

Ontology-derived Multiagent-based Signaltransduction-Simulation

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Signaltransduction networks are modular, highly structured dynamic and complex systems showing context sensitive emergent behavior. Such systems are intuitively modelled and analysed through individual-based modeling-approaches like Multiagent-based Systems (MAS) where the model is specified on the microdomain and analysed on the macrodomain. Like in an object-oriented approach the system is decomposed into principal individuals which then interact with each other and with an environment resulting in synergetic system-behavior.

Here the conceptual knowledge representation (KR) techniques ontological modeling and object-oriented modeling with Unified Modeling Language (UML) are evaluated as methods to structure basic entities of a knowledge-domain that is needed and could be used to build a MAS of a Signaltransduction-network in a semi-automatic way. Biological- and simulation-relevant concepts are formalised in a DAML+OIL based application-ontology. It is evaluated if inheritance of slots from general to special concepts could be used to provide Agents with useful functional information. A mapping between Ontology-, UML- and MAS- KR-Ideoms will be developed.