

PREFACE

Photoinduced processes in nucleic acids are phenomena of fundamental importance for our biosphere. Ultraviolet solar radiation has been a continuous factor of evolutionary pressure ever since early biotic ages by triggering mutations, cell death, and carcinogenesis. The study of how UV radiation impacts nucleic acids has a long story, which parallels the evolution of our understanding of genetics from the beginning of the 20th century. It was, however, mainly in the last decade that major knowledge gaps have been filled in the field. This has been achieved thanks to the development of advanced spectroscopic techniques and computational models, which have allowed real-time observation and simulation of the evolution of electronic excitations caused by radiation.

This book comes as a synthesis of a broad range of topics in nucleic-acid research. It brings together leading specialists from different subfields, providing a deep overview of the current state of knowledge, including recent achievements, open problems, and comprehensive lists of references. While each chapter was developed as a thematic and self-contained text, a certain degree of overlap was maintained to interrelate individual contributions. Consequently, the chapters can be read in any particular order and the reader can profit from the diverse perspectives on the same subjects originating from different authors.

In the two volumes, theoretical, computational, experimental, and instrumental aspects are discussed. It is hoped, therefore, that they are of value for a large spectrum of readers, ranging from students and scientists to technologists. The first volume focuses (but not exclusively) on the spectroscopy and dynamics of photoexcited nucleobases and their analogues in different environments. The emphasis of the second volume is placed on larger fragments, from base pairs to duplexes; and also on phenomenological aspects, including physiological effects, prebiotic chemistry, and charge-transport phenomena.

Editing a book of such broad scope, involving so many different topics, felt sometimes an overwhelming experience. It started already with the difficult task of selecting, among a large community composed of highly-active and successful researchers, those who would be invited to contribute a chapter. Although we had to make some hard choices, we think that we achieved a balanced result, with an approximately equal share of experimentalists and theorists from over ten countries in Europe, North and South Americas, and Asia. Considering that the invited contributors are leaders in their field, they were free to organize their chapters, taking only into account the broad subject area provided by us.

We are glad that, exactly as we have planned, the book turned out to be a very well integrated collection of independent chapters, where the focus is on the re-

views of particular topics, rather than on the research of individual groups or the presentation of new data. Naturally, we must acknowledge all the authors for their efforts and insightful contributions. We are also grateful to all the reviewers of individual chapters, whose constructive critique was invaluable to the success of this text.

We thank Massimo Olivucci, who invited us to edit these volumes for Topics in Current Chemistry. We also express our gratitude to Arun Manoj Jayaraman from Springer, who patiently coordinated the publishing project.

For us, editing this book was a challenging task, constantly bringing us face-to-face with phenomena outside our area of expertise. We can only hope that the readers will enjoy the same informative and enlightening experience.

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