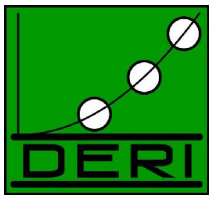
„Simple, ontology-based representation of biomedical statements through fine-granular entity tagging and new web standards“

Matthias Samwald, Holger Stenzhorn



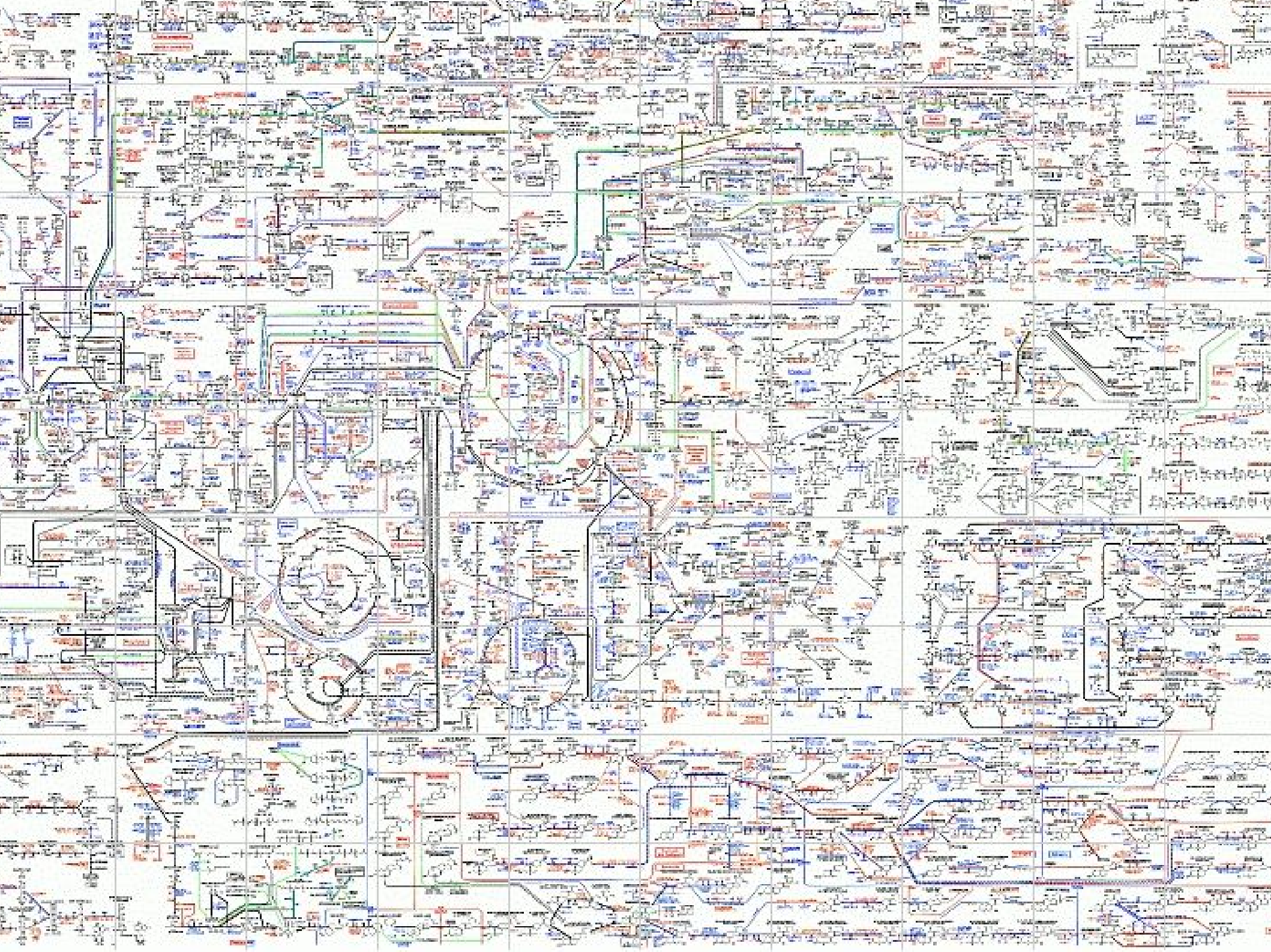
Konrad Lorenz Institute
for Evolution & Cognition Research

UNIVERSITÄTS
FREIBURG KLINIKUM

Started out doing experimental neuroscience

then switched to Semantic Web / ontologies

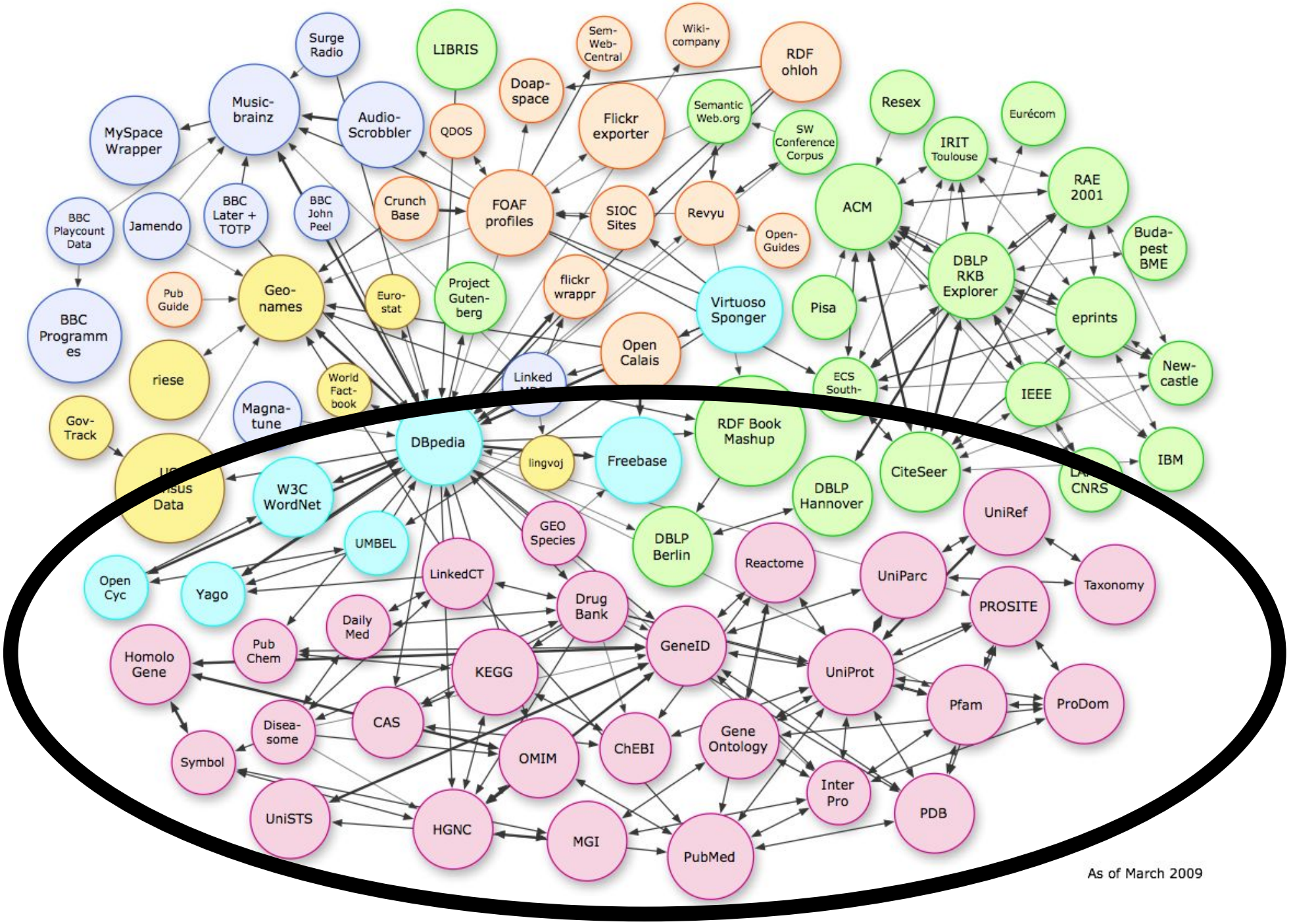
for biomedical, pharmaceutical, neuroscientific, cognitive... R&D



World Wide Web Consortium

„Semantic Web for Health Care and Life Science Interest Group“

Linking Open Data (LOD) cloud



Query the Neurocommons Knowledge Base:
Find candidate genes known to be involved in signal transduction and active in Pyramidal Neurons!

```
prefix go: <http://purl.org/obo/owl/GO#>
prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
prefix owl: <http://www.w3.org/2002/07/owl#>
prefix mesh: <http://purl.org/commons/record/mesh/>
prefix sc: <http://purl.org/science/owl/sciencecommons/>
prefix ro: <http://www.obofoundry.org/ro/ro.owl#>

select ?genename ?processname
where
{  graph <http://purl.org/commons/hcls/pubmesh>
    { ?paper ?p mesh:D017966 .
      ?article sc:identified_by_pmid ?paper.
      ?gene sc:describes_gene_or_gene_product_mentioned_by ?article.
    }
  graph <http://purl.org/commons/hcls/goa>
    { ?protein rdfs:subClassOf ?res.
      ?res owl:onProperty ro:has_function.
      ?res owl:someValuesFrom ?res2.
      ?res2 owl:onProperty ro:realized_as.
      ?res2 owl:someValuesFrom ?process.
   graph <http://purl.org/commons/hcls/20070416/classrelations>
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      union
     {?process rdfs:subClassOf go:GO_0007166 }}
      ?protein rdfs:subClassOf ?parent.
      ?parent owl:equivalentClass ?res3.
      ?res3 owl:hasValue ?gene.
    }
  graph <http://purl.org/commons/hcls/gene>
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  graph <http://purl.org/commons/hcls/20070416>
    { ?process rdfs:label ?processname}
}
```

