FACULTY OF ENGINEERING AND TECHNOLOGY

Department Biotechnology

Gene Expression Database (GXD)

The Gene Expression Database (GXD) is a community resource for gene expression information from the laboratory mouse. GXD stores and integrates different types of expression data and makes these data freely available in formats appropriate for comprehensive analysis.

Key Concepts of GXD

GXD stores primary data from different types of expression assays. By integrating these data, GXD provides, as data accumulate, increasingly complete information about the expression profiles of transcripts and proteins in different mouse strains and mutants. (*See* details.)

GXD describes expression patterns using an extensive, hierarchically-structured dictionary of anatomical terms. In this way, expression results from assays with differing spatial resolution are recorded in a standardized and integrated manner and expression patterns can be queried at different levels of detail. The records are complemented with digitized images of the original expression data. The Mouse Developmental Anatomy Ontology was developed in collaboration with the Edinburgh Mouse Atlas Project (EMAP).

GXD places the gene expression data in the larger biological context by establishing and maintaining interconnections with many other resources. Integration with MGD enables a combined analysis of genotype, sequence, expression, and phenotype data. Links to PubMed, Online Mendelian Inheritance in Man (OMIM), sequence databases, and databases from other species further enhance the utility of GXD.

Gene Expression Query Forms

The Gene Expression Literature Query Form allows you to search for references on endogenous gene expression during development with search parameters such as genes and ages analyzed, and assays used. To the best of our knowledge, you can query all relevant publications from 1993 to the present for all pertinent journals and from 1990 to the present for major developmental journals with this form.

The Gene Expression Data Query Form allows you to search for detailed expression results from RNA in situ, immunohistochemistry, in situ reporter (knock in), Northern blot, Western blot, RT-PCR, RNAse and Nuclease S1 protection and RNA-seq experiments. Experimental results are described together with the probes, specimens, and experimental conditions used and are complemented by digitized images of the original data. This query form has three search utilities:

Standard Search—provides the most fields to use for searching, enabling basic or complex queries

Differential Expression Search—designed for searching for genes expressed in some anatomical structures and/or development stages but not in others. RNA-seq data are not yet included in this search

Batch Search—accepts up to 5,000 gene symbols or IDs, either via hand entry or upload from a file

The Mouse Developmental Anatomy Browser allows you to navigate through the extensive dictionary to locate specific anatomical structures and to obtain the expression results associated with those structures.

The RNA-Seq and Microarray Experiment Search allows you to quickly and reliably find mouse expression studies of interest using GXD's standardized metadata annotations. Search parameters include the age, anatomical structure, mutant alleles, strain and sex of samples analyzed and the study type and key parameters of the experiments.

Data Acquisition—in situs and blots

New expression data are made available on a weekly basis. These data are acquired from the literature by our curatorial staff and via electronic submission. GXD encourages researchers to submit their expression data to us. Data submission both increases the exposure of the work and the amount of data available to the scientific community. Guidelines for submitting data can be found.

We have incorporated data from several large scale expression databases into GXD. Database entries in GXD may link to the corresponding entries at the providers' websites. In this way, users can take advantage of GXD's data integration and querying capabilities while having easy access to additional resources at the providers' sites.

XYZ

GenePaint Database

This data set can be viewed at J:122989.

Eurexpress

This data set can be viewed at J:153498.

BGEM

This data set can be viewed at J:162220.

GUDMAP

This data set can be viewed at J:171409.

IMPC

This data set can be viewed at J:228563.

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