

Cell Cycle Knowledge Base

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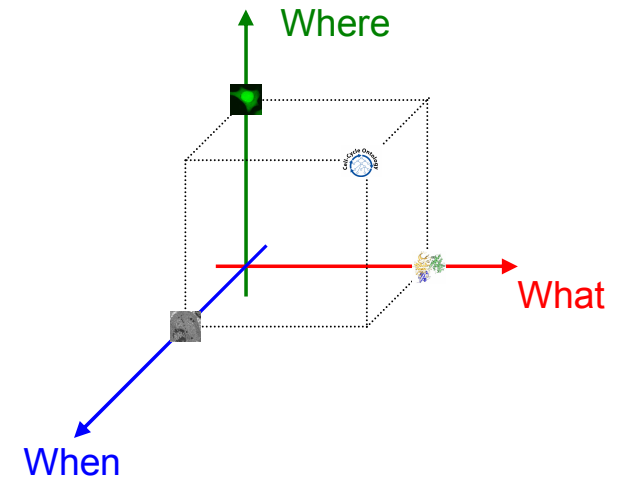
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Introduction

- (Application) Ontology for Cell Cycle: CCO
- CCO + data = Knowledge Base
- Growing data volume => Performance issue
- Repository

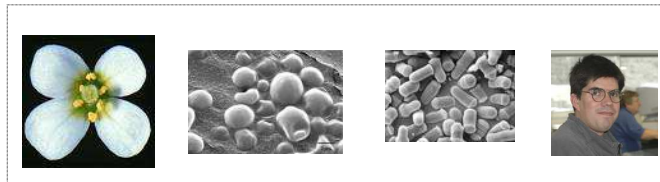
What is CCO?

- Capture the knowledge of the CC process
- dynamic aspects of terms and their interrelations*
- promote sharing, reuse and enable better computational integration with existing resources
- Issues: *synonymy*, *polysemy*



“Cyclin B (*what*) is located in Cytoplasm (*where*) during Interphase (*when*)”

ORGANISMS:



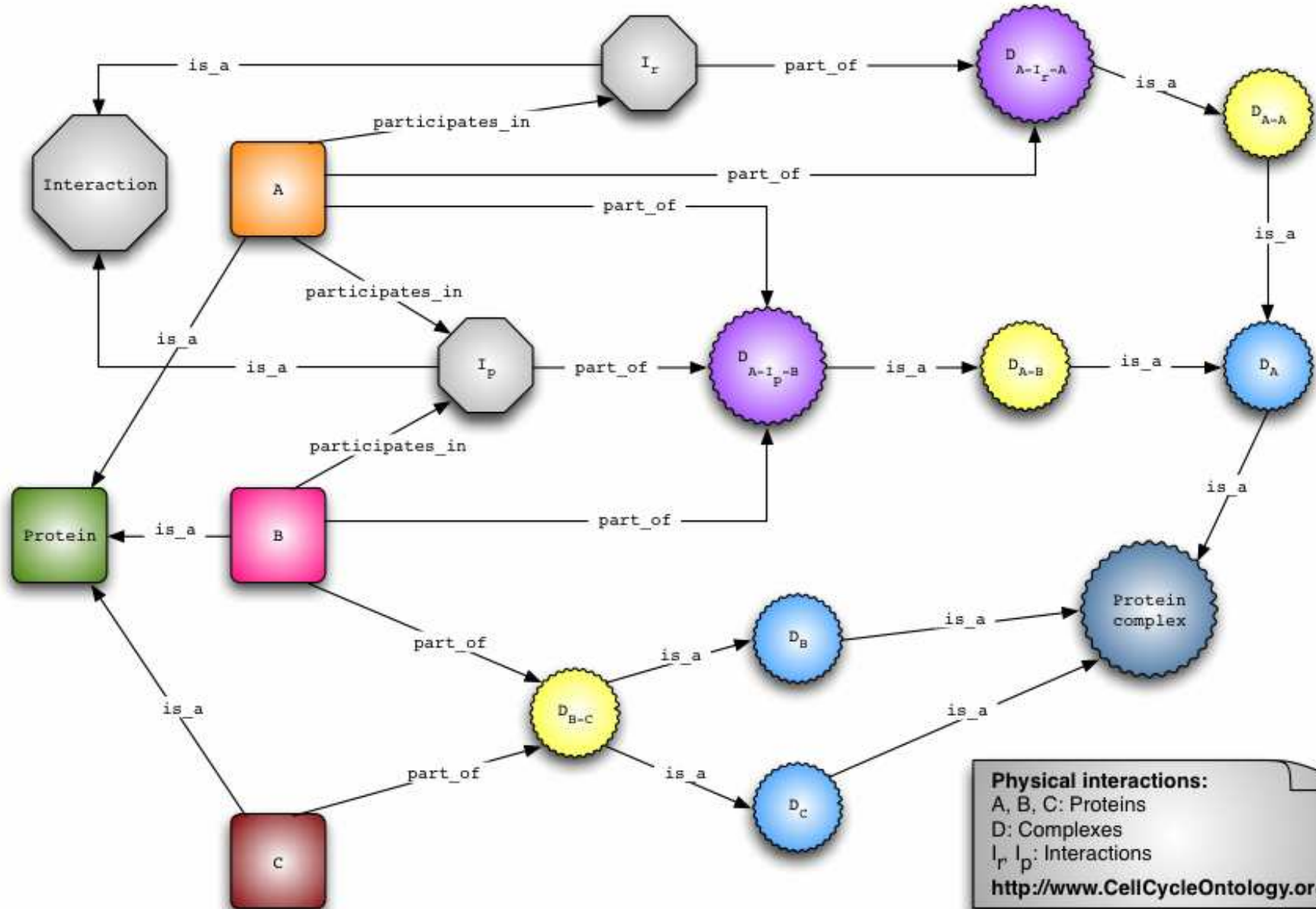
* Dynactome: <http://dynactome.mshri.on.ca/>

