

March 16, 2007

Semantic Medline

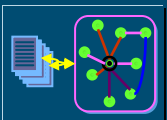
Overview and Demo



Olivier Bodenreider, M.D., Ph.D.
Thomas C. Rindflesch, Ph.D.

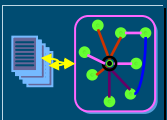
Motivation

- ◆ Biomedical information is growing at an increasingly faster pace
 - High-throughput approach to knowledge processing
- ◆ Information retrieval is the starting point, not the end of the journey for the researcher
 - Towards “computable” knowledge
- ◆ Integration between literature and other resources is insufficient
 - Adequate for navigation purposes
 - Insufficient for knowledge processing

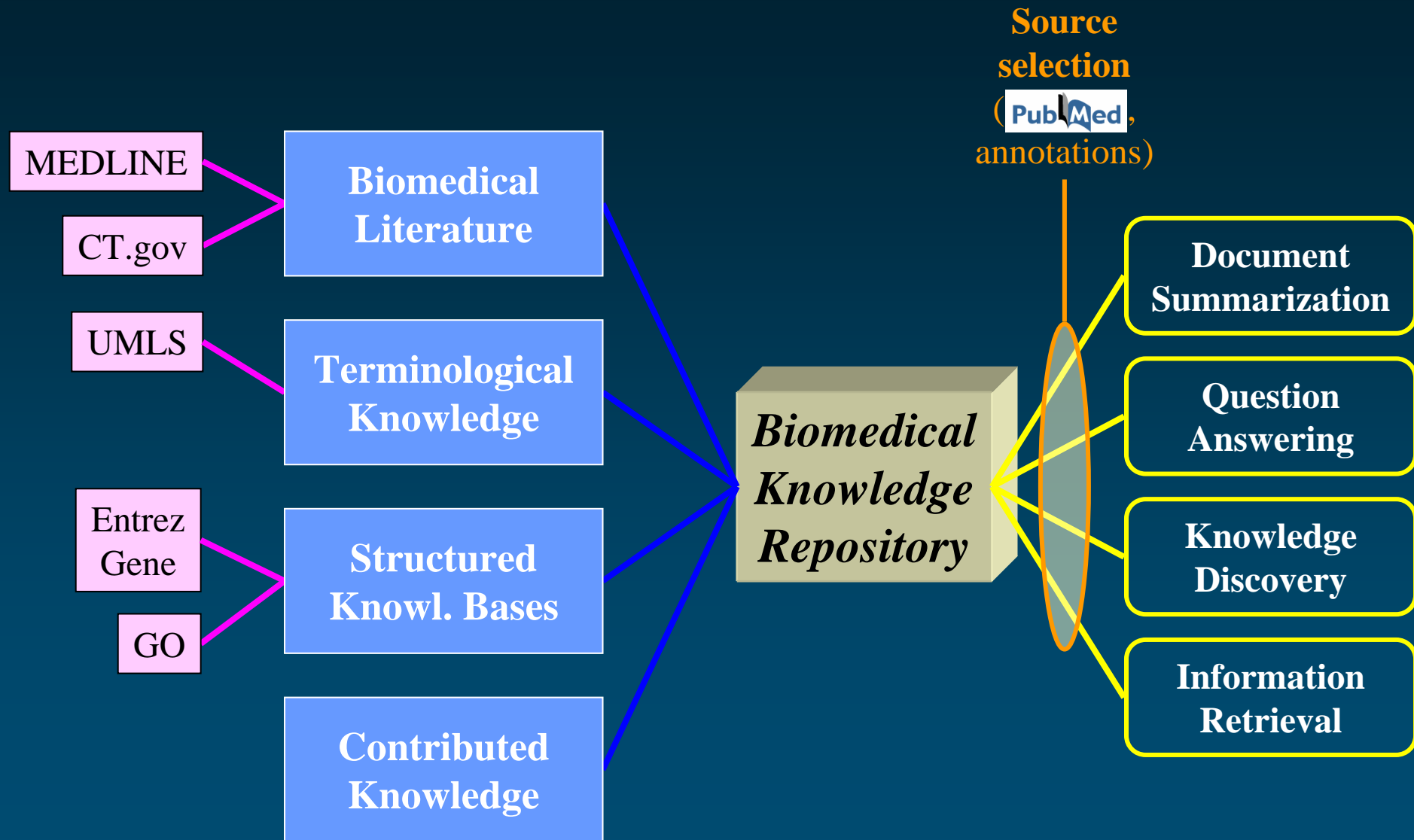


Applications

- ◆ Refined information retrieval
 - Indexing on relations in addition to concepts
 - *Find articles asserting that **IL-13 inhibits COX-2***
