

This species takes part in two reactions (as a product in LB15, R18b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIIIai\_l} = v_{15} + v_{48} \tag{162}$$

7.31 Species Vai_f

Name Vai_f

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

This species takes part in one reaction (as a reactant in LB16).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Vai\_f} = -v_{16} \tag{163}$$

7.32 Species Vai_l

Name Vai_l

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

This species takes part in two reactions (as a product in LB16, R19b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Vai\_l} = v_{16} + v_{50} \tag{164}$$

7.33 Species PC_f

Name PC_f

Initial concentration $60\ \mathrm{nmol \cdot l^{-1}}$

This species takes part in one reaction (as a reactant in LB17).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{PC\_f} = -v_{17} \tag{165}$$

7.34 Species PC_l

Name PC_l

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

This species takes part in two reactions (as a reactant in R28 and as a product in LB17).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{PC\_l} = v_{17} - v_{61} \tag{166}$$

7.35 Species TF_l

Name TF_l

Initial concentration $0.0050\ \mathrm{nmol \cdot l^{-1}}$

This species takes part in two reactions (as a reactant in R1, R2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_l} = -v_{18} - v_{19} \tag{167}$$

7.36 Species TF_VIIa_l

Name TF_VIIa_l

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

This species takes part in seven reactions (as a reactant in R3, R4, R21 and as a product in R1, R3b, R4c, R5b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VIIa\_l} = v_{18} + v_{21} + v_{24} + v_{26} - v_{20} - v_{22} - v_{52} \tag{168}$$

7.37 Species TF_VII_l

Name TF_VII_l

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

This species takes part in two reactions (as a reactant in R5 and as a product in R2).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VII\_l} = v_{19} - v_{25} \tag{169}$$

7.38 Species TF_VIIa_IX_l

Name TF_VIIa_IX_l

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

This species takes part in two reactions (as a reactant in R3b and as a product in R3).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VIIa\_IX\_l} = v_{20} - v_{21} \tag{170}$$

7.39 Species TF_VIIa_IXa_l

Name TF_VIIa_IXa_l

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

This species does not take part in any reactions. Its quantity does hence not change over time:

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VIIa\_IXa\_l} = 0 \tag{171}$$

7.40 Species TF_VIIa_X_l

Name TF_VIIa_X_l

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

This species takes part in two reactions (as a reactant in R4b and as a product in R4).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VIIa\_X\_l} = v_{22} - v_{23} \tag{172}$$

7.41 Species TF_VIIa_Xa_l

Name TF_VIIa_Xa_l

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

This species takes part in two reactions (as a reactant in R4c and as a product in R4b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VIIa\_Xa\_l} = v_{23} - v_{24} \tag{173}$$

7.42 Species TF_VII_Xa_l

Name TF_VII_Xa_l

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

This species takes part in two reactions (as a reactant in R5b and as a product in R5).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TF\_VII\_Xa\_l} = v_{25} - v_{26} \tag{174}$$

7.43 Species IXa_VIIIa_l

Name IXa_VIIIa_l

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

This species takes part in three reactions (as a reactant in R8 and as a product in R6, R8b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IXa\_VIIIa\_l} = v_{27} + v_{30} - v_{29} \tag{175}$$

7.44 Species Xa_Va_l

Name Xa_Va_l

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

This species takes part in four reactions (as a reactant in R13, R14 and as a product in R7, R15b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_Va\_l} = v_{28} + v_{42} - v_{39} - v_{40} \tag{176}$$

7.45 Species IXa_VIIIa_X_l

Name IXa_VIIIa_X_l

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

This species takes part in two reactions (as a reactant in R8b and as a product in R8).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IXa\_VIIIa\_X\_l} = v_{29} - v_{30} \tag{177}$$

7.46 Species V_Xa_l

Name V_Xa_l

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

This species takes part in two reactions (as a reactant in R9b and as a product in R9).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{V\_Xa\_l} = v_{31} - v_{32} \tag{178}$$

7.47 Species VIII_Xa_l

Name VIII_Xa_l

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

This species takes part in two reactions (as a reactant in R10b and as a product in R10).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIII\_Xa\_l} = v_{33} - v_{34} \tag{179}$$

7.48 Species IIa_f

Name IIa_f

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

This species takes part in nine reactions (as a reactant in R11, R12, R17, R24, R27 and as a product in R11b, R12b, R15b, R17b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IIa\_f} = v_{36} + v_{38} + v_{42} + v_{46} - v_{35} - v_{37} - v_{45} - v_{55} - v_{60} \tag{180}$$

7.49 Species V_IIa_l

Name V_IIa_l

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

This species takes part in two reactions (as a reactant in R11b and as a product in R11).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{V\_IIa\_l} = v_{35} - v_{36} \tag{181}$$

7.50 Species VIII_IIa_l

Name VIII_IIa_l

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

This species takes part in two reactions (as a reactant in R12b and as a product in R12).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIII\_IIa\_l} = v_{37} - v_{38} \tag{182}$$

7.51 Species Xa_Va_II_l

Name Xa_Va_II_l

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

This species takes part in two reactions (as a reactant in R15 and as a product in R13).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_Va\_II\_l} = v_{39} - v_{41} \tag{183}$$

7.52 Species Xa_Va_mIIa_l

Name Xa_Va_mIIa_l

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

This species takes part in three reactions (as a reactant in R15b and as a product in R14, R15).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_Va\_mIIa\_l} = v_{40} + v_{41} - v_{42} \tag{184}$$

