



Preface

About the book

This book is based on two courses that I designed and taught on joining the faculty of the School of Biological Sciences of the University of Manchester in 1997. One of these behavioral neurobiology courses was targeted at a beginner's level, the other at an advanced level. Over the five years that followed, they were taken by several hundred students coming from a wide range of degree programs. It was this positive interaction, as well as the students' request to make available a text covering these courses, that encouraged me to write this book. These students also provided me with invaluable feedback on how to stimulate interest in the subject, without compromising the quality of the science taught.

Like the Manchester courses, this book is designed primarily for undergraduate and graduate students, but postdoctoral scientists and instructors of such courses are also likely to benefit from it. I have assumed that the students have some basic knowledge in

biology, physics, and mathematics. However, courses in animal behavior or neurobiology are not a prerequisite. Concepts and approaches from these disciplines that are important for understanding behavioral neurobiology are introduced in Chapters 2 and 3.

Any scientific discovery can be fully understood only within its historical context. I have therefore also included a chapter (Chapter 4) on the historical development of behavioral neurobiology, and added to several chapters a description of the work and life of those who have pioneered this development.

The approach used in the book has been to focus on a few selected systems that, in my opinion, best illuminate the key principles. These examples are then discussed in depth. Unavoidably, such an approach leads to the exclusion of a number of other excellent studies. I apologize to those whose work has been neglected.

New features of the second edition

The first edition of this book was enthusiastically received by reviewers, instructors, and students. Their encouragement was a driving force to prepare the second edition. The major changes in this edition are as follows:

- All chapters have been updated.
- Biographical sketches of several eminent scholars have been added to the existing sketches of the first edition.
- The Questions section of each chapter has been significantly expanded.
- A section entitled Advanced topic has been added to all chapters (see Learning tools, below).
- Chapters 2 and 3 of the second edition have their origin in a combined chapter of the first edition. Chapter 2 of the new edition, which focuses on important neurobiological concepts and

approaches, has been significantly expanded, compared with the previous contents, particular in its molecular biological dimension. Chapter 3 focuses on essential concepts and approaches in ethology.

- A new chapter has been added to the book on circadian rhythms and biological clocks

Learning tools

Each of the 13 chapters is organized in a similar way, and contains a number of valuable learning tools:

- An introductory section outlines the major topic covered in the chapter.
- The margin notes highlight important points and define general biological, chemical, or physical terms used in the main text.
- Key concepts, such as the structure and function of central pattern generators, are explained in depth in several text boxes.
- Each chapter is supplemented by a summary and a list of key reviews suggested for additional reading.
- For those who wish to explore further the field covered in the individual chapters, a list of additional review articles and important original research papers is provided at the end of the book.

Online resource center

This book is supplemented by an online resource center that includes the following:

- Answers to the questions presented at the end of each chapter.
- Many illustrations from the book in a downloadable form.

(Chapter 10). It summarizes the key discoveries made in the behavioral analysis of biological timekeeping, in the elucidation of the molecular structure of biological clocks, and in the exploration of neural mechanisms linking these clocks to rhythmic behaviors.

- The questions in each chapter may be used by the students to check their knowledge, or by the instructors to set exams. These questions target primarily undergraduate students who, after having read the respective chapter, should be able to answer the questions in the form of short essays. Typically, a short essay of two to three handwritten pages is sufficient to answer a question.
- At the end of each chapter, an advanced essay topic is suggested. This section targets primarily graduate students or undergraduate students in their junior or senior years, who can write the essay as part of a homework assignment. In addition to the starter references listed, the student will have to search for further relevant original research papers and review articles. The essay should have the form of a review-like article (following the style and format of a specific journal to be chosen by the instructor), and will typically be five to ten printed pages long.

- A library of web links to web pages of relevance to the content of this book.

The companion web site is freely available at <http://www.oxfordtextbooks.co.uk/orc/zupanc2e/>.