

# Building the Virtual Physiological Human

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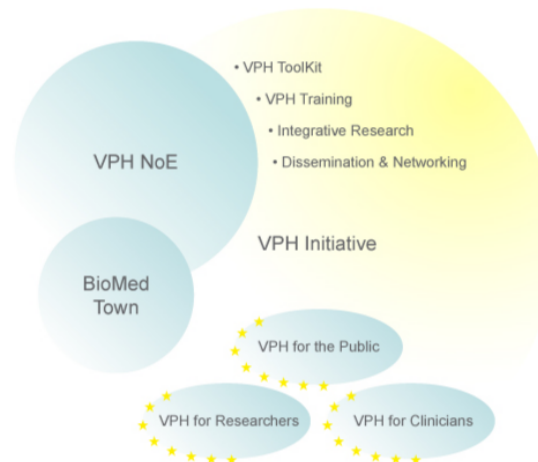
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## VPH Initiative

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Welcome to the home page of the **Virtual Physiological Human Network of Excellence (VPH NoE)** and information portal for the **VPH Initiative**



The VPH NoE is a project which aims to help support and progress European research in biomedical modelling and simulation of the human body. This will improve our ability to predict, diagnose and treat disease, and have a dramatic impact on the future of healthcare, the pharmaceutical and medical device industries.


## Latest News

### VPH NoE Position Regarding Proposals submitted to ICT 2009.5.4: International Cooperation on VPH [PDF](#) | [Print](#) | [E-mail](#)

The VPH NoE clarifies its position, relative to new projects being proposed in response to the call ICT 2009.5.4: International Cooperation on Virtual Physiological Human. For the formal position letter, please click [here](#)

search...

## HIGHLIGHTS

 VPH International  
Collaboration proposals and VPH  
NoE - letter of intent available [here](#)

Early notice of ICT call 6

 Newsletter January 2009

 VPH News Toolkit

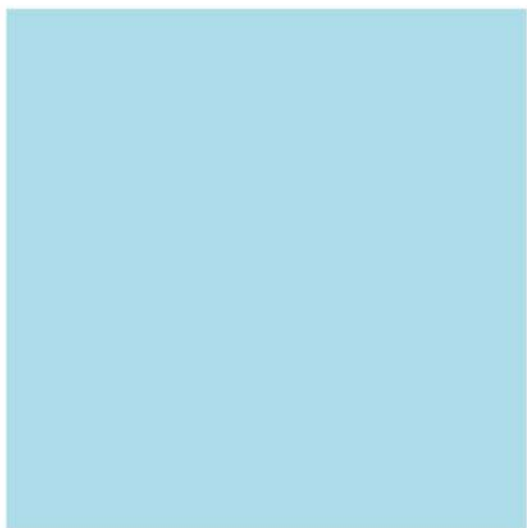
## LATEST VPH EVENTS

- 05.04.2009 - 09.04.2009  
CellML, SBGN, SBO, BioPAX, and  
MIASE Super-Workshop 2009
- 18.04.2009 - 22.04.2009  
Experimental Biology 2009 (EB  
2009), New Orleans, Louisiana
- 25.05.2009 - 27.05.2009  
International Conference on  
Computational Science ICCS 2009

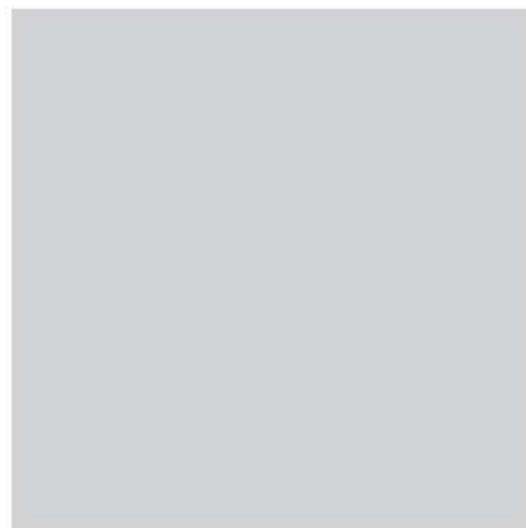
 FIMH 2009

## VPH I AND HEALTH NEWS

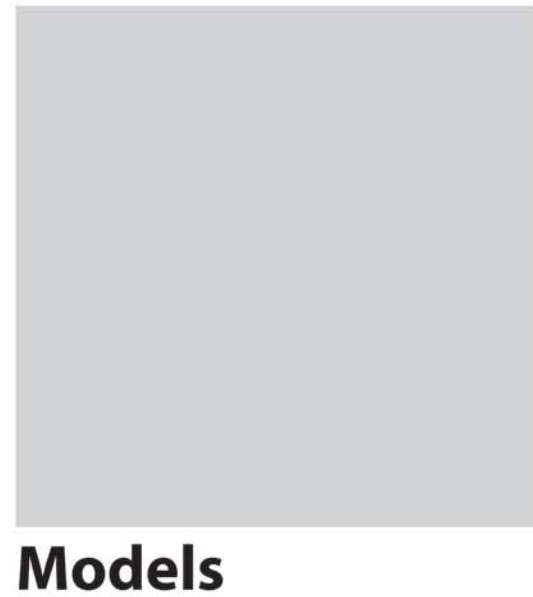
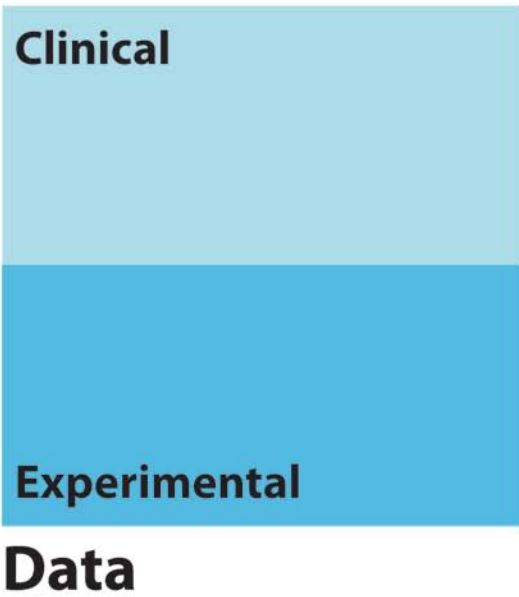
 <http://www.vph-noe.eu/>

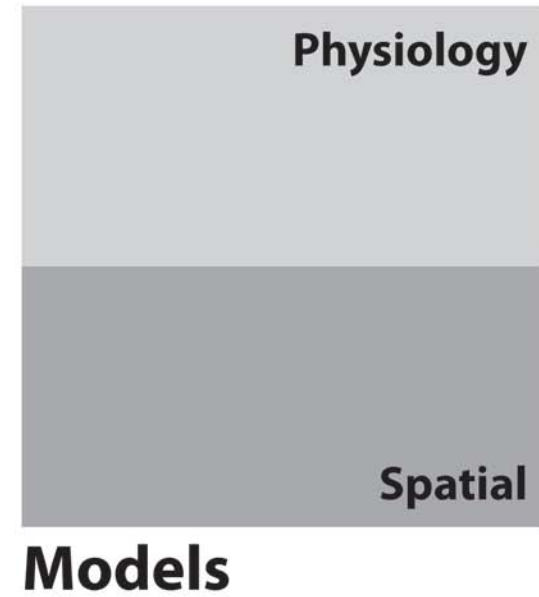


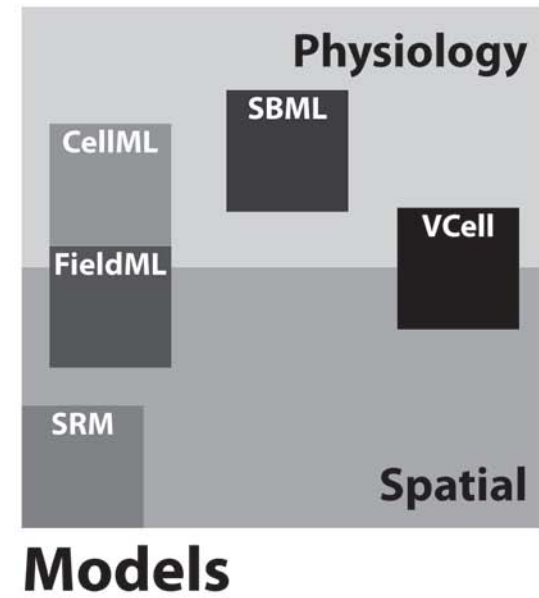
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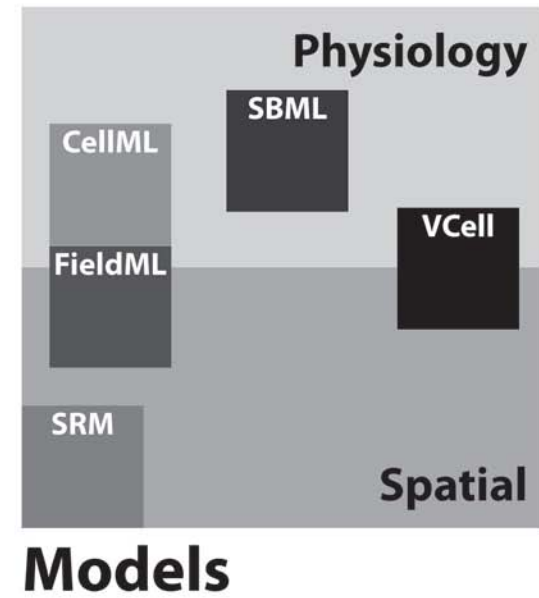
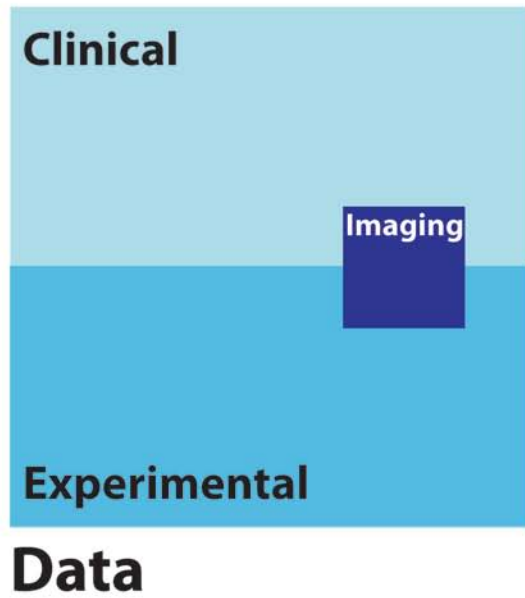


