PSICQUIC

A common query interface for interaction databases

Joint BSPR/EBI Conference 2010
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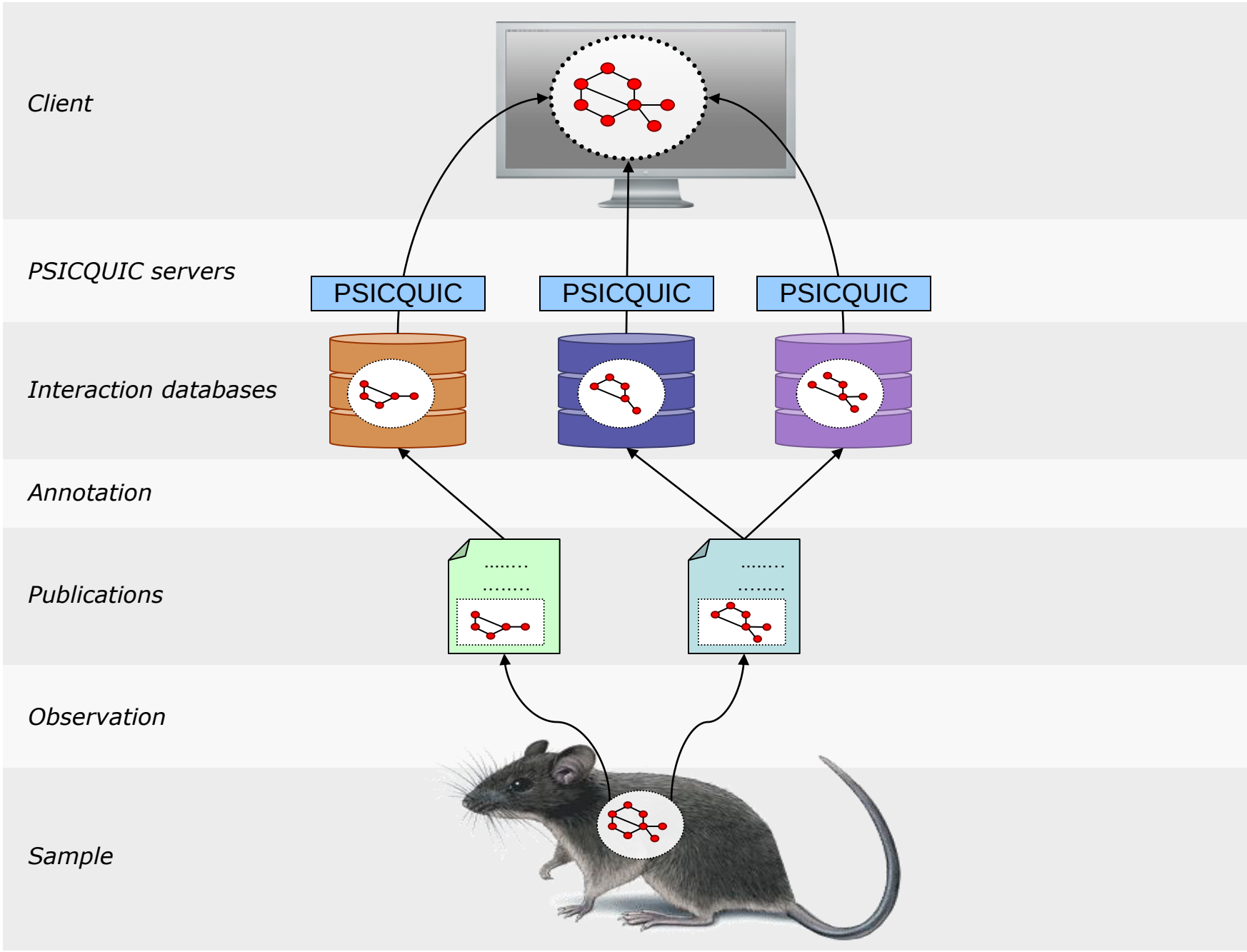
EBI Proteomics Services

