

Converters and graphical representation for BioModels Database

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Initial situation

BioModels Home Models Submit Support About BioModels Contact us

BIOMD0000000001 - Edelstein1996_EPSP_AChEvent

Download SBML | Other formats (auto-generated) | Actions | Submit Model Comment/Bug

Model Overview Math Parameters Curation

View Bitmap Reaction Graph
View SVG Reaction Graph
View Dynamic Reaction Graph
View Model of Month

Reference Publication

Publication ID: [8983160](#)
Edelstein SJ, Schaefer A, Lippman A, et al. A kinetic mechanism for the action of acetylcholine on nicotinic receptors based on multiple allosteric transitions. Biol Cybern 1996; 75:1-10.
Département de Biochimie, Université de Geneve, Switzerland. Stuart.Edelstein@biochem.unige.ch [\[more\]](#)

Model

Original Model: [BIOMD0000000001.xml.origin](#)
Submitter: [Nicolas Le Novère](#)
Submission ID: MODEL6613849442
Submission Date: 13 Sep 2005 12:18:50 UTC
Last Modification Date: 25 May 2011 10:30:46 UTC
Creation Date: 02 Feb 2005 14:56:11 UTC
Encoders: [Nicolas Le Novère](#)

set #1 bqbiol:isVersionOf [Gene Ontology neuromuscular synaptic transmission](#)
[Gene Ontology cell surface receptor linked signaling pathway](#)

set #2 bqbiol:is [Taxonomy Torpedo californica](#)

Notes

Model of a nicotinic EPSP in a Torpedo electric organ by Edelstein et al (1996)

Acetylcholine is not represented explicitly, but by an event that changes the constants of transition from unliganded to liganded.

This model originates from BioModels Database: A Database of Annotated Published Models (<http://www.ebi.ac.uk/biomodels/>). It is copyright (c) 2005-2011 The BioModels.net Team. For more information see the [terms of use](#).

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 Novère N, Laibe C \(2011\) resource for published quantitative kinetic models. BMC Syst Biol., 4:92.](#)

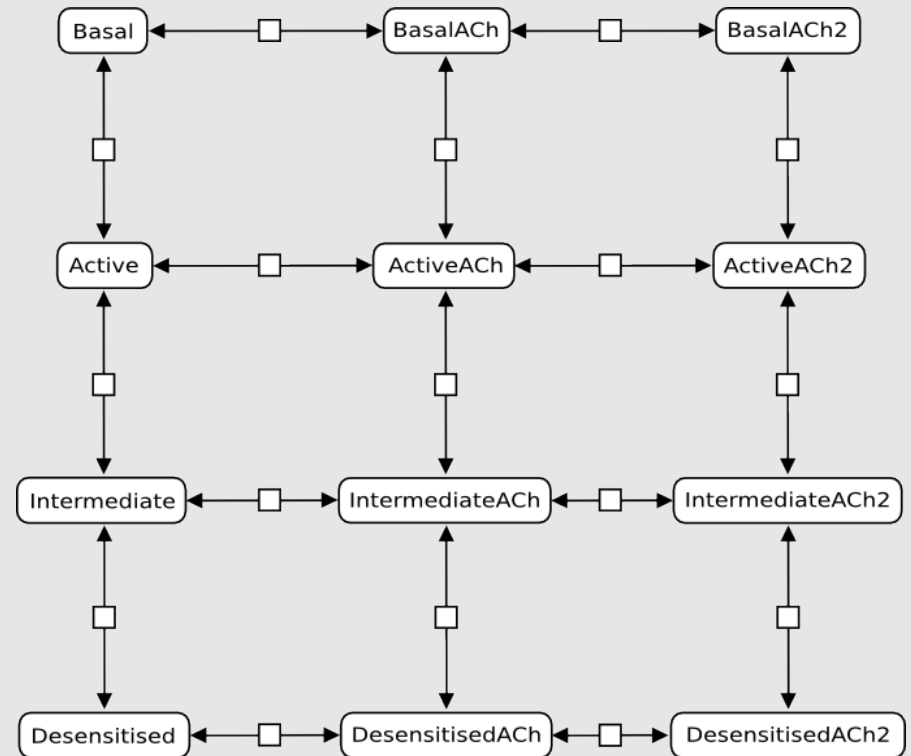
Model converted into DOT

```
digraph g {
  node [shape=plaintext]
  A1 -> B1
  A2 -> B2
  A3 -> B3

  A1 -> A2 [label=f]
  A2 -> A3 [label=g]
  B2 -> B3 [label="g'"]
  B1 -> B3 [label="(g o f)'" tailport=s headport=s]

  { rank=same; A1 A2 A3 }
  { rank=same; B1 B2 B3 }
}
```

