



# NCI Thesaurus, managing towards an ontology

CENDI/NKOS Workshop  
October 22, 2009  
Gilberto Fragoso



## Outline



- Background on EVS
- The NCI Thesaurus
- BiomedGT
- Editing Plug-in for Protege
- Semantic Media Wiki
  - supports collaborative development



## NCI Enterprise Vocabulary Services



### Goal – Integration by Meaning

- EVS provides services and resources that assists to:
  - Integrate different conceptual frameworks for clinical, basic and translational research,
  - Create terminological and taxonomic conventions across systems
- Controlled Terminology Products
  - NCI Thesaurus – an ontology-like cancer-centric controlled terminology
  - NCI Metathesaurus – maps biomedical vocabularies
  - BiomedGT (Biomedical Grid Terminology - **new**)
  - External vocabularies maintained and served: MedDRA, HL7, NDF-RT, LOINC, GO, Zebrafish, RadLex, etc.
- Further info, see: <https://wiki.nci.nih.gov/display/EVS/EVS+Wiki>



## Products: NCI Thesaurus



- Reference Terminology for NCI, caBIG, Partners
  - Underpins caCORE, caGRID semantics
- A Recommended Federal Standard Terminology for Anatomy
- Public domain, open content license
- 80,000 “Concepts” hierarchically organized into domains
- Broad coverage of the cancer research and clinical domain including prevention and treatment trials
  - Neoplastic and other Diseases
  - Findings and Abnormalities
  - Anatomy, Tissues, Subcellular Structures
  - Agents, Drugs, Chemicals
  - Genes, Gene Products, Biological Processes
  - Animal Models – Mouse, other
  - Research techniques and management, apparatus, clinical and lab, radiology, imagery



## Products: NCI Thesaurus (2)



- Description-logic based
- Concept History
- Published Monthly
- Accessible via API, web browsers, downloadable files
- Transition to OWL begun in '03



## Issues and Challenges



- Content
  - many domains, users and uses
- Support
  - collecting input from end users and collaborators
- Tracking Provenance
- Use of Properties
  - standard terminology for properties (e.g. preferred\_term vs term vs ?)
- QA and Editing Consistency
  
- New use cases
  - Query and reasoning against instance data on the Grid
  - Federation of ontologies and subontologies



## NCI Thesaurus Evaluation 2006-2007



### Goals

1. Review and report of OBO criteria and relevant ISO standards for semantic quality and federation of terminologies, semantic quality and consistency.
2. Review content and structure for compliance
3. Document examples of how compliance would be achieved



## Among the Recommendations



### (Genesis of BiomedGT)

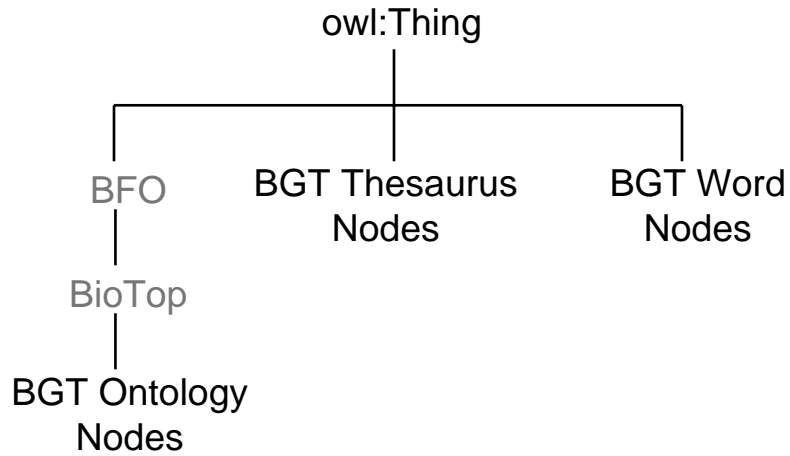
- 1) Unravel the vocabulary
  - Partition into:
    - Words and their definitions (Lexicon / Dictionary)
    - Categorization and navigational nodes (Thesauri)
    - Ontology
- 2) Identify external resources and:
  - Include ability to reference general upper level ontologies
  - Named relationships with other external resources
- 3) Enable collaboration: create environment where SME's can collaborate and discuss



