

Causal Statements

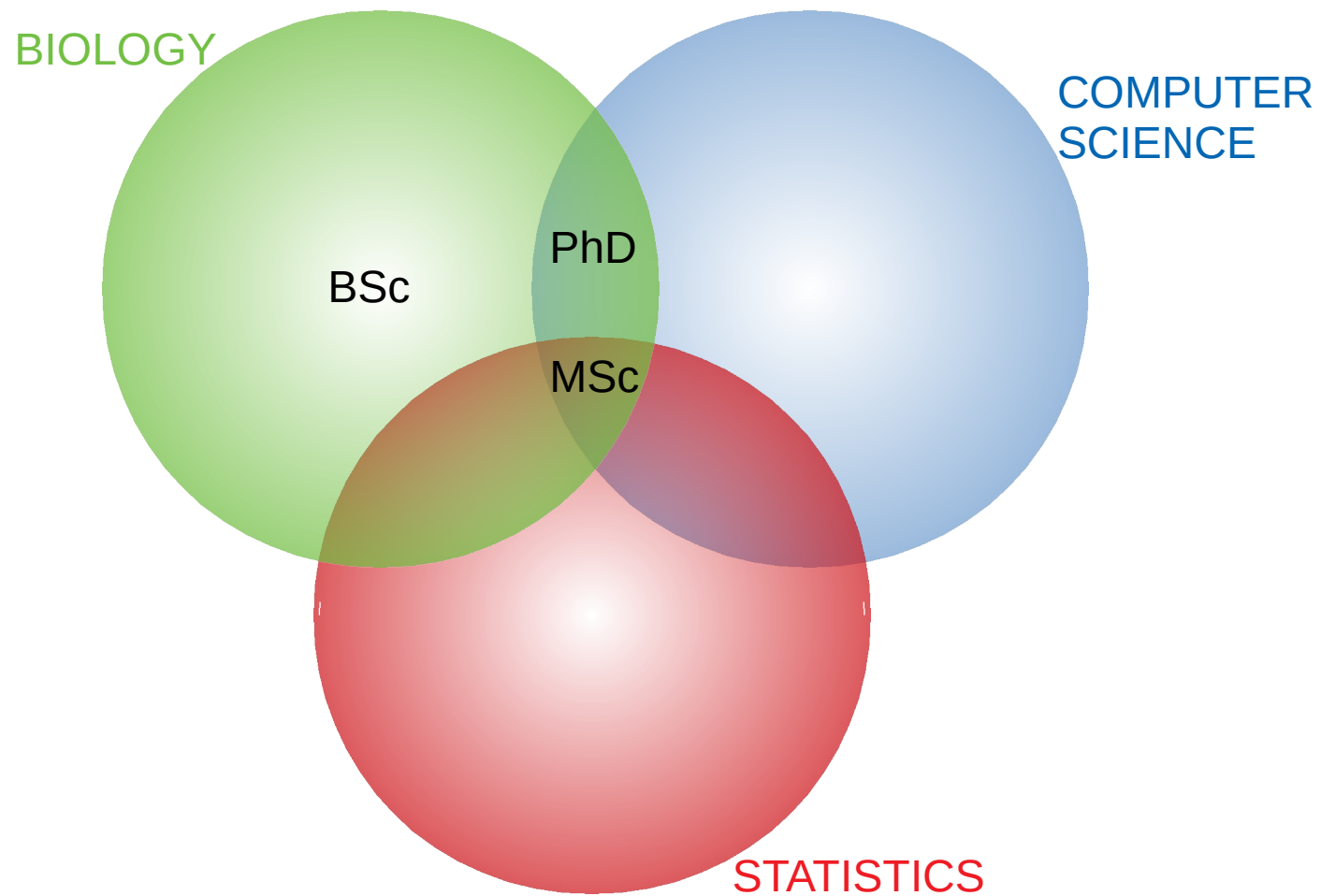
Knowledge management and data
extraction