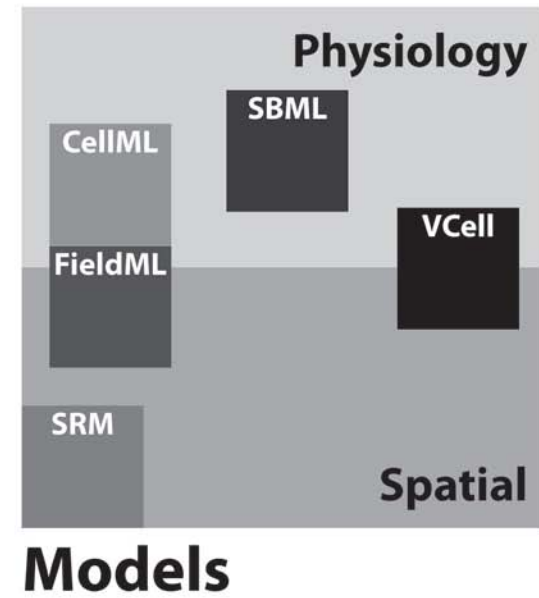
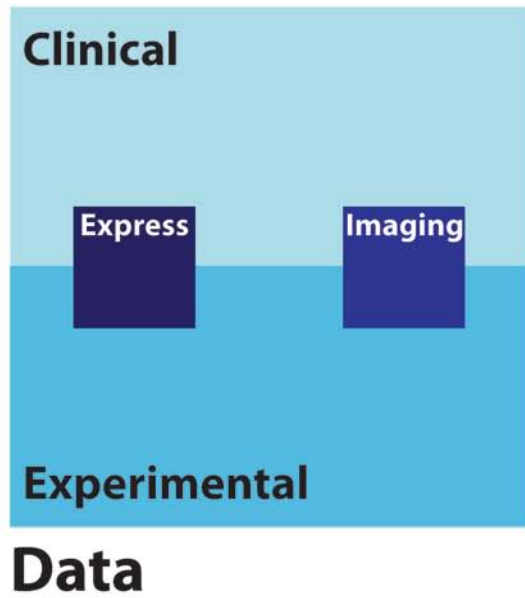
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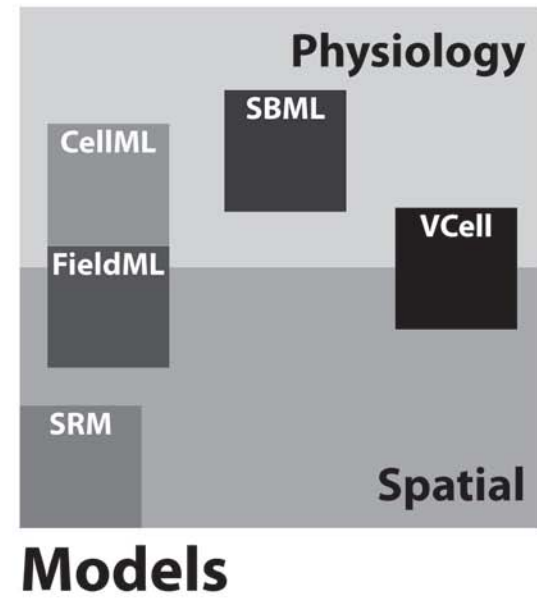
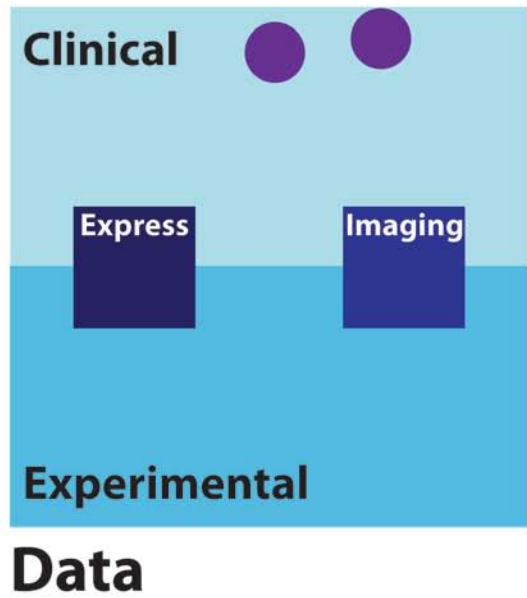


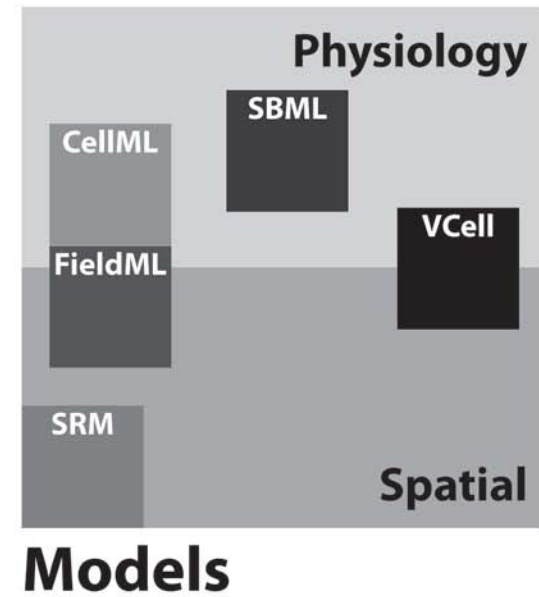
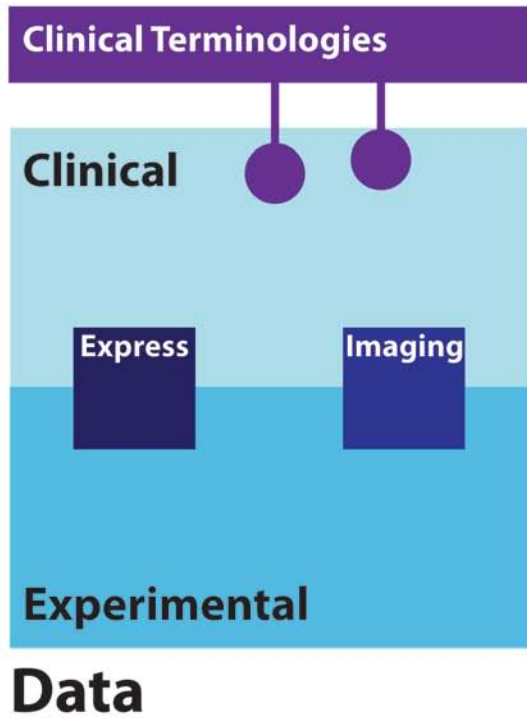