EMBL-EBI


Client
PSICQUIC servers
PSICQUIC
PSICQUIC
PSICQUIC
Interaction databases
Annotation
Publications
Observation
Sample

The Molecular Interaction Standard (PSI-MI)

- **Community format for the representation of interaction data**
- **XML schema**
- **Version 1.0: February 2004**
  - The HUPO PSI Molecular Interaction Format - A community standard for the representation of protein interaction data. Hermjakob, H., et al: Nature Biotechnology 2004, 22, 176-183.
- **Version 2.5: October 2007**
  - Quantitative parameters
  - Additional interactor types: DNA, RNA, small molecules
  - Also includes simplified tabular representation
  - Kerrien S., et al: Broadening the Horizon - Level 2.5 of the HUPO-PSI Format for Molecular Interactions. BMC Biol. 2007 Oct 9;5(1):44
- **Now widely implemented by DIP, MINT, MIPS, IntAct, HPRD, …**

http://www.psidev.info/MI

MITAB

- **The PSI MI XML format is full-featured, but complex**
- **On frequent user request, we developed a simplified tabular format, MITAB 2.5**
  - **15 well-defined columns to represent a molecular interaction in a database independent manner**
- **Now widely implemented**

7	FANCD1 PR BA UN	UniProt Dasty2	DSS1 PR PY UN	UniProt Dasty2	FANCD1; FACD; Fanconi anemia group D1 protein; [+]	DSS1; SHFDG1; Split hand/foot malformation type 1 protein; [+]	9606	9606	10373512	two hybrid	EBI-79
8	PR BA UN		PR PY UN						10373512	two hybrid	EBI-79
9	PR BA UN		PR PY UN						10373512	coimmunoprecipitation	EBI-79
10	PR PY UN		PR BA UN						10373512	coimmunoprecipitation	EBI-79

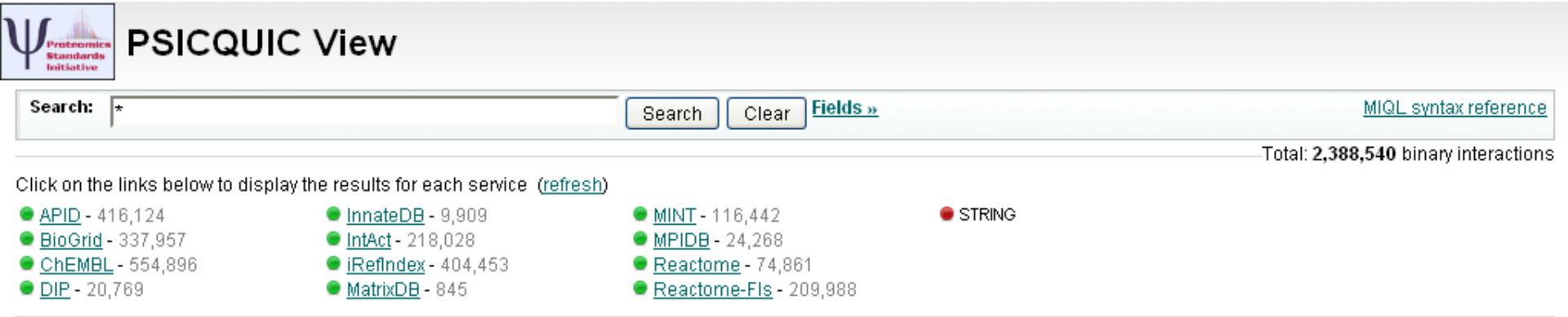
http://www.psidev.info/MI

PSICQUIC:
The PSI Common Query InterfaCe

- Common computational interface for querying molecular interaction databases
  - Widely implemented by independent interaction data resources
  - Simple interface, open source server implementation exists, can be “fed” from a tab-delimited file => easy to provide data
  - Not limited to protein-protein interactions, also e.g.
    - Drug-target interactions
      Simplified pathway data

