

Advances in Experimental Medicine and Biology 854

Catherine Bowes Rickman  
Matthew M. LaVail  
Robert E. Anderson  
Christian Grimm  
Joe Hollyfield  
John Ash *Editors*

# Retinal Degenerative Diseases

Mechanisms and Experimental Therapy

 Springer

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*Advances in Experimental Medicine and Biology* presents multidisciplinary and dynamic findings in the broad fields of experimental medicine and biology. The wide variety in topics it presents offers readers multiple perspectives on a variety of disciplines including neuroscience, microbiology, immunology, biochemistry, biomedical engineering and cancer research. *Advances in Experimental Medicine and Biology* has been publishing exceptional works in the field for over 30 years and is indexed in Medline, Scopus, EMBASE, BIOSIS, Biological Abstracts, CSA, Biological Sciences and Living Resources (ASFA-1), and Biological Sciences. The series also provides scientists with up to date information on emerging topics and techniques.

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# Dedication



**Holly Jo Whiteside**

*Holly Whiteside has been an extraordinary RD Symposium Coordinator for 16 years, from RD2000 through the RD2014 meeting. For most of these symposia, she managed all aspects of the meetings, their selection sites, the design and maintenance of the meeting website, all interactions with participants and Travel Awardees, as well as assisting the preparation and submission of the conference grant from the NEI and the proceedings volume. For many, Holly has been the face of the meetings, and she showed remarkable dedication to the meetings and their participants, often giving much of her personal time to be sure the symposia were successful. In so doing, she helped mostly during the period of doubling the size of the biennial meeting. Holly has decided to step down from her involvement with the RD Symposia to devote her time to other aspects of her research and administrative tasks and her personal interests. We will miss her and are honored to dedicate this proceedings volume to her.*

# Preface

The International Symposia on Retinal Degeneration have been held in conjunction with the biennial meeting of the International Society of Eye Research (ISER) since 1984. These RD Symposia have allowed basic and clinician scientists from around the world to convene and present their new research findings. They have been organized to allow substantial time for discussions and one-on-one interactions in a relaxed atmosphere, where international friendships and collaborations can be fostered.

The XVI International Symposium on Retinal Degeneration (also known as RD2014) was held from July 13–18, 2014 at the Asilomar Conference Center in the beautiful city of Pacific Grove, California, USA. The meeting brought together 272 basic and clinician scientists, retinal specialists in ophthalmology, and trainees in the field from all parts of the world. In the course of the meeting, 43 platform and 159 poster presentations were given, and a majority of these are presented in this proceedings volume. New discoveries and state of the art findings from most research areas in the field of retinal degenerations were presented. This was the largest of all of the RD Symposia, with the greatest number of attendees and presentations.

The RD2014 meeting was highlighted by three special keynote lectures. The first was given by **John Flannery**, PhD, of the University of California, Berkeley, Berkeley, CA. Dr. Flannery discussed “Engineering AAV vectors to target specific functional subclasses of retinal neurons and glia.” Dr. Flannery’s talk was the first named keynote lecture of the RD Symposia in 32 years, the Edward H. Gollob Lecture, named for the President of the Foundation Fighting Blindness. The second keynote lecture was given by **Sally Temple**, PhD, Director of the Neural Stem Cell Institute, Regenerative Research Foundation, Rensselaer, NY. Dr. Temple discussed “Endogenous RPE stem cells, their surprising plasticity and implications for therapeutic applications.” The third keynote lecture was given by **Samuel G. Jacobson**, MD, PhD, of the University of Pennsylvania, Philadelphia, PA. Dr. Jacobson discussed “A treatment trial for an inherited retinal degeneration: what have we learned?”

The scientific meeting ended with a “Welcome to RD2016” by Prof. Nagahisa Yoshimura of Kyoto, Japan, along with the organizers primarily responsible for the meeting, Drs. John Ash and Robert E. Anderson.

