

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2. Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Kuehn, Markus H		POSITION TITLE Assistant Professor of Ophthalmology	
eRA COMMONS USER NAME (credential, e.g., agency login) mkuehn			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
Goethe University, Frankfurt, Germany St. Louis University, St. Louis, MO	M.S. Ph.D.	1991 2000	Botany Cell & Molecular Biology
University of Iowa, Iowa City, IA	Postdoctoral	2000-2003	Ophthalmology and Visual Sciences

A. Personal Statement

My laboratory studies genetic factors that underlie or contribute to optic neuropathies - in particular glaucoma, but also the neurodegeneration associated with idiopathic intracranial hypertension (IIH). To date, the genetics of glaucoma and the cellular events that result in the degeneration of the retina are poorly understood. The main focus of the laboratory is to determine the whether the retinal neuroinflammation that occurs during glaucoma is detrimental or beneficial to the preservation of vision. During the course of our studies we have developed extensive expertise in the characterization of ocular phenotypes, such as intraocular pressure measurements or slit-lamp biomicroscopy, and have developed a number of stress tests that can point out abnormalities in retinal physiology. This expertise is applied in this large mutagenesis project aimed at developing new mouse models of glaucoma and other retinal diseases.

B. Positions and Honors

Positions and Employment

1988 - 1991 Teaching assistant (Physiology), Biology Department, Goethe University, Frankfurt, Germany
 1991 - 1992 Laboratory Technician, Abbott Laboratories, N. Chicago, IL
 1992 - 1994 Research Assistant, Bethesda Eye Institute, St. Louis, MO
 1994 - 2000 Graduate Student, St. Louis University, St. Louis, MO
 2000 - 2003 Postdoctoral Scholar – Ophthalmology and Visual Sciences, University of Iowa
 2003 - 2007 Assoc. Research Scientist– Ophthalmology and Visual Sciences, University of Iowa
 2007- Assistant Professor – Ophthalmology and Visual Sciences, University of Iowa
 2009 - Faculty Member – Interdisciplinary Graduate Program in Genetics, University of Iowa

Other Experience and Professional Memberships

1992 - Member, Association for Research in Vision and Ophthalmology
 2007 - Member, International Congress for Eye Research

Honors

1987 Fulbright Scholarship, received support to spend one year at the University of Wisconsin
 1995 National Institute of Health Travel Award Fellowship, received funds to present scientific findings at the annual meeting of the Association for Research in Vision in Ophthalmology (ARVO),

- 1998 Invited speaker: "Analyses of Differential Gene Expression in Age-Related Macular Degeneration", Meeting: Pathogenesis and Treatment of Age-related Macular Degeneration, Johns Hopkins University, Baltimore,
- 2000 – 2002 National Research Service Award "Effect of Aging and Age-related Macular Degeneration on Gene Expression Patterns in the Human Eye"
- 2008 Invited speaker: "Retinal Complement Activation in Glaucoma" 4th Annual ARVO/Pfizer Ophthalmics Research Institute Conference, Ft. Lauderdale
- 2008 Invited Speaker: "The Role of Complement in Glaucoma" Yonsei University College of Medicine, Dept. of Ophthalmology, Seoul, Korea.

C. Selected Peer-reviewed Publications (Selected from 24 peer-reviewed publications)

Most relevant to the current application

1. **Kuehn, M.H.**, Kim, C.Y., Ostojic, J, Bellin, M, Alward, W.L.M, et al. (2006) Retinal Synthesis and Deposition of Complement Components Induced by Ocular Hypertension. *Exp. Eye Res.*83 (3) 620-8
2. **Kuehn, M.H.**, Kim, C.Y., Jiang, B., Dumitrescu, A.V., Kwon, Y.H. (2008) Disruption of the complement cascade delays retinal ganglion cell death following retinal ischemia-reperfusion. *Exp Eye Res* 87, 89-95.
3. Kwon, Y.H., Fingert, J.H., **Kuehn, M.H.**, Alward, W.L.M. (2009) Mechanism of Disease: Primary Open Angle Glaucoma. *N. Engl. J. Med.* 360(11): 1113-1124
4. Grozdanic, S. D., Kecova, H, Harper, M.M, Nilaweera, W, **Kuehn, M.H**, Randy H. Kardon, R.H (2010) Functional and Structural Changes in a Canine Model of Hereditary Primary Angle-Closure Glaucoma *Invest Ophthalmol Vis Sci.* 51: 255-263
5. Tezel, G., Yang, X., Luo, C, Cai, J., Kain, A.D., Powell, D.W., **Kuehn, M.H.**, Pierce, W.M. (2010) Hemoglobin Expression and Regulation in Glaucoma: Insights into Retinal Ganglion Cell Oxygenation. *Invest. Ophth. Vis. Sci.* 51(2)907-917

Additional recent publications of importance to the field (in chronological order)

