MultiCellML-TDR – Standard and FAIR TDR for Computational Models of Multicellular Biological Systems

OSCARS
Open Science Clusters' Action for Research & Society

The MultiCellML-TDR project aims to facilitate FAIR computational models and Trustworthy Digital Repositories (TDRs) by advancing their standardisation under the ELIXIR-FAIRDOM and COMBINE umbrellas.
As a proof of concept using the advanced standardisation, the project will compose, execute and analyse larger computational models of the human liver and its diseases from submodels derived from at least three model repositories.

LS RI
Life Sciences

Challenge

Computational models of complex multicellular biological systems often combine diverse mathematical formalisms, such as partial differential equations, cell mechanics models, and agent-based models of dynamic cell behaviour. Unlike computational models for biochemical processes, multicellular models are just starting to gain support by standards.

Solution

MultiCellML-TDR will advance the standardisation of computational model descriptions for multiscale and multicellular biological systems using a modular composition of multiple ELIXIR-FAIRsharing standards. It will extend existing model repositories for multicellular models, and transparently document the standardisation workflow.

Scientific Impact

Researchers and developers across the life sciences and beyond will benefit from the project's modular standardisation approach, shared workflows and computational models. Its application to multiscale liver modelling highlights how integrated models reveal emergent phenomena not accessible through single-scale approaches.

https://oscars-project.eu/projects/multicellml-tdr-standard-and-fair-tdr-computational-models-multicellular-biological

Partners

Technische Universität Dresden - Center for Interdisciplinary Digital Sciences (CIDS) - Dept. Information Services and High Performance Computing (ZIH)