

# WebProtege and BioPortal as Infrastructures for Ontology Evaluation

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# WebProtégé

- Collaborative ontology browser and editor for the Web
- Platform for building Web-based semantic applications
- Customizable and extensible
- OWL-API backend
- OWL 2, OBO, RDF(S)
- Integrated with BioPortal to support the editing-publishing lifecycle of ontologies
- “Google docs” for ontologies; over 500 ontologies submitted by users
- Free and open source; implemented in Java and GWT

# WebProtégé – simplified interface

WebProtégé - Mozilla Firefox

File Edit View History Bookmarks Tools Help

webprotege-beta.stanford.edu/

Tania Tudorache | Sign Out | Options | Send feedback

My WebProtégé Gene Ontology (GO)

Classes Properties Individuals Notes and Discussions Change history Watches Reviews Revisions

Add content to this tab Add tab

### Classes

Create Delete Watch Branch Search: Type search string

- binding unfolded ER proteins
- biological\_process
  - biological adhesion
  - biological regulation
  - cell killing
  - cellular component organization or biogenesis
  - cellular process**
    - cellular metabolic process
    - cellular process involved in reproduction
    - multi-organism cellular process
    - phenotypic switching
    - single-organism cellular process
  - developmental process
  - establishment of localization
  - growth
  - immune system process
  - localization
  - locomotion
  - metabolic process
  - multi-organism process
  - multicellular organismal process
  - reproduction
  - reproductive process
  - response to stimulus
  - rhythmic process
  - signaling
  - single-organism process
- developmental process
- establishment of localization
- growth
- immune system process
- localization
- locomotion
- metabolic process
- multi-organism process
- multicellular organismal process
- reproduction
- reproductive process
- response to stimulus
- rhythmic process
- signaling
- single-organism process

### Class description for cellular process

Display name: cellular process

IRI: http://purl.obolibrary.org/obo/GO\_0009987

Annotations

rdfs:label	cellular process	lang	X
hasAlternativeId	http://purl.obolibrary.org/obo/GO_0008151		X
hasAlternativeId	http://purl.obolibrary.org/obo/GO_0050875		X
def	Any process that is carried out at the cellular level, but not necessarily restricted to a single cell. For example, cell communication occurs among more than one cell, but occurs at the cellular level.	lang	X
namespace	biological_process	lang	X
hasNarrowSynonym	cell growth and/or maintenance	lang	X
hasExactSynonym	cell physiology	lang	X
hasExactSynonym	cellular physiological process	lang	X
inSubset	goslim_pir	lang	X
inSubset	goslim_plant	lang	X
inSubset	gosubset_prok	lang	X

Properties

### Notes Tree for cellular process

# Features of WebProtégé

- Collaboration support; SVN-like revisions
- Contextual notes and discussions attached to any entity in the ontology, including reviews
- Complete and executable change history
- Sharing of ontologies, access policies
- Download any revision of the ontology
- Integrates with BioPortal content, notes and proposals
- Will integrate with Protégé 5+ desktop client

# BioPortal

- An open repository of biomedical ontologies and terminologies developed by NCBO at Stanford
- Publishing of ontologies, versioning (over 320 ontologies)
- Storing metadata
- Online, open, community-based peer review
- All content and functionality available as REST Web services
- 65,000 unique visitors per month
- <http://bioportal.bioontology.org>

# BioPortal – Browsing ontology terms

NCI Thesaurus Terms ▾

Jump To:

