About the Editors

Robyn Guymer

Robyn Guymer is a medical retinal specialist at the Royal Victorian Eye and Ear Hospital (Melbourne, Australia) and is Head of the Macular Research Unit at the Centre for Eye Research Australia, University of Melbourne (Australia). She is also Deputy Director of the Centre for Eye Research Australia and Deputy Head of the Department of Ophthalmology at the University of Melbourne. She is a clinician scientist, with age-related macular degeneration (AMD) being her major research interest. She has written more than 150 research papers on age-related macular degeneration. Her research interests have been the genetic and lifestyle risk factors predisposing to AMD, identification of new outcome measures (both anatomical and functional), as well as conducting investigator-initiated clinical trials into novel interventions for the earliest stages of AMD. Translating the knowledge gained from the bench into the clinic has been a major focus, as has been providing a clinical perspective back into the laboratory.

Chi Luu

Chi Luu is a clinical electrophysiologist and a research scientist in retinal diseases. He is Deputy Head of the Macular Research Unit at the Centre for Eye Research Australia. He is also a senior research fellow at the Department of Ophthalmology, University of Melbourne, and a clinical research fellow at the Royal Victorian Eye and Ear Hospital. His research interests include AMD, diabetic retinopathy, myopia, retinal prosthesis and the development of animal models of retinal diseases. Using multimodal imaging, psychophysical and electrophysiological techniques to study the retinal structure–function relationship in the early stages of AMD, he hopes to identify clinical tools that better characterize the disease, are more sensitive to monitor the rate of progression and are more effective to evaluate the efficacy of novel interventions. He has published extensively on these areas.

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Foreword

Age-related macular degeneration

Robyn Guymer & Chi Luu

Age-related macular degeneration (AMD) is the most common cause of severe irreversible vision loss in people over the age of 50 years in Western communities. It is estimated that approximately 15% of the Western population over 50 years of age have signs of AMD, yet only 1–2% progress to vision-threatening complications. As populations age, the impact of AMD will be ever increasing in terms of personal and societal cost.

Major advances have been made in the treatment of one form of advanced, or late, AMD— the neovascular form – with the widespread introduction of anti-VEGF treatments. While these intravitreal treatments have been responsible for halving the rate of blindness in the last decade from AMD, they are expensive and ongoing, often for many years, and they do nothing to address the underlying disease processes.

We do not fully understand the pathogenic mechanisms that cause AMD nor the reason why some early cases progress to vision loss while others remain stable. However, it is now an exciting time in AMD research as there is a real convergence of knowledge about the predisposing genetic associations, the ability to image the retina with multimodal techniques, and our ability to accurately and repeatably measure the function of the retina.

Currently, we do not have specific treatments to cure the disease, slow the atrophic complications or reverse the early changes that are detected long before vision is lost. With new advances in the understanding of pathways involved, it is possible that novel interventions will be on the horizon.

This book initially addresses the classification of the disease with its signs and symptoms, and then summarizes the current knowledge of epidemiology, risk factors and genetic predisposition. The book then addresses the novel approaches to multimodal imaging of the macula and modern techniques used for testing retinal function. Treatments are then discussed, both highlighting the first treatments tried in neovascular AMD before anti-VEGF treatment became widespread, and then detailing the anti-VEGF era. Novel approaches to treat AMD are highlighted, including interventions that will probably have an impact on other blinding diseases such as stem cell therapy treatments and gene replacement. Finally, the impact of AMD on quality of life is discussed, and a subset of AMD called polypoidal choroidal vasculopathy is highlighted, as it appears to be a distinct subgroup and more common than initially realized. It may have different risk factors and response to treatments compared with more typical AMD.

This book brings together the history of our understanding of the disease and its treatments, and brings us to today, where we are on the cusp of major advances in the understanding of this devastating disease and its potential treatments.

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