SABIO-RK Documentation

(May 2016)

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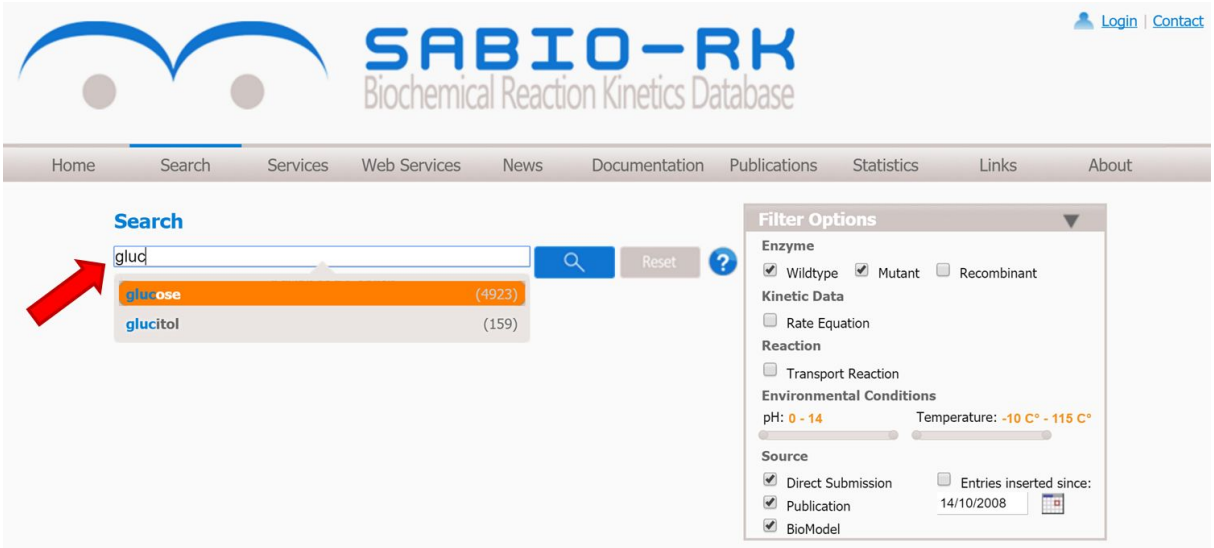
Search



The **Search** field offers free text search. The complete word (no fragments) inserted in this field will be searched in the entire database's content, including comments.

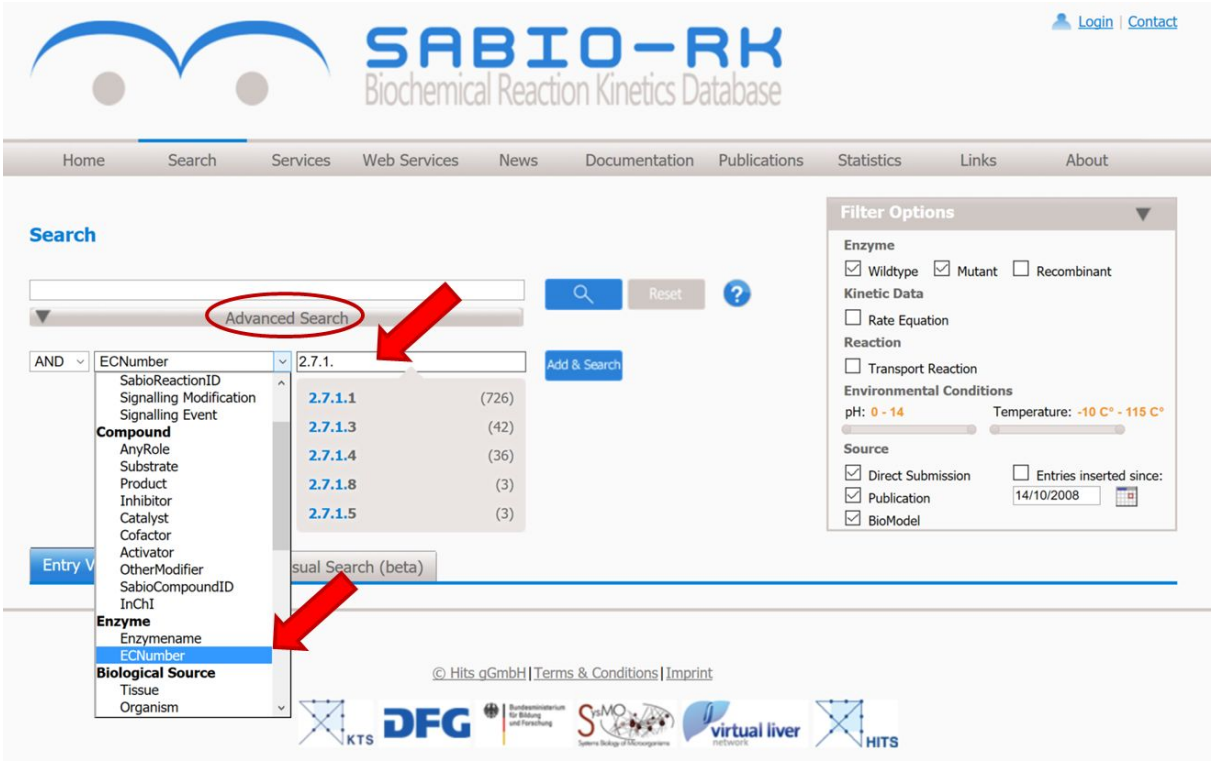
The auto completion function makes suggestions and indicates how many results (entries) are in the database for the distinct search terms. Queries can be modified by using the following syntax in the **Search** field:

Search	Result
rattus liver rattus AND liver	entries containing both terms *rattus* and *liver*
(rattus OR liver)	entries containing either the term *rattus* or *liver*
(rattus OR human) AND liver	entries containing the term *liver* and either *rattus* or *human*

Search	Result
"homo sapiens"	entries containing both terms *homo* and *sapiens* in the exact order
ratt* *kinase	wildcard search for more than one character entries containing terms starting with *ratt* (e.g. Rattus norvegicus) or ending with *kinase* (e.g. Hexokinase)
"mammalia (NCBI)" NOT "homo sapiens" "liver (BTO)"	entries for all organisms of class *mammalia* (based on NCBI taxonomy) but not for *homo sapiens* entries for tissue *liver* including all tissue sub-parts and cell lines (based on BRENDA Tissue Ontology)
Substrate:ATP	entries with reactions containing substrate *ATP* similar queries for specific attributes can be defined by using all other database attributes (see **Advanced Search**)
Substrate:ATP AND Substrate:Pyruvate Substrate:(ATP AND Pyruvate)	entries with reactions containing both *ATP* and *Pyruvate* as substrates
Year:[1990 TO 2012]	entries with publication years between *1990* and *2012* (see also **Advanced Search**)

More specific queries can additionally be defined by the **Advanced Search**.

Advanced Search



To restrict search terms to specific attributes also the **Advanced Search** can be used. First an attribute from the list has to be selected. Then while typing terms a selection list with suggestions will appear containing the number of database entries related to them. Select a term from the list and click the **Add & Search** button to start the search. Wildcard search is not possible for the advanced search, the exact search term is needed.

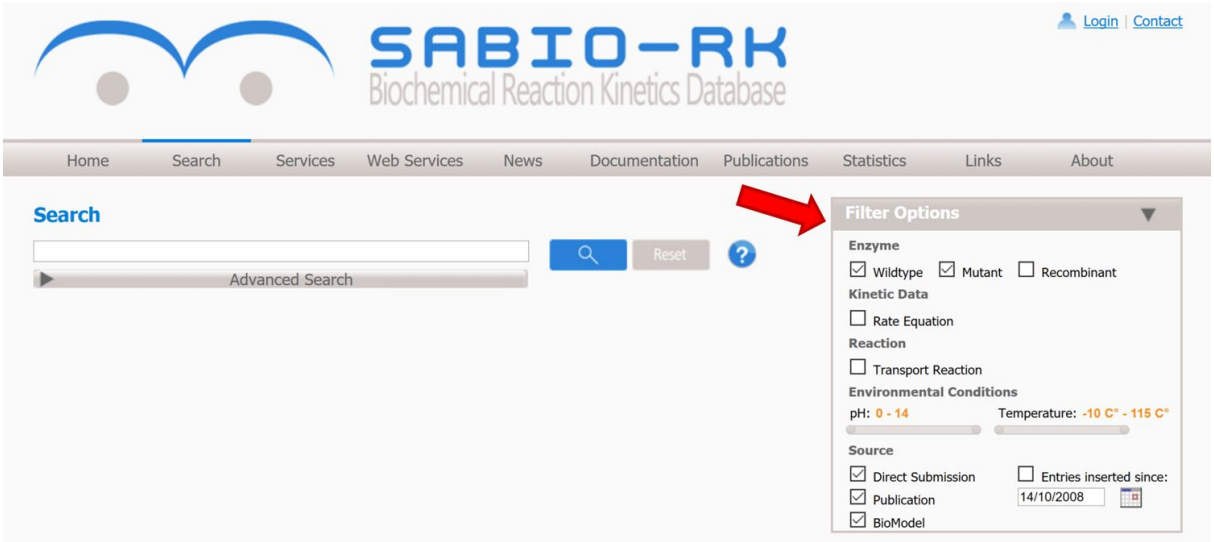
Searches with different terms for the same attribute is possible using the OR boolean operator.

