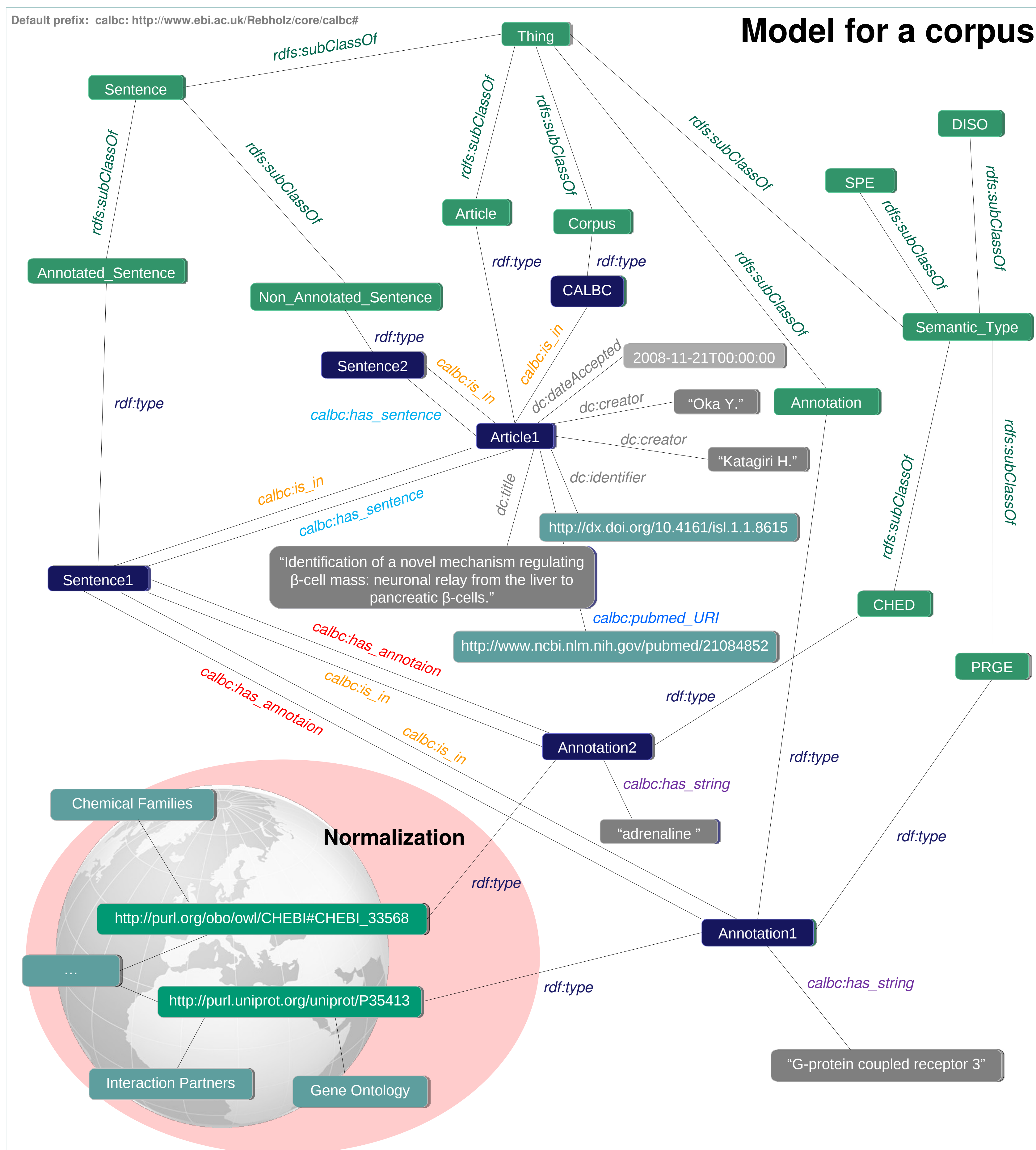




# A Semantic Model for Federated Queries Over a Normalized Corpus

Samuel Croset (croset@ebi.ac.uk - www.SamuelCroset.com), Christoph Grabmueller (grabmuel@ebi.ac.uk), Dietrich Reholz-Schuhmann (reholz@ebi.ac.uk)



## Semantic Model in Web Ontology Language (OWL)

We present here a model implemented in OWL which improves information retrieval and data integration of the corpus. The model is populated with entities from CALBC and some simple queries over it are presented.

### Resources

- owl:Class
- Individual from CALBC
- External Resource

### Properties

- owl:Class  $\xrightarrow{rdfs:SubClassOf}$  owl:Class
- Resource  $\xrightarrow{rdf:type}$  owl:Class
- Article X  $\xrightarrow{calbc:has\_sentence}$  Sentence X
- Sentence X  $\xrightarrow{calbc:has\_annotation}$  Annotation X
- Annotation X  $\xrightarrow{calbc:has\_string}$  "Literal"
- Article X  $\xrightarrow{calbc:pubmed\_URI}$  Resource
- Article X  $\xrightarrow{dc:title}$  "Literal"
- Article X  $\xrightarrow{dc:identifier}$  Resource
- Article X  $\xrightarrow{dc:creator}$  "Literal"
- Article X  $\xrightarrow{dc:dateAccepted}$  "Date"

$\xrightarrow{calbc:is\_i\_n}$  : Transitive property

## Local and Federated Queries Example - SPARQL

Which are the articles where the protein P35413 (Uniprot) has been identified? List the title of the articles.

```
SELECT Title? WHERE {
  Article? rdf:type Article
  Article? dc:title Title?
  Article? calbc:has_sentence Sentence?
  Sentence? calbc:has_annotation Annotation?
  Annotation? rdf:type uniprot:P35413 }
```

Which are the sentences having both an annotation about a chemical and an annotation about a protein? List only the annotations.

```
SELECT Annotation1? , Annotation2? WHERE {
  Sentence? calbc:has_annotation Annotation1?
  Sentence? calbc:has_annotation Annotation2?
  Annotation1? rdf:type PRGE
  Annotation2? rdf:type CHED }
```

Which are the sentences with 2 protein annotations? These proteins have to be known to interact together from Uniprot. List these annotations and the sentences.

```
SELECT Annotation1? , Annotation2? Sentence? WHERE {
  Sentence? calbc:has_annotation Annotation1?
  Sentence? calbc:has_annotation Annotation2?
  Annotation1? rdf:type PRGE
  Annotation2? rdf:type PRGE
  Annotation1? rdf:type UniprotEntry1?
  Annotation2? rdf:type UniprotEntry2?
  UniprotEntry1? uniprot:Participant UniprotEntry2? }
```

### Acknowledgements

This work was funded by the EU Support Action grant 231727 under the 7th EU Framework Programme within Theme "Intelligent Content and Semantics" (ICT 2007.4.2)