- ◆ Multi-document summarization
 - Extract and visualize facts from the literature
 - *Summarize the top 300 papers on **panic disorder***
- ◆ Question answering
 - Clinical and biological questions
 - *What drugs **interact** with **imipramine**?*
- ◆ Knowledge discovery
 - Reasoning with facts from heterogeneous resources
 - *From MEDLINE and UMLS together*

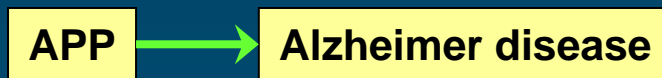
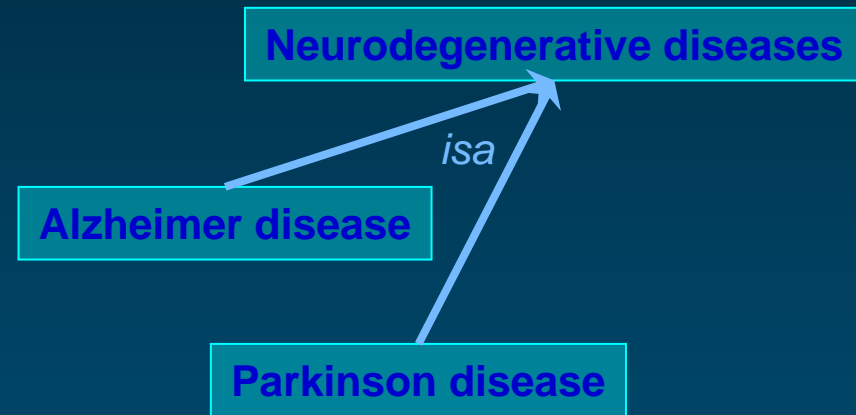


Advanced Library Services Summary

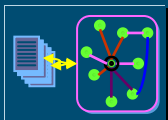
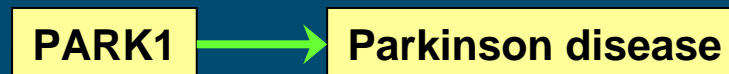


Information integration

- ◆ Transform resources into a common format
 - UMLS Metathesaurus
 - Other NCBI databases
 - Drug knowledge bases
 - ...
- ◆ Integrate resources
 - Query across resources



