Preface

Mosquitoes have had, and continue to have, an immense impact on human health, ecology, and the course of history. Accordingly, the study of mosquitoes and the diseases they transmit has been a long-standing pursuit of scientists and researchers around the world. In the past decade, there has been increased awareness of new and reemerging mosquito-borne diseases, with an urgent need for innovative control strategies, magnified by looming challenges like climate change and increasing instances of insecticide resistance. At the same time, the development of advanced gene editing technologies has drawn diverse research groups to focus their efforts on understanding mosquito biology, including novel genetic strategies to control mosquito populations or render them unable to transmit pathogens. In addition to vector control, these tools will continue to facilitate basic discovery science about mosquito physiology, behavior, and interactions with pathogens. Concomitantly, there has been an increase in researchers trained in diverse areas working on mosquitoes, greatly expanding research perspectives and available techniques brought to bear on these important animals.

This collection is designed to serve as a valuable resource for researchers, students, and professionals interested in mosquito biology, physiology, and behavior. It brings together knowledge and expertise from a broad group of scientists and is intended for use both by research groups that already have established mosquito colonies in their laboratories and groups who would like to start their own colony. The collection covers a wide array of topics, including the basics of mosquito rearing and colony maintenance, and protocols to evaluate mosquito behavior, visualize transcript and protein expression, quantify physiological responses to sensory stimuli, and score insecticide resistance. As mentioned above, one of the most exciting and rapidly evolving areas of mosquito research is the use of genome-editing technologies, such as CRISPR–Cas9, which have revolutionized researchers' ability to precisely manipulate the mosquito genome. As such, this collection also features protocols for gene editing, validating genetic lesions, and genotyping genetically edited animals.

Many of the protocols included here have been developed in *Aedes aegypti* or *Anopheles gambiae*; however, we anticipate that they will be useful to researchers studying many different species, with minor modifications. Indeed, it is our hope that this collection serves as a resource to apply these techniques in a broad range of mosquito species.

As editors of this manual, we are immensely grateful to the contributing authors and researchers who have generously shared their expertise and protocols. Their collective efforts have resulted in a comprehensive and up-to-date compilation of methodologies. We would also like to thank Maria Smit, Alejandro Montenegro-Montero, Christin Munkittrick, Inez Sialiano, Barbara Acosta, Danett Gil, Kathleen Bubbeo, and Richard Sever at Cold Spring Harbor Laboratory Press for their invaluable help with and enthusiasm about this collection.

Finally, we acknowledge that this manual is not exhaustive, as the field of mosquito research is continuously evolving. However, it is our hope that it will serve as a foundation for future investigations and inspire new generations of scientists.

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