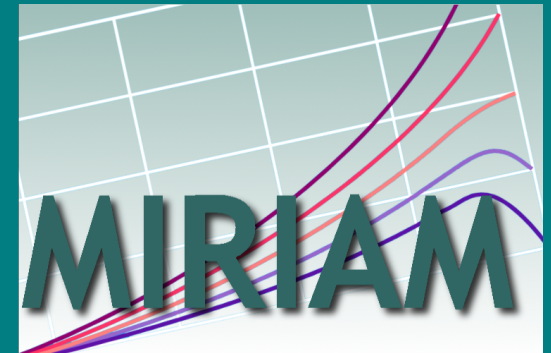
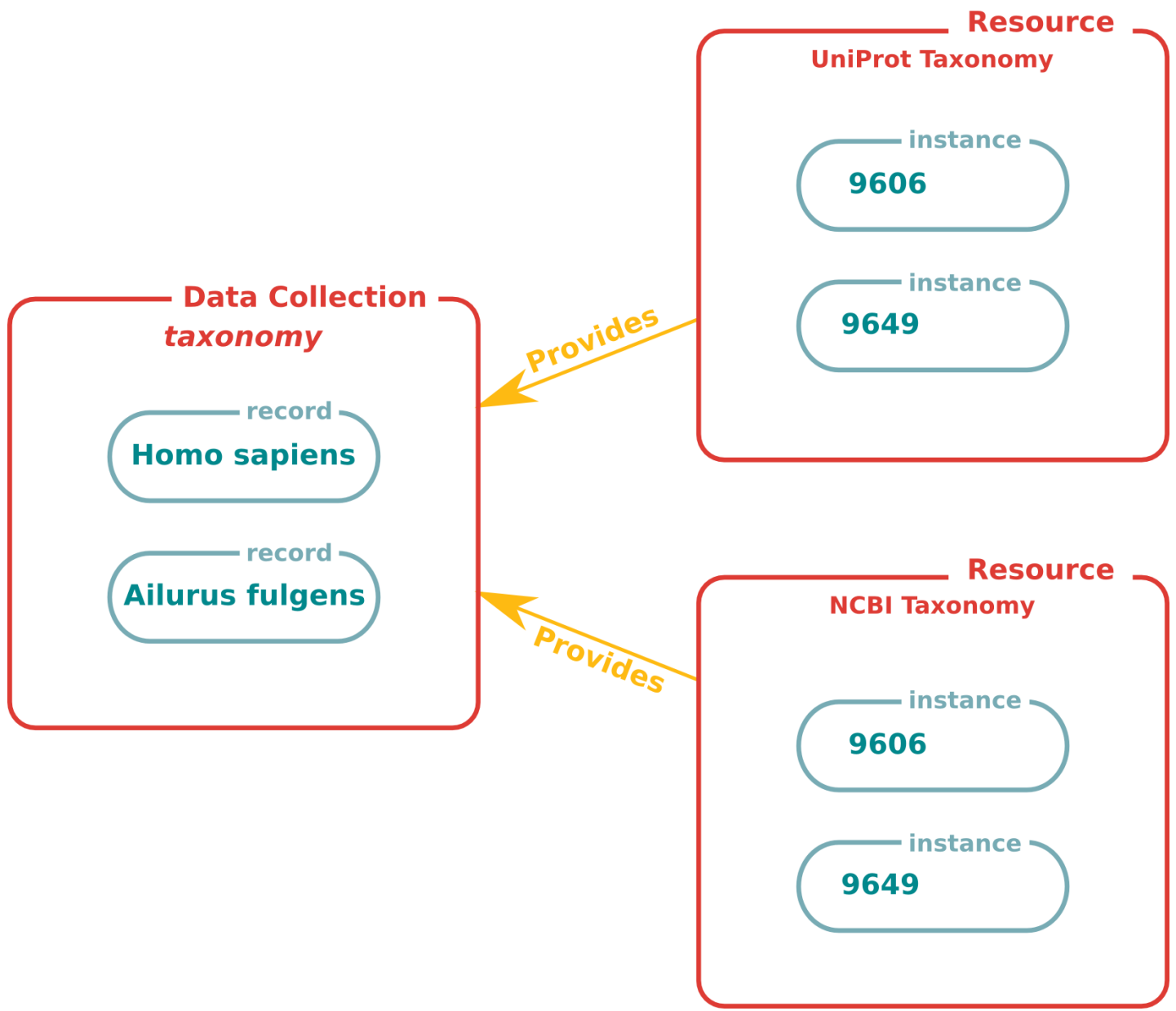


# Identifiers.org and MIRIAM Registry: perennial identifiers for cross-referencing purposes

Camille Laibe  
BioModels.net



Nature Precedings : doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011



**Cross-references** allow the **unambiguous identification** of:

- physical entities (records in a database)
  - molecular entities
  - diseases
  - clinical trials
  - ...
- information artefacts
  - ontological terms
  - scientific publications
  - books
  - ...
- ...



**Cross-references** allow the **unambiguous identification** of:

- physical entities (records in a database)
  - molecular entities
  - diseases
  - clinical trials
  - ...
- information artefacts
  - ontological terms
  - scientific publications
  - books
  - ...
- ...

**→ any concept really!**



**Cross-references**, and generally **metadata**, are essential for:

- **understanding** data
- **reusing** data
- **comparing** data
- **integrating** data
- **converting** data
- providing efficient **search** strategies
- ...



**Cross-references**, and generally **metadata**, are essential for:

- **understanding** data
- **reusing** data
- **comparing** data
- **integrating** data
- **converting** data
- providing efficient **search** strategies
- ...

**→ true for any kind of data!**



NP\_012345

E-MEXP-1712

BIOMD0000000048

2018

PMID:16333295

978-1584885658

ENSG00000139618

WBGene000000001

CHEBI:36927

P62158

10.1038/nbt1156

000057272

REACT\_1590

GO:0006915

0807.4956v1

EBI-2307691





NP\_012345

E-MEXP-1712

BIOMD00000000048

2018

PMID:16333295

978-1584885658

**but...**

ENSG00000139618

WBGene000000001

CHEBI:36927

P62158

10.1038/nbt1156

000057272

REACT\_1590

GO:0006915

0807.4956v1

EBI-2307691





603903





■ **ambiguous**

**603903**

**In PubMed:**

*Specification of angulated projections in coronary arteriography*

**In OMIM:**

*Sickle cell anemia*

**In PubChem Compound:**

*3-([2-(4-Bromophenyl)-2-oxoethyl]sulfonyl)-6-methyl-1,2,4-triazin-5(4H)-one*

...





- **ambiguous**

603903

**In PubMed:**

*Specification of angulated projections in coronary arteriography*

**In OMIM:**

What is “603903”?

**In PubChem Compound:**

*3- ([2- (4-Bromophenyl) -2-oxoethyl]sulfonyl) -6-methyl-1,2,4-triazin-5(4H)-one*

...



- **inconsistent**

SWISS-PROT:P23222

Swiss-Prot:P23222

UniProt:P23222

UniProtKB:P23222

UniProtKB/Swiss-Prot:P23222

DBREF 1XJ4 A 151 269 UNP P23222 [...]





- **inconsistent**

SWISS-PROT:P23222

Swiss-Prot:P23222

Are those  
identifying the  
same thing?

UniProtKB/Swiss-Prot:P23222

DBREF 1XJ4 A 151 269 UNP P23222 [...]



