OBI Assay Harmonization Patterns

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OBI Assays

- there are 2410 terms in the OBI namespace
- more than 25% of those are assays
- the assay branch is (arugably) the heart of OBI
- these assays have been added by many authors over many years

Modelling

- Jie has shown that OBI assays use very diverse patterns of logical axioms
  - messy, mixed hierarchy
  - difficult to query over assays
- she has been leading an assay harmonization effort

IEDB Assays

- IEDB has defined about 452 of those OBI assays
- IEDB assays currently use a few different patterns of logical axioms
- we've been revising them for greater consistency

Most IEDB assays are specific to immunology, but there are also more general "grouping" assays that other groups may want to use.

Assay Patterns

- Jie developed some assay template spreadsheets;
- we've been building on these as we revise our assays
- spreadsheets are the right tool to enforce shared patterns

Annotation Columns

All rows in our sheet have these columns for annotations:

Label
Textual Definition
Example
Editor

Logical Columns

Today we'll focus on the logical columns:

Parent
Target Process
Material Preparation Technique
Detection Technique
Input
- Evaluant
– Analyte
- Device
- Reagent
– Molecular Label
Output

Optional, Required, and Inherited

Of the logical columns, only the parent assay is always required.

Other fields are inherited from the parent assay.

DRY: Don't Repeat Yourself

Column Values

- usually contain the RDFS Label for a single class
- may also contain an OWL expression in Manchester Syntax (like Protégé)
- columns have types that we can use for validation

Descriptions

Column	Description
Parent	The parent assay class
Target Process	The biological process that is being measured by this assay
Material Preparation	A material transformation process that is part of this assay
Detection	The assay that does the **measurement** part of this assay
Input	An input to this assay (prefer more specific inputs)
Output	The output of the assay

Types

Column	Type
Parent	assay
Target Process	biological process
Material Preparation	material transformation
Detection	assay
Input	material entity
- Evaluant	material entity
– Analyte	material entity
- Device	device
- Reagent	reagent
– Molecular Label	molecular entity or molecular label
Output	data item

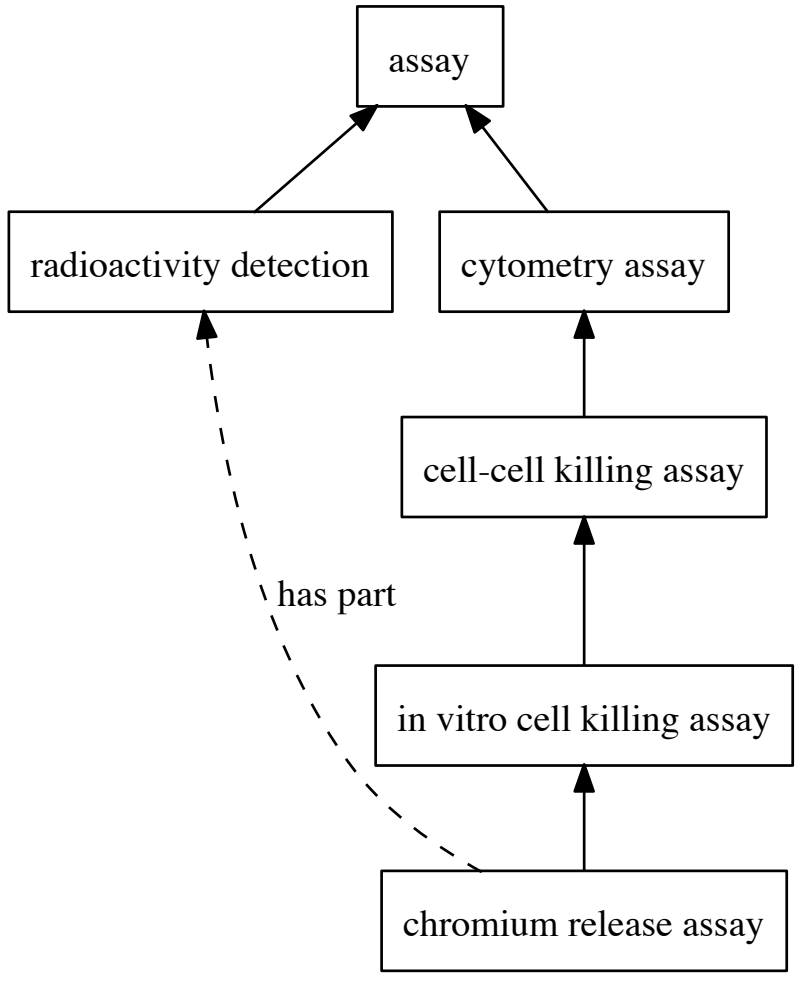
Logic: Parts and Participants

Column	Logic
Parent	**X**
Target Process	has_specified_output some ('is about' some **X**)
Material	'has part' some **X**
Preparation	
Detection	'has part' some **X**
Input	has_specified_input some **X**
Output	has_specified_output some **X**

Logic: Input Roles

Column	Logic
- Evaluant	(has_specified_input some **X**) and (realizes some (**'evaluant role'** and ('inheres in' some **X**)))
– Analyte	(has_specified_input some **X**) and (realizes some (**'analyte role'** and ('inheres in' some **X**)))
- Device	(has_specified_input some **X**) and (realizes some (**role** and ('inheres in' some **X**)))
- Reagent	(has_specified_input some **X**) and (realizes some (**'reagent role'** and ('inheres in' some **X**)))
– Molecular Label	(has_specified_input some **X**) and (realizes some (**'molecular label role'** and ('inheres in' some **X**)))

Example 1: Chromium Release Assay



Example 1: Chromium Release Assay

Inherited values in *italics*.