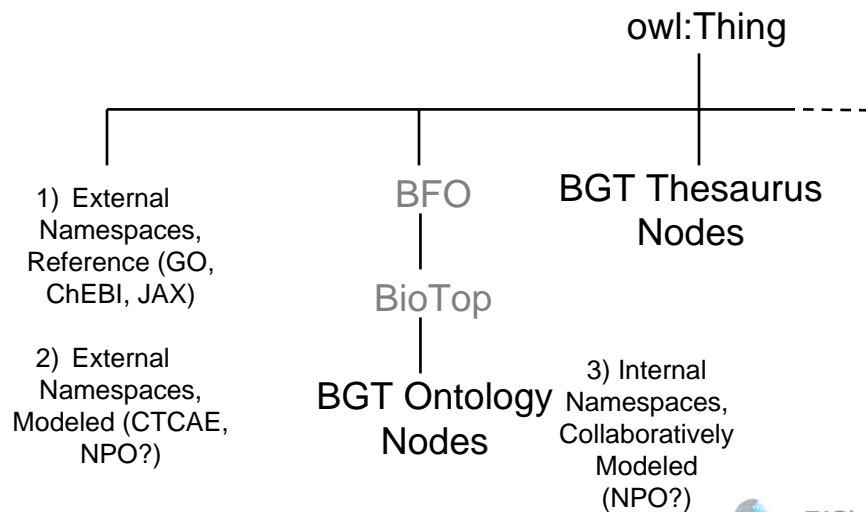
## Unraveling the Vocabulary



...in BGT



## Reuse of Resources



## BGT Initial Development



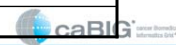
- NCI content used to seed BGT
- Categorization of all BGT concepts as O, N, C
- Eliminate NCI-specific branches and concepts
- Partition concepts – BFO, Thesaurus, and Words (ongoing)
- Import external vocabularies (ongoing)
- Refactor annotation properties (ongoing)
  - name and format
- Refactor object properties (standby)



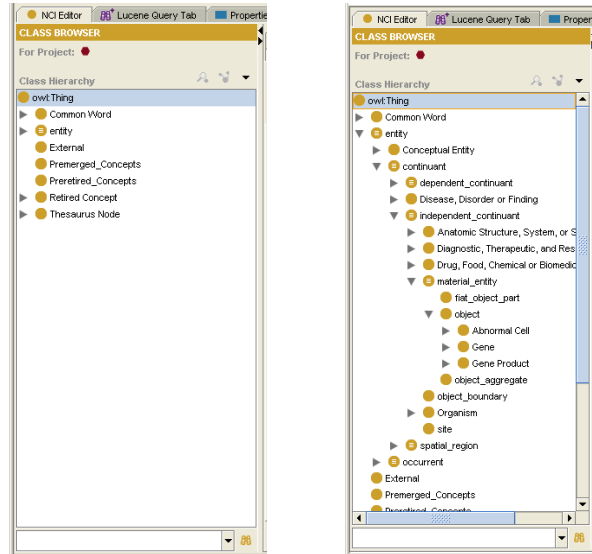
## Concept Removal and Federation



Branch Removed	Initial Federation	Removal after Refactoring
NCI Thesaurus Entity	GO	Biological Process
Chemotherapy Regimen or Agent Combination	chEBI	Biochemical Pathway
Experimental Organism Anatomical Concept	Sequence types and features ontology	Organism
Experimental Organism Disease	NCBI Taxon	Disease or Disorder
Medical Device Component or Accessory	Pathway Ontology	Molecular_Abnormality
Medical Product Usage and Evaluation	Protein Modification	Chemicals and Drugs
Reportable Event	PATO	
UML Entity	NCI Thesaurus Disease or Disorder Branch	
Business Rules	BFO	
Clinical or Research Facility		
Funding		
Information and Media		
Academic Degree		



## Partitioning of BGT Concepts



## Editing Tool Requirements



- Shared Data and Distributed Editing
- Reasoning
- GUI for Subject Matter Experts
  - search and reporting facilities
- Editing Consistency
  - basic content – preferred and alternative terms, definition
- Complex Operations
  - merge, split, retirement
  - tied to history tracking
- Rule Enforcement, Edit Checks
  - semantic type, no duplicate restrictions
- Support for Workflow, Editing Roles (manager, editor)



### NCIEditTab

BiomedGT Protégé 3.4 (rmi://cbapp-q1001.nc.nih.gov/BiomedGT)

File Edit Project QML Reasoning Code Tools Window Edit Tab Lucene Explanations Collaboration Help

protégé

CLASS BROWSER

For Project: ●

Class Hierarchy

- material\_entity
  - flat\_object\_part
  - object
    - Gene Product
      - Gene
        - Antigen Gene
        - Apoptosis Regulation Gene
        - Cancer Gene
          - BCAS1 Gene
          - BRCATA Gene
          - C3orf27 Gene
          - EPST11 Gene
          - HHCM Gene
          - Metastasis Gene
            - Metastasis Suppress
            - NAG Gene
            - Susceptibility/Resistance Gene
            - TRERF1 Gene
            - Tumor Promoter Induc
            - Tumor Suppressor Gene
            - Oncogene
              - Oncogene, Transmembrane
              - Oncogenes, G-Protein Coupled
              - Oncogene TIM