Mesh: Pyramidal Neurons

↓

Pubmed: Journal Articles

↓

Entrez Gene: Genes

↓

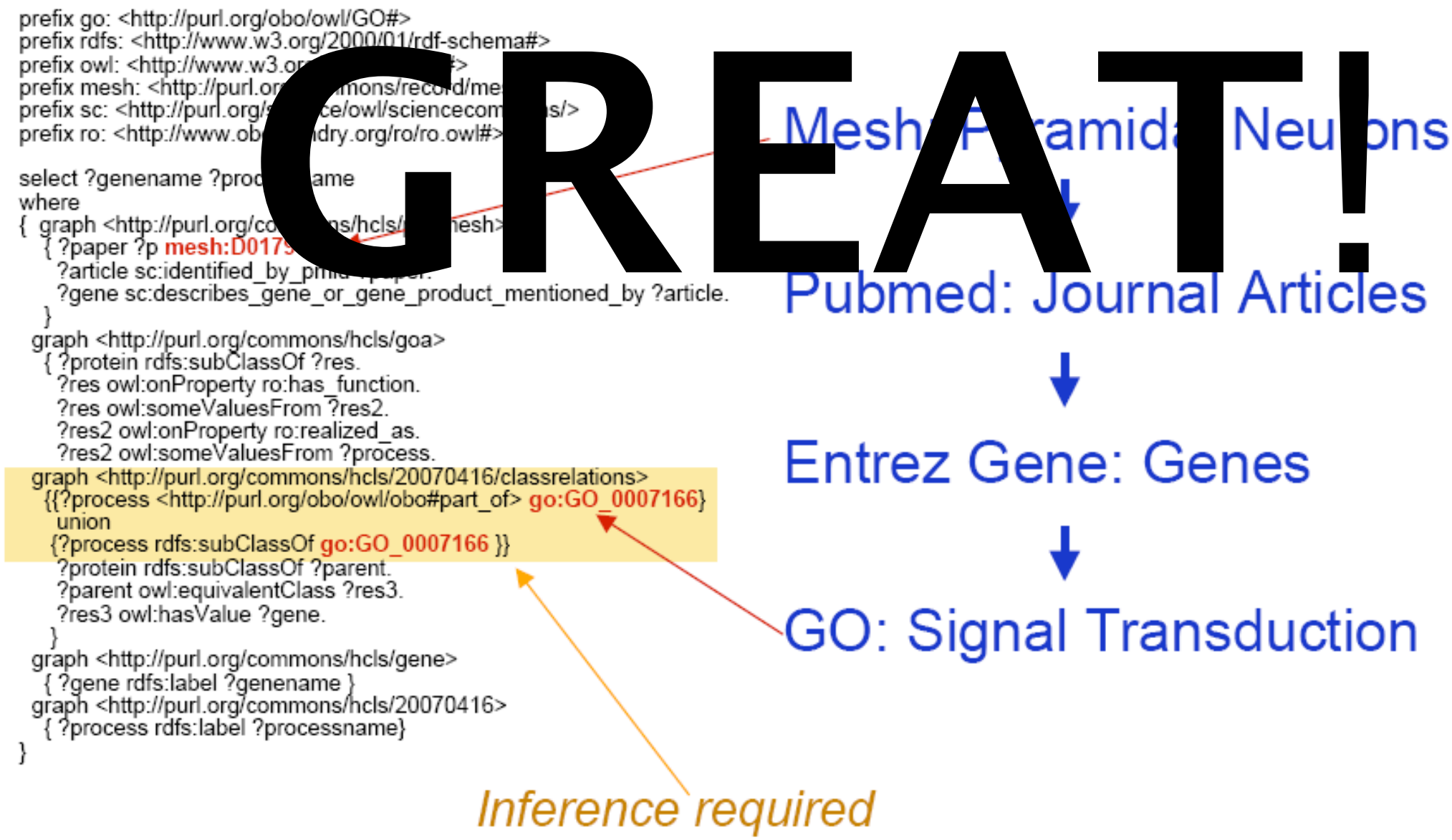
GO: Signal Transduction

Inference required

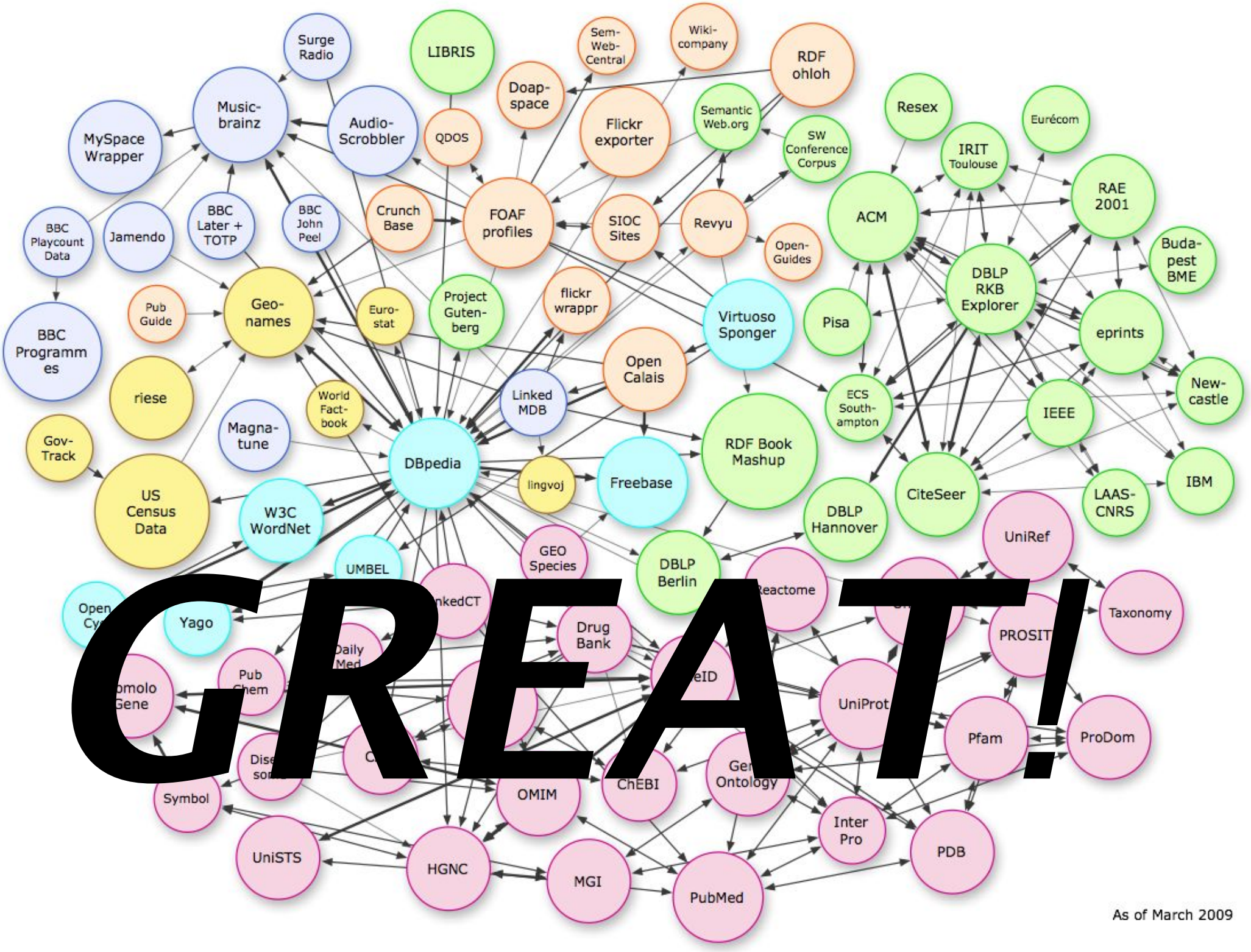
(Figure by Alan Ruttenberg)

Results

genename	processname
Entrez Gene record for human ADRB2, 154	arrestin mediated desensitization of G-protein coupled receptor protein signaling pathway
Entrez Gene record for human ADRB2, 154	transmembrane receptor protein tyrosine kinase activation (dimerization)
Entrez Gene record for human ADRB2, 154	adenylate cyclase activation
Entrez Gene record for human DRD1, 1812	adenylate cyclase activation
Entrez Gene record for human GRM7, 2917	negative regulation of adenylate cyclase activity
Entrez Gene record for human ADAM10, 102	Notch receptor processing
Entrez Gene record for human LRP1, 4035	negative regulation of Wnt receptor signaling pathway
Entrez Gene record for human ADRB2, 154	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human DRD2, 1813	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human GNG3, 2785	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human GRM7, 2917	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human HTR2A, 3356	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human GNG12, 55970	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human CALM3, 808	G-protein coupled receptor protein signaling pathway
Entrez Gene record for human EPHA4, 2043	transmembrane receptor protein tyrosine kinase signaling pathway
Entrez Gene record for human NRTN, 4902	transmembrane receptor protein tyrosine kinase signaling pathway
Entrez Gene record for human PTPRG, 5793	transmembrane receptor protein tyrosine kinase signaling pathway



(Figure by Alan Ruttenberg)


Surge Radio
LIBRIS
Sem-Web-Central
Wiki-company
RDF ohloh
Doap-space
Music-brainz
Audio-Scrobbler
Flickr exporter
Semantic Web.org
SW Conference Corpus
Resex
Eurécom
IRIT Toulouse
MySpace Wrapper
QDOS
FOAF profiles
SIOC Sites
Revyu
Open-Guides
ACM
RAE 2001
BBC Playcount Data
Jamendo
BBC Later + TOTP
BBC John Peel
Crunch Base
Buda-pest BME
DBLP RKB Explorer
Pub Guide
Geo-names
Euro-stat
Project Guten-berg
flickr wrappr
Virtuoso Sponger
Pisa
eprints
BBC Programm es
Open Calais
riese
World Fact-book
Linked MDB
ECS South-ampton
IEEE
New-castle
Gov-Track
Magna-tune
DBpedia
RDF Book Mashup
US Census Data
W3C WordNet
lingvoj
Freebase
CiteSeer
LAAS-CNRS
IBM
DBLP Hannover
UniRef
UMBEL
GEO Species
DBLP Berlin
Reactome
Open Cyc
Yago
Taxonomy
Drug Bank
PROSITE
Pub Chem
UniProt
Pfam
ProDom
Symbol
OMIM
ChEBI
Gene Ontology
Inter Pro
UniSTS
HGNC
MGI
PubMed
PDB
GREAT!
As of March 2009

but

still **very few tools suitable for end-users.**

(researchers, clinicians, anyone)

Hypothesis!

many relevant problems could be solved with less complicated solutions.

and less complicated solutions could work better in practice.

let's **test this hypothesis**.

