Reactome – A Knowledgebase of Biological Processes

Birney E1, Croft D1, de Bono B1, D'Eustachio P2,4, Gillespie M3,4, Gopinathrao G4, Jassal B1, Joshi-Tope G4, Lewis S5, Matthews L4, Schmidt E1, Stein L4, Vastrik I1, Wu G4

1European Bioinformatics Institute, Hinxton, Cambridge, UK, 2New York University School of Medicine, NY, USA, 3St Johns University, NY, USA, 4Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, USA and 5University of California, Berkeley, CA, USA

Reactome, located at http://www.reactome.org, is a database of human biochemical reactions and cellular processes. Reactome contains information on both metabolic and signal transduction pathways/networks as well as various other cellular processes. Reactions are described in terms of molecular entities that participate in the reaction as substrate, product or catalyst as well as a GO molecular function term if appropriate.

The information in Reactome is authored by experts in a given field, is supported by a scientific publication and is reviewed by other experts prior to the publication. Authors can accompany their formal description of reactions and pathways with free text that can be used to accommodate information too difficult to capture in the formal manner.

Most of the expert-authored data in Reactome deals with processes in human. However, in addition to that Reactome also provides orthology–based computational predictions of pathways in several model organisms.

Reactome knowledgebase makes extensive use of other databases and sources of biological information: UniProt identifiers are used to describe proteins, small molecules are identified ChEBI identifiers, NCBI taxonomy identifiers are used for species, GO terms are used for catalytic activity and sub-cellular location and to cross reference pathways. In addition Reactome provides links to Ensembl, Entrez Genes and KEGG.

Reactome software uses only freely available (and often open source) components and has been created with cross-platform compatibility and wide usability in mind: data is stored in MySQL database, web site is implemented in PERL and data entry tool in Java programming language.

The demonstration will cover:

- Accessing Reactome data using web interface.
- Editing data in your own copy of the database using Reactome Curator Tool.
- Accessing Reactome data programmatically.

Reactome data and tools are freely available and downloadable for local installation.