CCO

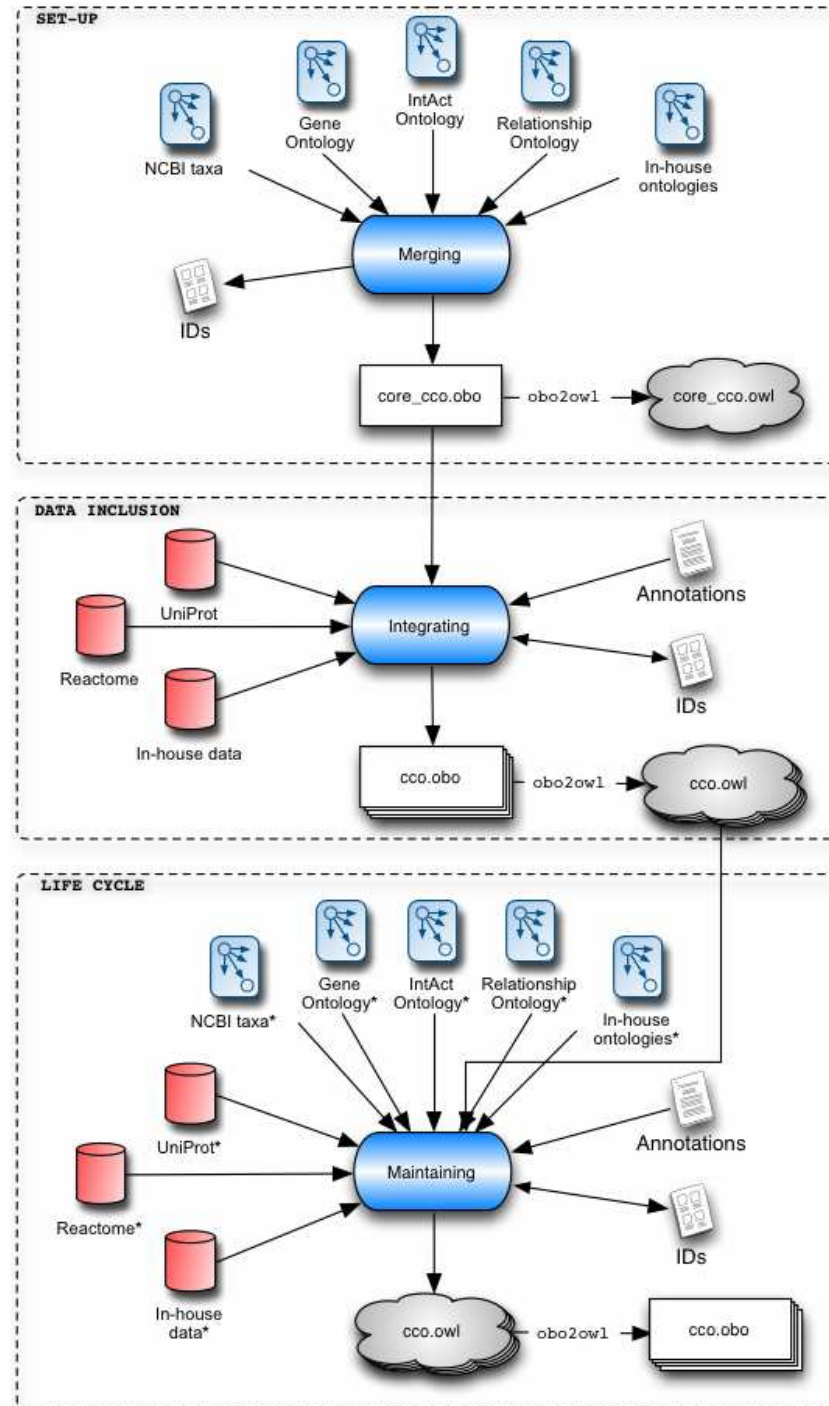
- Cell Cycle Ontology
 - Protein centric
 - Interaction models
 - Phosphorylation
 - Physical interaction
 - <http://www.CellCycleOntology.org>
- **Purpose:** one-stop-shop for all facts related to cell cycle control
- Highly Structured Data that allows advanced reasoning services