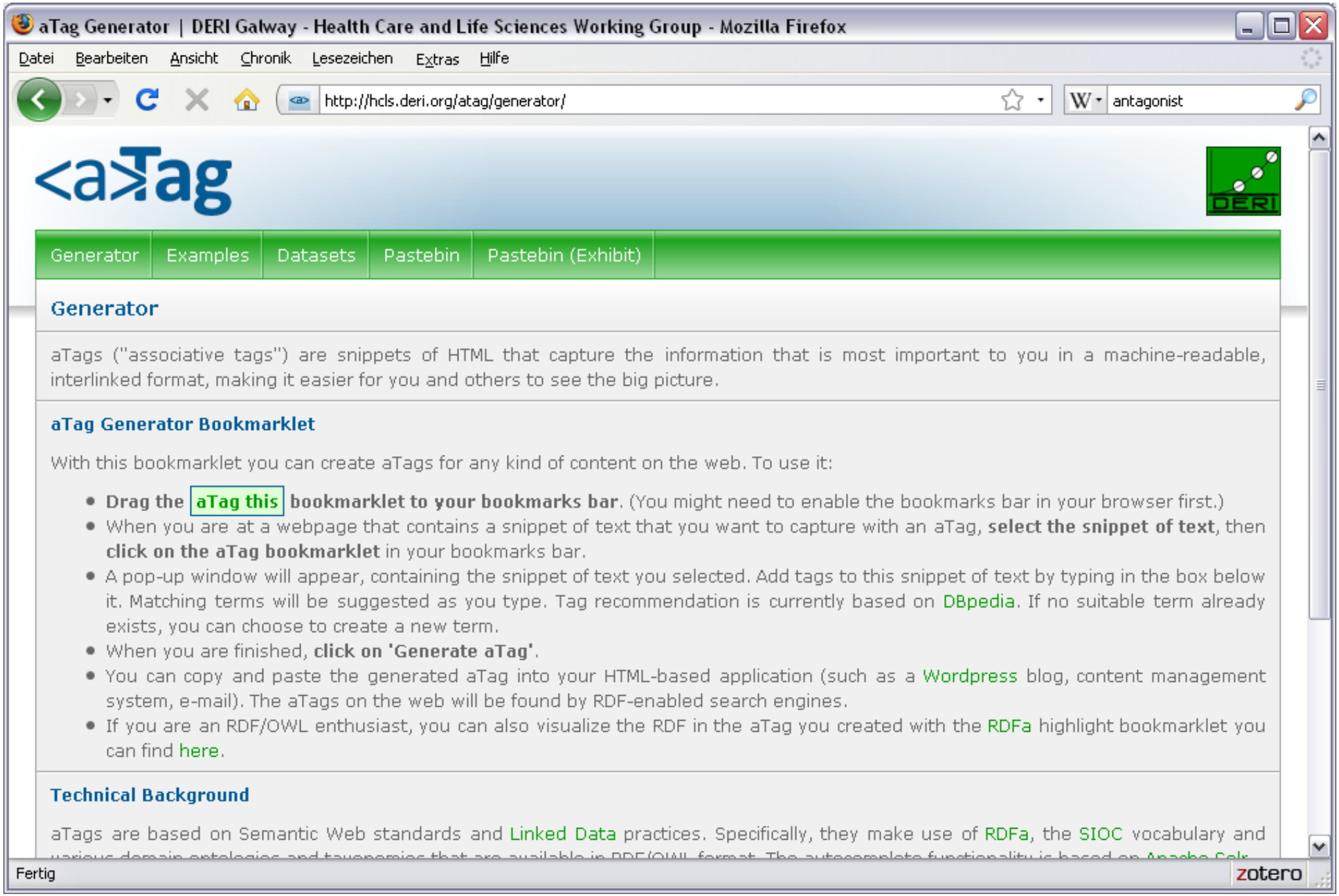
build a simple system, and try to do, well, everything with it.

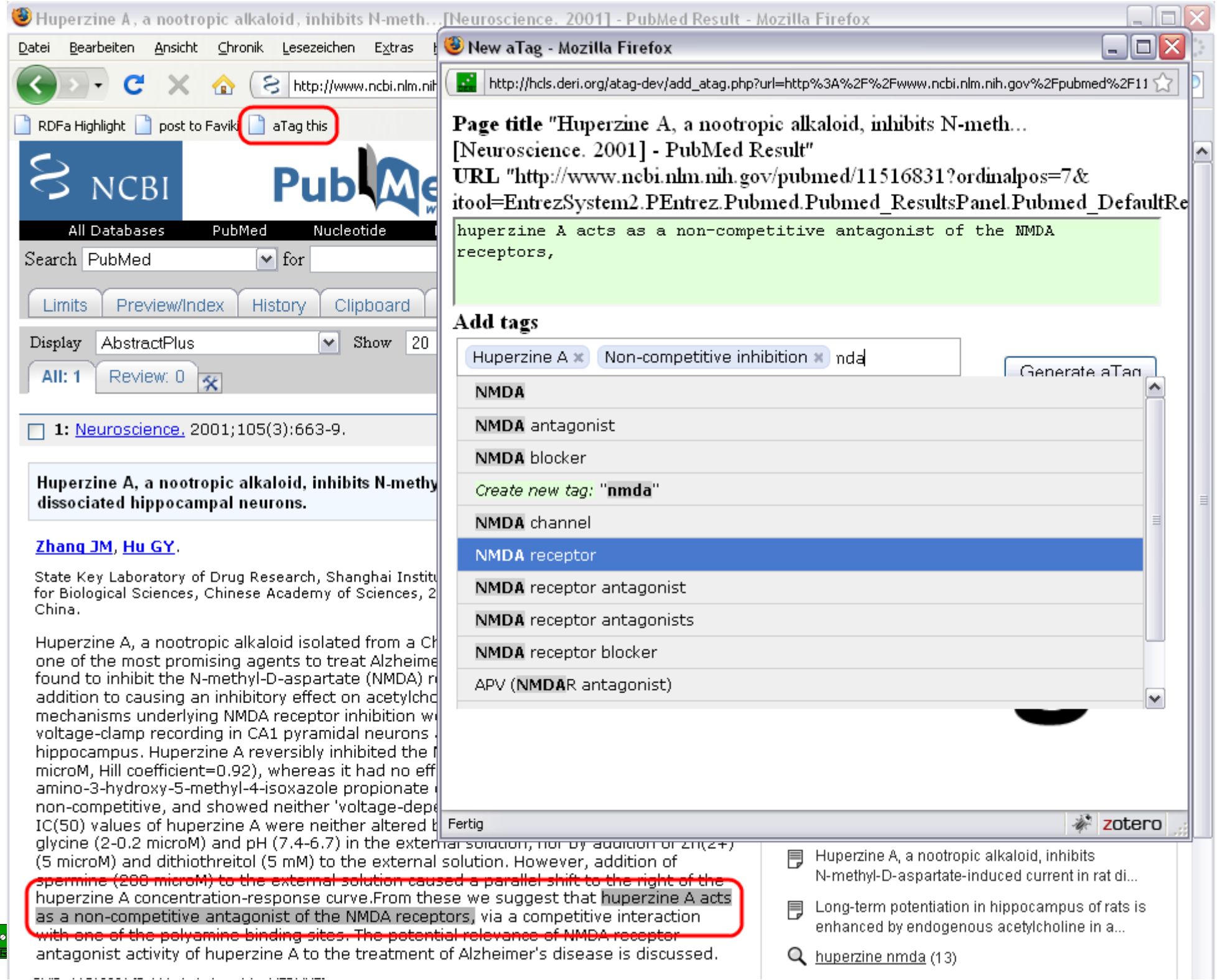
tagging, converting data, publishing, searching, aggregating...

at the very least, i will end up with a **system that i can actually use** for my projects...

