

## Division Data Summary

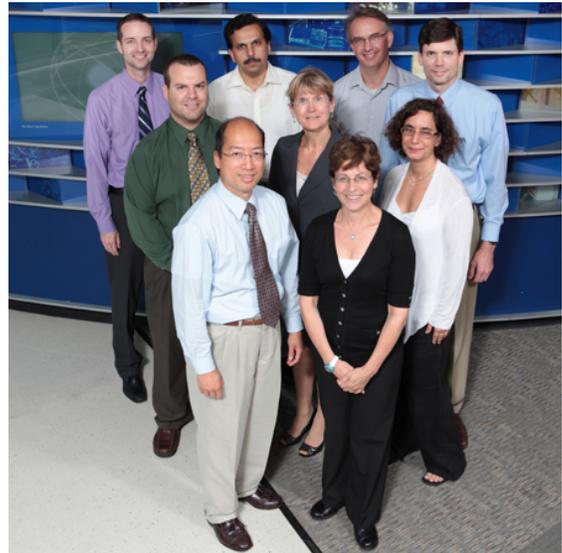
### Research and Training Details

Number of Faculty	15
Number of Joint Appointment Faculty	2
Number of Research Fellows	9
Number of Research Students	6
Number of Support Personnel	20
Direct Annual Grant Support	\$1,034,623
Peer Reviewed Publications	28

### Clinical Activities and Training

Number of Clinical Staff	17
Number of Clinical Fellows	1
Number of Clinical Students	12
Number of Other Students	2
Inpatient Encounters	2,998
Outpatient Encounters	22,948

## Division Photo



Row 1: M Yang, T Schwartz  
 Row 2: M Gray, C West, T Cook  
 Row 3: R Sisk, Z Ahmed, R Lang, WW Motley III

## Significant Publications

Stefater JA 3rd, Lewkowich I, Rao S, Mariggi G, Carpenter AC, Burr AR, Fan J, Ajima R, Molkentin JD, Williams BO, Wills-Karp M, Pollard JW, Yamagushi T, Ferrara N, Gerhardt H, **Lang RA**. **Regulation of angiogenesis by a non-canonical Wnt-Flt1 pathway in myeloid cells.** *Nature*. 474(7352):511-5. May 29, 2011.

This work uncovered novel mechanisms by which immune cells regulate blood vessel development. As a result, we have found pathways that could be exploited in treating diseases with a vascular component.

Macgregor S, Hewitt AW, Hysi PG, Ruddle JB, Medland SE, Henders AK, Gordon SD, Andrew T, McEvoy B, Sanfilippo PG, Carbonaro F, Tah V, Li YJ, Bennett SL, Craig JE, Montgomery GW, Tran-Viet KN, **Brown NL**, Spector TD, Martin NG, Young TL, Hammond CJ, Mackey DA. **Genome-wide association identifies ATOH7 as a major gene determining human optic nerve size.** *Hum Molec. Genet.* 19: 2716-24. 2011.

This is the initial study linking polymorphic SNP nucleotide changes within an essential gene enhancer of the human ATOH7 gene to heritable differences in optic disc size. There are now four other publications further associating this SNP with susceptibility for developing open angle glaucoma.

Charlton-Perkins M, Whitaker SL, Fei Y, Gebelein B, **Cook TA**. **Prospero and Pax2 differentially neural cell fate decisions by mediating EGF and Notch signaling.** *Neural Development*. 6:20. 2011.

Notch and Ras signaling are associated with a wide range of developmental processes, and are highly linked to a multitude of diseases and cancers. Moreover, these pathways frequently cross-regulate each other. However, how these pathways function in different tissue and organ types to mediate distinct functions is unclear. The work described in Charlton-Perkins et al. in *Neural Development* show that two downstream targets of Ras and Notch, the transcription factors Prospero and dPax2, feedback to modulate the output of

the signaling pathways. Moreover, it reveals that, in response to Ras and Notch signaling, Pros and dPax2 function antagonistically to control neuronal vs non-neuronal cell fates but function synergistically to control lens formation during *Drosophila* eye development. Pros and Pax2-related molecules are important for lymphangiogenesis, liver, lens, kidney, and ear development, and cancer in vertebrate systems, so these studies provide insight into how Ras and Notch signaling may integrate with these factors in many biological contexts.