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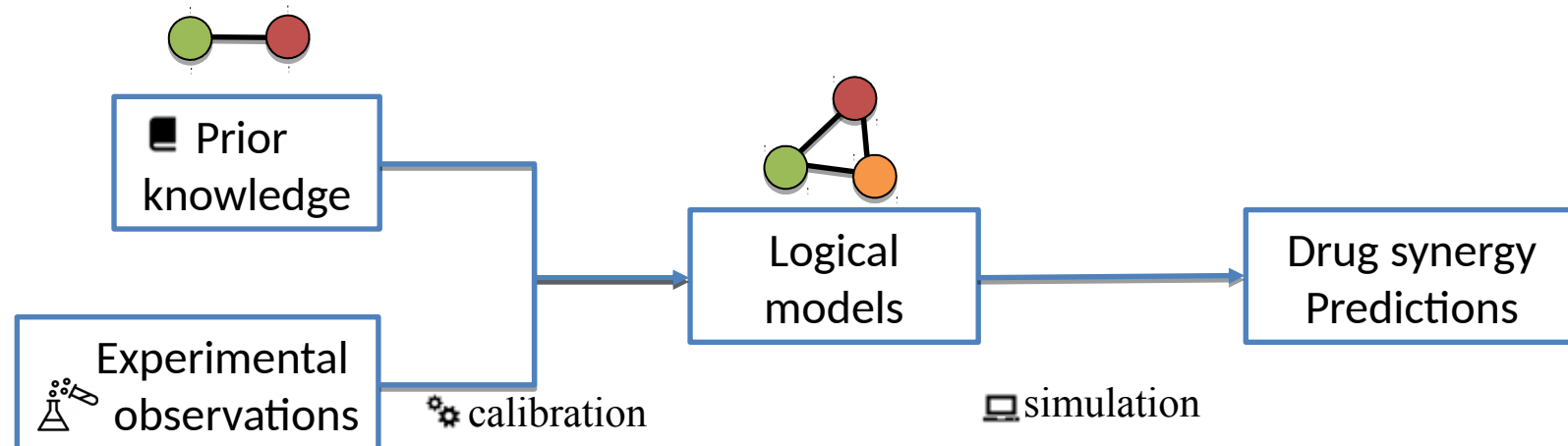


