



Joint Press Release



European Bioinformatics Institute
Cold Spring Harbor Laboratory

For immediate release

International consortium launches new web-based tool: Reactome provides map of human biological pathways

New York/Hinxton, June 2, 2004 – A partnership between Cold Spring Harbor Laboratory (CSHL) and the European Molecular Biology Laboratory's European Bioinformatics Institute (EBI) has publicly released Reactome, a curated database of biological processes in humans. This database, available at www.reactome.org, is a dual-purpose project that can be used by general biologists as an online textbook of biology, or by bioinformaticians to make discoveries about biological pathways.

Now that the human genome is essentially complete and we are making daily strides in cataloguing information about the other ingredients of a cell such as proteins, RNA molecules and metabolites, scientists have begun to focus on how these components interact in living systems, an emerging field called 'systems biology'. Reactome puts the 'parts lists' together to build pathways – the functional units that orchestrate the different activities of a cell.

The basic information in Reactome is provided by bench biologists who are experts on a particular pathway. The information is then managed by groups of curators at CSHL and EBI, peer-reviewed by other researchers and published on the web. It covers biological pathways ranging from the basic processes of metabolism to complex regulatory pathways such as hormonal signalling. While Reactome is targeted at human pathways, it also includes many individual biochemical reactions from non-human systems such as rat, mouse, pufferfish and zebrafish. This makes the database relevant to the many researchers who work on model organisms. All the information in Reactome is backed up by its provenance: either a literature citation or an electronic inference based on sequence similarity.

"Traditionally, researchers have had to use different databases to find information on the various types of building blocks in pathways," explains CSHL's Lincoln Stein. "Reactome is an important breakthrough because it allows researchers to focus on entire processes." The EBI's Ewan Birney continues: "Scientists are increasingly focused on the bigger picture; Reactome allows them to see it right away; it's like having a digital camera instead of waiting three weeks to get your out-of-focus photos developed."

Reactome supersedes an earlier project called The Genome Knowledgebase and incorporates all the information previously available in its predecessor. Reactome sports a radically redesigned user interface in which the entire set of human pathways known to the database is represented as a series of constellations in a 'starry sky'. The starry sky can be used to navigate through the universe of human reactions and is invaluable to visualize connections between pathways, some of which will be surprising to biologists who are not familiar with pathways outside their domain of research. Also new in Reactome are cross-references to the online databases PubMed, UniProt, LocusLink, Ensembl and the Gene Ontology.

Since the first release of The Genome Knowledgebase a year ago, this project has covered the important topics of cell division and its checkpoints, DNA Repair, DNA replication, metabolism of sugars, amino acids, lipids, and nucleotides, the tricarboxylic acid cycle, the central dogma comprising the transcription of coding genes, processing of mRNA and translation to proteins. Future releases, which occur at roughly quarterly intervals, will include programmed cell death, transmission of nerve impulses, blood clotting and blood cell development. Reactome contains information concerning more than 1000 human proteins in the SwissProt section of the UniProt protein knowledgebase, a substantial proportion of the total set of well-characterized proteins.

Reactome is an NIH-funded collaboration between Dr Lincoln Stein's laboratory at Cold Spring Harbor Laboratory in New York and the laboratory of Dr Ewan Birney of the European Bioinformatics Institute, part of the European Molecular Biology Laboratory, in Hinxton, UK. The data in Reactome is free and can be freely re-distributed by both the author and the users, and Reactome software is open source. Author contributions to Reactome are citable, and the worldwide biology community is encouraged to link to its database, www.reactome.org. Reactome is supported by the National Human Genome Research Institute (NHGRI) and the Cell Migration Consortium (CMC), a European Union Project Grant and funding from the EBI Industry Programme. ●

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About Cold Spring Harbor:

Cold Spring Harbor Laboratory is a private, non-profit basic research and educational institution. Under the leadership of Dr. Bruce Stillman, a member of the National Academy of Sciences and a Fellow of the Royal Society (London). Some 330 scientists conduct groundbreaking research in cancer, neurobiology, plant genetics and bioinformatics.

About the EBI:

The European Bioinformatics Institute (EBI) is part of the European Molecular Biology Laboratory (EMBL) and is located on the Wellcome Trust Genome Campus in Hinxton near Cambridge (UK). The EBI grew out of EMBL's pioneering work in providing public biological databases to the research community. It hosts some of the world's most important collections of biological data, including DNA sequences (EMBL-Bank), protein sequences (UniProt), animal genomes (Ensembl), three-dimensional structures (the Macromolecular Structure Database) and data from microarray experiments (ArrayExpress). The EBI hosts several research groups and its scientists continually develop new tools for the biocomputing community.

About EMBL:

The European Molecular Biology Laboratory is a basic research institute funded by public research monies from 17 member states (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom). Research at EMBL is conducted by approximately 80 independent groups covering the spectrum of molecular biology. The Laboratory has five units: the main Laboratory in Heidelberg, and Outstations in Hinxton (the European Bioinformatics Institute), Grenoble, Hamburg, and Monterotondo near Rome. The cornerstones of EMBL's mission are: to perform basic research in molecular biology; to train scientists, students and visitors at all levels; to offer vital services to scientists in the member states; and to develop new instruments and methods in the life sciences. EMBL's international PhD Programme has a student body of about 170. The Laboratory also sponsors an active Science and Society programme. Visitors from the press and public are welcome.

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