Creating a Translational Medicine Ontology

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Introduction

Pharma companies have an increasing focus on personalized medicines, requiring the right patients to receive the right drug at the right dose

Personalized medicines require the translation of preclinical science into patient studies and the use of clinical data to help humanize preclinical drug discovery

Such translational medicine strategies require that traditionally separate data sets from early drug discovery through to patients in the clinical setting be integrated, and presented, queried and analyzed collectively

Ontologies can be used to drive such capabilities; however, at present few ontologies exist that bridge genomics, chemistry and medicine.

The Translational Medicine Ontology, an application ontology that bridges the diverse areas of translational medicine, draws on existing domain ontologies where appropriate and will provide a framework centered on less than 50 entities

Goals

The Translational Medicine Ontology will facilitate data integration from diverse areas of translational medicine such as discovery research, hypothesis management, formulation, clinical trials, and clinical research

It will serve as a template for further ontology development, enabling scientists to answer interesting and currently difficult questions more easily, especially those about data that are typically hosted by different functional areas

The ontology will provide a framework for the modeling of patient-centric information, which is essential for tailoring drugs.

Bridge existing domain ontologies.

Methodology

We have identified a set of 17 roles played by people across pharmaceutical and health care and collected:
(1) relevant questions that people in those roles frequently ask or want to ask,
(2) the entities that those questions involve, and
(3) applicable extant domain ontologies that reference entities of interest

Types of entities of interest include:

- disease
- drug
- patient
- target
- gene
- risk
- pathway
- population
- compound
- phenotype
- treatment

Next steps involve finalizing the entities of interest, defining the predicates, and aligning the work with the BFO upper-level ontology (http://www.ifomis.org/bfo)

Translational science use cases will be defined, and one use case selected for building a data integration application

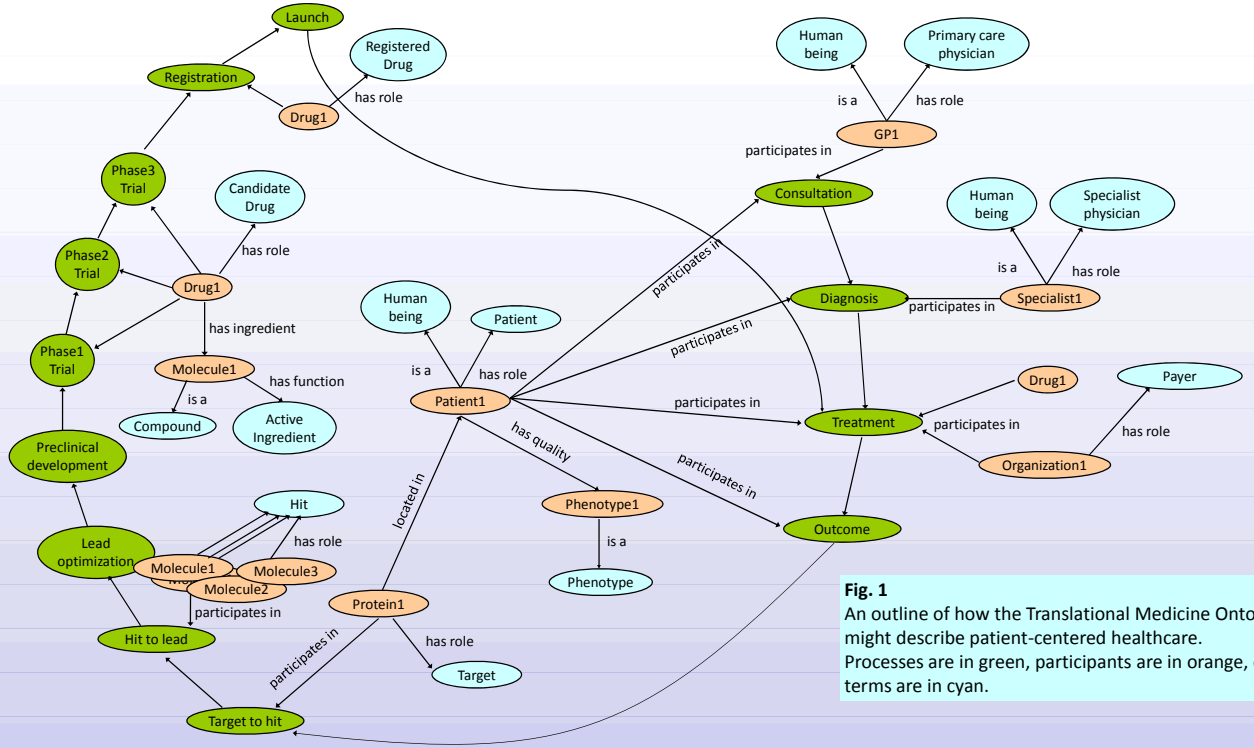

Fig. 1
An outline of how the Translational Medicine Ontology might describe patient-centered healthcare. Processes are in green, participants are in orange, ontology terms are in cyan.

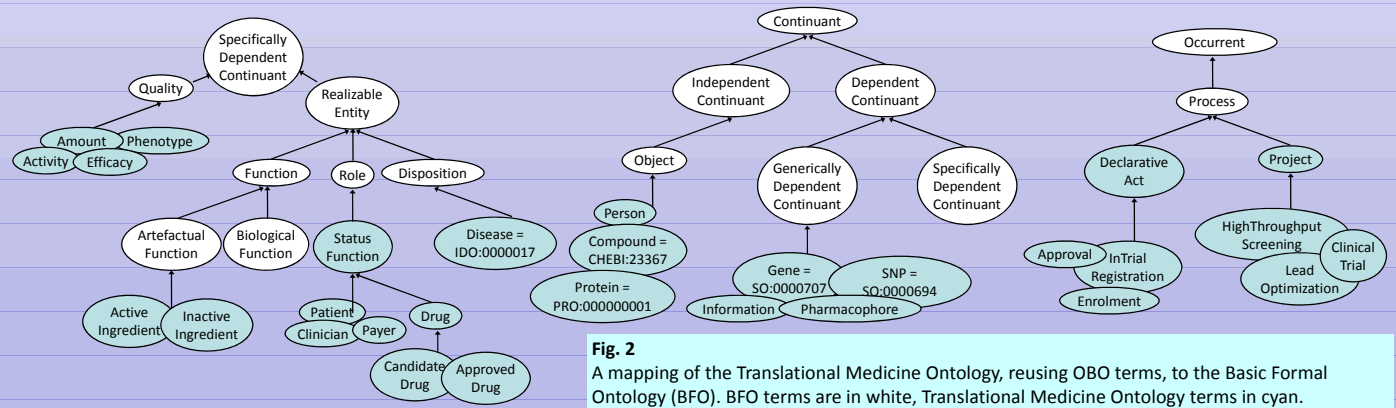

Fig. 2
A mapping of the Translational Medicine Ontology, reusing OBO terms, to the Basic Formal Ontology (BFO). BFO terms are in white, Translational Medicine Ontology terms in cyan.