- **not perennial**



[http://www.ebi.ac.uk/citexplore/citationDetails.do  
?dataSource=MED&externalId=16333295](http://www.ebi.ac.uk/citexplore/citationDetails.do?dataSource=MED&externalId=16333295)



<http://www.ncbi.nlm.nih.gov/pubmed/16333295>



<http://www.hubmed.org/display.cgi?uids=16333295>



[http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+  
MedlineFull+\[medline-PMID:16333295\]](http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+MedlineFull+[medline-PMID:16333295])





■ **not perennial**



[http://www.ebi.ac.uk/citexplore/citationDetails.do  
?dataSource=MED&externalId=16333295](http://www.ebi.ac.uk/citexplore/citationDetails.do?dataSource=MED&externalId=16333295)



<http://www.ncbi.nlm.nih.gov/pubmed/16333295>



<http://www.pubmed.org/display.cgi?uids=16333295>



<http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+>



[MedlineFull+ \[medline-PMID:16333295\]](#)

Will those still be  
valid in three  
months?



- **not perennial**
- **location dependent**



[http://www.ebi.ac.uk/citexplore/citationDetails.do  
?dataSource=MED&externalId=16333295](http://www.ebi.ac.uk/citexplore/citationDetails.do?dataSource=MED&externalId=16333295)



<http://www.ncbi.nlm.nih.gov/pubmed/16333295>



<http://www.hubmed.org/display.cgi?uids=16333295>



[http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+  
MedlineFull+\[medline-PMID:16333295\]](http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+MedlineFull+[medline-PMID:16333295])





- **not perennial**
- **location dependent**



<http://www.ebi.ac.uk/citexplore/citationDetails.do?dataSource=MED&externalId=16333295>



<http://www.ncbi.nlm.nih.gov/pubmed/16333295>



<http://www.hubmed.org/display.cgi?uids=16333295>



<http://srs.ebi.ac.uk/srsbin/cgi-bin/wgetz?-view+>

MedlineFull+ [medline-PMID:16333295]

Are all those  
referring to the  
same data record?

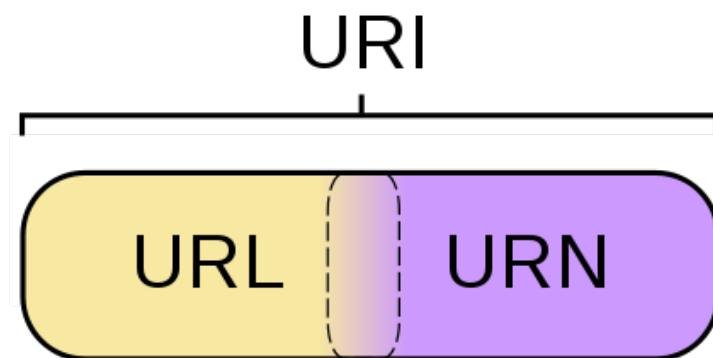


- ambiguous
- inconsistent
- not perennial
- location dependent
- **not standard compliant**
- **non resolvable**
- **non free to use**





A **Uniform Resource Identifier** (URI) is a string of characters used to **identify** a resource.



- **Uniform Resource Name** (URN)  
identifies a resource but does not imply its availability
- **Uniform Resource Locator** (URL)  
specifies where a resource is available on the Internet



- <http://www.ebi.ac.uk/>
- [http://en.wikipedia.org/wiki/Uniform\\_Resource\\_Identifier](http://en.wikipedia.org/wiki/Uniform_Resource_Identifier)
- <https://www.ebi.ac.uk/chembl/db/>
- <ftp://public.ftp-servers.example.com/mydirectory/myfile.txt>
- <ftp://ftp.uniprot.org/pub/databases/uniprot/uniref/>
- <urn:ietf:rfc:2648>
- <file:///home/username/presentation.pdf>
- ...



## Namespace

Identifies a data collection

## Entity identifier

Identifies a data entry within the data collection





## Namespace

Identifies a data collection

from a shared list of  
*namespaces*

## Entity identifier

Identifies a data entry within the data collection

provided by the data collection

unique within the data collection

format defined by the data collection





## Namespace

Identifies a data collection

## Entity identifier

Identifies a data entry within the data collection

Human calmodulin: P62158 in UniProt

↳ urn:miriam:uniprot:P62158

Alcohol dehydrogenase: 1.1.1.1 in EC code

↳ urn:miriam:ec-code:1.1.1.1

Activation of MAPKK activity: GO:0000186 in Gene Ontology

↳ urn:miriam:obo.go:GO%3A0000186





## Namespace

Identifies a data collection

## Entity identifier

Identifies a data entry within the data collection

Human calmodulin: P62158 in UniProt

↳ urn:miriam:uniprot:P62158

↳ <http://identifiers.org/uniprot/P62158>

Alcohol dehydrogenase: 1.1.1.1 in EC code

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↳ <http://identifiers.org/ec-code/1.1.1.1>

Activation of MAPKK activity: GO:0000186 in Gene Ontology

↳ urn:miriam:obo.go:GO%3A0000186

↳ <http://identifiers.org/obo.go/GO:0000186>





MIRIAM URNs is a well established identification system.

**So, why introducing URLs?**



The Semantic Web provides a **common framework** that allows **data** to be **shared** and **reused** across application, enterprise, and community boundaries.

Goal: allows **machines** to understand the **semantics**, or meaning, of information on the **World Wide Web**.

Collaborative effort led by **W3C** with participation from a large number of researchers and industrial partners.





Set of technologies helping to link data of different natures and different locations in a meaningful way:

- **Uniform Resource Identifiers** (URIs) to unambiguously identify pieces of data
- **Controlled vocabularies** to characterise the relationships between data entity (SKOS, RDFs, ontologies)
- Syntaxes to encode the **relationships** between data entity (RDF)
- **Query** languages, to retrieve information encoded using semantic web technologies (SPARQL)





Information stored as **triples**:

Nature Precedings : doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011

**Subject**

EGFR

P00533

(UniProt)

<http://identifiers.org/uniprot/P00533>

**Predicate**

*located\_in*

OBO\_REL:0000008

(OBO Relation ontology)

[http://identifiers.org/obo.ro/OBO\\_REL:0000008](http://identifiers.org/obo.ro/OBO_REL:0000008)

**Object**

plasma membrane

GO:0005886

(Gene Ontology)

<http://identifiers.org/obo.go/GO:0005886>





## Linked Data

“The Semantic Web isn't just about putting data on the web. It is about **making links**, so that a person or machine can explore the web of data.”

*Tim Berners-Lee*

- Use URIs as names for things

- Use **HTTP URIs** so that people can look up those names.

- When someone looks up a URI, provide useful information, using the standards (RDF, SPARQL)

- Include links to other URIs. so that they can discover more things.

