

WikiPathways & PathVisio

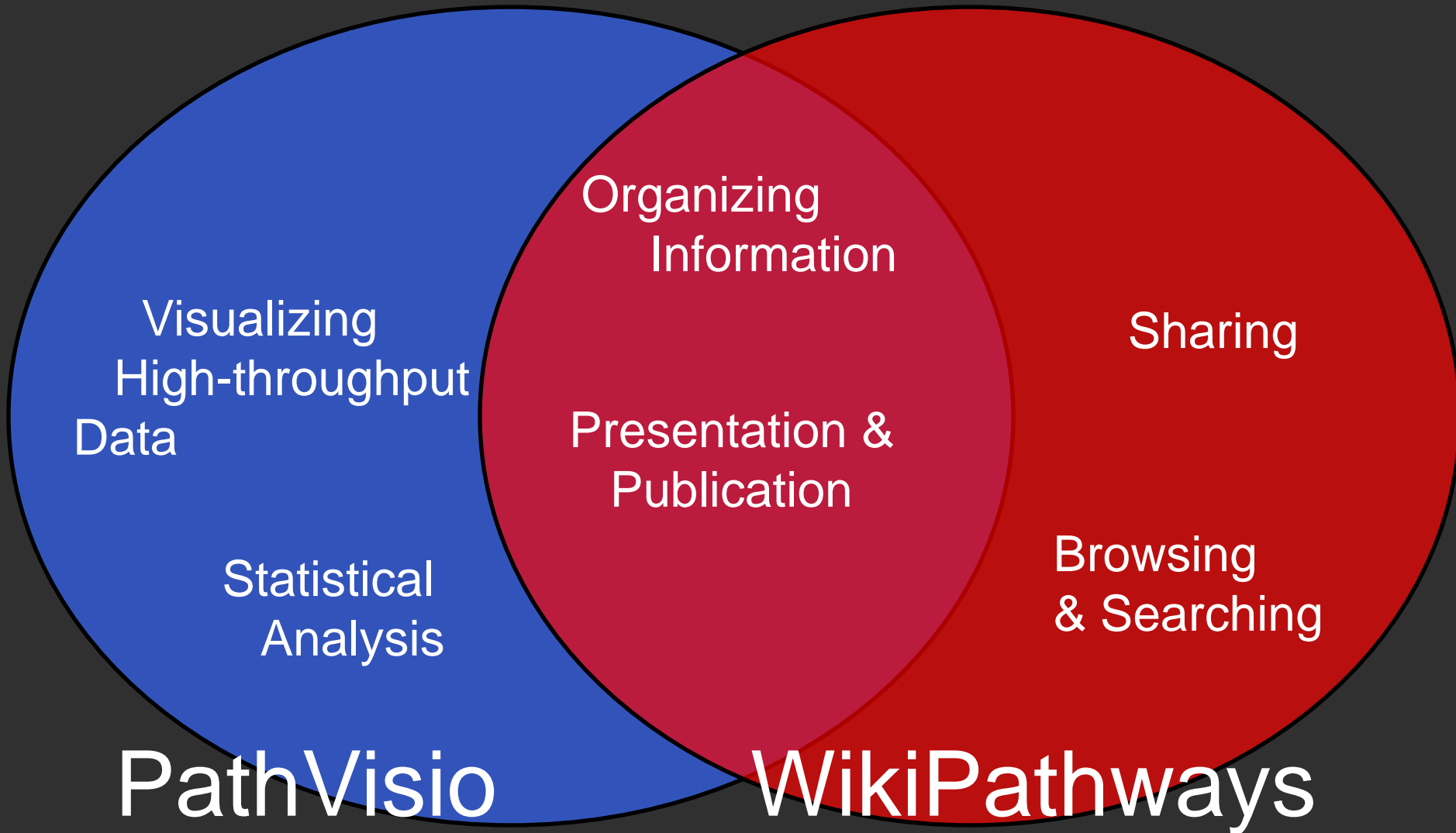
COMBINE 2010

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Maastricht University, the Netherlands



Uses for Pathways



WikiPathways

- Resource for biological pathways
- Free and open source
- Wiki, editable by users



Latest edits

Today

- [Pathways in Cancer \(Homo sapiens\)](#) by Luigi Maiorana

5 October 2009

- [Retinol metabolism \(BiGCaT, NuGO\) \(Homo sapiens\)](#) by Andra Waagmeester
- [Insulin Signaling \(Homo sapiens\)](#) by Andra Waagmeester

