

Genomics and Proteomics Resources



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Information Resources



⌘ Annotation

⌘ Pathways

⌘ Gene Expression

⌘ To Learn More ...

Annotation



- ⌘ Data into knowledge
- ⌘ Genes to protein, protein function, attributes, interactions
- ⌘ Multiple analysis types –homology searches, phylogenetics, lab experiments, etc.

Gene Ontology Consortium



⌘ Non-profit Group

⌘ <http://www.geneontology.org/>

⌘ Variety of Organisms:

⌘ Human, *Drosophila*, *Caenorhabditis*, *Saccharomyces*, mouse, *Dictyostelium*, etc.

⌘ Gene Ontology:

⌘ Develops controlled vocabularies

⌘ Vocabularies used to annotate gene/protein records in individual consortium databases

⌘ Gene Ontology terms used in NCBI's LocusLink

Gene OntologyTM:

Term	Evidence	Source	Pub
* extracellular	IEA	MGD	pm
* extracellular	TAS	MGD	pm
* protein binding	IPI	MGD	pm
* signal transduction	IEA	MGD	pm
* regulation of metabolism	TAS	MGD	pm

Relationships ?

Human Homology Maps:

NCBI vs. MGD	7q31.3	LEP	Mm Hs
UCSC vs. MGD	7q31.3	LEP	Mm Hs

Map Information ?

Chromosome:	6		mv
Cytogenetic:	6	RefSeq	
Genetic:	6 10.5 cM	MGD	
<u>Markers:</u>	Chr. 6	Lep	

Three Vocabularies



⌘ Molecular Function:

- ☑ "what a gene does at the biochemical level"
- ☑ "enzyme", "transporter", "adenylate cyclase"

⌘ Biological Process:

- ☑ "biological objective to which the gene product contributes"
- ☑ "signal transduction", "purine metabolism"

⌘ Cellular Component:

- ☑ "place in the cell where the gene product is formed"
- ☑ "ribosome", "histone deacetylase complex"

GO Term Name:

- [aspartic protease inhibitor](#)
- [cysteine protease inhibitor](#)
- [endopeptidase inhibitor](#)
- [metalloprotease inhibitor](#)
- [protease inhibitor](#)
- [serine protease inhibitor](#)
- [wide-spectrum protease inhibitor](#)

Check/Uncheck All

protease inhibitor

Accession: GO:0030414

Synonyms:

peptidase inhibitor

Definition: Stops, prevents or decreases the activity of any enzyme that hydrolyses pept

Term Lineage

[GO:0003673](#) : [Gene Ontology](#) (31688)

① [GO:0003674](#) : [molecular function](#) (22396)

② [GO:0030234](#) : [enzyme regulator](#) (561)

③ [GO:0004857](#) : [enzyme inhibitor](#) (227)

④ [GO:0030414](#) : [protease inhibitor](#) (118)

External References

GO (1)

Associated Genes **Gene Filters:** **Filter by database:**

- All ▲
- FlyBase
- SGD ▼

Filter by Evidence for Association:

- Curator Approved ▲
- All
- Inferred from Mutant Phenotype ▼

Filter Associated Genes

GO Term Name:

- [aspartic protease inhibitor](#)
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- [metalloprotease inhibitor](#)
- [protease inhibitor](#)
- [serine protease inhibitor](#)
- [wide-spectrum protease inhibitor](#)

Check/Uncheck All

GO Term:

Gene Symbol:

Datasource:

Evidence:

GO:0004866 : endopeptidase inhibitor

<input type="checkbox"/>	CG12807	FlyBase	ISS
<input type="checkbox"/>	CG14470	FlyBase	ISS
<input type="checkbox"/>	CG15418	FlyBase	ISS
<input type="checkbox"/>	CG7027	FlyBase	ISS
<input type="checkbox"/>	PRTS HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	TSP1 HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	APOA HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	ICAL HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	RNBP HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	SP24 HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	EP4 HUMAN	SWISS-PROT	TAS
<input type="checkbox"/>	Y029 HUMAN	SWISS-PROT	NR - NOREFERENCE
<input type="checkbox"/>	Q9UHG2	TrEMBL	TAS

GO Ontology Citations



- ⌘ The Gene Ontology Consortium. 2001. "Creating the Gene Ontology Resource: Design and Implementation", *Genome Res*, 11:1425-1433.
- ⌘ The Gene Ontology Consortium. 2000. "Gene Ontology: Tool for the Unification of Biology", *Nat Genet*, 25:25-29.

KEGG



- ⌘ Kyoto Encyclopedia of Genes and Genomes
- ⌘ “aimed at understanding the basic principles, as well as practical utilities, of the relations between genomic information and higher order functional information”
- ⌘ Includes KEGG/PATHWAY (pathways)
- ⌘ Match genes with gene products in pathway to predict interactions and functions
- ⌘ <http://www.genome.ad.jp/kegg/>

KEGG



⌘ Kanehisa, Goto, Kawashima, and Nakaya.
2002. "The KEGG Databases at
GenomeNet", *Nucleic Acids Res*, 30:42-46.