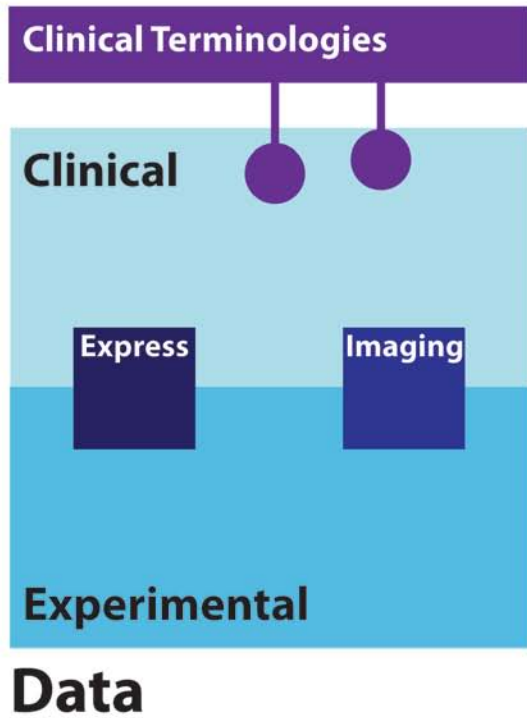




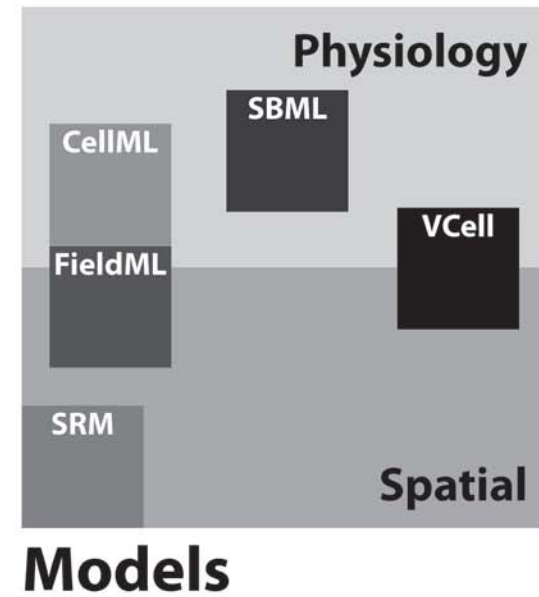


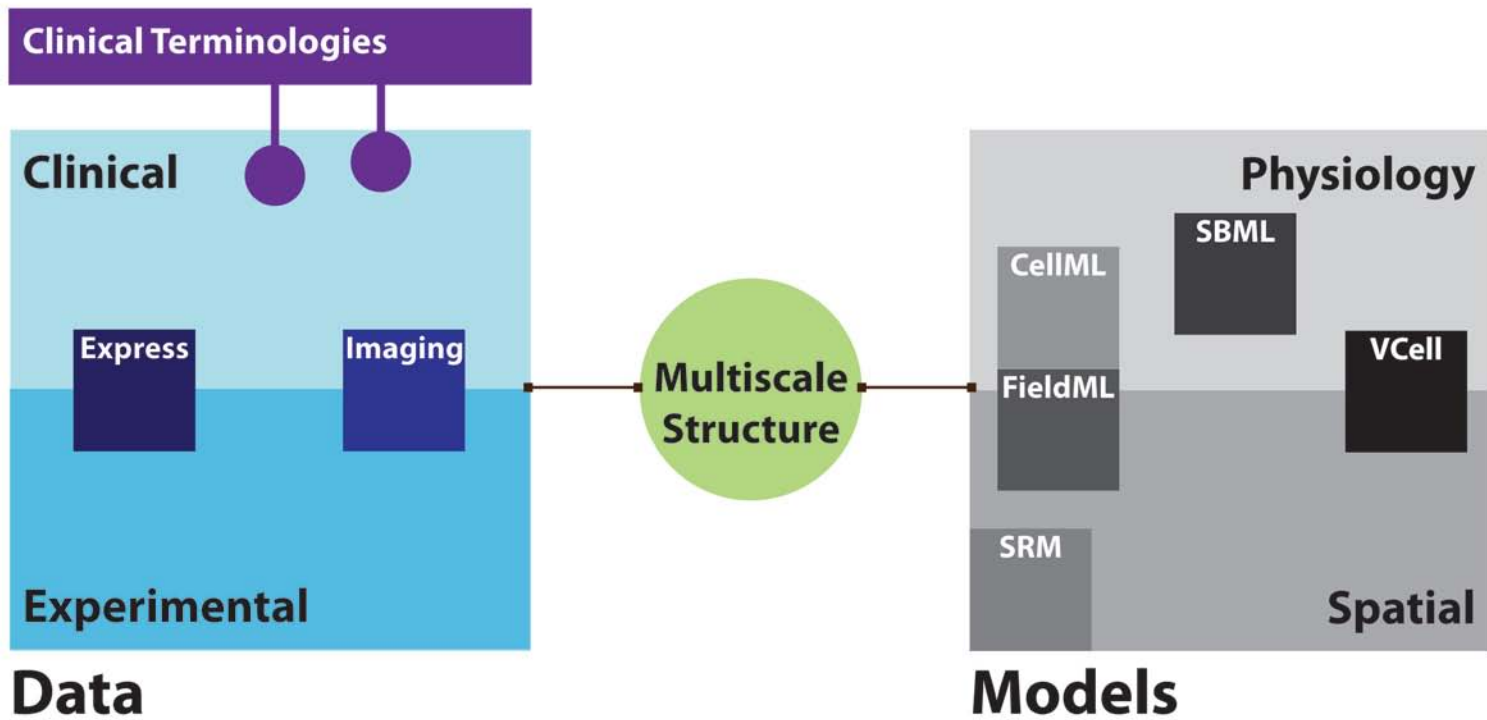


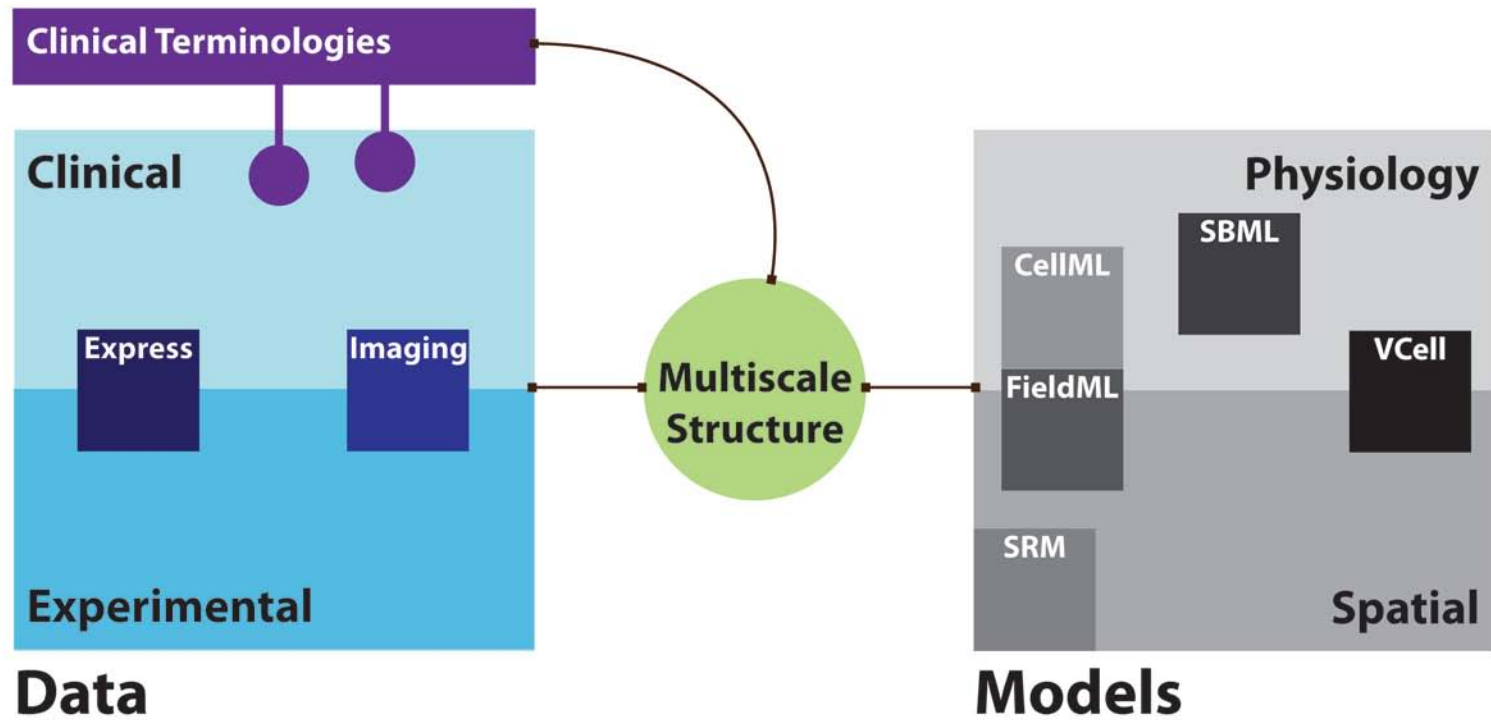


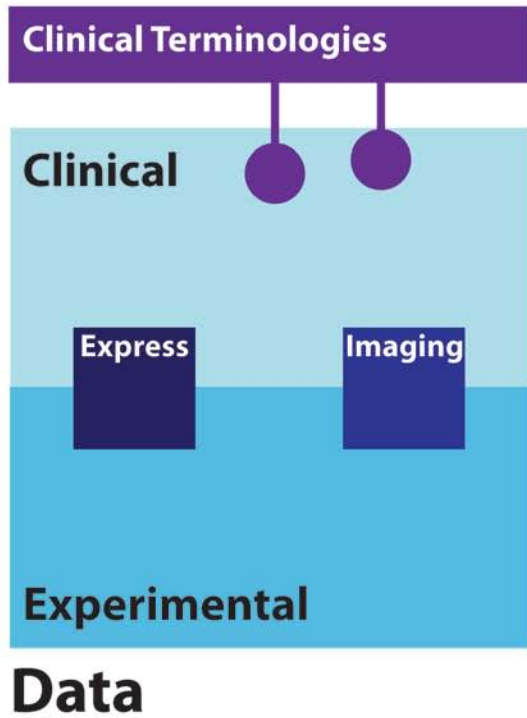


**Multiscale Structure**

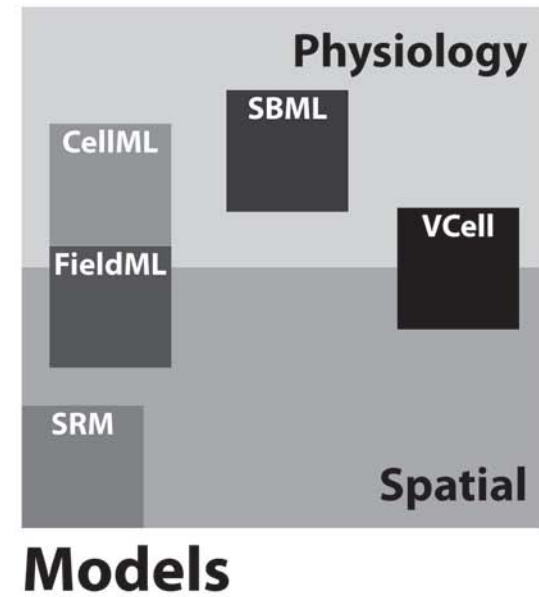


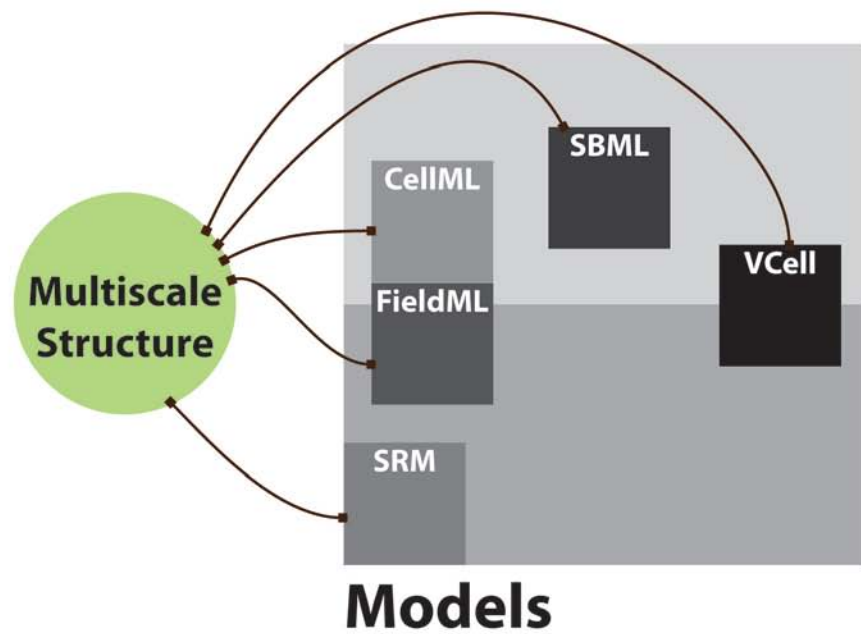
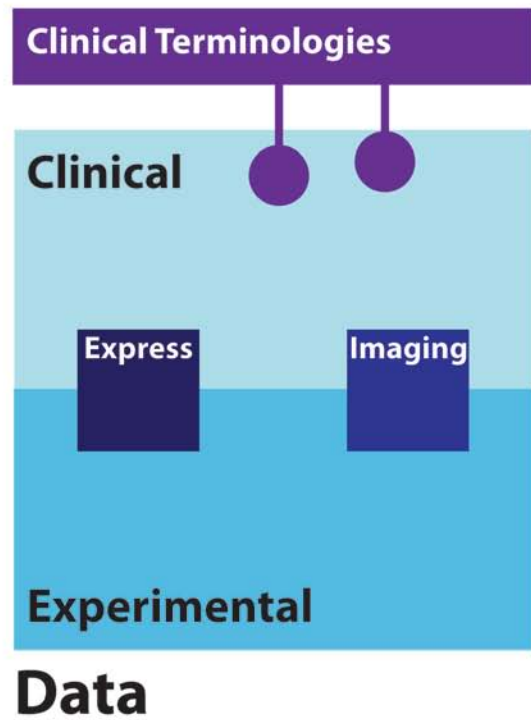


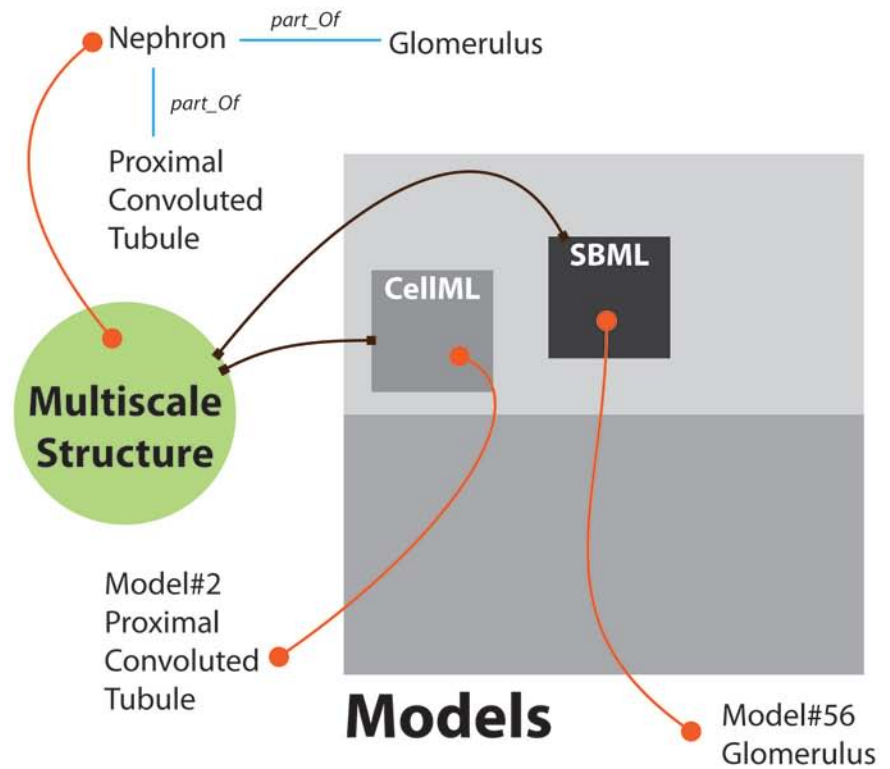
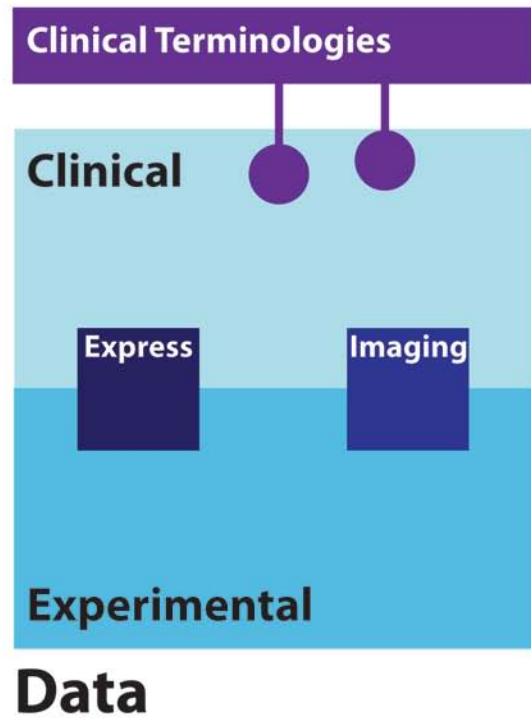