'associative tags'

tagging statements, not documents.
tagging with entities, not strings.


aTag Generator | DERI Galway - Health Care and Life Sciences Working Group - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://hcls.deri.org/atag/generator/
antagonist
<aTag
Generator
Examples
Datasets
Pastebin
Pastebin (Exhibit)
Generator
aTags ("associative tags") are snippets of HTML that capture the information that is most important to you in a machine-readable, interlinked format, making it easier for you and others to see the big picture.
aTag Generator Bookmarklet
With this bookmarklet you can create aTags for any kind of content on the web. To use it:
Drag the aTag this bookmarklet to your bookmarks bar. (You might need to enable the bookmarks bar in your browser first.)
When you are at a webpage that contains a snippet of text that you want to capture with an aTag, select the snippet of text, then click on the aTag bookmarklet in your bookmarks bar.
A pop-up window will appear, containing the snippet of text you selected. Add tags to this snippet of text by typing in the box below it. Matching terms will be suggested as you type. Tag recommendation is currently based on DBpedia. If no suitable term already exists, you can choose to create a new term.
When you are finished, click on 'Generate aTag'.
You can copy and paste the generated aTag into your HTML-based application (such as a Wordpress blog, content management system, e-mail). The aTags on the web will be found by RDF-enabled search engines.
If you are an RDF/OWL enthusiast, you can also visualize the RDF in the aTag you created with the RDFa highlight bookmarklet you can find here.
Technical Background
aTags are based on Semantic Web standards and Linked Data practices. Specifically, they make use of RDFa, the SIOC vocabulary and
Fertig
zotero


Huperzine A, a nootropic alkaloid, inhibits N-meth...[Neuroscience. 2001] - PubMed Result - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras
http://www.ncbi.nlm.nih
RDFa Highlight
post to Faviki
aTag this
NCBI
PubMe
All Databases PubMed Nucleotide
Search PubMed for
Limits Preview/Index History Clipboard
Display AbstractPlus Show 20
All: 1 Review: 0
1: Neuroscience. 2001;105(3):663-9.
Huperzine A, a nootropic alkaloid, inhibits N-methy
dissociated hippocampal neurons.
Zhang JM, Hu GY.
State Key Laboratory of Drug Research, Shanghai Institu
for Biological Sciences, Chinese Academy of Sciences, 2
China.
Huperzine A, a nootropic alkaloid isolated from a Ch
one of the most promising agents to treat Alzheime
found to inhibit the N-methyl-D-aspartate (NMDA) r
addition to causing an inhibitory effect on acetylcho
mechanisms underlying NMDA receptor inhibition w
voltage-clamp recording in CA1 pyramidal neurons
hippocampus. Huperzine A reversibly inhibited the
microM, Hill coefficient=0.92), whereas it had no eff
amino-3-hydroxy-5-methyl-4-isoxazole propionate
non-competitive, and showed neither 'voltage-depe
IC(50) values of huperzine A were neither altered b
glycine (2-0.2 microM) and pH (7.4-6.7) in the extern
(5 microM) and dithiothreitol (5 mM) to the external solution. However, addition of
spermine (200 microM) to the external solution caused a parallel shift to the right of the
huperzine A concentration-response curve.From these we suggest that huperzine A acts
as a non-competitive antagonist of the NMDA receptors, via a competitive interaction
with one of the polyamine binding sites. The potential relevance of NMDA receptor
antagonist activity of huperzine A to the treatment of Alzheimer's disease is discussed.
New aTag - Mozilla Firefox
http://hcls.deri.org/atag-dev/add_atag.php?url=http%3A%2F%2Fwww.ncbi.nlm.nih.gov%2Fpubmed%2F11
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[Neuroscience. 2001] - PubMed Result"
URL "http://www.ncbi.nlm.nih.gov/pubmed/11516831?ordinalpos=7&
itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultRe
huperzine A acts as a non-competitive antagonist of the NMDA
receptors,
Add tags
Huperzine A
Non-competitive inhibition
nda
Generate aTag
NMDA
NMDA antagonist
NMDA blocker
Create new tag: "nmda"
NMDA channel
NMDA receptor
NMDA receptor antagonist
NMDA receptor antagonists
NMDA receptor blocker
APV (NMDAR antagonist)
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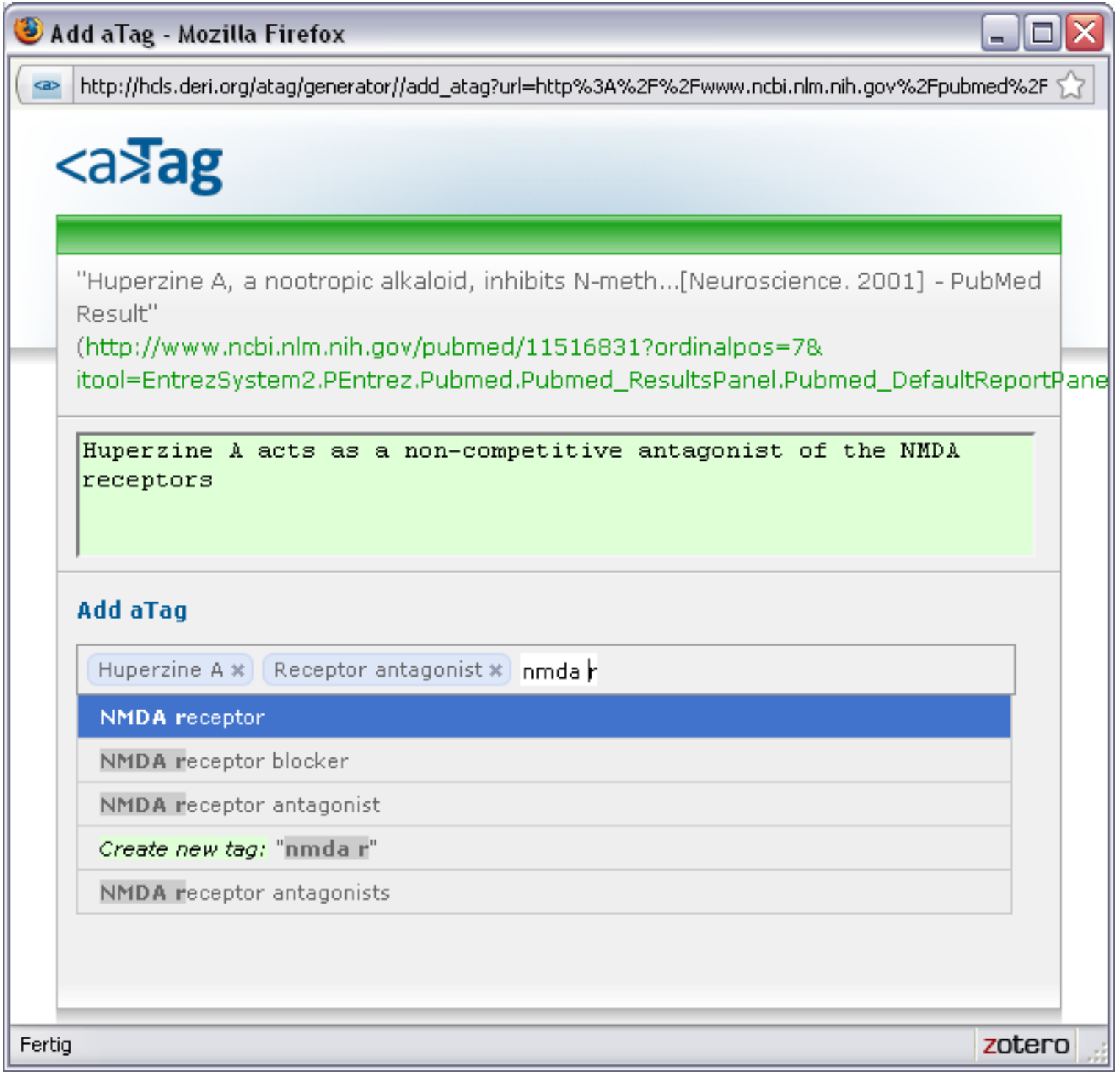
zotero
Huperzine A, a nootropic alkaloid, inhibits N-methyl-D-aspartate-induced current in rat di...
Long-term potentiation in hippocampus of rats is enhanced by endogenous acetylcholine in a...
huperzine nmda (13)


Add aTag - Mozilla Firefox
http://hcls.deri.org/atag/generator//add_atag?url=http%3A%2F%2Fwww.ncbi.nlm.nih.gov%2Fpubmed%2F
<aTag
"Huperzine A, a nootropic alkaloid, inhibits N-meth...[Neuroscience. 2001] - PubMed Result"
(http://www.ncbi.nlm.nih.gov/pubmed/11516831?ordinalpos=7&
itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPane
Huperzine A acts as a non-competitive antagonist of the NMDA receptors
Add aTag
Huperzine A
Receptor antagonist
nmda r
NMDA receptor
NMDA receptor blocker
NMDA receptor antagonist
Create new tag: "nmda r"
NMDA receptor antagonists
Fertig
zotero

Pastebin

You can add aTags to this page with the aTag bookmarklet. The data embedded in this page can be visualized and processed with various tools.

| "**Huperzine A acts as a non-competitive antagonist of the NMDA receptors**" aTags: Huperzine A Receptor antagonist NMDA receptor (Source) |

| "**Radiofrequency ablation (RFA) for the treatment of superficial venous reflux has been available since 1998 and is now established as a safe and efficacious treatment modality for the ablation of refluxing superficial and perforating veins.**" aTags: Radiofrequency ablation Varicose veins (Source) |

| "**Evodia rutaecarpa (Rutaceae) is used in TCM for cardiotonic, restorative and analgesic effects**" aTags: Evodiamine Analgesic Heart (Source) |

| "**Coptis chinensis (Ranunculaceae) has been used in TCM for several conditions. A methanol extract fraction of C. chinensis, jatrorrhizine and berberine are MAO inhibitors [Kong et al], indicating potential antidepressant activity, and C. chinensis and some alkaloids isolated from this plant (berberine, coptisine and palmatine) are reported to be anti-Cholinesterase**" aTags: Coptis chinensis Monoamine oxidase inhibitor Acetylcholinesterase inhibitor (Source) |

| "**In TCM, Codonopsis pilosula (Campanulaceae) root is used for various disorders including amnesia, and is believed to promote blood circulation and enhance vitality**" aTags: Codonopsis pilosula Therapy Amnesia Circulatory System (Source) |

| "**Biota orientalis (Coniferae) is used in TCM for insomnia and amnesia**" aTags: Biota orientalis Insomnia Amnesia (Source) |

| "**A crude alcoholic extract of Angelica archangelica (Umbelliferae), which has been used in TCM for cerebral diseases, displaced nicotine binding to nicotine receptors in a concentration-dependent manner, but it is unknown if this effect was due to agonistic or antagonistic binding**" aTags: Angelica Nicotinic acetylcholine receptor (Source) |

| "**Salvia miltiorrhiza root may inhibit neuronal cell death by inhibition of presynaptic glutamate release**" aTags: Salvia miltiorrhiza Therapy Excitotoxicity Glutamatergic (Source) |

| "**Salvia miltiorrhiza prescribed in TCM to stabilise the heart and calm nerves. Official indications for the root include treatment of**

there is more than meets the eye...