For the specific attributes *Tissue* and *Organism* an ontology-based search can be defined by selecting terms with additional information *(BTO)* or *(NCBI)*. By selecting BTO terms the search will include all subclasses of this term based on the BRENDA Tissue Ontology (http://bioportal.bioontology.org/ontologies/1005). By selecting NCBI terms the search will include all subclasses of this term based on the NCBI Organism Taxonomy (http://www.ncbi.nlm.nih.gov/taxonomy).

Time periods of publications in attribute *Year* can be defined:

>1990	entries with publication years from *1990* until today
<1990	entries with publication years up to *1990*

Filter Options



Queries can be specified additionally by setting different filters using the **Filter Options** box.

There are filters for the enzyme/protein. By default all entries containing Wildtype or Mutant proteins are displayed. By disabling one of these criteria only wildtype or only mutant data will be displayed. Selecting Recombinant will restrict the search output to entries resulting from experiments conducted with recombinant proteins.

Selecting the Rate Equation filter will display only data entries with a kinetic rate equation. Accordingly, selecting the Transport Reaction filter will restrict the search result to transport reactions.

Environmental conditions (pH value, Temperature) can be specified by moving the slider buttons to select a range.

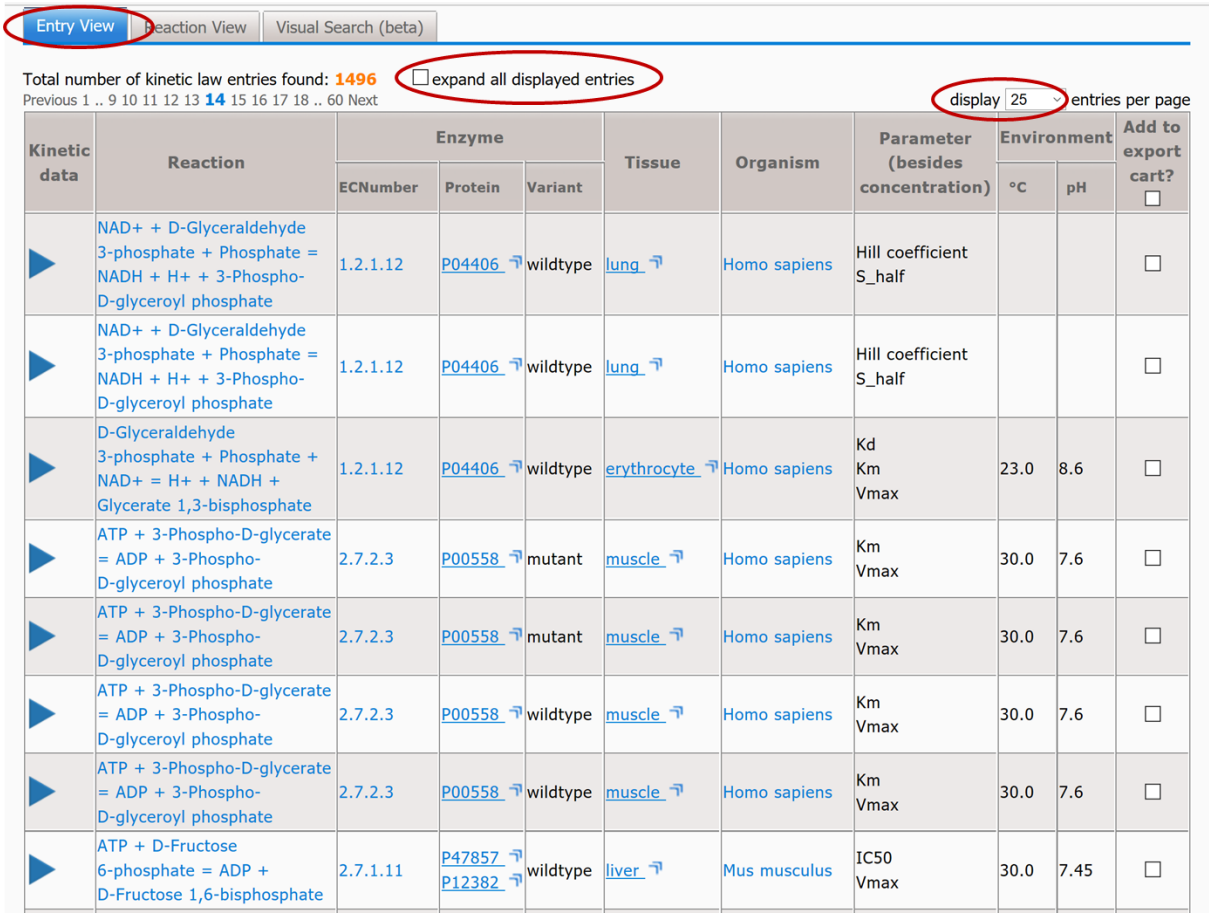
Additionally the source of the data (Direct Submission, Publication, or BioModel (Model upload via SBML)) and the time of data insertion can be used to restrict the search.

Search Result

Entry View

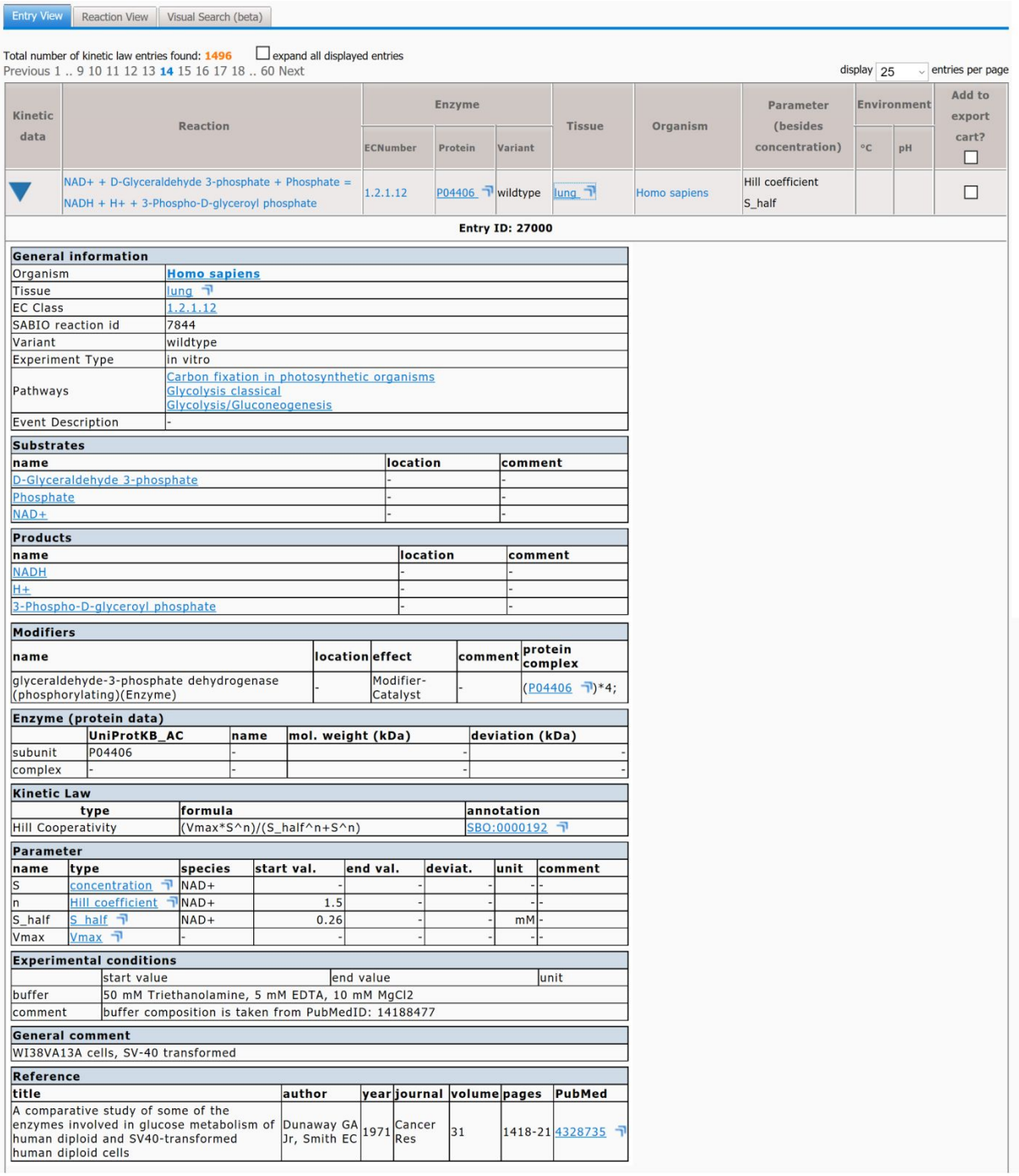
The search result is represented by default in the **Entry View**, which is a table containing overview information of the database entries sorted by Sabio EntryID. The content of the table columns can be re-sorted by clicking on the column headers.

