

Preface

This book discusses the various classes of antibiotics and their mechanisms of action. Millions of lives have been saved by antibiotics since they were first discovered about 90 years ago. For the first few decades antibiotics had remarkable success. Encouraged by the remarkable success, in 1969 the then-US Surgeon General William Stewart testified before Congress that it was “time to close the book on infectious disease.” Today, we know how premature that statement was. More than four decades later, infectious disease still remains the leading cause of death worldwide, and ranks among the top ten causes of death in the United States. The main reason is that bacteria are becoming increasingly resistant to antibiotics. Mechanisms by which bacteria develop resistance to antibiotics are also discussed here.

This book has been written with the student in mind. The main focus is to explain how antibiotics work in curing infectious diseases and how resistance develops to the antibiotics. A background in Biochemistry is needed to understand the mechanism of action of the antibiotics. However, any background information that is needed is discussed in the book. So, it will not be necessary for the student to consult any separate biochemistry textbook in order to understand the theory of antibiotics. However, the discussion of biochemistry in this book is not meant to be complete. The only information presented is what is relevant to the understanding of antibiotics.

There are many other important aspects of antibiotics that are studied by doctors, pharmacists, and scientists but are beyond the scope of this book. Some of these aspects are briefly mentioned but will not be discussed in much detail.

Dosage, formulation, bioavailability, and biostability are important aspects for effective use of antibiotics. These ensure that the antibiotic will be delivered specifically to diseased site in the right amount and for the required duration. Dose depends on how much of the antibiotic is absorbed from the digestive system, how stable it is, how much enters the cells, the distribution of the drug in various tissues, and many other factors. However, discussions of these aspects are beyond the scope of this book.

All antibiotics do not work for all infections. Antibiotics also have various side effects and may interact with other drugs to give unwanted effects. Information needed to decide which antibiotic to prescribe for which infection is beyond the scope of this book.

All antibiotics will be referred to by their common names such as penicillin, tetracycline, and erythromycin even though many of these antibiotics have other brand names. There are also various derivatives with altered but similar activities for many of these antibiotics. Not all of these names are included in this book. All antibiotics will also have a systematic name based on IUPAC nomenclature of organic compounds. Those names will be mentioned for the simple molecules but not for those with complex structures.

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