RDFa

+

SIOC

+

domain ontologies/terminologies

What the machine sees...

```
<http://hcls.deri.org/atag-data/pastebin.html#49ddfee65f7f4> a
sioc:Item ;
   sioc:content "Huperzine A acts as a non-competitive
                 antagonist of the NMDA receptors"@en ;
   sioc:topic  <http://dbpedia.org/resource/Huperzine_A> ,
               <http://purl.org/obo/owl/GO#GO_0048019> ,
               <http://dbpedia.org/resource/NMDA_receptor> ;
   rdfs:seeAlso <http://www.ncbi.nlm.nih.gov/pubmed/11516831> .
```

RDFa is simple to embed into existing systems

websites, blogs, wikis, e-mails, biomedical databases...

handling data and annotations via Copy & Paste

→ We do not need to build everything from scratch

Some aTags about neuropharmacology etc.

Below I have collected some interesting statements from research papers I recently stumbled upon. They are encoded as aTags.

| "Huperzine A acts as a non-competitive antagonist of the NMDA receptors" aTags: Huperzine A receptor antagonist activity NMDA receptor (Source) |

| "some effects of CDP-choline could be mediated by changes in brain platelet-activating factor (PAF) levels" aTags: Citicoline Platelet-activating factor (Source) |

| "Changes in brain striatum dopamine and acetylcholine receptors induced by chronic CDP-choline treatment of aging mice" aTags: Striatum Dopamine receptor Acetylcholine receptor Citicoline (Source) |

| "changes in ERK phosphorylation in hippocampus and PFC were regulated by GABAA receptor in a learning and memory paradigm under acute restraint stress conditions" aTags: MAPK/ERK pathway Hippocampus Stress (Source)|

| "our data suggest actions of memantine beyond NMDA receptor antagonism, including stimulating effects on cholinergic signalling via muscarinic receptors" aTags: Memantine Muscarinic acetylcholine receptor (Source)|

Written by admin
March 18th, 2009 at 8:32 pm

Posted in Uncategorized

add to blog post

SIDER drug side effect data

This document/database contains information about side effects (adverse drug reactions) derived from SIDER. Relevant terms are mapped to DBpedia, the OBO Disease ontology and the OBO symptom ontology. Mappings were established via shared PubChem and UMLS identifiers. SIDER entries where no mapping for drug or disease/symptom could be established were omitted.

Disclaimer: The content of this document/database is intended for educational and scientific research purposes only. It is not intended as a substitute for professional medical advice, diagnosis or treatment.

This document was generated by Matthias Samwald on 30 April 2009

| " methadone might cause weight loss . " |

| " methadone might cause urinary retention . " |

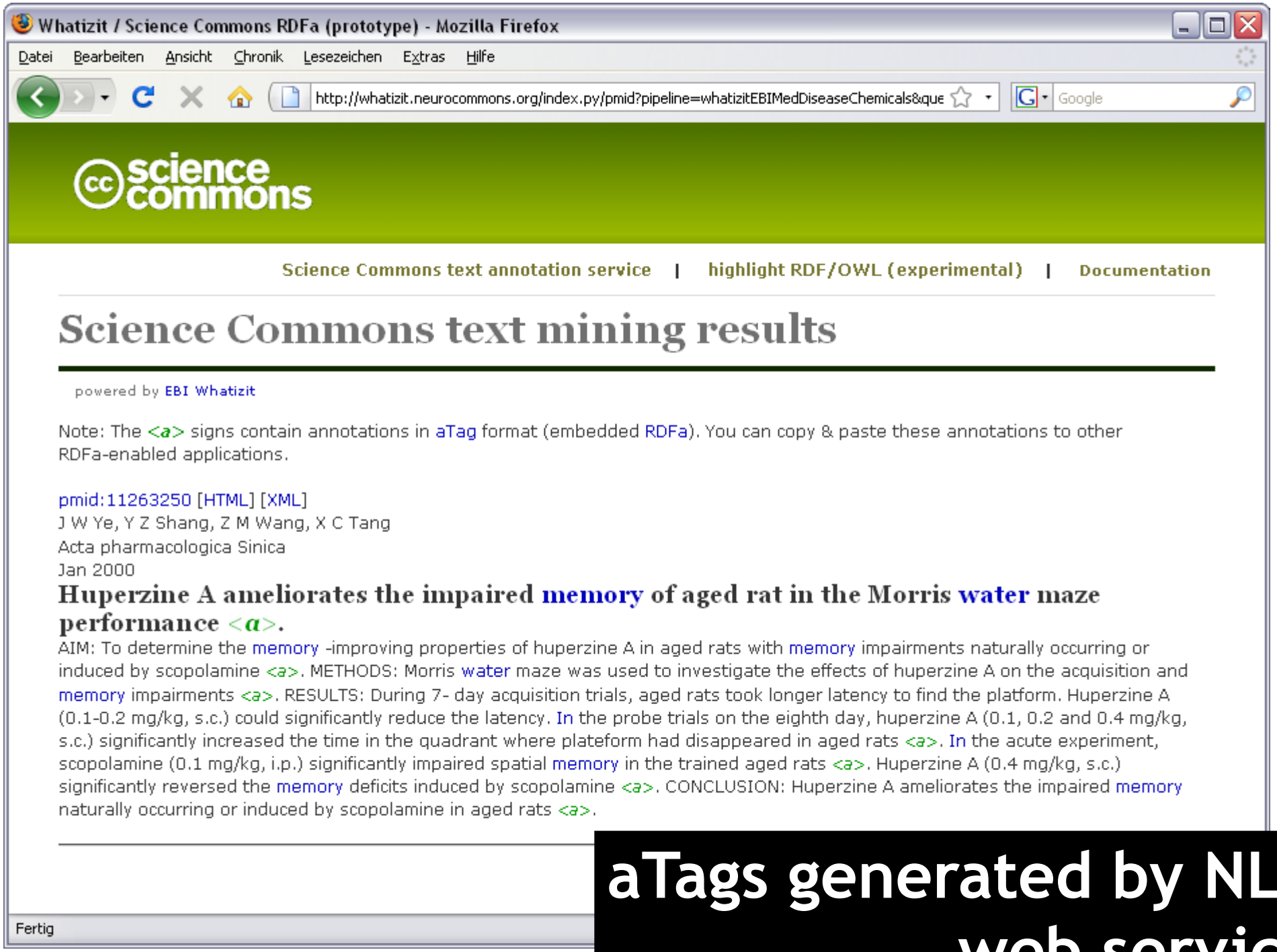
| " methadone might cause palpitations . " |

| " methadone might cause constipation . " |

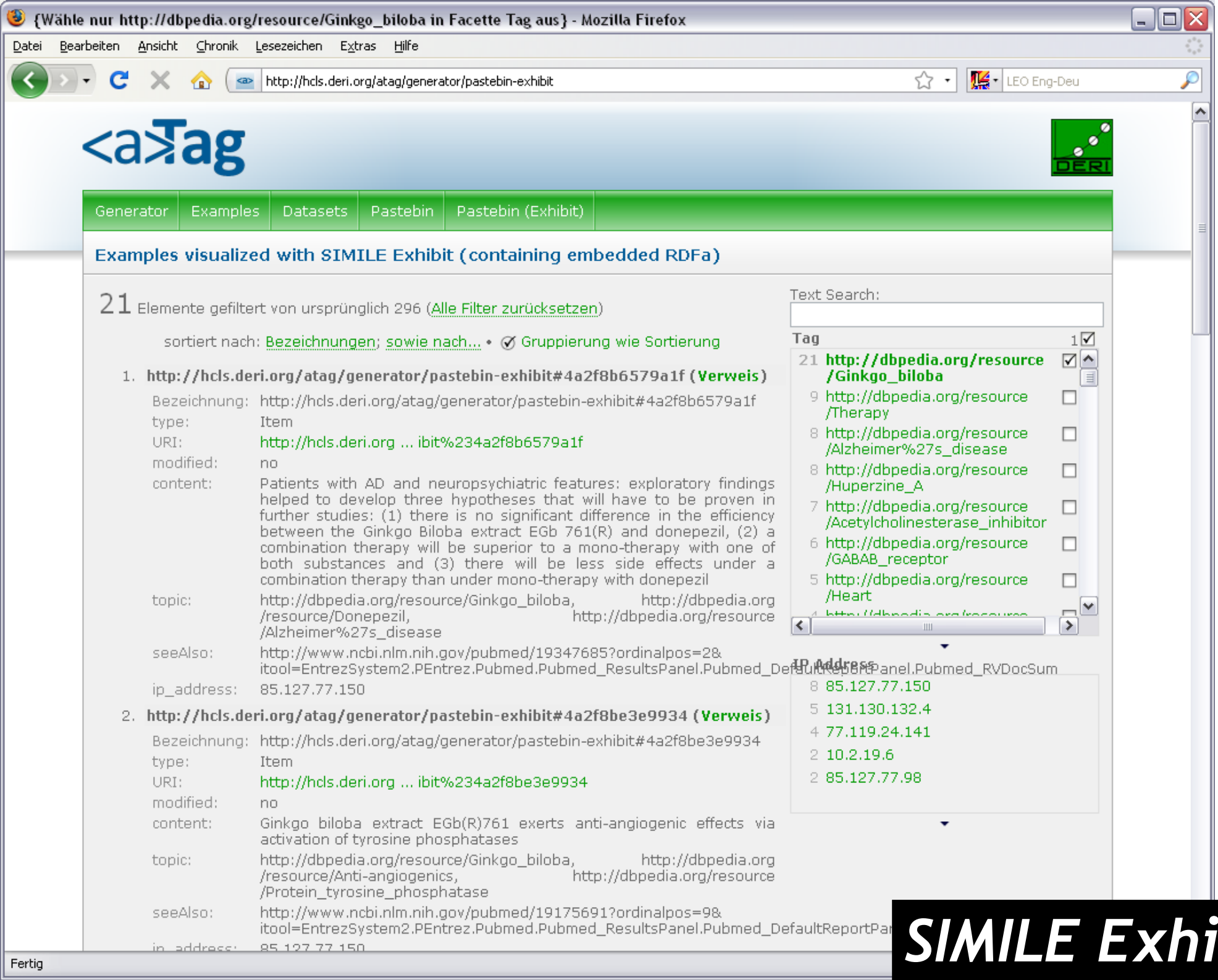
| " methadone might cause weakness . " |