My background



The Druglogics project

Development of anti-cancer drug therapies via model predictions



The topics of my PhD

Develop resources and tools to ease data analysis

Knowledge management

K
N
O N T O L O G I E S
W
G U I D E L I N E S
E
S T A N D A R D S
G
E

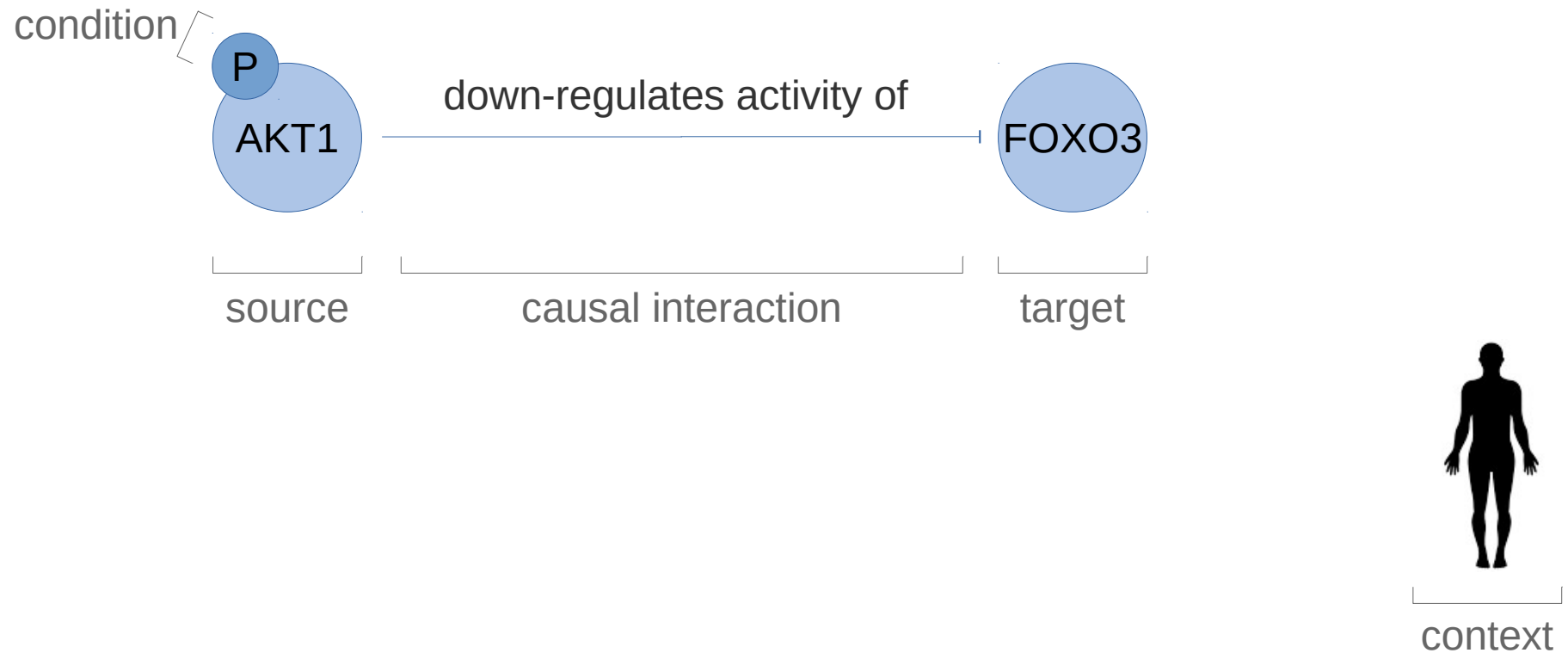
Data extraction



Focus: Causal statements in Systems Biology



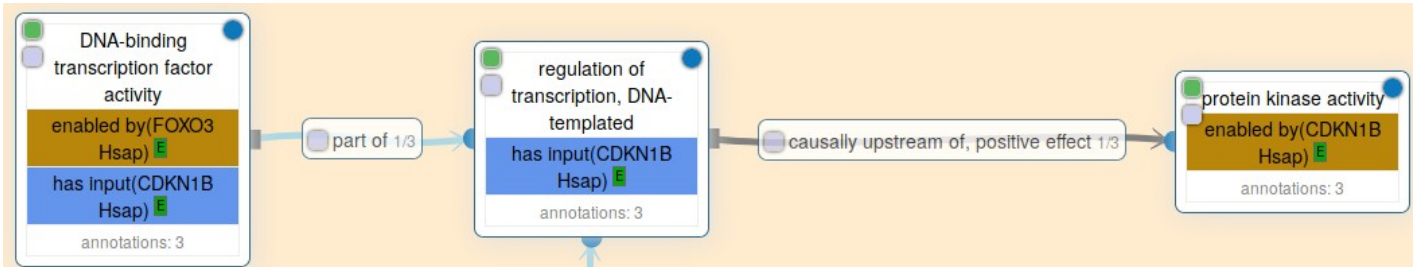
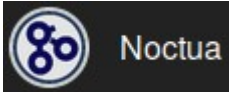
What is a causal statement

Causal interaction between biological entities (gene, RNA, protein,...)