Class: Oncogene\_TIM

Preferred Name: Oncogene TIM code: B18542

Basic Data Relations Properties

Terms

Term Name	Term Group	Term Source	Source Code	Lang
Oncogene TIM	PT	NCI		
Guanine nucleotide regulatory protein TIM gene	SY	NCI		
Rho guanine nucleotide exchange factor 5 gene	SY	NCI		
Transforming immortalized mammary oncogene	SY	NCI		

Definition

Value

Oncogene TIM encodes a predicted 60 kD protein containing a DBL homology domain, shared by several signal transducing regulators of small GTP-binding proteins. TIM is thought to control cytoskeletal organization through regulation of small GTP-binding proteins. The human gene is located at 7q33-q35.

Qualifiers

Name	Value
Definition_Review_Date	060127
def-source	NCI
Definition_Reviewer_Name	DEFAULT_Review

New Delete Review Save Cancel

### NCIEditTab – editing definitions and terms

BiomedGT Protégé 3.4 (rmi://cbapp-q1001.nc.nih.gov/BiomedGT)

File Edit Project QML Reasoning Code Tools Window Edit Tab Lucene Explanations Collaboration Help

protégé

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- material\_entity
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        - Cancer Gene
          - BCAS1 Gene
          - BRCATA Gene
          - C3orf27 Gene
          - EPST11 Gene
          - HHCM Gene
          - Metastasis Gene
            - Metastasis Suppress
            - NAG Gene
            - Susceptibility/Resistance Gene
            - TRERF1 Gene
            - Tumor Promoter Induc
            - Tumor Suppressor Gene
            - Oncogene
              - Oncogene, Transmembrane
              - Oncogenes, G-Protein Coupled
              - Oncogene TIM

Class: Oncogene\_TIM

Preferred Name: Oncogene TIM code: B18542

Basic Data Relations Properties

Terms

Term Name	Term Group	Term Source	Source Code	Lang
Oncogene TIM	PT	NCI		
Guanine nucleotide regulatory protein TIM gene	SY	NCI		
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Oncogene TIM encodes a predicted 60 kD protein containing a DBL homology domain, shared by several signal transducing regulators of small GTP-binding proteins. TIM is thought to control cytoskeletal organization through regulation of small GTP-binding proteins. The human gene is located at 7q33-q35.

Qualifiers

Name	Value
Definition_Review_Date	060127
def-source	NCI
Definition_Reviewer_Name	DEFAULT_Review

**Edit FULL\_SYN Annotation Property**

FULL\_SYN

Term

Guanine nucleotide regulatory protein TIM gene

Definition

Oncogene TIM encodes a predicted 60 kD protein containing a DBL homology domain, shared by several signal transducing regulators of small GTP-binding proteins. TIM is thought to control cytoskeletal organization through regulation of small GTP-binding proteins. The human gene is located at 7q33-q35.

Qualifiers

Name	Value
Term Type	SY
Term Source	CA3
Code	CN
Lang	CNU
	DN
	FB
	HD
	SN

OK



## NCIEditTab – relations subtab

**CLASS BROWSER**

For Project: ●

Class Hierarchy

- Central Nervous System Hematopoietic Neoplasm
- Childhood Hematopoietic Neoplasm
- Cutaneous Hematopoietic and Lymphoid Cell Neoplasms
- Histiocytic and Dendritic Cell Neoplasms
- Lymphocytic Neoplasm
- Mast Cell Neoplasm
- Myeloid Neoplasm
  - Chronic Myeloproliferative Disorder
    - Chronic Eosinophilic Leukemia
    - Chronic Idiopathic Myelofibrosis
    - Chronic Myelogenous Leukemia
      - Accelerated Phase Chronic Myelogenous Leukemia
      - Blast Phase Chronic Myelogenous Leukemia
      - Childhood Chronic Myelogenous Leukemia
      - Chronic Phase Chronic Myelogenous Leukemia
      - Meningeal Chronic Myelogenous Leukemia
      - Philadelphia Chromosome Negative Chronic Myelogenous Leukemia
      - Philadelphia Chromosome Positive Chronic Myelogenous Leukemia
      - Recurrent Chronic Myelogenous Leukemia
      - Refractory Chronic Myelogenous Leukemia
      - Splenic Manifestation of Chronic Myelogenous Leukemia
      - Chronic Myeloproliferative Disease, Unclassified
      - Chronic Neutrophilic Leukemia
      - Essential Thrombocythemia

Class: Philadelphia\_Chromosome\_Positive\_Chronic\_Myelogenous\_Leukemia  
 Preferred Name: Philadelphia Chromosome Positive Chronic Myelogenous Leukemia code: B9301

