Microarray Analysis Using Function Express

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August 5, 2004

Requirements for Microarray Analysis

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Address http://bioinformatics.wustl.edu/mgscore/servlet/DownloadChipData

SITEMAN CANCER CENTER BIOINFORMATICS CORE

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PI Name

Milbrandt Jeffrey

Investigators

—Any—

Experiment

—Any—

Sample

—Any—

Chip Types

—Any—

Chip Format

Affymetrix 5.0 Format

Search

*Affymetrix5.0 is the default format

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Available	ChipId	Chip Type	Date	Sample	Experiment	Investigator	PI
☐	454	Hu95A	11-21-00	P13k-86h	Infected	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	368	Hu95A	10-26-00	pten 36-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	367	Hu95A	10-26-00	pten 24-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	366	Hu95A	10-26-00	pten 16-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	365	Hu95A	10-26-00	C8S	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	364	Hu95A	10-26-00	gag 36-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	363	Hu95A	10-26-00	gag 24-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	362	Hu95A	10-26-00	gag 16-2	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	361	Hu95A	10-26-00	C8N	Pathway-1	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	203	Hu95A	10-01-00	48 HR	Gdnf Stim	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	183	Hu95A	10-05-00	48Hr	Gdnf Stim	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	182	Hu95A	10-05-00	8Hr	Gdnf Stim	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	181	Hu95A	10-05-00	2Hr	Gdnf Stim	Milbrandt Jeffrey	Milbrandt Jeffrey
☐	180	Hu95A	10-05-00	0Hr	Gdnf Stim	Milbrandt Jeffrey	Milbrandt Jeffrey

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SITEMAN CANCER CENTER — A National Cancer Institute-Designated Cancer Center IN SAINT LOUIS, MISSOURI

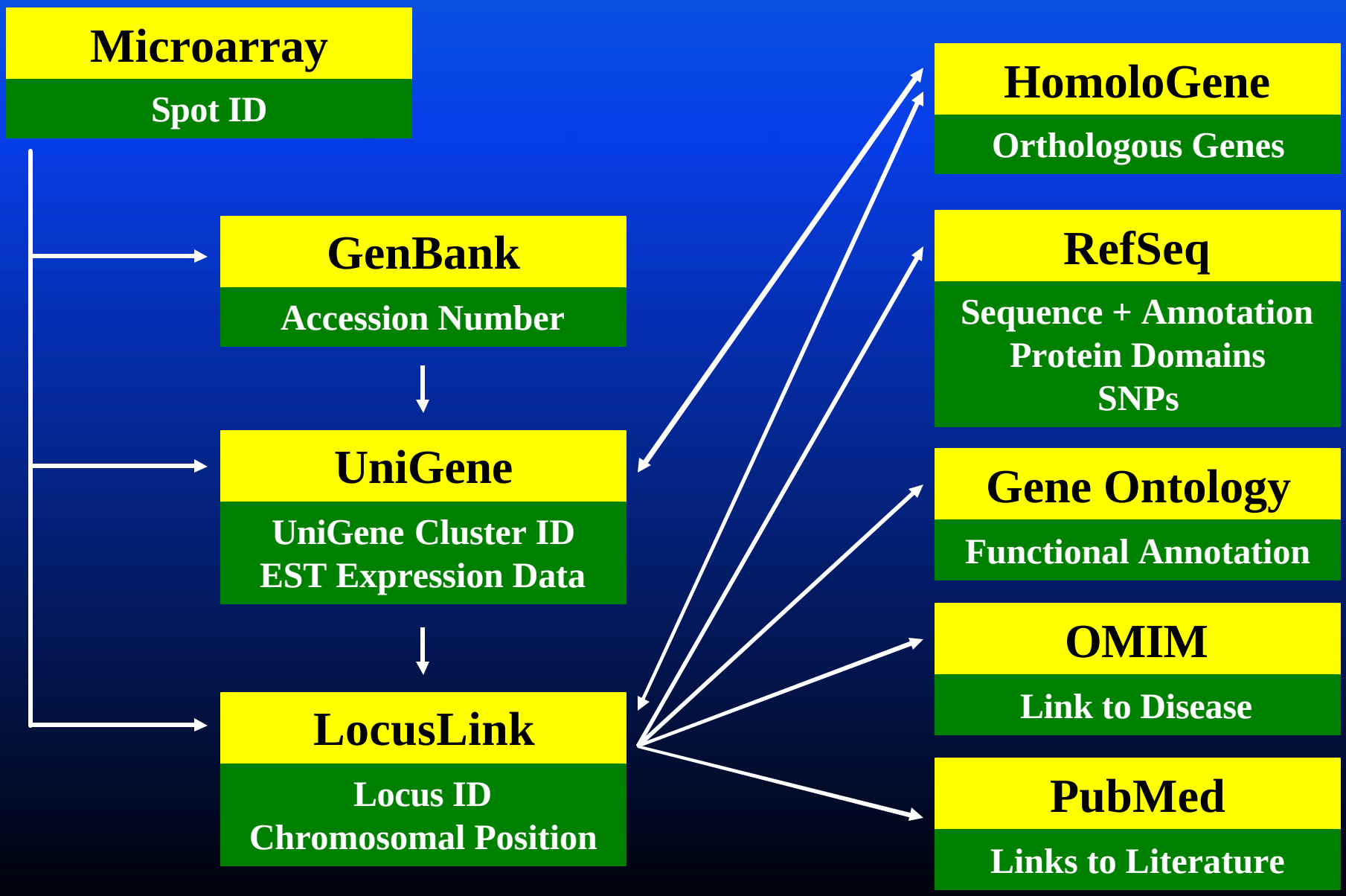
Washington University in St. Louis School of Medicine