**Ahmed ZM**, Yousaf R, Lee BC, Khan SN, Lee S, Lee K, Husnain T, Rehman AU, Bonneux S, Ansar M, Ahmad W, Leal SM, Gladyshev VN, Belyantseva IA, Van Camp G, **Riazuddin S**, Friedman TB, Riazuddin S\*. **Functional Null Mutations of MSRB3 Encoding Methionine Sulfoxide Reductase Are Associated with Human Deafness.** *American Journal of Human Genetics.* 88:19-29.

This paper describes the identification of first Methionine Sulfoxide Reductase mutations causing isolated hearing loss in humans. This identification provides new insights about the function and the role of oxidative stress on the physiology of inner ear.

## Division Highlights

### **Zubair Ahmed, PhD**

Zubair Ahmed's lab continued to investigate the molecular and genetic basis of Usher syndrome and oculocutaneous albinism (OCA), utilizing human, mouse and zebrafish genetics. His lab significantly contributed in the identification of two new deafness genes, *MSRB3* and *ILDR1*. In addition his lab has recently initiated a joint venture with an institute in Pakistan to discover the new genes responsible for OCA phenotype. To decipher the genetic lesions and genotype-phenotype correlation in subjects suffering with Blue Cone monochromatism, Dr. Ahmed in collaboration with Dr. Robert Sisk enrolled three large kindreds from Cincinnati-Kentucky area. In the past year, work from Dr. Ahmed's lab was at the annual meeting of the Association for Research in Otolaryngology (ARO), annual meeting of The Association for Research in Vision and Ophthalmology (ARVO) and at the 16<sup>th</sup> Annual Ophthalmology Conference & Research symposium organized by Department of Ophthalmology, University of Cincinnati.

### **Marie Bodack, OD**

Dr. Bodack is working on a research project with the clinical characteristics of children under the age of 13 with exotropia or esotropia. The research will look at the magnitude of the deviation, associated ocular and systemic diagnoses, the presence of amblyopia and stereopsis, etc.

### **Nadean Brown, PhD**

Dr. Brown's research focuses on the critical roles of the Notch signaling pathway during prenatal lens formation. A second project in the lab aims to understand the regulation and functions of bHLH transcription factors and Notch signaling during retinal ganglion cell and cone photoreceptor differentiation. Dr. Brown gave research presentations at the University of Utah; University of Missouri; University of California, Davis; West Virginia Univ Med School; and University of Michigan; 2010 International Conference on Eye Research in Montreal; 2011 annual meeting of the Association for Research in Otolaryngology Meeting in Baltimore; and 2011 Keystone Symposium on Evolution and Development in Lake Tahoe. Dr. Brown was an invited guest lecturer in a Developmental Genetics graduate course at the University of Missouri. Graduate student Kate Maurer has been awarded a Prevent Blindness Ohio Summer Fellowship.

### **Tiffany Cook, PhD**

Dr. Cook's research continues to explore evolutionarily conserved processes underlying retina and lens formation. Her group has made important advances in understanding into how the decision to become neuronal (retina) vs. non-neuronal (lens) is made during development. In addition, Dr. Cook's retina research has provided mechanistic insight into how the various light-sensing photoreceptor cells are generated and maintained. This work has implications for developing better diagnostic and therapeutic tools for retinal degenerative diseases. Last year, Dr. Cook presented her work at SUNY Downstate and Indiana University (IUPUI), and was invited to review the most up-to-date findings in the fields of eye development for *Current Topics in Developmental Biology* and *Progress in Molecular Biology and Translational Sciences*.