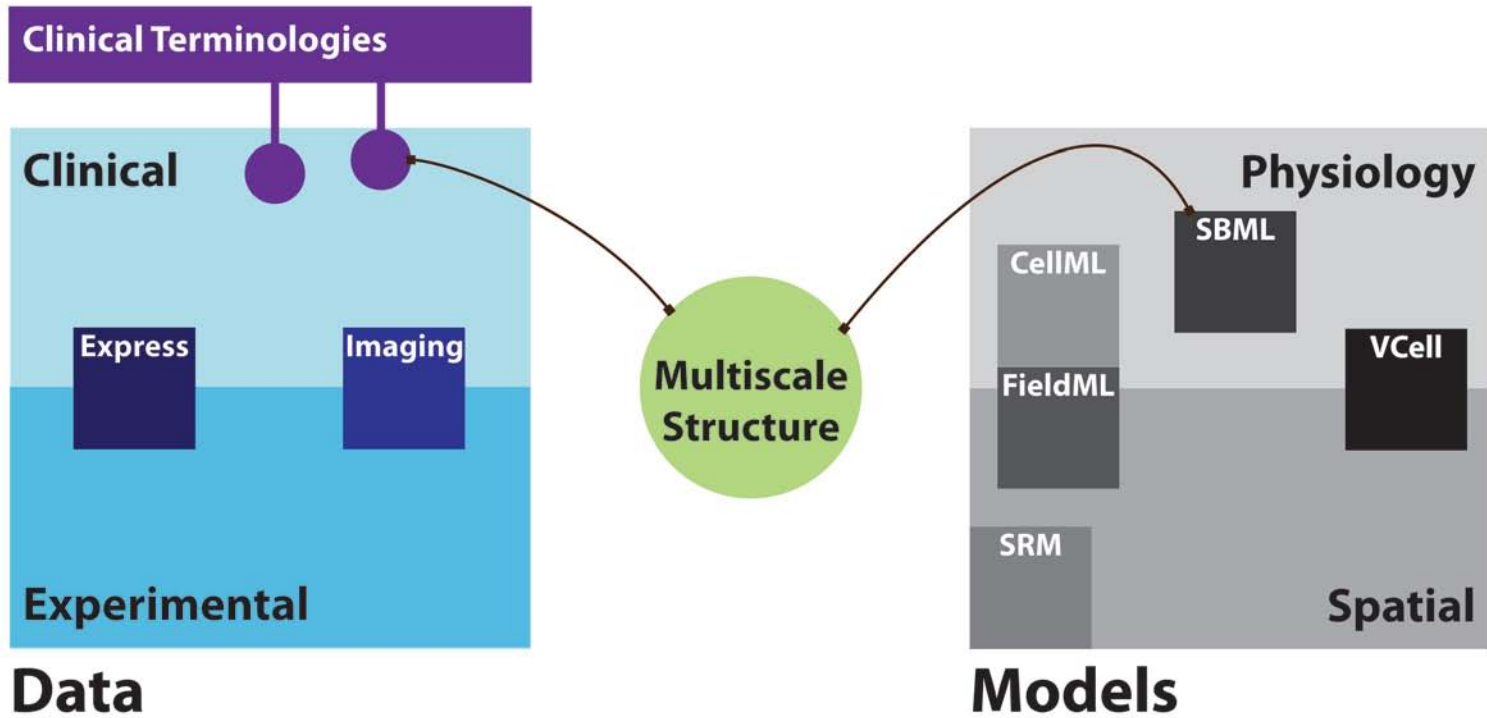
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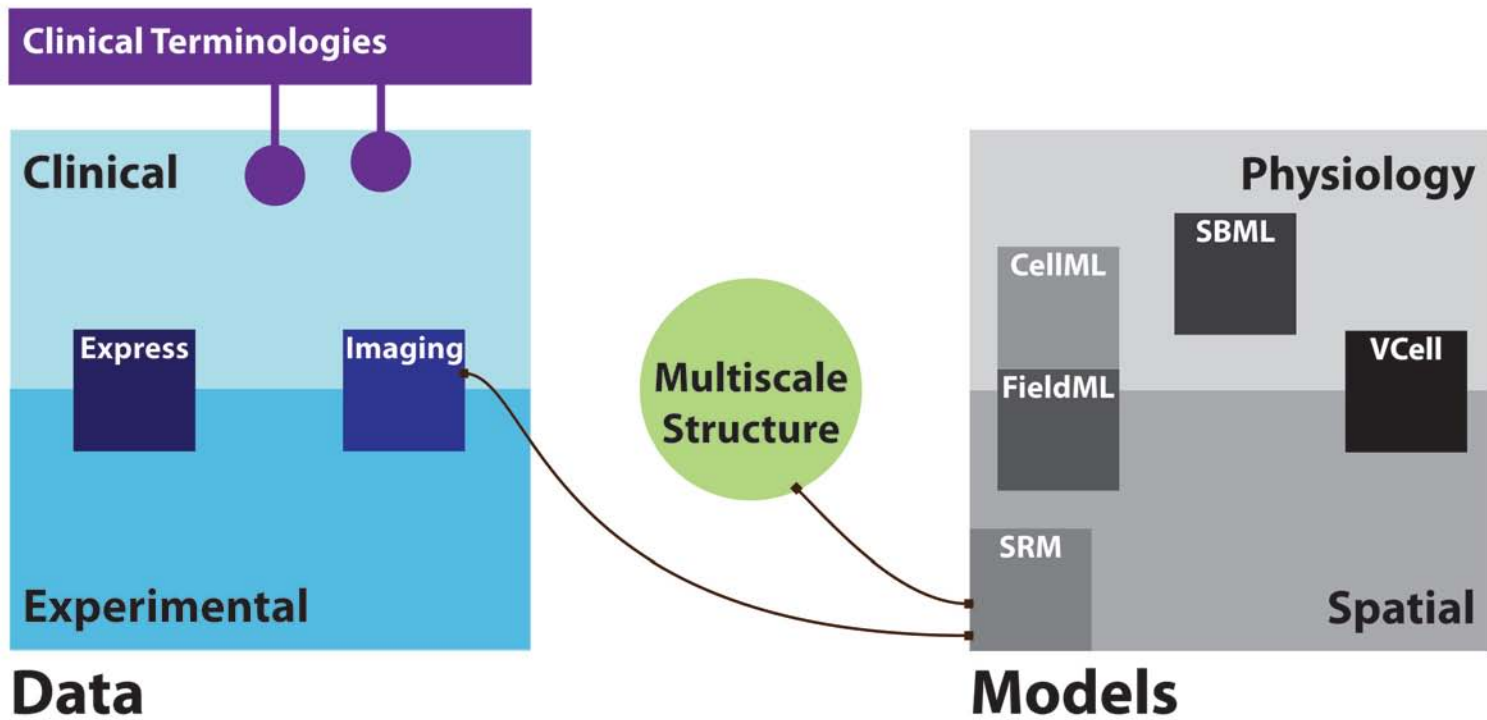


