

Automated Selection of Genes for Translational Research on Comorbidity of Bipolar Disorder with Substance Abuse

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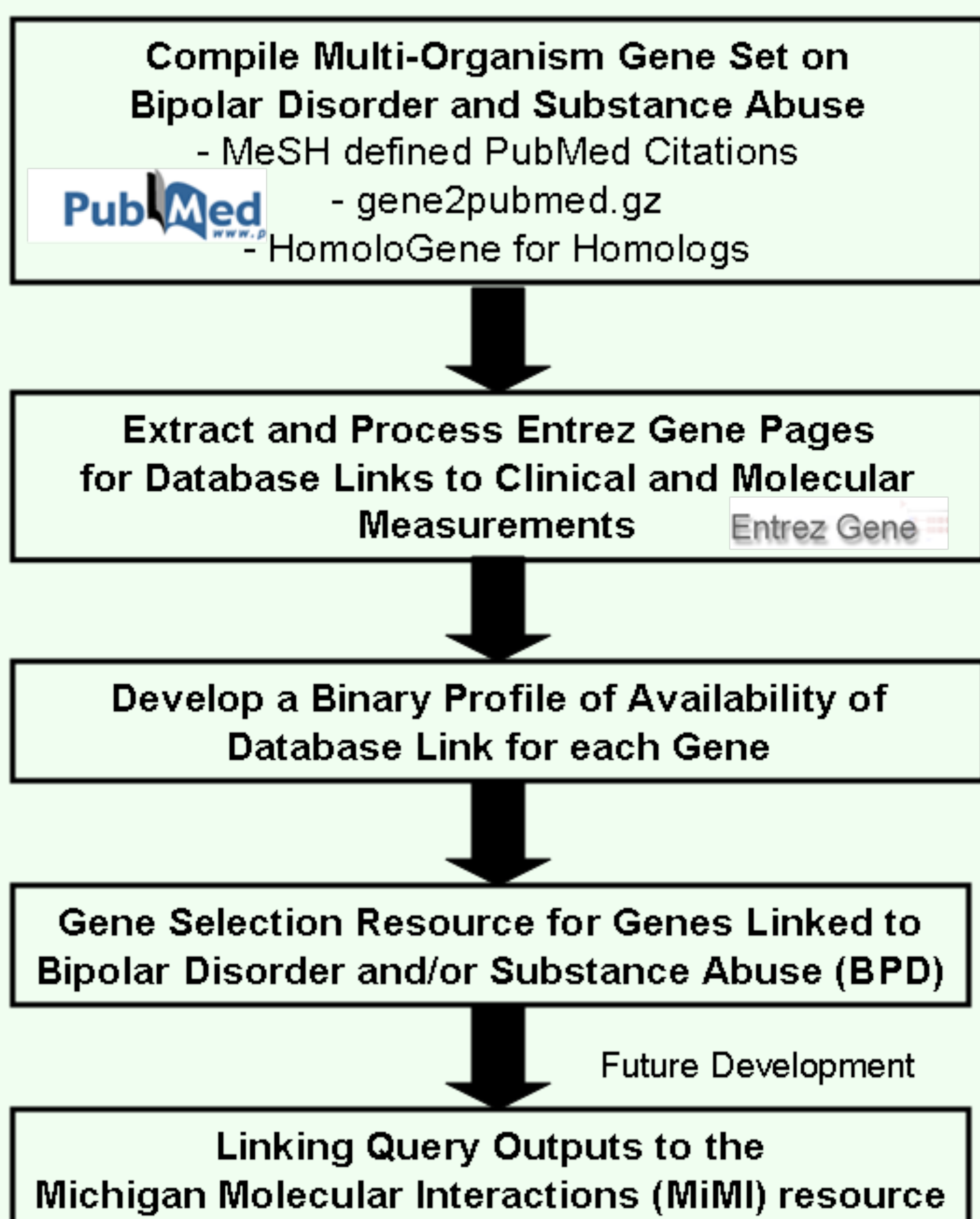
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INTRODUCTION:

- Bipolar Disorder is a highly heritable mental illness. The global burden of bipolar disorder is complicated by its comorbidity with substance abuse.
- Several genome-wide linkage and association studies on Bipolar Disorder as well as Substance Abuse have focused on the identification and/or prioritization of candidate disease genes (18247375; 18694166; 18711365; 18628681).
- A useful step for translational research of these identified/prioritized genes is to identify sets of genes that have particular kinds of publicly available data.
- Therefore, we have leveraged the availability of links to related resources in the Entrez Gene database to develop a web-based resource for selecting genes based on presence or absence in particular biological data resources.