### **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 International Symposium of Life Sciences at Fukuoka University in Fukuoka, Japan and the Gordon Research Conference on Chronobiology in Barga, Italy.

### **Richard Lang, PhD**

Dr. Lang's laboratory continued making significant scientific contributions during FY2011. His lab has made important advances in our understanding of epithelial morphogenesis mechanisms and has shown that the small GTPases RhoA and Rac1 control the shape of cells and thus epithelial curvature during lens formation. Dr. Lang has also shown that during development of the retina, microglia, a type of immune cell, regulate the formation of blood vessels branches and ultimately determine the density of the blood vessel network. This has important implications for understanding the many diseases in which immune cells play a role. In this past year, Dr. Lang has presented his work at New York University, the University of Illinois at Chicago, The Medical College of Wisconsin and the University of Kentucky. Internationally, he presented at Frontiers in Sensory Development Conference in Barcelona, Spain, the International Society for Eye Research in Montreal, Canada. He also participated in the Cincinnati Children's Israel Exchange Program in Tel Aviv, Israel.

### **Sarah Lopper, OD**

Dr. Lopper has developed a reliable pathway to ensure regular ophthalmic screenings for children at risk for ophthalmic manifestations of systemic diseases such as juvenile idiopathic arthritis. This has improved the outcomes for children with juvenile idiopathic arthritis. She completed a 6 month course learning the techniques of Quality Improvement in Healthcare and is currently working on developing a model to improve the show rate for ophthalmology patients. This initiative has the potential to improve access for the division and expand the reach to patients. The history of no shows impacts the clinic in several ways: (1) underutilization of resources, (2) patients are not seen in a timely manner, (3) patients cannot be followed for an urgent diagnosis. The division anticipates a reduction of the no show rate with various intervention strategies.

### **W. Walker Motley, MD**

Dr. Motley is interested in eye issues associated with Down syndrome. Dr. Motley and co-author Dr. Saltarelli recently had a manuscript on Ophthalmic Manifestations of Mosaic Down Syndrome accepted for publication in the Journal of the American Association for Pediatric Ophthalmology and Strabismus (AAPOS). Dr. Motley

and colleagues have submitted another manuscript on strabismus surgery outcomes in individuals with Down syndrome. This work was presented at the AAPOS national meeting in April of 2011 and won the award for best presentation at the University of Cincinnati Department of Ophthalmology research symposium. Dr. Motley is currently working on methods of improvement in resident and fellow education and training in the areas of strabismus surgery and laser surgery for retinopathy of prematurity. Dr. Motley won this year's University of Cincinnati Department of Ophthalmology Academic Faculty Teacher of the Year Award in June 2011.

### **Saima Riazuddin, PhD**

Riazuddin's lab continued to investigate the molecular and genetic basis of hearing loss, utilizing human and mouse genetics. Her lab recently identified the *MSRB3* gene that is responsible for autosomal recessively inherited deafness (DFNB74) in eight Pakistani families. Using the genetic, molecular biological and cell biology techniques her lab is currently characterizing the molecular mechanisms of auditory dysfunction resulting from mutation in *MSRB3* gene. In addition her lab has recently discovered a new locus for recessively inherited deafness (DFNB86) in another Pakistani family. In the past year, Dr. Riazuddin presented her work at the annual meeting of the Association for Research in Otolaryngology. Dr. Riazuddin's research is expected to stimulate the next critical step of clinical improvements in the treatment and prevention of hearing loss.

### **Dan Saltarelli, OD**

Dr. Saltarelli is a provider of optometric services within the division. He has developed a special interest in the area of pediatric contact lenses, and continues to pursue advances in this field. His current interests revolve around pediatric aphakia and the development of an infant aphakia database with the eventual goal of improving the visual outcome for this special population of children.