**Basic Data** | **Relations** | **Properties**

Restrictions/Groups

1 (Disease\_Has\_Cytogenetic\_Abnormality only t(9;22)(q34;q11)) and (Disease\_Has\_Cytogenetic\_Abnormality only Philadelphia\_Chromosome\_Positive\_Chronic\_Myelogenous\_Leukemia) NECESSARY & SUFFICIENT

2 Disease\_May\_Have\_Associated\_Disease some Anemia

3 Disease\_May\_Have\_Finding some Fatigue

4 Disease\_May\_Have\_Finding some Hepatomegaly

5 Disease\_May\_Have\_Finding some Weight Loss

6 Disease\_May\_Have\_Finding some White Blood Cell Count Increased

7 Disease\_May\_Have\_Finding some Chronic\_Clinical\_Course

Parent Class

Chronic\_Myelogenous\_Leukemia NECESSARY & SUFFICIENT

Philadelphia-Positive Myelogenous Leukemia NECESSARY

Associations

Property	Value

New Delete Review Save Cancel

## NCIEditTab – class expressions, editing

**CLASS BROWSER**

For Project: ●

Class Hierarchy

- Central Nervous System Hematopoietic Neoplasm
- Childhood Hematopoietic Neoplasm
- Cutaneous Hematopoietic and Lymphoid Cell Neoplasms
- Histiocytic and Dendritic Cell Neoplasms
- Lymphocytic Neoplasm
- Mast Cell Neoplasm
- Myeloid Neoplasm
  - Chronic Myeloproliferative Disorder
    - Chronic Eosinophilic Leukemia
    - Chronic Idiopathic Myelofibrosis
    - Chronic Myelogenous Leukemia
      - Accelerated Phase Chronic Myelogenous Leukemia
      - Blast Phase Chronic Myelogenous Leukemia
      - Childhood Chronic Myelogenous Leukemia
      - Chronic Phase Chronic Myelogenous Leukemia
      - Meningeal Chronic Myelogenous Leukemia
      - Philadelphia Chromosome Negative Chronic Myelogenous Leukemia
      - Philadelphia Chromosome Positive Chronic Myelogenous Leukemia
      - Recurrent Chronic Myelogenous Leukemia
      - Refractory Chronic Myelogenous Leukemia
      - Splenic Manifestation of Chronic Myelogenous Leukemia
      - Chronic Myeloproliferative Disease, Unclassified
      - Chronic Neutrophilic Leukemia
      - Essential Thrombocythemia

Class: Relapsed\_Chronic\_Myelogenous\_Leukemia  
 Preferred Name: Recurrent Chronic Myelogenous Leukemia code: B9243

**Basic Data** | **Relations** | **Properties**

Restrictions/Groups

1 (Disease\_May\_Have\_Cytogenetic\_Abnormality some Philadelphia\_Chromosome\_Positive\_Chronic\_Myelogenous\_Leukemia) NECESSARY & SUFFICIENT

2 (Disease\_May\_Have\_Molecular\_Abnormality some t(9;22)(q34;q11)) NECESSARY & SUFFICIENT

3 (Disease\_May\_Have\_Molecular\_Abnormality some p230 Fusion Protein Expression) NECESSARY & SUFFICIENT

4 (Disease\_May\_Have\_Molecular\_Abnormality some p210 Fusion Protein Expression) NECESSARY & SUFFICIENT

5 (Disease\_May\_Have\_Molecular\_Abnormality some t(9;22)(q34;q11)) NECESSARY & SUFFICIENT

6 (Disease\_May\_Have\_Molecular\_Abnormality some t(9;22)(q34;q11)) NECESSARY & SUFFICIENT

7 (Disease\_May\_Have\_Molecular\_Abnormality some p190 Fusion Protein Expression) NECESSARY & SUFFICIENT

Parent Class

Chronic\_Myelogenous\_Leukemia NECESSARY & SUFFICIENT

Recurrent Chronic Myelogenous Leukemia NECESSARY

Associations

Defining

OK Cancel

New Delete Review Save Cancel

## NCIEditTab – other properties

**CLASS BROWSER**

For Project: ●

Class Hierarchy

- Immunosuppressant
- Lenalidomide
- Nosantine
- Procadazole
- Thymalfasin
- Vaccine
  - AdRTPV-1-Transduced Prost
  - Antineoplastic Vaccine
  - Attenuated Live Virus Vaccine
  - Autologous Epstein-Barr Viru
  - Cancer Prevention Vaccine
  - Conjugate Vaccine
  - DNA Vaccine
  - HV Vaccine
  - Human Papilloma Virus Vacc
  - Inactivated Vaccine
  - Non-Tumor Cell Derivative Va
  - Peptide Vaccine
  - Polyclonal Vaccine
  - Polyvalent Vaccine
  - Recombinant Viral Vaccine
    - Adenovirus Vaccine
    - ALVAC Vaccine
    - ALVAC-CEA Vaccine

