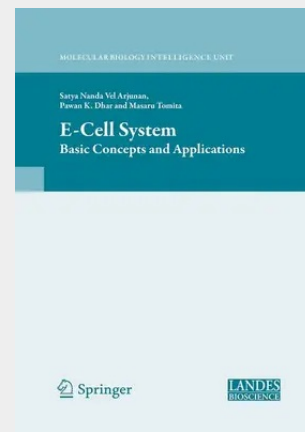


E-Cell System

Basic Concepts and Applications

The interdisciplinary field of molecular systems biology aims to understand the behavior and mechanisms of biological processes composed of individual molecular components. As we gain more qualitative and quantitative information of complex intracellular processes, biochemical modeling and simulation become indispensable not only to uncover the molecular mechanisms of the processes, but to perform useful predictions. To this end, the E-Cell System, a multi-algorithm, multi-timescale object-oriented simulation platform, can be used to construct predictive virtual biological systems. Gene regulatory and biochemical networks that constitute a sub- or a whole cellular system can be constructed using the E-Cell System to perform qualitative and quantitative analyses. The purpose of E-Cell System: Basic Concepts and Applications is to provide a comprehensive guide for the E-Cell System version 3 in terms of the software features and its usage. While the publicly available E-Cell Simulation Environment version 3 User's Manual provides the technical details of model building and scripting, it does not describe some of the underlying concepts of the E-Cell System. The first part of the book addresses this issue by providing the basic concepts of modeling and simulation with the E-Cell System.

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