### **Michael B. Yang, MD**

Dr. Yang has continued his research on retinopathy of prematurity. Through his involvement, the department of ophthalmology has been invited to participate in upcoming multicenter trials (currently in submission or planning stages) on analyzing weekly weight gain in premature infants as a predictor of ROP outcome and on the use of Avastin to treat severe treatment warranting ROP. We anticipate one or possibly both of these trials to be funded. Dr. Yang also collaborated with researchers in the Winkle College of Pharmacy to demonstrate high local concentrations of propranolol after topical instillation of the drug as compared with systemic intravenous or oral administration of propranolol. This may influence how infants with periorcular capillary hemangiomas are treated in the future. A research paper has been accepted for publication and two grant proposals have been submitted for consideration of funding based on this research.

### **Constance E. West, MD**

Dr. West the Director of the Division of Pediatric Ophthalmology and the Abrahamson Pediatric Eye Institute, has a special interest in ophthalmic optics, and teaches nationally and internationally. She travels yearly to Mexico City to help teach at a large eye hospital, and also to the Curso Basico, a program for ophthalmology residents from Central and South America. She just finished a three-year term as Secretary-Treasurer of the American Association for Pediatric Ophthalmology and Strabismus (AAPOS). She has a special interest in the documentation of eye findings in child abuse.

## **Division Collaboration**

**Developmental Biology** » James Wells, PhD

Wntless in pancreas development with Richard Lang, PhD

**Developmental Biology** » Aaron Zorn, PhD; Rashmi Hegde, PhD; Matthew Kofron, PhD

CRIM1 function with Richard Lang, PhD

**Developmental Biology** » Yutaka Yoshida, PhD

Wntless in neurogenesis with Richard Lang, PhD

**Developmental Biology** » Geraldine Guasch, PhD

Sox2 and Wnt in transitional zone formation with Richard Lang, PhD

**Developmental Biology** » Yi Zheng, PhD

GTPase function in morphogenesis with Richard Lang, PhD

**Developmental Biology** » Xinhua Lin, PhD

Wntless function with Richard Lang, PhD

**Gastroenterology** » Noah Shroyer, PhD

Wnts in gut regeneration with Richard Lang, PhD

**Immunobiology** » Marsha Wills-Karp, PhD

Micoglia function in vascular patterning with Richard Lang, PhD

**Developmental Biology** » Brian Gebelein, PhD

Molecular control of Drosophila nervous system development with Tiffany Cook, PhD

**Molecular Cardiology** » Katherine Yutzey, PhD

Notch signaling in early lens, heart & liver development with Nadean Brown, PhD

**Developmental Biology** » Xinhua Lin, PhD

Novel BTB domain protein in Drosophila morphogenetic cell with Nadean Brown, PhD

**Developmental Biology** » James Wells, PhD; Christopher Mayhew, PhD

Differentiation of hPSCs into lentoid bodies with Nadean Brown, PhD

**Audiology** » David Brown, PhD

Universal newborn hearing screen with Saima Riazuddin, PhD

**Developmental Biology** » Saulius Sumanas, PhD

Analysis of DFNB26 mutation using Zebrafish as a model system with Saima Riazuddin, PhD & Zubair Ahmed, PhD

**Developmental Biology** » Rashmi Hegde, PhD

Molecular modeling of USH1 protein to identify the affect on the structure with Zubair Ahmed, PhD