| " methadone might cause cardiomyopathy . " |

database converted to aTags



aTags generated by NLP web service

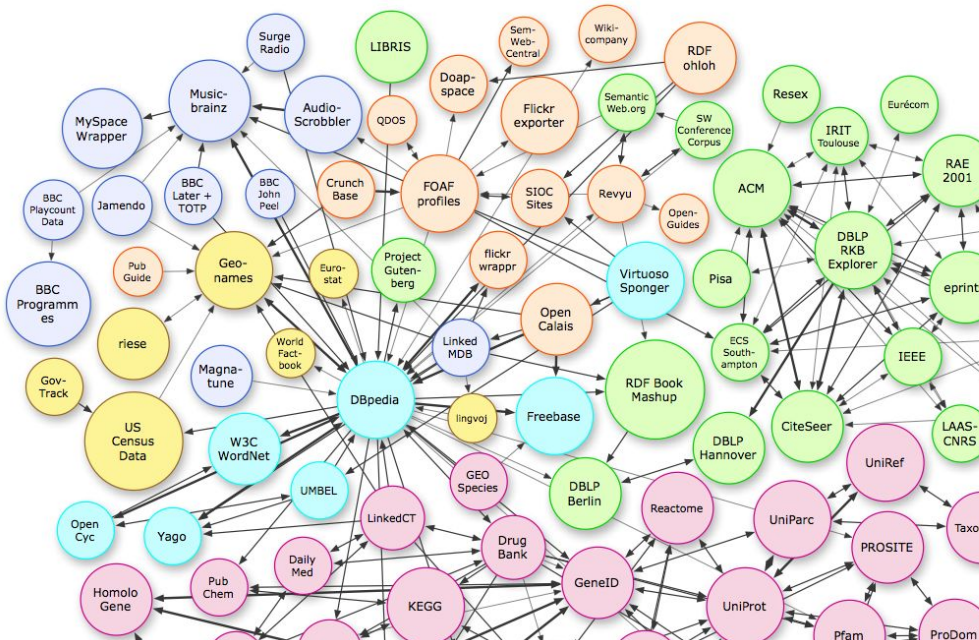

{Wähle nur http://dbpedia.org/resource/Ginkgo_biloba in Facette Tag aus} - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://hcls.deri.org/atag/generator/pastebin-exhibit
LEO Eng-Deu
<aTag
DERI
Generator
Examples
Datasets
Pastebin
Pastebin (Exhibit)
Examples visualized with SIMILE Exhibit (containing embedded RDFa)
21 Elemente gefiltert von ursprünglich 296 (Alle Filter zurücksetzen)
sortiert nach: Bezeichnungen; sowie nach... • Gruppierung wie Sortierung
1. http://hcls.deri.org/atag/generator/pastebin-exhibit#4a2f8b6579a1f (Verweis)
Bezeichnung: http://hcls.deri.org/atag/generator/pastebin-exhibit#4a2f8b6579a1f
type: Item
URI: http://hcls.deri.org ... ibit%234a2f8b6579a1f
modified: no
content: Patients with AD and neuropsychiatric features: exploratory findings helped to develop three hypotheses that will have to be proven in further studies: (1) there is no significant difference in the efficiency between the Ginkgo Biloba extract EGb 761(R) and donepezil, (2) a combination therapy will be superior to a mono-therapy with one of both substances and (3) there will be less side effects under a combination therapy than under mono-therapy with donepezil
topic: http://dbpedia.org/resource/Ginkgo_biloba, http://dbpedia.org/resource/Donepezil, http://dbpedia.org/resource/Alzheimer%27s_disease
seeAlso: http://www.ncbi.nlm.nih.gov/pubmed/19347685?ordinalpos=2&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPanel.Pubmed_RVDocSum
ip_address: 85.127.77.150
2. http://hcls.deri.org/atag/generator/pastebin-exhibit#4a2f8be3e9934 (Verweis)
Bezeichnung: http://hcls.deri.org/atag/generator/pastebin-exhibit#4a2f8be3e9934
type: Item
URI: http://hcls.deri.org ... ibit%234a2f8be3e9934
modified: no
content: Ginkgo biloba extract EGb(R)761 exerts anti-angiogenic effects via activation of tyrosine phosphatases
topic: http://dbpedia.org/resource/Ginkgo_biloba, http://dbpedia.org/resource/Anti-angiogenics, http://dbpedia.org/resource/Protein_tyrosine_phosphatase
seeAlso: http://www.ncbi.nlm.nih.gov/pubmed/19175691?ordinalpos=9&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_DefaultReportPa
Text Search:
Tag
21 http://dbpedia.org/resource/Ginkgo_biloba
9 http://dbpedia.org/resource/Therapy
8 http://dbpedia.org/resource/Alzheimer%27s_disease
8 http://dbpedia.org/resource/Huperzine_A
7 http://dbpedia.org/resource/Acetylcholinesterase_inhibitor
6 http://dbpedia.org/resource/GABAB_receptor
5 http://dbpedia.org/resource/Heart
IP Address
8 85.127.77.150
5 131.130.132.4
4 77.119.24.141
2 10.2.19.6
2 85.127.77.98
Fertig
SIMILE Exhibit

„Substance A interacts with receptor B in region C of the brain“

„Region C has strong axonal projections into region D“

„Region D is implicated in the processing of aversive stimuli“

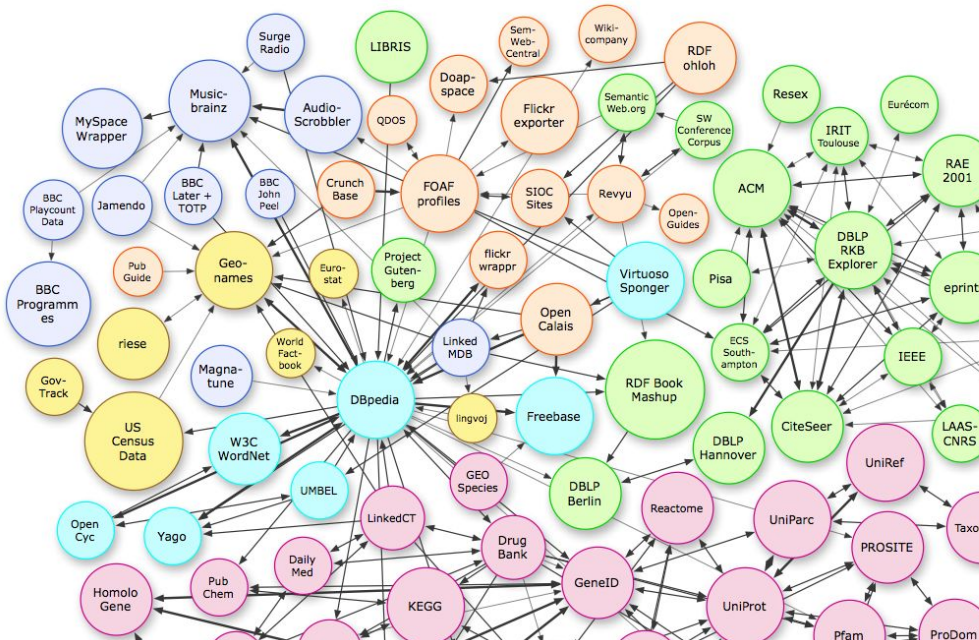
Standing on ~~the shoulders of giants~~ *clouds*



Konrad Lorenz Institute
for Evolution & Cognition Research
KLI

Linked Data paradigm:

Entities have URIs that can be resolved to yield further information



Some aTags about neuropharmacology etc.

