

Using a Database Wiki for Biological Database Curation

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Wikis vs databases

- Much easier to get started using wikis
 - easy to edit, versioning for free
 - don't have to think hard about structure
- But many projects (eventually) need:
 - structured data, fast querying, access control
 - *databases!*

Where we come in

- Our background:
 - Databases, programming languages
- Our research:
 - Archiving/versioning for structured data
 - Provenance for DB queries and updates
 - Advanced Web programming languages

Database Wikis

- Goal: Make databases usable by everyone.
 - Secondary: A general database curation platform
- Add tree-structured *data resources* to wikis
 - editable via Web browser; can import data as XML
 - support annotation, provenance, versioning
- Provide for *embedding* data into Wiki pages
 - path queries, "stylesheets", updatable "views"

Database Wikis

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- Secondary: A general database
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... a lot like
Semantic MediaWiki,
but allows for **nested**
data

Demo

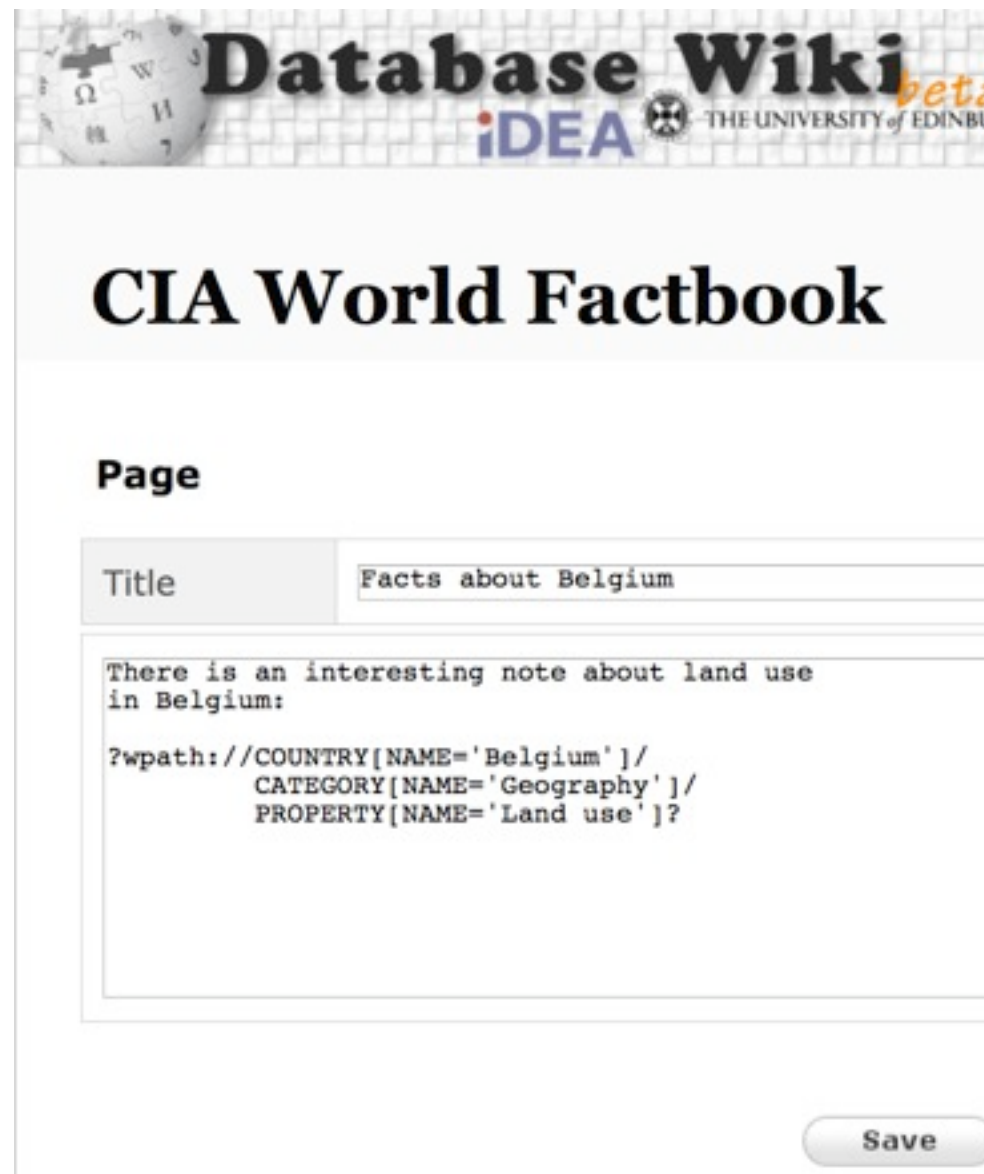
Data in DBWiki



The screenshot shows the Database Wiki interface. At the top, there is a logo for Database Wiki, IDEA, and THE UNIVERSITY of EDINBURGH. Below the logo, there are navigation links for Edit, View, and Settings. The main content area displays the title "CIA World Factbook" and a sub-section "Facts about Belgium". A note states: "There is an interesting note about land use in Belgium:". Below this, there is a table titled "Land use" with the following data:

