

AN EYE TO THE FUTURE

The Department of Ophthalmology
The University of Arizona
Health Sciences Center

Fall/Winter 2001

Unlocking the Mystery of Myocilin May Lead to New Treatments for Glaucoma

Imagine seeing the world through a cylinder that eventually could close and leave you in the dark. This is the fate of many people with glaucoma.

Glaucoma damages vision in most by increasing pressure inside the eye as a result of the buildup of fluid known as the aqueous humor. In primary open-angle glaucoma, the most common form of glaucoma, fluid is unable to drain normally and ultimately exerts pressure on the optic nerve in the back of the eye. If the pressure is not relieved over time, nerves in the retina die, peripheral vision fades, and ultimately the condition progresses to complete blindness.

Although glaucoma is the No. 1 cause of irreversible visual impairment and blindness in the world, little is known about the molecular pathways of this disease. The rapid advances being made in the area of human genomics are helping researchers across the country to better understand the origins of glaucoma and to devise better therapeutic approaches to control intraocular pressure.

At the UA Department of Ophthalmology, scientist W. Daniel Stamer, PhD, has been awarded \$1.5 million from the National Eye Institute to uncover the role of a mysterious protein linked to open-angle glaucoma.

Dr. Stamer is directing this research in the Department's state-of-the-art Glaucoma Research Laboratory. The laboratory was created three years ago with the help of donations from Arizona Lions Clubs, Lions Sight & Hearing Foundation, Lions Clubs International and concerned individuals.

Specifically, Dr. Stamer is studying the protein myocilin, which is the protein encoded by *GLC1A*, the first gene linked to people with primary open-angle glaucoma. "The mystery of myocilin is not only its linkage with glaucoma, but also that it is a newly discovered protein with no known function," says Dr. Stamer.

People who have mutations in the gene *GLC1A* consequently have mutations in the protein myocilin, which dramatically increases their chances of developing glaucoma, explains Dr. Stamer. Researchers believe that a defective myocilin impairs the drainage of aqueous humor from the eye in these patients with glaucoma, resulting in a build-up of intraocular pressure. Parents can pass the defect to their children, along with a higher risk of developing glaucoma, he adds.

"The genetic link provides glaucoma researchers for the first time with a specific player at the molecular level involved in the pathology of glaucoma," Dr. Stamer says. "Thus, the goal of this research is to determine the pathway which myocilin functions so more effective treatments can be developed to correct for its dysfunction."

"Although more than 3 million Americans and 67 million people worldwide are estimated to have glaucoma, with early detection and more effective treatments to control intraocular pressure, the majority of those affected do not have to go blind," Dr. Stamer says.

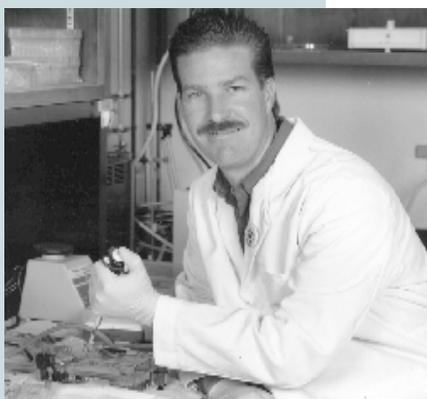
Dr. Stamer Receives RPB Award

W. Daniel Stamer, PhD, assistant professor of ophthalmology and pharmacology, received a \$200,000 Career Development Award from Research to Prevent Blindness (RPB). This support is provided over a four-year period.

The RPB Research Career Development Award was established to attract young physicians and basic scientists to eye research. RPB is the world's leading voluntary organization supporting eye

research. Since its founding in 1960, RPB has channeled more than \$172 million to medical institutions for research into all diseases of the visual system that damage and destroy sight, including macular degeneration, cataract, glaucoma and diabetic retinopathy. RPB has been identified with virtually every major scientific advance in eye research.

This marks the first time the UA Department of Ophthalmology has received a Career Development Award. In January, RPB awarded the Department a \$220,000 Challenge Grant to expand its research efforts directed toward the elimination of blinding diseases. The Challenge Grant opened the door to further funding by RPB.