Details	Visualization	Notes (0)	Term Mappings (8)	Term Resources
Preferred Name <i>(Preferred_Name)</i>			Adverse Event	
Synonyms <i>(FULL_SYN)</i>			AdverseEvent Adverse Experience AE	
Definitions <i>(DEFINITION)</i>			Any unfavorable or unintended symptom, sign, or disease including an abnormal laboratory finding) temporal association with the use of a medical treatment or procedure that may or may not be considered related to the medical treatment or procedure. Such events can be intervention related, dose related, route related, patient related, or caused by an interaction with another drug(s) or procedure(s).	
ID			Adverse_Event	
Full Id			<a href="http://ncicb.nci.nih.gov/xml/owl/EVS/Thesaurus.owl#Adverse_Event">http://ncicb.nci.nih.gov/xml/owl/EVS/Thesaurus.owl#Adverse_Event</a>	
ALT_DEFINITION			<p>An unexpected medical problem that happens during treatment with a drug or other therapy. Adverse effects do not have to be caused by the drug or therapy, and they may be mild, moderate, or severe.NCI-GLOSS</p> <p>Any unfavorable and unintended sign, symptom, disease, or other medical occurrence with a temporal association with the use of a medical product, procedure or other therapy, or in conjunction with a research study, regardless of causal relationship. EXAMPLE(S): death, back pain, headache, pulmonary embolism, heart attackBRIDG</p> <p>Any untoward medical occurrence in a patient or clinical investigation subject administered a pharmaceutical product and which does not necessarily have a causal relationship with this treatment. An adverse event (AE) therefore be any unintended sign (including an abnormal laboratory finding), symptom, or disease temporally associated with the use of a medicinal (investigational) product, whether or not related to the medicinal (investigational) product. NOTE: For further information, see the ICH Guideline for Clinical Safety Data Management: Definitions and Standards for Expedited Reporting. [Modified from ICH E2A] Synonyms: side effect, adverse experience. See also serious adverse event, serious adverse experience. (CDISC glossary)CDISC</p>	
code			C41331	
Concept_In_Subset			<a href="#">Type of Event ICSR Terminology</a> <a href="#">Individual Case Safety Report Terminology</a> <a href="#">CDISC SDTM Terminology</a> <a href="#">Clinical Data Interchange Standards Consortium Terminology</a> <a href="#">CDISC SDTM Reason for Non-Completion Terminology</a>	

- Abnormal Cell
- Activity
- Anatomic Structure, System, or Substance
- Biochemical Pathway
- Biological Process
- Chemotherapy Regimen or Agent Combination
- Conceptual Entity
- Diagnostic or Prognostic Factor
- Disease, Disorder or Finding
  - Disease or Disorder
  - Finding
    - Cancer TNM Finding
    - Clinical Course of Disease
    - Clinical Test Result
    - Finding by Cause
      - Adverse Event**
      - Cause of Death
      - Chemical Exposure
      - Chemical Imbalance
      - Ciliary Motility Defect
      - Contamination From Blood Or Body Fluids
      - Drug Exposure
      - Drug Extravasation
      - Electrical Exposure
      - Explanted Organ
      - Failure to Thrive
      - Foreign Body Reaction
      - Foreign Body Sensation
      - Fungal Colonization
      - Hypothermia
      - Iatrogenic Source
      - Infusion Site Extravasation
      - Injury

## Details

ONTOLOGY ID:	1032
BIOPORTAL PURL:	<a href="http://purl.bioontology.org/ontology/NCIt">http://purl.bioontology.org/ontology/NCIt</a>
STATUS:	Production
FORMAT:	OWL
CATEGORIES:	
GROUPS:	Unified Medical Language System Cancer Biomedical Informatics Grid
CONTACT:	NCICB Support, <a href="mailto:ncicb@pop.nci.nih.gov">ncicb@pop.nci.nih.gov</a>
HOME PAGE:	<a href="http://ncicb.nci.nih.gov/core/EVS">http://ncicb.nci.nih.gov/core/EVS</a>
PUBLICATIONS PAGE:	
DOCUMENTATION PAGE:	<a href="http://nciterms.nci.nih.gov">http://nciterms.nci.nih.gov</a>
DESCRIPTION:	A vocabulary for clinical care, translational and basic research, and public information and administrative activities.
LICENSE INFORMATION	The version of the NCI Thesaurus (NCIt) available in BioPortal has been modified by reformatting some property values so that they can be more easily browsed (replacing or removing embedded XML). The original, unmodified NCIt, as well as NCIt license information, is available at <a href="http://ncit.nci.nih.gov">http://ncit.nci.nih.gov</a> .

