The traditional (and still prevalent) way to teach organic chemistry is to focus on examples that are primarily of interest to students who are planning to become professional organic chemists - that is, to focus on the molecules and reactions of organic synthesis, considering mainly non-aqueous conditions and non-biological reagents. The majority of students studying organic chemistry, however, are doing so because they are majoring in biology, biochemistry, or health sciences. They need to learn about the structure and reactivity of organic compounds because, quite simply, organic chemistry is the chemistry of life. What is most interesting and relevant to these students is the organic chemistry that takes place in the context of a living cell.

In this textbook, a unique approach is taken to the study of organic chemistry. To the greatest extent possible, biological molecules and biochemical reactions are used to explain and illustrate the central concepts of organic chemistry. This novel approach is most evident in chapters 9-17, which cover the main organic reaction mechanisms in a biological context. However, earlier chapters on organic structure and spectroscopy also focus as much as possible on examples of interest to students of biology and the health sciences. The chemistry of lab synthesis is not ignored - however, these examples are generally grouped together in subsections and introduced to illustrate parallels between laboratory and biological chemistry.
2: Introduction to Organic Structure and Bonding II

3: Conformations and Stereochemistry

4: Structure Determination I - UV-Vis and Infrared Spectroscopy, Mass Spectrometry

5: Structure Determination II - Nuclear Magnetic Resonance Spectroscopy

6: Overview of Organic Reactivity
7: Acid-base Reactions

\[ pK_a = 4.8 \]

8: Nucleophilic Substitution Reactions

9: Phosphate Transfer Reactions

10: Nucleophilic Carbonyl Addition Reactions

11: Nucleophilic Acyl Substitution Reactions
• 12: Reactions at the α-Carbon, Part I

• 13: Reactions at the α-Carbon, Part II

• INTERCHAPTER: Retrosynthetic analysis and metabolic pathway prediction

• 14: Electrophilic Reactions
15: Oxidation and Reduction Reactions

carbon radical (neutral)

16: Radical Reactions

17: The Organic Chemistry of Vitamins

Appendix I: Index of enzymatic reactions by pathway
Appendix II: Review of laboratory synthesis reactions

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