

CellDesigner 4.0beta: A Modeling Tool for Biochemical Networks

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Identification of logic and dynamics of gene-regulatory and biochemical networks is a major challenge of systems biology. We believe that such network building tools and simulation environments using standardized technologies play an important role in software platforms for systems biology. As one of the approaches, we have developed CellDesigner, which is a process diagram editor for gene-regulatory and biochemical networks. The aim of the development of CellDesigner is to supply a process diagram editor and simulation interface using standardized technology for every computing platform so that it benefits the users as much as possible. By using standardized technology, created models can be easily used with other applications. Thus it reduces efforts of users to create a separate model for each editing/simulation/analysis tools. The main features of standardized technology that CellDesigner supports are “Graphical representation (SBGN)”, “Model description (SBML)”, and “Application integration environment (SBW)”. CellDesigner supports biologists to easily create and simulate gene-regulatory and biochemical networks using solidly defined and comprehensive graphical representation. CellDesigner is SBML compliant, and SBW-enabled software which can import/export SBML described models, and can integrate with other SBW-enabled simulation/analysis packages. CellDesigner also supports simulation and parameter search, which is supported by integration with SBML ODE Solver, enabling us to simulate through our sophisticated graphical user interface. We could also browse and modify existing SBML models with references to existing databases such as BioModels, PubMed, SGD, iHOP and DBGET. CellDesigner runs on various platforms such as Windows, MacOS X and Linux, and is freely available from our website at <http://celldesigner.org/>.

Current version of CellDesigner (4.0beta) has following additional features:

- Enhanced support of clearly expressive and unambiguous graphical notation system (SBGN Level-1 draft).
- Plugin development framework. Users can develop their own plugin with CellDesigner plugin API, and can call the plugin from CellDesigner.
- Enhanced KineticLaw Editor
- Export Species/Reactions information including Notes into CSV file.

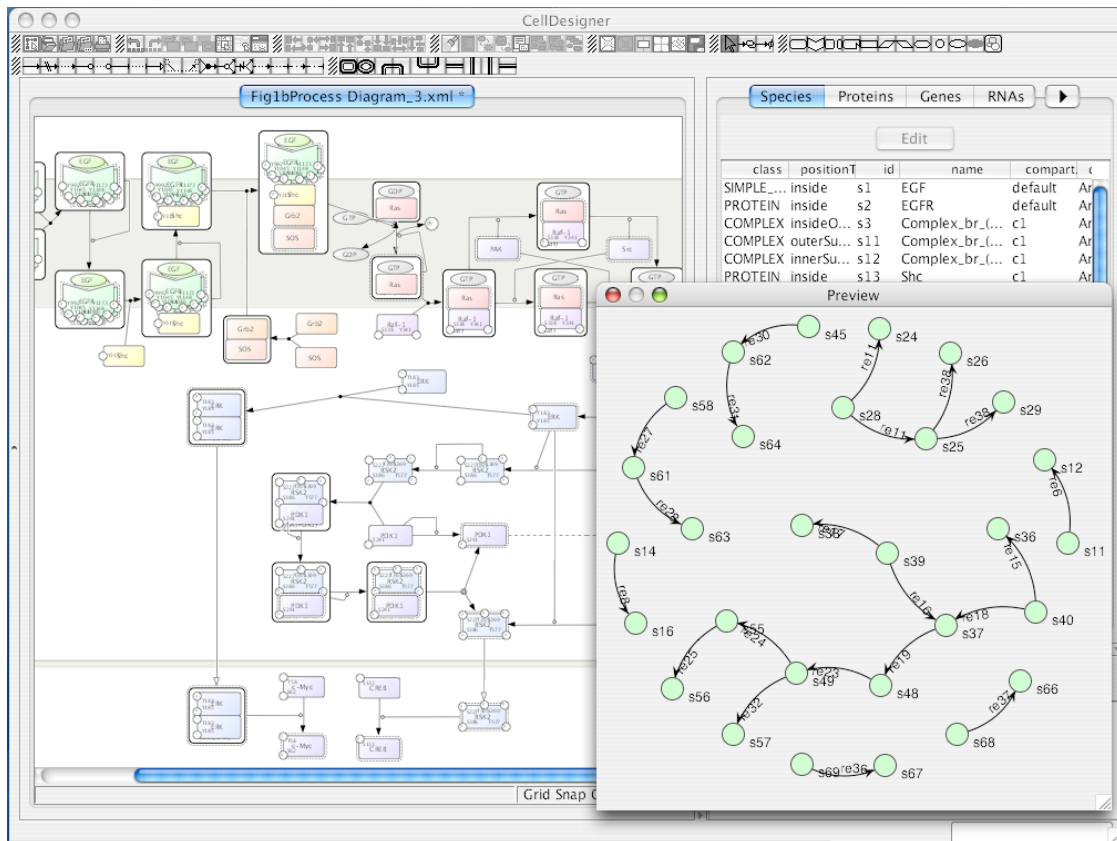


Figure 1: A screenshot of CellDesigner4.0beta with a sample plugin module. The Sample plugin converts CellDesigner's notation (process diagram) to different notation that represents a relationship of activation/inactivation of proteins. Only 300 lines of Java code, which uses CellDesigner plugin API and external libraries is used to implement the plugin.