## Faculty Members

**Constance E. West, MD**, Associate Professor

*Division Director*

**Research Interests**

**James J. Augsburger, MD, FACS**, Professor

*Chairperson, Department of Ophthalmology*

**Research Interests**

**Richard A. Lang, PhD**, Professor

*Emma & Irving Goldman Scholar*

*Head, Visual Systems Group*

**Research Interests**

**Zubair Ahmed, PhD**, Assistant Professor

**Research Interests**

**Marie I. Bodack, OD, FAAO, FCOVD**, Instructor

**Research Interests**

**Dean J. Bonsall, MD, MS, FACS**, Associate Professor

**Research Interests**

**Tiffany Cook, PhD**, Assistant Professor

**Research Interests**

**Fumika Hamada, PhD**, Assistant Professor

**Research Interests**

**Adam H. Kaufman, MD, FACS**, Associate Professor

**Research Interests**

**Sarah Lopper, OD**, Instructor

**Research Interests**

**William Walker Motley, MD, MS**, Assistant Professor

**Research Interests**

**Daniele Saltarelli, OD**, Instructor

**Research Interests**

**Terry Schwartz, MD**, Assistant Professor

**Research Interests**

**Robert Sisk, MD**, Assistant Professor

**Research Interests**

**Michael B. Yang, MD**, Associate Professor

**Research Interests**

## Joint Appointment Faculty Members

**Nadean Brown, PhD**, Associate Professor

Department of Developmental Biology

**Saima Riazuddin, PhD**, Assistant Professor

Department of Otolaryngology

## Clinical Staff Members

- Laurie Hahn-Parrott, CO, COT, MBA
- Corey Bowman, COT, LDO, ABOC
- Brandy Dearwater, COA
- Adrienne Distler, COA
- Jennifer Duncan, COA
- Lisa Fite, COA
- Ashley Jackson, COA

- Debbie Lipps, COA
- Patty Lucas, COA
- Melody Klayer,
- Judy Masters, COT
- Nicole McLeod, COA
- Debbie Meister, COA
- Jill Simmons, COA
- Kelli Vieson, COT

## Trainees

- Melanie Bradley, MD, PGY5, Ophthalmology Resident, University of Kentucky-Lexington
- Katie Bezold, BS, Graduate Student, Xavier University, Cincinnati, OH
- Yuqi Cai, PhD, Research Fellow, Zhejiang University, China
- Manpreet Chhabra, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Ian Conner, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- April Carpenter-Elrod, PhD, Research Fellow, Hospital for Special Surgery, New York, NY
- Mark Charlton-Perkins, BS, Graduate Student, University of Otago, Dunedin, New Zealand
- Bharesh Chauhan, PhD, Research Associate, Oxford University, Oxford England
- Jieqing Fan, BS, Graduate Student, Tsinghua University, Beijing, China
- Arnaud Giese, PhD, Research Fellow, Universite Victor Segalen, Bordeaux, France
- Michael Gray, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Mary "Meg" Grulee, MD, PGY2, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Hena Khaja, MD, PGY2, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Haruna Kaneko, PhD, Research Fellow, Tokyo Medical and Dental University, Japan
- Ailee Laham, MD, PGY2, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Shawn Lewis, MD, PGY2, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Manna Li, PhD, Research Fellow, Peking University Health Science Center, Beijing, China
- Amina Malik, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Kate Maurer, BS, Graduate Student, Susquehanna University, Sellingsgrove, PA
- Elizabeth McDonald, BA, Graduate Student, Hartwick College, Oneonta, NY
- Mitul Mehta, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Myungsoon Moon, PhD, Research Fellow, University of Wisconsin, Madison, WI
- Gowri Nayak, PhD, Research Fellow, University of Sussex, Brighton, United Kingdom
- Jamey Osher, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Timothy Plageman, PhD, Research Fellow, University of Cincinnati, Cincinnati, OH
- Virgilio Ponferrada, PhD, Research Associate, Wright State University, Dayton, OH
- Sujata Rao, PhD, Research Associate, Cornell University, Ithaca, New York
- Tomohito Sato, MD, Visiting Research Scientist, National Medical College, Japan
- Scott Schoenberger, MD, PGY4, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- Adeel Shaikh, MD, PGY3, Ophthalmology Resident, University of Cincinnati, Cincinnati, OH
- James A. Stefater, BS, Graduate Student, Centre College, Danville, KY
- David Terrell, BS, Graduate Student, Texas State University - San Marcos, San Marcos, TX
- Baotong Xie, PhD, Research Fellow, Chinese Academy of Sciences, Beijing, China
- Eun-Jin Yeo, PhD, Research Fellow, Seoul National University, Seoul, South Korea
- Rizwan Yousaf, MS, Graduate Student, Center for Excellence in Molecular Biology, Pakistan

