Biomedical Resource Ontology

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Biomedical Resource Ontology

- Provides semantics for Biositemaps
  - Resource type
    - An entity that provides access to material, intellectual, financial, technological, or electronic means of carrying out research and development, e.g. Core Facility, Algorithm
  - Activity
    - Activity of interest that may be related to a Resource, e.g. Biospecimen Management
  - Area of Research
    - Area of research that may be related to a Resource, e.g. Bioinformatics
Use Cases

- A researcher wants to know where to send samples for full genome sequencing using a particular type of *next generation sequencer*.
- A *genomics* core director wants to know what experiences others have had with two different *data storage system* vendors.
Use Cases

• A researcher is studying *physiology* and *metabolism*. She already makes use of a *calorimeter* at her home institution, but is not aware of a double-labeled water technology to quantify oxidation, available at another institution – and useful for various applications within the study of metabolism and physiology.
Biomedical Resource Ontology

Definition: An entity that provides access (either in the open community or within an organization) to material, intellectual, financial, technological, or electronic means of carrying out research and development.

Definition: A resource that provides an act of helpful activity, consisting of an organized system of apparatus, appliances, technology, personnel, etc.

Definition: A resource comprised of one or more individuals who have specific expertise and provide professional or expert advice.

Definition: A resource that provides monetary support in the form of grants, contracts, or gifts for research, training, or education.

Definition: A resource that provides access to educational materials or events, such as courses, workshops or graduate programs.

Definition: A resource that provides items such as reagents, instruments, tissue samples or organisms.

Definition: A resource that provides data, knowledge or narrative.

Definition: Resource that provides access usually through repositories or the Internet to computer executables, libraries, plugins, or source code.

http://purl.bioontology.org/ontology/BRO
BRO Design Principles

• Utilitarian approach
  – Include what is needed

• Term definitions
  – Format “A resource that provides...”

• Simple structure
  – Yes, there is multiple inheritance

• Metadata
  – SKOS (W3C standard)
BRO Development Process

Community

BioPortal Notes

Developers

Web Protégé
Applications

• Biositemaps Editor and Search Tool
• iTools
• Resource Discovery System
• SimTK
• NCBO Resource Index
• ODiSSea Gadget
Resource Discovery System

http://biositemaps.ncbcs.org/cirwp/index.html
SimTK

https://simtk.org/xml/index.xml
NCBO Resource Index

Genomics (preferred name) from: Biomedical Resource Ontology
Database (preferred name) from: Biomedical Resource Ontology

Ontology filters | Terms restricted by 1 ontology

ARRS GoldMiner
ArrayExpress
ClinicalTrials.gov
Database of Genotypes and Phenotypes
Gene Expression Omnibus DataSets
Online Mendelian Inheritance in Man
PharmGKB [Disease]
PharmGKB [Gene]
PubMed
ResearchCrossroads
UniProt KB
ciaNanoLab

Adverse Event Reporting System Data
Biositemaps
Conserved Domain Database (CDD)
DrugBank
MICAD
Pathway Commons
PharmGKB [Drug]
PubChem
Reactome
Stanford Microarray Database
WikiPathways

BioSitemaps
NCBO Resource Index

http://bioportal.bioontology.org/visualize/42483/BRO:Algorithm
ODiSSea
Community Interactions

• NIF
  – Synchronize resource hierarchy
  – Harmonize term definitions

• eagle-i, NIF and OBI
  – Instrument term pilot project
Future Work

• Develop modules for submission of resource types
• Separate out the Biositemaps Information Model as a separate ontology
• Add alphanumeric identifiers for terms
• Import Instrument terms from OBI and adjust tools as necessary
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http://biositemaps.ncbcs.org