7.53 Species XI_f

Name XI_f

Initial concentration $30\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in R17).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{XI\_f} = -\ v_{45} \tag{185}$$

7.54 Species XI_IIa_l

Name XI_IIa_l

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

This species takes part in two reactions (as a reactant in R17b and as a product in R17).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{XI\_IIa\_l} = v_{45} - v_{46} \tag{186}$$

7.55 Species XIa_l

Name XIa_l

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

This species takes part in three reactions (as a reactant in R31 and as a product in R17b, R31b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{XIa\_l} = v_{46} + v_{66} - v_{65} \tag{187}$$

7.56 Species APC_PS_l

Name APC_PS_l

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

This species takes part in five reactions (as a reactant in R18, R19 and as a product in R18b, R19b, R30).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{APC\_PS\_l} = v_{48} + v_{50} + v_{64} - v_{47} - v_{49} \tag{188}$$

7.57 Species APC_PS_VIIIa_l

Name APC_PS_VIIIa_l

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

This species takes part in two reactions (as a reactant in R18b and as a product in R18).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{APC\_PS\_VIIIa\_l} = v_{47} - v_{48} \tag{189}$$

7.58 Species TFPI_f

Name TFPI_f

Initial concentration $2.5\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in one reaction (as a reactant in R20).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TFPI\_f} = -v_{51} \tag{190}$$

7.59 Species AT_f

Name AT_f

Initial concentration $3400\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in four reactions (as a reactant in R22, R23, R24, R29).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{AT\_f} = -v_{53} - v_{54} - v_{55} - v_{63} \tag{191}$$

7.60 Species IIa_AT_f

Name IIa_AT_f

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

This species takes part in one reaction (as a product in R24).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IIa\_AT\_f} = v_{55} \tag{192}$$

7.61 Species TFPI_Xa_l

Name TFPI_Xa_l

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

This species takes part in two reactions (as a reactant in R21 and as a product in R20).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TFPI\_Xa\_l} = v_{51} - v_{52} \tag{193}$$

7.62 Species TFPI_Xa_TF_VIIa_l

Name TFPI_Xa_TF_VIIa_l

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

This species takes part in one reaction (as a product in R21).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TFPI\_Xa\_TF\_VIIa\_l} = v_{52} \tag{194}$$

7.63 Species APC_PS_Va_l

Name APC_PS_Va_l

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

This species takes part in two reactions (as a reactant in R19b and as a product in R19).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{APC\_PS\_Va\_l} = v_{49} - v_{50} \tag{195}$$

7.64 Species IXa_AT_f

Name IXa_AT_f

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

This species takes part in one reaction (as a product in R22).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IXa\_AT\_f} = v_{53} \tag{196}$$

7.65 Species Xa_AT_f

Name Xa_AT_f

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

This species takes part in one reaction (as a product in R23).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{Xa\_AT\_f} = v_{54} \tag{197}$$

7.66 Species VII_Xa_l

Name VII_Xa_l

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

This species takes part in two reactions (as a reactant in R16b and as a product in R16).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VII\_Xa\_l} = v_{43} - v_{44} \tag{198}$$

7.67 Species V_mIIa_l

Name V_mIIa_l

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

This species takes part in two reactions (as a reactant in R25b and as a product in R25).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{V\_mIIa\_l} = v_{56} - v_{57} \tag{199}$$

7.68 Species VIII_mIIa_l

Name VIII_mIIa_l

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

This species takes part in two reactions (as a reactant in R26b and as a product in R26).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{VIII\_mIIa\_l} = v_{58} - v_{59} \tag{200}$$

7.69 Species TM_l

Name TM_l

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

This species takes part in one reaction (as a reactant in R27).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{TM\_l} = -v_{60} \tag{201}$$

7.70 Species IIa_TM_l

Name IIa_TM_l

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

This species takes part in three reactions (as a reactant in R28 and as a product in R27, R28b).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IIa\_TM\_l} = v_{60} + v_{62} - v_{61} \tag{202}$$

7.71 Species IIa_TM_PC_l

Name IIa_TM_PC_l

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

This species takes part in two reactions (as a reactant in R28b and as a product in R28).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{IIa\_TM\_PC\_l} = v_{61} - v_{62} \tag{203}$$

7.72 Species mIIa_AT_l

Name mIIa_AT_l

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

This species takes part in one reaction (as a product in R29).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{mIIa\_AT\_l} = v_{63} \tag{204}$$

7.73 Species XIa_IX_l

Name XIa_IX_l

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

This species takes part in two reactions (as a reactant in R31b and as a product in R31).

$$\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{XIa\_IX\_l} = v_{65} - v_{66} \tag{205}$$

7.74 Species LIPID

Name LIPID

Initial concentration $849079\ \mathrm{nmol}\cdot\mathrm{l}^{-1}$

This species takes part in 17 reactions (as a reactant in LB1, LB2, LB3, LB4, LB5, LB6, LB7, LB8, LB9, LB10, LB11, LB12, LB13, LB14, LB15, LB16, LB17).

$$\begin{aligned}\frac{\mathrm{d}}{\mathrm{d}t}\mathrm{LIPID} = &-100\,v_1 - 100\,v_2 - 100\,v_3 - 100\,v_4 - 100\,v_5 - 100\,v_6\\ &- 100\,v_7 - 100\,v_8 - 100\,v_9 - 100\,v_{10} - 100\,v_{11} - 100\,v_{12}\\ &- 100\,v_{13} - 100\,v_{14} - 100\,v_{15} - 100\,v_{16} - 100\,v_{17}\end{aligned} \tag{206}$$

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