Universität Rostock

Traditio et Innovatio

Elaine
electrically active implants
SFB 1270

The Story Behind Wnt Simulation Models: Interrelating Wnt Models by Provenance Information

Introduction and Results

- Provenance provides “information about entities, activities, and people involved in producing a piece of data or thing, which can be used to form assessments about its quality, reliability, or trustworthiness” (Groth and Moreau, WWW Consortium 2013).
- All models (M1-M12) have used at least ideas of Lee et al. (PLoS bio. 2003), but only few compare with their results or cross-validate with other wet-lab or simulation data.
- Concrete roles show a clear separation between data (entities) used for different activities, such as calibration or validation.
- Examples of model building studies are:
  - M12 relies on various wet-lab and simulation data sources,
  - M10 has not been calibrated with wet-lab data,
  - M2 extends another model,
  - M8 has used the same data sources as input as another model.

Open Questions

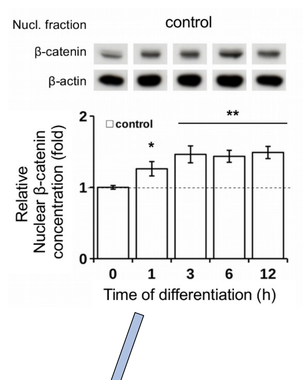
- Which level of abstraction (granularity) is required to include all major steps of a simulation study?
- How can aggregations be related to each other in the provenance model?
- How should one include other entities such as assumptions or hypotheses?
- What is an adequate and easy way to effectively collect provenance information during the execution of simulation studies?

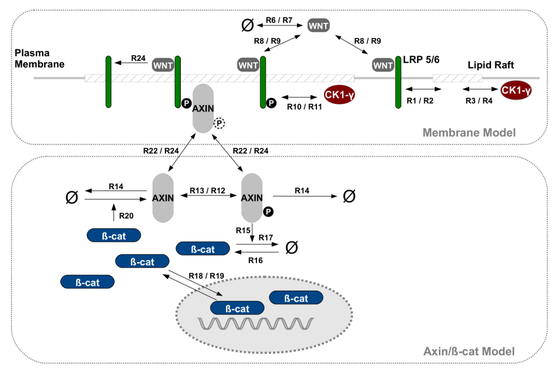
PROV DM

Symbol	Meaning / Roles
	Activity
	Entity
	Was generated by
	Derived from
	Used
	Used for calibration
	Used for validation

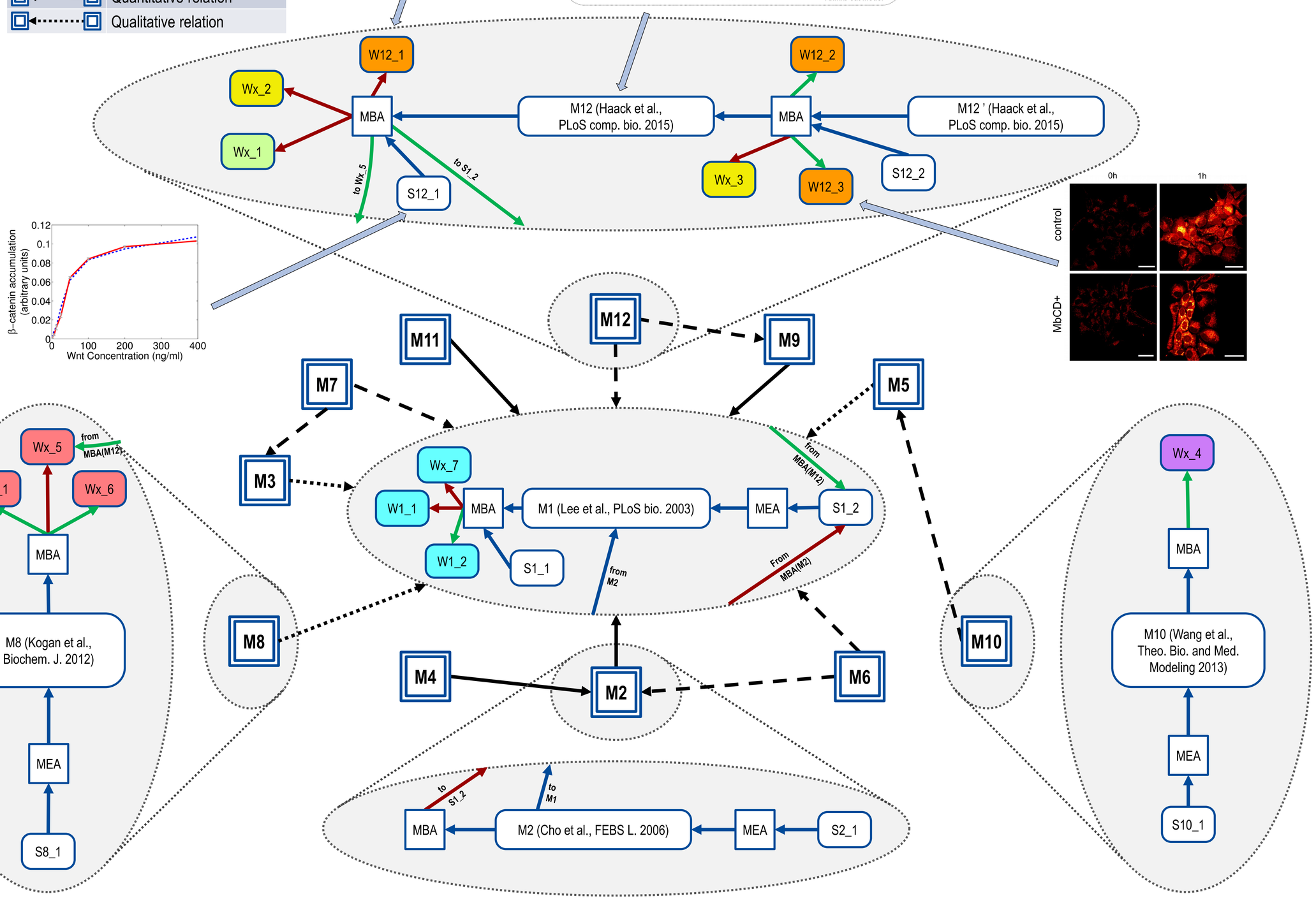
Provenance Model of Canonical Wnt Signaling

Symbol	Meaning
M	Model
W	Wet-lab data
S	Simulation data
MBA	Model building activity
MEA	Model exploration activity
&	Model building study
	Extension
	Quantitative relation
	Qualitative relation





Color	Cell line
	Xenopus egg extract
	hNPCs
	L-Cells
	HEK293T cells
	Cells of PSM (mouse and chick)
	Diverse cell lines (L, NIH3T3, HEK293T, N1E-115, hNPC, BHK, PTK2)



Kai Budde, **Elisa Krummrich**, **Andreas Ruscheinski**, **Pia Wilsdorf**, **Fiete Haack***, **Adelinde M. Uhrmacher**

INSTITUTE OF COMPUTER SCIENCE | MODELING AND SIMULATION GROUP | **University of Rostock**, Albert-Einstein-Str. 22 | 18059 Rostock

* INSTITUTE OF GENOME BIOLOGY | **Leibniz Institute for Farm Animal Biology**, Wilhelm-Stahl-Allee 2 | 18196 Dummerstorf

This research was supported by the German Research Foundation (Deutsche Forschungsgemeinschaft (DFG)) within the Collaborative Research Center (SFB) 1270 'Elaine'.