Barnes-Jewish Hospital BJC HealthCare

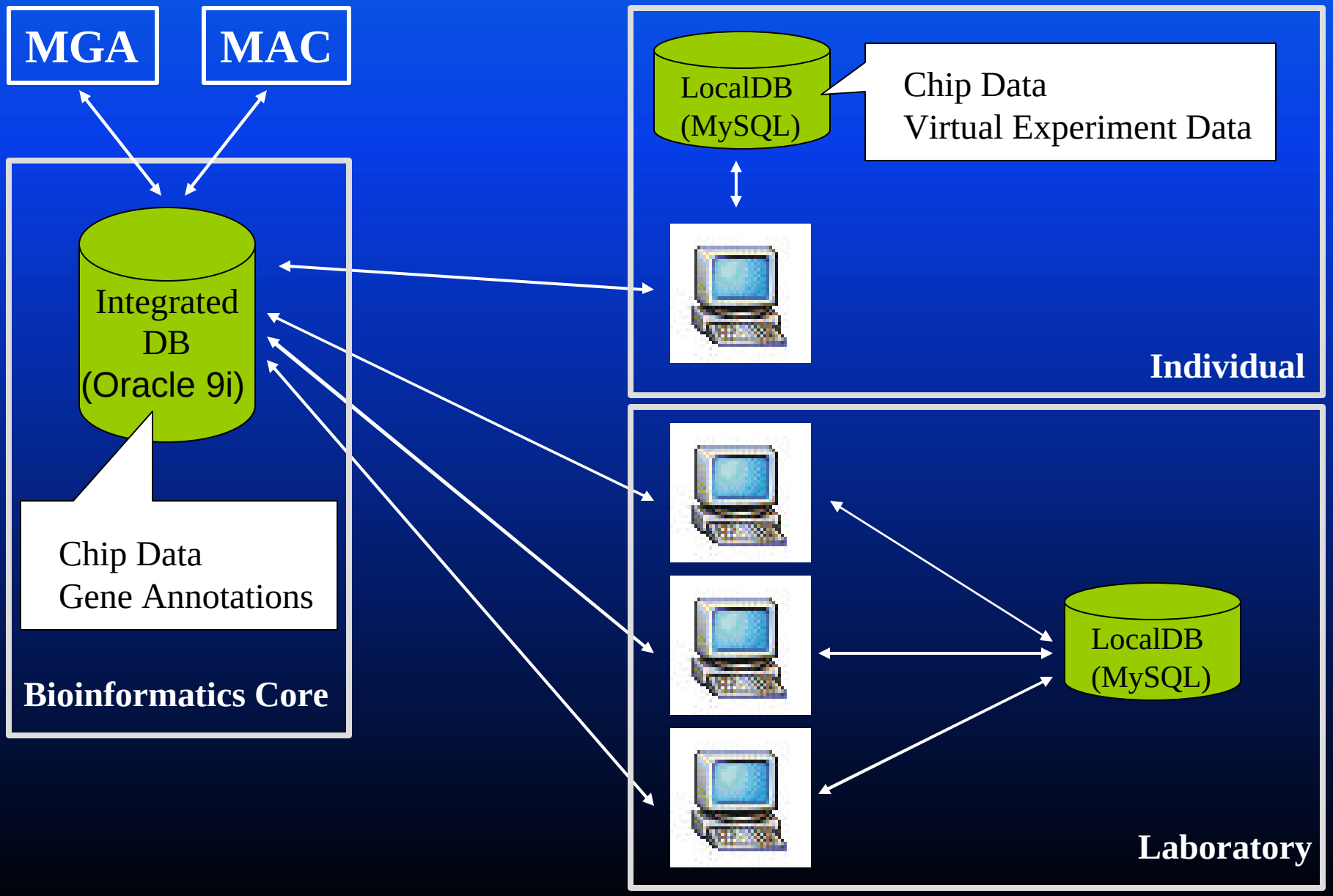
The Bioinformatics Core is a cooperative effort between the Siteman Cancer Center and the Department of Pathology and Immunology

Internet

Gene Annotation Sources



Function Express: Architecture



Gene Annotation: CHIPDB

- **Model: Data Warehouse & Link Integration**
- **Ora**
- **Java**
- **Feat**
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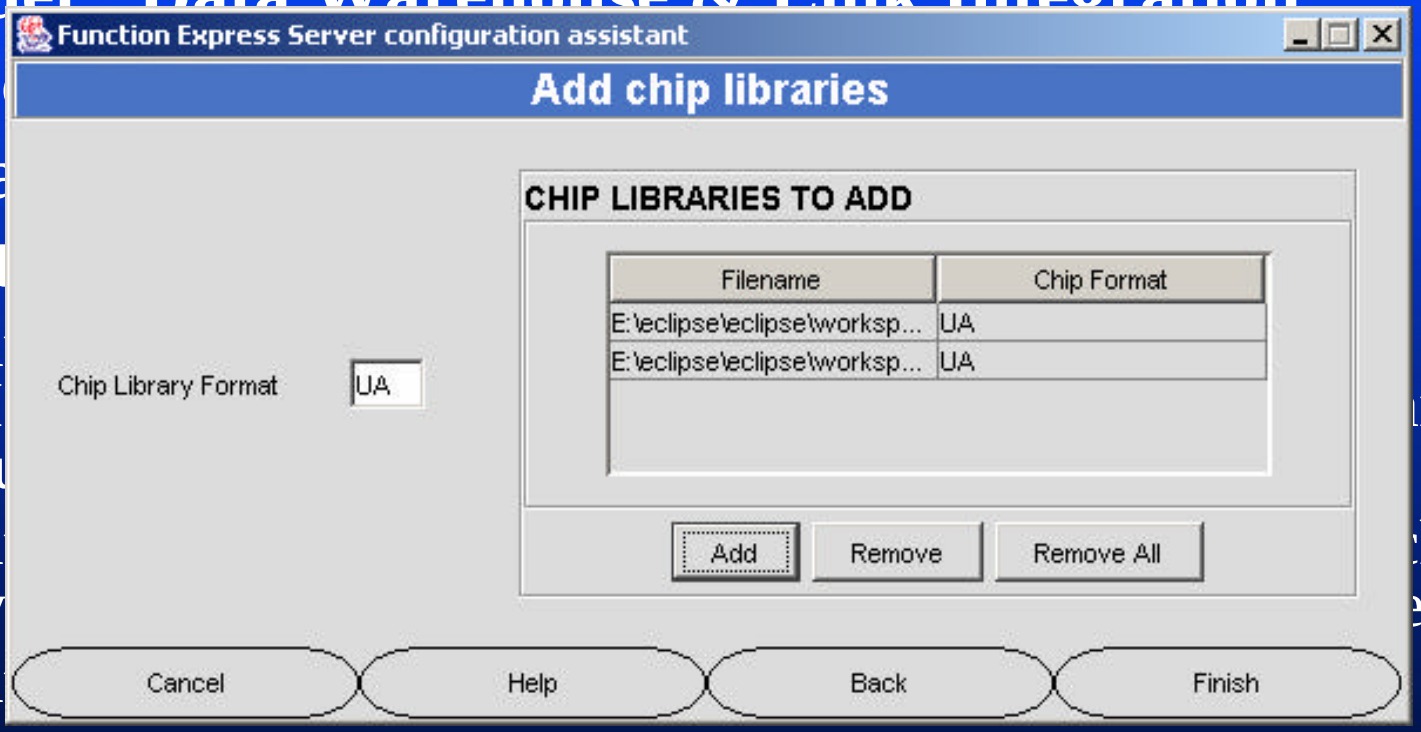
  - Chip level security