# Significant Accomplishments

## Abrahamson Pediatric Eye Institute

The Division of Pediatric Ophthalmology continues to research ways to improve clinical outcomes. Michael Yang, MD, has one active study that will be internally funded by the Department of Pediatric Ophthalmology. "Retinopathy of Prematurity (ROP) in Older and Heavier Premature Infants" will retrospectively study the efficacy of the 2006 national ROP screening criteria for premature infants at risk for development of this potentially blinding ocular disease by determining how many of a recently included small subset of heavier and older premature infants actually developed ROP warranting surgical treatment. ROP is caused by overgrowth of capillaries in the eye which can lead to scarring and eventual detachment of the retina if left untreated in its early stages. The hypothesis is that very few from this subset of infants develop severe ROP or require ROP surgery, and that they may not require screening exams at all. The objective is to decrease the number of screening exams performed on infants, reducing the time and cost expended by both physicians and patient families, thus enhancing quality of care.

## Visual Systems Group

The Visual Systems Group of Pediatric Ophthalmology is dedicated to providing the most cutting-edge research initiative at Cincinnati Children's. Our mission is to exclusively work on the development and disease processes and make every effort to understand how these diseases affect the visual system. With recruitment completed, we expect to see an increase in the overall research contribution of our group. We are excited and continue to have great expectations about the future of the Visual Systems Group and the significant contributions that each individual will make. We believe our results will open doors and opportunities for research endeavors for years to come.

# Division Publications

1. Ahmed ZM, Yousaf R, Lee BC, Khan SN, Lee S, Lee K, Husnain T, Rehman AU, Bonneux S, Ansar M, Ahmad W, Leal SM, Gladyshev VN, Belyantseva IA, Van Camp G, Riazuddin S, Friedman TB. **Functional null mutations of MSRB3 encoding methionine sulfoxide reductase are associated with human deafness DFNB74.** *Am J Hum Genet.* 2011; 88:19-29.
2. Bodack MI. **Pediatric acquired brain injury.** *Optometry.* 2010; 81:516-27.
3. Bodack MI, Chung I, Krumholtz I. **An analysis of vision screening data from New York City public schools.** *Optometry.* 2010; 81:476-84.
4. Borck G, Ur Rehman A, Lee K, Pogoda HM, Kakar N, von Ameln S, Grillet N, Hildebrand MS, Ahmed ZM, Nurnberg G, Ansar M, Basit S, Javed Q, Morell RJ, Nasreen N, Shearer AE, Ahmad A, Kahrizi K, Shaikh RS, Ali RA, Khan SN, Goebel I, Meyer NC, Kimberling WJ, Webster JA, Stephan DA, Schiller MR, Bahlo M, Najmabadi H, Gillespie PG, Nurnberg P, Wollnik B, Riazuddin S, Smith RJ, Ahmad W, Muller U, Hammerschmidt M, Friedman TB, Leal SM, Ahmad J, Kubisch C. **Loss-of-function mutations of ILDR1 cause autosomal-recessive hearing impairment DFNB42.** *Am J Hum Genet.* 2011; 88:127-37.
5. Carpenter AC, Rao S, Wells JM, Campbell K, Lang RA. **Generation of mice with a conditional null allele for Wntless.** *Genesis.* 2010; 48:554-8.
6. Charlton-Perkins M, Cook TA. **Building a fly eye: terminal differentiation events of the retina, corneal lens, and pigmented epithelia.** *Curr Top Dev Biol.* 2010; 93:129-73.
7. Charlton-Perkins M, Whitaker SL, Fei Y, Xie B, Li-Kroeger D, Gebelein B, Cook T. **Prospero and Pax2**