has_associated_disease



Pilot Application

Populating and exploiting the Biomedical Knowledge Repository

*Semantic Medline:
Multi-document summarization
and visualization*

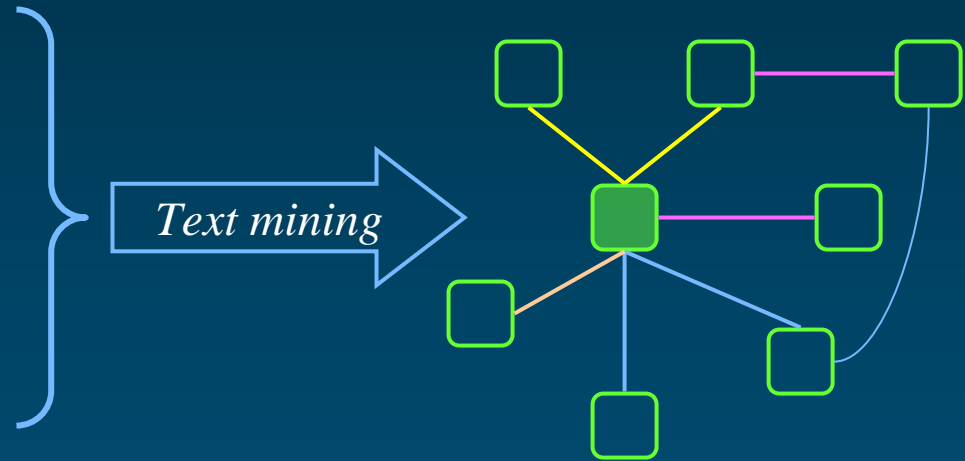
With Marcelo Fiszman, M.D., Ph.D.
and Halil Kilicoglu, M.S.

Managing retrieval results



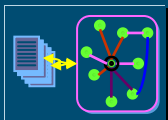
500 citations

Information retrieval

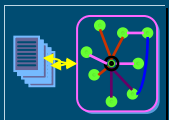
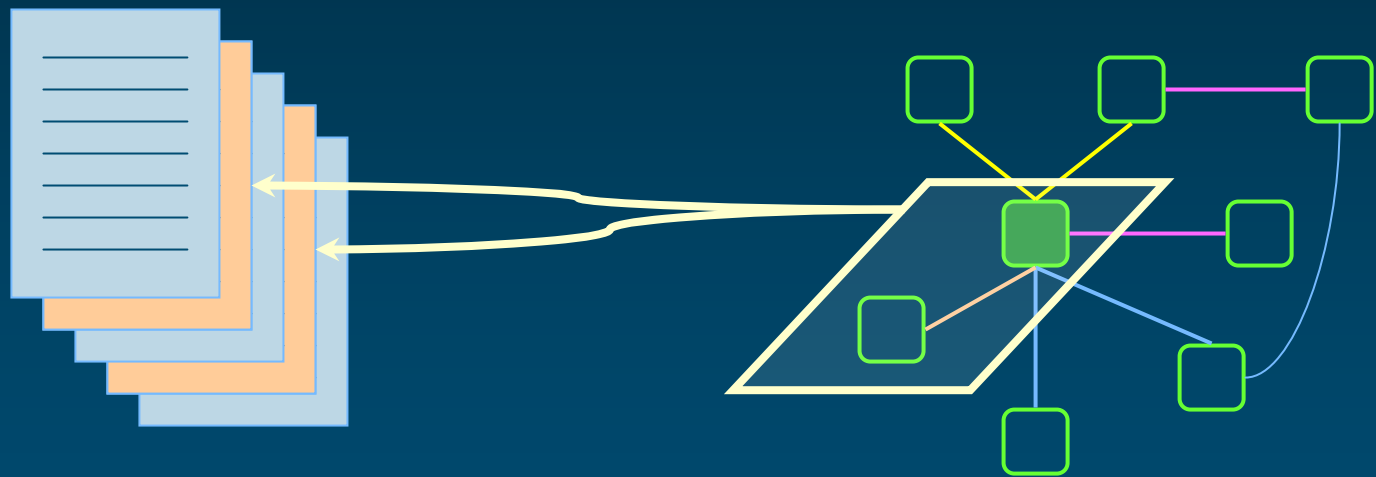