We thank the outstanding management and staff of the beautiful Asilomar Conference Center for their assistance in making this an exceptionally smooth-running conference and a truly memorable experience for all of the attendees. These included, in particular, **Suzan Carabarin, Vivian Garcia, Sammy Ramos and Carlene Miller**. We also thank **Kelly Gilford** and **Jason McIntosh** for providing audio/visual equipment and services that resulted in a flawless flow of platform presentations. We thank **Steve Henry** of Associated Hosts, Inc. for planning and implementing transportation of most of the attendees to and from the Asilomar meeting venue, the memorable whale watching excursion, as well as for providing the dynamic “Beach Boys Band” for the end-of-meeting Gala for a truly California experience. Lastly, we thank **Franz Badura** of Pro Retina Germany for serenading the attendees at the Gala with his beautiful trumpet solos.

The Symposium received international financial support from a number of organizations. We are particularly pleased to thank The Foundation Fighting Blindness, Columbia, Maryland, for its continuing support of this and all previous biennial Symposia, without which we could not have held these important meetings. In addition, for the seventh time, the National Eye Institute of the National Institutes of Health contributed in a major way to the meeting. In the past, funds from these two organizations allowed us to provide 25–35 Travel Awards to young investigators and trainees working in the field of retinal degenerations. However, the response to the Travel Awards program was extraordinary, with 110 applicants, many more than in the past. For this reason, we sought additional support for the Travel Awards program. We are extremely appreciative for the contributions from Pro Retina Germany, the Fritz Tobler Foundation Switzerland and from Ed and Sandy Gollob. In total, we were able to fund 49 Travel Awards, the largest number ever an RD Symposium held in North America. We are grateful to the BrightFocus Foundation, which supported the important poster sessions. Many of the contributing foundations sent members of their organizations to attend the meeting. Their participation and comments in the scientific sessions were instructive to many, offering new perspectives to some of the problems being discussed. The Travel Awardees were selected on the basis of 9 independent scores of their submitted abstracts, 6 from each of the organizers and 3 from the other members of the Travel Awards Committee for RD2014, Drs. Jacque Duncan, Mabelle Pardue and XianJie Yang.

We also acknowledge the diligent and outstanding efforts of Ms. **Holly White-side**, who along with Dr. **John Ash**, carried out most of the administrative aspects of the RD2014 Symposium, and designed and maintained the meeting website. Holly is the Administrative Manager of Dr. Anderson’s laboratory at the University of Oklahoma Health Sciences Center. For this Symposium, Ms. **Melody Marcum**, Director of Development of the Dean McGee Eye Institute, worked closely and extensively in selecting and negotiating the meeting venue, and in planning the meals, entertainment and various events. Melody and Holly were crucial to the success of the RD2014 symposium. Also, Dr. **Michael Matthes** in Dr. LaVail’s laboratory



played a major role in all aspects in the production of this volume, along with the assistance of Ms. **Cathy Lau-Villacorta**, also in Dr. LaVail's laboratory.

Finally, we honor the monumental efforts of Holly Whiteside. Holly has been the RD Symposium Coordinator since 2000, and during that time she has been the "face" of the RD Symposia. She has been responsible for virtually all of the administrative aspects of the RD Symposia for 16 years, and most repeat attendees feel a close relationship with Holly. She is now stepping back from the efforts of the RD Symposia to pursue personal and professional avenues. We have valued Holly's efforts enormously over these years, and we are proud to dedicate this volume to her.

Catherine Bowes Rickman  
Matthew M. LaVail  
Robert E. Anderson  
Christian Grimm  
Joe G. Hollyfield  
John D. Ash

# Travel Awards

We gratefully acknowledge National Eye Institute, NIH, USA; the Foundation Fighting Blindness, USA; Pro Retina Germany; the Fritz Tobler Foundation, Switzerland; and Ed and Sandy Gollob for their generous support of 49 Travel Awards to allow young investigators and trainees to attend this meeting. Eligibility was restricted to graduate students, postdoctoral fellows, instructors and assistant professors actively involved in retinal degeneration research. These awards were based on the quality of the abstract submitted by each application. Catherine Bowes Rickman chaired the Travel Awards Committee of 9 senior retinal degeneration investigators, the 6 organizers and Drs. Jacque Duncan, Machelie Pardue and Xian-Jie Yang. The travel awardees are listed below.