Class: ALVAC-CEA\_Vaccine  
 Preferred Name: ALVAC-CEA Vaccine code: B1821

**Basic Data**

**Simple Properties**

Property	Value	Lang
Concept_Type	N	
PDQ_Closed_Trial_Se...	42326	
PDQ_Open_Trial_Sear...	42326	
rdfs:comment		
rdfs:label	ALVAC-CEA Vaccine	
Semantic_Type	Immunologic Factor	
Semantic_Type	Pharmacologic Substance	

**Complex Properties**

Property	Value	Lang
ALT_DEFINITION	A cancer vaccine containing a canary pox virus (ALVAC) combined with the human carcinoembryonic antigen (CEA) gene.	

**Qualifiers**

Name	Value
def-source	NCI-GLOSS
Definition_Reviewer_Name	DEFAULT_Review

Buttons: New, Delete, Review, Save, Cancel

## NCIEditTab – tree panel in copy, split, and merge

**CLASS BROWSER**

For Project: ●

Class Hierarchy

- Olfactory Chemoreceptor
- Peripheral Nervous System Part
- Peripheral Nervous System
  - Axon
  - Dendrite
  - Nerve
    - Cranial Nerve
      - Abducens Nerve
      - Accessory Nerve
      - Cochlear Nerve
      - Facial Nerve
      - Glossopharyngeal Nerve
      - Hypoglossal Nerve
      - Oculomotor Nerve
      - Olfactory Nerve
      - Optic Nerve
      - Trigeminal Nerve
      - Trochlear Nerve
      - Vagus Nerve
      - Vestibular Nerve
      - Vestibulocochlear Nerve
    - Nerve Plexus
    - Peripheral Nerve
    - Spinal Nerve