Name	Active	Interactions	Version	SOAP URL
BioGrid	YES	241,285	1.1.1-SNAPSHOT	http://tyerslab.bio.ed.ac.uk:8080/psicquic-ws/webservices/psic
ChEMBL	YES	492,354	1.1.0	http://www.ebi.ac.uk/Tools/webservices/psicquic/chembl/webs
IntAct	YES	207,332	1.1.5	http://www.ebi.ac.uk/Tools/webservices/psicquic/intact/webser
iRefIndex	YES	404,453	1.1.5	http://biotin.uio.no:8080/psicquic-ws/webservices/psicquic
MatrixDB	YES	520	1.1.6-SNAPSHOT	http://matrixdb.ibcp.fr:8080/webservices/psicquic
MINT	YES	116,442	1.1.1	http://mint.bio.uniroma2.it/mint/psicquic/webservices/psicquic
MPIDB	YES	23,580	1.0-SNAPSHOT	http://www.jcvi.org/mpidb/servlet/webservices/psicquic
Reactome	YES	74,861	1.1.2-SNAPSHOT	http://brie8.cshl.edu:8080/psicquic-ws-reactome/webservices/p
Reactome-Functional-Interactions	YES	209,988	1.1.2-SNAPSHOT	http://brie8.cshl.edu:8090/psicquic-ws-reactome-fi/webservices
STRING	NO	0	1.0alpha	http://string-db.org/psicquic/ws

PSICQUIC:
Simple PSICQUIC viewer



http://www.ebi.ac.uk/Tools/webservices/psicquic/view

PSICQUIC:
Simple PSICQUIC viewer

PSICQUIC View

Search: abl* AND species:9606 | Search | Clear | Fields » | MIQL syntax reference

Total: **2,712** binary interactions

Click on the links below to display the results for each service (refresh)

- APID - 481
- BioGrid - 205
- ChEMBL - 799
- DIP - 0
- InnateDB - 9
- IntAct - 335
- iRefIndex - 352
- MatrixDB - 0
- MINT - 352
- MPIDB - 0
- Reactome - 0
- Reactome-FIs - 179
- STRING

19	CHEBI:49840; EBI-1380990	ChEBI	P00519; EBI-375543	UniProt	purvalanol b	ABL; Abelson murine leukemia viral oncogene homolog 1; Proto-oncogene c-Abl; p150; JTK7; abl1_human		ABL1		Human (9606)	Bantscheff et al. (2007)	17721511	association
20	P00519; EBI-375543	UniProt	EBI-1550568		ABL; Abelson murine leukemia viral oncogene homolog 1; Proto-oncogene c-Abl; p150; JTK7; abl1_human		ABL1		Human (9606)	-2	Lin et al. (2007)	17486070	enzymatic reaction
21	Q9UJV9; EBI-1046350	UniProt	P00519; EBI-375543	UniProt	DEAD box protein 41; DEAD box protein abstrakt homolog;	ABL; Abelson murine leukemia viral oncogene homolog 1;	DDX41	ABL1	Human (9606)	Human (9606)	Wu et al. (2007)	17474147 imex:IM-11903	physical association

PSICQUIC:

Pointing to other resources

EBI > Databases > Pathways & Networks > IntAct > View

Search: BRCA2 Search Clear Show Advanced Fields »

Home | Search | Interactions (89) | Browse | Lists | Interaction Details | Molecule View | Graph

Browse by taxonomy, gene ontology, ChEBI ontology

» **89** binary interactions were found in IntAct. **23** of them are originated from spoke expanded co-complexes and you may want to filter them.
» [Counting results in other databases...]

Previous 1-30 of 89 Next 30 | Export to: Select format... Export Change Columns Displayed Previous

	Name molecule A	Links molecule A	Name molecule B	Links molecule B	Aliases molecule A	Aliases molecule B	Species molecule A	Species molecule B	Publication Identifier	Interaction Detection Method	In
1	FANCD1 PR NE IN	UniProt Dasty2	atp SM NE EN	ChEBI	FANCD1; FACD; Fanconi anemia group D1 protein; [+]	atp	9606		19303847	atpase assay	EB
2	PR NE IN		SM NE EN						19303847	atpase assay	EB
3	PR NE IN		SM NE EN						19303847	atpase assay	EB
4	PR NE IN		SM NE EN						19303847	atpase assay	EB
5	PR NE IN		SM NE EN						19303847	atpase assay	EB