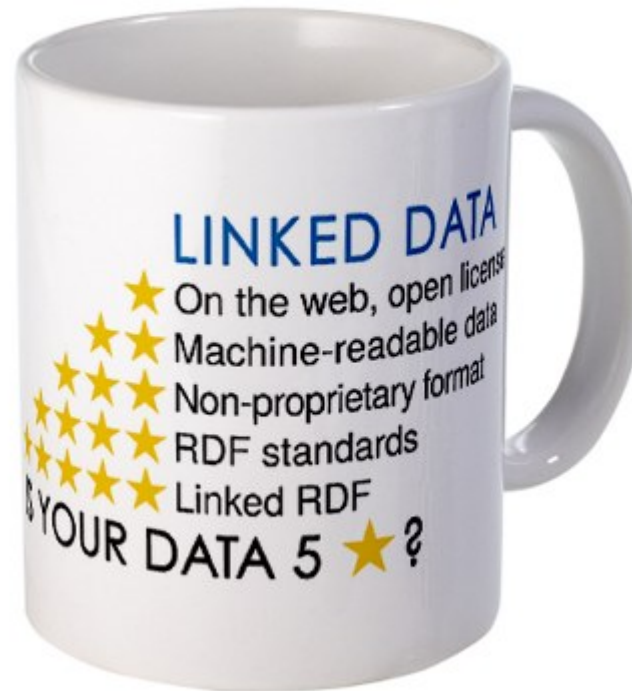


## Linked Data

“The Semantic Web isn't just about putting data on the web. It is about **making links**, so that a person or machine can explore the web of data.”

*Tim Berners-Lee*

- Use URIs as names for
- Use **HTTP URIs** so that
- When someone looks at
- standards (RDF, SPARQL)
- Include links to other



names.

formation, using the

over more things.













all MIRIAM URNs remain **valid identifiers**

support of MIRIAM URNs will continue

new developments are encouraged to use Identifiers.org URLs  
(as it only provides advantages over the URNs)

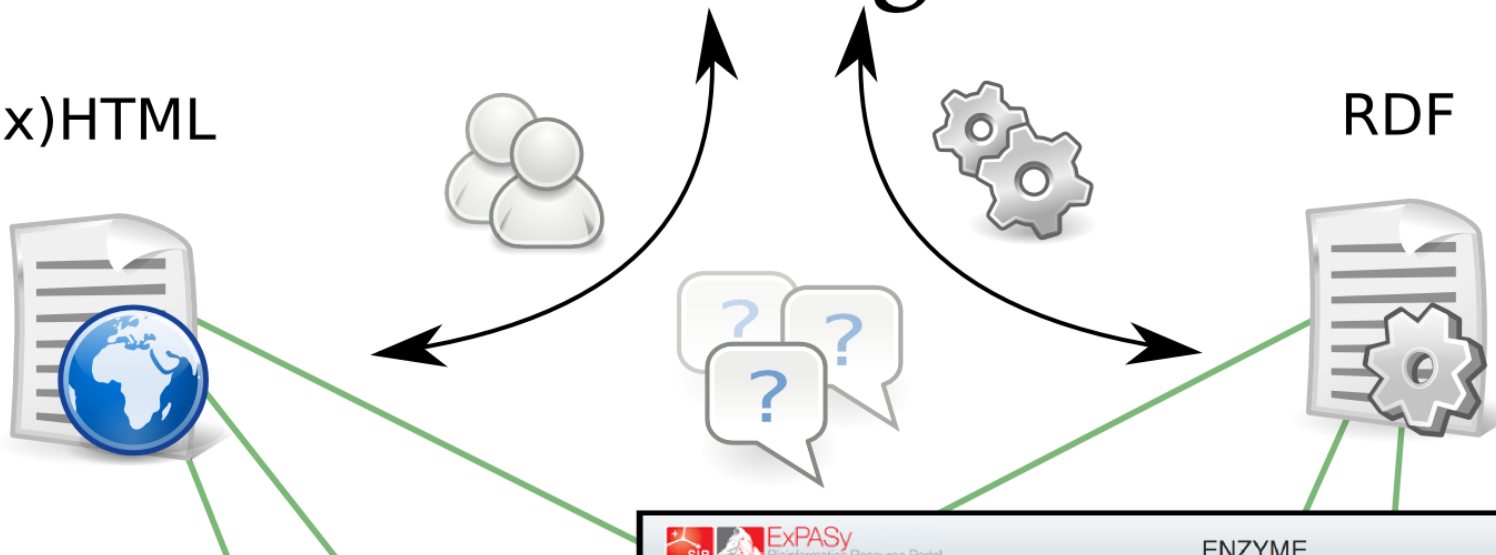
services are provided to convert from one form into the other



# http://identifiers.org/ec-code/1.1.1.1

(x)HTML

RDF




Nature Precedings: doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011



ENZYME: 1.1.1.1


Entry Name	EC 1.1.1.1	Enzyme
Class	Oxidoreductases; Acting on the CH-OH Group of Donors With NAD+ or NADP+	
Sysname	alcohol:NAD+ oxidoreductase	
Reaction(IUBMB)	(1) a primary alcohol + NAD+ → an aldehyde or ketone + NADH + H+	
Reaction(KEGG)	R07326 > R00623 R00624 > R06927 R08281 R083	


ENZYME
Home | Contact

---

ENZYME entry: EC 1.1.1.1

	Accepted Name
	Alcohol dehydrogenase.
	Alternative Name(s)
	Aldehyde reductase.
	Reaction catalysed
An alcohol + NAD(+) <=> an aldehyde or ketone + NADH	



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[EC 1 - Oxidoreductases](#)

[EC 1.1 - Acting on the CH-OH Group of Donors](#)

[EC 1.1.1 - With NAD\\* or NADP\\* as acceptor](#)

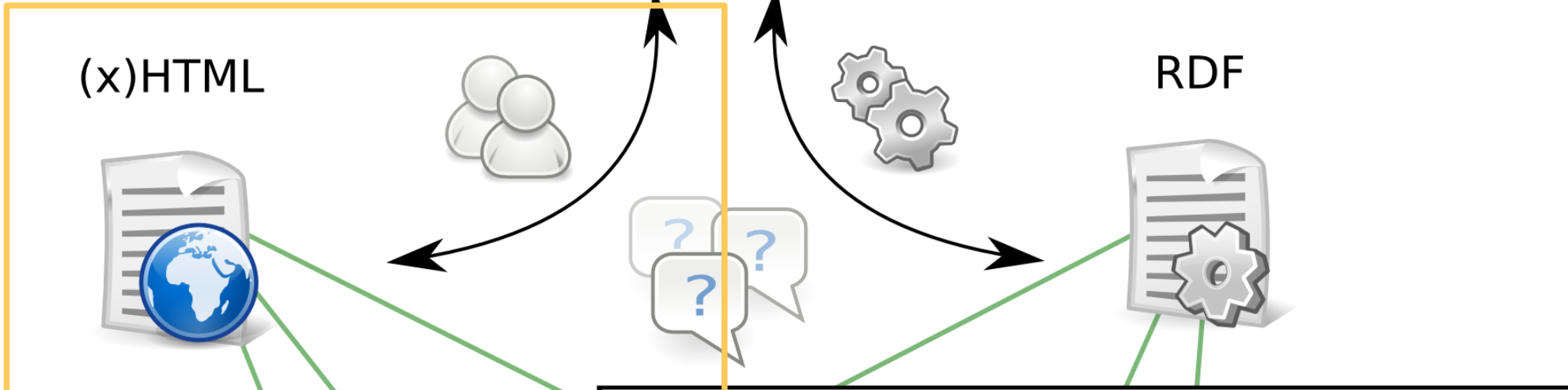
**EC 1.1.1.1 - Alcohol dehydrogenase**

IntEnz view
ENZYME view

XML

IntEnz Enzyme Nomenclature  
EC 1.1.1.1

# http://identifiers.org/ec-code/1.1.1.1



Nature Precedings doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011

**ENZYME: 1.1.1.1**

<b>Entry</b>	EC 1.1.1.1	Enzyme
<b>Name</b>	alcohol dehydrogenase; aldehyde reductase; ADH; alcohol dehydrogenase (NAD); aliphatic alcohol dehydrogenase; ethanol dehydrogenase; NAD-dependent alcohol dehydrogenase; NAD-specific aromatic alcohol dehydrogenase; NADH-alcohol dehydrogenase; NADH-aldehyde dehydrogenase; primary alcohol dehydrogenase; yeast alcohol dehydrogenase	
<b>Class</b>	Oxidoreductases; Acting on the CH-OH Group of Donors With NAD+ or NADP+	
<b>Sysname</b>	alcohol:NAD+ oxidoreductase	
<b>Reaction(IUBMB)</b>	(1) a primary alcohol + NAD(+) <=> an aldehyde or ketone + NADH (2) a secondary alcohol + NAD(+) <=> a ketone + NADH	
<b>Reaction(KEGG)</b>	R07326 > R00623 R00624 > R06927 R08281 R083	

