2014 Research Annual Report
Ophthalmology

Division Summary

RESEARCH AND TRAINING DETAILS

Number of Faculty 16
Number of Joint Appointment Faculty 1
Number of Research Fellows 12
Number of Research Students 3
Number of Support Personnel 14
Direct Annual Grant Support $1,628,819
Peer Reviewed Publications 27

CLINICAL ACTIVITIES AND TRAINING

Number of Clinical Staff 21
Number of Staff Physicians 11
Number of Clinical Fellows 1
Number of Clinical Students 12
Number of Other Students 1
Inpatient Encounters 1,552
Outpatient Encounters 26,220

Significant Accomplishments

Limited light exposure linked to retinopathy of prematurity
The Division of Pediatric Ophthalmology at the Abrahamson Pediatric Eye Institute has been investigating whether light exposure during pregnancy is a risk factor for severe retinopathy of prematurity (ROP), a potentially blinding vascular overgrowth in infants born prematurely. The project, led by Richard Lang, PhD, and Michael Yang, MD, is based on mouse studies of vascular development mechanisms and light response pathways. Yang has recently shown that there may be a critical threshold of light exposure during early gestation above which there is no further decrease in the risk for the subsequent development of severe ROP. This may have implications for the amount of light therapy needed to decrease the risk of severe ROP. Yang is now analyzing patient data in a multi-center database to confirm the results of the previous single center study.

Ocular genetics has an impact
The Eye Genetics Clinic completed its first full year of operations and evaluated patients with a wide array of genetic diseases linked to ocular problems. The clinic is a collaborative effort of Howard Saal, MD; Robert Hufnagel, MD, PhD, from Genetics; and Constance West, MD; Virginia Utz, MD; Zubair Ahmed, PhD; and Patricia Cobb, MS, from Ophthalmology. Some novel disease genes will be considered for future reports.

Separately, Hufnagel, Ahmed, and lead author Robert Sisk, MD, a pediatric retina specialist, reported in Ophthalmology the case of an infant boy diagnosed with Norrie disease, which is characterized by postnatal retinal detachment and vision loss. When the child’s mother became pregnant again, genetic testing showed
that the male fetus also had the Norrie mutation. The infant was delivered preterm and treated with laser and anti-angiogenesis agents, which thus far have prevented blindness.

Reducing unnecessary screening for retinopathy of prematurity
Increased risk for retinopathy of prematurity (ROP) is associated with slow rate of weight gain after birth in premature infants, which reflects the infant’s level of insulin-like growth factor 1, which is also important for retinal angiogenesis. Yang is the principal investigator in Cincinnati for the multi-center Growth in Retinopathy of Prematurity (G-ROP) study, which examines whether an infant’s weight gain can help predict the severity of ROP. This could help determine which infants can be safely excluded from screening examinations. Cincinnati is one of the largest contributing centers, with more than 1,200 patients in the retrospective portion of the study.

Research Highlights

Michael Gray, MD
Dr. Gray is an assistant professor in Pediatric Ophthalmology and Adult Strabismus. Over the past year, Dr. Gray has been active within PEDIG, the Pediatric Eye Disease Investigator Group. This is a collaborative network dedicated to clinical research in strabismus, amblyopia, and other eye diseases that affect children. Through PEDIG, the group at Cincinnati Children's has been recruiting for the CO2 study (Pediatric Cataract Surgery Outcomes Registry) and the HTS1 study (Glasses versus Observation for Moderate Hyperopia in Young Children). We will soon be involved in ATS18, a study of Binocular Computer Activities for Treatment of Amblyopia. Dr. Gray has also evaluated several patients with ocular injuries due to exposure from newer detergent "pods", and has an upcoming paper accepted in *JAAPOS* evaluating a series of patients with these injuries.

Fumika Hamada, PhD
Dr. Hamada's laboratory studies circadian rhythm of body temperature (body temperature rhythm). Body temperature rhythm is critical for the maintenance of homeostasis functions, such as metabolic energy generation and sleep. Her lab progress has been remarkable as their work reveals the hitherto unknown molecular mechanisms underlying body temperature rhythm and has led to the first identification of a molecule that links circadian clock to body temperature rhythm. Dr. Hamada has presented her work at The Society for Research on Biological Rhythms (SRBR) meeting.