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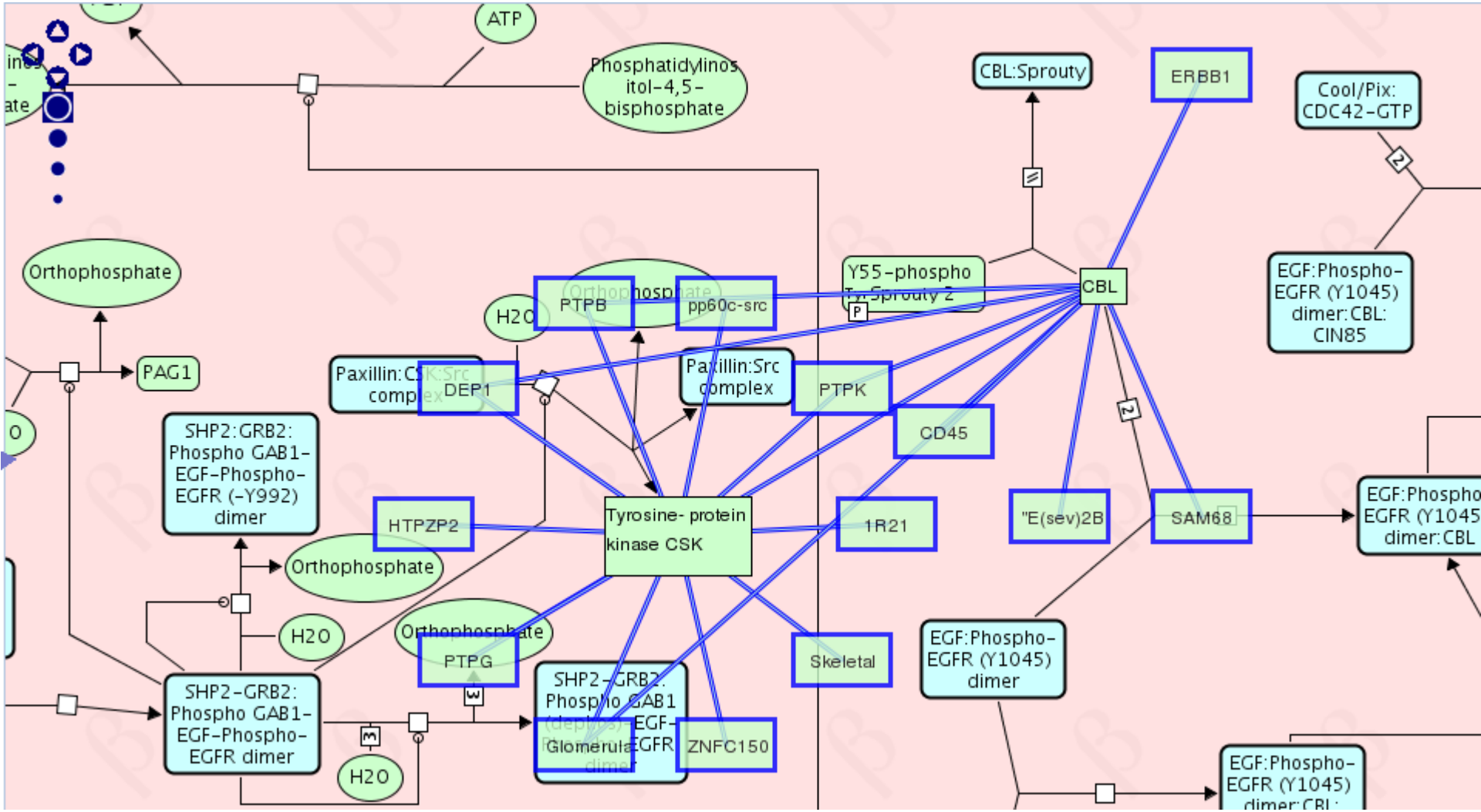
» **89** binary interactions were found in IntAct. **23** of them are originated from spoke expanded co-complexes and you may want to filter them.