The number of entries per page can be varied.



Kinetic data	Reaction	Enzyme			Tissue	Organism	Parameter (besides concentration)	Environment		Add to export cart?
		ECNumber	Protein	Variant				°C	pH	☐
▶	NAD+ + D-Glyceraldehyde 3-phosphate + Phosphate = NADH + H+ + 3-Phospho-D-glyceroyl phosphate	1.2.1.12	P04406	wildtype	lung	Homo sapiens	Hill coefficient S_half			☐
▶	NAD+ + D-Glyceraldehyde 3-phosphate + Phosphate = NADH + H+ + 3-Phospho-D-glyceroyl phosphate	1.2.1.12	P04406	wildtype	lung	Homo sapiens	Hill coefficient S_half			☐
▶	D-Glyceraldehyde 3-phosphate + Phosphate + NAD+ = H+ + NADH + Glycerate 1,3-bisphosphate	1.2.1.12	P04406	wildtype	erythrocyte	Homo sapiens	Kd Km Vmax	23.0	8.6	☐
▶	ATP + 3-Phospho-D-glycerate = ADP + 3-Phospho-D-glyceroyl phosphate	2.7.2.3	P00558	mutant	muscle	Homo sapiens	Km Vmax	30.0	7.6	☐
▶	ATP + 3-Phospho-D-glycerate = ADP + 3-Phospho-D-glyceroyl phosphate	2.7.2.3	P00558	mutant	muscle	Homo sapiens	Km Vmax	30.0	7.6	☐
▶	ATP + 3-Phospho-D-glycerate = ADP + 3-Phospho-D-glyceroyl phosphate	2.7.2.3	P00558	wildtype	muscle	Homo sapiens	Km Vmax	30.0	7.6	☐
▶	ATP + 3-Phospho-D-glycerate = ADP + 3-Phospho-D-glyceroyl phosphate	2.7.2.3	P00558	wildtype	muscle	Homo sapiens	Km Vmax	30.0	7.6	☐
▶	ATP + D-Fructose 6-phosphate = ADP + D-Fructose 1,6-bisphosphate	2.7.1.11	P47857 P12382	wildtype	liver	Mus musculus	IC50 Vmax	30.0	7.45	☐

Detailed information is given in the single database entries which can be displayed by clicking on the blue triangle to open an entry. Alternatively all entries can be opened at once by selecting “expand all displayed entries”.



Entry View | Reaction View | Visual Search (beta)

Total number of kinetic law entries found: 1496 ☐ expand all displayed entries

Previous 1 .. 9 10 11 12 13 **14** 15 16 17 18 .. 60 Next

display 25 entries per page

Kinetic data	Reaction	Enzyme			Tissue	Organism	Parameter (besides concentration)	Environment		Add to export cart?
		ECNumber	Protein	Variant				°C	pH	☐
▼	NAD+ + D-Glyceraldehyde 3-phosphate + Phosphate = NADH + H+ + 3-Phospho-D-glyceroyl phosphate	1.2.1.12	P04406	wildtype	lung	Homo sapiens	Hill coefficient S_half			☐

Entry ID: 27000

General information	
Organism	**Homo sapiens**
Tissue	lung
EC Class	1.2.1.12
SABIO reaction id	7844
Variant	wildtype
Experiment Type	in vitro
Pathways	Carbon fixation in photosynthetic organisms Glycolysis classical Glycolysis/Gluconeogenesis
Event Description	-

Substrates

name	location	comment
D-Glyceraldehyde 3-phosphate	-	-
Phosphate	-	-
NAD+	-	-

Products

name	location	comment
NADH	-	-
H+	-	-
3-Phospho-D-glyceroyl phosphate	-	-

Modifiers

name	location	effect	comment	protein complex
glyceraldehyde-3-phosphate dehydrogenase (phosphorylating)(Enzyme)	-	Modifier-Catalyst	-	(P04406)*4;

Enzyme (protein data)

	UniProtKB_AC	name	mol. weight (kDa)	deviation (kDa)
subunit	P04406	-	-	-
complex	-	-	-	-

Kinetic Law

type	formula	annotation
Hill Cooperativity	(Vmax*S^n)/(S_half^n+S^n)	SBO:0000192

Parameter

name	type	species	start val.	end val.	deviat.	unit	comment
S	concentration	NAD+	-	-	-	-	-
n	Hill coefficient	NAD+	1.5	-	-	-	-
S_half	S_half	NAD+	0.26	-	-	mM	-
Vmax	Vmax	-	-	-	-	-	-

Experimental conditions

	start value	end value	unit
buffer	50 mM Triethanolamine, 5 mM EDTA, 10 mM MgCl2		
comment	buffer composition is taken from PubMedID: 14188477		