## Metrics ?

NUMBER OF CLASSES:	93411
NUMBER OF INDIVIDUALS:	0
NUMBER OF PROPERTIES:	200
MAXIMUM DEPTH:	14
MAXIMUM NUMBER OF SIBLINGS:	2619
AVERAGE NUMBER OF SIBLINGS:	145
CLASSES WITH A SINGLE SUBCLASS:	6668
CLASSES WITH MORE THAN 25 SUBCLASSES:	30477
CLASSES WITH NO DEFINITION:	37617

## Versions

VERSION	RELEASE DATE	UPLOAD DATE	DOWNLOADS
<a href="#">12.04e</a>	04/30/2012	06/08/2012	<a href="#">Ontology</a>
<a href="#">12.03d</a>	03/26/2012	05/23/2012	<a href="#">Ontology</a>
<a href="#">11.06d</a>	07/27/2011	09/30/2011	<a href="#">Ontology</a>
<a href="#">11.01e</a>	03/15/2011	03/21/2011	<a href="#">Ontology</a>
<a href="#">10.03</a>	03/15/2010	05/24/2010	<a href="#">Ontology</a>
<a href="#">more...</a>			

# Reviews

Add your review

REVIEW BY DECORONS ON 02/07/2011

- ★★★★★ Usability
- ★★★★★ Domain Coverage
- ★★★★★ Correctness
- ★★★★★ Quality Of Content
- ★★★★★ Degree Of Formality
- ★★★★★ Documentation And Support

Good coverage for cancer research domains and moderate coverage for more general health care research. Especially good cancer related drug coverage, and chemotherapy regimen coverage. Includes number of standards used by the community, including CDISC, UCUM, FDA standard product labeling terminology, and others. Quality in many areas high. OWL DL, but degree of formality varies by area of the terminology. Available through easy to use browsers, API and

multiple download formats.

## Projects Using This Ontology

Create new project

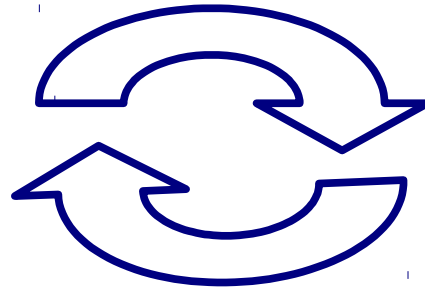
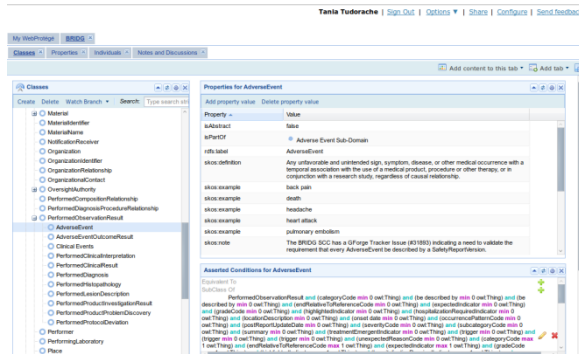
PROJECT	DESCRIPTION	PEOPLE	INSTITUTION
<a href="#">Patient/Research Participant Permissions Ontology</a>	An ontology to capture patients' and research participants' res...		MUSC
<a href="#">ISA software suite</a>	An open source ISA software suite and an extensible hierarchica...	International collaborative effort	Multiple institutions; leads at University of Oxford, UK
<a href="#">NCBO Resource Index</a>	The NCBO Resource Web service is a system for ontology based a...	NCBO	Stanford University
<a href="#">Pediatric Terminology</a>	Terms associated with pediatrics, representing information rela...	Ranjana Srivastava, Daniel Lyman, Ipsita Das	National Institute of Child Health and Human Development
<a href="#">OntoCAT</a>	High level abstraction API (Java/REST/R) for interacting with o...	Tomasz Adamus...	EMBL-EBI, University of Groningen
<a href="#">LogMap</a>	Logic-based and Scalable Ontology Matching. LogMap is a highly ...	Ernesto Jimenez Ruiz and Bernardo Cuenca Grau	University of Oxford
<a href="#">MeRy-B</a>	MeRy-B is a plant metabolomics platform allowing the storage an...	Daniel Jacob, Catherine Deborde, Annick Moing	INRA & Univ. Bordeaux
<a href="#">Hypertrophic Cardiomyopathy</a>	The Hypertrophic Cardiomyopathy (HCM) project is focused on the...		
<a href="#">NViz: A Visualization Tool</a>	Ontology alignment, the task of	Watson W.K. Chua	



