SHORTEST PATHS TO ENRICHING YOUR MS DATA – AND PUTTING IT TO WORK!
AGENDA

• “Link” MS Data to Meaning, Value
• How is this done?
  • W3C, Stanford, MIT, IO, Sage-N, …
• Use Cases
  • Systems Biology, Pharma, Medical examples
• Discussion
ADD VALUE TO MS RESULTS BY CONNECTING IT TO MEANING
RAPIDLY GROWING PUBLIC RESOURCES
2010
HOW IS THIS DONE?
W3C Standards-based “RDF” Resource Description Framework

- **Entity Merging**: Using a specific thesaurus, columns in each input set are mapped to the same class. Equivalent entities are merged to their representative terms.

- **Ontology Merging**: During data import, equivalent classes with equivalent superclasses are merged using a specified thesaurus.

- **Relationship Merging**: User specifies a relationship thesaurus at import. Upon import, relationships are converted to their respective groups’ representative terms.

**Definitions**

- **Term**: a single entry in the thesaurus
- **Group**: a set of terms
- Each group has a single “Representative Term”
- Two terms are “equivalent” if they are in the same group

**Use cases**

- Browse a list of available groups and examine its terms
- Search for a term by partial string or regular expression
- Move a term from one group to another
- Insert a new term into a selected group
- Delete a term from a group
- Import existing 3rd party thesaurus
- Export thesaurus to XML
“Link” Internal & External Resources

Resources

Integrated Access

Cloud, Firewalled, Personal install / hosting options

Hosted Platform

Knowledge Applications

*Compound SKB

*Tox ASK

*Renal SKB

*Cancer ASK

*Stability ASK

*PROOF ASK

...+ (n,000 areas)

EMR / EHR

Proteomics

Lab DB - LIMS

Genes – NGS, GEP, ...

MS / Metabolomics

Corp. Libraries, ...

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EXAMPLES - TOOLS

CORE DATA MANAGEMENT

- Data Manager
- Import Assistant
- Image Interactor

KNOWLEDGE APPLICATIONS

- Knowledge Explorer
- Sentient iDA
- Web Applications (ASK)
USE CASES: INTEGRATION, ENRICHMENT, VALUE
Check pathogens against a comprehensive, extensible reference resource
TOXICITY CLASSIFICATION

IDENTIFICATION OF TYPES OF TOXICITY (NIST ATP)

Development of multi-modal gene expression and metabolic biomarkers to classify and identify types of toxicity
Inflammatory response pre-cursor marker confirms onset of plaque rupture and helps accelerate response acute atherosclerosis
Semantic integration of multiple data sources across imprecise connections allows fast, visual, web-based impact of excipient and compound formulation on stability of drug formulations.
Assess effectiveness of different combination treatments for prostate cancer based on multi-platform genomic, metabolic and proteomic marker profiles and patient match
Integration of gene, protein, clinical and reference sources for combinatorial marker-based screening of patients for COPD event risk, likelihood of organ failure.
Genomic, proteomic, and imaging endpoints across species to discover species-independent biomarkers applicable to human adverse events and diseases.
TAKE HOME MESSAGE

MOVE quickly FROM MS results TO MEANINGFUL, “CONNECTED” DECISIONS via W3C standards-based SEMANTIC INTEGRATION
SELECTED REFERENCES

- E. Gombocz: "Research Data Integration of Retrospective Studies for Prediction of Disease Progression"
  IO Informatics, Berkeley, CA, June 2010
  [White Paper.pdf / 1.8 MB]

- E. Gombocz: "Semantic cross-domain integration: The intersection of research, public, and clinical data; creating applicable knowledge for decision support in patient-centric healthcare"
  [Abstract.html]
  [Lecture Slides.pdf / 3.2 MB]
  [WebEx Recording] (~54 min. stream)

- R. Stanley, B. McManus, R. Ng, E. Gombocz, J. Eshleman, C. Rockey:
  "Case Study: Applied Semantic Knowledgebase for Detection of Patients at Risk of Organ Failure through Immune Rejection"
  Joint Case Study of IO Informatics and University British Columbia (UBC), NCE CECR PROOF Centre of Excellence, James Hogg iCAPTURE Centre, Vancouver, BC, Canada, March 29, 2011
  [W3C Semantic Web Use Cases and Case Studies]

- T.N. Plasterer, R. Stanley, E. Gombocz:
  "Correlation Network Analysis and Knowledge Integration"