» Your query also matches 82 interaction evidences from **3** other databases.

Previous 1-30 of 89 Next 30 | Export to: Select format... Export Change Columns Displayed Previous

	Name molecule A	Links molecule A	Name molecule B	Links molecule B	Aliases molecule A	Aliases molecule B	Species molecule A	Species molecule B	Publication Identifier	Interaction Detection Method	In
1	FANCD1 PR NE IN	UniProt Dasty2	atp SM NE EN	ChEBI	FANCD1; FACD; Fanconi anemia group D1 protein; [+]	atp	9606		19303847	atpase assay	EB
2	PR NE IN		SM NE EN						19303847	atpase assay	EB
3	PR NE IN		SM NE EN						19303847	atpase assay	EB
4	PR NE IN		SM NE EN						19303847	atpase assay	EB
5	PR NE IN		SM NE EN						19303847	atpase assay	EB

PSICQUIC: Overlay of molecular interactions on Reactome pathways (beta)

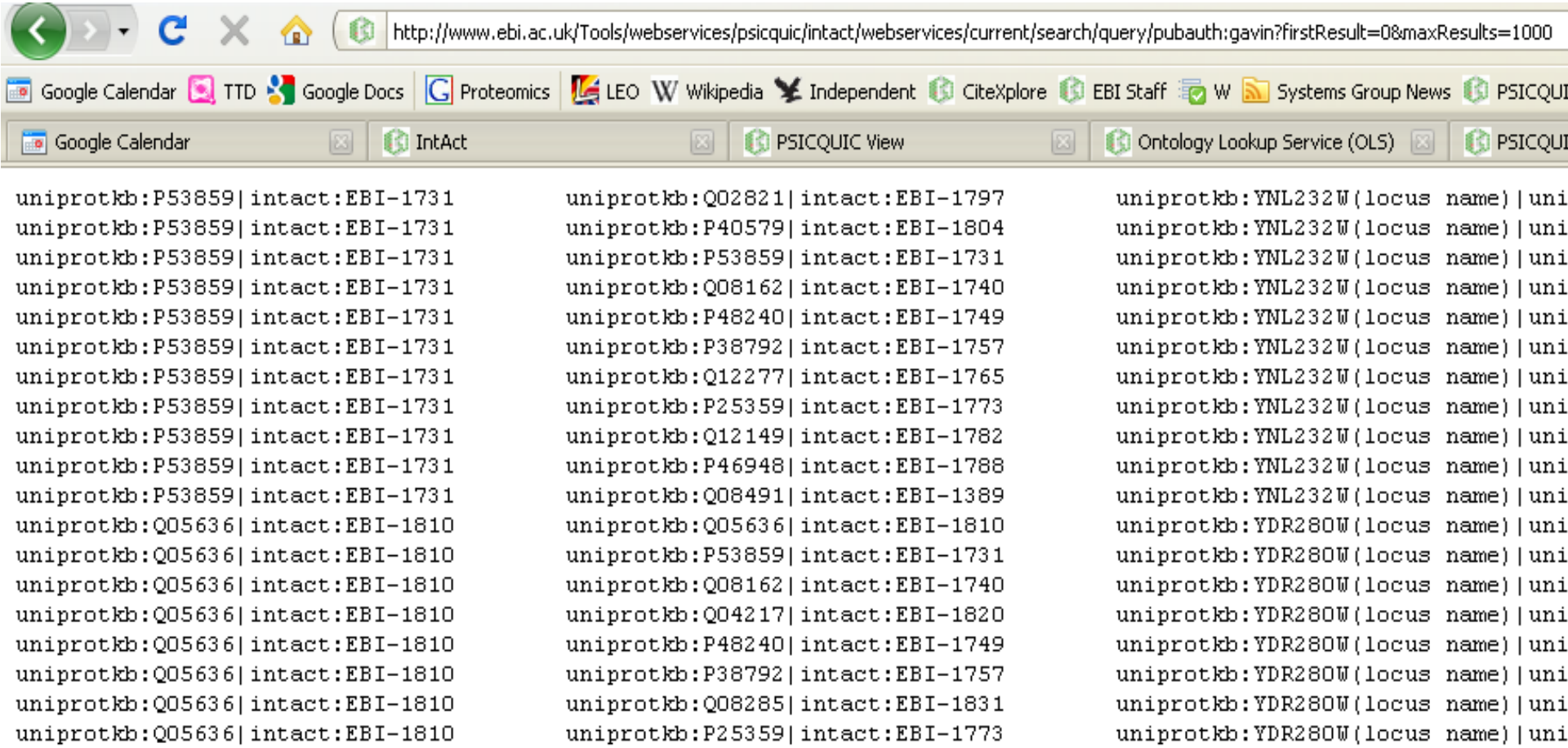


PSICQUIC Query Language: MIQL

- Based on Lucene, with specific field names
- Example:
  ppx
  AND
  species:"Escherichia coli"
  AND
  pubauth:”Scott”

Field Name	Searches on	Implicit*	Example
idA	IdentifierA	No	idA:P74565
id	Identifiers (A or B)	No	id:P74565
alias	Aliases (A or B)	No	alias:(KHDRBS1 HCK)
identifiers	Identifiers and Aliases undistinctively	Yes	identifier:P74565
pubauth	Publication 1st author(s)	Yes	pubauth:scott
pubid	Publication Identifier(s) OR	Yes	pubid:(10837477 12029088)
taxidA	Tax ID interactor A: be it the tax ID or the species name	No	taxidA:mouse
taxidB	Tax ID interactor B: be it the tax ID or species name	No	taxidB:9606
species	Species. Tax ID A and Tax ID B	Yes	species:human
type	Interaction type(s)	Yes	type:"physical interaction"
