

PREFACE

Cells are the smallest form of life; the functional and structural units of all living things. Your body contains several billion cells, organized into over 200 major types, with hundreds of cell-specific functions. Some functions performed by cells are so vital to the existence of life that all cells perform them (e.g. cellular respiration). Others are highly specialized (e.g. photosynthesis). An understanding of these processes can lead to therapies which work by targeting the abnormal function. Cell biology is the study of cells and how they function, from the subcellular processes which keep them functioning, to the way that cells interact with other cells. Whilst molecular biology concentrates largely on the molecules of life (largely the nucleic acids and proteins), cell biology concerns itself with how these molecules are used by the cell to survive, reproduce and carry out normal cell functions.

Illustrated Handbook of Cell Structure & Function provides an introduction to biological structure and function at the cellular level. This book is intended to provide you with an overview of how cells and their component parts are structured and interact to allow organisms to carry out their basic functions.

Illustrated Handbook of Cell Structure & Function starts with an overview of the cell; further it sheds light on prokaryotic and eukaryotic chromosome structure; cellular organelles and structure. Succeeding, a focus on cellular communication is given. Cells usually communicate with each other through extracellular messenger molecules. Extracellular messengers can travel a short distance and stimulate cells that are in close proximity to the origin of the message, or they can travel throughout the body, potentially stimulating cells that are far away from the source. In the case of autocrine signaling, the cell that is producing the messenger expresses receptors on its surface that can respond to that messenger.

The book also narrates on the cell cycle process in which a cell grows and divides to create a copy of it. Some organisms reproduce exclusively through this process, while in complex multicellular life, it allows an organism to grow, and to replace cells as they become worn out. In animals, the cycle takes around 24 hours from start to finish for most cell types, although some, such as those in the skin, are constantly going through this cycle, while others may divide rarely, if at all. Neurons, for example, do not grow and divide once they are mature. Physical and chemical sciences have helped scientists in developing some tools and techniques with the help of which biologists have been able to get a clearer

insight into the life processes. A chapter of this book will look into some of these tools and techniques.

The cytoskeleton is an important part of the cell structure. Therefore, the book last chapter focuses on the structure of Cytoskeleton Molecular Motors. It spans the cytoplasm to provide support, shape, elasticity, and protection to the contents of the cell, much like the larger skeleton found in many living organisms. It was historically thought that only eukaryotic cells contained this structure, but studies has revealed that some prokaryotes have it as well. Using microscopy techniques which include staining, researchers have been able to demonstrate the myriad forms which the cytoskeleton can take, and much has been learned about the architecture of the cytoskeleton. Another important role of the cytoskeleton is as a source of elasticity for the cell. This structure can break and repair itself, allowing cells to change shape to adapt to their environment. It also protects the vulnerable contents of the cell, and helps cells hold their shape when they are subjected to external pressures. Flexibility is an important trait for many cells to have, as there are a number of pressures which cells can be subjected to during their lifetimes. The cytoskeleton also enables the cell itself to move with the assistance of tiny projections called cilia. This handbook will serve as a guide to the culture requirements, preservation, & international organizations from which help & information on animal cell cultures can be obtained.