

**Plattner, H., Hentschel, J.****Zellbiologie**

2nd revised and extended edition. Georg Thieme Verlag: Stuttgart – New York, 2002. IX + 457 pages.  
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Both authors are affiliated with the University at Constance (Germany). First edition of this book occurred in print in 1997. As declared in the preface by the authors, the aim of this book was to provide congruent explanation of the cell structure and function – from molecules to the light microscopical level. This second edition followed generally the same format, the layout of it has been newly arranged. The volume is composed of 24 chapters divided into subchapters. Each chapter begins with an informative summary and is provided with a reference bibliography.

Initial two chapters characterize the development of modern biology of the cell and the dimensions of cellular components and subcellular structures. Chapter 3 is devoted to visualization of cellular architecture using the microscopical instrumentation and technologies: standard light microscope and diverse contrast techniques, fluorescence microscopy, confocal imaging, freeze-fracture and freeze etching, the transmission electron microscopy and various modifications. Next chapters 4 and 5 give an overview of cellular organization, nominally how the cells develop and differentiate. Implicated are some biological characteristics: biomembranes segregating the interior of the cell from its environment, complex interconnections of cellular functions, and ATP for capturing energy in the cell. Furthermore, access is provided to comparisons between prokaryotes and eukaryotes and to molecular composition of cells enclosing the phospholipids, amino acids and proteins, saccharids, pyrimidines and purines. Chapter 6 moves into the area of biological membranes and the internal cell environment. Comprised are the biomembranes as selective barriers, their architecture and structure, the transport phenomena, membrane proteins, lipids and other components, glycocalyx and functions of the cell surface, recognition of diverse molecules and pathogens, and the intercellular signal transduction. Chapter 7 highlights the nucleus as a “commanding centre” of the cell. Pointed up are the structures of the nucleus and chromatin, the set of chromosomes in the cell, nucleolus, the nuclear pore complex and biogenesis of ribosomes. Chapter 8 examines the protein synthesis, nominally the composition and structure of free and membrane-bound ribosomes, and the distribution of proteins in the cell. Chapter 9 places emphasis upon the Golgi apparatus – the “shunting station” of the cell – namely its architecture, flow of proteins from the rough endoplasmic reticulum, glycolysation, secretory vesicles, trans-Golgi network, and the like. Chapter 10 centres attention upon the analysis of cellular structures and functions using modern laboratory procedures: cell fractionation, ultracentrifugation, localization and measuring enzymes, radioactive labeling, antibodies in the cell biology, and others.

The following chapters 11 and 12 delineate the transport processes, principles of the vesicular transport, secretion, exo-, endo- and transeytosis, phagocytosis, neurotransmitters secreted from cells by exocytosis, further on intake of substances, including the clathrin attached to the cytosolic face of the cell membrane. Next coming chapters 13 through 14 are concerned with lysosomes,

with variant cell organelles as the smooth endoplasmic reticulum, and with the synthesis of lipids (lipid droplets), further on with biogenesis of glycogen and with peroxisomes. Chapter 15 focuses on peroxisomes and their peroxidative enzymes. In chapter 16 described are structural elements of the cytoskeleton and its components: microtubules, microfilaments and intermediate filaments. Chapter 17 elucidates the cell movements, nominally the movement of cilia and flagella, microtubule-based motility, axoneme, dynein, basal bodies, amoeboid movement, and the velocity of dynamic cell processes. Chapter 18 is concerned with the cytosol and the activities taking place in it, particularly with the glycolysis. Subsequent chapters 19 and 20 deal with mitochondria and chloroplasts, nominally with their biogenesis, structural basis and functions. In chapter 21 outlined are cell junctions that link cells in tissues, tight junctions, adherens junctions and hemidesmosomes, cell-cell and cell-extracellular matrix junctions, gap junctions, plasmodesmata, and the like. Chapter 22 encompasses the cell cycle, the nucleus during the cell cycle, mitotic spindle, cytokinesis, regulation of the cell cycle, and the gametes. In chapter 23 analysed are characteristics of plant and animal cells. Concluding chapter 24 provides access to the evolution of the cell while discussing the prebiotic evolution some 3.8 billion years ago, differentiation of prokaryotes, compartmentalization in the archaeobacteria, the symbiotic hypothesis, origin of mitochondria and chloroplasts, etc. In addition to the text there are “technical boxes” – separated textual parts providing information on methodical pre-requisites and feasibilities, for example: preparation of cells and tissues for electron microscopical examination, freeze-fracture technique, cell culturing. Another “plus-boxes” offer in-depth explanations of some cell components and activities: the amoeboid movement, eukaryotic genome, vesicular transport, and the like.

The volume is amply illustrated by a wealth of 255 figures featuring in schematic line drawings – mostly in four colours – arrangements of molecules, internal and external structures of cells, biochemical and genetic processings, miscellaneous laboratory equipment and procedures, light and electron micrographs, confocal microscopy, structural formulae, and more. Besides, there are 23 summary-type tables offering overviews of presented data: participation of miscellaneous components on the structure of a mammalian cell, the genetic code, leading enzymes in cell organelles, types of intermediate filaments, similarities between the eubacteria and autonomous organelles (mitochondria, chloroplasts). The volume offers, in a practical format and condensed form, an attractive, concise and well readable introduction to structural and functional relationships in the animal and plant cells – from molecules to complex organisms. Undergraduate and postgraduate students in diverse fields of biology and biomedical sciences will find this book an essential reference source.

**Jindřich Jira**