General comment

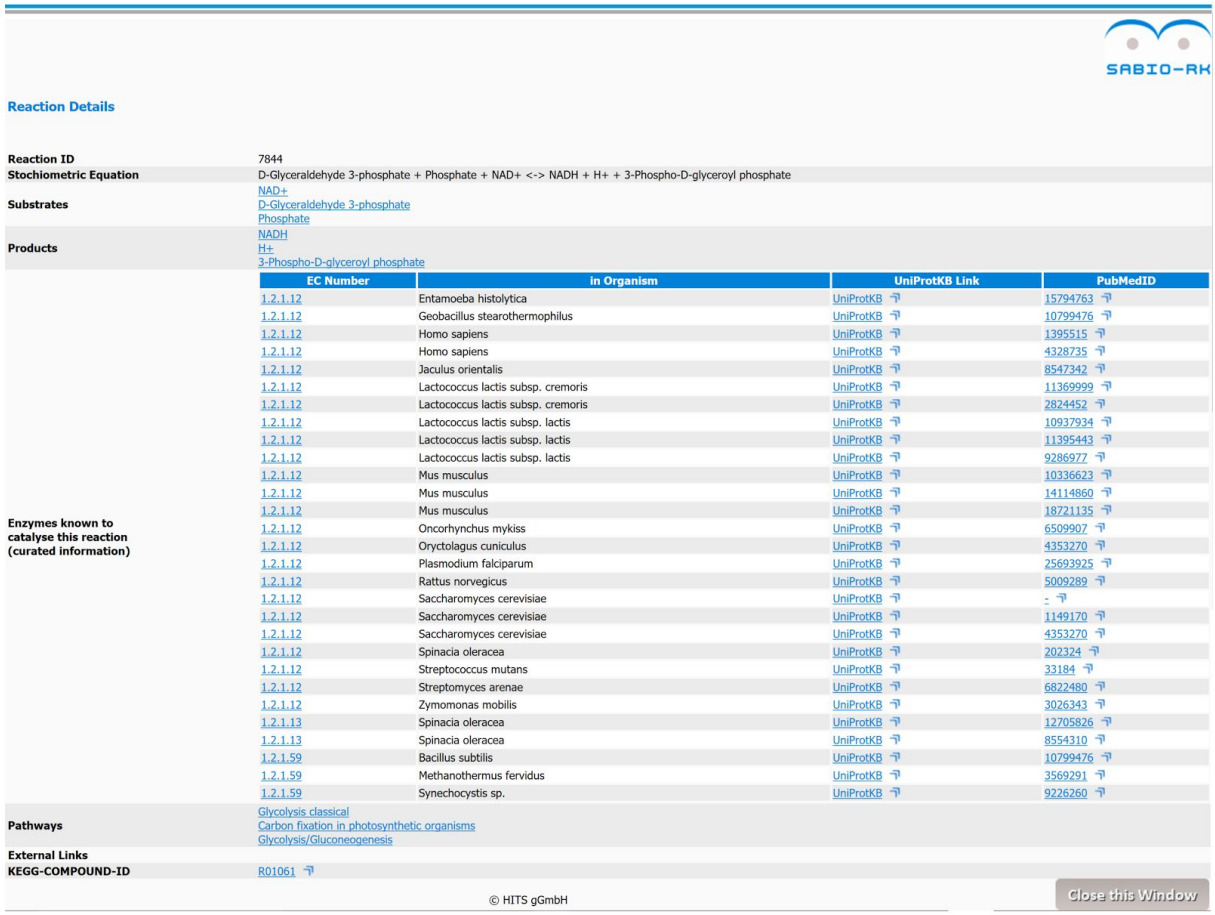
WI38VA13A cells, SV-40 transformed

Reference

title	author	year	journal	volume	pages	PubMed
A comparative study of some of the enzymes involved in glucose metabolism of human diploid and SV40-transformed human diploid cells	Dunaway GA Jr, Smith EC	1971	Cancer Res	31	1418-21	4328735

SABIO-RK offers details about the Reaction, Organism, Enzyme, Pathway and Compound of an entry which are shown in additional pop-up windows after clicking on the appropiate term.

These Details are partially interlinked, and contain additionally links to external databases, e.g., clicking on the Reaction (in the Entry View or in the Reaction View) opens the Reaction Details containing the SABIO ReactionID, Stochiometric Equation, Substrates, Products, Enzymes known to catalyse this reaction, Pathways and links to external databases.



Reaction Details

Reaction ID	7844
Stochiometric Equation	D-Glyceraldehyde 3-phosphate + Phosphate + NAD+ <-> NADH + H+ + 3-Phospho-D-glyceroyl phosphate
Substrates	NAD+ D-Glyceraldehyde 3-phosphate Phosphate
Products	NADH H+ 3-Phospho-D-glyceroyl phosphate

Enzymes known to catalyse this reaction (curated information)

EC Number	in Organism	UniProtKB Link	PubMedID
1.2.1.12	Entamoeba histolytica	UniProtKB	15794763
1.2.1.12	Geobacillus stearothermophilus	UniProtKB	10799476
1.2.1.12	Homo sapiens	UniProtKB	1395515
1.2.1.12	Homo sapiens	UniProtKB	4328735
1.2.1.12	Jaculus orientalis	UniProtKB	8547342
1.2.1.12	Lactococcus lactis subsp. cremoris	UniProtKB	11369999
1.2.1.12	Lactococcus lactis subsp. cremoris	UniProtKB	2824452
1.2.1.12	Lactococcus lactis subsp. lactis	UniProtKB	10937934
1.2.1.12	Lactococcus lactis subsp. lactis	UniProtKB	11395443
1.2.1.12	Lactococcus lactis subsp. lactis	UniProtKB	9286977
1.2.1.12	Mus musculus	UniProtKB	10336623
1.2.1.12	Mus musculus	UniProtKB	14114860
1.2.1.12	Mus musculus	UniProtKB	18721135
1.2.1.12	Oncorhynchus mykiss	UniProtKB	6509907
1.2.1.12	Oryctolagus cuniculus	UniProtKB	4353270
1.2.1.12	Plasmodium falciparum	UniProtKB	25693925
1.2.1.12	Rattus norvegicus	UniProtKB	5009289
1.2.1.12	Saccharomyces cerevisiae	UniProtKB	-
1.2.1.12	Saccharomyces cerevisiae	UniProtKB	1149170
1.2.1.12	Saccharomyces cerevisiae	UniProtKB	4353270
1.2.1.12	Spinacia oleracea	UniProtKB	202324
1.2.1.12	Streptococcus mutans	UniProtKB	33184
1.2.1.12	Streptomyces arenae	UniProtKB	6822480
1.2.1.12	Zymomonas mobilis	UniProtKB	3026343
1.2.1.13	Spinacia oleracea	UniProtKB	12705826
1.2.1.13	Spinacia oleracea	UniProtKB	8554310
1.2.1.59	Bacillus subtilis	UniProtKB	10799476
1.2.1.59	Methanothermus fervidus	UniProtKB	3569291
1.2.1.59	Synechocystis sp.	UniProtKB	9226260

Pathways	Glycolysis classical Carbon fixation in photosynthetic organisms Glycolysis/Gluconeogenesis
External Links	
KEGG-COMPOUND-ID	R01061

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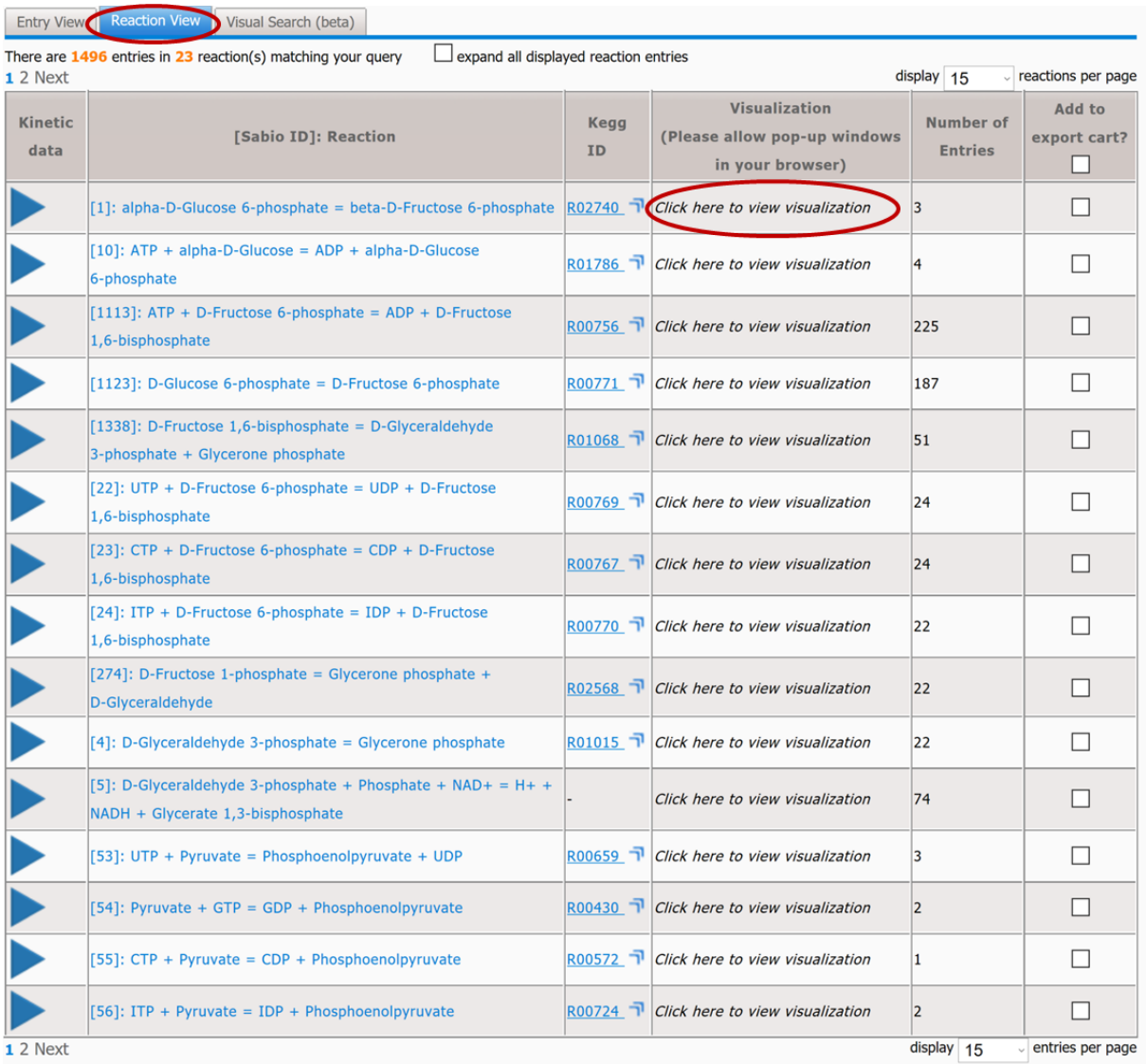
Close this Window

Reaction View

In addition to the **Entry View** table there is the **Reaction View** table which groups the entries based on the biochemical reaction.