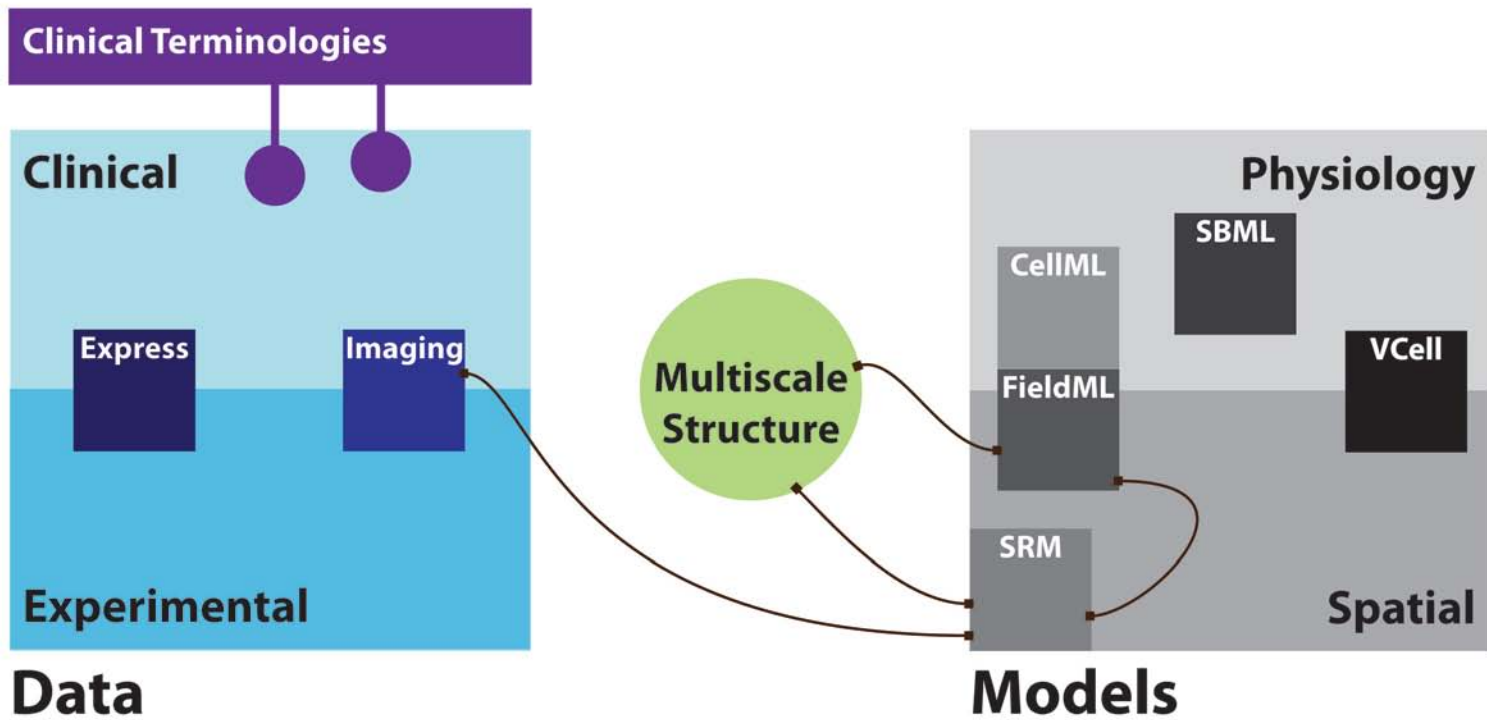


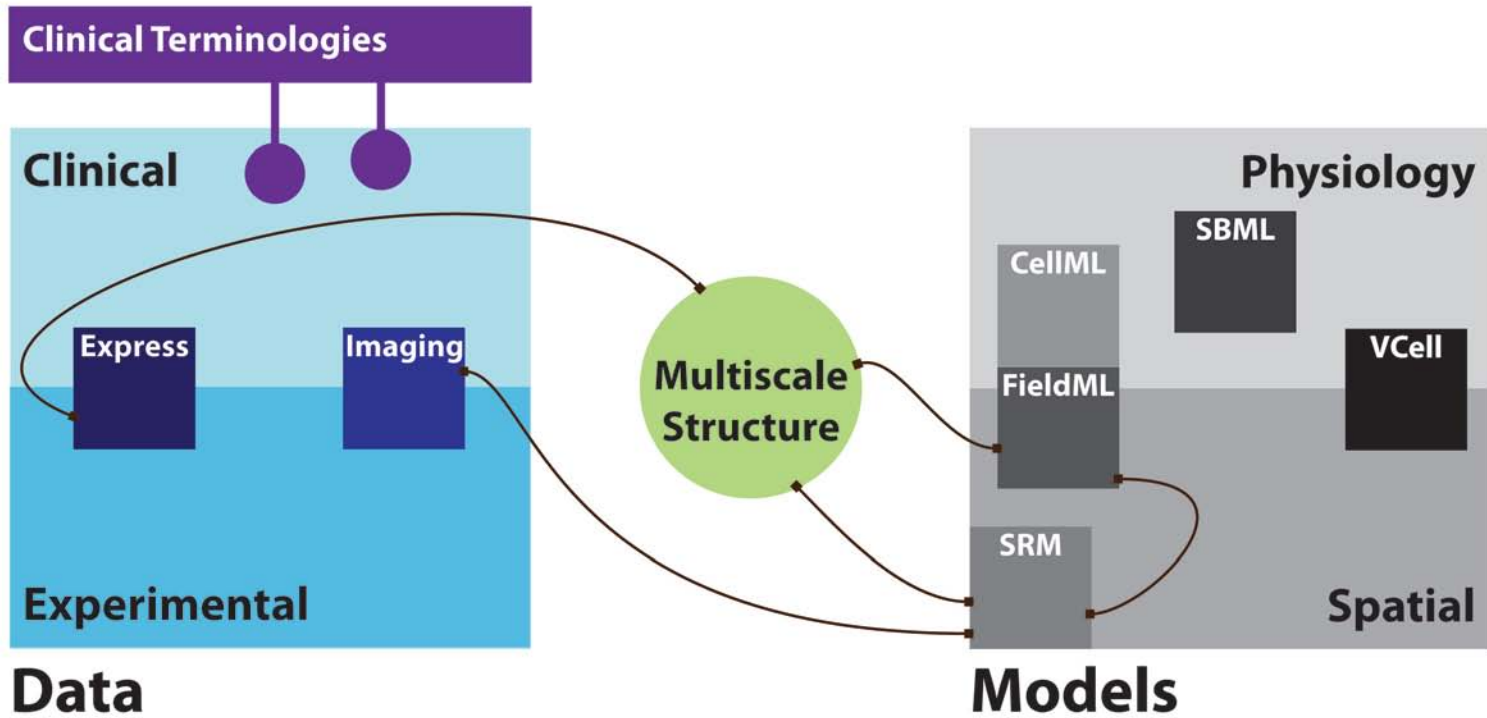


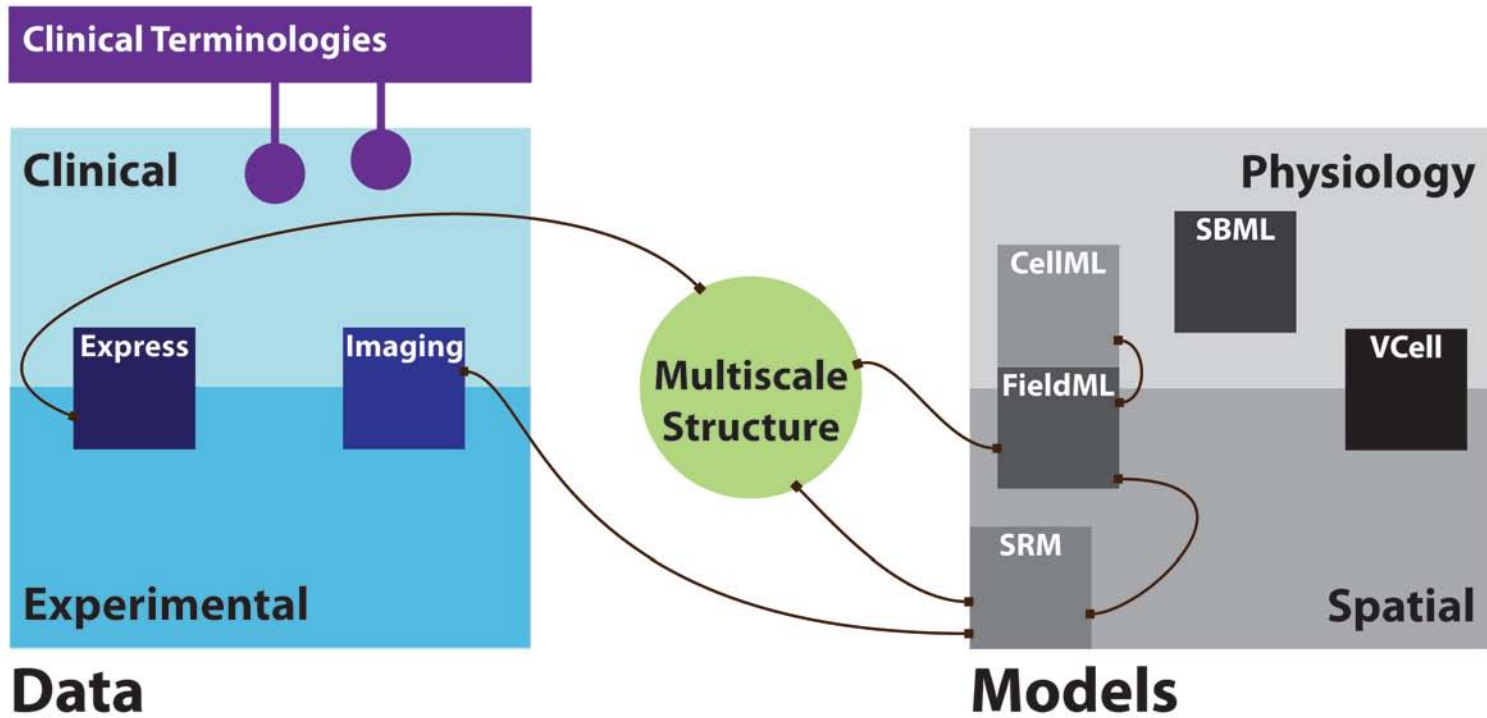






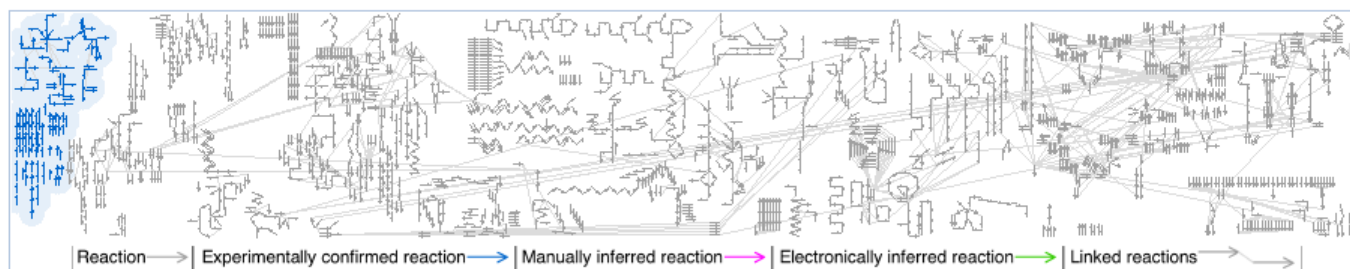








## Reactome - a curated knowledgebase of biological pathways

 The data displayed is for  Use the menu to change the species. Check ☐ for cross-species comparison.


Apoptosis	Cell Cycle Checkpoints	Cell Cycle, Mitotic	DNA Repair
DNA Replication	Electron Transport Chain	Epidermal Growth Factor Receptor (EGFR) signaling	Fibroblast Growth Factor Receptor (FGFR) signaling
Gap junction trafficking and regulation	Gene Expression	HIV Infection	<b>Hemostasis</b>
Immune System signaling	Influenza Infection	Insulin receptor mediated signaling	Integration of pathways involved in energy metabolism
Maintenance of Telomeres	Metabolism of amino acids and related nitrogen-containing molecules	Metabolism of carbohydrates	Metabolism of lipids and lipoproteins
Metabolism of nucleotides	Metabolism of porphyrins	Notch Signaling Pathway	Oxidative decarboxylation of pyruvate and TCA cycle
Post-translational modification of proteins	Transforming Growth Factor (TGF) beta signaling	Transcription	Translation
mRNA Processing	Xenobiotic metabolism		

### About Reactome

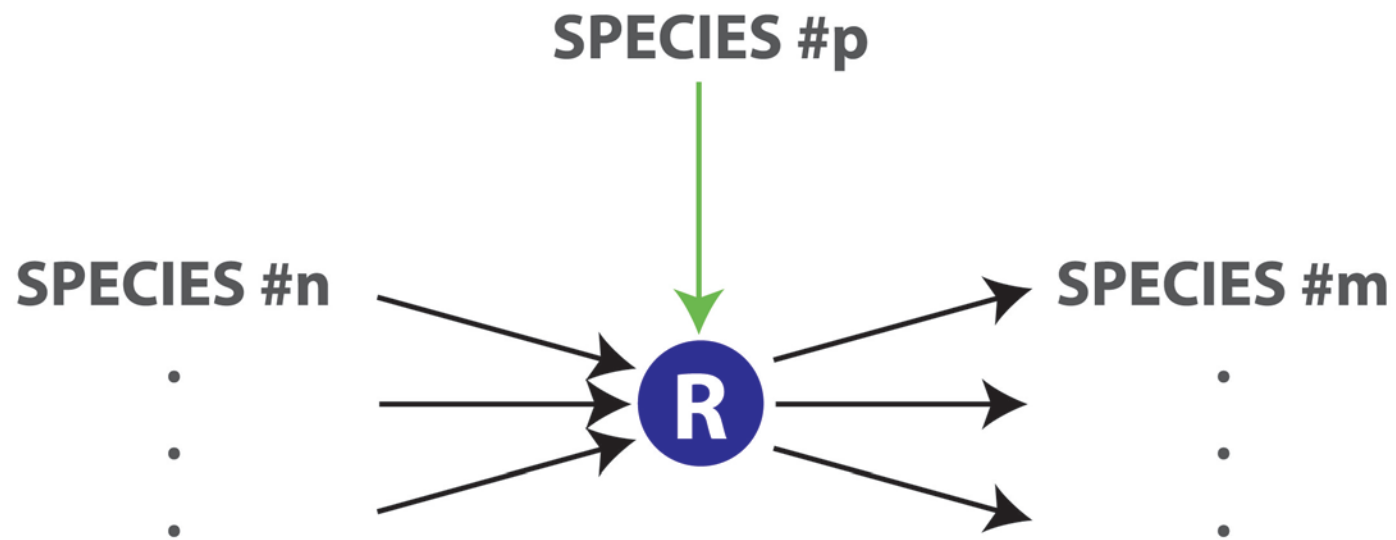


The **Reactome** project is a collaboration among Cold Spring Harbor Laboratory, The European Bioinformatics Institute, and The Gene Ontology Consortium to develop a curated resource of core pathways and reactions in human biology. The information in this database is authored by biological researchers with expertise in their fields, maintained by the Reactome editorial staff, and cross-referenced with the sequence databases at NCBI, Ensembl and UniProt, the UCSC Genome Browser, HapMap, KEGG (Gene and Compound), ChEBI, PubMed and GO. In addition to curated human events, inferred orthologous events in 22 non-human species including mouse, rat, chicken,