▲ W. Daniel Stamer, PhD

From the Director's Desk

As this issue of the Department newsletter goes to press, the country is still trying to deal with the aftermath of the events that took place on Sept. 11. In this difficult time, it is important to stand united as a community and a country. Our thoughts and prayers are with those of you who have been personally affected by this tragedy.

Due to the recent tragedy, there had been discussion about canceling the "Gift of Sight" breakfast to be held on Nov. 7. However, when we realized that over 100 patients were seen at the Lions Eye Clinic on Sept. 11 and on each weekday since, it underscored the need for our services.

What we do in the Department of Ophthalmology is to serve you, the public. We serve you at the Lions Eye Clinic by providing the best clinical care possible, through our research projects to find cures and causes for eye disease, and through our hours of volunteer time spent providing vision care to the needy. For that reason, the "Gift of Sight" breakfast will be held as scheduled.

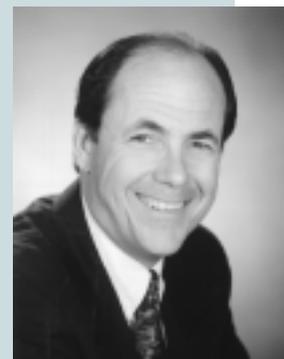
If we have been unable to reach you by phone (no invitations are being sent in the mail), please consider this your personal invitation to join us. The breakfast will highlight the Department's research and clinical services at a fund-raising breakfast on **Wednesday, Nov. 7, 7:30-8:30 a.m. at the Westin La Paloma.**

The one-hour breakfast event, "Gift of Sight," is **free**. No minimum or maximum gift is required. We would simply like as many community members to attend as possible to learn about the important work of the Lions Eye Clinic and the research of the Ophthalmology Department. So far, more than 300 people have confirmed they will attend.

At this event we hope to touch, move and inspire guests about our work. Never before has the Department provided the general public with such an in-depth look at what we do and how it affects the community. We look forward to seeing you on Nov. 7!

To RSVP for the "Gift of Sight" breakfast event, please call **520-322-3800, ext. 228.**

Robert W. Snyder, MD, PhD



▲ Robert Snyder, MD, PhD

Going Beyond 20/20 Science of Eye Disease Seminar Series



▲ Guy M. Kezirian, MD; Jim Schwiegerling, PhD; and Roland Shack, PhD

The latest results from research using telescope technology to customize laser surgery that potentially could improve vision beyond 20/20 was presented at the University of Arizona Department of Ophthalmology's fourth Science of Eye Disease lecture in September.

Three experts in ophthalmology and optical

sciences presented "Wavefront Sensing, Custom Corneal Ablation and Super Vision."

Jim Schwiegerling, PhD, UA assistant professor with a joint appointment at the Department of Ophthalmology and the Optical Sciences Center, and Guy M. Kezirian, MD, SurgiVision Consultants, Paradise Valley, have been studying how to use light-measuring technology employed by telescopes to measure aberrations of the eye that limit vision. These

measurements would improve the efficiency of refractive laser surgery (PRK and LASIK), resulting in much sharper vision. Roland V. Shack, PhD, UA professor of Optical Sciences, is one of the original inventors of the light-measuring technology.

The UA Department of Ophthalmology Science of Eye Disease Seminar Series is presented quarterly to members of the community with medical or research interests in eye disease.

Save the Date! The next Science of Eye Disease Seminar is scheduled for December 12.

Ophthalmology Faculty

Robert W. Snyder, MD, PhD, Head
Harry D. Carrozza, MD
Harold E. Cross, MD, PhD
Velma Dobson, PhD
Erin M. Harvey, MA
Joseph M. Miller, MD, MPH
John C. Nichols, MD
Robert J. Noecker, MD
Richard R. Ober, MD
Millicent L. Palmer, MD
Lynn Polonski, MD
Jim Schwiegerling, PhD
Rand W. Siekert, OD
W. Daniel Stamer, PhD

Building a Better Place

Sandy Shiff comes from a family of builders. His grandfather sold building supplies, his uncle and father were contractors. While Sandy doesn't build buildings, he builds a better community through his service to the Lions and as president of the UA Department of Ophthalmology Advisory Board.

Sandy was introduced to Dr. Robert Snyder, head of the Department, by his father Howard Shiff. Howard was a member of the Tucson Breakfast Lions and the Department of Ophthalmology Advisory Board. He also was one of the driving forces involved in the establishment of the Lions Eye Clinic, now located at Alvernon Way.

