

PREFACE

The first decade of the twenty-first century has witnessed an explosion of information about biology in general and about cells and tissues in particular. While this might arguably make the current time the most exciting of all for biologists, it paradoxically also makes it more difficult to teach biology. How can a teacher decide what to include and what to discard when writing a text or a lecture? What is the most essential information for an audience, and how can a student be kept alert and interested while being bombarded with an avalanche of facts?

My own solution to this problem, both for myself and my students, has been to focus on questions more than answers. Many texts put so much emphasis on what we know that they leave the impression there is little more to learn, except for some fine tuning of our knowledge. This is far from true, and I hope to demonstrate this in this abbreviated text of cell biology. My goal in writing this text is to keep alive the sense of wonder and puzzlement that naturally comes to any observer of living things. The quest for solutions to riddles of nature is often more exciting than finding the answers themselves. That is how I motivate myself to continue to understand cells, and I think this is a good way for a student to find continued motivation to learn.

This book assumes that the reader has a basic understanding of the components of cells — the nucleus, DNA, and organelles like mitochondria, the rough ER, and the Golgi apparatus. When writing this book, I wanted to avoid repeating the basic information found in introductory texts of biology. This book also focuses upon what I know and enjoy the most: the incredible variety of cell types found in the human body. I don't propose to even try to review the vast

amounts of information about the molecular biology of microorganisms or plant cells or about the biochemical pathways utilized in cells. Also, I haven't provided structural details about the molecules composing the cell membrane or cellular proteins, which can best be found in a text of structural biology. My main purpose is to try to bring alive the basic facts presented in courses in histology or cell biology by putting them in the context of challenging questions about cells.

In many courses, the varieties of cell shapes and sizes are presented in rather a matter-of-fact way. However, if human beings commonly underwent similar changes, and grew to heights of fifteen feet or acquired multiple heads or became filled with a thousand pounds of fat, the reasons for these changes would be of intense interest. I feel that the reasons why cells enlarge or acquire multiple nuclei are just as compelling and hope that these questions form a successful basis for this book.

The reader may find some of the statements in this book to be inadequately detailed, confusing, or simply hard to believe. To offset these difficulties, I have tried to provide numbered references to the scientific literature within the text of each topic. These scientific articles may be easily accessed on a website provided by the National Library of Medicine called www.pubmed.gov. Simply type in the name of the author and the date, and an abstract of the article (or often, the article in entirety) pops up.

Some of the opinions I express in this book about cells may prove to be wrong. However, I feel — perhaps erroneously! — that having a wrong opinion about a controversy is preferable to having no opinion at all. A wrong opinion mainly connotes a misplaced enthusiasm for a problem, which can be tested experimentally. A lack of an opinion connotes a lack of interest, which leads nowhere.