Cell-simulations portal

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Abstract

The National Resource for Cell Analysis and Modeling (NRCAM) includes virtual cell software for simulating and modeling cell processes and aims to become a portal for modeling in cell biology.

Content

The National Resource for Cell Analysis and Modeling (NRCAM) includes virtual cell software for simulating and modeling cell processes and aims to become a portal for modeling in cell biology. Most sites for computational cell biology focus on a single database, a software tool or a data standard, but this one attempts to combine all these aspects. On offer is a mathematical framework for modeling molecular species, biochemical reactions, cellular structures and geometry. The results of simulations can be downloaded as data in comma-delimited ASCII files in zipped form, and the visualization of spatial simulations as animated GIF and QuickTime movie files, also compressed. The site is aimed at intermediate-level users with at least an idea of modeling in biology as well as a clear model that they intend to build and use. A database of binary images assists in generating realistic model geometries. Tutorials and a list of published applications are also available. A simple explanation of model geometry, the use of remote computing and a database and language for the exchange of models place this site among the prominent resources for *in silico* biology. There are links to events such as the first International Symposium on Computational Cell Biology and the International Conference on Systems Biology. Registration is required before the modeling program can be used but there are no registration charges for academic users.

Navigation

Navigation is reasonably straightforward and finding the different parts of the site is easy, although there is no dedicated search engine. The links back and forth are not uniform, however: good in some places but absent from others. Customization is possible in the modeling, simulation and image framework. Most pages print as they are seen on-screen, including the figures. No special software, other than a JAVA-enabled browser, is needed to access the site.

Reporter's comments

Timeliness

The last update at the time of writing was 13 June 2001 with Version 3.0 of Virtual Cell.

Best feature

The availability of a modeling platform that frees biologists from having to invest in local computing resources is great. It realizes the vision of remote computing with bare-bones computers logged into central high-performance machines over the internet.

Worst feature

At the moment, even small simulations take a very long time to run, without any indication of how long it will take. The response to feedback is poor, having taken over a working week for me

Wish list

Better performance from the program and a fitting and optimization module added to the virtual cell software would certainly add to the attractiveness of the resources.

Related websites

Tools for similar simulations in cell biology are commercially available for work offline from Berkeley Madonna and the ordinary differential equations (ODE) and partial differential equations (PDE) solvers of MATLAB. Image libraries of cells are available at, for example, the Virtual Cell for plant cells. Data standards in computational cell biology are available at CellML and Systems Workbench Development Group.

Table of links

The National Resource for Cell Analysis and Modeling

Berkeley Madonna

MATLAB

Virtual Cell

CellML

Systems Workbench Development Group

References

1. The National Resource for Cell Analysis and Modeling.

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