Latest discussions

6 October 2009

- [Duplicate pathway? \(1\)](#) by Kristina Hanspers

8 September 2009

- [Nice pathway, but not categorized \(2\)](#) by Kristina

Statistics

- There are **1268** pathways
- Number of **pathways** (and unique genes) per species:

Anopheles gambiae:	23	(391)
Arabidopsis thaliana:	5	(62)
Bos taurus:	119	(2876)
Caenorhabditis elegans:	33	(529)
Canis familiaris:	117	(2910)
Danio rerio:	105	(2435)
Drosophila melanogaster:	35	(616)
Equus caballus:	12	(214)
Gallus gallus:	103	(2151)
Homo sapiens:	150	(3881)

Pathway editor



BETA

WIKIPATHWAYS
Pathways for the People

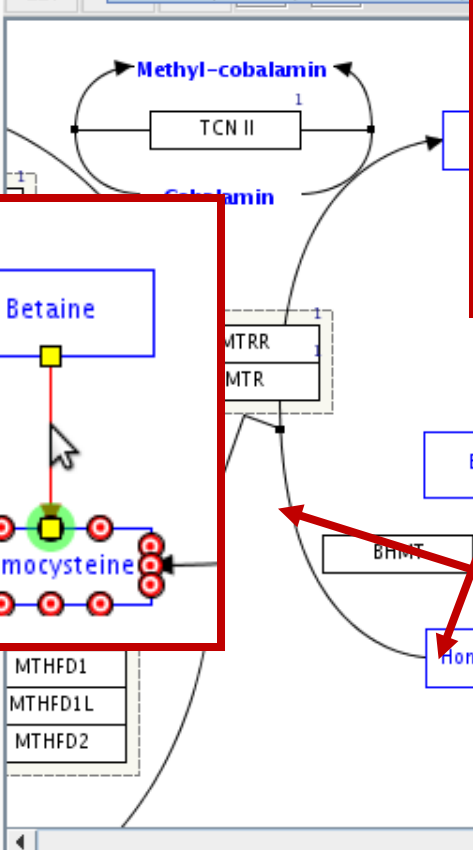
pathway discussion edit

One Carbon Metabolism

Michiel Adriaens, Frank, Thor

Zoom: 100%

Save the pathway to WikiPathways



navigation

- Home
- Help

pathway

- Create
- Browse
- Wish List
- Download

overview

- Recent Changes
- Most Viewed
- Most Edited
- New Pathways

community

- About us
- Contact us
- GenMAPP Portal
- BiGCaT Portal
- Micronutrient Portal

search

Google Custom Search

titles only

DataNode properties

Comments Literature Annotation

Search

betaine Search

Results

Please select one of the references and press Ok

Name	Identifier	Datasource
Betaine	HMDB00043	HMDB
Betaine aldehyde	HMDB01252	HMDB
Proline betaine	HMDB04827	HMDB