- combinatorially control neural cell fate decisions by modulating Ras- and Notch-dependent signaling.** *Neural Dev.* 2011; 6:20.
8. Cook T, Zelhof A, Mishra M, Nie J. **800 facets of retinal degeneration.** *Prog Mol Biol Transl Sci.* 2011; 100:331-68.
  9. Gordon EJ, Rao S, Pollard JW, Nutt SL, Lang RA, Harvey NL. **Macrophages define dermal lymphatic vessel calibre during development by regulating lymphatic endothelial cell proliferation.** *Development.* 2010; 137:3899-910.
  10. Gutzwiller LM, Witt LM, Gresser AL, Burns KA, Cook TA, Gebelein B. **Proneural and abdominal Hox inputs synergize to promote sensory organ formation in the Drosophila abdomen.** *Dev Biol.* 2010; 348:231-43.
  11. Katayama K, Melendez J, Baumann JM, Leslie JR, Chauhan BK, Nemkul N, Lang RA, Kuan CY, Zheng Y, Yoshida Y. **Loss of RhoA in neural progenitor cells causes the disruption of adherens junctions and hyperproliferation.** *Proc Natl Acad Sci U S A.* 2011; 108:7607-12.
  12. Leung E, Sisk RA, Flynn HW, Jr.. **Progression of diabetic tractional retinoschisis by optical coherence tomography.** *Ophthalmic Surg Lasers Imaging.* 2010; 41 Online:e1-3.
  13. Macgregor S, Hewitt AW, Hysi PG, Ruddle JB, Medland SE, Henders AK, Gordon SD, Andrew T, McEvoy B, Sanfilippo PG, Carbonaro F, Tah V, Li YJ, Bennett SL, Craig JE, Montgomery GW, Tran-Viet KN, Brown NL, Spector TD, Martin NG, Young TL, Hammond CJ, Mackey DA. **Genome-wide association identifies ATOH7 as a major gene determining human optic disc size.** *Hum Mol Genet.* 2010; 19:2716-24.
  14. McDonald EC, Xie B, Workman M, Charlton-Perkins M, Terrell DA, Reischl J, Wimmer EA, Gebelein BA, Cook TA. **Separable transcriptional regulatory domains within Otd control photoreceptor terminal differentiation events.** *Dev Biol.* 2010; 347:122-32.
  15. Melendez J, Stengel K, Zhou X, Chauhan BK, Debidda M, Andreassen P, Lang RA, Zheng Y. **RhoA GTPase is dispensable for actomyosin regulation but is essential for mitosis in primary mouse embryonic fibroblasts.** *J Biol Chem.* 2011; 286:15132-7.
  16. Mishra M, Oke A, Lebel C, McDonald EC, Plummer Z, Cook TA, Zelhof AC. **Pph13 and orthodenticle define a dual regulatory pathway for photoreceptor cell morphogenesis and function.** *Development.* 2010; 137:2895-904.
  17. Motley WW, Melson AT. **Pediatric intraoperative floppy iris syndrome associated with persistent pupillary membrane.** *J AAPOS.* 2011; 15:196-7.
  18. Motley WW, Melson AT, Mortensen JE. **Pediatric Metarrhizium anisopliae keratitis.** *J AAPOS.* 2011; 15:101-3.
  19. Phelan JD, Shroyer NF, Cook T, Gebelein B, Grimes HL. **Gfi1-cells and circuits: unraveling transcriptional networks of development and disease.** *Curr Opin Hematol.* 2010; 17:300-7.
  20. Prasov L, Brown NL, Glaser T. **A critical analysis of Atoh7 (Math5) mRNA splicing in the developing mouse retina.** *PLoS One.* 2010; 5:e12315.
  21. Rajkumar P, Rollmann SM, Cook TA, Layne JE. **Molecular evidence for color discrimination in the Atlantic sand fiddler crab, Uca pugilator.** *J Exp Biol.* 2010; 213:4240-8.
  22. Riazuddin S, Ahmed ZM, Hegde RS, Khan SN, Nasir I, Shaukat U, Butman JA, Griffith AJ, Friedman TB, Choi BY. **Variable expressivity of FGF3 mutations associated with deafness and LAMM syndrome.** *BMC Med Genet.* 2011; 12:21.
  23. Riazuddin SA, Shahzadi A, Zeitz C, Ahmed ZM, Ayyagari R, Chavali VR, Ponferrada VG, Audo I, Michiels C, Lancelot ME, Nasir IA, Zafar AU, Khan SN, Husnain T, Jiao X, MacDonald IM, Riazuddin S, Sieving PA, Katsanis N, Hejtmancik JF. **A mutation in SLC24A1 implicated in autosomal-recessive congenital stationary night blindness.** *Am J Hum Genet.* 2010; 87:523-31.
  24. Sisk RA, Berrocal AM, Albin TA, Murray TG. **Bevacizumab for the treatment of pediatric retinal and**