Existing Concept

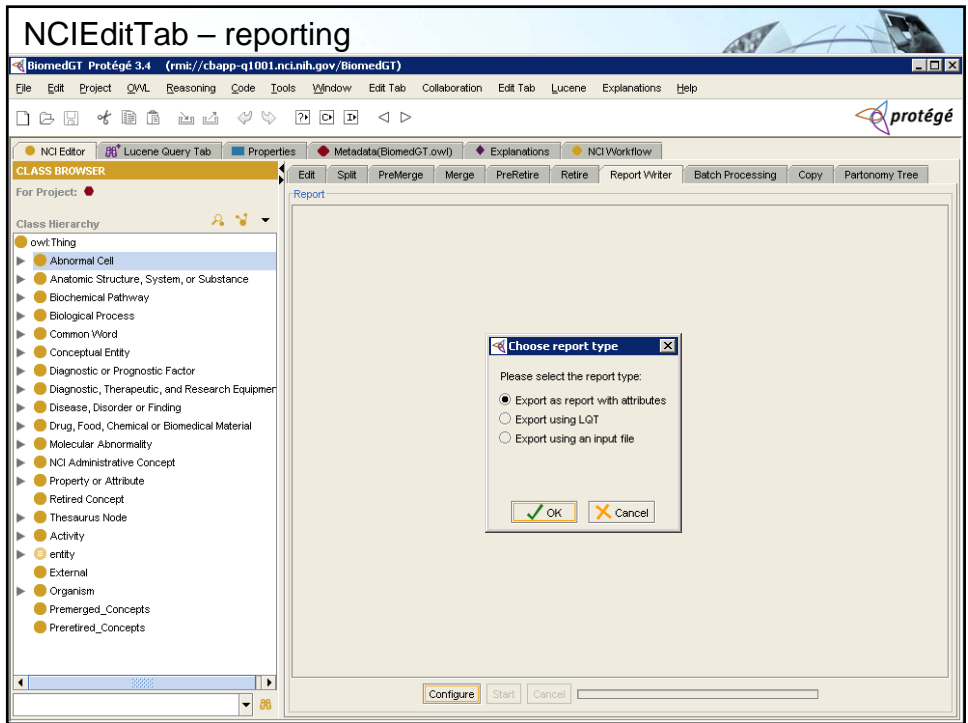
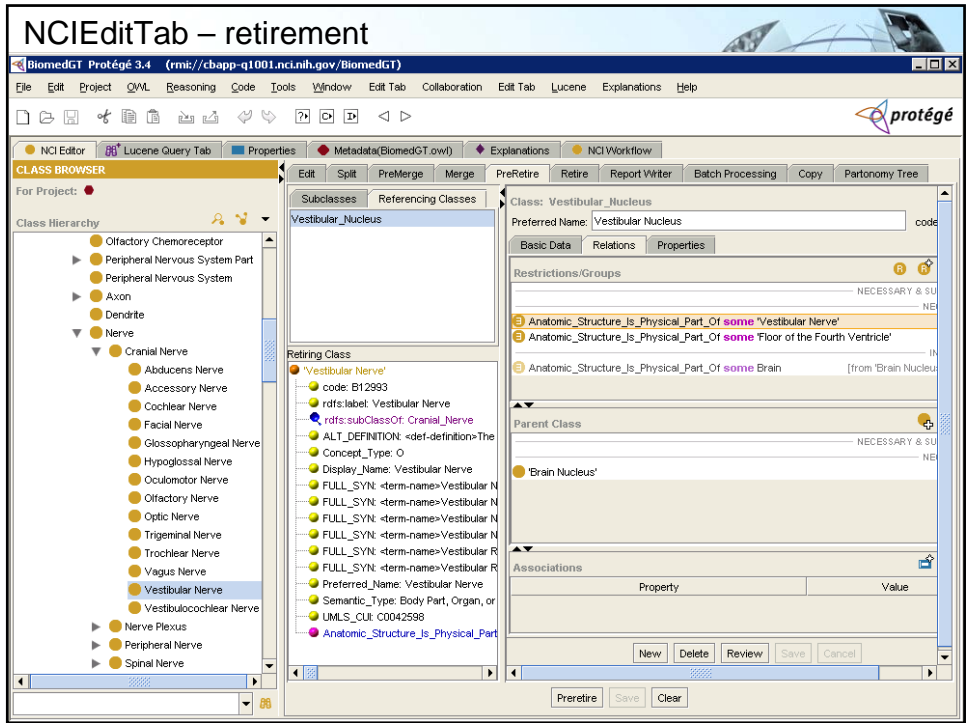
- Vestibulocochlear Nerve
  - code: B13169
  - rdfs:label: Vestibulocochlear Nerve
  - rdfs:subClassOf: Cranial\_Nerve
  - Concept\_Type: O
  - DEFINITION: <def-definition>The eighth cranial nerve composed of the acoustic nerve and the vestibular nerve. The nerve travels fro
  - Display\_Name: Vestibulocochlear Nerve
  - FULL\_SYN: <term-name>Cranial Nerve Eight<term-name><term-group>SY<term-group><term-source>CTRM<term-source>
  - FULL\_SYN: <term-name>Cranial Nerve Eight<term-name><term-group>SY<term-group><term-source>NCI<term-source>
  - FULL\_SYN: <term-name>Cranial Nerve VIII<term-name><term-group>SY<term-group><term-source>CTRM<term-source>
  - FULL\_SYN: <term-name>Cranial Nerve VIII<term-name><term-group>SY<term-group><term-source>NCI<term-source>
  - FULL\_SYN: <term-name>Eighth Cranial Nerve<term-name><term-group>SY<term-group><term-source>CTRM<term-source>

New Concept

- Vestibular Nerve
  - code: B12993
  - rdfs:label: Vestibular Nerve
  - rdfs:subClassOf: Cranial\_Nerve
  - ALT\_DEFINITION: <def-definition>The vestibular part of the 8th cranial nerve (VESTIBULOCOCHLEAR NERVE). The vestibular nerve i
  - Concept\_Type: O
  - Display\_Name: Vestibular Nerve
  - FULL\_SYN: <term-name>Vestibular Nerve (VIII)<term-name><term-group>SY<term-group><term-source>CTRM<term-source>
  - FULL\_SYN: <term-name>Vestibular Nerve (VIII)<term-name><term-group>SY<term-group><term-source>NCI<term-source>
  - FULL\_SYN: <term-name>Vestibular Nerve<term-name><term-group>DN<term-group><term-source>CTRM<term-source>
  - FULL\_SYN: <term-name>Vestibular Nerve<term-name><term-group>PT<term-group><term-source>NCI<term-source>
  - FULL\_SYN: <term-name>Vestibular Root of Eighth Cranial Nerve<term-name><term-group>SY<term-group><term-source>CTRM<term-source>
  - FULL\_SYN: <term-name>Vestibular Root of Eighth Cranial Nerve<term-name><term-group>SY<term-group><term-source>NCI<term-source>

Context Menu: Delete, Modify Property, Copy, Paste, Create Workflow Task

Buttons: Clons, Save, Clear



### Lucene Query Tab

BiomedGT Protégé 3.4 (rmi://cbapp-q1001.nci.nih.gov/BiomedGT)

File Edit Project OWL Reasoning Code Tools Window Edit Tab Collaboration Edit Tab Lucene Explanations Help

protégé

Query Slot Contributing\_Source exact match String FDA

Negated Queries (NOT) Slot FULL\_SYN lucene match String FDA

Search Results (0 match)  
No results found.