Phosphorylation/Dephosphorylation

Physical interaction



PIPELINE



Ontology vs. KB

- **OLS** (*The ontology lookup service, a lightweight cross-platform tool for controlled vocabulary queries.* Cote et al. [BMC Bioinformatics. 2006 Feb 28;7\(1\):97](#))
- Database schema : OBO
- CCO + Data
- DBMS choice imminent
- CCO browsed with OLS



Ontology Lookup Service (OLS) - Mozilla Firefox

http://www.ebi.ac.uk/ontology-lookup/browse.do?ontName=MI

Web ontology reasoning with logic databases 7.2wang_protége2006.pdf (application/pdf) AmiGO: Term Details

EMBL-EBI Search All Databases Enter Text Here Go Reset Advanced Search

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OLS - Ontology Lookup Service

MI Ontology Browser

- OLS Home
- Documentation
 - Project
 - Publications
- Developer Resources
 - Download
 - Implementation Overview
 - Javadoc
 - Webservice documentation
- Contact Us
 - Acknowledgements

News

January 2007: Data and interface upgrades

The OLS got a facelift in order to better integrate with the new look&feel deployed sitewide at the EBI. In other news, the Medical Subject Heading vocabulary (MeSH) has been removed from the OLS in order to comply with requests from the National Library of Medicine (NLM). The full list of loaded ontologies can be seen [here](#).

November 2006: Data and interface upgrades

The unit ontology (UO) has been added to the OLS. The full list of loaded ontologies can be seen [here](#). Furthermore, a quick term ID lookup has been added to the search.

- molecular interaction
 - interaction detection method
 - participant identification method
 - feature detection method
 - feature type
 - interaction type
 - genetic interaction
 - physical interaction
 - direct interaction
 - covalent binding
 - enzymatic reaction
 - colocalization
 - alias type
 - interactor type
 - feature range status
 - experimental preparation
 - cross-reference type
 - database citation
 - experimental role
 - biological role
 - attribute name
 - parameter type
 - parameter unit

Legend:

- is a
- develops from
- part of
- other

Help (hide)

Double-click a term to see its children. The ontology browser is populated dynamically. If there are many children for a given term, there may be a small delay while the browser fetches. **Click** to highlight a term to see any information associated with it. **Hover** over a term to see its relation with its immediate parent. Root terms will not display any relational information.