Richard A. Lang, PhD
Dr. Lang's major research interests include early eye development, vascular development, the developmental and homeostatic function of myeloid cells and more recently, the role of light response pathways in development. The Lang Lab has been investigating whether light exposure during pregnancy is a risk factor for severe retinopathy of prematurity and in collaboration with Dr. Michael Yang, published those findings in *Ophthalmology* in December 2013. In this past year, Dr. Lang has presented his work at Boston Children's Hospital, Case Western University, Columbia University and The Cole Eye Institute in Cleveland. Internationally, he presented at The Sackler Lecture Series at Tel Aviv University, Israel.

Terry Schwartz, MD
Under Dr. Schwartz’s direction, the low vision rehabilitation program continues to grow. With the third year of grant support from the Ettlinger Foundation, monthly multidisciplinary clinics have been established in collaboration with the Perlman Center for the evaluation of children with cerebral palsy and cortical visual impairment. For children with permanent visual impairment, low vision rehabilitation clinics are held in in multiple locations throughout Kentucky, Ohio, and West Virginia. A new collaborative effort is underway to
provide services to children in southeastern Ohio and eastern Kentucky. In collaboration with Dr. Kelly Lusk, there is ongoing clinical research in the field of pediatric low vision rehabilitation.

Michael B. Yang, MD

Dr. Yang's research focus is on retinopathy of prematurity (ROP). His major work, performed in collaboration with Dr. Lang and colleagues, on the association of average day length during early gestation with severe ROP outcome was published in *Ophthalmology* this past year. Under Dr. Yang's leadership, the division has nearly completed data collection for the retrospective portion of the G-ROP (Postnatal Growth in ROP) multicenter study which evaluates daily weight gain after birth in premature infants as a predictor of severe ROP outcome to determine if that information can help reduce the number of screening eye examinations that have to be performed on premature infants. He is also a subinvestigator for the INS-3 multicenter trial which seeks to determine if administering the complex sugar inositol to premature infants can reduce the occurrence of severe ROP. As a member of the Ophthalmic Technology Assessment Committee of the American Academy of Ophthalmology, Dr. Yang was lead author on a paper assessing the risks and benefits of using fibrin glue to close conjunctival incisions after strabismus surgery.

**Division Publications**


Faculty Members

Constance E. West, MD, Associate Professor
   Leadership Division Director

James J. Augsburger, MD, FACS, Professor
   Leadership Chairperson, Department of Ophthalmology

Richard A. Lang, PhD, Professor
   Leadership Emma and Irving Goldman Scholar; Director, Visual Systems Group

Zubair Ahmed, PhD, Associate Professor

Tiffany Cook, PhD, Associate Professor

Eniolami Dosunmu, MD, Assistant Professor

Fumika Hamada, PhD, Assistant Professor

Michael Gray, MD, Assistant Professor

Sarah L. Lopper, OD, Instructor

Kelly Lusk, PhD, CLVT, Assistant Professor

Virginia Miraldi-Utz, MD, Assistant Professor

William Walker Motley, III, MS, MD, Associate Professor

Andrea Prosser, MD, Instructor

Melissa Rice, OD, FAAO, Instructor

Daniele Saltarelli, OD, Instructor

Terry Schwartz, MD, Professor

Michael B. Yang, MD, Associate Professor

Joint Appointment Faculty Members

Saima Riazuddin, PhD, Associate Professor (Department of Otolaryngology)

