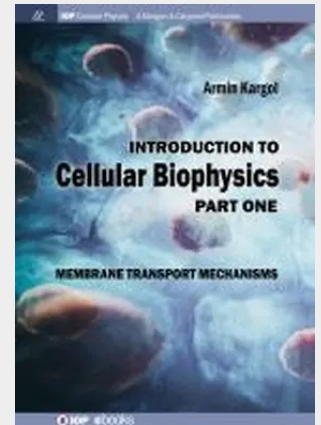


Introduction to Cellular Biophysics, Volume 1

Membrane Transport Mechanisms

All living matter is comprised of cells, small compartments isolated from the environment by a cell membrane and filled with concentrated solutions of various organic and inorganic compounds. Some organisms are single-cell, where all life functions are performed by that cell. Others have groups of cells, or entire organs, specializing in one particular function. The survival of the entire organism depends on all of its cells and organs fulfilling their roles. While the cells are studied by different sciences, they are seen differently by biologists, chemists, or physicists. Biologists concentrate their attention on cell structure and function. What does the cell consist of? Where are its organelles? What function does each organelle fulfil? From a chemists' point of view, a cell is a complex chemical reaction chamber where various molecules are synthesized or degraded. The main question is how these, sometimes very complicated chains of reactions are controlled. Finally, from a physics standpoint, one of the main questions is the physical movement of all these molecules between organelles within the cell, as well as their exchange with the extracellular medium. The aim of this book is to look into the basic physical phenomena occurring in cells. These physical transport processes facilitate chemical reactions in the cell and that in turn leads to the biological functions necessary for the cell to satisfy its role in the mother organism. Ultimately, the goals of every cell are to stay alive and to fulfil its function as a part of a larger organ or organism. This book is an inventory of physical transport processes occurring in cells while the second volume will be a closer look at how complex biological and physiological cell phenomena result from these very basic physical processes.



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