**Carolina Abrahan**

University of Florida, Gainesville, USA

**Martin-Paul Agbaga**

University of Oklahoma HSC, Oklahoma City, USA

**Monica Aguila**

University College of London, London, United Kingdom

**Marcel Alavi**

University of California, San Francisco, San Francisco, USA

**Seifollah Azadi**

University of Oklahoma HSC, Oklahoma City, USA

**Emran Bashar**

University of British Columbia, Vancouver, Canada

**Lea Bennett**

Retina Foundation of the Southwest, Dallas, USA

**Manas Biswal**

University of Florida, College of Medicine, Gainesville, USA

**Shannon Boye**

University of Florida, Gainesville, USA

**Melissa Calton**

Stanford University School of Medicine, San Francisco, USA

**Livia Carvalho**

Schepens Eye Research Institute/MEEI, Boston, USA

**Wei-Chieh Chiang**

University of California, San Diego, LaJolla, USA

**Rob Collin**

Radboud University Medical Centre, Nijmegen, Netherlands

**Janise Deming**

University of Southern California, Los Angeles, USA

**Louise Downs**

University of Pennsylvania, Philadelphia, USA

**Lindsey Ebke**

Cleveland Clinic Cole Eye Institute, Cleveland, USA

**Michael Elliott**

University of Oklahoma HSC, Oklahoma City, USA

**Michael Gale**

Oregon Health and Science University, Portland, USA

**Xavier Gerard**

Institut Imagine, Paris, France

**Rosario Fernandez Godino**

MEEI-Harvard Medical School, Boston, USA

**Christin Hanke**

University of Utah, Salt Lake City, USA

**Stefanie Hauck**

Helmholtz Zentrum München, Neuherberg, Germany

**Roni Hazim**

University of California, Los Angeles, Los Angeles, USA

**Claire Hippert**

UCL Institute of Ophthalmology, London, United Kingdom

**John Hulleman**

Univ. of Texas Southwestern Medical Center, Dallas, USA

**Xiaojie Ji**

The Jackson Laboratory, Bar Harbor, USA

**Mark Kleinman**

University of Kentucky, Lexington, USA

**Elod Kortvely**

Universität Tübingen, Tübingen, Germany

**Ruanne Lai**

University of British Columbia, Vancouver, Canada

**Christopher Langlo**

Medical College of Wisconsin, Milwaukee, USA

**Jennifer Lentz**

Louisiana State University HSC, New Orleans, USA

**Yao Li**

Columbia University, New York City, USA

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University of Oklahoma HSC, Oklahoma City, USA

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Massachusetts General Hospital, Charlestown, USA

**Alex McKeown**

University of Alabama at Birmingham, Birmingham, USA

**Claudia Müller**

Fordham University, New York City, USA

**Celia Parinot**

Institut de la Vision, Paris, France

**David Parfitt**

UCL Institute of Ophthalmology, London, United Kingdom

**Diana Pauly**

Universität Regensburg, Regensburg, Germany

**Beryl Royer-Bertrand**

University of Lausanne, Lausanne, Switzerland

**Matt Rutar**

The Australian National University, Canberra, Australia

**Marijana Samardzija**

University of Zurich, Schlieren, Switzerland

**Kimberly Toops**

University of Wisconsin—Madison, Madison, USA

**Christopher Tracy**

University of Missouri, School of Medicine, Columbia, USA

**Mallika Valapala**

Johns Hopkins University School of Medicine, Baltimore, USA

**Lei Wang**

Johns Hopkins University, Baltimore, USA

**Qingjie Wang**

Regenerative Research Foundation, Rensselaer, USA

**Wenjun Xiong**

Harvard Medical School, Boston, USA

**Lei Xu**

University of Florida, Gainesville, USA

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