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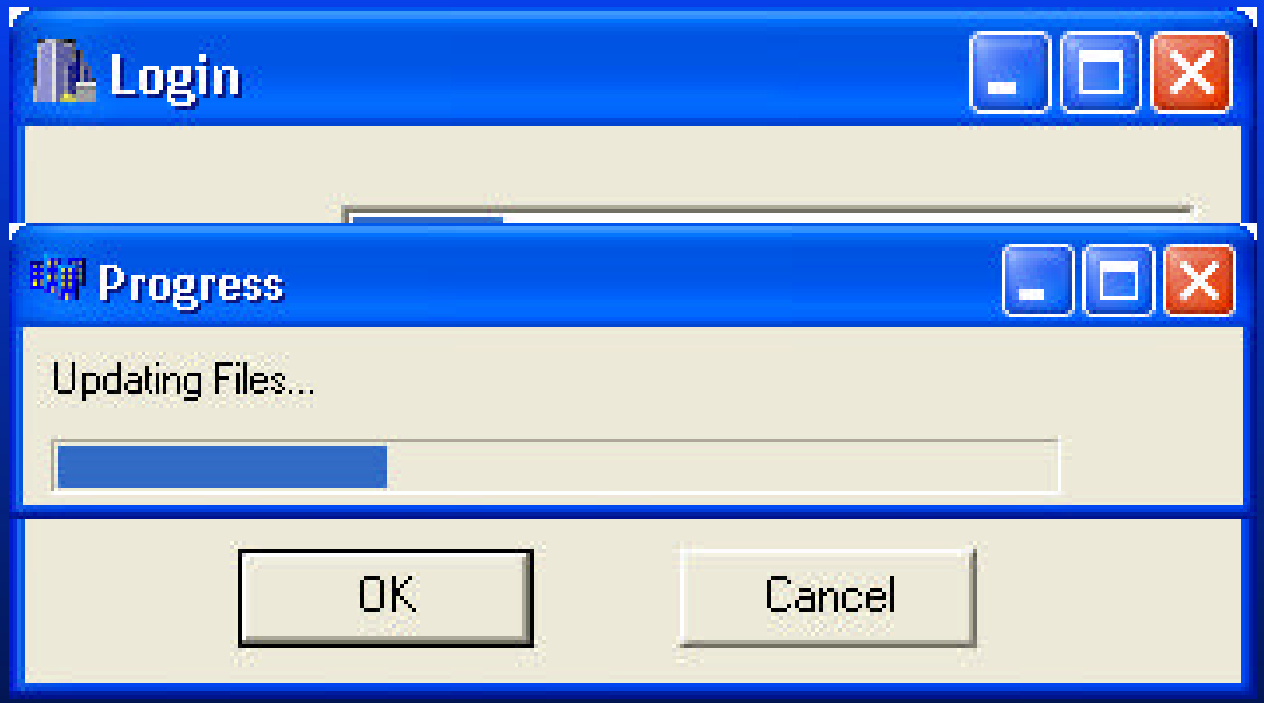
Function Express: Use Cases

- View expression of all genes that are transcription factors or all genes on chromosome 1
- View expression of selected genes across experiments conducted in different species
- View literature-based gene networks

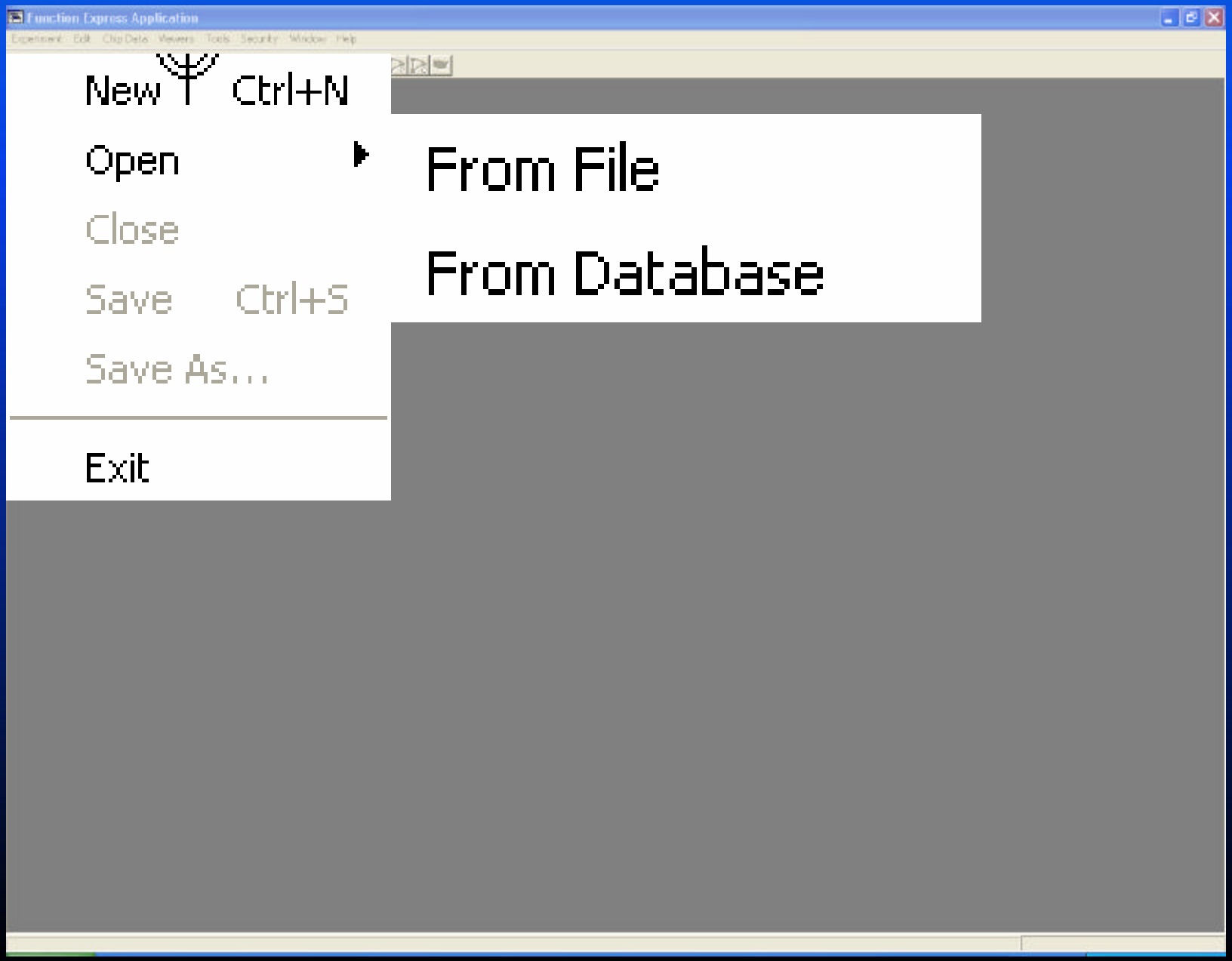
Function Express: Description & Features

- C++ Windows Application- 27,063 lines of code
- Features
  - Real time acquisition of gene annotation- Data Warehousing & Link Integration Models
  - Raw/Transformed data plotting
  - View expression of probesets in context of annotation
  - View expression of orthologous probesets in other experiments
  - Literature-based gene networks- Biological Process prediction