Clear Match All Match Any Search

### Explanation Tab

BiomedGT Protégé 3.4 (rmi://cbapp-q1001.nci.nih.gov/BiomedGT)

File Edit Project OWL Reasoning Code Tools Window Edit Tab Collaboration Edit Tab Lucene Explanations Help

protégé

CLASS BROWSER

For Project: ●

Class Hierarchy

- 'Biochemical Pathway'
- 'Biological Process'
- 'Common Word'
- 'Conceptual Entity'
- 'Diagnostic or Prognostic Factor'
- 'Diagnostic, Therapeutic, and Research'
- 'Disease, Disorder or Finding'
- 'Drug, Food, Chemical or Biomedical Material'
- 'Molecular Abnormality'
- 'NCI Administrative Concept'
- 'Property or Attribute'
- 'Retired Concept'
- 'Thesaurus Node'
- 'Cytoplasmic Protein'

Named Inferred Superclasses

- 'Gene Product'
- 'Thesaurus Node'

Named Inferred Subclasses

Axioms

Axiom: `Cytoplasmic Protein subClassOf Gene Product`

Explanations (2):

- 1) `Cytoplasmic Protein subClassOf Gene Product Has Associated Anatomy some Gene Product Has Associated Anatomy domain Gene Product`
- 2) `Cytoplasmic Protein subClassOf Gene Product Encoded By Gene some Cytoplasmic Gene Product Encoded By Gene domain Gene Product`

Irrelevant parts of explanations  Show  Color  Hide All 2 explanations Get M

Class

Class	Changed direct superclasses
● '14-3-3 Family'	Added 'Gene Product'
● 'Cytoplasmic Protein'	Added 'Gene Product'
● 'NOVA Family'	Added 'Gene Product'
● 'UGT1A1*28 Allele'	Moved from 'UGT1A1 Gene' to 'UGT1A1 wt Allele'

Classification Results

## Download site

[http://gforge.nci.nih.gov/frs/?group\\_id=174](http://gforge.nci.nih.gov/frs/?group_id=174)

<b>Protege QA Server BiomedGT OWL File</b>		<b>2008-12-15 10:47</b>
BiomedGT-Fixed-wNS-DefaultAndPrefix.zip	14.77 MB	3 1386 .zip
<b>SmallTestingThesaurus</b>		<b>2008-09-23 10:21</b>
NCIThesaurusSmall.owl	7.3 MB	60 Any Other
<b>NCI Thesaurus OWL File 080711</b>		<b>2008-07-11 18:27</b>
Thesaurus-ByName-080711.zip	8.54 MB	10 1386 .zip
<b>NCI Thesaurus sample fragment</b>		<b>2008-03-21 11:30</b>
sample.owl	120 KB	162 Any text
<b>Protege OWL Raw Data File</b>		<b>2008-02-13 15:35</b>
BiomedGT-080129-08_01d-Modified.zip	14.96 MB	8 Other Other
BiomedGT-080904-08_09a-fixedscript.zip	14.72 MB	2 Other .zip
<b>PROMPT Files and reproduce defect</b>		<b>2008-02-07 14:59</b>
PROMPT_FILES.zip	7.87 MB	3 Other Other Source File
<b>BGTForWiki</b>		<b>2007-12-05 23:33</b>
BGTForWikiLoad.zip	12.62 MB	6 Any .zip
BGTInitialWikiLoad.owl.z	14.77 MB	199 Any .zip
BiomedGT_LGExport.zip	11.08 MB	3 Any .zip
BiomedGT.zip	11.08 MB	6 Any .zip
<b>NCIT Subset 060926 w Retired</b>		<b>2006-09-28 13:57</b>
Thesaurus-ByName-060926-Retired.zip	2.34 MB	51 Any .zip
<b>Package</b> <input checked="" type="checkbox"/>		
<b>1.3 Protege Public Release Package</b>		<b>2009-05-19 18:36</b>
1.3PublicReleasePackage.zip	124.99 MB	8 Other .zip
<b>Protege 1.2.3.25 Public Release Package</b>		<b>2008-12-19 18:18</b>
PublicReleaseProtegePackage.zip	140.07 MB	6 Other .zip
<b>Project totals</b>	<b>23</b>	<b>36 1 GB 2071</b>

## SMW-based collaborative development

**Main Page**  
**BiomedGT Collaborative Ontology Development Wiki**  
(Beta 7 Release - December 2, 2008; patch Jan 16, 2009)

**About This Wiki**

The BiomedGT Wiki is a new tool that enables groups of domain experts to collaboratively develop and maintain terminologies, including BiomedGT, subsets of BiomedGT, and other standard terminologies. This wiki is being developed by the [National Cancer Institute Center for Bioinformatics](#) and the [Mayo Clinic Division of Biomedical Informatics](#) with contributions from [Apelien, Inc.](#), [Northrop Grumman](#) and [Dionne-Associates Inc.](#)

We welcome your help in developing terminology in your specialty area and in fine tuning the use of the wiki as a collaborative terminology development tool. Several terminology collaborations, such as [CTCAE](#) and [NPO](#) (see terminologies at left) are underway in this wiki.

