THE VISIBLE CELL™ PROJECT: CHANGING THE WAY WE THINK ABOUT CELLS

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Constructing a realistic systems biology of the mammalian cell will require us to describe molecular and cellular “parts”, and to model and simulate their relationships in space and time. To date, most modelling and simulation has focused on temporally dynamic processes including pathways of gene regulation, metabolism and cellular signalling. A goal of the Visible Cell™ project is to integrate spatial as well as temporal models within a common data, computational and visualisation environment to support hypothesis-generation and hypothesis-testing by biologists and modellers. A unique feature of this project is our use of actual 3-D cellular structure data, reconstructed from medium-resolution confocal video microscopy and high-resolution electron tomography, to generate the matrix for our visualisation environment. Molecular sequence and protein structure data are obtained from distributed databases via web services. The Visible Cell™ has been designed as an e-research project and implements computational and data grid standards and technologies.