- choroidal diseases.** *Ophthalmic Surg Lasers Imaging.* 2010; 41:582-92.
25. Sisk RA, Berrocal AM, Feuer WJ, Murray TG. **Visual and anatomic outcomes with or without surgery in persistent fetal vasculature.** *Ophthalmology.* 2010; 117:2178-83 e1-2.
26. Stefater JA, 3rd, Lewkowich I, Rao S, Mariggi G, Carpenter AC, Burr AR, Fan J, Ajima R, Molkentin JD, Williams BO, Wills-Karp M, Pollard JW, Yamaguchi T, Ferrara N, Gerhardt H, Lang RA. **Regulation of angiogenesis by a non-canonical Wnt-Flt1 pathway in myeloid cells.** *Nature.* 2011; 474:511-5.
27. Uhl JD, Cook TA, Gebelein B. **Comparing anterior and posterior Hox complex formation reveals guidelines for predicting cis-regulatory elements.** *Dev Biol.* 2010; 343:154-66.
28. Witt LM, Gutzwiller LM, Gresser AL, Li-Kroeger D, Cook TA, Gebelein B. **Atonal, Senseless, and Abdominal-A regulate rhomboid enhancer activity in abdominal sensory organ precursors.** *Dev Biol.* 2010; 344:1060-70.

## Grants, Contracts, and Industry Agreements

Grant and Contract Awards Annual Direct / Project Period Direct

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### AHMED, Z

#### **Molecular Genetics of Usher Syndrome Type I**

National Institutes of Health

R00 DC 009287 08/01/09-07/31/12 \$170,342

#### **RPB Career Development Award**

Research to Prevent Blindness(University of Cincinnati)

07/01/10-06/30/14 \$50,000

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### COOK, T

#### **Pros/Prox1 and Lens Development in Drosophila**

National Institutes of Health

R01 EY 017907 09/15/07-07/31/12 \$222,750

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### LANG, R

#### **Macrophages and Tumor Angiogenesis**

National Institutes of Health(Albert Einstein College of Medicine)

R01 CA 131270 12/01/07-11/30/12 \$93,375

#### **RhoGTPases in Early Eye Development**

National Institutes of Health

R01 EY 017848 04/06/07-03/31/12 \$200,475

#### **Targeting Survival Factors for Ocular NV**

National Institutes of Health(The Johns Hopkins University)

R01 EY 012609 04/01/08-03/31/12 \$23,000

#### **Wnt Pathway Regulation of Lens Polarity**

National Institutes of Health

R01 EY 016241 03/01/11-02/28/15 \$250,000

#### **The Roles of Sox2 in Lens and Retinal Development**

US-Israel Binational Science Foundation

02/01/09-01/31/13 \$13,000

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### XIE, B

#### **Investigating the Mechanisms of Basic Leucine Zipper Factor Traffic Jam Regulating Photoreceptor Cell Subtype Fate Decisions in Drosophila Eye**

University of Cincinnati

01/01/11-12/31/11 \$5,000

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### WEST, C.

**Save Our Sight Ohio Amblyope Registry**

Ohio Department of Health(The Research Institute at Nationwide Children's Hospital )

07/01/08-06/30/12

\$6,681

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**Current Year Direct**

**\$1,034,623**