

PREFACE

The present volume (#80) of the *Advances in Botanical Research*, 'Glucosinolates', is dedicated to a fascinating group of natural products. Glucosinolates have a large range of functions in plants and beyond. Apart from being important components of plant defence systems against various pathogens and pests, they are responsible for the flavour of cruciferous vegetables and one of the mechanisms underlying the 5-a-day importance of vegetables in our diet. It is therefore surprising that unlike other groups of secondary metabolites, terpenes, flavonoids, etc., glucosinolates are restricted to a single taxonomic order, the Capparales. However, as the model plant *Arabidopsis thaliana* is also classified in this order and forms glucosinolates, and presumably because the number of glucosinolate structures is far lower than the variety of terpenes or flavonoids, glucosinolates have become probably the most studied class of secondary metabolites. This book brings together world's leading experts in different aspects of glucosinolate biology to provide the readers with the current state of the art in glucosinolate research.

The book is divided into 10 chapters. In the first, introductory chapter Barbara Halkier gives a short overview of the newest developments in glucosinolate research, the progress in understanding the synthesis pathway, recently discovered glucosinolate transporters and attempts of glucosinolate synthetic biology. Second chapter by Meike Burow describes the environmental factors that are responsible for the variation in glucosinolate accumulation in plants. She focuses on the mechanisms that control the dynamic responses of glucosinolate patterns to complex environmental signals. The next chapter from Daniel Kliebenstein and Ivalú Cacho explains how the large variation in glucosinolate composition in *Arabidopsis* can be caused by a small number of genetic loci. The genetic and molecular information is compared and discussed in the frame of ecological and evolutionary observations. Henning Frerigmann in the fourth chapter then focuses on the transcriptional regulation of the pathway. He describes the transcription factors involved in this control and their interplay and interdependence in regulation of the complex pathway. The fifth chapter by Stanislav Kopriva and Tamara Gigolashvili shows how glucosinolate synthesis is embedded in the general plant metabolism, particularly the connections to sulphate assimilation. This chapter also highlights the function of various transporters involved in transport of glucosinolates and intermediates in their synthesis.

The sixth chapter is the first one focussing more on glucosinolate function. Ute Wittstock et al. address the breakdown of glucosinolates into the active volatile isothiocyanates and other compounds that form the molecular basis of the 'mustard oil bomb'. The seventh chapter by Marta Pastorczyk and Paweł Bednarek describes the recent progress in deciphering the role of glucosinolates in plant immunity and defence against various pathogens. The eighth chapter from Verena Jeschke et al. takes the reader beyond the plant kingdom. It shows different strategies among insects to metabolize and detoxify glucosinolates and fascinating examples of evolution and adaptation to plant defence compounds. The ninth chapter by Maria Traka is also concerned with nonplant processes. It describes the health benefits of glucosinolates and their degradation products, including the molecular mechanisms. In the 10th and last chapter Ewald Schnug and Silvia Haneklaus take the readers on a tour of a different, more applied aspect of glucosinolate metabolism. Their overview explains, for example, the role glucosinolates played in development of modern oilseed rape varieties.

We hope that this book will find broad audience as an overview of an interesting and important research area that touches our everyday life. We believe that it will be of interest to graduate students and researchers in a wide range of disciplines including plant nutrition, plant physiology, plant biochemistry and agriculture and that the readers will find the book to be an informative, interesting and enjoyable reading.