Automatic layout with graphViz



Problems

1. Graphs are inaccurate:
 - Shapes and arcs do not have any particular meaning
2. Graph layouts are unefficient:
 - Important number of nodes and arcs
 - Highlighting biological interests
3. Display of SBML metadata is forgotten

Problems

1. Graphs are inaccurate:

- Shapes and arcs do not have any particular meaning

Convert SBML models into SBGN representations

2. Graph layouts are unefficient:

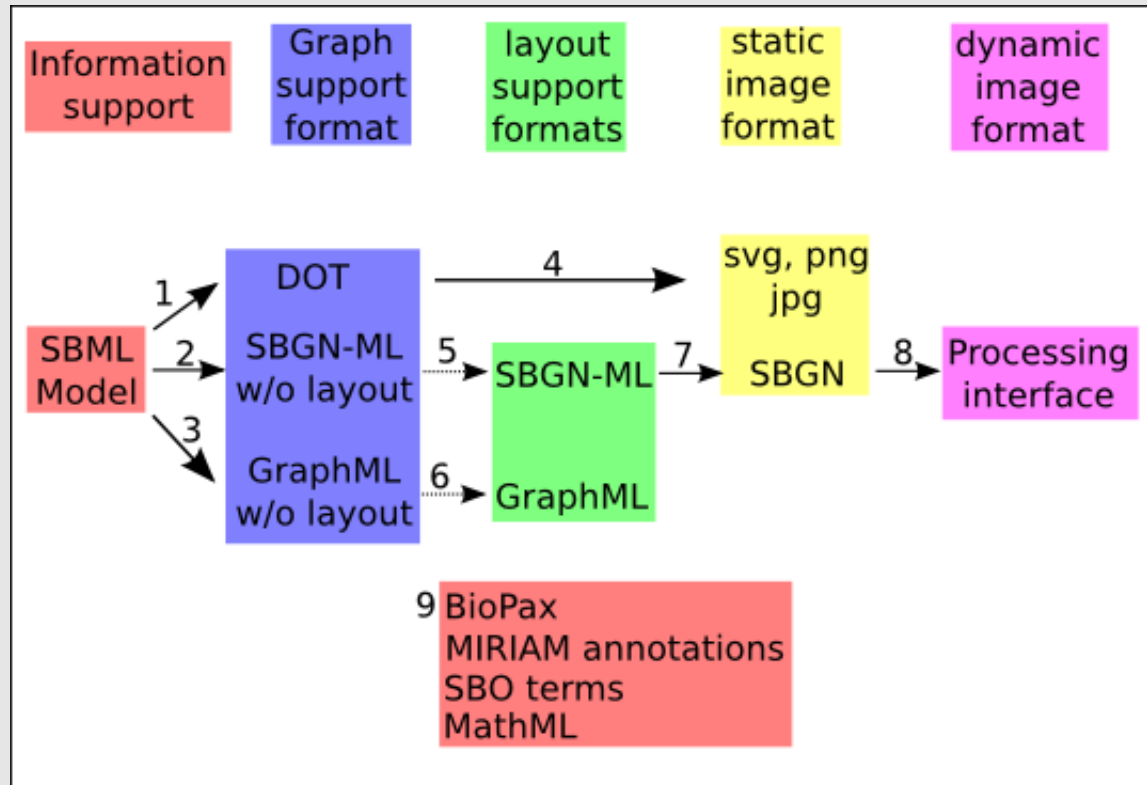
- Important number of nodes and arcs
- Highlighting biological interests