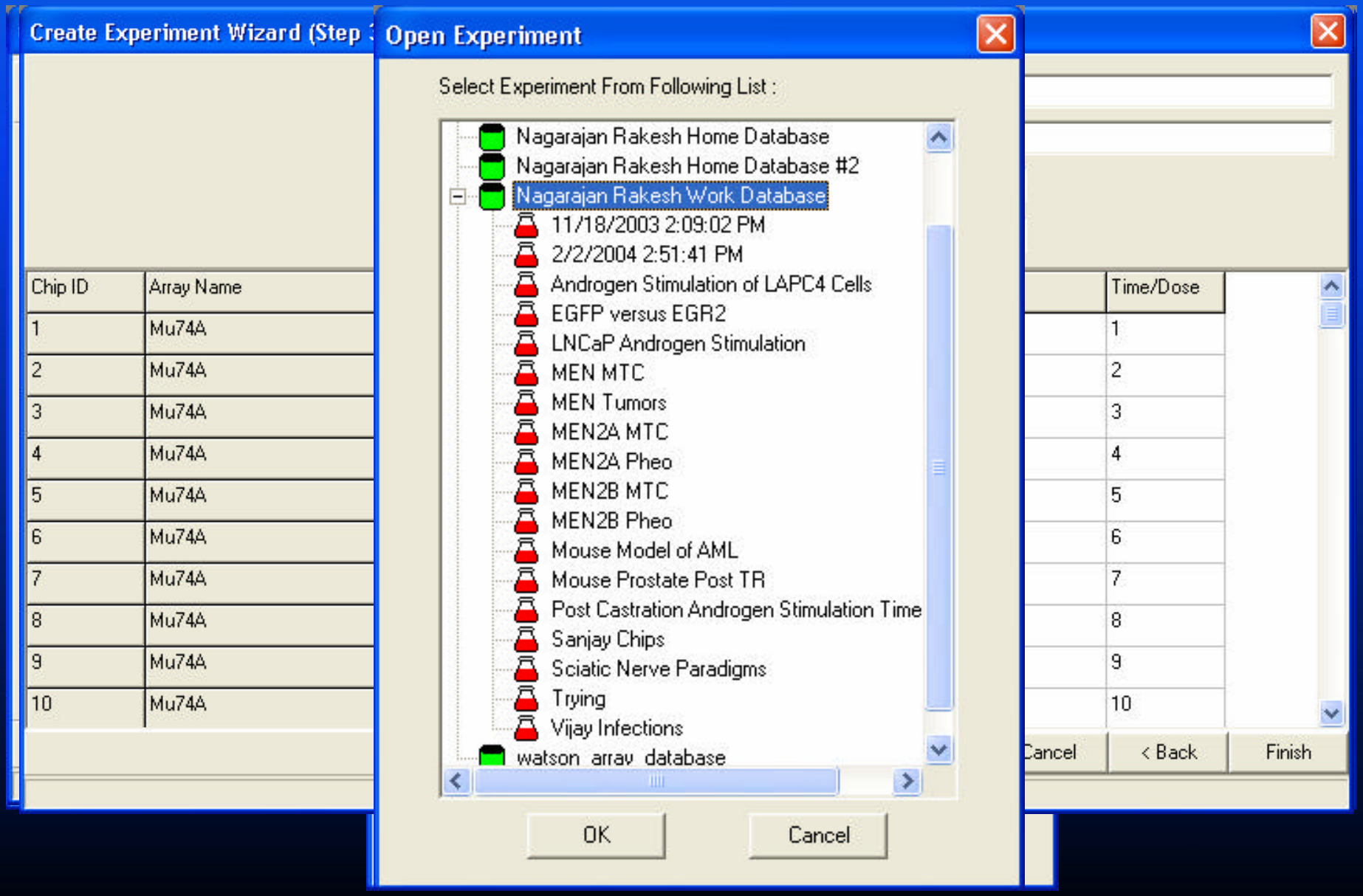
Function Express: Log in & Auto Update



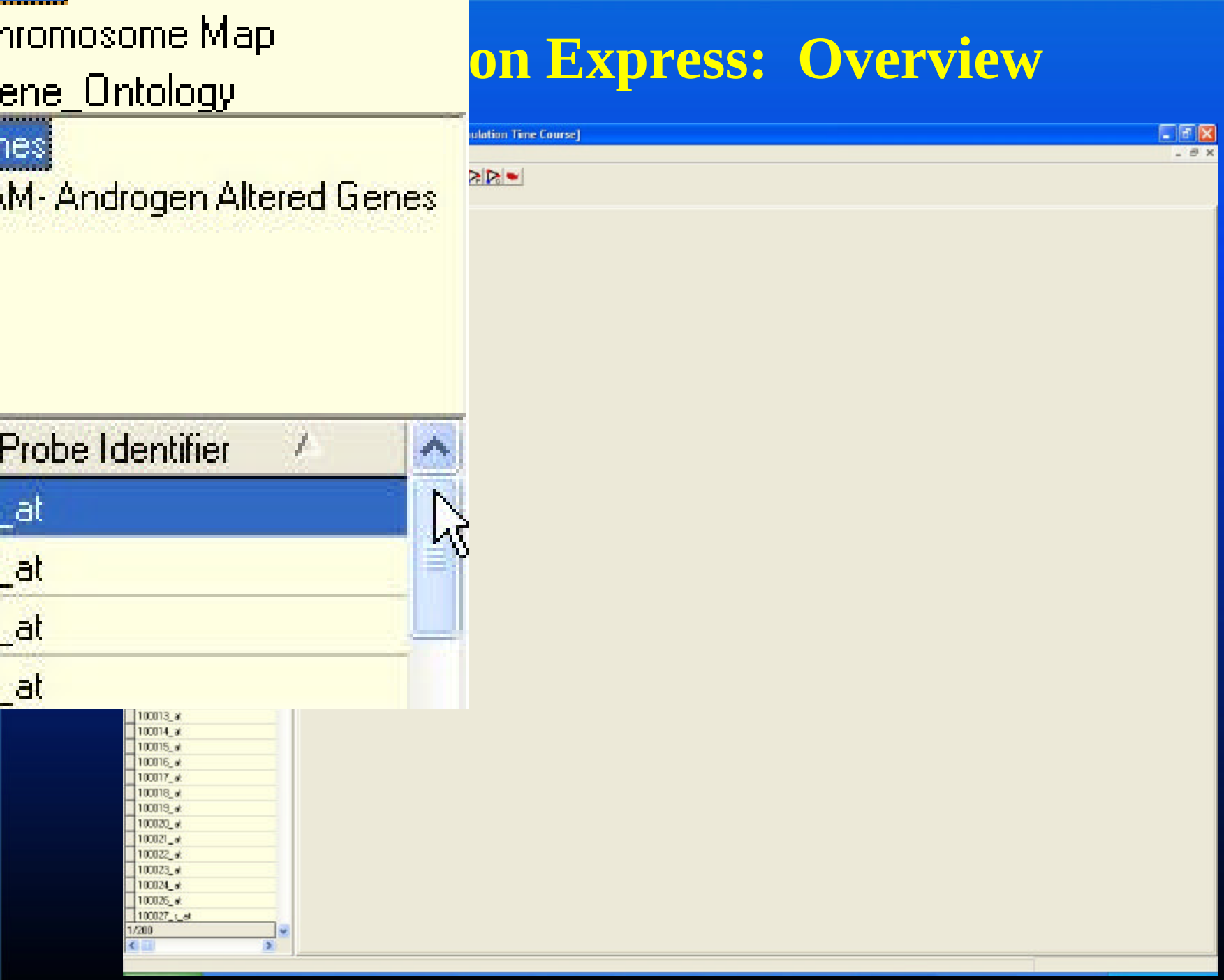