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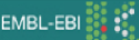
**ENZYME entry: EC 1.1.1.1**



**Accepted Name**  
Alcohol dehydrogenase.

**Alternative Name(s)**  
Aldehyde reductase.

**Reaction catalysed**  
An alcohol + NAD(+) <=> an aldehyde or ketone + NADH

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[EC 1.1 - Acting on the CH-OH Group of Donors](#)


[EC 1.1.1 - With NAD\\* or NADP\\* as acceptor](#)

**EC 1.1.1.1 - Alcohol dehydrogenase**

[XML](#)

**IntEnz Enzyme Nomenclature**  
**EC 1.1.1.1**





<http://identifiers.org/ec-code/1.1.1.1>

*beta*

3 physical locations (or resources) are available for accessing 1.1.1.1 (from [Enzyme Nomenclature](#)):

**Enzyme nomenclature database, ExPASy  
(Expert Protein Analysis System)**

Swiss Institute of Bioinformatics

*Switzerland*

(Uptime: 99%)

**KEGG Ligand Database for Enzyme  
Nomenclature**

Kyoto University Bioinformatics Center

*Japan*

(Uptime: 100%)

**IntEnZ (Integrated relational Enzyme  
database)**

European Bioinformatics Institute

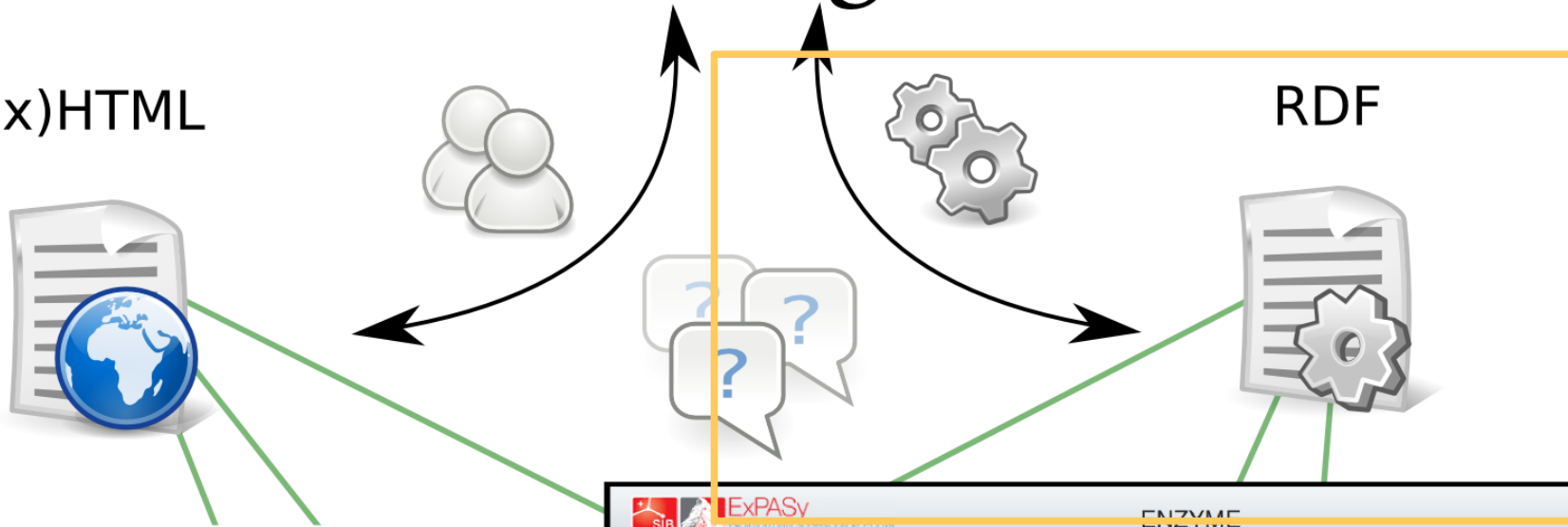
*United Kingdom*

(Uptime: 100%)

# http://identifiers.org/ec-code/1.1.1.1

(x)HTML

RDF



Nature Precedings: doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011



ENZYME: 1.1.1.1

Entry	EC 1.1.1.1	Enzyme
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Class	Oxidoreductases; Acting on the CH-OH Group of Donors With NAD+ or NADP+	
Sysname	alcohol:NAD+ oxidoreductase	
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Reaction(KEGG)	R07326 > R00623 R00624 R06927 R08281 R0831	

Home | Contact

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---

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[EC 1.1 - Acting on the CH-OH Group of Donors](#)

[EC 1.1.1 - With NAD+ or NADP+ as acceptor](#)

**EC 1.1.1.1 - Alcohol dehydrogenase**

IntEnz Enzyme Nomenclature  
EC 1.1.1.1

[XML](#)





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  - [News](#)
  - [BioModels.net](#)
  - [Qualifiers](#)

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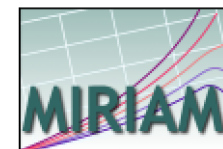
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## MIRIAM Registry

**MIRIAM Registry** are a set of online services created in support of [MIRIAM](#), a set of guidelines for the annotation and curation of computational models.

The core of *MIRIAM Registry* is a catalogue of data types (namespaces corresponding to controlled vocabularies or databases), their [URIs](#) and the corresponding physical [URLs](#) or resources. Access to this data is made available via exports ([XML](#)) and Web Services ([SOAP](#)).

*MIRIAM Registry* is developed and maintained under the [BioModels.net](#) initiative, and are free for use by all.