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| "Huperzine A acts as a non-competitive antagonist of the NMDA receptors" aTags: Huperzine A receptor antagonist activity NMDA receptor (Source) |

| "some effects of CDP-choline could be mediated by changes in brain platelet-activating factor (PAF) levels"

http://dbpedia.org/resource/Huperzine_A

ment of aging mice" aTags: Striatum Dopamine receptor Acetylcholine receptor Citicoline (Source) |

| "changes in ERK phosphorylation in hippocampus and PFC were regulated by GABAA receptor in a learning and memory paradigm under acute restraint stress conditions" aTags: MAPK/ERK pathway Hippocampus Stress (Source)|

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Written by admin
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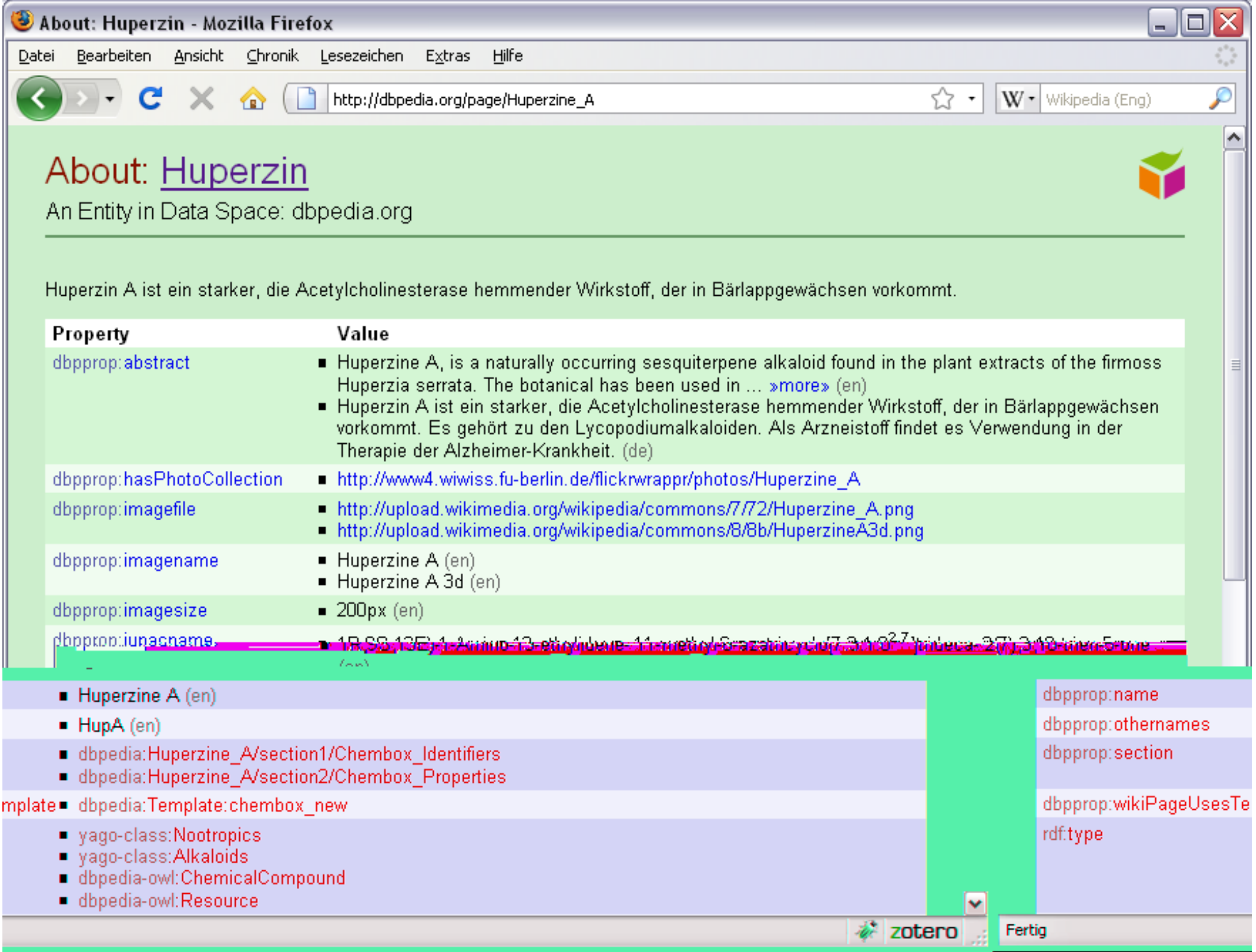
About: Huperzin - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://dbpedia.org/page/Huperzine_A
Wikipedia (Eng)
About: Huperzin
An Entity in Data Space: dbpedia.org
Huperzin A ist ein starker, die Acetylcholinesterase hemmender Wirkstoff, der in Bärlappgewächsen vorkommt.
Property
Value
dbpprop:abstract
Huperzine A, is a naturally occurring sesquiterpene alkaloid found in the plant extracts of the firmoss Huperzia serrata. The botanical has been used in ... »more» (en)
Huperzin A ist ein starker, die Acetylcholinesterase hemmender Wirkstoff, der in Bärlappgewächsen vorkommt. Es gehört zu den Lycopodiumalkaloiden. Als Arzneistoff findet es Verwendung in der Therapie der Alzheimer-Krankheit. (de)
dbpprop:hasPhotoCollection
http://www4.wiwiss.fu-berlin.de/flickrwrappr/photos/Huperzine_A
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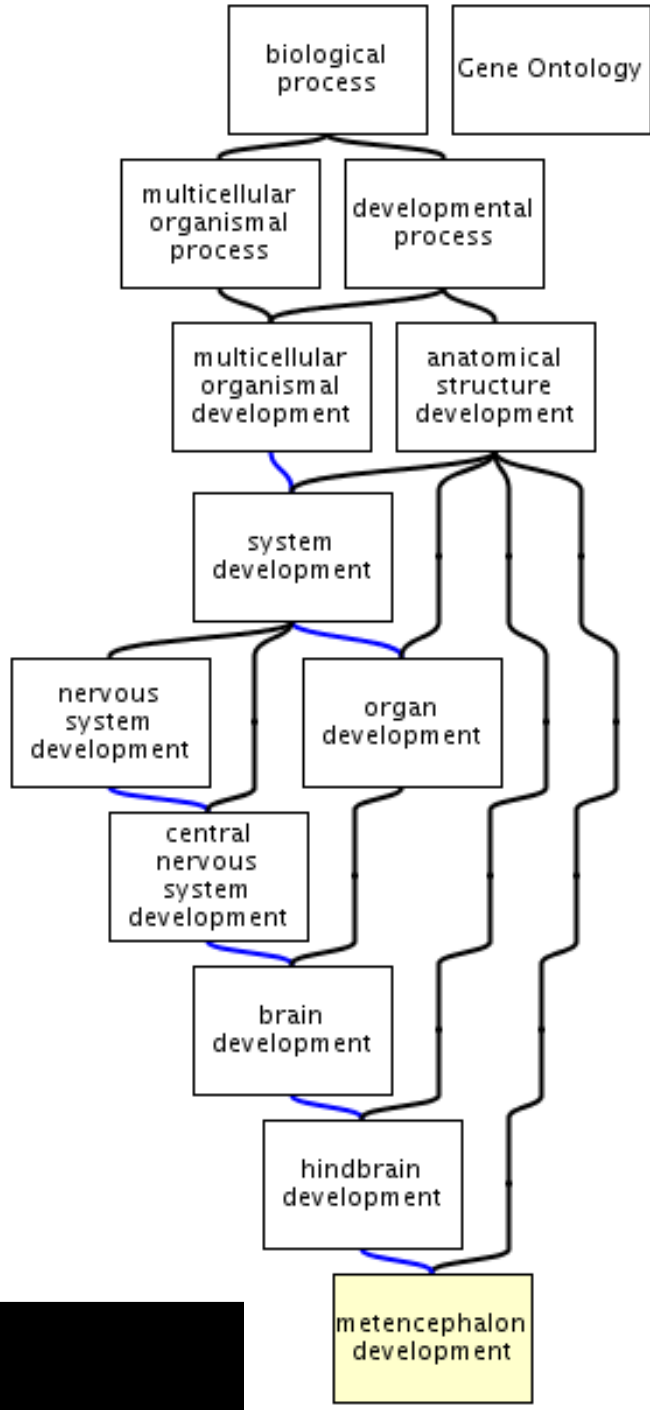
http://upload.wikimedia.org/wikipedia/commons/7/72/Huperzine_A.png
http://upload.wikimedia.org/wikipedia/commons/8/8b/HuperzineA3d.png
dbpprop:imagename
Huperzine A (en)
Huperzine A 3d (en)
dbpprop:imagesize
200px (en)
dbpprop:iupacname
Huperzine A (en)
HupA (en)
dbpedia:Huperzine_A/section1/Chembox_Identifiers
dbpedia:Huperzine_A/section2/Chembox_Properties
dbpedia:Template:chembox_new
yago-class:Nootropics
yago-class:Alkaloids
dbpedia-owl:ChemicalCompound
dbpedia-owl:Resource
dbpprop:name
dbpprop:othernames
dbpprop:section
dbpprop:wikiPageUsesTe
rdf:type
zotero
Fertig

Substance A
Interacts with
Receptor B

Region C
axonal projections
brain region D

Region D
aversive stimuli



All these entities are part of linked data resources and ontologies

VisiNav -- Visual Data Navigation - Mozilla Firefox

Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe

http://visinav.deri.org/atags/list?keyword=memantine

Wikipedia (Eng)

Home Content

memantine

Search

Detail List Table

Results 1 - 10 of 10

label
comment
content
ip_address
atcPrefix
width
atcprefix
casNumber
drugbank
casnumber
abstract

topic
navigate link →
NMDA receptor a...
Muscarinic acet...
Memantine
5-HT3 antagonist
5-HT3 receptor
subject
metabolism
hasPhotoCollect...

Memantine
http://en.wikipedia.org/wiki/Memantine
Document Document

Memantine
http://rdf.freebase.com/ns/guid.9202a8c04000641f80000000004b2c53

Resource Drug antagonist 5 more
Memantine is the first in a novel class of Alzheimer's disease medications acting on the glutamatergic system by blocking NMDA glutamate receptors. Memantine was first synthesized and patented by Eli Lilly and Company in 1968 (as cited in the Merck Index)...