In the Entry and in the Reaction View data can be exported in spreadsheet, SBML or BioPAX format. Entries can be selected either by clicking the checkbox at the end of each entry row in the overview table or by clicking the checkbox in the last column header to select all displayed entries per page (see also **Data Export**).



Entry View | Reaction View | Visual Search (beta)

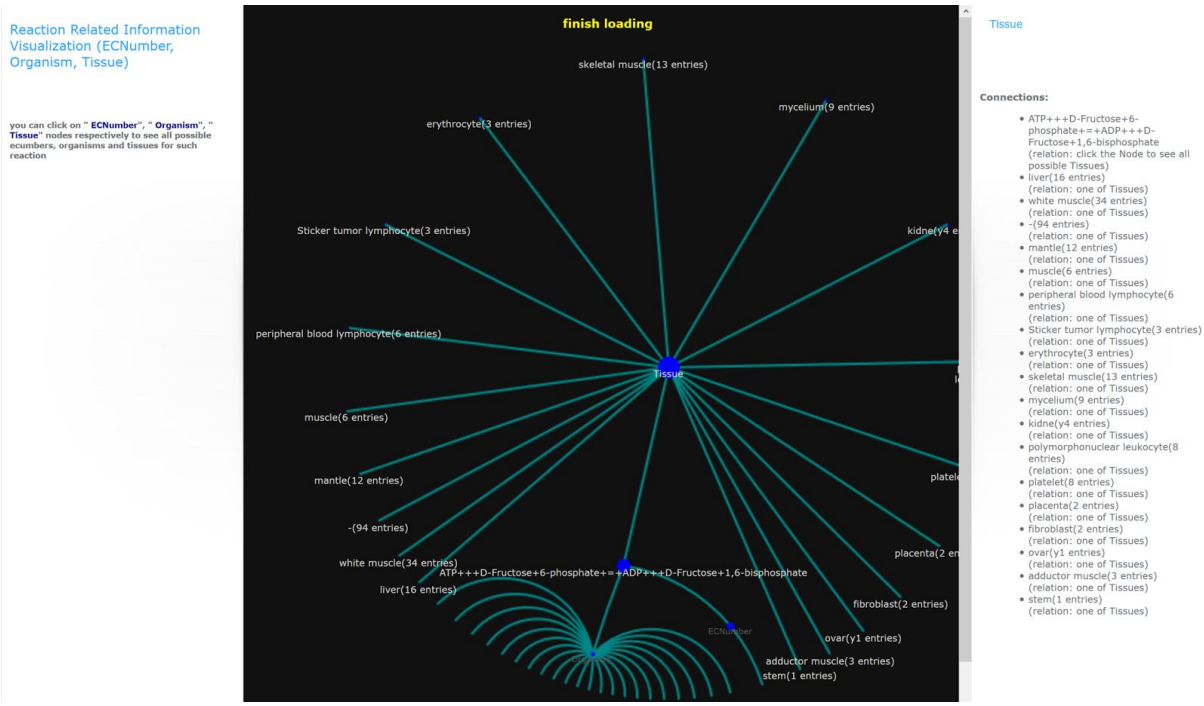
There are 1496 entries in 23 reaction(s) matching your query ☐ expand all displayed reaction entries

1 2 Next display 15 reactions per page

Kinetic data	[Sabio ID]: Reaction	Kegg ID	Visualization (Please allow pop-up windows in your browser)	Number of Entries	Add to export cart? ☐
▶	[1]: alpha-D-Glucose 6-phosphate = beta-D-Fructose 6-phosphate	R02740	*Click here to view visualization*	3	☐
▶	[10]: ATP + alpha-D-Glucose = ADP + alpha-D-Glucose 6-phosphate	R01786	*Click here to view visualization*	4	☐
▶	[1113]: ATP + D-Fructose 6-phosphate = ADP + D-Fructose 1,6-bisphosphate	R00756	*Click here to view visualization*	225	☐
▶	[1123]: D-Glucose 6-phosphate = D-Fructose 6-phosphate	R00771	*Click here to view visualization*	187	☐
▶	[1338]: D-Fructose 1,6-bisphosphate = D-Glyceraldehyde 3-phosphate + Glycerone phosphate	R01068	*Click here to view visualization*	51	☐
▶	[22]: UTP + D-Fructose 6-phosphate = UDP + D-Fructose 1,6-bisphosphate	R00769	*Click here to view visualization*	24	☐
▶	[23]: CTP + D-Fructose 6-phosphate = CDP + D-Fructose 1,6-bisphosphate	R00767	*Click here to view visualization*	24	☐
▶	[24]: ITP + D-Fructose 6-phosphate = IDP + D-Fructose 1,6-bisphosphate	R00770	*Click here to view visualization*	22	☐
▶	[274]: D-Fructose 1-phosphate = Glycerone phosphate + D-Glyceraldehyde	R02568	*Click here to view visualization*	22	☐
▶	[4]: D-Glyceraldehyde 3-phosphate = Glycerone phosphate	R01015	*Click here to view visualization*	22	☐
▶	[5]: D-Glyceraldehyde 3-phosphate + Phosphate + NAD+ = H+ + NADH + Glycerate 1,3-bisphosphate	-	*Click here to view visualization*	74	☐
▶	[53]: UTP + Pyruvate = Phosphoenolpyruvate + UDP	R00659	*Click here to view visualization*	3	☐
▶	[54]: Pyruvate + GTP = GDP + Phosphoenolpyruvate	R00430	*Click here to view visualization*	2	☐
▶	[55]: CTP + Pyruvate = CDP + Phosphoenolpyruvate	R00572	*Click here to view visualization*	1	☐
▶	[56]: ITP + Pyruvate = IDP + Phosphoenolpyruvate	R00724	*Click here to view visualization*	2	☐