Relations

physical interaction is_a interaction type

Term Information

ID: [MI:0218](#) Zoom

Name: physical interaction

Associated information

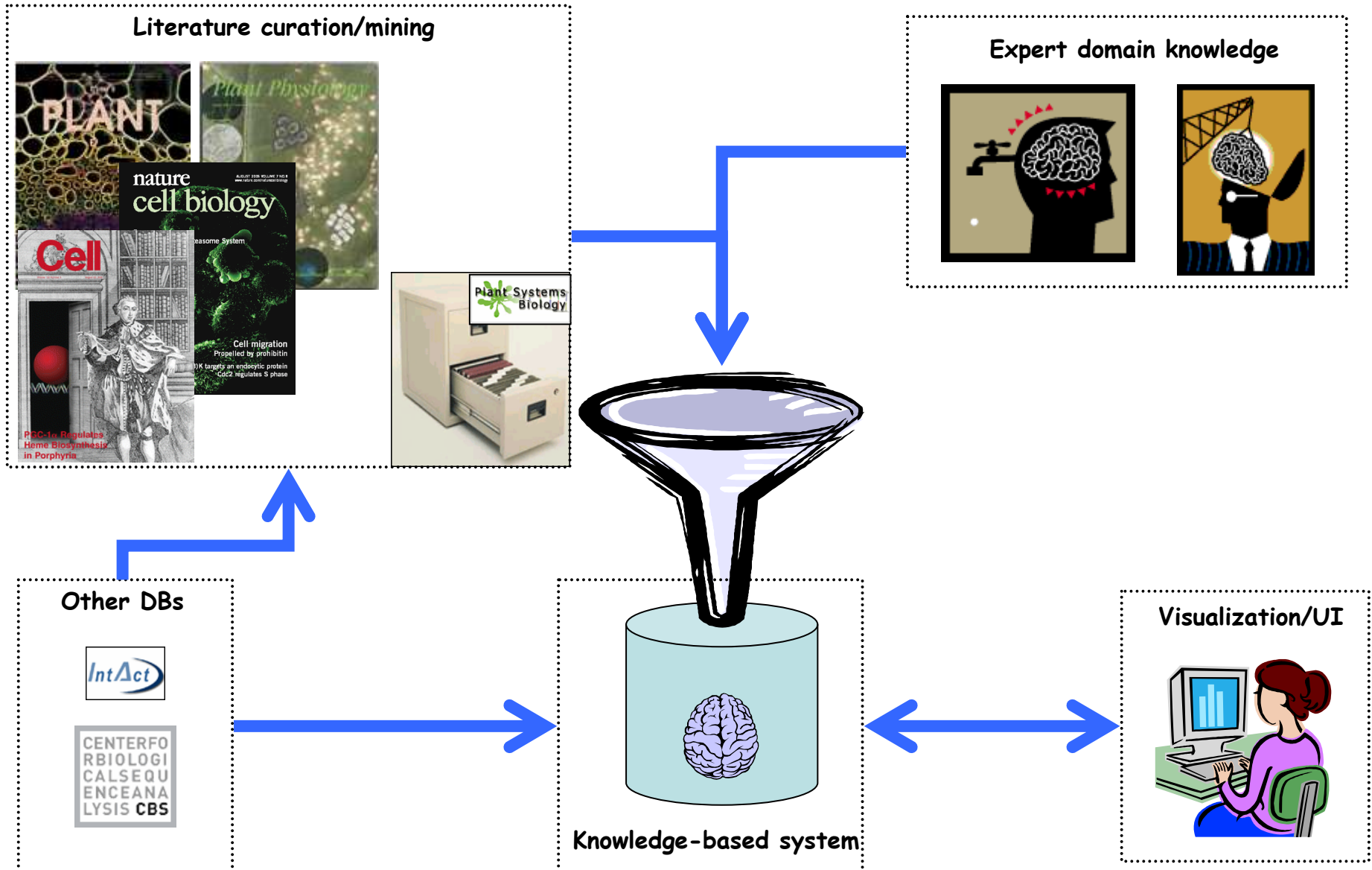
definition	Interaction among molecules that can be direct or indirect.
preferred name	physical interaction
related synonym	aggregation
xref_definition	PMID:14755292

Term Hierarchy

```
graph TD
    A["molecular interaction  
HI: 0000"] -- part_of --> B["interaction type  
HI: 0190"]
    B -- is_a --> C["physical interaction  
HI: 0218"]
```

Start \$-m 260:raz... Ontology L... Inbox for er... Resource - p... Madrid.01.0... Bioscope.24... ppts CBDMeeting... DiamondsMe... 16:28

Architecture



Future work

- Continued data upload, expansion of coverage
 - PTM (e.g. phosphorylation)
 - New classes (clustering methods)
 - Interaction (curated) data (CBS)
 - Quantitative data (simulation)
- Data checking
 - Reasoning (inconsistencies, hypothesis building)

Future work (2)

- Visualization, querying, manual upload / editing of the data
- Incorporation of data from text – automated and manually curated
- Integration into core of cell cycle analysis platform