Name	Text	Rank
arable land	27.42%	
permanent crops	0.69%	
other	71.89%	

Queries embedded in wiki pages



Database Wiki *beta*
iDEA THE UNIVERSITY of EDINBURGH

CIA World Factbook

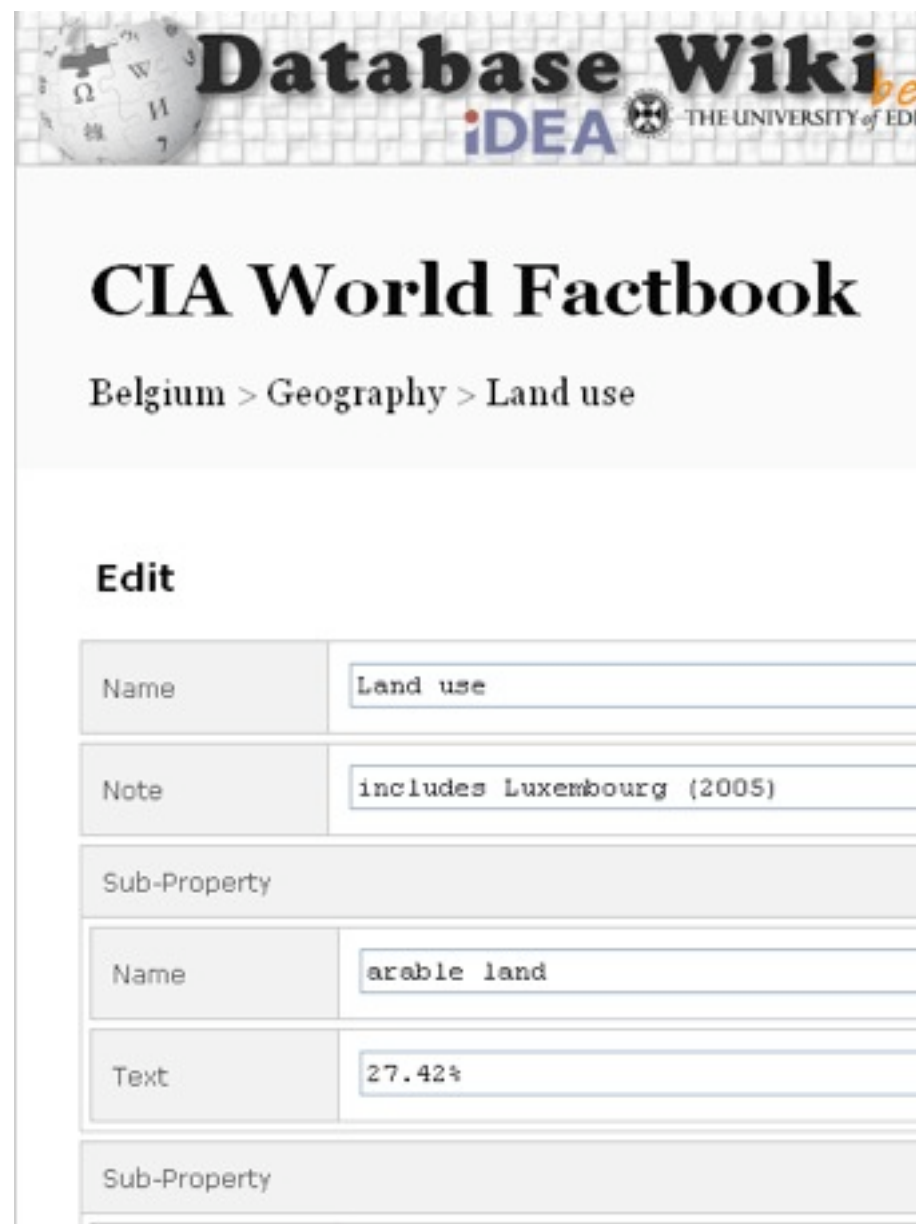
Page

Title

There is an interesting note about land use in Belgium:

```
?wpath://COUNTRY[NAME='Belgium']/  
CATEGORY[NAME='Geography']/  
PROPERTY[NAME='Land use']?
```


Updating data through forms



The screenshot shows a web form for editing data in a 'Database Wiki'. The header includes a globe icon and the text 'Database Wiki' with 'iDEA' and 'THE UNIVERSITY of EDINBURGH' logos. The main title is 'CIA World Factbook' and the breadcrumb is 'Belgium > Geography > Land use'. Below this is an 'Edit' section with several input fields:

