

Preface

Yellow Biotechnology has been introduced as a synonymous term for insect biotechnology, which can be defined as the use of biotechnology-based methods for the development of insects (or their molecules, cells, organs or associated microorganisms) into products and services for specific applications in medicine, plant protection or industry. This emerging field has an enormous economic potential and the remarkable promise of the *Yellow Biotechnology* value chain is attracting increasing interest and investment, particularly from the growing Asian economies of China, Japan and South Korea. In 2010, the growth of this emerging field inspired Springer to publish the first book dedicated to this subject, entitled *Insect Biotechnology* (edited by Prof. Andreas Vilcinskas), which has now been translated into a number of languages.

The rapid development of insect biotechnology and the expanding applications of insect-derived models and tools have motivated both Springer and the editor Andreas Vilcinskas to publish two further volumes on *Yellow Biotechnology* within the Springer book series *Advances in Biochemical Engineering and Biotechnology*, to complement the original publication. *Yellow Biotechnology* Part I focuses on the use of insects in drug discovery and preclinical research, whereas *Yellow Biotechnology* Part II considers the applications of insect biotechnology in plant protection and industry.

Insects can be used as sources of new drugs, particularly antibiotics, but their medical use extends well beyond insects as bioresources, and now includes their development as powerful preclinical research models, facilitating both the investigation of molecular mechanisms underlying human diseases and the inexpensive and ethical in vivo testing of drugs in suitable whole-animal-high-throughput systems. *Yellow Biotechnology* Part I comprises six chapters addressing the use of insect models for the analysis of human diseases, preclinical research and food safety, and is the largest collection of chapters on this subject. The transferability of data representing molecular mechanisms from insect models to humans has profited from the availability of insects with completely-sequenced genomes and rapid progress in genome-scale bioinformatics. Two further chapters highlight the use of insects in drug discovery. Insects are taxonomically diverse and therefore offer the opportunity to source thousands of new molecular entities with pharmacological properties. In contrast, pest insects are major competitors for human food/animal feed, and vector insects transmit diseases such as plague and malaria

that have threatened humans and domestic animals throughout history and still kill millions of people every year. *Yellow Biotechnology* therefore considers biotechnology-based strategies to develop sustainable methods to control insect pests and vectors.

The majority of authors contributing to *Yellow Biotechnology* are members of the first German collaborative Insect Biotechnology research group, which is funded by the Hessen State Ministry of Higher Education, Research and the Arts via the excellence program LOEWE. This research program is hosted by the Justus-Liebig-University of Giessen and coordinated by the Editor Andreas Vilcinskas. In collaboration with the Fraunhofer Institute of Molecular Biology and Applied Ecology, it represents the first operational unit in Germany that aims to explore insects as a source of new compounds for specific applications in medicine, plant protection and industry. The Hessian research focus on Insect Biotechnology includes funding for 25 Ph.D. students, some of whom contributed chapters to this publication.

We are aware that even two volumes are not sufficient to provide exhaustive coverage of this burgeoning research and development field, but we hope that the collected chapters will provide an overview of the diverse and expanding frontiers of *Yellow Biotechnology*.

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Yellow Biotechnology I

Insect Biotechnologie in Drug Discovery and Preclinical
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