Function Express: File Menu



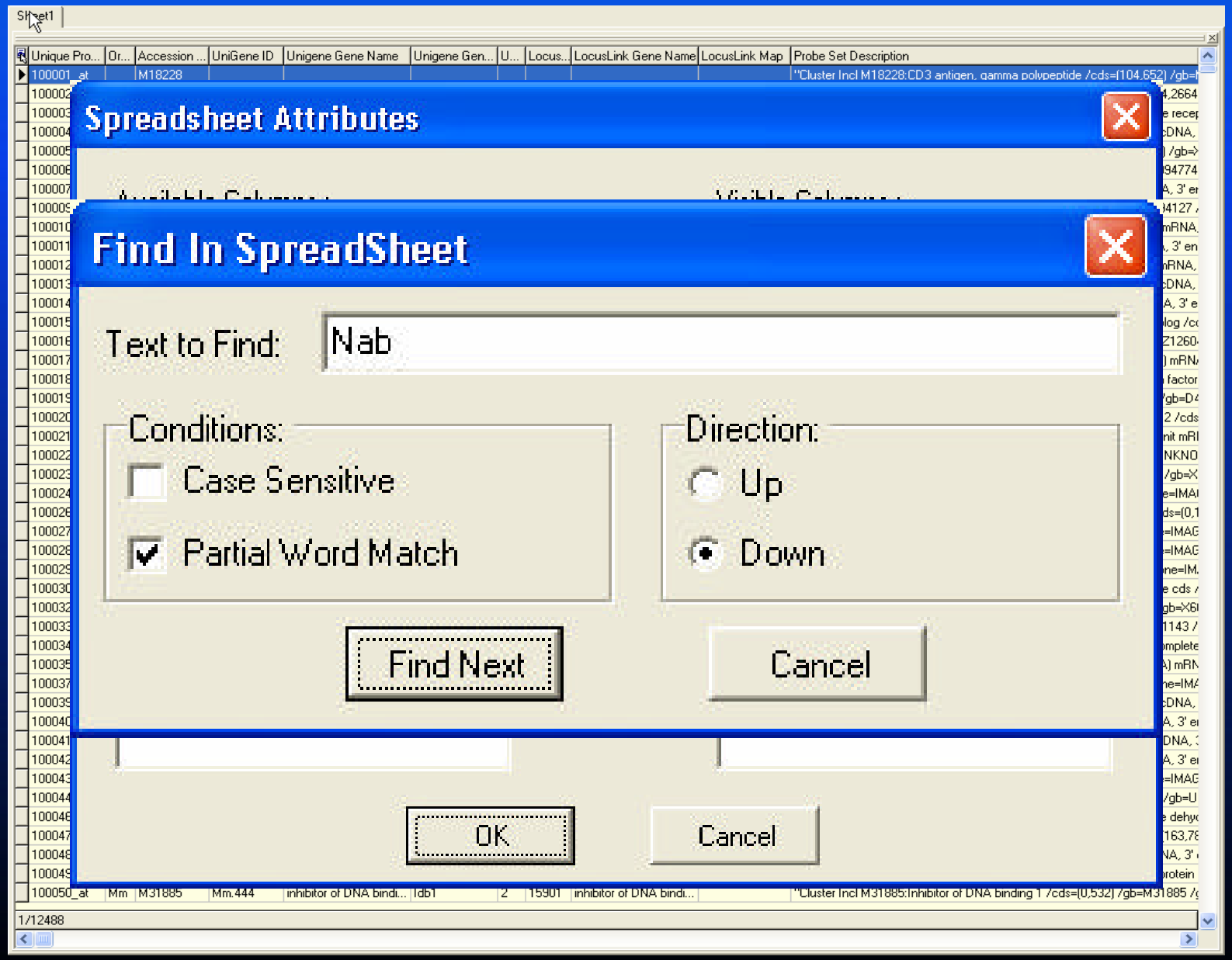
Creating and Opening Virtual Experiments



