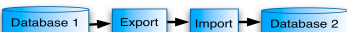


Sharing biological pathway information using the BioPAX exchange language

BioPAX.org

BioPAX supports:

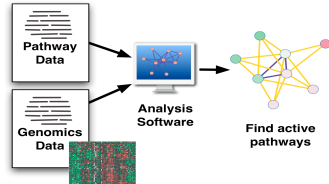
Data Exchange Between Database Groups



Pathway Visualization From Database



Pathway Analysis of Genomics Data

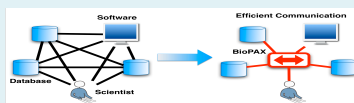


Aims and Motivation

BioPAX is a collaborative effort to develop a standard biological pathway data exchange language and format. Level 3 supports metabolic, signal transduction, gene regulation networks and molecular and genetic interactions. The ontology is open-source under LGPL and implemented in OWL.

Challenge: Integrate and use ~317 Pathway Databases!

- Varied formats, representation, coverage
- Pathway data are extremely difficult to combine and use



Solution: Common Pathway Exchange Format - BioPAX

Pathguide: the pathway resource list <http://pathguide.org>

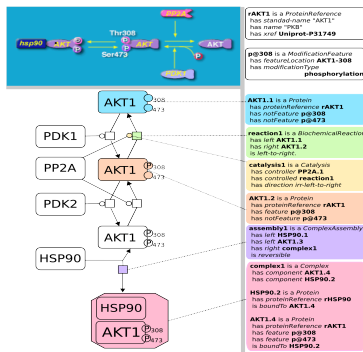
Complete Listing of All Pathguide Resources

Pathguide contains information about 317 biological pathway resources. Click on a link to go to the resource home page or click on a description page. Databases that are free and have supporting BioPAX, CellML, PSI-MI or SBML standards are respectively indicated.

If you know of a pathway resource that is not listed here, or have other questions or comments, please [email us](mailto:info@pathguide.org).

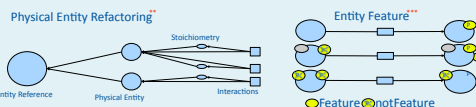
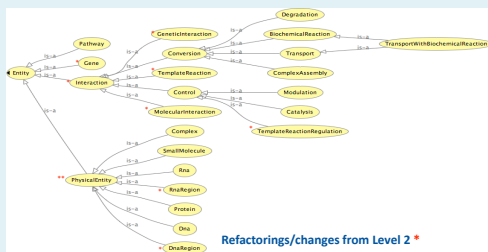
Resource Name (Other abbreviations, by web presence)	Full Name	Available	Standards
3DID - 3D Interacting domains	Details	Free	
ADAM - Prediction of protein-protein interaction of modular domains	Details	Free	
Affix - Functional Associations of Proteins in Complexes	Details	Free	X
ama2 - Protein Function and Biochemical Pathways Project	Details	Free	
APD - Apic Protein Interaction Database	Details	Free	
ASDB - Amino Acid Scanning Database	Details	Free	
ASPD - Artificially Selected Protein-Protein Database	Details	Free	
BID - Binding Interface Database	Details	Free	
BIND - Biomolecular Interaction Network Database	Details	Free	
BioGRID - Biological General Repository for Interaction Datasets	Details	Free	
BRITC - Biomolecular Relations in Information Transmission and Expression	Details	Free	
CATNeuron - Pathways of the Hippocampal CA1 neuron	Details	Free	
Cancer Cell Map - The Cancer Cell Map	Details	Free	
CellCyclo - CellCyclo	Details	Free	
Complex - Database of protein structures in bound (Complex) and unbound (Single) states	Details	Free	
CCPDB - Comprehensive resource of mammalian protein complexes	Details	Free	
CPDB - ConsensusPathDB	Details	Free	

Representing pathway data in BioPAX



BioPAX Ontology

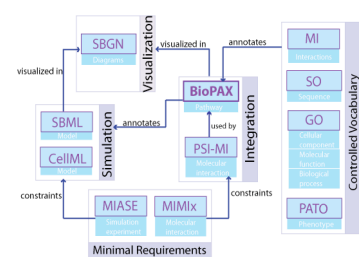
BioPAX Entity subClasses



BioPAX UtilityClass subClasses



BioPAX and other data standards



Contributions

Level 1 - Gary D. Bader, Erik Brauer, Michael P. Cary, Robert Goldberg, Chris Huganir, Peter Karp, Joanne Luciano, Debbie Marks, Natalia Mathew, Eric Neumann, Suzanne Paley, John Pick, Avy Regor, Andrew Rethelky, Chris Sander, Vincent Schachter, Imran Shah, Michaela Spel, Jeremy Zucker

Level 2 - Miki Abadi, Gary D. Bader, Michael P. Cary, Kara Dahlquist, Emek Demir, Peter D'Antonio, Ken Fukuda, Frank Gibbons, Marc Gillespie, Chris Huganir, Michael Huch, Genji Iwata, David Kane, Peter Karp, Christian Lemer, Joanne Luciano, Natalia Mathew, Eric Neumann, Suzanne Paley, Elgi Polak, Jonathan Rees, Alan Ruttenberg, Andrew Rethelky, Chris Sander, Vincent Schachter, Andreas Splendiani, Mustafa Sped, Edgar Wingender, Guoming Wu, Jeremy Zucker

Level 3 - Gary Bader, Michael Cary, Emek Demir, Sara Dissanayake, Ugur Dogrusoz, Ramon Feliciano, Ken Fukuda, Akiko Fushimi, Igor Goryainov, Susumu Goto, Matthew Hendig, Michael Huch, Samuel Keren, Nikolai Khramov, Nicolas Le Novère, Christian Lemer, Joanne Luciano, Stuart Moad, Poul Møller, Victoria Petri, Hama Rajasimha, Rajani Ramakrishnan, Alan Ruttenberg, Chris Sander, Frank Schachner, Carl Schaffer, Anand Srinivas, Andrea Splendiani, Paul Thomas, Inna Vastrik, Jeremy Zucker

BioPAX is coordinated by Chris Sander's group in the Computational Biology Center at Memorial Sloan-Kettering Cancer Center (biopax@mskcc.org) and Gary Bader's group at the University of Toronto, in collaboration with many of the above participants.

Data Exchange and Integration

Databases supporting BioPAX

- BioCyc
- BioModels
- Cancer Cell Map
- Ecocyc
- IMID
- INOH
- KEGG
- MetaCyc
- Nature/NCI PID
- NetPath
- OPHID
- Pathway Commons
- PSI-MI (BIND, BioGRID, DIP, HPRD, IntAct, MINT, MIPS)
- Reactome
- RegulonDB
- Rhea

Software supporting BioPAX