Clinical Staff Members

- Corey Bowman, COT, LDO, ABOC
- Rosalyn Grant, COA
- JaTawna Bush,
- Shemeka Butler, CO
- Rebecca Bystra, COA
- Kaylie Davidson, COA
- Brandy Dearwater, COA, RN
- Jennifer Duncan, COA
- Lisa Fite, COA
- Amanda Johnson, COA
- Melody Klayer, COA
- Debbie Lipps, COA
- Patty Lucas, COA
• Tamara Lyons, COA
• Nicole McLeod, COA
• Debbie Meister, COA
• Erika Setser, LDO
• Jill Simmons, COA
• Miqua Stewart, CO
• Kelli Vieson, COT,
  Clinical Manager
• Leanne Wagner, COA

Trainees
• Zegary Allen, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Joseph Armenia, MD, PGY2, Reading Hospital and Medical Center, Pennsylvania
• Mark Charlton-Perkins, BS, Graduate Student, University of Otago, Dunedin, New Zealand
• Jieqing Fan, BS, Graduate Student, Tsinghua University, Beijing, China
• Arnaud Giese, PhD, Research Fellow, Université Victor Segalen Bordeaux II, Bordeaux, France
• Tadahiro Goda, PhD, Research Fellow, Kyushu University, Fukuoka, Japan
• Laura Hanson, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Jason Lee, OD, Pediatric Optometry Resident, Ohio State University
• Luke Lindsell, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Greg Mecoli, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Eileen Myers, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Ajit Muley, PhD, Research Fellow, Anna University, Chennai, India
• Minh-Thanh Nguyen, PhD, Research Associate, University of Florida, Gainesville, FL
• Yoshinobu Odaka, PhD, Research Fellow, Louisiana State University Health Shreveport, Shreveport, LA
• Erika Osterholzer, MD, PGY2, Boonshoft School of Medicine, Kettering Medical Center, Kettering, OH
• Jon Pargament, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Sujata Rao, PhD, Research Associate, Cornell University, Ithaca, New York
• Elodie Richard, PhD, Research Fellow, Université Victor Segalen Bordeaux II, Bordeaux, France
• Deepam Rusia, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Ama Sadaka, MD, PGY2, The Christ Hospital
• Gowri Sarangdhar, PhD, Research Fellow, University of Sussex, Brighton, United Kingdom
• Mohsin Shazad, PhD, Research Fellow, Center for Excellence in Molecular Biology, University of The Punjab, Lahore, Pakistan
• Rachel Talbott, BA, Research Assistant, Purdue University, West Lafayette, IN
• Xin Tang, PhD, Research Fellow, Vanderbilt University, Nashville, TN
• Yujiro Umezaki, PhD, Research Fellow, Okayama University, Okayama, JAPAN
• Shruti Vemaraju, PhD, Research Fellow, Texas A&M University, College Station, TX
• Aaron Weber, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
• Rizwan Yousaf, MS, Graduate Student, Center for Excellence in Molecular Biology, University of The Punjab, Lahore, Pakistan
• Brian Zamora, MD, PGY2, West Virginia University School of Medicine, Morgantown, WV
• Fareeha Zulfiqar, PhD, Research Associate, University of The Punjab, Lahore, Pakistan

Division Collaboration
Analysis of DFNB26 mutation using Zebrafish as a model system (Zubair Ahmed, PhD)

**Developmental Biology** » Saulius Sumanas, PhD

Molecular modeling of USH1 protein to identify the effect on the structure (Zubair Ahmed, PhD)

**Developmental Biology** » Rashmi Hegde, PhD

Eyes absent proteins in vascular development, cancer and the retinal vasculopathies (Richard Lang, PhD)

**Developmental Biology** » Rashmi Hegde, PhD

Role of RhoA and Cdc42 in pre-migratory progenitors of the medial ganglionic eminence (Richard Lang, PhD)

**Experimental Hematology & Cancer Biology - Cell Signaling** » Yi Zheng, PhD

Role of new deafness protein in the mitochondrial function (Zubair Ahmed, PhD)

**Human Genetics** » Taosheng Huang, PhD

Functional analysis of newly retinal disorder genes (Zubair Ahmed, PhD)

**Human Genetics** » Robert Hufnagel, MD, PhD

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**Grants, Contracts, and Industry Agreements**

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<td>Defining Glial Programs that Support Adult Photoreceptor Form and Function</td>
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