Expression Data



⌘ NCBI's "GEO" (Gene Expression Omnibus)

☑ <http://www.ncbi.nlm.nih.gov/GEO/>

☑ Data also available via Entrez search –
ProbeSet

⌘ KEGG/EXPRESSION Database

☑ <http://www.genome.ad.jp/kegg/expression/>

In order to support the public use and dissemination of gene expression data, NCBI has launched the Gene Expression Omnibus. GEO is a gene expression and hybridization array data repository, as well as an online resource for the retrieval of gene expression data from any organism or artificial source.

Repository contents

Platforms	82 (88 Mb)
Samples	1609 (1109 Mb)
Series	40

Tue Jun 4 14:13:19 2002 EDT

Many types of gene expression data from platform types such as nucleotide, antibody and tissue arrays and serial analysis of gene expression (SAGE) data, will be accepted, accessioned, and archived as public data sets.

Resource Lists...



⌘ Hightower, Christy. "Guide to Selected Bioinformatics Internet Resources." *Issues in Science and Technology Librarianship*, Winter 2002.

📧 <http://www.istl.org/istl/02-winter/internet.html>

⌘ *Nucleic Acids Research*, January issue

To Learn More ...



⌘ NCBI's "Science Primer"

📄 <http://www.ncbi.nlm.nih.gov/About/primer/index.html>

⌘ Glossaries

📄 www.genomicglossaries.com/content/Basic_Genetic_Glossaries.asp

📄 <http://www.ornl.gov/hgmis/glossary/>

⌘ Genomics Impact on Medicine & Society

📄 <http://www.ornl.gov/hgmis/publicat/primer/intro.html>

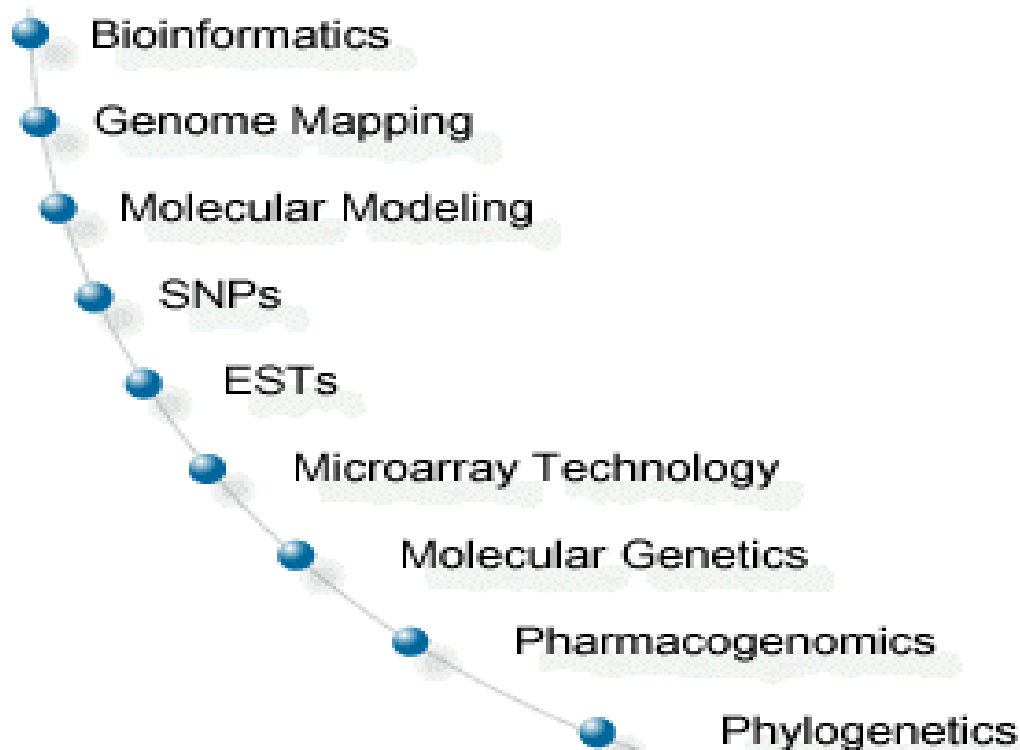
⌘ "A Primer of Genome Science", Gibson and Muse, Sinauer Associates, Inc., 2002.



A Science Primer

National Center for Biotechnology Information

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Human Genome Resources	Model Organisms Guide	Outreach and Education	News



NCBI's Advanced Course



- ⌘ 40 hr course for librarians and bioinformatics information specialists
- ⌘ Advanced modules on NCBI resources
- ⌘ MLA CE credit
- ⌘ August 5-9, 2002
- ⌘ Application and information available at <http://www.ncbi.nlm.nih.gov/Class/NAWBIS/>