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DKFZ

07.09.2011|1/18

Current State of JUMMP

COMBINE 2011

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1 Introduction

2 Current State of Development

3 Development

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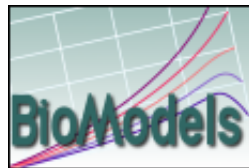
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What is JUMMP?

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Goals

- Modular framework for handling any Model file
- Replacement for existing BioModels DB
- Easy setup on sites outside the EBI
- Secure access to Models
- Collaborative Model Development



Who develops it

- Computational Systems Neurobiology Group at EBI
- Data Management Group of TBI at DKFZ
- **Community**: JUMMP is Open Source

Stack

- General Model Management Platform
- Not limited to SBML
- Strong use of Plugins
- Web Application using Grails Framework
- Easy to Extend and Contribute

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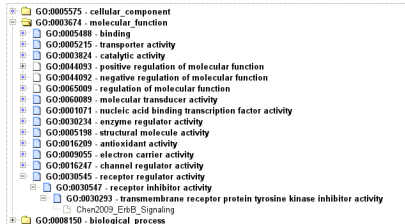
Implemented Features

- Uses JSBML
- Extract all information
- Online Validation of submitted files
- Prototype views like Biomodels
- Submodel Generation
- Reaction Graph

Model	Overview	Math	Physical Entities
Parameters	Reaction Graph	Curation	Revisions
Reactions (0)			
Rules (9)			
Rate Rule	$\alpha_1 x_1^{g11} x_2^{g21} - (\beta_1 x_1) = \frac{d(\text{Osteoclasts})}{dt}$		
Rate Rule	$\alpha_2 x_1^{g12} x_2^{g22} - (\beta_2 x_2) = \frac{d(\text{Osteoblasts})}{dt}$		
Rate Rule	$k_2 y_2 - (k_1 y_1) = \frac{d(\text{BoneMass})}{dt}$		
Assignment Rule	$\begin{cases} x_1 - x_{1_bar} & \text{if } x_1 > x_{1_bar} \\ 0 & \text{otherwise} \end{cases} = y_1$		
Assignment Rule	$\begin{cases} x_2 - x_{2_bar} & \text{if } x_2 > x_{2_bar} \\ 0 & \text{otherwise} \end{cases} = y_2$		
Assignment Rule	$\left(\frac{\beta_1}{\alpha_1}\right)^{\frac{1-g22}{\gamma_1}} \left(\frac{\beta_2}{\alpha_2}\right)^{\frac{g21}{\gamma_1}} = x_{1_bar}$		
Assignment Rule	$\left(\frac{\beta_1}{\alpha_1}\right)^{\frac{g12}{\gamma_1}} \left(\frac{\beta_2}{\alpha_2}\right)^{\frac{1-g11}{\gamma_1}} = x_{2_bar}$		
Assignment Rule	$g_{12} g_{21} - ((1 - g_{11})(1 - g_{22})) = \gamma$		
Assignment Rule	$\begin{cases} 0.15 & \text{if } \text{time} \geq 1 \wedge \text{time} < 2 \\ -0.5 & \text{otherwise} \end{cases} = g_{21}$		

Implemented Features

- Import of MIRIAM registry dump
- Generates identifiers.org URLs
- Web Services for name resolving
- Annotations are resolved during SBML upload
- Stored in database
- Search Models by Gene-Ontology Tree



Implemented Features

- Publication Information Support
- Retrieved from Webservice
- Automatically extracted from SBML file
- Stored in Database
- Manual insert possible

PubMed ID	<u>20488988</u>
Journal	Science 2010 Jun; 328(5984): 1404-8
Title	Covering a broad dynamic range: information processing at the erythropoietin receptor.
Authors	V Becker, M Schilling, J Bachmann, U Baumann, A Raue, T Maiwald, J Timmer, U Klingmüller
Affiliation	Division Systems Biology of Signal Transduction, DKFZ-ZMBH Alliance, German Cancer Research Center, 69120 Heidelberg, Germany.
Abstract	Cell surface receptors convert extracellular cues into receptor activation, thereby triggering intr...

Implemented Features

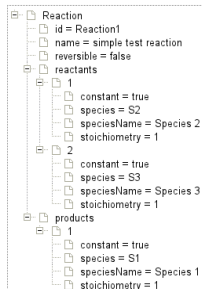
- Models under version control
- Bives: Diff between Revisions
- Public/Private Revisions
- Deletion of latest Revision
- Grant Read/Write Permission to Collaborators

Multiple Backends

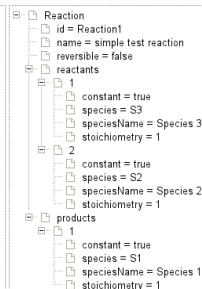
- git
- svn
- Plugins...

Moves

Elements in revision2



Elements in revision3



Flexibility

- First start to configure the application
- Stored in simple Java Properties file
- Multiple authentication backends:
 - Database
 - LDAP
 - More possible through Spring-Security
- User Registration and Administration

External Command Tool to Load SBML files

- Uses IPC to communicate with JUMMP
- Written in Qt/C++
- Able to load all SBML models in a directory
- Can directly publish the model

Linux Packages on OBS

<https://build.opensuse.org/package/show?package=jummp-loader&project=home:mgraesslin:jummp-loader>

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DEMO

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Work Items

- Flexible Tagging System
- Search
- Curation/Annotate Process
- User Groups
- Web Service
- User Interface

Alpha Release planned to be released soon.

Announcement

Release will be announced when done

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Everyone is Welcome

- **General Wiki:** <https://bitbucket.org/jummp/jummp/wiki/Home>
- **Development Wiki:** <https://bitbucket.org/mgraesslin/jummp/wiki/Home>
- **Fork on Bitbucket:** <https://bitbucket.org/mgraesslin/jummp/fork>
- **Issue Tracker:** <https://bitbucket.org/mgraesslin/jummp/issues>
- **Mailing Lists:** jummp-discuss@googlegroups.com and jummp-dev@googlegroups.com

Plugins

Development is very easy due to flexible Plugin Infrastructure

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Plugins

Development is very easy due to flexible Plugin Infrastructure

- Jürgen Eils
- Roland Eils
- Robert Hälke
- Camille Laibe
- Nicolas Le Novère
- Jochen Schramm
- All other members of the Data Management Group