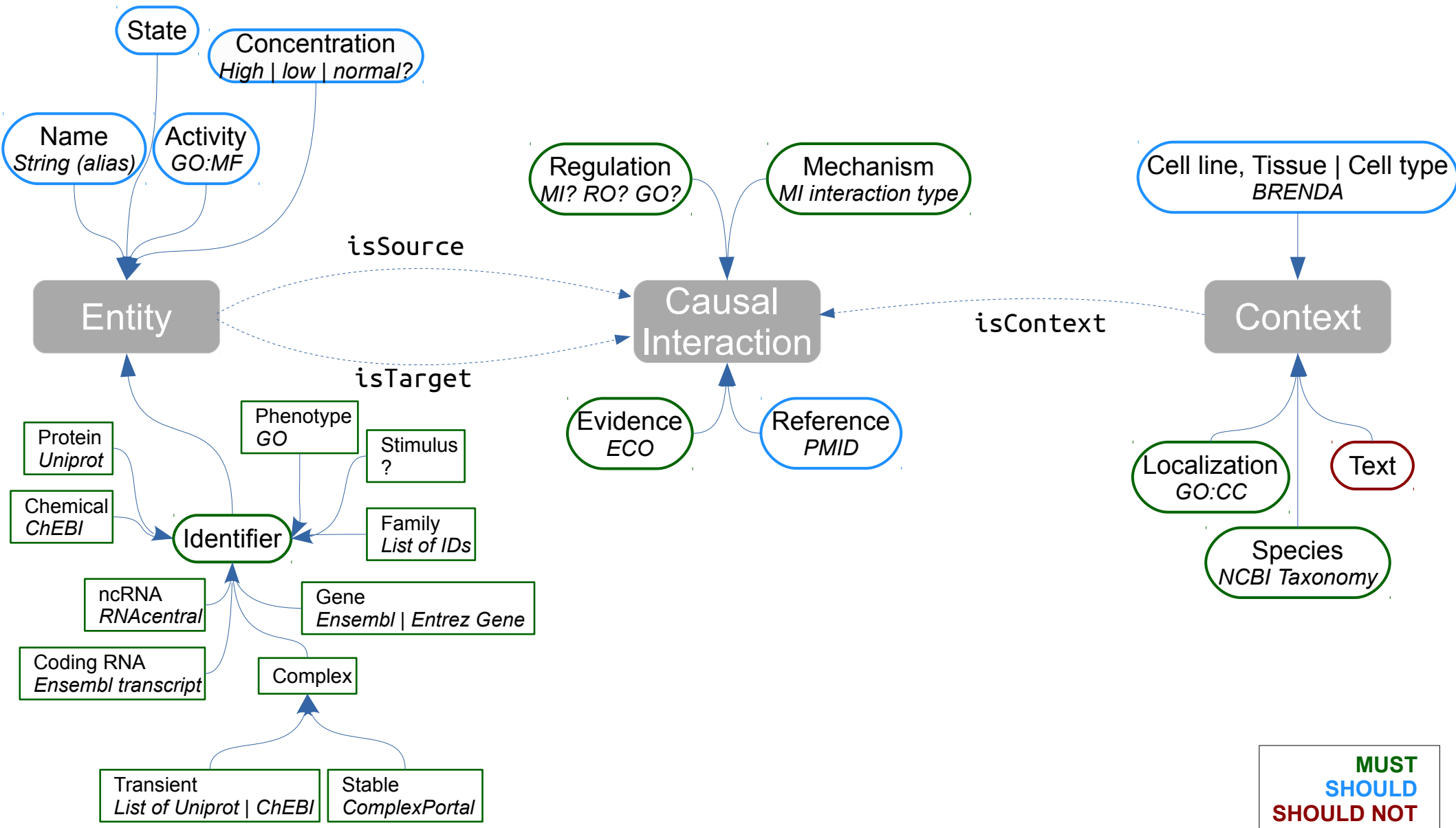
Causal statement in Systems Biology

Existing formats depicting causality

Format	Causal statement representation	Database
MITAB2.8	A up-regulates quantity by expression of B	
BEL	$p(A) \rightarrow \text{transcriptionalActivity}(B)$	 Causal Bio network
GO-CAM		