Memantine
http://dbpedia.org/resource/Memantine

Memantine
http://www4.wiwiss.fu-berlin.de/flickrwrappr/photos/Memantine

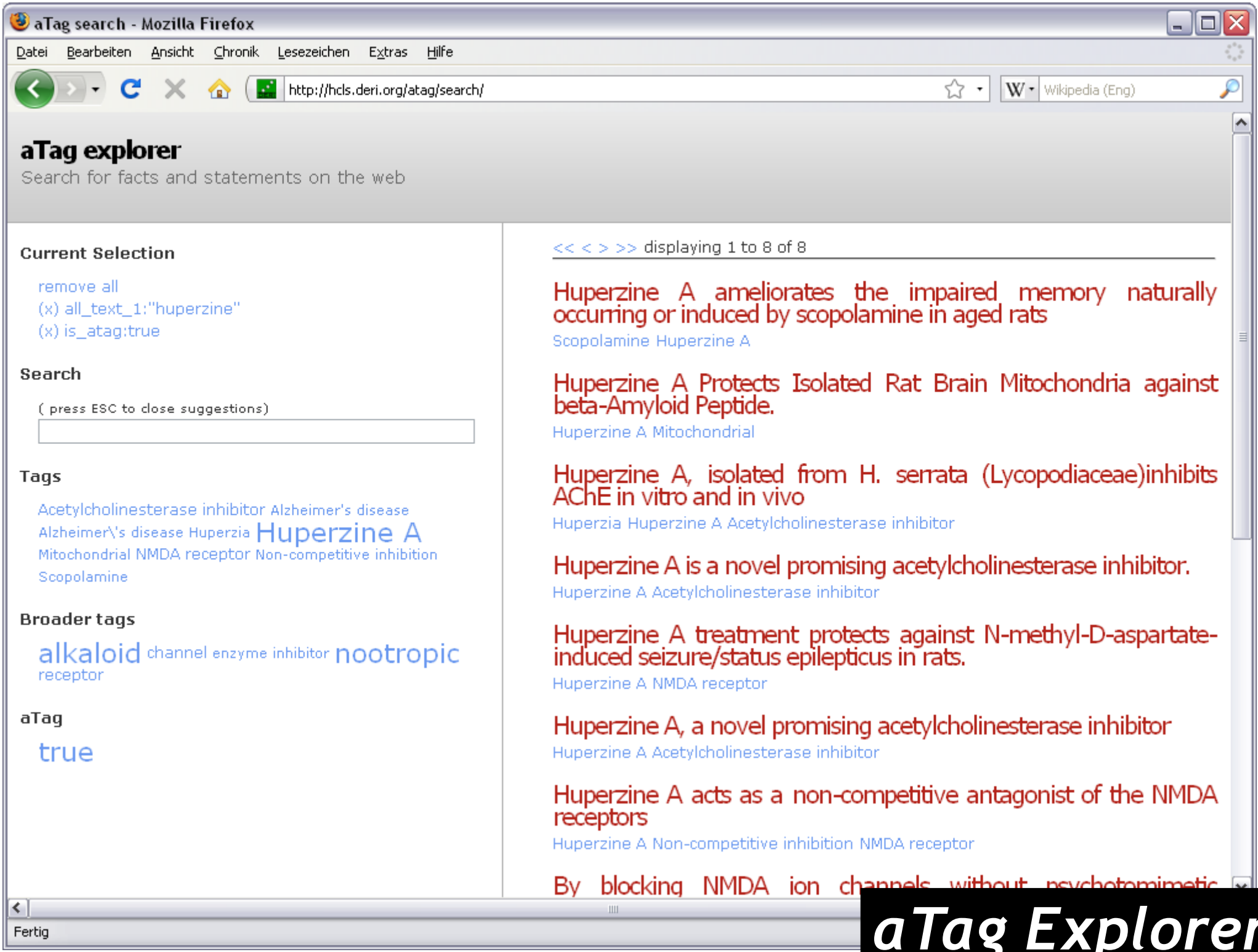
49c0fd66ad0a3

Fertig

zotero

Konrad Lorenz Institute for Evolution & Cognition Research KLI

DERI Visinav

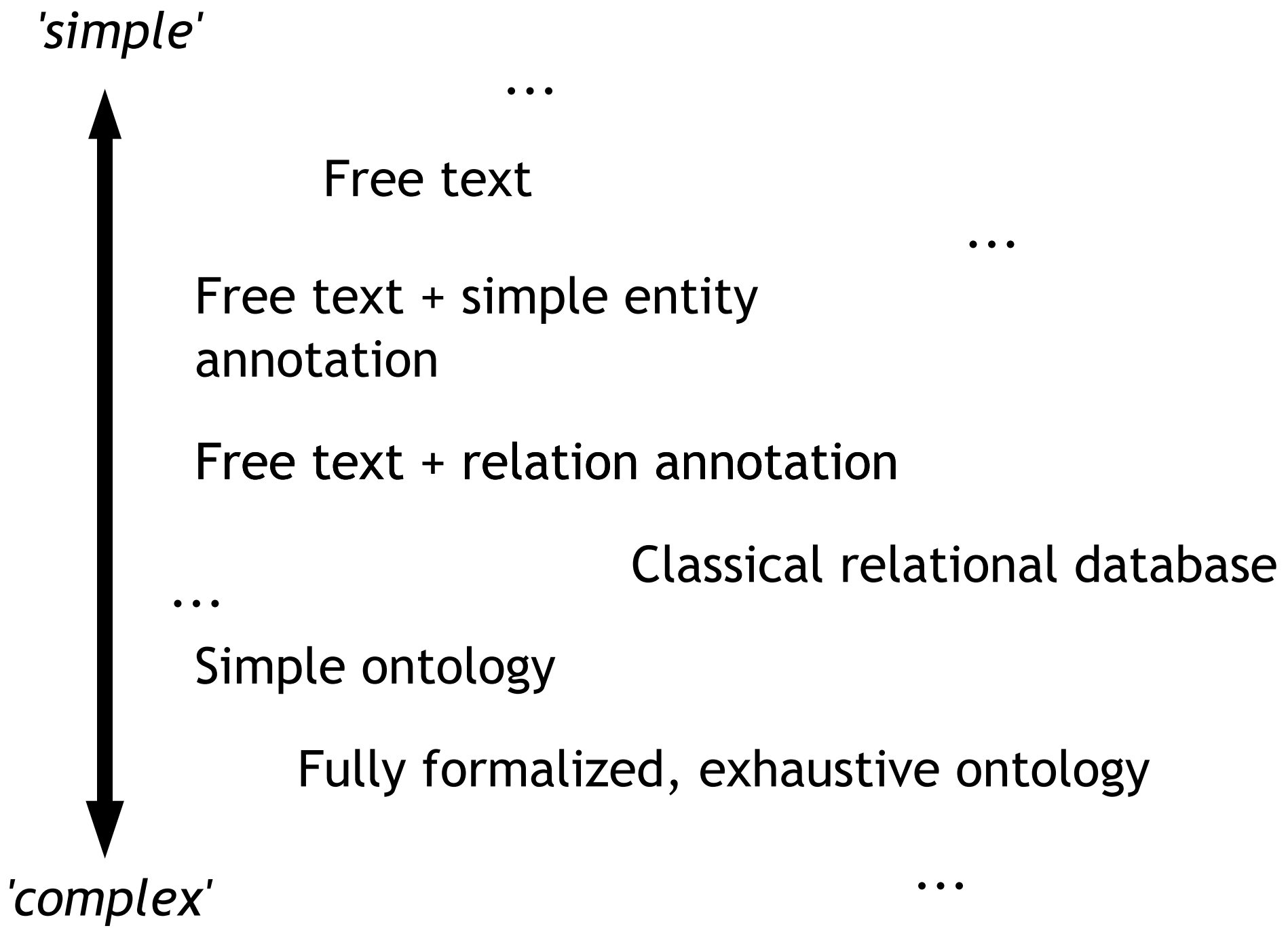

aTag search - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
http://hcls.deri.org/atag/search/
Wikipedia (Eng)
aTag explorer
Search for facts and statements on the web
Current Selection
remove all
(x) all_text_1:"huperzine"
(x) is_atag:true
Search
(press ESC to close suggestions)
Tags
Acetylcholinesterase inhibitor Alzheimer's disease Alzheimer\'s disease Huperzia Huperzine A Mitochondrial NMDA receptor Non-competitive inhibition Scopolamine
Broader tags
alkaloid channel enzyme inhibitor nootropic receptor
aTag
true
<< < > >> displaying 1 to 8 of 8
Huperzine A ameliorates the impaired memory naturally occurring or induced by scopolamine in aged rats
Scopolamine Huperzine A
Huperzine A Protects Isolated Rat Brain Mitochondria against beta-Amyloid Peptide.
Huperzine A Mitochondrial
Huperzine A, isolated from H. serrata (Lycopodiaceae)inhibits AChE in vitro and in vivo
Huperzia Huperzine A Acetylcholinesterase inhibitor
Huperzine A is a novel promising acetylcholinesterase inhibitor.
Huperzine A Acetylcholinesterase inhibitor
Huperzine A treatment protects against N-methyl-D-aspartate-induced seizure/status epilepticus in rats.
Huperzine A NMDA receptor
Huperzine A, a novel promising acetylcholinesterase inhibitor
Huperzine A Acetylcholinesterase inhibitor
Huperzine A acts as a non-competitive antagonist of the NMDA receptors
Huperzine A Non-competitive inhibition NMDA receptor
By blocking NMDA ion
Fertig
aTag Explorer

Developers need...

understandable and **predictable data structures** across distributed data sources

ability to integrate into existing (web) applications, rather than building everything from scratch

simple means to develop GUIs to present and manipulate data


'simple'
...
Free text
...
Free text + simple entity annotation
Free text + relation annotation
Classical relational database
...
Simple ontology
Fully formalized, exhaustive ontology
...
'complex'

'simple'

'complex'

Where

is

the

optimum?

start simple, not complex

balance 'semantics' and 'pragmatics'

blur distinction between 'text' and 'data'

let real biomedical projects and user feedback drive developments

Todo

convert more data

curate more papers

improve software (e.g., tag recommendation based on NCBO OBA etc.)

align with discourse ontologies (SWAN, SALT etc.)

learn from it

creating aTags and aTag-enabled applications is simple and fun!

if you want to participate, contact me!

Tom Sawyer convincing someone else to do his work

Early prototypes:

http://hcls.deri.org/atag

Bye!