### Quick links

#### Browse

- [by data type name](#)
- [by tags](#)

#### Web Services

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- [usage of the services](#)
- [online demonstration](#)

#### Search

- [generic search](#)

#### Exports

- [XML](#)

<http://www.ebi.ac.uk/miriam/>







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Name	Namespace	Definition
<a href="#">Protein Model Database</a>	pmdb	The Protein Model DataBase (PMDb), is a database that collects manually built three dimensional protein models, obtained by different structure prediction techniques.
<a href="#">MIRIAM Registry collection</a>	miriam.collection	MIRIAM Registry is an online resource created to catalogue collections (Gene Ontology, Taxonomy or PubMed are some examples), their URIs and the corresponding resources (physical locations), whether these are controlled vocabularies or databases.
<a href="#">TEDDY</a>	biomodels.teddy	The Terminology for Description of Dynamics (TEDDY) is an ontology for dynamical behaviours, observable dynamical phenomena, and control elements of bio-models and biological systems in Systems Biology and Synthetic Biology.
<a href="#">UniProt</a>	uniprot	UniProt (Universal Protein Resource) is the world's most comprehensive catalog of information on proteins. It is a central repository of protein sequence and function created by joining the information contained in Swiss-Prot, TrEMBL, and PIR.
<a href="#">PubChem-substance</a>	pubchem.substance	PubChem provides information on the biological activities of small molecules. It is a component of NIH's Molecular Libraries Roadmap Initiative. PubChem Substance archives chemical substance records.
<a href="#">EDAM Ontology</a>	edam	EDAM is an ontology of general bioinformatics concepts, including topics, data types, formats, identifiers and operations. EDAM provides a controlled vocabulary for the description, in semantic terms, of things such as: web services (e.g. WSDL files), applications, tool collections and packages, work-benches and workflow software, databases and ontologies, XSD data schema and data objects, data syntax and file formats, web portals and pages, resource catalogues and documents (such as scientific publications).
<a href="#">Ontology for Biomedical Investigations</a>	obo.obo	The Ontology for Biomedical Investigations (OBI) project is developing an integrated ontology for the description of biological and clinical investigations. The ontology will represent the design of an investigation, the protocols and instrumentation used, the material used, the data generated and the type analysis performed on it. Currently OBI is being built under the Basic Formal Ontology (BFO).
<a href="#">MACiE</a>	macie	MACiE (Mechanism, Annotation and Classification in Enzymes) is a database of enzyme reaction mechanisms. Each entry in MACiE consists of an overall reaction describing the chemical compounds involved, as well as the species name in which the reaction occurs. The individual reaction stages for each overall reaction are listed with mechanisms, alternative mechanisms, and amino acids involved.
<a href="#">FMA</a>	obo.fma	The Foundational Model of Anatomy Ontology (FMA) is a biomedical informatics ontology. It is concerned with the representation of classes or types and relationships necessary for the symbolic representation of the anatomical structure of the human body. Specifically, the FMA is a domain ontology that represents a coherent



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<a href="#">TEDDY</a>	biomodels.teddy	The Terminology for Description of Dynamics (TEDDY) is an ontology for dynamical behaviours, observable dynamical phenomena, and control elements of bio-models and biological systems in Systems Biology and Synthetic Biology.
<a href="#">UniProt</a>	uniprot	UniProt (Universal Protein Resource) is the world's most comprehensive catalog of information on proteins. It is a central repository of protein sequence and function created by joining the information contained in Swiss-Prot, TrEMBL, and PIR.
<a href="#">PubChem-substance</a>	pubchem.substance	PubChem provides information on the biological activities of small molecules. It is a component of NIH's Molecular Libraries Roadmap Initiative. PubChem Substance archives chemical substance records.
<a href="#">EDAM Ontology</a>	edam	EDAM is an ontology of general bioinformatics concepts, including topics, data types, formats, identifiers and operations. EDAM provides a controlled vocabulary for the description, in semantic terms, of things such as: web services (e.g. WSDL files), applications, tool collections and packages, work-benches and workflow software, databases and ontologies, XSD data schema and data objects, data syntax and file formats, web portals and pages, resource catalogues and documents (such as scientific publications).
<a href="#">Ontology for Biomedical Investigations</a>	obo.obo	The Ontology for Biomedical Investigations (OBI) project is developing an integrated ontology for the description of biological and clinical investigations. The ontology will represent the design of an investigation, the protocols and instrumentation used, the material used, the data generated and the type analysis performed on it. Currently OBI is being built under the Basic Formal Ontology (BFO).
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## Physical Locations


<b>Resource</b> <u>MIR:00100002</u>	<b>Access URL</b>	<a href="http://www.genome.jp/dbget-bin/www_bget?ec:\$id">http://www.genome.jp/dbget-bin/www_bget?ec:\$id</a> [Example: <a href="http://www.genome.jp/dbget-bin/www_bget?ec:1.1.1.1">1.1.1.1</a> 
	<b>Website</b>	<a href="http://www.genome.jp/dbget-bin/www_bfind?enzyme">http://www.genome.jp/dbget-bin/www_bfind?enzyme</a>
	<b>Description</b>	KEGG Ligand Database for Enzyme Nomenclature
	<b>Institution</b>	Kyoto University Bioinformatics Center, Japan
<b>Resource</b> <u>MIR:00100003</u>	<b>Access URL</b>	<a href="http://enzyme.expasy.org/EC/\$id">http://enzyme.expasy.org/EC/\$id</a> [Example: <a href="http://enzyme.expasy.org/EC/1.1.1.1">1.1.1.1</a> 
	<b>Website</b>	<a href="http://enzyme.expasy.org/">http://enzyme.expasy.org/</a>
	<b>Description</b>	Enzyme nomenclature database, ExPASy (Expert Protein Analysis System)
	<b>Institution</b>	Swiss Institute of Bioinformatics, Switzerland
<b>Resource</b> <u>MIR:00100001</u>	<b>Access URL</b>	<a href="http://www.ebi.ac.uk/intenz/query?cmd=SearchEC&amp;ec=\$id">http://www.ebi.ac.uk/intenz/query?cmd=SearchEC&amp;ec=\$id</a> [Example: <a href="http://www.ebi.ac.uk/intenz/query?cmd=SearchEC&amp;ec:1.1.1.1">1.1.1.1</a> 
	<b>Website</b>	<a href="http://www.ebi.ac.uk/intenz/">http://www.ebi.ac.uk/intenz/</a>
	<b>Description</b>	IntEnZ (Integrated relational Enzyme database)
	<b>Institution</b>	European Bioinformatics Institute, United Kingdom



Resource: **MIR:00100042**camille | [My Account](#) | [Sign Out](#)

**WARNING! This resource has been deprecated!**  
 Please use [the other resources providing the same dataset.](#)

General information about the resource: **WormBase Mirror at Marseille-Nice Genopole** (associated with the data type: [WormBase](#)).

Health statistics	
Last known state	down
Last check	2010-09-15 09:11:48
Uptime ratio	43% (245 checks)
Downtime ratio	56% (318 checks)
Unknown ratio	0% (0 checks)
URL used	<a href="http://crfb-3.univ-mrs.fr/db/gene/gene?name=WBGene00000001;class=Gene">http://crfb-3.univ-mrs.fr/db/gene/gene?name=WBGene00000001;class=Gene</a> 

### Health history

Full record of the health checks performed on this resource.