METHODS:

Computational Pipeline



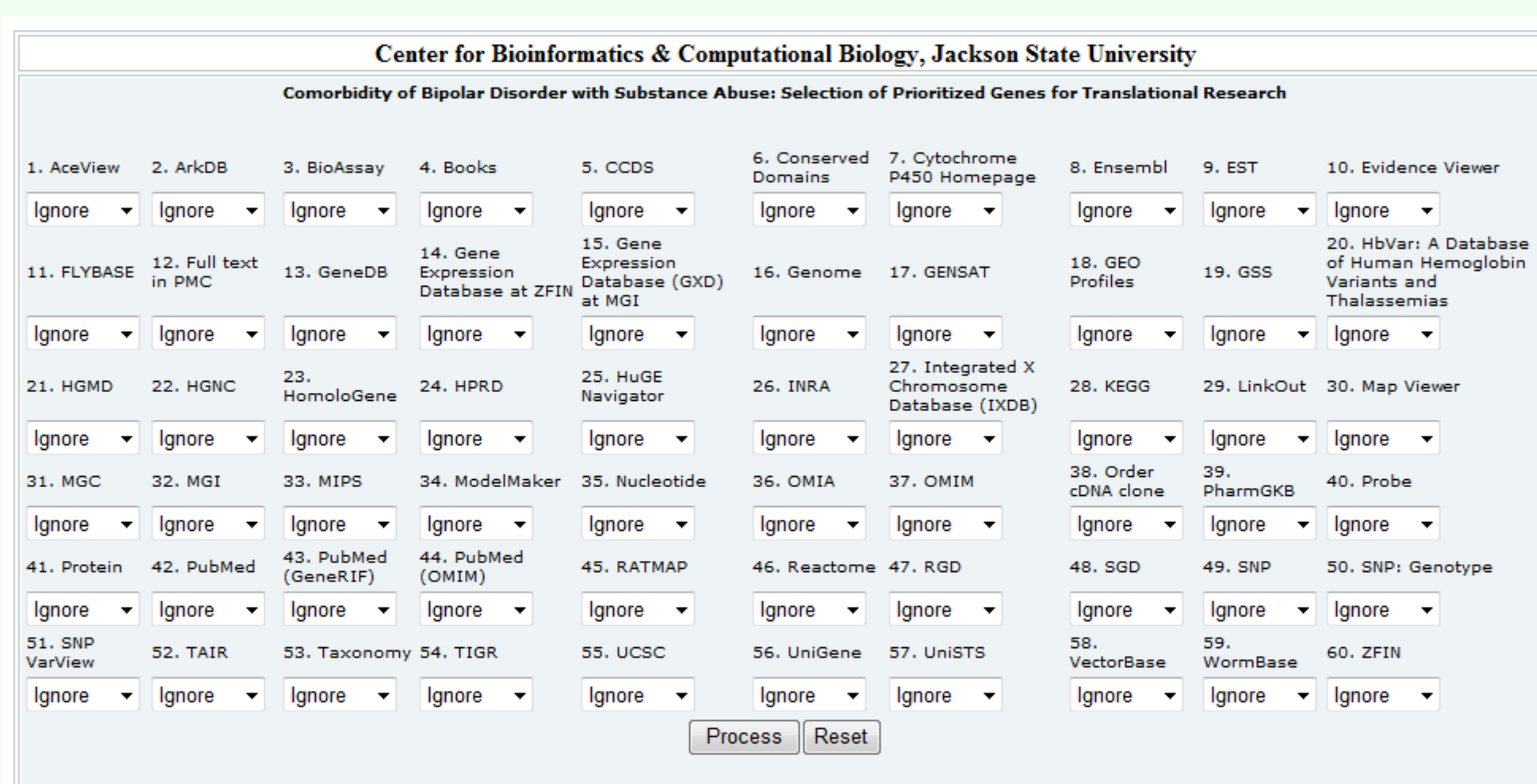
RESULTS:

- The utility of our approach is demonstrated using a set of 3,399 genes from multiple eukaryotes that have been studied in the context of Bipolar Disorder and/or Substance Abuse. A web resource to automate the selection of genes that contain certain database links is available at <http://compbio.jsums.edu/bpd>