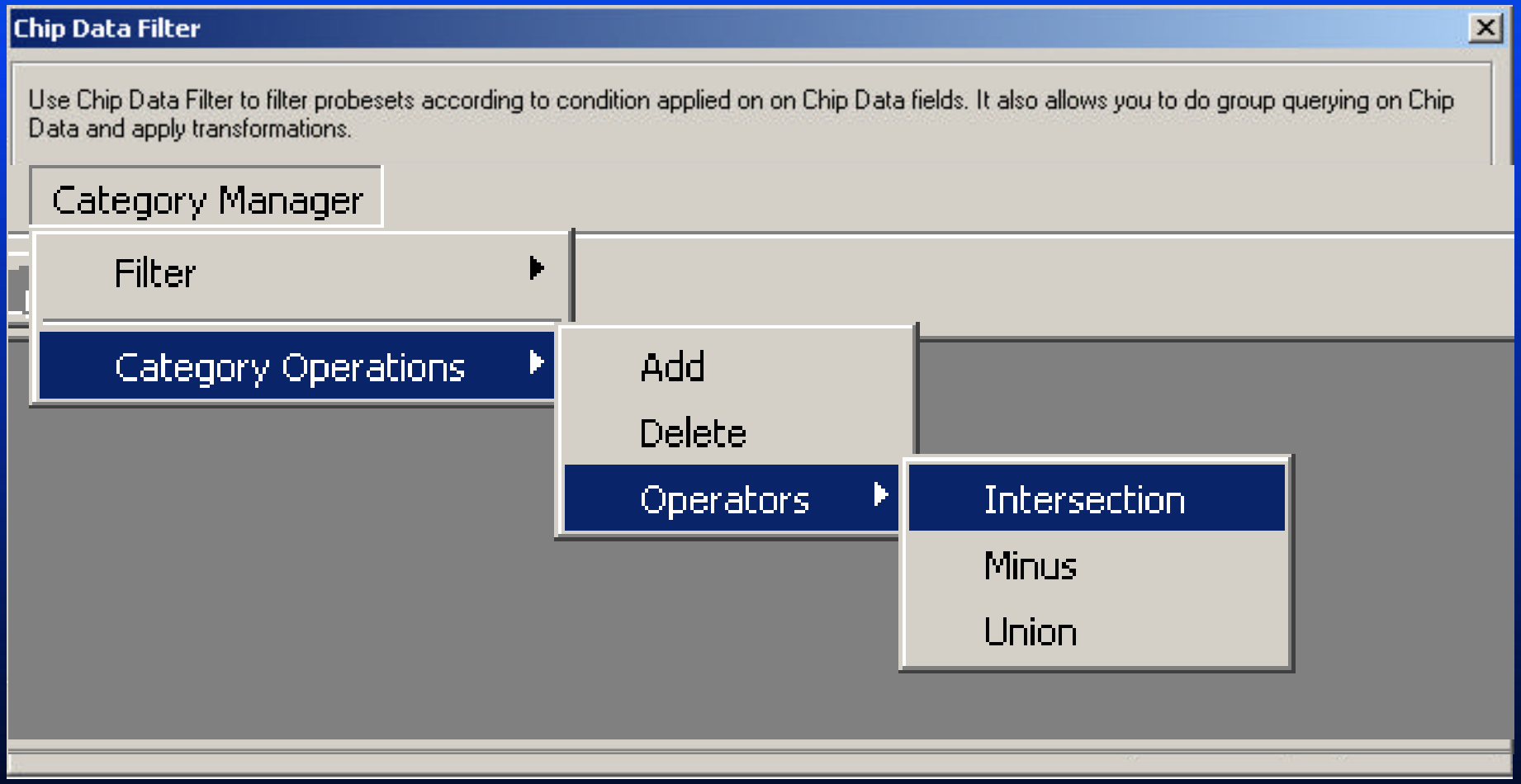
on Express: Overview



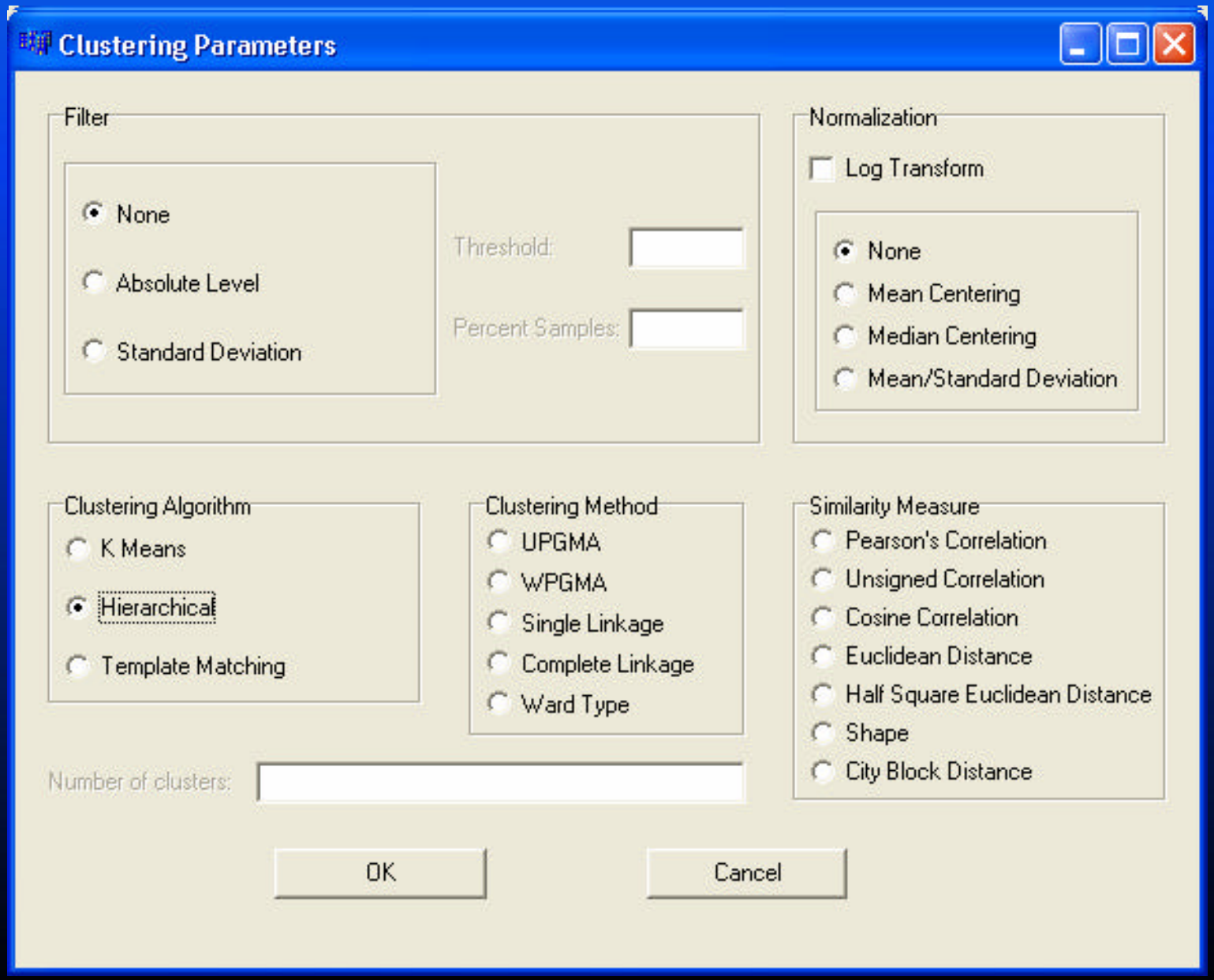
Function Express: Gene Info Spreadsheet



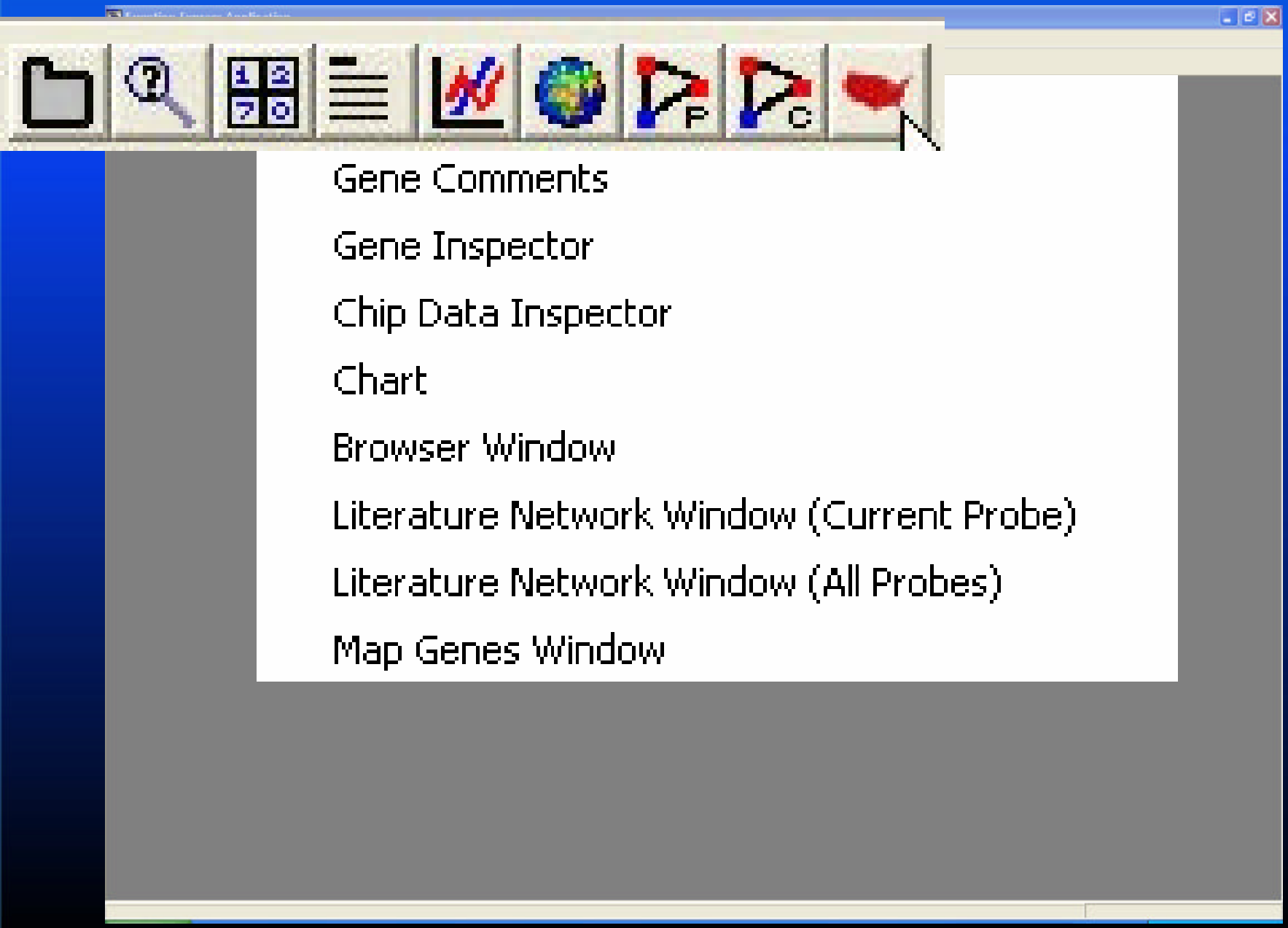
Function Express: Filters



Function Express: Analysis Tools



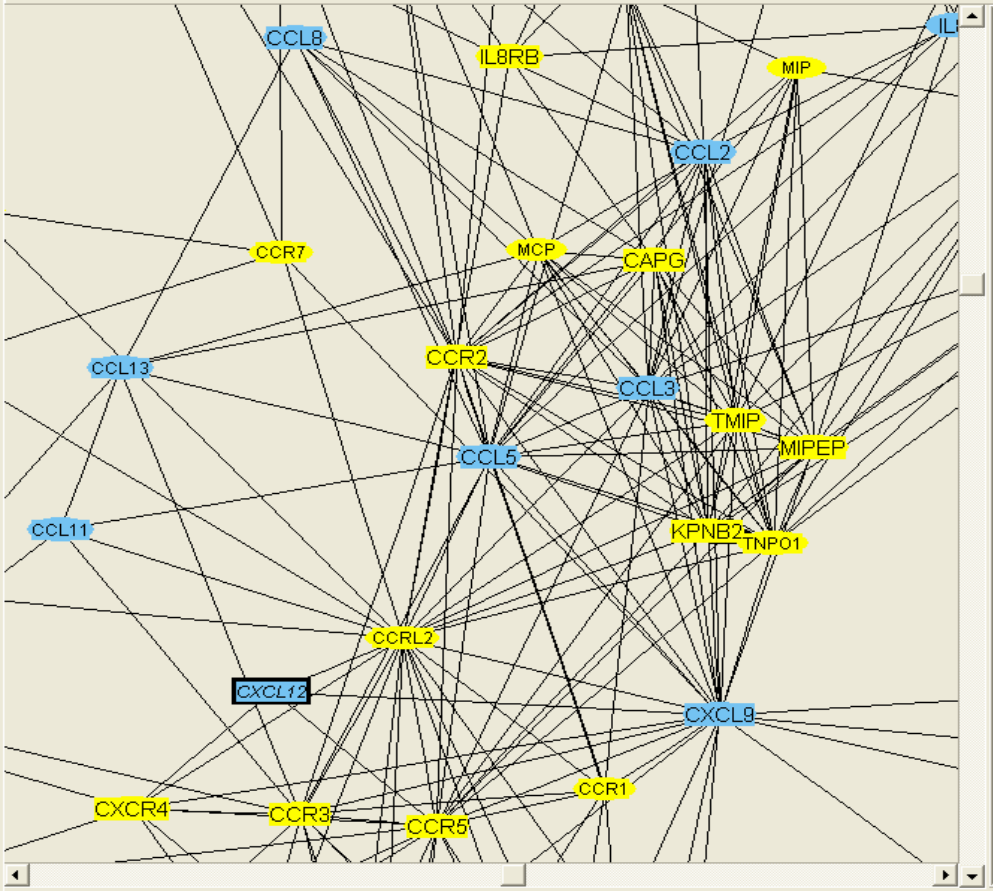
Function Express: Viewers Menu



Single Probe: Available Viewers

Sheet1

Draw | Back | Forward | Minimum Correlation: 0.01 | Depth: 3



Go ID	Term	Number Of Genes	p Value
GO:0006935	chemotaxis	39	5.15E-57
GO:0008009	chemokine activity	23	1.19E-38
GO:0006955	immune response	42	1.37E-31
GO:0006954	inflammatory response	36	1.49E-31
GO:0007267	cell-cell signaling	32	2.1E-27
GO:0005125	cytokine activity	27	6.44E-22
GO:0016493	C-C chemokine receptor activity	13	3.05E-20
GO:0007186	G-protein coupled receptor prot...	30	2.64E-17
GO:0001584	rhodopsin-like receptor activity	22	3.68E-16
GO:0005576	extracellular	30	1.05E-15
GO:0006968	cellular defense response	14	1.06E-14
GO:0007204	cytosolic calcium ion concentra...	11	6.22E-13
GO:0004930	G-protein coupled receptor acti...	18	1.15E-11
GO:0004950	chemokine receptor activity	8	1.61E-11
GO:0019735	antimicrobial humoral response ...	10	3.15E-9