### News and Notes

#### February 28, 2007: Version 20 Released

New topics released in Version 20 are **Fibroblast Growth Factor Receptor (FGFR) signaling**, **Epidermal Growth Factor Receptor (EGFR) signaling** under **signaling pathways**, **Gap junction trafficking** under **cell biology**, and **Porphyrin metabolism**, Digestion of dietary **carbohydrate** and **lipid** under **metabolic pathways**. Additional events for **HIV REV protein interactions**, and **Influenza virus RNP assembly** have been added to corresponding infectious disease pathways. Updated release **statistics** and the **Editorial Calendar** are





# REACTOME ([www.reactome.org](http://www.reactome.org))



**Protein**



**Small  
Molecule**



**Subcellular  
Compartment**

# REACTOME ([www.reactome.org](http://www.reactome.org))



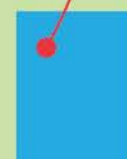
Protein  
:UniProt



Small  
Molecule  
:ChEBI



Subcellular  
Compartment  
:GO CC



**Protein  
:UniProt**



**Small  
Molecule  
:ChEBI**



**Subcellular  
Compartment  
:GO CC**



Gene  
:Ensembl



Protein  
:UniProt



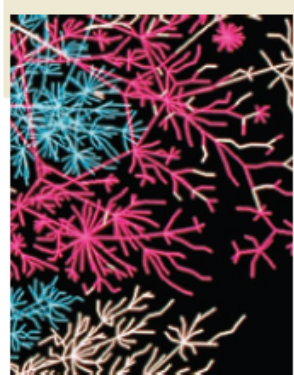
Small  
Molecule  
:ChEBI



Subcellular  
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:GO CC



- a. rate of urinary urea excretion**
- b. rate of O<sub>2</sub> delivery to muscle tissues**
- c. rate of change of plasma protein**
- d. left atrial ANP secretion**
- e. total ADH secretion**
- f. afferent arteriolar resistance**
- g. vascular resistance through muscle tissues**
- h. alveolar ventilation**
- i. diuretic effect on tubular reabsorption**
- j. arterial O<sub>2</sub> content**



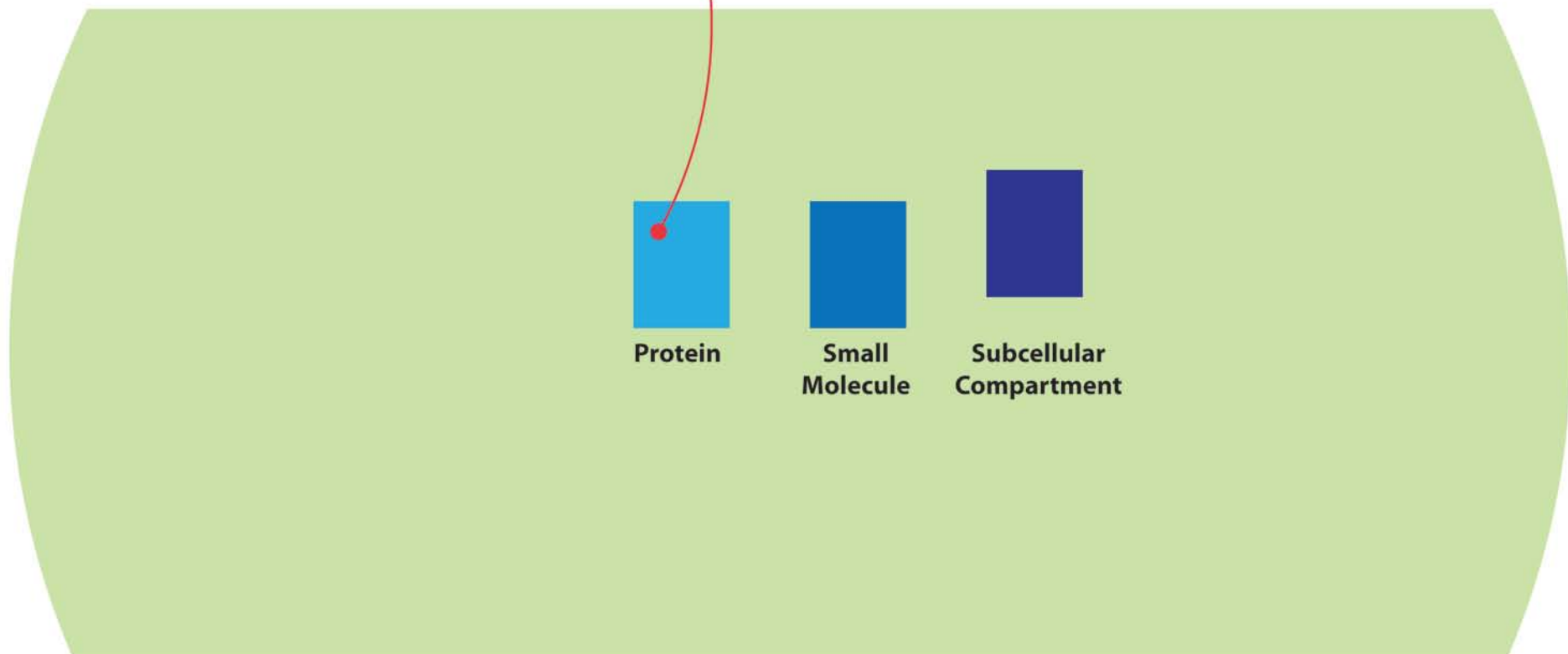
# Minimum information requested in the annotation of biochemical models (MIRIAM)

Nicolas Le Novère<sup>1,15</sup>, Andrew Finney<sup>2,15</sup>, Michael Hucka<sup>3</sup>, Upinder S Bhalla<sup>4</sup>, Fabien Campagne<sup>5</sup>, Julio Collado-Vides<sup>6</sup>, Edmund J Crampin<sup>7</sup>, Matt Halstead<sup>7</sup>, Edda Klipp<sup>8</sup>, Pedro Mendes<sup>9</sup>, Poul Nielsen<sup>7</sup>, Herbert Sauro<sup>10</sup>, Bruce Shapiro<sup>11</sup>, Jacky L Snoep<sup>12</sup>, Hugh D Spence<sup>13</sup> & Barry L Wanner<sup>14</sup>

- a. rate of urinary urea excretion**
- b. rate of O<sub>2</sub> delivery to muscle tissues**
- c. rate of change of plasma protein**
- d. left atrial ANP secretion**
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- a. rate of **urinary** **urea** excretion
- b. rate of **O2** delivery to **muscle** tissues
- c. rate of change of **plasma** protein
- d. left **atrial** **ANP** secretion
- e. total **ADH** secretion
- f. afferent **arteriolar** resistance
- g. **vascular** resistance through **muscle** tissues
- h. **alveolar** ventilation
- i. diuretic effect on **tubular** reabsorption
- j. **arterial** **O2** content







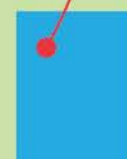
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**Small  
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**Subcellular  
Compartment**



**Protein**  
**:UniProt**

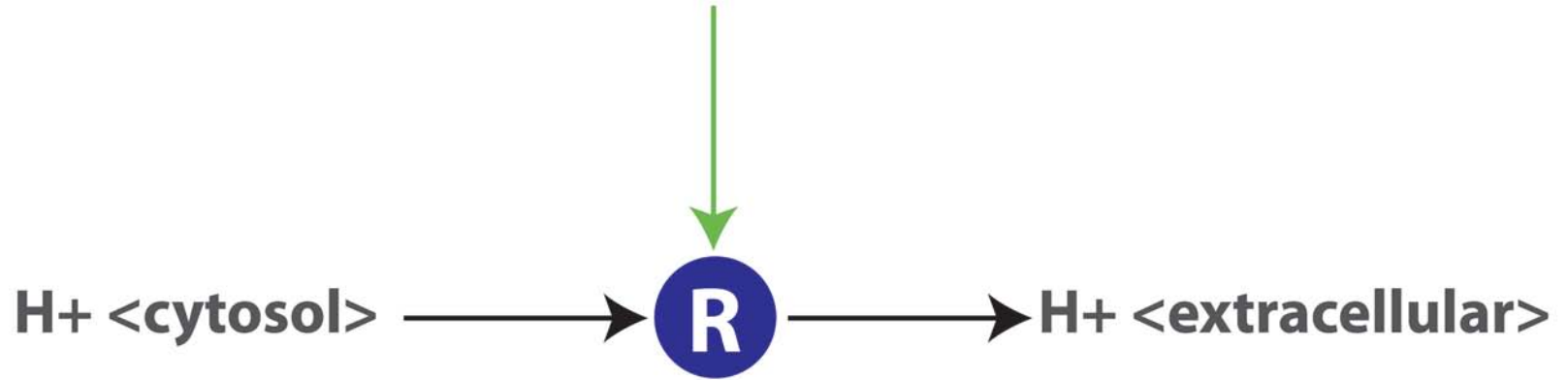


**Small  
Molecule**  
**:ChEBI**



**Subcellular  
Compartment**  
**:GO CC**

**H<sup>+</sup> Pump<plasma membrane>**





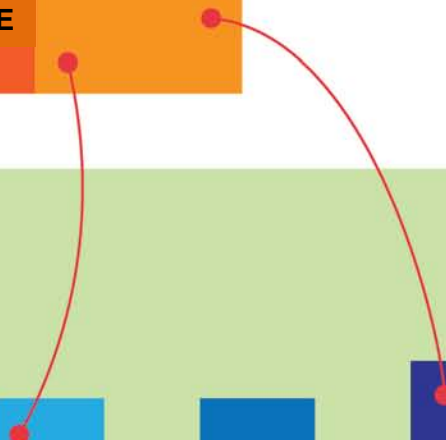
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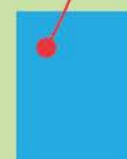