Implement specific algorithms for SBGN

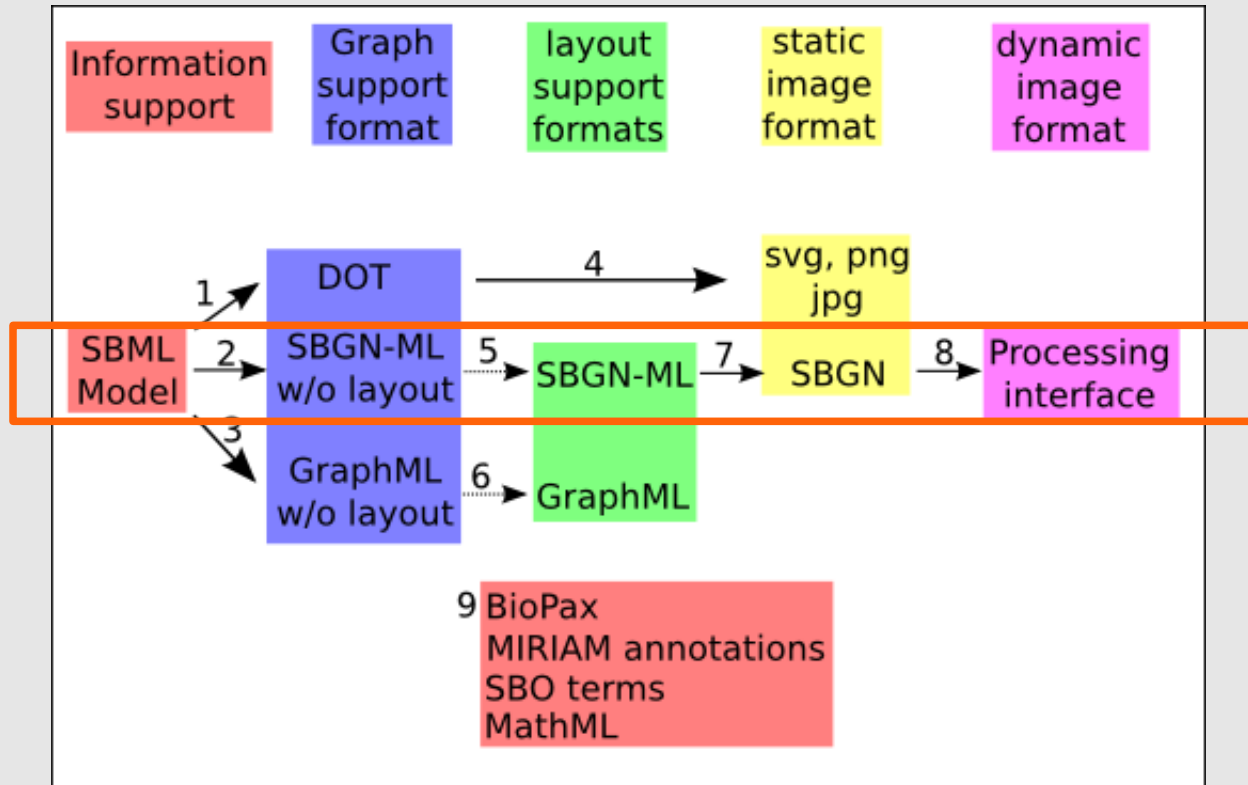
3. Display of SBML metadata is forgotten

Enriching model conversions with MIRIAM annotations, SBO terms, MathML...

Pipeline of converters



Pipeline of converters



SBML to SBGN-ML

Conversion properties:

- More **accurate** with MIRIAM annotations and SBO terms
- **Independent mapping** to SBGN classes into other formats
- Use **extension** tag of milestone 2 to support SBML metadata
- Identify SBGN **clones**
- Identify **complexes** and their **decorations**

SBGN representation

Processing

- Software open source, GNU license
- Designed for graphical and visualization of data
- processing.js 1.2.3 / processing 1.5

