Acuity 4 Microarray Informatics Software

Acuity 4 Software imports standard tab-delimited text files, making it easy to import microarray data, experimental descriptions and substance annotations from any source into the Acuity database. Full import of Affymetrix CEL, CHP, CDF and DAT files of all versions are also supported. All other file types (PDF, TIFF, JPG, BMP, GPS, GAL, HTM, etc.) can be imported into the Acuity database for convenient storage, as attachments to datasets. Many database management tools, such as merge microarrays, database backup and restore, are also included.

NORMALIZATION
Acuity 4 Software’s Normalization Wizard can normalize an arbitrary number of microarrays with the click of a button. Normalize on all spots, control spots, negative controls or any other subset of spots that can be specified with database queries. Normalize groups of microarrays to a time point or a sample. Choose linear ratio-based methods or non-linear Lowess methods, including print-tip groups. For Affymetrix data, Acuity employs the Robust Multichip Analysis (RMA) method of background subtracting, normalizing and calculating summary expression values from the probe-level data in Affymetrix CEL files.

DATA WAREHOUSING
Acuity 4 Microarray Informatics Software from Molecular Devices makes enterprise microarray informatics accessible to everyone. From installing and maintaining databases, and managing users and groups, to filtering and analyzing data, the intuitive interface of Acuity 4 allows users to set up and begin running quickly. Designed with performance, speed and scalability in mind, Acuity 4 Software securely stores data and provides sophisticated data mining tools in the form of cluster algorithms, advanced statistics and visualizations to track down elusive data correlations. Because it is a multi-user, enterprise-wide relational database tool, it can accommodate the microarray analysis needs of all lab users.

DATA WAREHOUSING
With Acuity 4 Software’s data management tools, data can be stored, accessed and shared with colleagues and collaborators. Central to Acuity 4 is a powerful and scalable relational database that can effortlessly store and retrieve terabytes of data. Acuity 4 Software supports both Microsoft SQL Server and Oracle databases, providing platform flexibility.

ADVANCED STATISTICS

MULTI-THREADED ANALYSIS

NO ANNUAL LICENSE FEES
Each dataset is stored in the database together with all the transformations and analyses performed on the data, maintaining an analysis audit trail.

**MANY CLUSTERING METHODS**

Acuity 4 Software has a suite of advanced analysis methods, among them Hierarchical Clustering, Self-Organizing Maps, K-Means and K-Medians, Gap Statistic, Principal Components Analysis (PCA), Gene Shaving and more. Each algorithm offers a large choice of similarity metrics, so the appropriate analysis for the data can be used.

**VISUALIZATIONS**

In addition to cluster dendrograms, 2-D Self-Organizing Maps, and 3-D PCA plots, Acuity includes a number of other interactive visualizations. The Chromosome Viewer plots expression data directly on chromosome maps, particularly useful for array CGH experiments. A fully configurable scatter plot allows users to plot any data columns, including results of t-tests (volcano plots), ANOVA and PCA. User-definable profiles find matching expression profiles within datasets. For quick and easy data validation, users can also refer back to the original array image within Acuity 4 Software.

**STATISTICS**

Acuity 4 Software calculates statistics for replicate microarrays, including mean, median, coefficient of variation, standard deviation, maximum and minimum. Significance statistics (p-values) can also be calculated by the Two-Sample Student’s t-Test or Mann-Whitney Test, with a choice of multiple hypothesis testing correction. Multiple group comparisons by one-way ANOVA and Discriminant Analysis are also included in the feature set.

**ANALYSIS AUDIT TRAIL**

All Acuity 4 Software’s analysis operations and results are stored sequentially in the database as they are calculated, so that an audit trail is maintained automatically and displayed in the software’s project tree for each dataset. An analysis can be easily reproduced, or data transformations removed from microarrays or datasets.

**WEB LINKS**

With the Web Links functionality of Acuity 4 Software, a substance can be queried in any web-based database. Define as many web links as needed, and look up substances based on any identifier. Link directly to web-based pathway sites such as KEGG or BioCarta and display and interact with them in the Acuity 4 Software interface.