**Small  
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**:ChEBI**



**Subcellular  
Compartment**  
**:GO CC**





Protein  
:UniProt

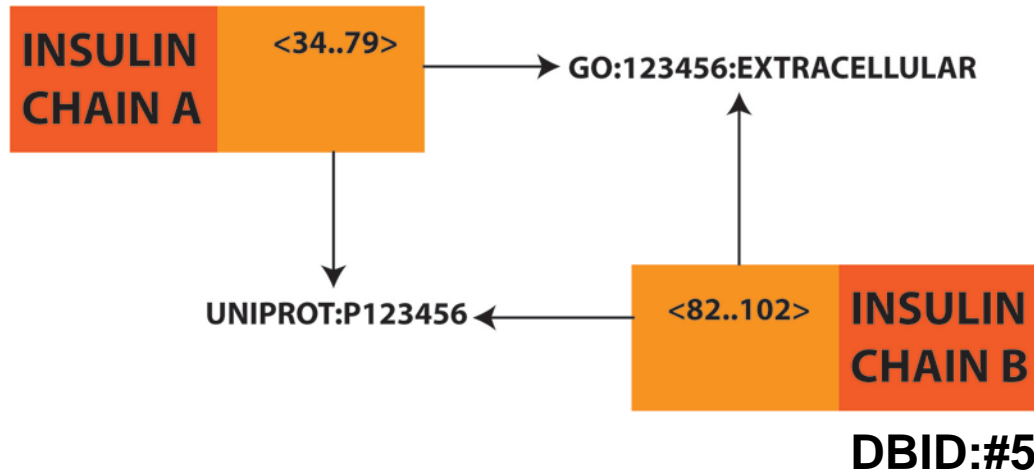


Small  
Molecule  
:ChEBI



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:GO CC

**DBID:#3**





Protein  
:UniProt

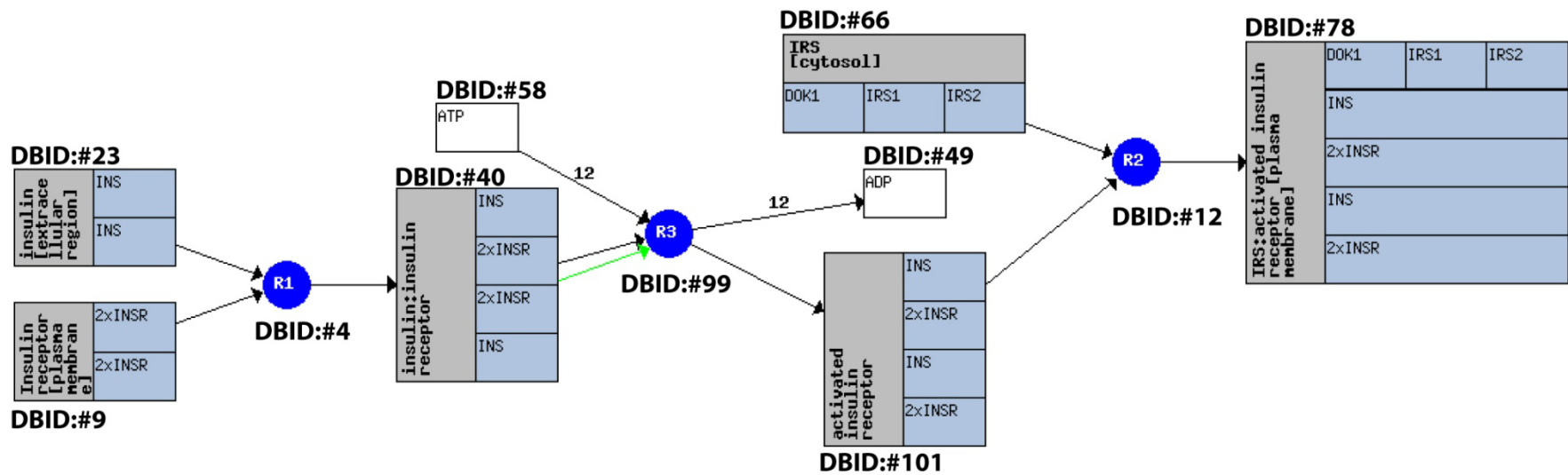


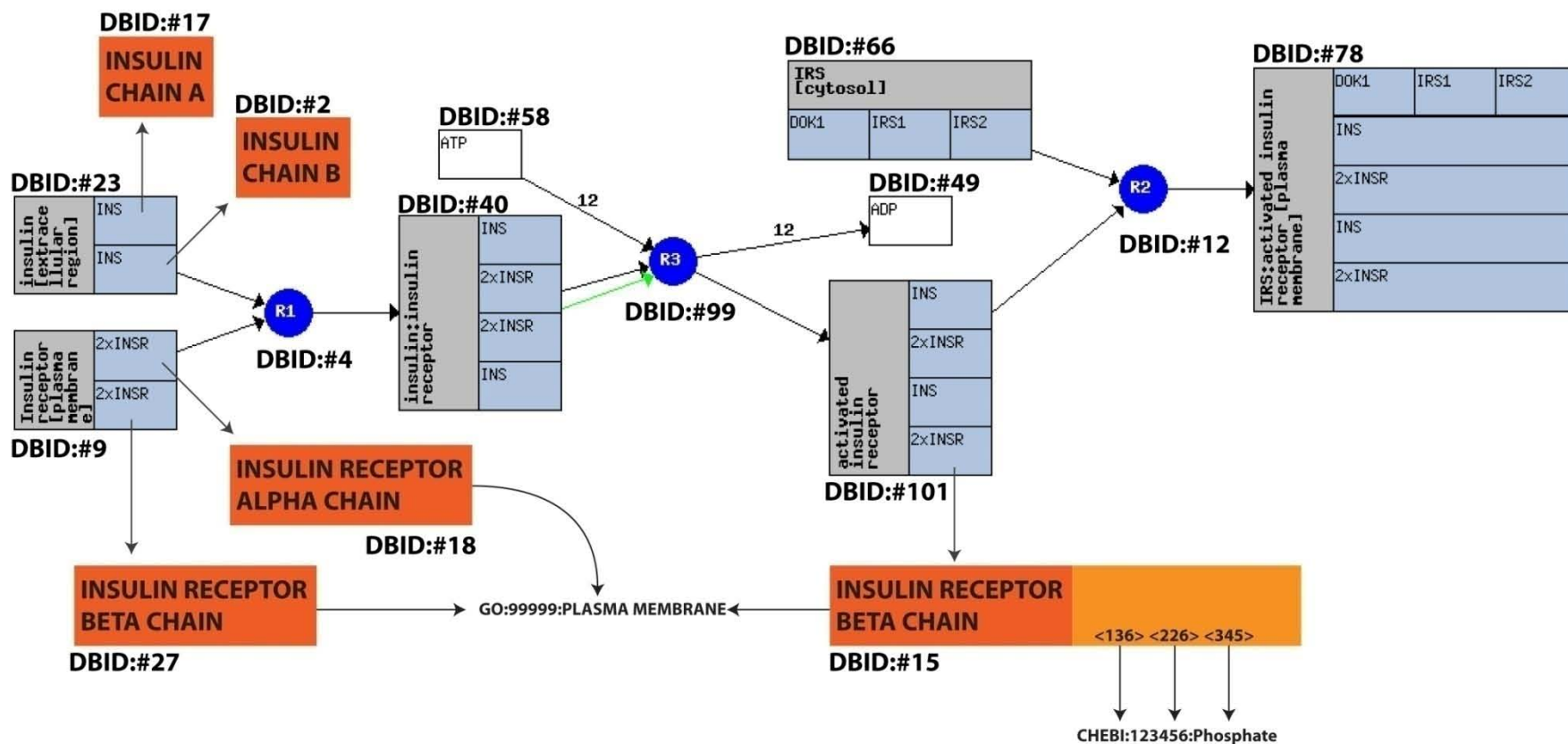
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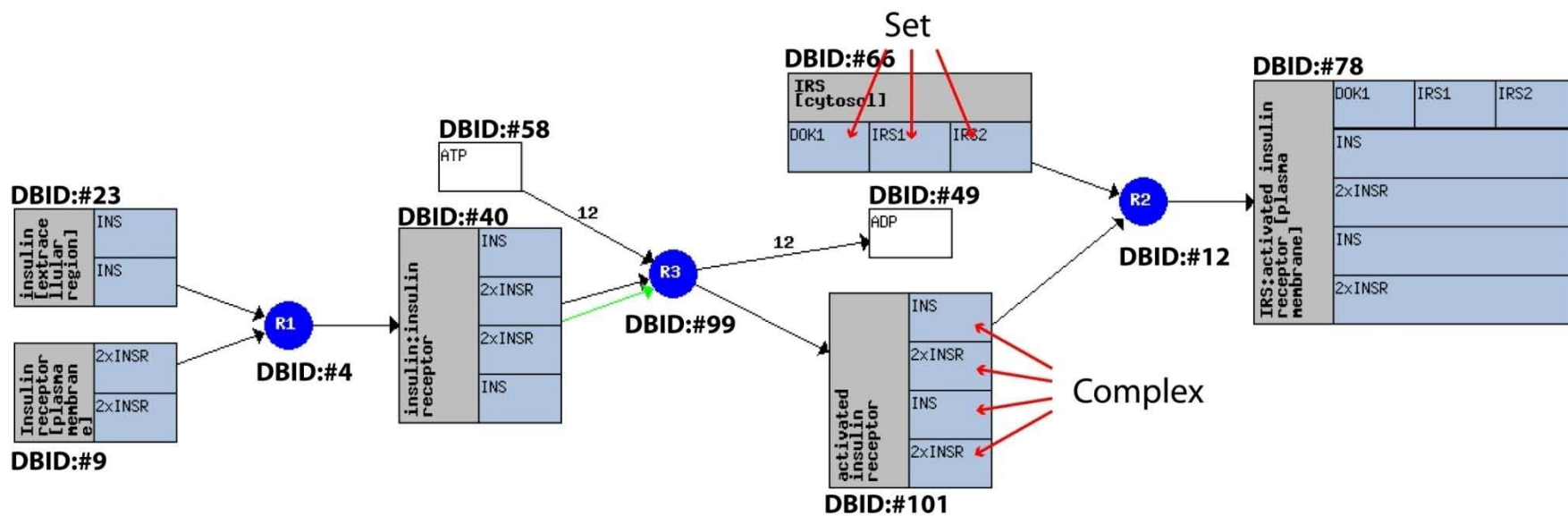


Subcellular  
Compartment  
:GO CC









# **When to use Composite Constructs?**

- 1) Dictionaries have insufficient resolution to discriminate structures;**
- 2) Combinatorial challenge;**
- 3) Keep track of information associated with its cardinal components;**
- 4) Need to span multiple concepts (e.g. structure and properties).**

MYD88											
MAL											
2xTLR9	hag	3xporB	Triacy	Clostr	Diacyl	Imiqui	R 848	ssRNA	LPS	groEL_	Ligand
Unmeth	2xTLR5	TLR1		TLR6		2xTLR7		2xTLR8		2xMD2	
		TLR2		TLR2				2xTLR4		2xTLR10	

## **Two scenarios:**

- (i) the 'level of oxygen in erythrocytes in the coronary blood';**
- (ii) 'the basement extracellular matrix that links sinusoidal endothelium with hepatocytes in the liver (i.e. in the space of Disse)';**