RDFS Label	assay	radioactivity detection
OBI ID	OBI:0000070	OBI:0000201
Parent		assay
Target Process		(realizes some radioactive)
Evaluant	material entity	*material entity*
Output	data item	*data item*

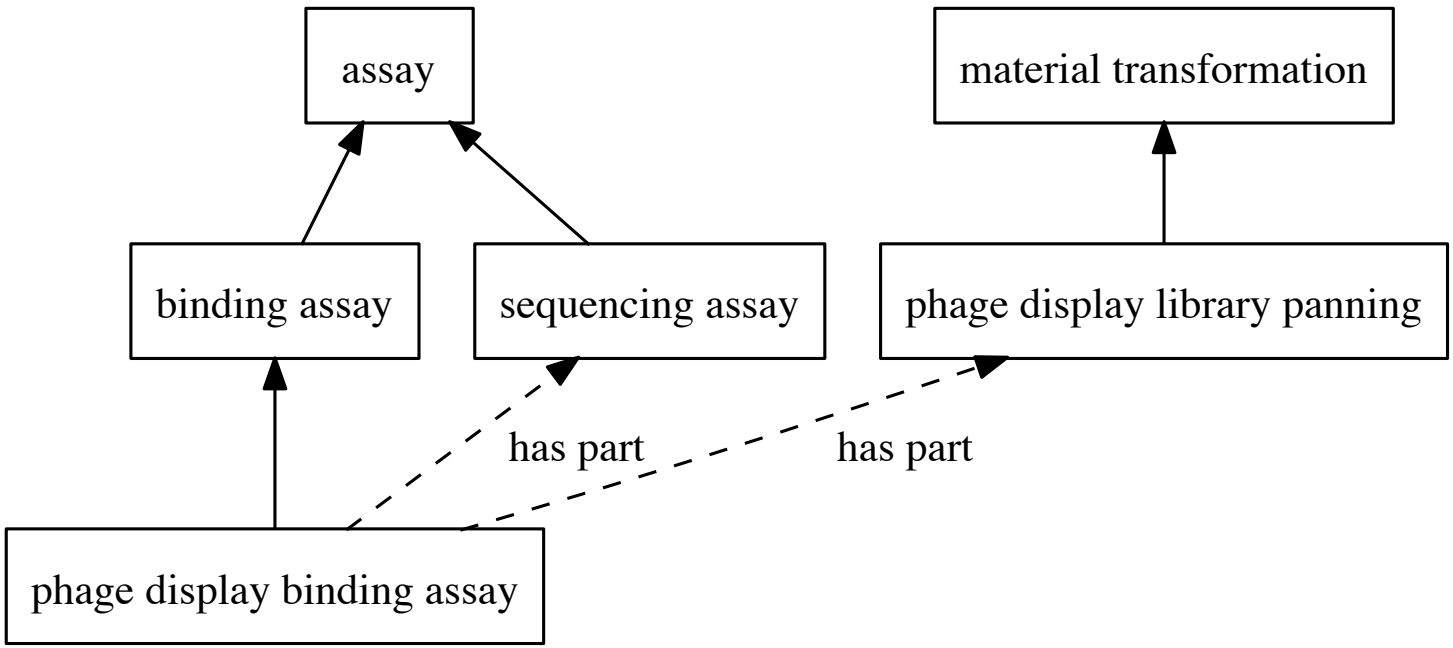
Example 1: Chromium Release Assay

RDFS Label	cytometry assay	cell-cell killing assay
OBI ID	NEW	NEW
Parent	assay	cytometry assay
Target Process		cell killing
Evaluant	cell	*cell*
Output	*data item*	*data item*

Example 1: Chromium Release Assay

RDFS Label	in vitro cell killing assay	chromium release assay
OBI ID	OBI:0000903	OBI:9999994
Parent	cell killing assay	in vitro cell killing assay
Target Process	*cell killing*	*cell killing*
Detection		**radioactivity detection**
Evaluant	cultured cell population	*cultured cell population*
Molecular Label		chromium-51
Output	*data item*	*data item*

Example 2: Phage Display Binding Assay



Tooling

- spreadsheets are the right format for highly patterned data
- it was difficult to pull these assays out of OWL and into spreadsheets
- we should keep the assay definitions in spreadsheets
- update assays in the sheets
- add new assays to the sheets
- we can build OWL from the spreadsheets as required (during the build process)