**About BiomedGT**

The Biomedical Grid Terminology ([BiomedGT](#)) is an open, collaboratively developed terminology for translational research. BiomedGT builds on the strengths of the NCI Thesaurus, including concept orientation, description logic, and public accessibility. While the current terminology has been seeded with NCI Thesaurus content, it is being restructured to facilitate open content development. The goal is to enable BiomedGT into a set of federated sub-terminologies, with content maintained by experts in the relevant research communities.

BiomedGT is registered in the HL7 OID Registry as 2.16.840.1.113883.3.26.1.3.

**Becoming a Collaborator**

You are welcome to browse this site and search for terminology. If you want to contribute content, you can register as a collaborator by following the instructions on the [Registration Process for Collaborators](#) page.

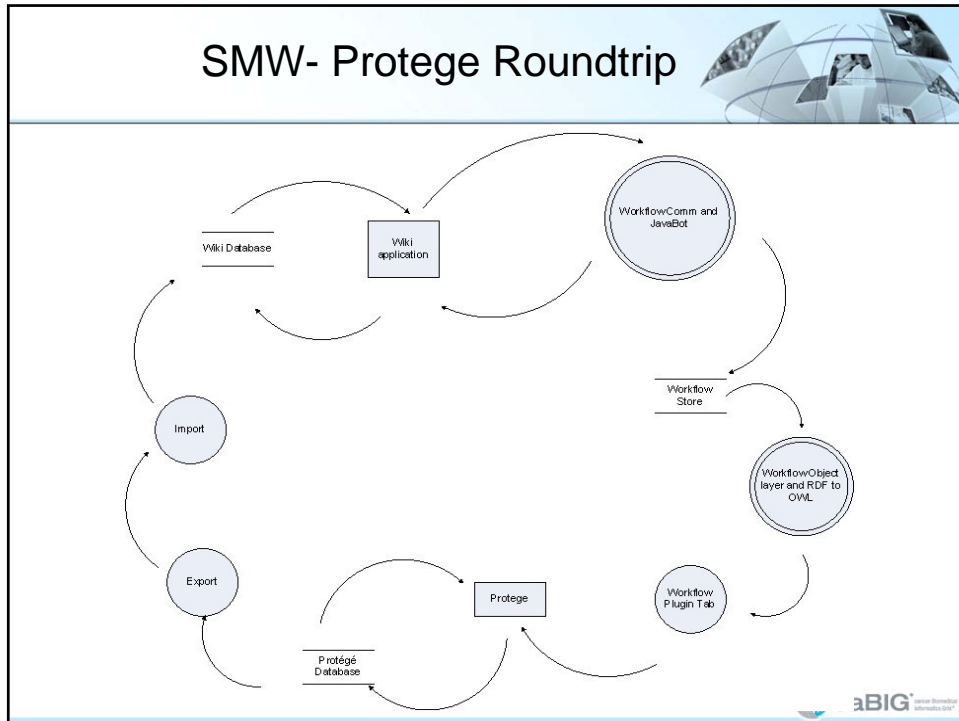
**Subscribing to Our Listserv**

You can subscribe to a listserv and receive announcements about changes to the wiki, information about support and maintenance, and other newsworthy items. To subscribe, send an e-mail message to [biomedgt\\_wiki-l@nci.nih.gov](mailto:biomedgt_wiki-l@nci.nih.gov)

**Currently Available Terminologies or Terminology Subsets**

- BGT - BiomedGT Grid Terminology
- Nano - Nanotechnology Domain Concepts
- CTCAE - Common Terminology Criteria for Adverse Events v4.0
- CRCH Nutrition Terms
- Biospecimen
- Semantic Type

## SMW- Protege Roundtrip



## Acknowledgements

### EVS Team

- **Protégé/ NCI Protégé/SMW programmers**

- Stanford BMIR staff
- Dionne Associates
- Clark & Parsia
- Mayo Clinic

- **Production and QA staff**

- Steve Hunter (Ekagra)
- M. Storey's group (UVic)
- Tracy Safran, Rob Wynne, John Park

- **Editing**

- Laura Roth
- Lori Whiteman
- Liz Hahn-Dantona and others (Lockheed Martin)

- **NCI staff**

- Frank Hartel
- Gilberto Fragoso
- Sherri de Coronado
- Margaret Haber
- Larry Wright