# REACTOME ([www.reactome.org](http://www.reactome.org))



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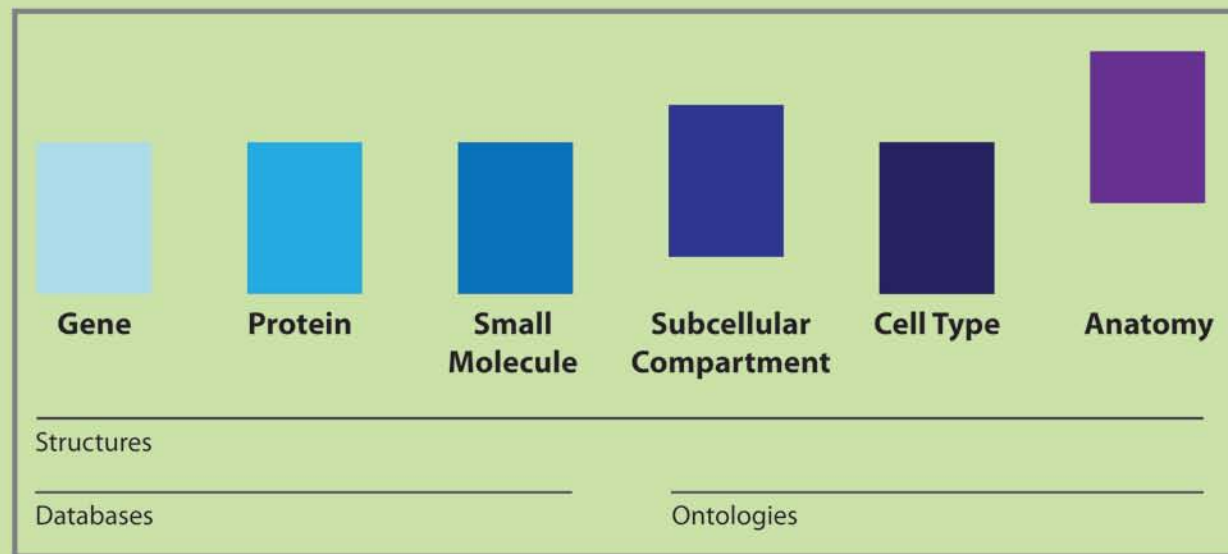


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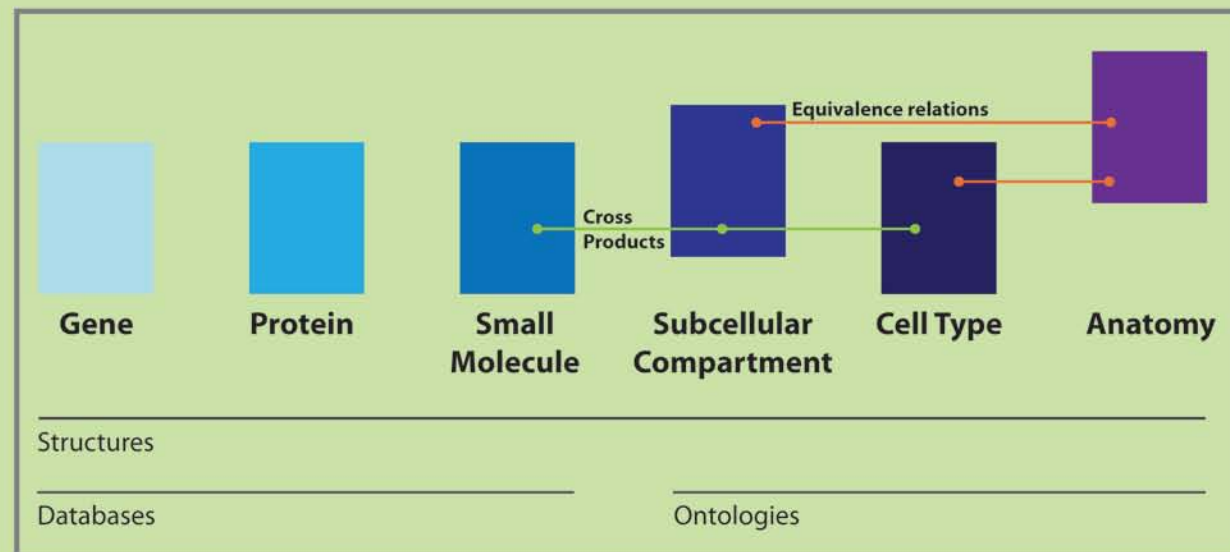


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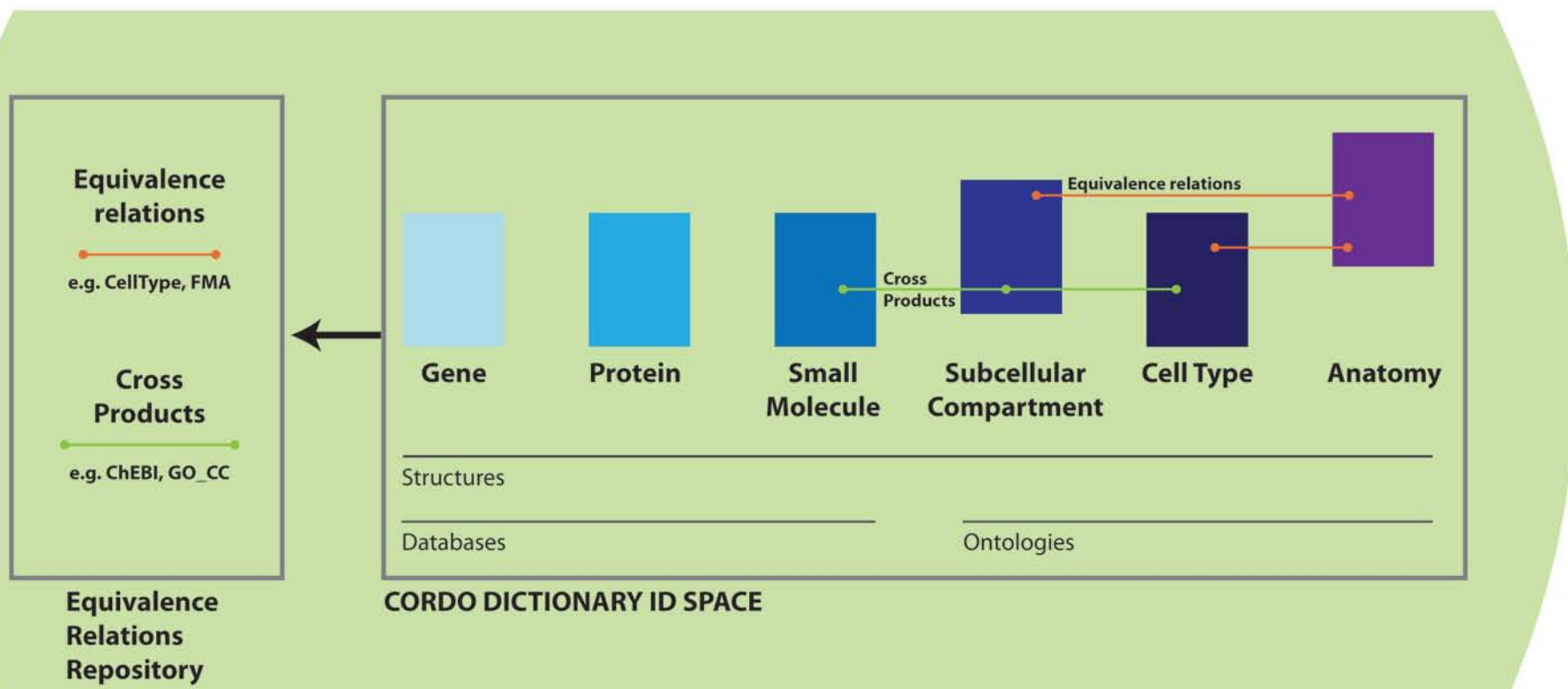




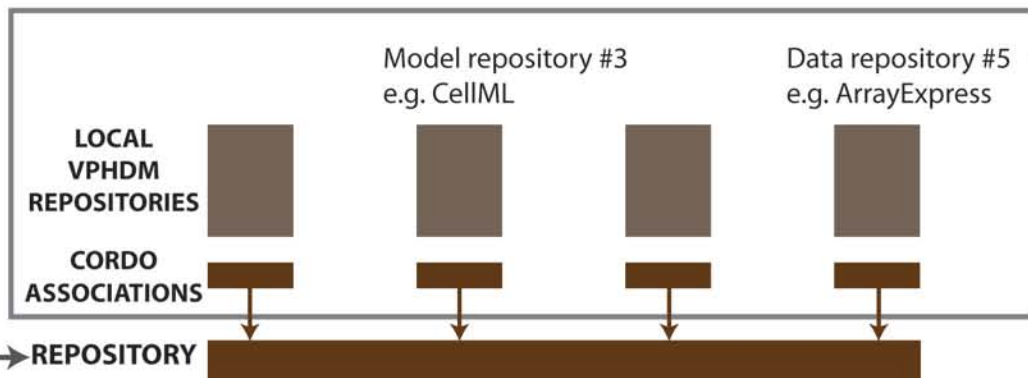
**CORDO DICTIONARY ID SPACE**



**CORDO DICTIONARY ID SPACE**



**QUERY  
ENGINE**



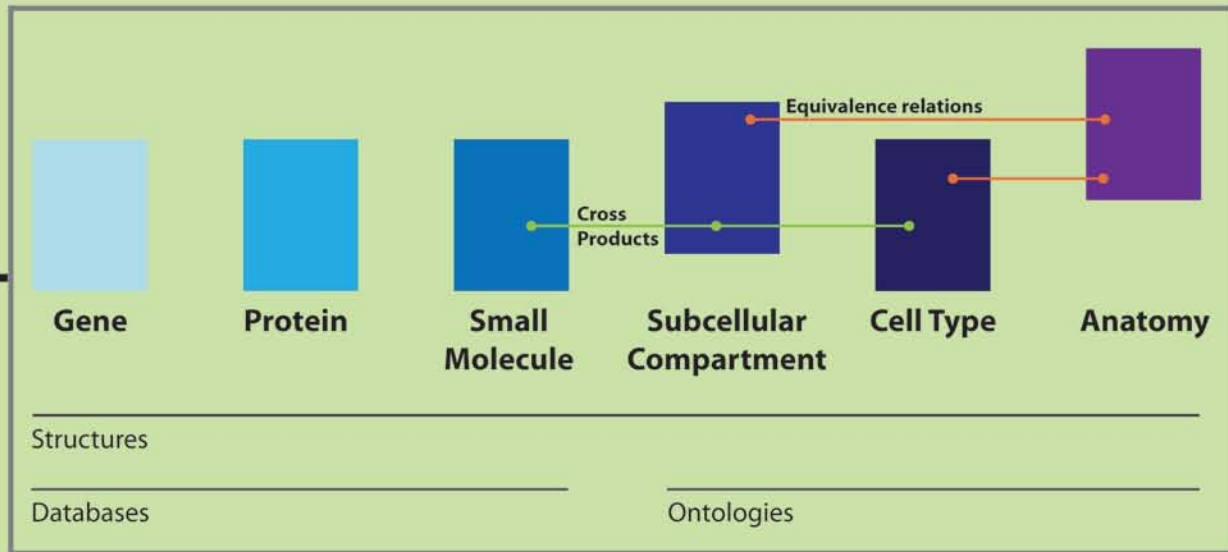
**Equivalence  
relations**

e.g. CellType, FMA

**Cross  
Products**

e.g. ChEBI, GO\_CC

**Equivalence  
Relations  
Repository**



**CORDO DICTIONARY ID SPACE**

# Thank You

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**bdb@ebi.ac.uk**