GO:0009615	response to virus	8	3.4E-9
GO:0005887	integral to plasma membrane	28	9.34E-9
GO:0006874	calcium ion homeostasis	8	1.57E-8
GO:0006928	cell motility	12	2.04E-8
GO:0005615	extracellular space	36	5.74E-8
GO:0042092	T-helper 2 type immune response	3	2.65E-7
GO:0007165	signal transduction	25	3.83E-7
GO:0045028	purinergic nucleotide receptor ...	7	5.86E-7
GO:0005625	soluble fraction	10	1.08E-6
GO:0015026	coreceptor activity	5	5.69E-6
GO:0016494	C-X-C chemokine receptor acti...	4	7.45E-6
GO:0019955	cytokine binding	3	1.45E-5
GO:0006952	defense response	12	3.9E-5
GO:0045080	positive regulation of chemokin...	2	4.17E-5
GO:0045191	regulation of isotype switching	2	4.17E-5
GO:0006959	humoral immune response	4	7.48E-5
GO:0007631	feeding behavior	4	8.37E-5
GO:0004983	neuropeptide Y receptor activity	5	0.000103
GO:0030593	neutrophil chemotaxis	3	0.00014

3/50

LocusID1	Symbol1	LocusID2	Symbol2	Correlation
3627	CXCL10	2833	CXCR3	0.0153459186508012
6373	CXCL11	2833	CXCR3	0.0685673471817154
6387	CXCL12	1234	CCR5	0.0174389469815922
6387	CXCL12	9034	CCRL2	0.0309193330754206
6387	CXCL12	4283	CXCL9	0.0282450438384083
6387	CXCL12	7852	CXCR4	0.272543653750898