Cancel Ok

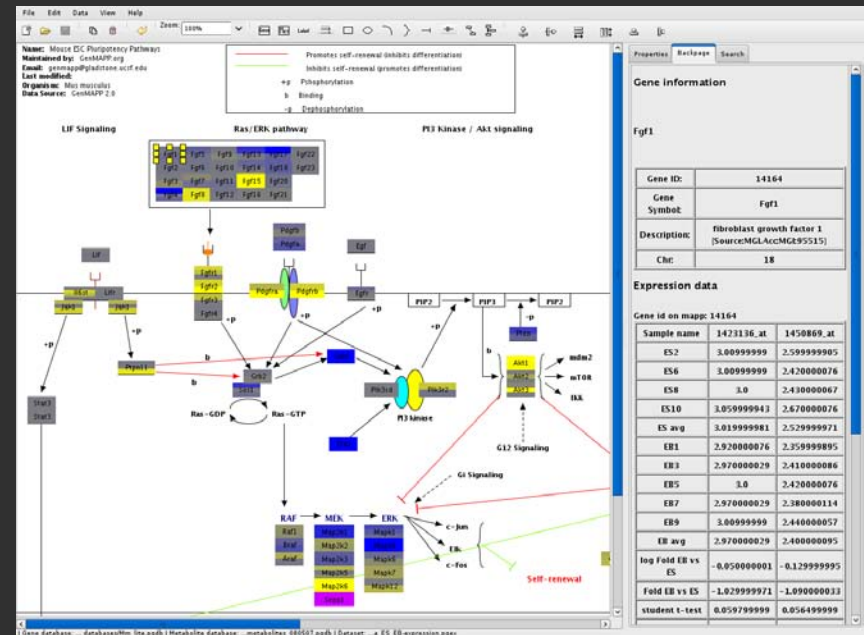
Element properties

Comments Literature

2: Twenty-four non-synonymous polymorphisms in the one-carbon metabolic pathway and risk of colorectal adenoma in the Nurses' Health Study.; **Hazra A; Wu K; Kraft P; Fuchs CS; Giovannucci EL; Hunter DJ;** *Carcinogenesis*, 2007; [PubMed](#)

PathVisio

- Pathway editor
 - High-throughput data visualization
 - Plugin framework
- Target audience: Biologists



<http://www.pathvisio.org>

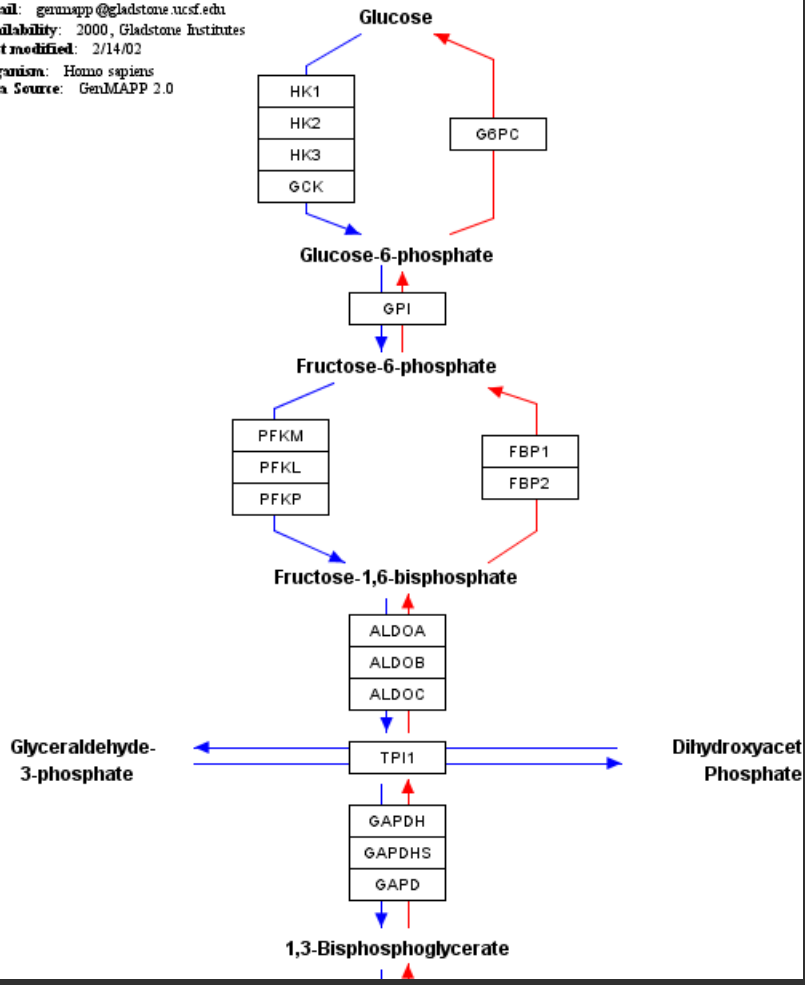
GPML

- Custom XML format
- Backwards compatible with GenMAPP
- Graphical presentation and layout
- *Not a standard*