#### 2010

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
January	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
February	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
March	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
April	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
May	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
June	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up
July	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up	up



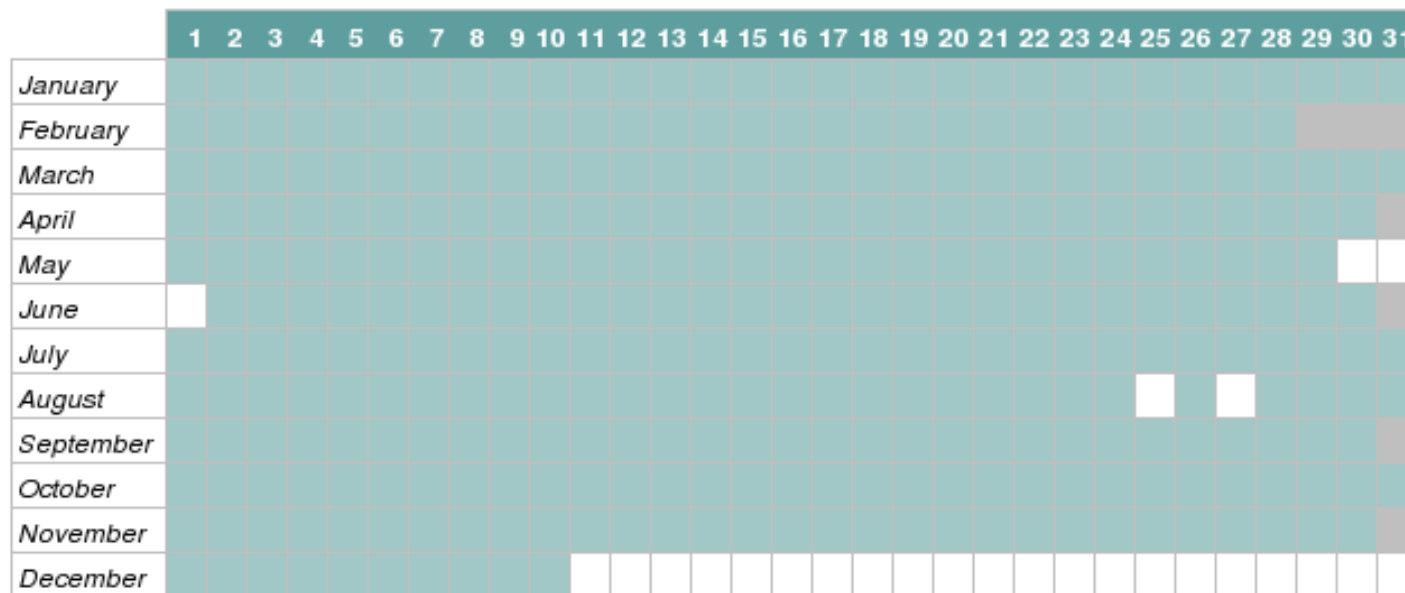
**Resource: MIR :00100050**

General information about the resource: **The FlyBase Database** (associated with the data type: [FlyBase](#)).

Health statistics	
Last known state	up
Last check	2010-12-10 06:31:44
Uptime ratio	100% (656 checks)
Downtime ratio	0% (0 checks)
Unknown ratio	0% (0 checks)
URL used	<a href="http://www.flybase.org/reports/FBgn0011293.html">http://www.flybase.org/reports/FBgn0011293.html</a> 

**Health history**

Full record of the health checks performed on this resource.

**2010**

## Submit a new data collection


Please fill this form in order to submit a new data type to MIRIAM Registry. Alternatively, you can [contact us](#) with your query.

You **do not** need to fill all the fields, you can just enter the information you have.

The new data type will not be directly publicly available after you pressed the **Submit** button. A curator will first check if it complies with the terms and conditions of MIRIAM Registry and, if necessary, correct and complete it before publishing it.

### Help

You can display all help bubbles by clicking on: [Displays all the help messages](#), or hide them: [Hides all the help messages](#).

Moreover, you can display the individual help by clicking on the button:  located in the title of each section.

## Information about the new data type

First you need to enter the name of the data type you want to add to the database. After you can add as much synonyms as you want.

### Name and synonyms

Primary name:

[\[Add a synonym\]](#)

Here is some information about the data type: definition and regular expression (*i.e.* pattern for identifiers of elements, following the PERL style).

### Definition and pattern

Definition:

Enter definition here...

Enter Identifier pattern here...



## Submit a new data collection


Please fill this form in order to submit a new data type to MIRIAM Registry. Alternatively, you can [contact us](#) with your query.

You **do not** need to fill all the fields, you can just enter the information you have.

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Name and synonyms 

Primary name:

[\[Add a synonym\]](#)

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Definition:

Enter definition here...

Enter Identifier pattern here...





[Browse the data types \(PENDING\)](#)[camille](#) | [My Account](#) | [Sign Out](#)[Submitted](#) | [Curation](#) | [Published](#) | [Pending](#) | [Canceled](#) | [All](#)

Brief overview of the data types:

	Name	Definition	Submission date	State	Action
<input type="checkbox"/>	<a href="#">CABRI</a>	CABRI (Common Access to Biotechnological Resources and Information) is an online service where users can search a number of European Biological Resour [...]	14 Nov 2008 11:55:59 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">ENCODE</a>	The Encyclopedia Of DNA Elements (ENCODE) Project aims to identify all functional elements in the human genome. The pilot phase is for comparison of e [...]	26 Nov 2008 12:46:55 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">HUGE</a>	The Human Unidentified Gene-Encoded (HUGE) protein database contains results from sequence analysis of human novel large (>4 kb) cDNAs identified [...]	26 Nov 2008 16:31:34 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">STRING</a>	STRING (Search Tool for Retrieval of Interacting Genes/Proteins) is a database of known and predicted protein interactions. The interactions include [...]	20 May 2009 13:52:22 BST	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">STITCH</a>	STITCH is a resource to explore known and predicted interactions of chemicals and proteins. Chemicals are linked to other chemicals and proteins by ev [...]	20 May 2009 13:54:39 BST	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">Phenol-Explorer</a>	Phenol-Explorer is an electronic database on polyphenol content in foods. Polyphenols form a wide group of natural antioxidants present in a large num [...]	15 Jan 2010 16:09:00 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">FooDB</a>	FooDB is a comprehensive database providing information on 1932 food components (eventually ~3500).	15 Jan 2010 16:20:24 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">UniGene</a>	A UniGene entry is a set of transcript sequences that appear to come from the same transcription locus (gene or expressed pseudogene), together with i [...]	21 Jan 2010 12:09:58 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">MeSH</a>	MeSH (Medical Subject Headings) is the National Library of Medicine's controlled vocabulary thesaurus. It consists of sets of terms naming descriptors [...]	08 Feb 2010 14:31:54 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">Japan Chemical Substance Dictionary</a>	The Japan Chemical Substance Dictionary is an organic compound dictionary database prepared by the Japan Science and Technology Agency (JST).	19 Feb 2010 13:01:39 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">MassBank</a>	A federated database of reference spectra from different instruments, including high-resolution mass spectra of metabolites.	06 Dec 2010 11:28:06 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">Golm Metabolome Database</a>	GMD provides public access to custom mass spectral libraries, metabolite profiling experiments as well as additional information and tools, e.g. with [...]	07 Dec 2010 16:33:50 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">HomoloGene</a>	HomoloGene is a system for automated detection of homologs among the annotated genes of several completely sequenced eukaryotic genomes.	24 Jan 2011 13:16:44 GMT	Pending	<a href="#">Publish it!</a>
<input type="checkbox"/>	<a href="#">IUPHAR</a>	The IUPHAR Compendium details the molecular, biophysical and pharmacological properties of identified mammalian sodium, calcium and potassium channels [...]	08 Jun 2011 16:21:36 BST	Pending	<a href="#">Publish it!</a>