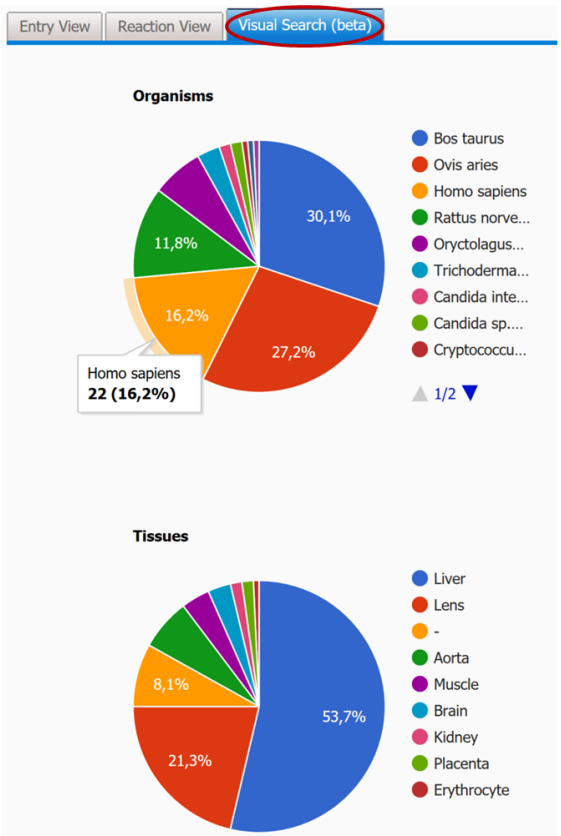
1 2 Next display 15 entries per page

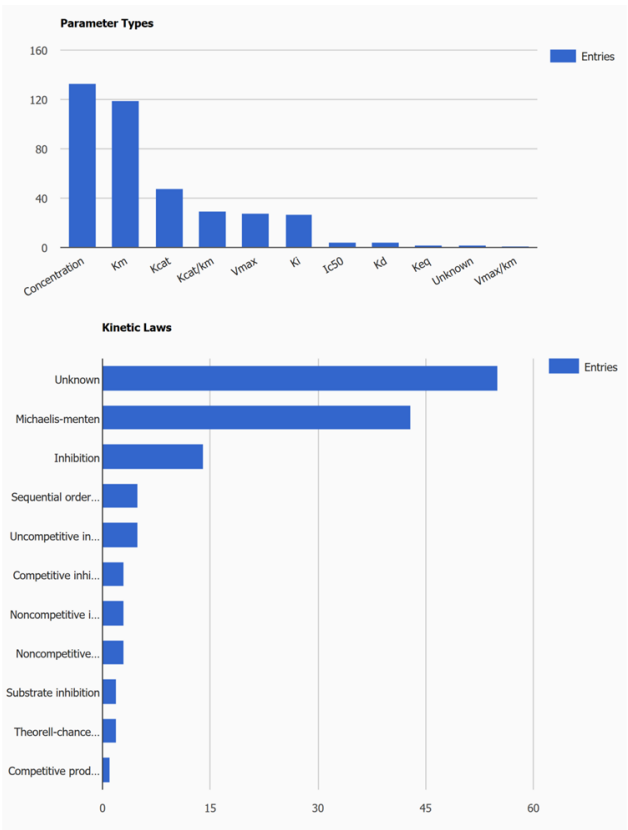
To get a quick impression about a certain reaction and to understand the connections between reaction, enzymes, organisms, and tissues a visualization is available.



Visual Search

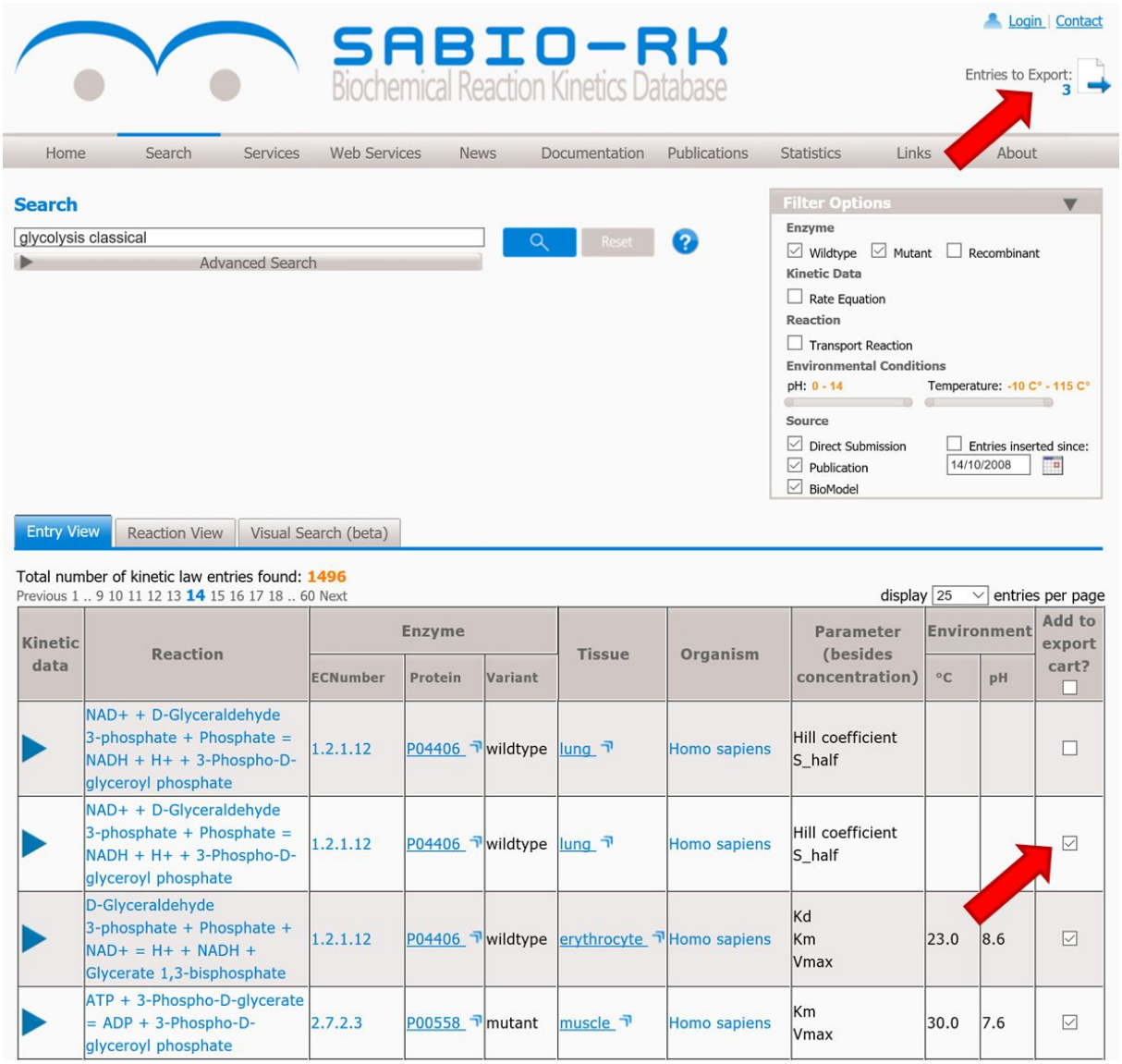
Finally **Visual Search** gives an visual overview of the Search Result together with the opportunity to confine the search, e.g. to an organism, a tissue or a special kind of kinetic parameter or kinetic rate law.





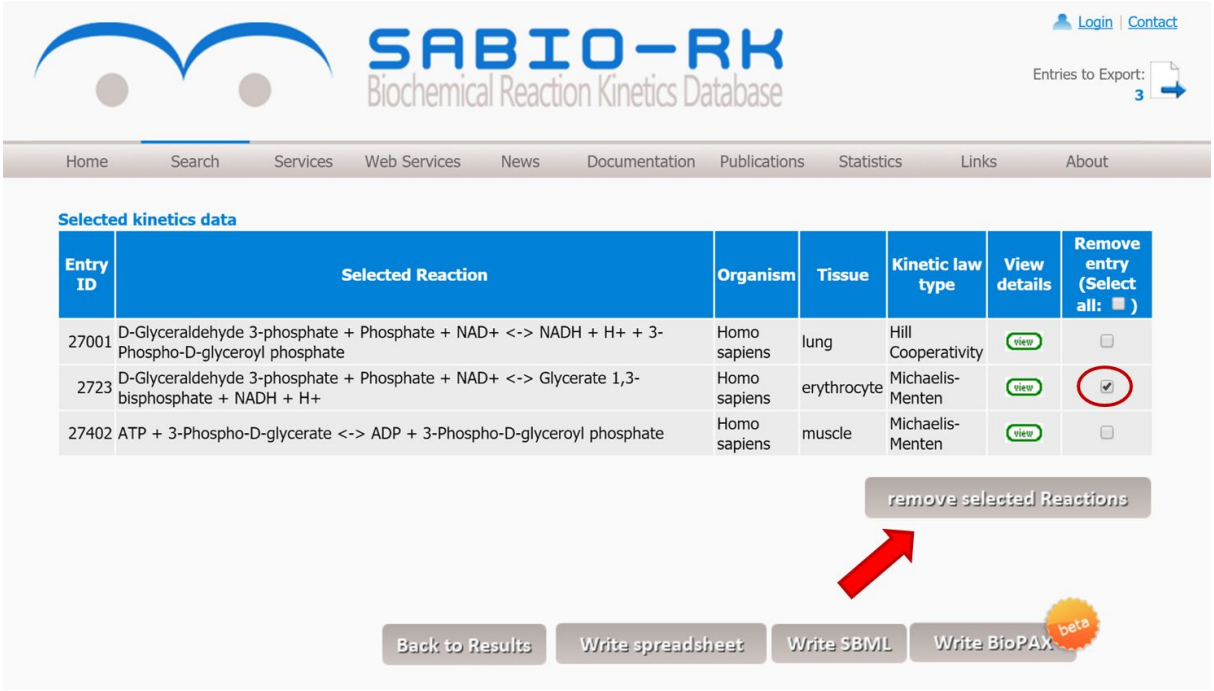
Data Export

To export data in SBML, BioPAX, or spreadsheet format entries can be selected either in the **Entry View** or **Reaction View** by clicking the checkbox at the end of each entry row in the overview table or by clicking the checkbox in the last column header to select all displayed entries per page.