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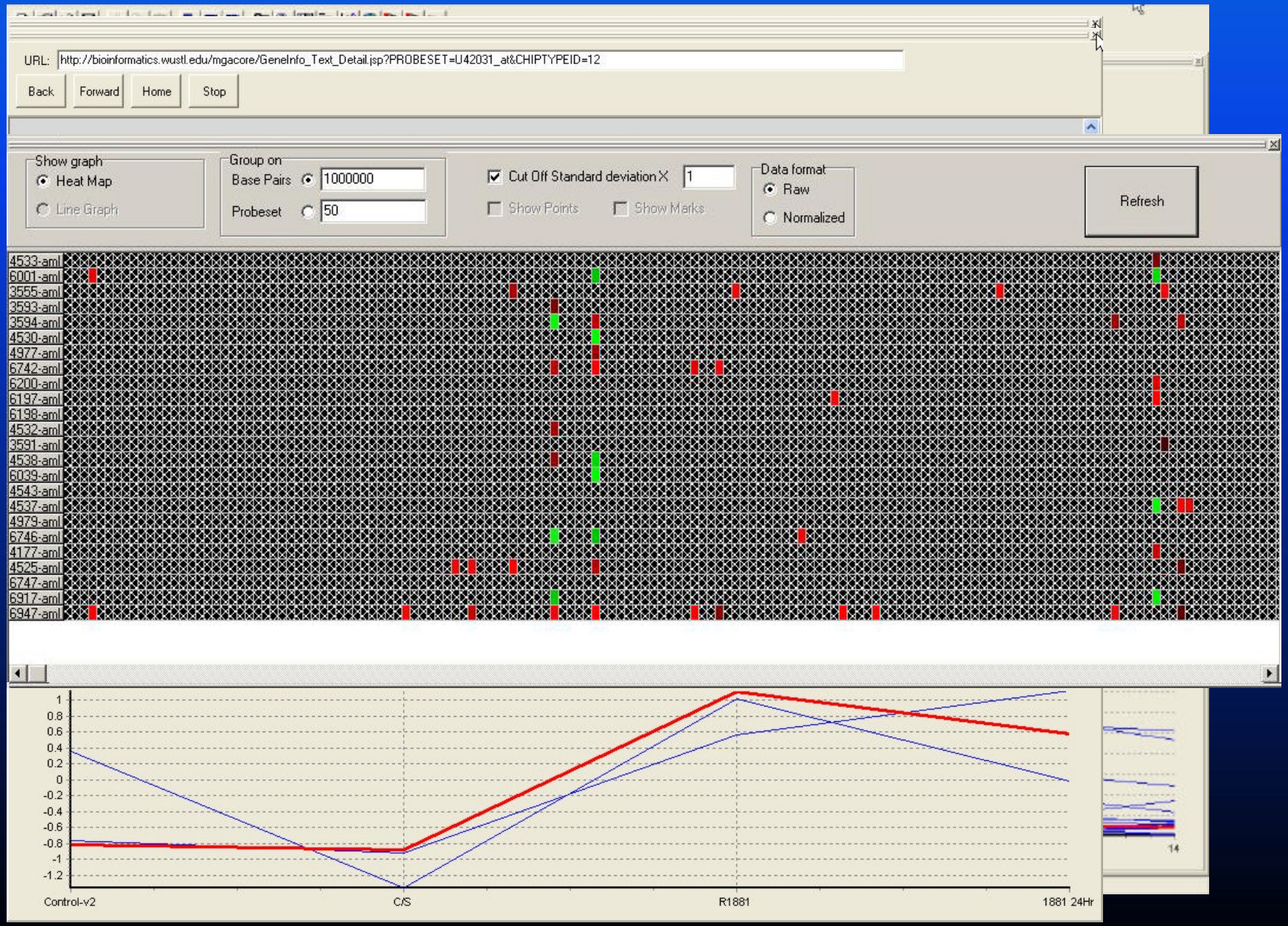
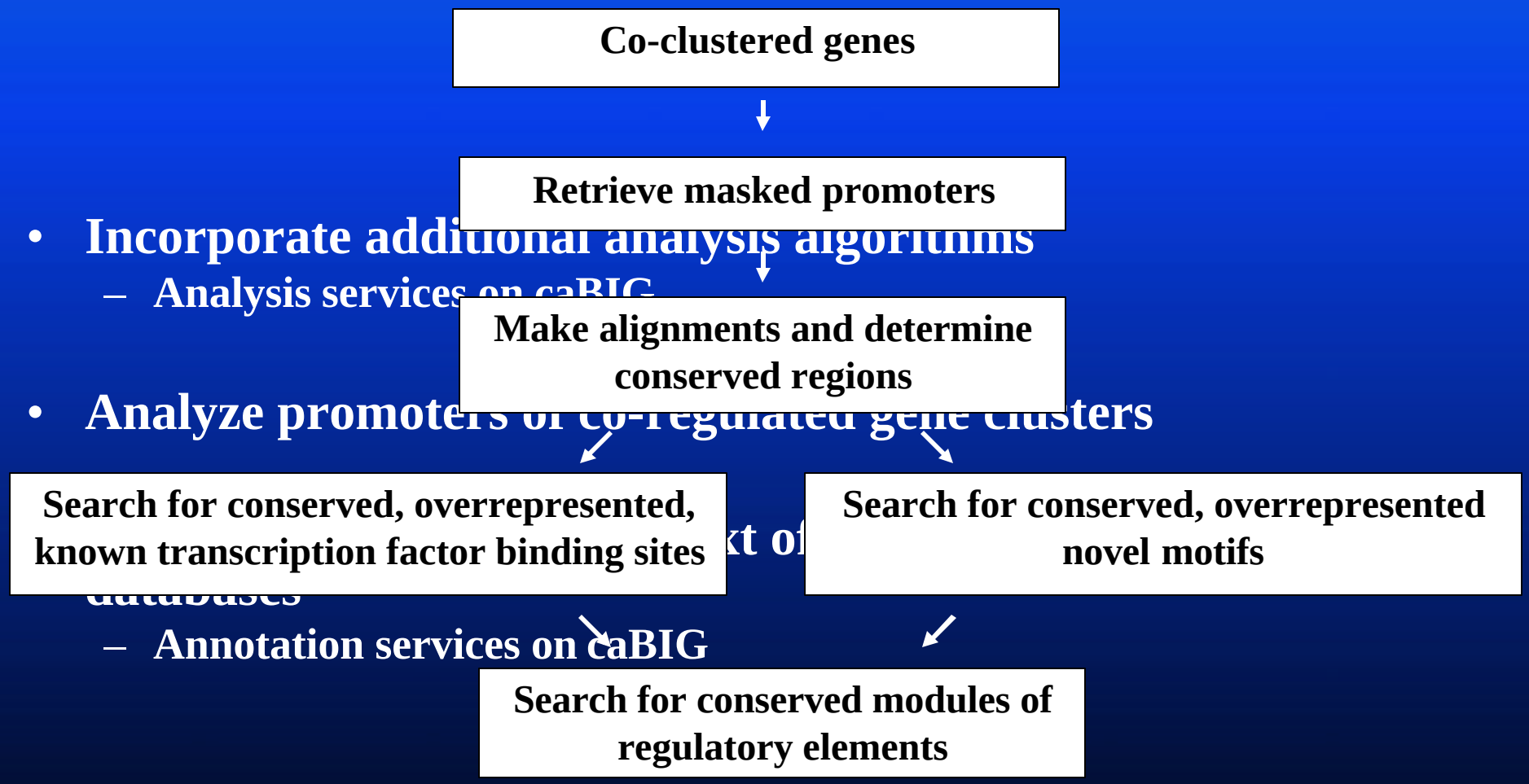
Gene Info Probes: Available Viewers



Future Directions

- Incorporate additional analysis algorithms
  - Analysis services on caBIG
- Analyze promoters of co-regulated gene clusters
  - Annotation services on caBIG