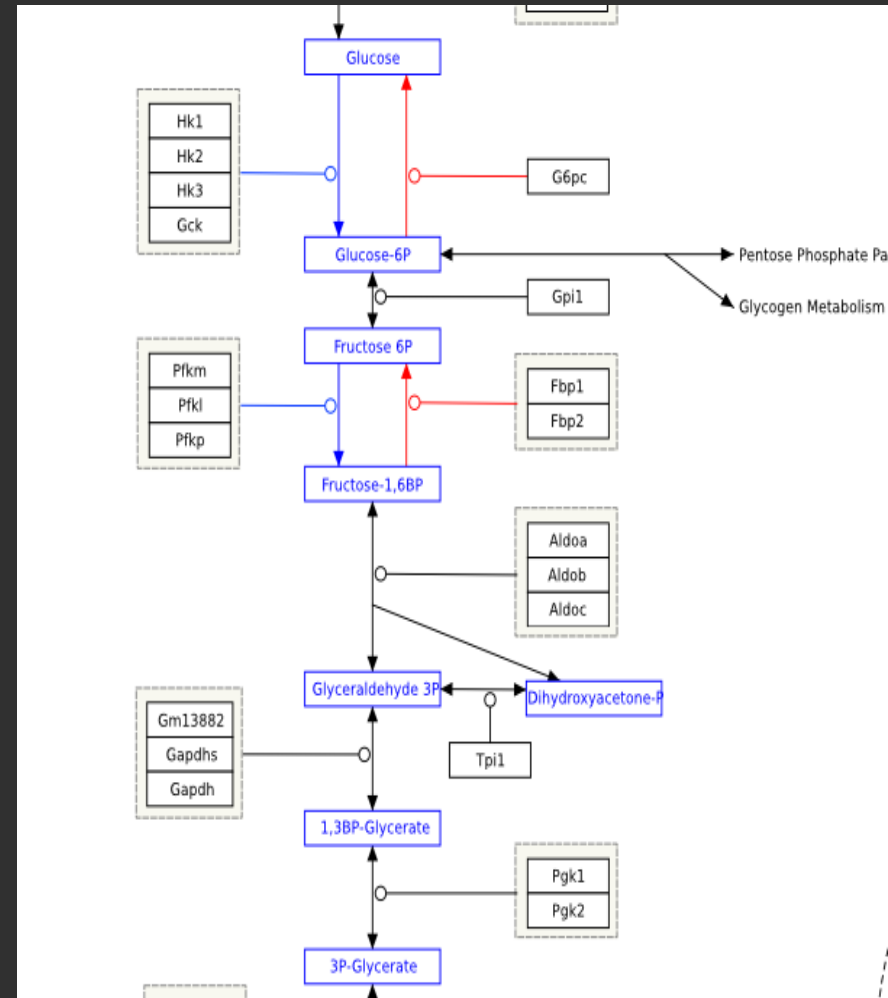
```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<Pathway xmlns="http://genmapp.org/GPML/2007" Name="Apoptosis Mechanisms" Data-Source="GenMAP
  <Graphics BoardWidth="19989.0" BoardHeight="12267.2" WindowWidth="19304.0" WindowHeight="13
  <DataNode TextLabel="TRADD" Type="GeneProduct" BackpageHead="TRADD | TNFRSF1A-associated vi
    <Graphics Color="Transparent" CenterX="1350.0" CenterY="3350.0" Width="900.0" Height="300
    <Xref Database="Entrez Gene" ID="8717" />
  </DataNode>
  <DataNode TextLabel="TNFSF10" Type="GeneProduct" BackpageHead="TNFSF10 | tumor necrosis fac
    <Graphics Color="Transparent" CenterX="2550.0" CenterY="1050.0" Width="1000.0" Height="30
    <Xref Database="Entrez Gene" ID="8743" />
  </DataNode>
  <Line>
    <Graphics Color="0000ff">
      <Point x="5900.0" y="8800.0" Head="TBar" />
      <Point x="6200.0" y="9200.0" />
    </Graphics>
  </Line>
  <Shape Type="Oval" GraphId="bfa">
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  </Shape>
</Pathway>
```