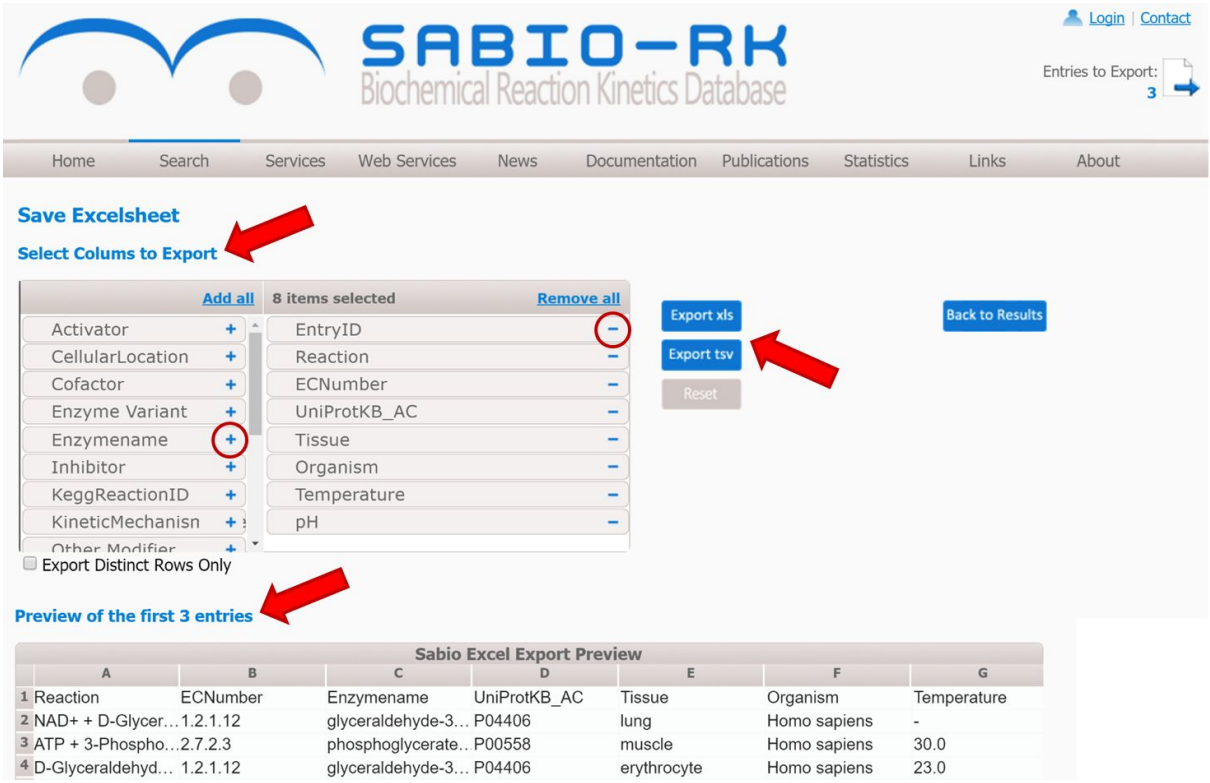
Kinetic data	Reaction	Enzyme			Tissue	Organism	Parameter (besides concentration)	Environment		Add to export cart?
		ECNumber	Protein	Variant				°C	pH	
▶	NAD+ + D-Glyceraldehyde 3-phosphate + Phosphate = NADH + H+ + 3-Phospho-D-glyceroyl phosphate	1.2.1.12	P04406	wildtype	lung	Homo sapiens	Hill coefficient S_half			☐
▶	NAD+ + D-Glyceraldehyde 3-phosphate + Phosphate = NADH + H+ + 3-Phospho-D-glyceroyl phosphate	1.2.1.12	P04406	wildtype	lung	Homo sapiens	Hill coefficient S_half			☑
▶	D-Glyceraldehyde 3-phosphate + Phosphate + NAD+ = H+ + NADH + Glycerate 1,3-bisphosphate	1.2.1.12	P04406	wildtype	erythrocyte	Homo sapiens	Kd Km Vmax	23.0	8.6	☑
▶	ATP + 3-Phospho-D-glycerate = ADP + 3-Phospho-D-glyceroyl phosphate	2.7.2.3	P00558	mutant	muscle	Homo sapiens	Km Vmax	30.0	7.6	☑

Selected entries are stored in the **Export Cart** (“Entries to Export”) and the total number of selected entries is given. By clicking on “Entries to Export” a table gives an overview about selected entries for export in SBML, BioPAX or spreadsheet format. Single entries can be removed afterwards from the export table by checking them and clicking on the remove button.



There are three different exports methods: Write spreadsheet, SBML, and BioPAX

Write spreadsheet allows to export the data in a table format (xls or tsv).



The user can choose which entry information should be exported by selecting the columns to be exported.

As a default choice 8 items are selected (right column) which can easily be removed by clicking on the minus. To include additional columns in the export table the appropriate items on the left side should be included by clicking on the plus.

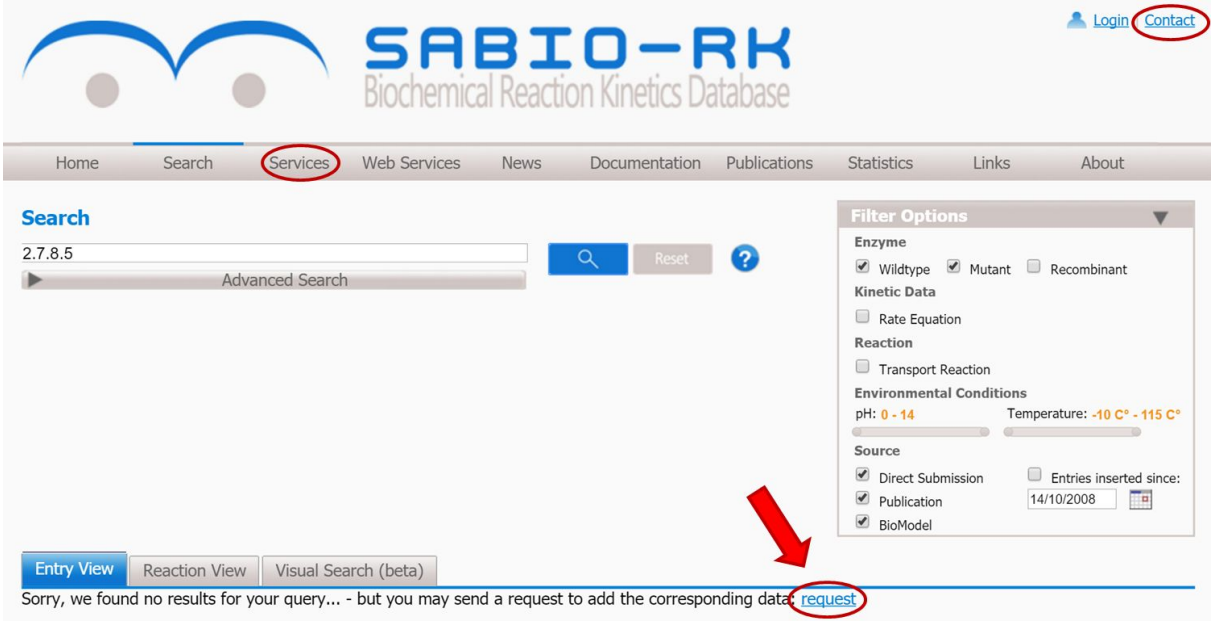
The order of the columns can easily be changed by shifting them up and down.

After finishing the selection and the order of the favoured columns, which are previewed for the first 3 entries, the Export xls or Export tsv button should be pressed to execute the export.