Network of relations

Semantic Medline



Managing retrieval results



Semantic Medline Live

Search SemRep Summarization Translation Visualization

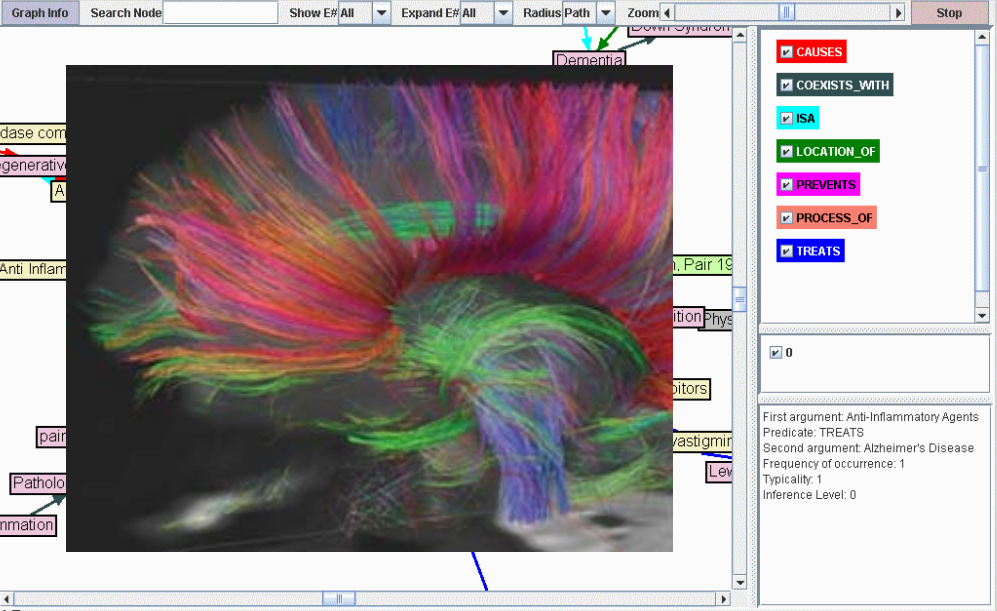
Process SemRep summary predications from the current session
(Search Term: Alzheimer's, Source: Medline, Most Recent: 500, Start Date: 08/31/2005, End Date: 08/31/2006, Summary Type: treatment, 87 predications extracted by summarization.)

Upload File

Include UMLS relations

Note: The visualization applet requires JRE 5.0. You can download JRE 5.0 from [here](#).

Graph Info Search Node Show E# All Expand E# All Radius Path Zoom Stop

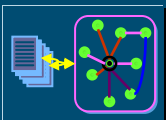


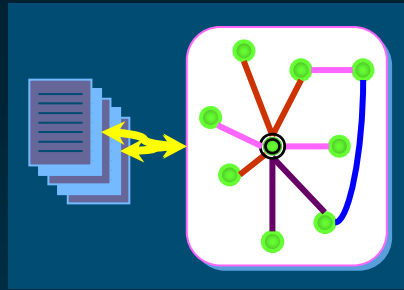
CAUSES
 COEXISTS_WITH
 ISA
 LOCATION_OF
 PREVENTS
 PROCESS_OF
 TREATS

0

First argument: Anti-Inflammatory Agents
Predicate: TREATS
Second argument: Alzheimer's Disease
Frequency of occurrence: 1
Typicality: 1
Inference Level: 0

PMID: 16914866
DP - 2006 Aug
TI - Inflammation, anti-inflammatory agents and Alzheimer disease: The last 12 years.
AB - Two basic discoveries have spurred research into inflammation as a driving force in the pathology of Alzheimer disease (AD). The first was the identification of activated microglia in association with the lesions. The second was the finding that rheumatoid arthritics were relatively spared from the disease. These findings spurred the first pilot trial of a classical NSAID in the treatment of AD. This trial showed promise for indomethacin as a useful therapeutic agent but appropriate follow up trials have not been done. However, more than 20 epidemiological studies have since been conducted showing a sparing effect for antiinflammatories in AD, including four which specifically addressed the use of classical NSAIDs. Other key findings linking inflammation to AD pathology are the identification of activated complement fragments, including the membrane attack complex, as well as inflammatory cytokines in





Advanced Library Services

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