2006

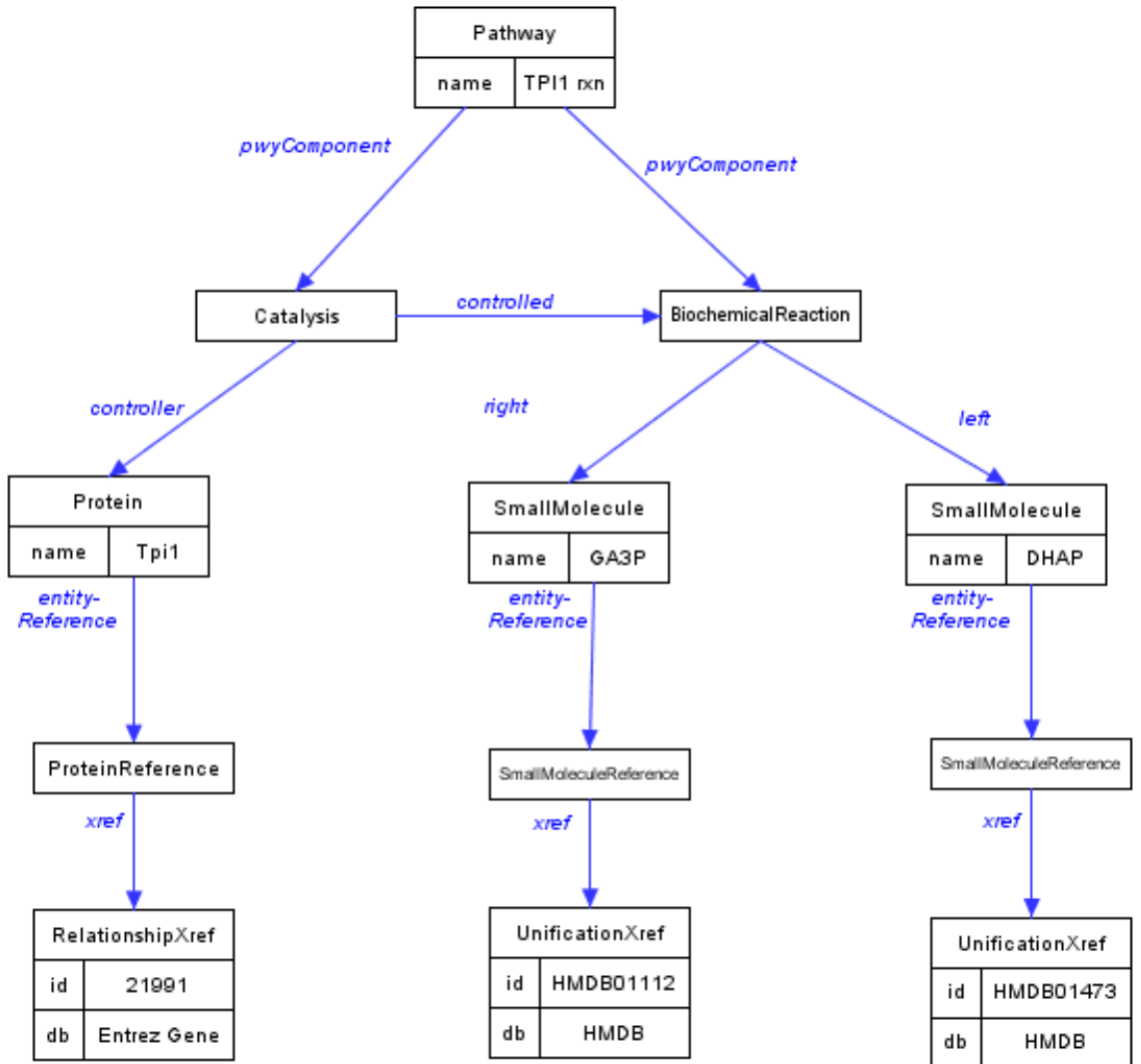
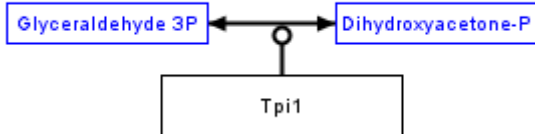
Title: Glycolysis and Gluconeogenesis
Email: genmapp@gladstone.ucsf.edu
Availability: 2000, Gladstone Institutes
Last modified: 2/14/02
Organism: Homo sapiens
Data Source: GenMAPP 2.0



Now



BioPAX Export



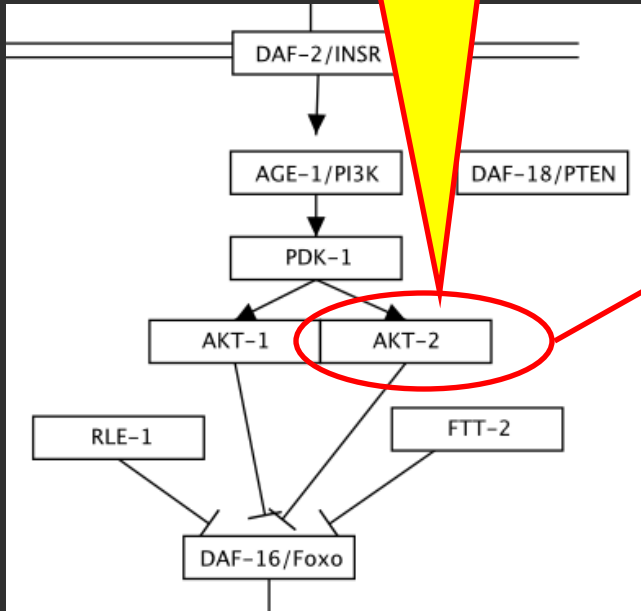
BioPAX Export

Remaining problems:

- Compartments
- Underspecified reactions
- Gene Identifiers on Proteins

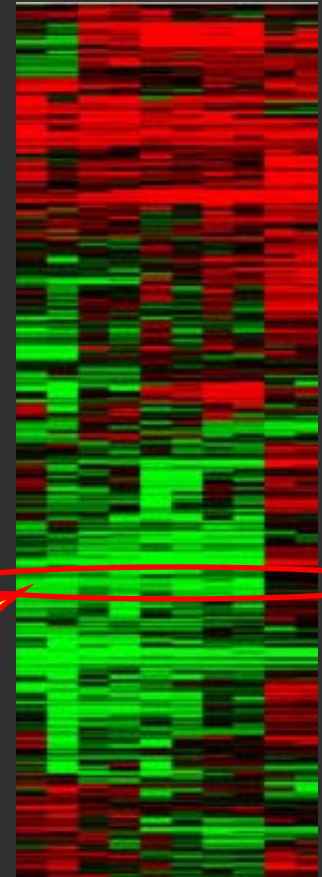
BridgeDb for ID mapping

Entrez Gene
3643



BridgeDb

Affymetrix probeset
100234_at



Problem: Which mapping service?

- Ensembl Biomart
- Synergizer
- CRONOS
- DAVID
- AliasServer
- MatchMiner
- OntoTranslate
or
- Local database



Easy & Flexible Code

```
IDMapper mapper = BridgeDb.connect("idmapper-biomart:" +
    "http://www.biomart.org/biomart/martservice?" +
    "mart=ensembl&dataset=hsapiens_gene_ensembl");

Xref ref1 = new Xref ("3643", BioDataSource.ENTREZ_GENE);
Xref ref2 = new Xref ("1004_at", BioDataSource.AFFY);

// get link to online description
ref1.getUrl();

// find all known cross-references
mapper.mapID (ref1);

// find all cross-references in a specific data source
mapper.mapID (ref1, BioDataSource.UNIGENE);
```

Easy & Flexible Code

```
IDMapper mapper = BridgeDb.connect("idmapper-synergizer:" +
    "authority=ncbi&species=Homo sapiens");

Xref ref1 = new Xref ("3643", BioDataSource.ENTREZ_GENE);
Xref ref2 = new Xref ("1004_at", BioDataSource.AFFY);

// get link to online description
ref1.getUrl();

// find all known cross-references
mapper.mapID (ref1);

// find all cross-references in a specific data source
mapper.mapID (ref1, BioDataSource.UNIGENE);
```

Easy & Flexible Code

```
IDMapper mapper = BridgeDb.connect("idmapper-jdbc:" +
    "mysql://localhost/snp?user=bridgedb");

Xref ref1 = new Xref ("3643", BioDataSource.ENTREZ_GENE);
Xref ref2 = new Xref ("1004_at", BioDataSource.AFFY);

// get link to online description
ref1.getUrl();

// find all known cross-references
mapper.mapID (ref1);

// find all cross-references in a specific data source
mapper.mapID (ref1, BioDataSource.UNIGENE);
```

www.wikipathways.org

www.pathvisio.org



– Gladstone Institutes

- Alexander Pico
- Kristina Hanspers
- Nathan Salomonis
- Bruce Conklin

– Oregon State University

- Pankaj Jaiswal
- Justin Elser

– Maastricht University

- Chris Evelo
- Susan Coort
- Andra Waagmeester
- Tina Kutmon
- Ferry Jagers
- Thomas Kelder



• LMB at NCI/NIH

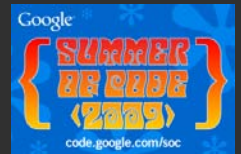
- Mirit Aladjem
- Margot Sunshine
- Augustin Luna

• PharmGKB

- Mark Woon
- Rebecca Tang

• Google Summer of code

- Jianjiong Gao
- Adem Bilican



• NuGO

- Jildau Bouwman
- Suzan Wopereis
- Ben van Ommen



• LibSBGN

- Alice Villeger
- Tobias Czauderna