Minimum Information about a Causal Statement

Guideline for consistency and intelligibility of knowledge

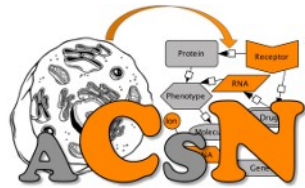


Extraction from prior knowledge

Aggregation of causal data from existing resources



Pathways,
reactions



Pathways of
cancer related
signaling
networks



DB of causal
interactions



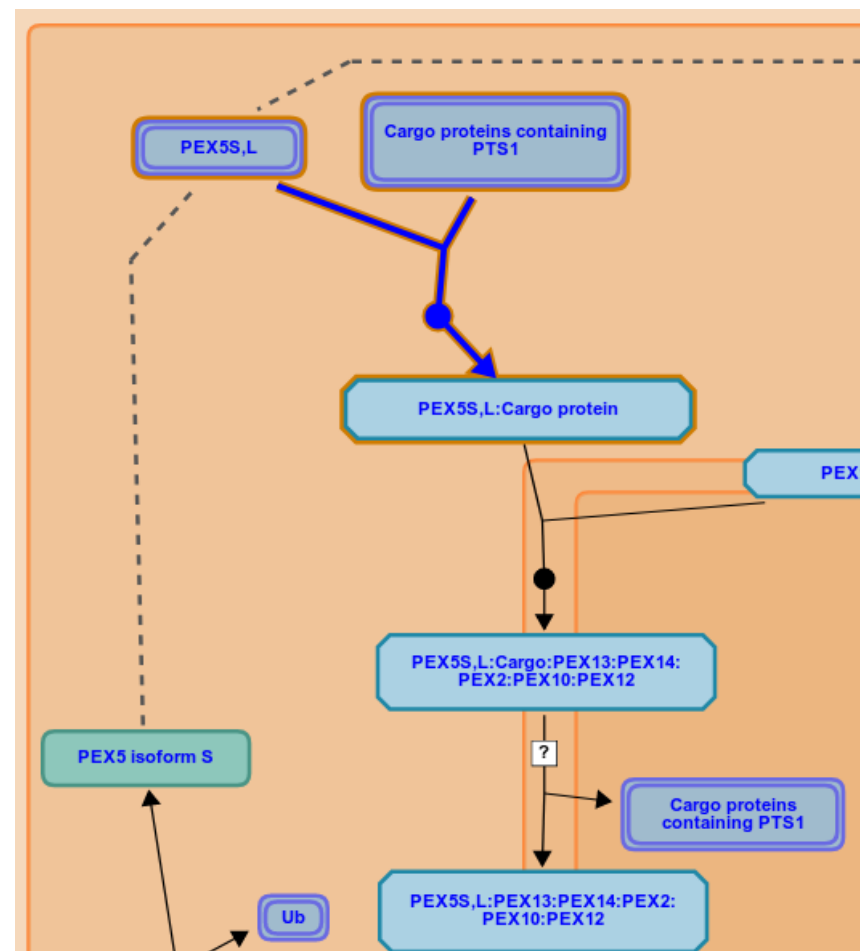
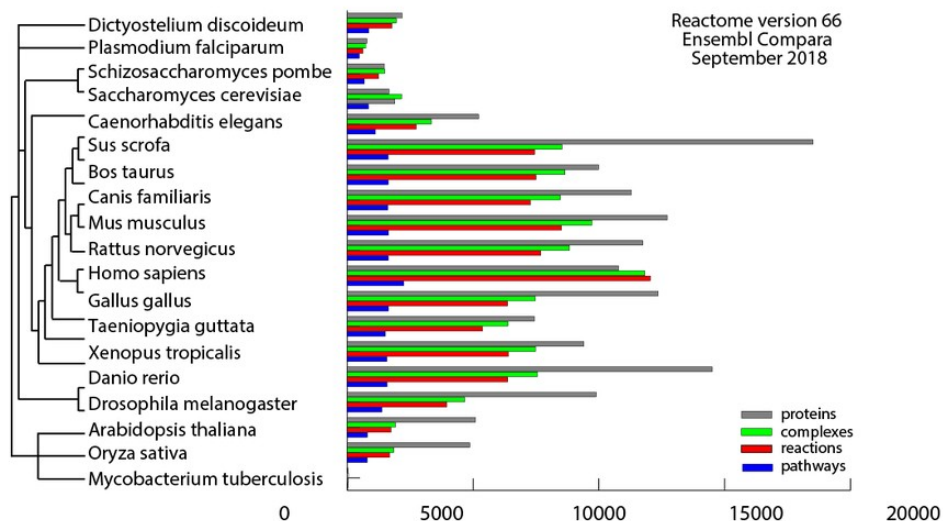
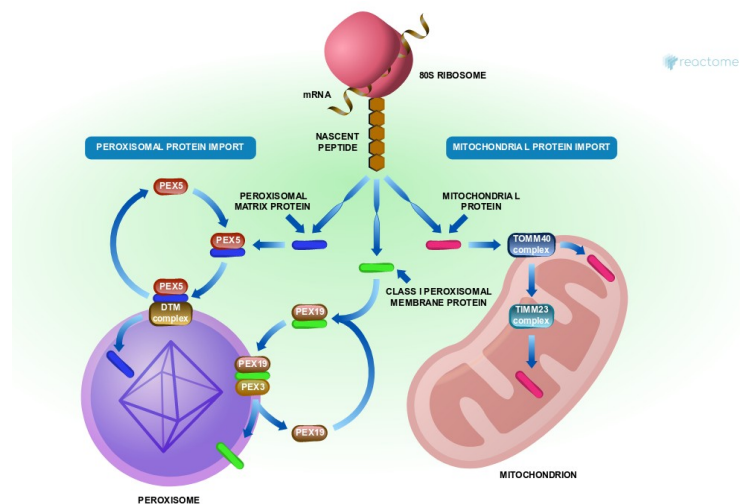
DB of molecular
interactions