6. Stone, E.M, Braun, T.A., Russell, S.R, **Kuehn, M.H.**, Lotery, A.J., Moore, P.A, Christopher G. Eastman, C.G, Casavant, T.C., and Sheffield, V.C. (2004) Missense Variations in the Fibulin 5 Gene and age-related macular degeneration. *N. Engl. J. Med.* 351(4): 346-53.
7. **Kuehn, M.H.**, Fingert, J.H., and Kwon, Y.H. (2005) Retinal ganglion cell death in glaucoma: Mechanisms and neuroprotective strategies. *Ophthalmol Clin North Am.* 18, 383-395
8. Mullins, R.F, Skeie, J.M., Malone, E.A, and **Kuehn, M.H.** (2006) Macular and Peripheral Distribution of ICAM-1 in the Human Choriocapillaris and Retina. *Mol Vis.* 12: 224-25
9. Kim, C.Y., **Kuehn, M.H.**, Anderson, M.G., and Kwon, Y.H. (2006) Intraocular Pressure Measurement in Mice: A Comparison between Goldmann and Rebound Tonometry. *Eye* 20: 1-8
10. Mullins, R.F, **Kuehn, M.H.**, Faidley, E.A., Syed, N.A., Stone, E.M. (2007): Differential Macular and Peripheral Expression of Bestrophin in Human Eyes and its Implication for Best Disease. *Invest Ophthalmol Vis Sci.*48: 3372-3380
11. Ostojic, J., Grozdanic, S.D., Syed, N.A., Hargrove M.S., Trent III J.T., **Kuehn M.H.**, Kwon Y.H., Kardon R.H., and Sakaguchi D.S. (2008): Patterns of Distribution of the Oxygen-Binding Globins, Neuroglobin and Cytoglobin, in Human Retina. *Arch. Ophthalmol.*126(11): 1530-6
12. Ostojic J., Grozdanic S.D., Syed, N.A., Hargrove M.S., Trent III J.T., **Kuehn M.H.**, Kwon Y.H., Kardon R.H., and Sakaguchi D.S. (2008): Neuroglobin and Cytoglobin Distribution in the Anterior Eye Segment: a Comparative Immunohistochemical Study *J. Histochem. Cytochem.* 56: 863-872
13. Tezel, G., **Fourth ARVO/Pfizer Ophthalmic Research Institute Conference Working Group** (2009). The role of glia, mitochondria, and the immune system in glaucoma. *Invest Ophthalmol Vis Sci*, 50(3), 1001-1012.
14. Grozdanic, S. D., Kecova, H, Harper, M.M, Nilaweera, W, **Kuehn, M.H**, Randy H. Kardon, R.H (2009) Functional and Structural Changes in a Canine Model of Hereditary Primary Angle-Closure Glaucoma *Invest Ophthalmol Vis Sci.* In Press

15. Lively, G.D, Jiang, B., Hedberg-Buenz, A., Chang, B., Petersen, G.E, **Kuehn, M.H.**, Anderson, M.G. Genetic Dependence of Central Corneal Thickness among Inbred Strains of Mice. *Invest Ophthalmol Vis Sci*. In Press

D. Research Support

Ongoing Research Support

- NIH R01 EY017142 Kuehn (PI) 08/01/2009-07/31/2013
"The Role of Complement in Glaucoma"
Based upon our preliminary data suggesting that components of the complement system are synthesized in the glaucomatous retina, this program is aimed to characterize the functional role of this process during the progression of the disease.
Role: PI
- NIH R01 EY017168-03S109 Sheffield (PI) 9/1/2009-8/31/2011
"Interdisciplinary approach to retinal disease gene identification"
The goal of this project is to identify novel murine models of retinal disease using a high throughput sequence-driven mutagenesis approach.
Role: Co-Investigator
- The Coulter Foundation Lavik (PI) 08/01/2008-07/31/2010
"Sustained Delivery of Timolol Maleate for Management of Elevated IOP for Glaucoma" The goal of this project is to develop biodegradable microspheres that are suitable for delivery of established IOP lowering drugs
Role: Collaborator
- NIH U10EY017281-01A1 Wall (PI) 2/1/2009 – 1/31/2012
"Idiopathic Intracranial Hypertension Treatment Trial" This large multi-center clinical trial will rigorously evaluate the efficacy of current treatment regimens for Idiopathic Intracranial Hypertension. Additionally, genetic studies will be carried out to examine a possible genetic bias towards the development of the disease.
Role: Collaborator
- DOD C056200 Kardon (PI) 10/01/2007-9/31/2010
"Treatment of Laser-Induced Retinal Injury and Visual Loss Using Sustained Release of Intra-vitreous Neurotrophic Growth Factors" The project is aimed to evaluate if application of growth factors after retinal injury as a result from laser exposure results in a more favorable outcome.
Role: Collaborator
- VA Rehab C3919R Kardon (PI) 6/01/2007-5/31/2011
"Growth Factor Treatment of Visual Loss in Compressive Optic Nerve Injury" The goal of this research is to develop and test a new method of treatment of visual loss due to acute and chronic compressive optic nerve injury using different neurotrophic growth factors which are slowly released from specifically engineered polymer microspheres injected into the vitreous cavity of the affected eye.
Role: Collaborator

Completed Research Support(past 3 years)

- The Glaucoma Foundation Kuehn (PI) 01/01/2008-12/31/2008
"Genetic Characterization of a Novel Canine Model of Heritable Angle Closure Glaucoma" The purpose of these studies is to identify a genetic aberration leading to the development of PACG in a pedigree of dogs as an approach to identify genes that cause PACG in humans.
Role: PI