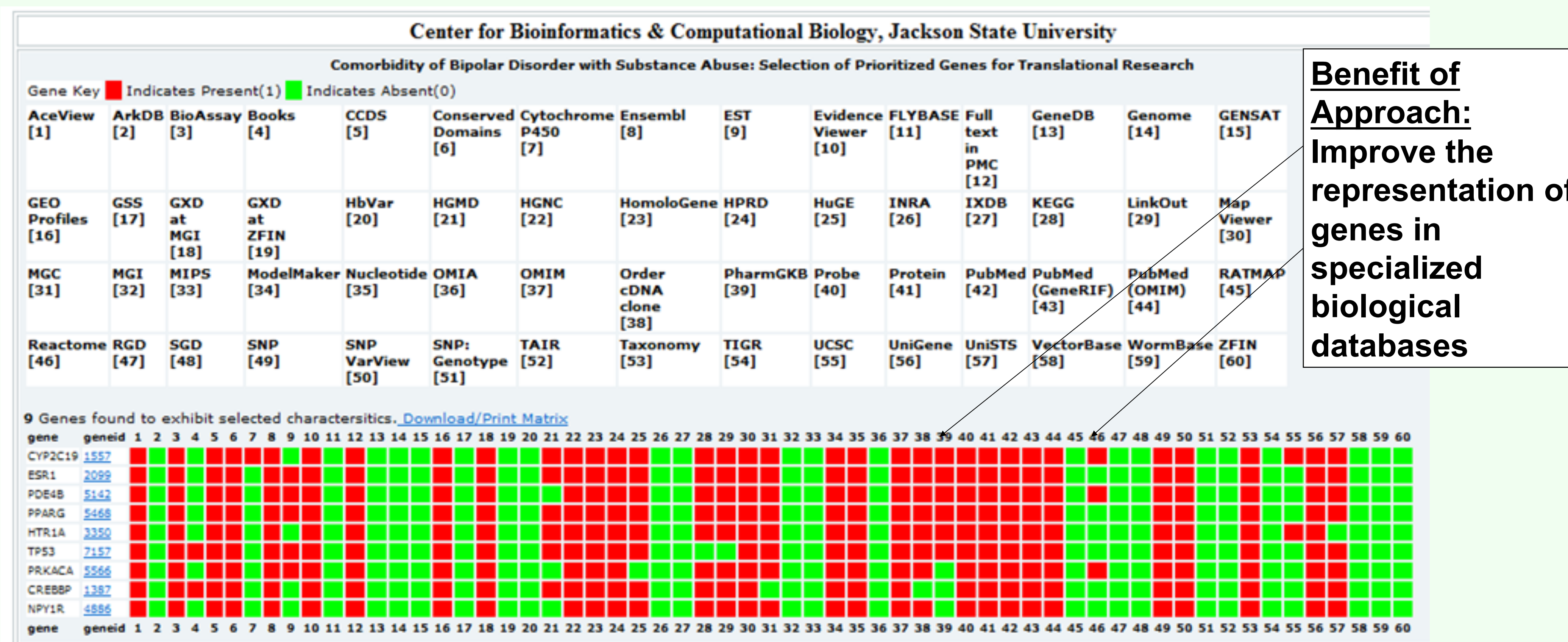
Multi-organism Dataset

Organism	Gene Count
<i>Anopheles gambiae</i> str. PEST	124
<i>Arabidopsis thaliana</i>	46
<i>Ashbya gossypii</i> ATCC 10895	22
<i>Bos taurus</i>	326
<i>Caenorhabditis elegans</i>	101
<i>Canis lupus familiaris</i>	330
<i>Danio rerio</i>	321
<i>Drosophila melanogaster</i>	142
<i>Gallus gallus</i>	290
<i>Homo sapiens</i>	388
<i>Kluyveromyces lactis</i> NRRL Y-1140	30
<i>Macaca mulatta</i>	6
<i>Magnaporthe oryzae</i> 70-15	36
<i>Mus musculus</i>	433
<i>Neurospora crassa</i>	36
<i>Oryza sativa</i> Japonica Group	44
<i>Pan troglodytes</i>	294
<i>Plasmodium falciparum</i> 3D7	10
<i>Rattus norvegicus</i>	352
<i>Saccharomyces cerevisiae</i>	31
<i>Schizosaccharomyces pombe</i>	37

Database Selection (60)



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Benefit of Approach: Improve the representation of genes in specialized biological databases

Top 20 databases with "Links" for Bipolar Disorder and Substance Abuse Gene Set

Database	Gene count	Digit in Signature*
Map Viewer	3362	30
Taxonomy	3352	53
HomoloGene	3307	23
Nucleotide	3285	35
Protein	3279	41
Genome	3203	16
Conserved Domains	3063	6
LinkOut	2808	29
KEGG	2780	28
Evidence Viewer	2664	10
ModelMaker	2664	34
UniGene	2503	56
PubMed	2349	42
GEO Profiles	2064	18
SNP	1765	49
Full text in PMC	1729	12
Ensembl	1579	8
SNP: Genotype	1411	50
Probe	1400	40
UniSTS	1325	57

FUTURE WORK:

A future development goal of the resource is to facilitate systems biology analyses by linking query outputs to the Michigan Molecular Interactions (MiMI) resource.