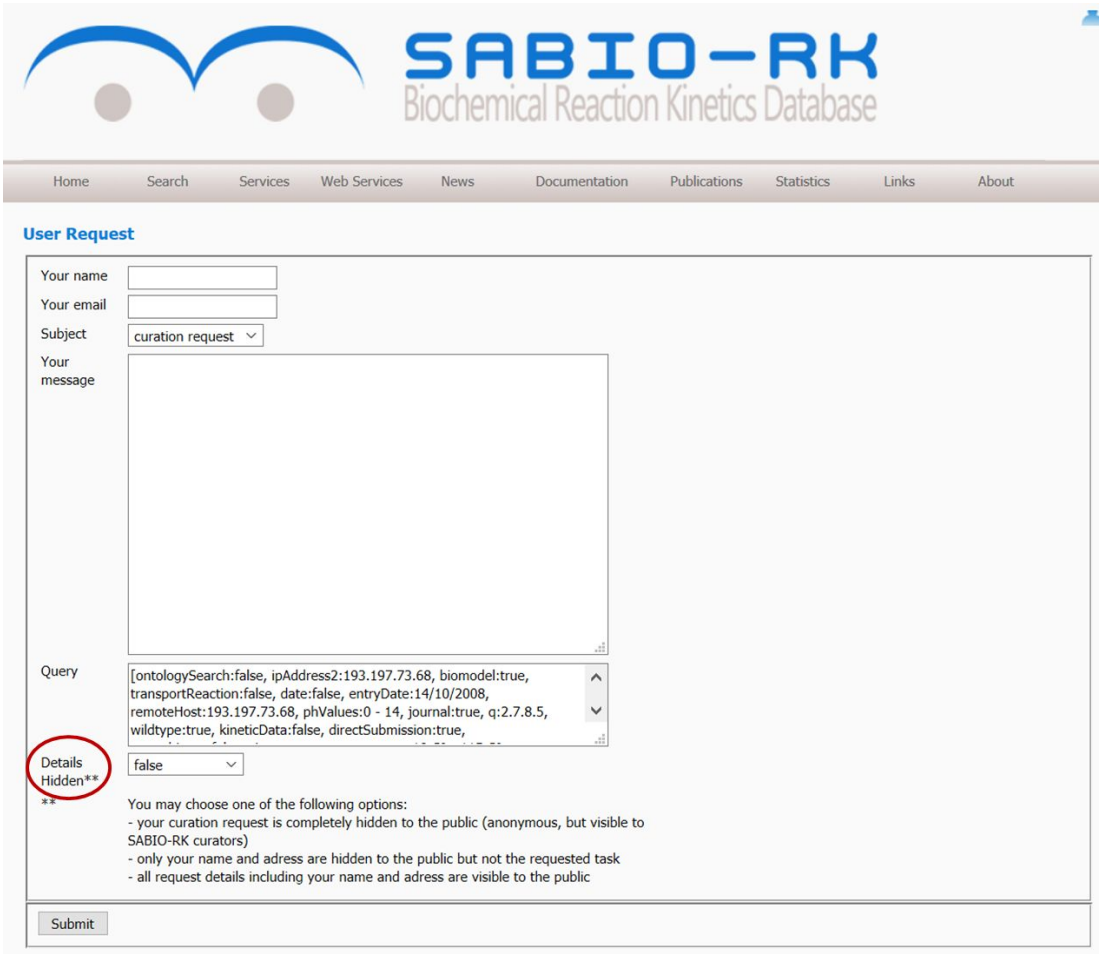
Write SBML allows to export the selected entries as a model in the Systems Biology Markup Language (SBML)-format or as pdf. Different SBML versions and annotation schema could be selected and a user-defined name could be given to the SBML file.

No Search Result

If the **Search** did not give any results, a link to a pre-filled request form is given (see below).

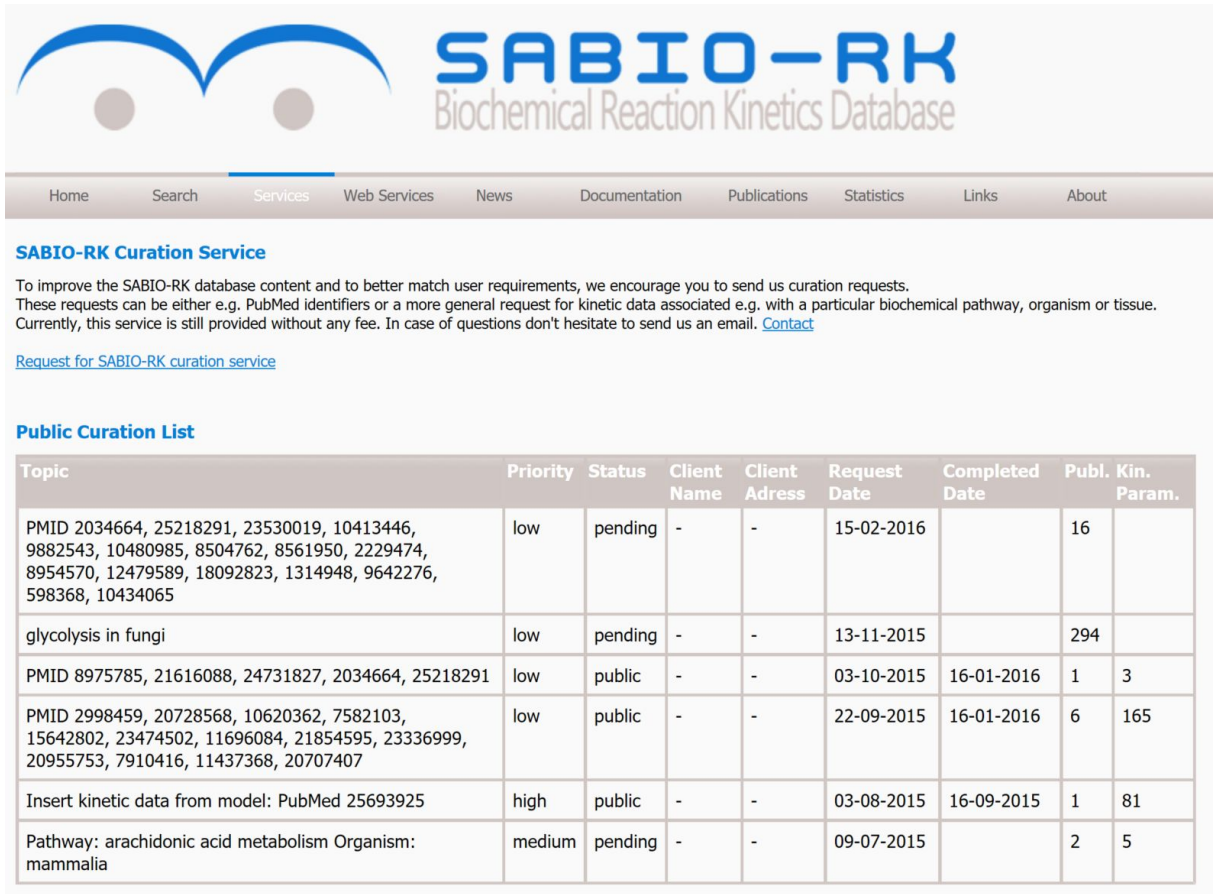


User feedback can also be given via the contact button or within Services as Request for SABIO-RK curation service. Any feedback is highly appreciated.



The search term is already filled in, so that the user can request, e.g., for the addition of special publications, pathways or kinetic data for the search term.

This request is for free, will be edited by a SABIO curator and shown subsequently in the Public Curation List, if the user allowed it by chosing false in the Details Hidden section.



SABIO-RK
Biochemical Reaction Kinetics Database

Home | Search | Services | Web Services | News | Documentation | Publications | Statistics | Links | About

SABIO-RK Curation Service

To improve the SABIO-RK database content and to better match user requirements, we encourage you to send us curation requests.
These requests can be either e.g. PubMed identifiers or a more general request for kinetic data associated e.g. with a particular biochemical pathway, organism or tissue.
Currently, this service is still provided without any fee. In case of questions don't hesitate to send us an email. Contact

Request for SABIO-RK curation service

Public Curation List

Topic	Priority	Status	Client Name	Client Adress	Request Date	Completed Date	Publ.	Kin. Param.
PMID 2034664, 25218291, 23530019, 10413446, 9882543, 10480985, 8504762, 8561950, 2229474, 8954570, 12479589, 18092823, 1314948, 9642276, 598368, 10434065	low	pending	-	-	15-02-2016		16	
glycolysis in fungi	low	pending	-	-	13-11-2015		294	
PMID 8975785, 21616088, 24731827, 2034664, 25218291	low	public	-	-	03-10-2015	16-01-2016	1	3
PMID 2998459, 20728568, 10620362, 7582103, 15642802, 23474502, 11696084, 21854595, 23336999, 20955753, 7910416, 11437368, 20707407	low	public	-	-	22-09-2015	16-01-2016	6	165
Insert kinetic data from model: PubMed 25693925	high	public	-	-	03-08-2015	16-09-2015	1	81
Pathway: arachidonic acid metabolism Organism: mammalia	medium	pending	-	-	09-07-2015		2	5