Nature Precedings : doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011

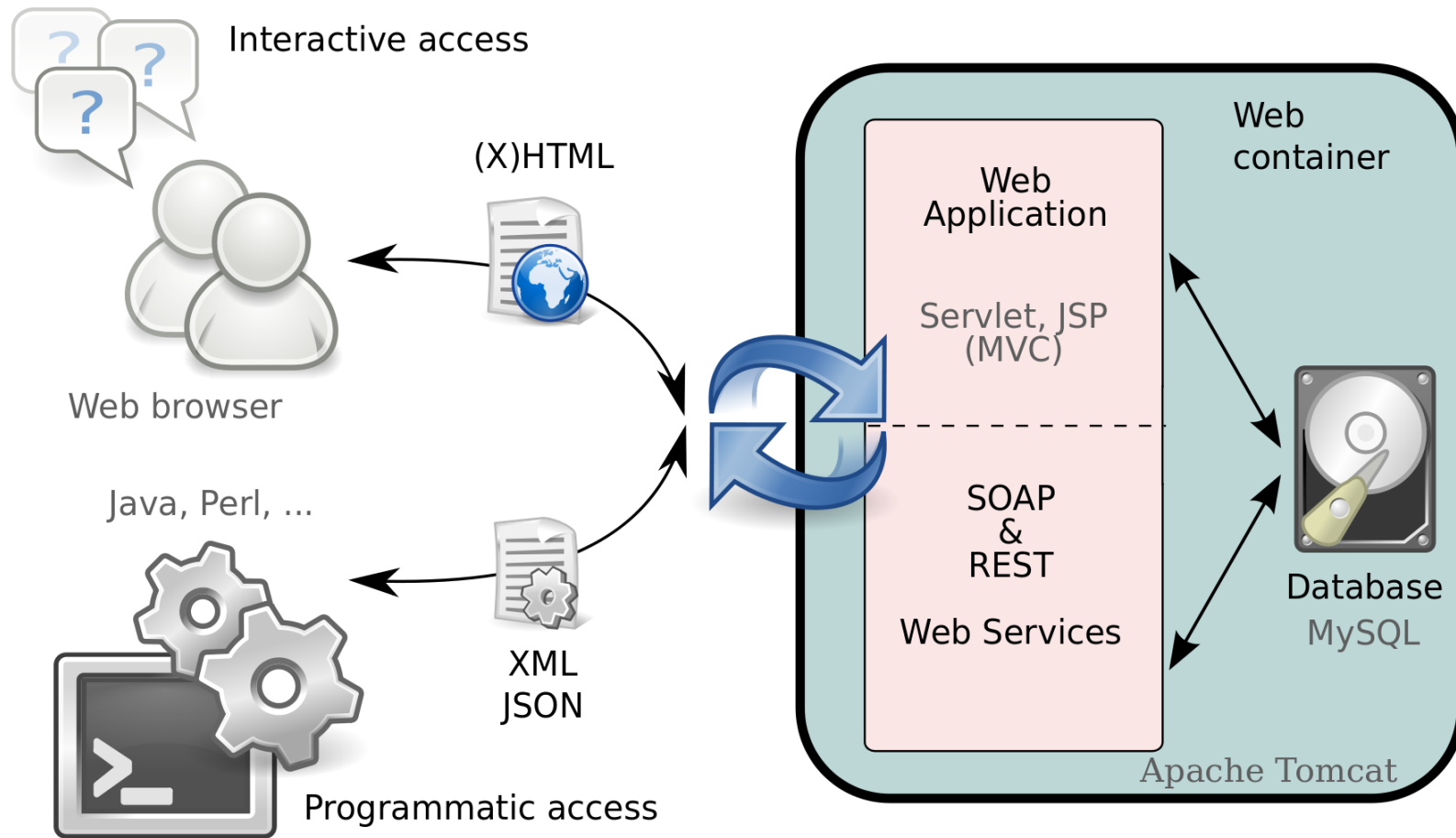
[Browse the data types \(PENDING\)](#)[camille](#) | [My Account](#) | [Sign Out](#)[Submitted](#) | [Curation](#) | [Published](#) | [Pending](#) | [Canceled](#) | [All](#)

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<a href="#">Phenol-Ex</a>			Pending	<a href="#">Publish it!</a>
<a href="#">FooD</a>			Pending	<a href="#">Publish it!</a>
<a href="#">UniGene</a>	A UniGene entry is a set of transcript sequences that appear to come from the same transcription locus (gene or expressed pseudogene), together with i [...]	21 Jan 2010 12:00:00 GMT	Pending	<a href="#">Publish it!</a>
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<a href="#">MassBank</a>	A federated database of reference spectra from different instruments, including high-resolution mass spectra of metabolites.	06 Dec 2010 11:28:06 GMT	Pending	<a href="#">Publish it!</a>
<a href="#">Golm Metabolome Database</a>	GMD provides public access to custom mass spectral libraries, metabolite profiling experiments as well as additional information and tools, e.g. with [...]	07 Dec 2010 16:33:50 GMT	Pending	<a href="#">Publish it!</a>
<a href="#">HomoloGene</a>	HomoloGene is a system for automated detection of homologs among the annotated genes of several completely sequenced eukaryotic genomes.	24 Jan 2011 13:16:44 GMT	Pending	<a href="#">Publish it!</a>
<a href="#">IUPHAR</a>	The IUPHAR Compendium details the molecular, biophysical and pharmacological properties of identified mammalian sodium, calcium and potassium channels [...]	08 Jun 2011 16:21:36 BST	Pending	<a href="#">Publish it!</a>

[Submitted](#) | [Curation](#) | [Published](#) | [Pending](#) | [Canceled](#)

Nature Precedings : doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011



Nature Precedings : doi:10.1038/npre.2011.6479.1 : Posted 30 Sep 2011

Camille Laibe and Nicolas Le Novère.

**MIRIAM Resources: tools to generate and resolve robust cross-references in Systems Biology.**

*BMC Systems Biology*, 2007



list of **data collections**

**web services** and **XML export** available

**community** driven (everybody can submit new data collections or suggest modification of existing records)

**curated** resource

systems in place to **monitor** registered web resources

**unrestricted** scope (currently mainly focused on Life Sciences, but the scope is potentially unlimited)

**free** to use







**Two** representations:

- internal storage of cross-references in databases or standard formats
- external display of those in user interfaces

```
<annotation>  
  <uniprot>P62158</uniprot>  
</annotation>
```

```
<annotation>  
  <resource database="UniProt" accession="P62158" />  
</annotation>
```





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<annotation>  
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</annotation>
```

```
<annotation>  
  <resource database="UniProt" accession="P62158" />  
</annotation>
```

→ the semantics is hidden in the format structure  
and the database schema!





**Two** representations:

- internal storage of cross-references in databases or standard formats
- external display of those in user interfaces

→ Identifiers.org combines both representations into **one!**