detmethod	Interaction Detection method(s)	Yes	detmethod:"two hybrid*"
interaction_id	Interaction identifier(s)	Yes	interaction_id:EBI-761050
annotation	Annotations Interactor A or B	No	annotation:experimental
properties	Properties of Interactor A or B (note that this field also contains parent terms of ontology terms of GO, InterPro and PSI-MI)	Yes	properties:"1GQ5"
expansion	Expansion method(s)	Yes	expansion:spoke
dataset	Dataset name(s)	Yes	dataset:Apoptosis
experimentalRole	Experimental role(s) interactor A or interactor B	No	experimentalRole:prey
biologicalRole	Biological role(s) interactor A or interactor B	No	biologicalRole:enzyme
hostOrganism	Host organism in which the interaction was detected	Yes	hostOrganism:human

PSICQUIC:
SOAP and REST interfaces



http://code.google.com/p/psicquic/

PSICQUIC:

The challenge

FROM:

Click on the links below to display the results for each service (refresh)

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TO:

PR PY UN		PR BA UN				Marston et al. (1999)	10373512	coimmunoprecipitation	i	EBI-79852
At4g00020 PR BA UN	UniProt Dasty2	DMC1 PR PY UN	UniProt Dasty2	3702	3702	Siaud et al. (2004)	15014444	two hybrid	MINT	EBI-307726
PR BA UN		PR PY UN				Dray et al. (2006)	16415210	two hybrid	IntAct	EBI-930902
PR BA UN		PR PY UN				Siaud et al. (2004)	15014444	two hybrid	MINT	EBI-930747
PR BA UN		PR PY UN				Dray et al. (2006)	16415210	anti tag coimmunoprecipitation	IntAct	EBI-930779

Molecular Interactions - Dataset: set3

It provides molecular interaction data from different molecular interactions databases. It makes use of PSICQUIC.