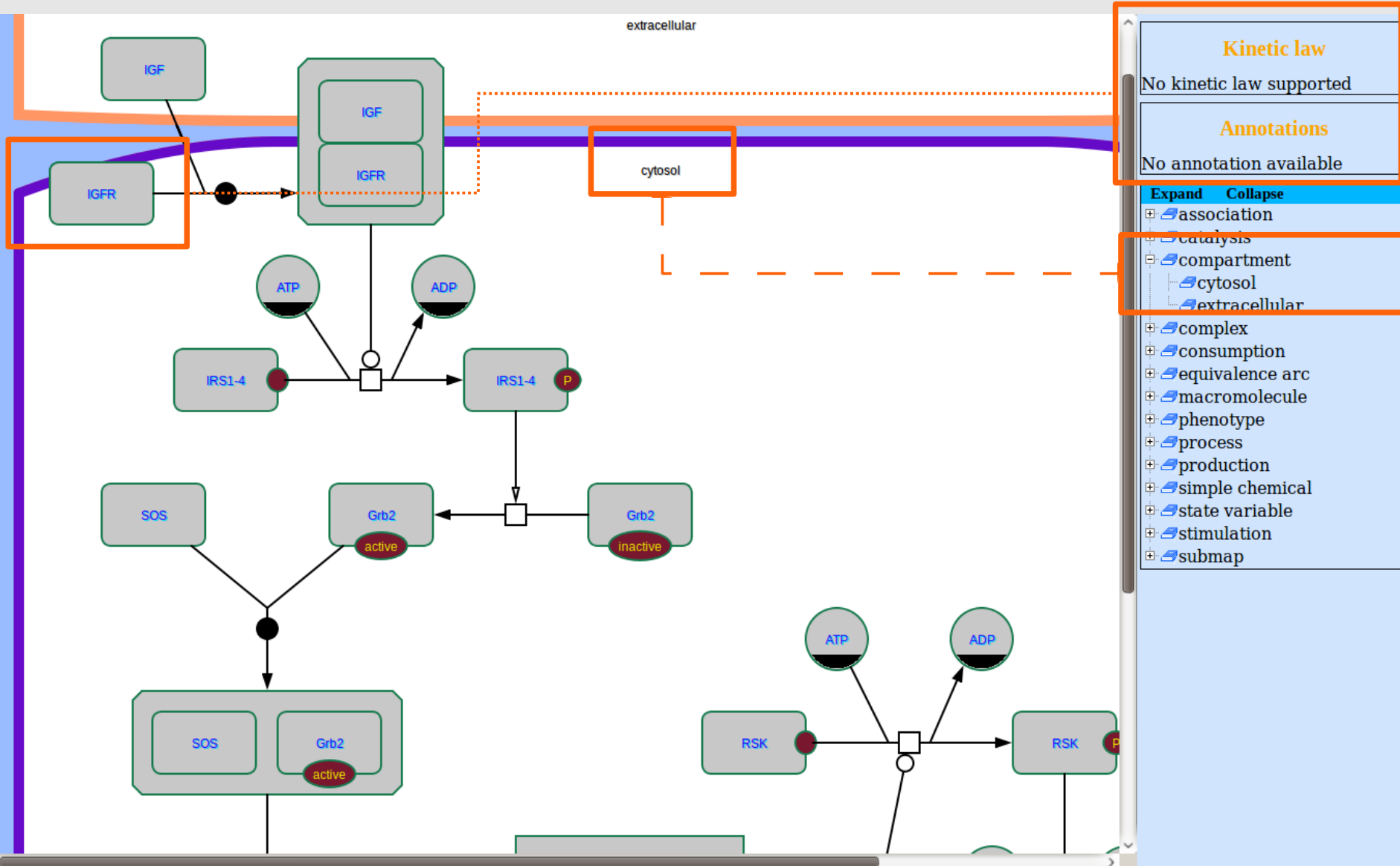
Conversion into **interactive SBGN glyphs**

- All shapes (SBGN PD) are organized as object classes

SBGN-ML glyphs are **mapped** to:

- SBGN PD glyph
- Interaction properties
- Annotations

Web interface



Perspectives

Complete SBGN support (ER and AF)

Improve browser support

Adding automatic SBGN layout

Work on the interface:

- Display of other SBML metadata
- Provide direct links to metadata
- Add graph display control

Zooming property (hide/display information)

Acknowledgments

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SBGN community