```
<annotation>
```

```
<!-- // -->
```

```
<rdf:li rdf:resource="http://identifiers.org/uniprot/P62158" />
```

```
<!-- // -->
```

```
</annotation>
```







<http://identifiers.org/pubmed/16333295>

*beta*

4 physical locations (or resources) are available for accessing 16333295 (from [PubMed](#)):

**SRS@EBI**  
European Bioinformatics Institute

United Kingdom

(Uptime: 100%)

**HubMed**  
Alfred D. Eaton  
*United Kingdom*

*(Uptime: 97%)*

**free digital archive of biomedical and life  
sciences journal literature**  
National Center for Biotechnology Information

USA

(Uptime: 100%)

**CiteXplore**  
European Bioinformatics Institute

United Kingdom

(Uptime: 99%)

<http://identifiers.org/pubmed/16333295>



## Profiles:

- list of data collections
- subset of the Registry's content
- each data collection in a profile can have settings (such as **one** preferred resource)
- can be defined at the level of an institution, project, individual, ...
- can be public (shareable) or private (protected by a key)
- centrally managed in the Registry (*user interface in progress*)
- have a unique shortname (used for identification purposes in URLs)
- provide access to a custom XML export
- Provide access to custom web services (*in progress*)





<http://identifiers.org/obo.go/GO:0006915>

*beta*

4 physical locations (or resources) are available for accessing *GO:0006915* (from [Gene Ontology](#)):

**QuickGO (Gene Ontology browser)**  
European Bioinformatics Institute

United Kingdom

(Uptime: 100%)

**GO Browser**  
The Jackson Laboratory

USA

(Uptime: 99%)

**AmiGO**  
The Gene Ontology Consortium

USA

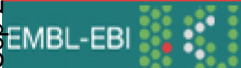


(Uptime: 99%)

**GO through BioPortal**  
National Center for Biomedical Ontology,  
Stanford

USA

(Uptime: 94%)

<http://identifiers.org/obo.go/GO:0006915>

<http://identifiers.org/obo.go/GO:0006915>Close Access to GO:0006915 (from [Gene Ontology](#)) using the preferred resource of the profile demo.Entity available from 4 providers, for more information please refer to: <http://identifiers.org/obo.go/GO:0006915>.Powered by: [Identifiers.org](#) & [MIRIAM Registry](#)[Help](#) | [Feedback](#)  
Databases | Tools | Research | Training | Industry | About Us | Help | [Site Index](#)  

EBI &gt; Databases &gt; QuickGO

**GO:0006915 apoptosis**

Web Services Dataset Term Basket: 0

Term Information


Ancestor Chart

Child Terms

Protein Annotation

Co-occurring Terms

Change Log

<b>ID</b>	 GO:0006915
<b>Name</b>	apoptosis
<b>Ontology</b>	Biological Process
<b>Definition</b>	A form of programmed cell death that begins when a cell receives internal or external signals that trigger the activity of proteolytic caspases, proceeds through a series of characteristic stages typically including rounding-up of the cell, retraction of pseudopodes, reduction of cellular volume (pyknosis), chromatin condensation, nuclear fragmentation (karyorrhexis), and plasma membrane blebbing (but maintenance of its integrity until the final stages of the process), and ends with the death of the cell.
<b>Comment</b>	
<b>Secondary IDs</b>	GO:0008632
<b>CONUTS</b>	<a href="#">GO:0006915 Wiki Page</a>

<http://identifiers.org/obo.go/GO:0006915?profile=demo>



<http://identifiers.org/obo.go/GO:0006915>

Close X

Access to GO:0006915 (from [Gene Ontology](#)) using the preferred resource of the profile demo.

Entity available from 4 providers, for more information please refer to: <http://identifiers.org/obo.go/GO:0006915>

Powered by: [Identifiers.org](#) & [MIRIAM Registry](#)

Generation of  
always up-to-date  
(hyper)links  
without  
requirement for  
any specific code

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Databases Tools Research Training Industry About Us Help Site Index  
EBI > Databases > QuickGO

GO:0006915 apoptosis



Click for example search

Search!

Web Services ID Dataset Term Basket: 0

Term Information

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Protein Annotation

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Change Log

ID GO:0006915

Name apoptosis

Ontology Biological Process

Definition A form of programmed cell death that begins when a cell receives internal or external signals that trigger the activity of proteolytic caspases, proceeds through a series of characteristic stages typically including rounding-up of the cell, retraction or pseudopodes, reduction of cellular volume (pyknosis), chromatin condensation, nuclear fragmentation (karyorrhexis), and plasma membrane blebbing (but maintenance of its integrity until the final stages of the process), and ends with the death of the cell.

Comment

Secondary GO:0008632

IDs

CONUTS [GO:0006915 Wiki Page](#)

<http://identifiers.org/obo.go/GO:0006915?profile=demo>


<http://identifiers.org/ec-code/1.1.1.1>



Close 

Access to 1.1.1.1 (from [Enzyme Nomenclature](#)) using the preferred resource of the profile most reliable.

Entity available from 3 providers, for more information please refer to: <http://identifiers.org/ec-code/1.1.1.1>.

Powered by: [Identifiers.org](#) & [MIRIAM Registry](#)

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EBI > Databases > Enzymes > IntEnz

### [EC 1 - Oxidoreductases](#)

#### [EC 1.1 - Acting on the CH-OH Group of Donors](#)

#### [EC 1.1.1 - With NAD<sup>+</sup> or NADP<sup>+</sup> as acceptor](#)

### EC 1.1.1.1 - Alcohol dehydrogenase

**IntEnz view**

[ENZYME view](#)

XML

IntEnz Enzyme Nomenclature

## EC 1.1.1.1

### Names

**Accepted name:** alcohol dehydrogenase

**Other names:** ADH  
NAD-dependent alcohol dehydrogenase  
NAD-specific aromatic alcohol dehydrogenase  
NADH-alcohol dehydrogenase  
NADH-aldehyd dehydrogenase

[http://identifiers.org/ec-code/1.1.1.1?profile=most\\_reliable](http://identifiers.org/ec-code/1.1.1.1?profile=most_reliable)

alcohol dehydrogenase (NAD)  
aldehyde dehydrogenase

aliphatic alcohol dehydrogenase  
ethanol dehydrogenase

provides **uniform identifiers** for Life Sciences

- **unambiguous**
- **perennial**
- **directly resolvable**
- standard compliant (**URIs**)
- location independent

identifiers available at **multiple levels** (data collection, resource, and data record)

**customisable** behaviours (formats available, preferred resource, ...)

responses encoded in **HTML** and **RDF** (either requested explicitly in the URLs or via *content negotiation*)

built on the **MIRIAM Registry**





**■ Data resources**

- BioModels Database (kinetic models)
- Pathway Commons (BioPAX)
- Physiome Model Repository (CellML)
- SABIO-RK (reaction kinetics)
- Yeast consensus model database
- Human consensus model database
- E-MeP (structural genomics)

**■ Application software**

- ARCADIA (graph editor)
- BIOUML (modelling and simulation)
- BridgeDb
- CellDesigner
- COPASI (Simulation)
- Cpath
- JSBML

**■ Application software (continued)**

- LibAnnotationSBML
- LibSBML
- PathText
- Pathway Commons
- SAINT (semantic annotation)
- SBML2BioPAX
- SBML2LaTeX
- SBMLeditor (model editor)
- SemanticSBML (annotation, merging, comparison, ...)
- Snazer (network analysis, simulations)
- Systems Biology Workbench (model design and simulation)
- The Virtual Cell (simulation)
- PSICQUIC
- ...



## Data providers:

- shielded from changes in the way other providers give access to their data
- unification of identifiers
- easy data integration between providers

## Software engineers:

- don't need to maintain expensive lists of links
- don't need to develop specific code to handle cross-references

## Users:

- are always provided with usable links



<http://identifiers.org/ec-code/1.1.1.1>



<http://identifiers.org/ec-code/1.1.1.1>



<http://identifiers.org/ec-code/1.1.1.1>



<http://identifiers.org/ec-code/1.1.1.1>



- Nick Juty
- Identifiers.org board of trustees
  - Michel Dumontier (WC3 HCLS, Bio2RDF)
  - Pascale Gaudet (BioDBCore)
  - Michael Hucka (SBML)
  - Nicolas Le Novère
  - Philippe Rocca-Serra (BioSharing)
- Community of Computational Systems Biology