Name	Land use
Note	includes Luxembourg (2005)
Sub-Property	
Name	arable land
Text	27.42%
Sub-Property	

Annotation and provenance

The screenshot shows the Database Wiki interface for the entry 'DBLP Computer Science Bibliography'. The page includes a search bar, navigation tabs for 'Displayed version(s)', 'Current version', 'Full history', 'Previous version', and 'Changes since ...'. The user 'James Cheney' is logged in. The entry title is 'DBLP Computer Science Bibliography' with the subtitle 'LaTeX: User's Guide & Reference Manual'. There are tabs for 'Comments' and 'History'. The 'Comments' section shows a table with one comment by James Cheney on 1 Nov 2010. The 'History' section shows a table with one action: 'IMPORT' by Heiko Mueller on 4 Sep 2010. Below the history table is a metadata table with fields for Mod. Date, Key, Title, Publisher, Year, ISBN, and Author.

Database Wiki IDEA THE UNIVERSITY OF EDINBURGH

Displayed version(s) Current version Full history Previous version Changes since ...

Edit View Settings

You are currently logged in as James Cheney

DBLP Computer Science Bibliography

LaTeX: User's Guide & Reference Manual

Comments History

Comments

Comment	User	Date
A classic	James Cheney	1 Nov 2010 10:44:33

Add your comment ...

History

Version	User	Action
4 Sep 2010 16:01:05	Heiko Mueller	IMPORT

Mod. Date	2002-01-03
Key	books/aw/Lampport86
Title	LaTeX: User's Guide & Reference Manual
Publisher	Addison-Wesley
Year	1986
ISBN	0-201-15790-X
Author	Leslie Lamport

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Case study

- Applied to IUPHAR database (www.iuphar-db.org)
- DBWiki appearance can be customized through templates, style sheets
- Close to look and feel of original
 - not an exact match
 - but provides archiving, annotation, provenance for free

Real IUPHAR

- GPCRs
 - Database
 - 7TM Receptor List
 - Latest Pairings
- Ion Channels
 - Database
 - VGIC List
 - LGIC List
- Nuclear Hormone Receptors
 - Database
 - NHR List
- Ligand List
- Hot Topics 🔥
- Help Page

- Nomenclature Guidelines
- Terms and Symbols
- Publications
- Citing the Database
- Linking to us
- About NC-IUPHAR
- About IUPHAR
- Subscribe 📧
- Useful links

Quick text search:

Search the database

>>> [Receptor search](#)

>>> [Ligand search](#)



Supported by:



● Annotated and expert reviewed ● Annotated and awaiting review ◦ Awaiting annotation/under development ?


G protein-coupled receptors

- 5-Hydroxytryptamine receptors
- Acetylcholine receptors (muscarinic)
- Adenosine receptors
- Adrenoceptors
- Anaphylatoxin receptors
- Angiotensin receptors
- Apelin receptor
- Bile acid receptor
- Bombesin receptors
- Bradykinin receptors
- Calcitonin receptors
- Calcium-sensing receptors
- Cannabinoid receptors
- Chemokine receptors
- Cholecystokinin receptors
- Corticotropin-releasing factor receptors
- Dopamine receptors
- Endothelin receptors
- Estrogen (G protein coupled) receptor
- Formylpeptide receptors
- Free fatty acid receptors
- Frizzled receptors
- GABA_B receptors
- Galanin receptors
- Ghrelin receptor
- Glucagon receptor family
- Glycoprotein hormone receptors
- Gonadotrophin-releasing hormone receptors
- GPRC5 receptors
- Histamine receptors
- Kisspeptin receptor
- Leukotriene receptors
- Lysophospholipid receptors
- Melanin-concentrating hormone receptors
- Melanocortin receptors
- Melatonin receptors
- Metabotropic glutamate receptors
- Motilin receptor
- Neuromedin U receptors
- Neuropeptide FF/neuropeptide AF receptors
- Neuropeptide S receptor
- Neuropeptide W/neuropeptide B receptors
- Neuropeptide Y receptors
- Neurotensin receptors
- Nicotinic acid receptor family
- Opioid receptors
- Orexin receptors
- P2Y receptors
- Parathyroid hormone receptors
- Peptide P51B receptor
- Platelet-activating factor receptor
- Prokineticin receptors
- Prolactin-releasing peptide receptor
- Prostanoid receptors
- Protease-activated receptors
- Relaxin family peptide receptors
- Somatostatin receptors
- Tachykinin receptors
- Thyrotropin-releasing hormone receptor
- Trace amine receptor
- Urotensin receptor
- VIP and PACAP receptors
- Vasopressin and oxytocin receptors
- Class A Orphans
- Class B Orphans
- Class C Orphans
- Non-signalling 7TM chemokine-binding proteins