Table view | Network view

Pubmed ID selection

Database selection

☑ chembl ☐ intact ☐ mint

Experiment selection

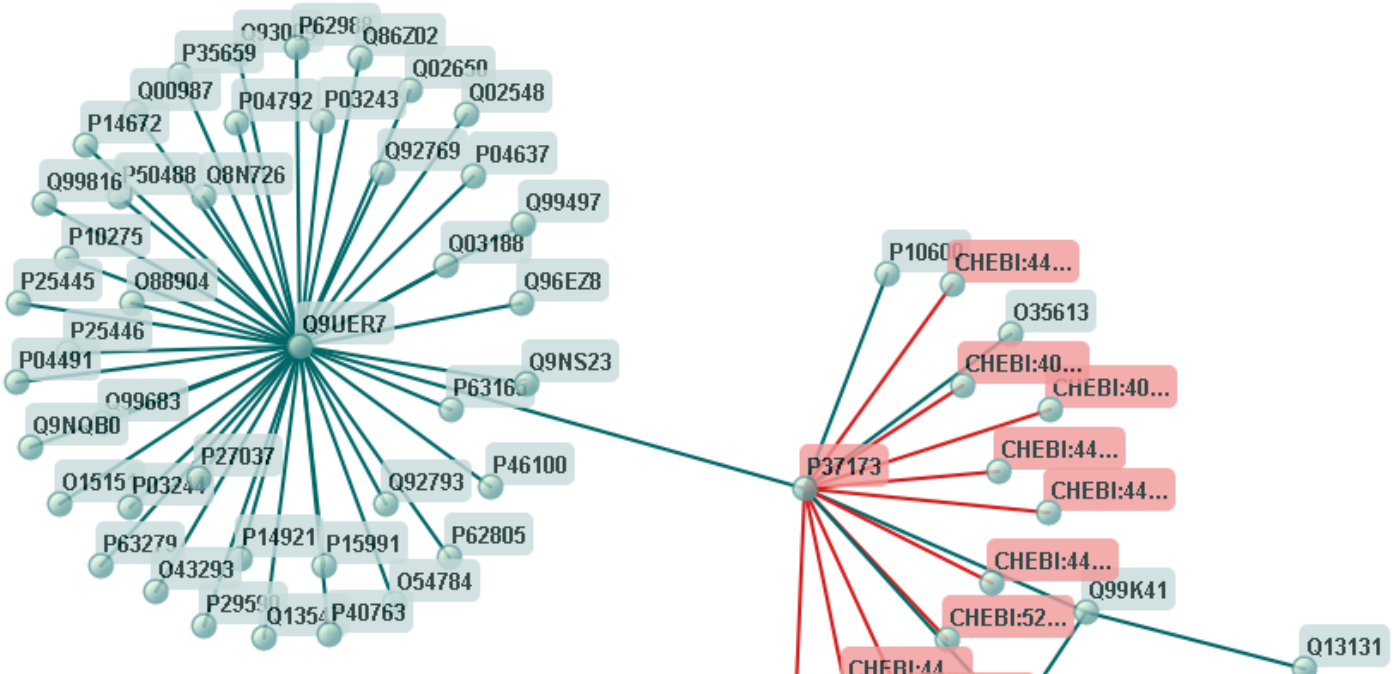
Filter by number

Associated databases	Associated pubmeds	Associated experiments
○ none	○ none	○ none
○ 1 or more	○ 1 or more	○ 1 or more
○ 2 or more	○ 2 or more	○ 2 or more
○ 3 or more	○ 3 or more	○ 3 or more
○ 4 or more	○ 4 or more	○ 4 or more

10 interactions with 20 interactors for the "chembl" database

Download ALL the interactions

Download SELECTED interactions



ENVISION2
Version: ${version}

- New Dataset
- Documentation
- Datasets
  - set1
  - set2
  - set3
    - Overview
    - Protein information
    - Protein identifications
    - Biological pathways
    - Molecular interactions
    - Protein localization
    - Biological models
    - Protein length
    - Dataset history
    - Download results
- Dataset Manager
- Contact

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Thank you!

Questions?

ALL PSI CONTRIBUTORS!

All PSICQUIC implementors!

IntAct team:
- **Bruno Aranda**
- **Samuel Kerrien**
- **Rafael Jimenez**

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- **EU FW7 PSIMEx**