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Cellular Models and Spatial Complexity

Intracellular Signaling in a Molecular Jungle: Insights from Bacterial Chemotaxis

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Abstract:

The set of biochemical reactions by which an E. coli bacterium detects and responds to distant sources of attractant or repellent molecules is probably the simplest and best understood example of a cell signaling pathway. The pathway has been saturated genetically and all of its protein components have been isolated, measured biochemically, and their atomic structures determined. We are using detailed computer simulations, tied to experimental data, to ask how the pathway works as an integrated unit. Increasingly we find that the physical location of molecular components within the molecular jungle of the cell interior is crucial for an understanding of their function.