IUPHAR in DBWiki


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Supported by:

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[Edit](#) [View](#) [Settings](#)

5-Hydroxytryptamine receptors	Leukotriene receptors*
Acetylcholine receptors (muscarinic)	Lysophospholipid receptors*
Adenosine receptors	Melanin-concentrating hormone receptors
Adrenoceptors	Melanocortin receptors
Anaphylatoxin receptors*	Melatonin receptors
Angiotensin receptors	Metabotropic glutamate receptors
Apelin receptor	Motilin receptor*
Bile acid receptor	Neurodynin U receptors
Bombesin receptors	Neuropeptide FF/neuropeptide AF receptors
Bradykinin receptors	Neuropeptide S receptor
Calcitonin receptors	Neuropeptide W/neuropeptide B receptors
Calcium-sensing receptors	Neuropeptide Y receptors
Cannabinoid receptors	Neurotensin receptors
Chemokine receptors	Nicotinic acid receptor family
Cholecystokinin receptors	Non-signalling 7TM chemokine-binding proteins
Class A Orphans	Opioid receptors
Class B Orphans	Orexin receptors
Class C Orphans	P2Y receptors
Corticotropin-releasing factor receptors	Parathyroid hormone receptors
Dopamine receptors	Peptide PS18 receptor*
Endothelin receptors	Platelet-activating factor receptor
Estrogen (G protein coupled) receptor	Prokineticin receptors
Formylpeptide receptors*	Prolactin-releasing peptide receptor
Free fatty acid receptors	Prostanoid receptors
Frizzled receptors*	Protease-activated receptors*
GABA _B receptors	Relaxin family peptide receptors
GPRCS receptors	Somatostatin receptors
Galanin receptors*	Tachykinin receptors*
Ghrelin receptor	Thyrotropin-releasing hormone receptor
Glucagon receptor family	Trace amine receptor
Glycoprotein hormone receptors	Urotensin receptor
Gonadotrophin-releasing hormone receptors	VIP and PACAP receptors
Histamine receptors	Vasopressin and oxytocin receptors*
Kisspeptin receptor	

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- Help Page

5-Hydroxytryptamine receptors

- Introduction
- Contributors
- References
- **5-HT_{1A}**
- 5-HT_{1B}
- 5-HT_{1D}
- 5-HT_{1e}
- 5-HT_{1F}
- 5-HT_{2A}
- 5-HT_{2B}
- 5-HT_{2C}
- 5-HT₄
- 5-HT_{5a}
- 5-HT₆

• Annotated and expert reviewed. Please contact us if you can help with updates. ⓘ

5-HT_{1A}

Structural Information ⓘ					
class A G protein-coupled receptor					
Species	TM	AA	Chromosomal Location	Gene Name	Reference
Human	7	422	5q11.2-q13	<i>HTR1A</i>	3-4
Rat	7	422	2q16	<i>Htr1a</i>	1-2
Mouse	7	421	13 D2.1	<i>Htr1a</i>	5

Contents:


- Structural Information
- Database Links
- Agonists
- Antagonists
- Allosteric Regulators
- Transduction Mechanisms
- Tissue Distribution
- Functional Assays
- Physiological Functions
- Physiological Consequences of Altering Gene Expression
- Biologically Significant Variants

Database Links ⓘ	
ChEMBL Target	51 (Hs), 11863 (Mm), 10576 (Rn)
Ensembl	ENSG00000178394 (Hs), ENSMUSG00000021721 (Mm), ENSRNOG00000010254 (Rn)
Entrez Gene	3350 (Hs), 15550 (Mm), 24473 (Rn)
GeneCards	<i>HTR1A</i> (Hs)
UniProt	P04480 (Hs)

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[Comments](#)  [History](#) 

5-Hydroxytryptamine receptors > 5-HT_{1A}

Name

5-HT_{1A}

Database References

Database	Accession Number
Entrez Gene	15550
Entrez Gene	24473
Entrez Gene	3350
GeneCards	HTR1A
HGNC	5286
HomoloGene	20148

Next steps

- Scaling up to big data, existing sources
 - efficient querying on unstructured sources
 - import/annotation vs. refresh issue
- Structure discovery/learning?
 - can we extract useful *structure* from unstructured wiki page contributions?
- Getting UI and functionality right
 - volunteers?

Would this be useful to you? Want to help?

- Play with prototype, let us know what breaks

<http://forsberg.inf.ed.ac.uk:8080>

- mailing list: db-wiki@inf.ed.ac.uk

- plug: W3C Provenance Incubator Group

- industry/bioinformatics involvement sought for WG

- <http://www.w3.org/2005/Incubator/prov/wiki/>