The Reactome database



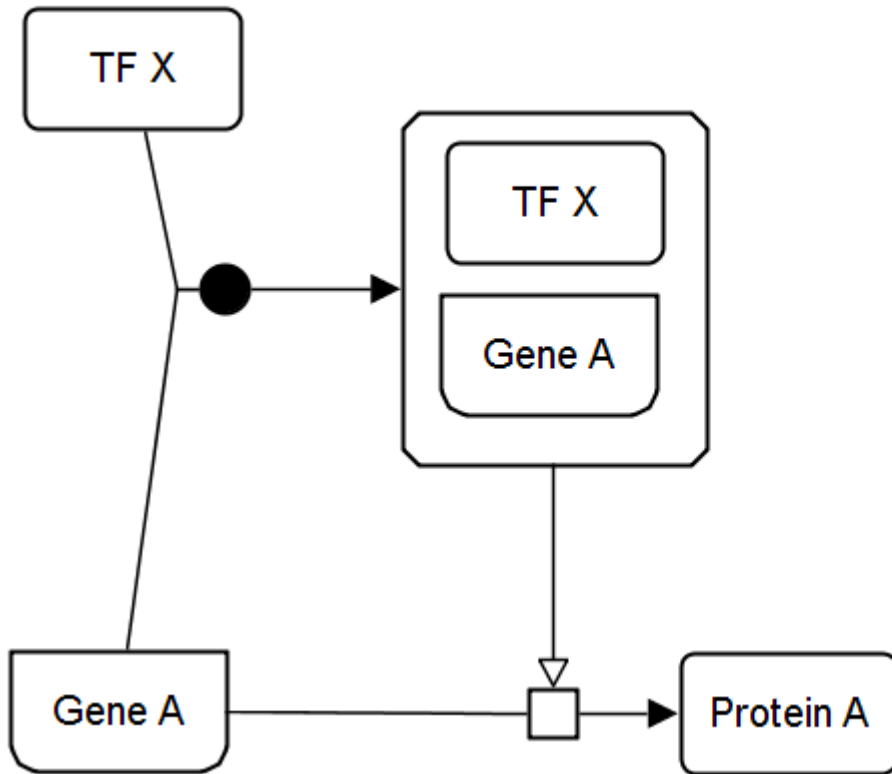
Graph Database

Curated database of pathways

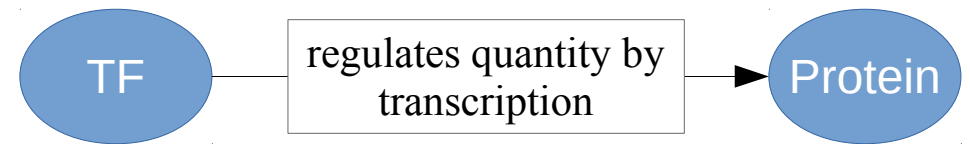


Template-based extraction

Transcription event

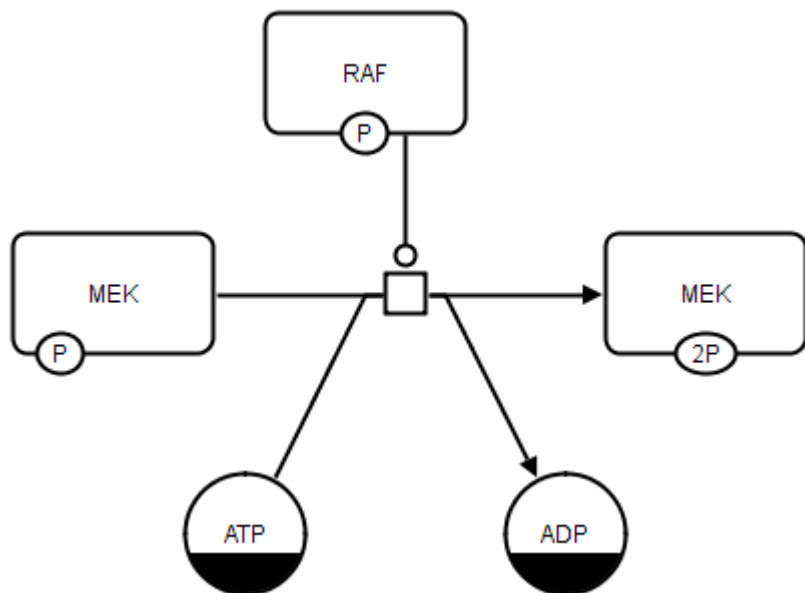


429 transcription causal interactions

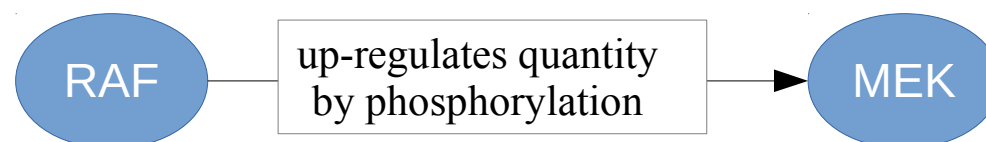


Template-based extraction

Catalysis event

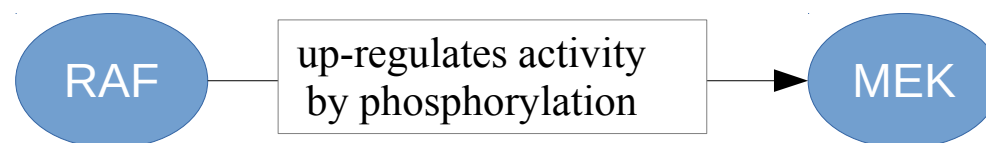


Automatic causal interaction



Reasoned causal interaction

if MEK-2P = (catalyst | regulator)