# An Integrated Editing and Publishing Infrastructure for Ontology Evaluation

WebProtégé

BioPortal



- Collaborative editing platform
- Internal notes and discussions
- Enacting of proposals for change

- Publishing platform
- Elicit public commenting
- Reviews
- Proposals for change

# Ontology Evaluation with WebProtégé and BioPortal

- Support an ontology review process similar to the scientific papers' review
- Different levels of reviewing:
  - Internal review (on development version in WebProtégé)
  - Public review (on released version in BioPortal)
- Address the reviewing comments in WebProtégé and publish a new released version to BioPortal
- Reviews and proposals are structured so that many of them can be enacted automatically

# Accessing BioPortal notes in WebProtégé

The screenshot displays the WebProtégé web application interface. At the top, the browser address bar shows `webprotege.stanford.edu/#BRO`. The user is logged in as Tania Tudorache. The main content area is titled "BioPortal notes and proposals for Activity" and contains a table of notes:

Subject	Author	Date
RE: what's the difference between this note and notes on mappin...	whetzel	Tue Oct 11 09:47:45 GMT-700 2011
RE: what's the difference between this note and notes on mappin...	whetzel	Tue Oct 11 09:10:11 GMT-700 2011
what's the difference between this note and notes on mappings?	imposim	Mon Sep 26 18:38:46 GMT-700 2011

Below the table, there is an "Add new note" button and a selected note titled "RE: what's the difference between this note and notes on mappings?". The note content includes: "The Term Notes refer to comments or actions requested on Terms in the ontology. The Mapping Notes refer to comments on Mappings." Below the note content, there are "Reply" and "Status" buttons. The "Status" dropdown menu is open, showing options: "Not set", "Submitted", "Under Discussion", "Under Review", "Approved", "Rejected", "Implemented", and "Published".

On the left side, there is a "Classes" tree view showing a hierarchy of classes including "Activity", "Area of Research", "Biositemaps Information Model", "core:Colle", "core:Conc", "core:Conc", "Deprecated", "Deprecated Resource", and "Resource".

At the bottom left, a "Configure" dialog box is open, showing the "BioPortal" tab. It contains fields for "BioPortal REST Base:" and "Linked BioPortal Ontology Id:" (with the value "44450").

Four callout boxes with arrows point to specific features:

- "Add new note" points to the "Add new note" button.
- "Browse BioPortal notes" points to the table of notes.
- "Actions on BioPortal notes" points to the "Status" dropdown menu.
- "Configure BioPortal connection" points to the "Configure" dialog box.

# Some issues

- Visibility of reviews: public or private?
- How to incentivize users to review ontologies?
- How to structure a review? E.g. R1: *“I've used this ontology for annotating images, and it works great.”* - 5 stars; R2: *“This ontology is useless for data integration in domain X.”* - 1 star
- Are there generic types of tasks for which ontologies can be evaluated?
- What kind of reviewing workflow is needed?
- How to aggregate reviewing data?

# Resources

- WebProtégé:
  - <http://webprotege-beta.stanford.edu>
  - Documentation: <http://protegewiki.stanford.edu/wiki/WebProtege>
  - Papers:  
<http://protegewiki.stanford.edu/wiki/WebProtege#References>
- BioPortal:
  - <http://bioportal.bioontology.org>
  - Documentation: <http://bioportal.bioontology.org/help>
  - Papers:  
[http://bioportal.bioontology.org/help#How\\_to\\_cite\\_NCBO\\_and\\_BioPortal](http://bioportal.bioontology.org/help#How_to_cite_NCBO_and_BioPortal)