Applying Ontologies to Medical Knowledge

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Abstract: To fully exploit the potential of medical information and knowledge on the World Wide Web requires an understanding of the definitions and relationships of diseases, medications, genes, and anatomy. Open Biomedical Ontologies are used to map the Medical Knowledge Base that defines medical ontology entities and their relationships to support web-enabled Medical Knowledge Applications.

Keywords: Open Biomedical Ontologies, Disease Ontology, Medical Knowledge Base, Medical Knowledge Applications

1. <u>Introduction</u>

Medical Knowledge Applications are based on understanding the definition and relationships of diseases, medications, genes, and anatomy. The study investigates how Open Biomedical Ontologies are mapped to a Medical Knowledge Base that is used to support Medical Knowledge Applications.

The below diagram illustrates how Medical Ontology can be used to describe the relationship between diabetes and anatomical systems, organs and tissues to provide the base reference for Medical Knowledge Discovery.
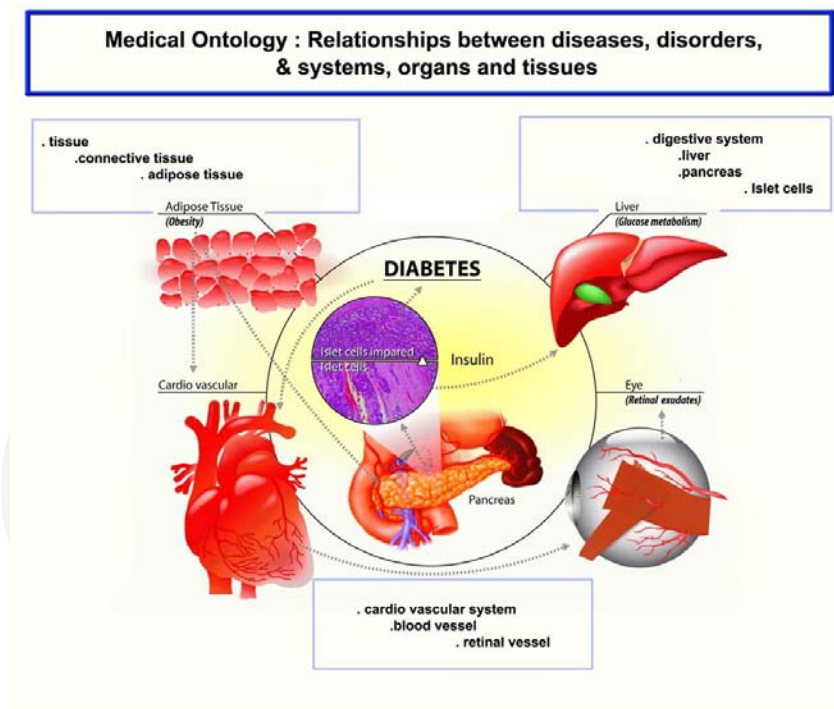
Open Biomedical Ontologies may be cross mapped to describe the neuronal interaction between diseases, anatomical systems, organs, substances, tissues, cells, proteins, and genetics as shown in the below diagram.
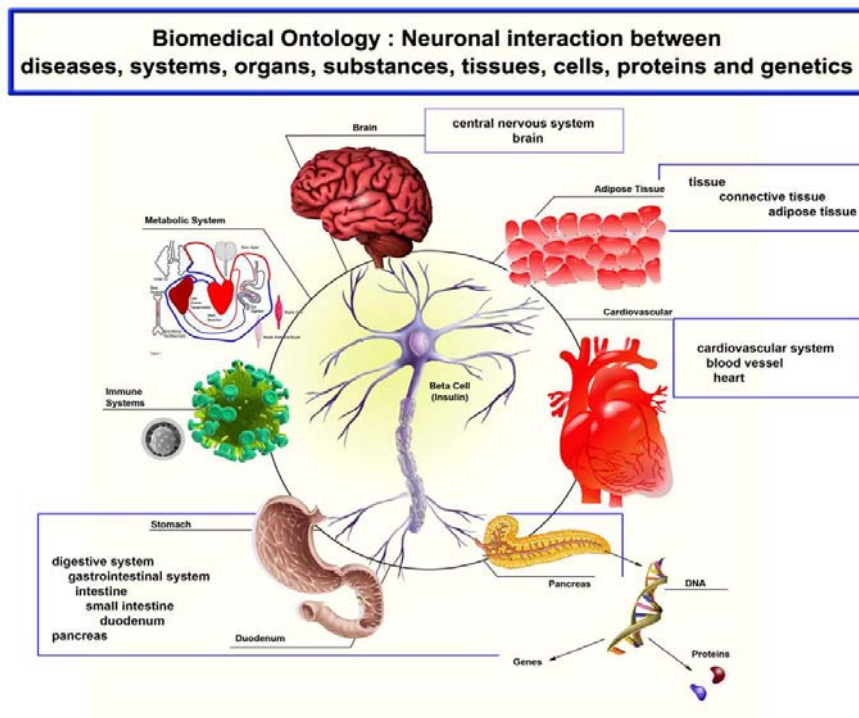
2. Methodology

The Disease Ontology is used to map the Medical Knowledge Base with 18 major classes of diseases, over 1,200 sub-classes, and over 700 disease entities. The Medical Knowledge Base is used as a base reference for the "Medical Knowledge Discovery" study. Over 700 diseases and disorders in 20 classes were selected for the research. Emphasis is given to 40 cardiovascular, 60 diabetes mellitus (endocrine and metabolic), 220 hematology and oncology (including 37 cancer and 23 leukemia disorders), and 150 musculoskeletal disorders.

3. <u>Using Ontology to support Medical Knowledge Applications</u>

The diagram shows the mapping of Basal cell carcinoma to the Medical Knowledge Base. The relationships described in the Disease Ontology are referenced by Medical Knowledge Applications such as the Medical Portal Search and the Symptom Search.