

Intuitive Computational Modeling as a Method to Teach About Biological and Biochemical Processes Using Cell Collective

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Traditional lecture and textbook-based learning format in life sciences courses makes it challenging for students to fully conceptualize and appreciate the complex and dynamic nature of biological and biochemical processes. We have developed a new learning approach that enables students to build, simulate, and investigate computational models of processes embedded in biological systems. This method is facilitated through an easy-to-use software, Cell Collective (<http://learn.cellcollective.org>), that makes this computational modeling approach accessible to any student and instructor (i.e., no prior computational modeling experience is necessary). The learning modules have been designed to be self-contained, and adoptable by any instructor. This computational approach has been used at several levels, including large introductory courses, upper-level undergraduate, and graduate courses, as well as high school. The setting of its utility is also flexible; the modeling activities can be used in-class, assigned as homework, as well as deployed as extensive lab investigations. During this workshop, we will briefly present the theoretical basis for the computational modules, highlight available learning modules, and assist participants in developing and simulating a computational model related to one of the learning modules.

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