Other types of event

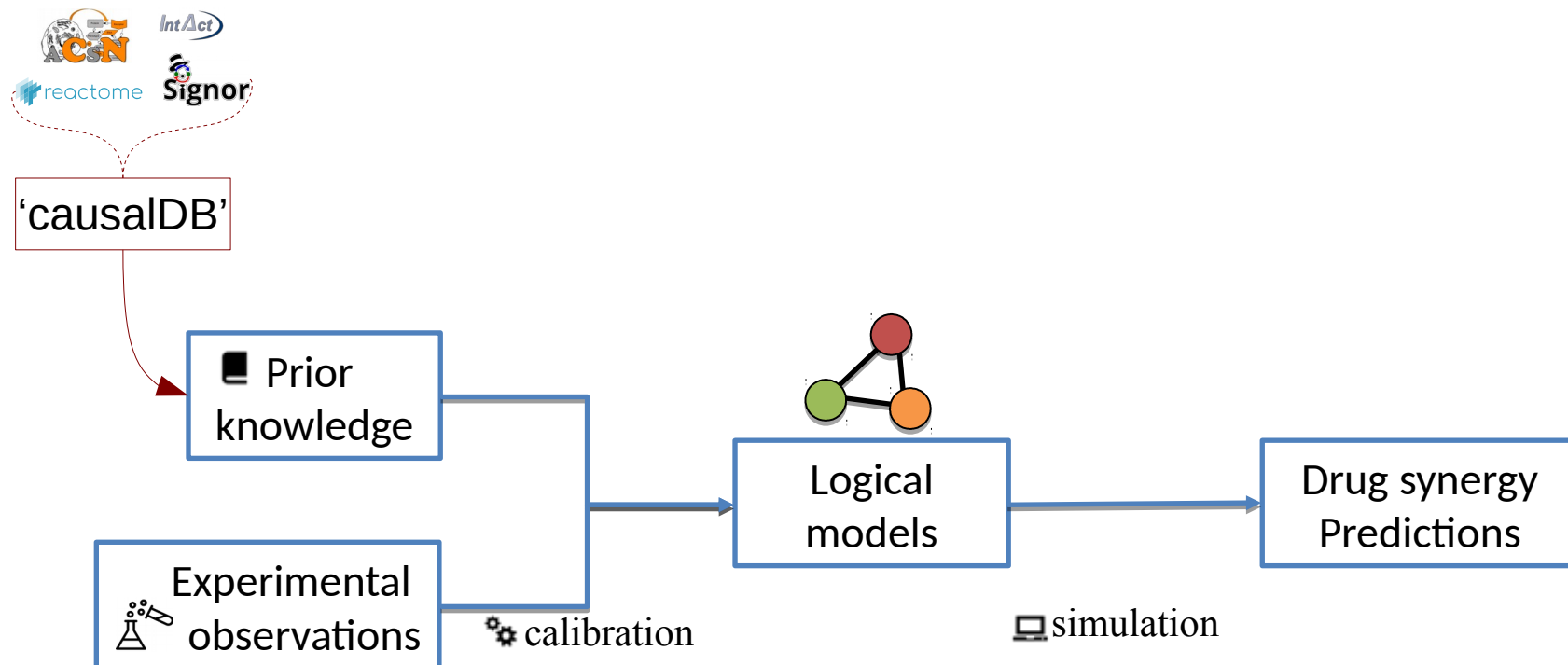
Binding

Dissociation

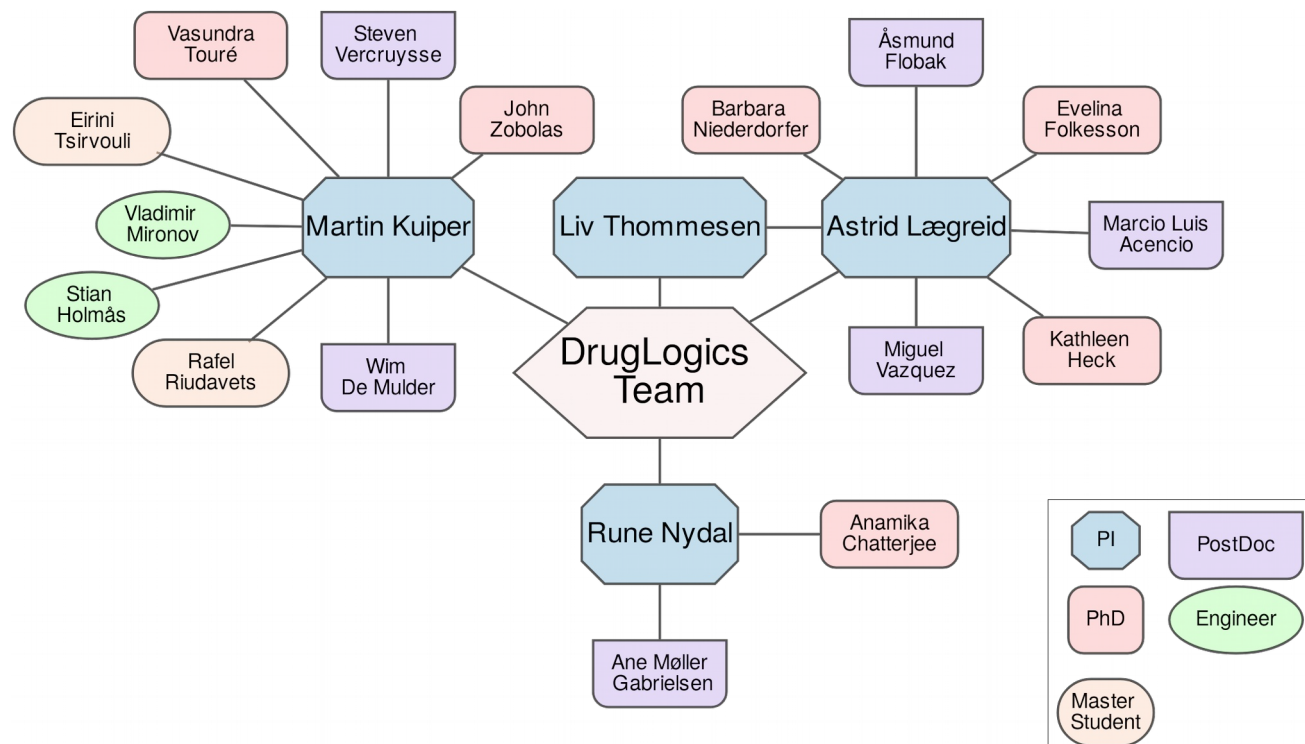
...

The Druglogics project

Application of the PhD project



Thank you for your attention!



Norwegian University of
Science and Technology



NTNU Helse



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