"I was there when my dad sat down with Dr. Snyder and talked about building the clinic," recalls Sandy. Today, the Lions Eye Clinic offers state-of-the-art eye care to thousands of patients.

When Howard passed away, Sandy stepped in to continue his father's work. He joined the Tucson Breakfast Lions Club in

1989 and the Department's Advisory Board in 1997. Since then, he has been actively involved with the Department and its mission of providing research, education and service to the people of the Southwest. Like his father before him, Sandy's goal is to help build the Department into one of the premier eye research institutions in the country.

"Tucson is the perfect place for establishing a top-10 eye research center," says Sandy. "The University of Arizona is a world leader in optical sciences, and we have some of the best and brightest in the field of ophthalmology. Why not call on the world's largest service organization, the Lions Clubs International, to add its financial strength and volunteer power and make this endeavor a long-term success."

Dr. Snyder agrees the Lions and Sandy, as Advisory Board President, play an important role in the success of the Department.

"Sandy is a visionary like his father. He also has enthusiasm for supporting our efforts, a dedication for helping other people, and a strong commitment to Lionism,"

Board Spotlight



▲ Sandy Shiff

Dr. Snyder says. "He's indefatigable."

The result, Dr. Snyder says, is that patients throughout Arizona and around the world are benefiting from outstanding clinical care and cutting-edge research.

"The Department is now a passion of mine, along with the work I do for the Lions," says Sandy, a Tucson native and insurance executive.

"Community involvement has been a long tradition in my family. I just want to leave this world a better place."

Department Advisory Board

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Sandy Shiff*

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Aldine von Isser, PhD
Robert W. Snyder, MD, PhD
Ernie Soto*
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*Lions Club representatives

DEPARTMENT NEWS

Dr. John Nichols Joins UA Ophthalmology



▲ John Nichols, MD

John C. Nichols, MD, has joined the UA Department of Ophthalmology. As a board-eligible ophthalmologist, Dr. Nichols has special interests in comprehensive eye disease, including diabetic retinopathy, glaucoma and cataract surgery.

Dr. Nichols received his medical degree from the University of Arizona College of Medicine, where he spent a year as a research fellow in ophthalmology investigating cornea physiology. He completed his residency at the St. Louis University Eye Institute. He joined the UA Department of Ophthalmology as a fellow in corneal and external disease in July 2001.



▲ In September, Donna Rowe, executive director of the Lions Sight and Hearing Foundation, presented Dr. Robert Snyder with a \$10,000 check. The donation from the Lions Sight and Hearing Foundation was made in support of the Southwest Age-Related Macular Degeneration Research Program. Dr. Snyder also received a recognition plaque for his work with the Foundation.

Dr. Dobson to Serve as Scientific Adviser of NEI Study

Velma Dobson, PhD, professor of ophthalmology and psychology, will serve as the scientific adviser of a national, multicenter \$10 million clinical study funded by the National Eye Institute of the National Institutes of Health. Dr. Dobson is one of a group of nine investigators at various universities, colleges of optometry, and departments of ophthalmology involved in the Vision in Preschoolers (VIP) study.

The primary goal of the study is to determine whether vision-screening tests can reliably predict which three- and four-year-old children would benefit from comprehensive eye examinations. More than 10,000 Head Start preschoolers across the country will participate in the study.

Currently, no standard vision

screening procedures exists for preschool-age children, says Dr. Dobson, and there is no scientific evidence that the vision-screening procedures being used are effective. This is significant because it is during this period of life that vision is developing very rapidly, she says.

When vision-screening procedures of unknown effectiveness are used, children with disorders are missed, Dr. Dobson explains. Parents are led to believe vision is developing normally. Implementation of vision-screening procedures known to be highly effective for use with preschoolers will help to identify children who need treatment to prevent vision loss.

Welcome New Residents

The UA College of Medicine offers a three-year ophthalmology residency program, combining clinical training, academic activities, and research opportunities.

The UA Ophthalmology Residency Program has two residents a year, for a total of six residents throughout the three-year period.

This year's residents are **Neil J. Atodaria, MD**, and **Emily L. Patterson, MD**. Dr. Atodaria attended Youngstown State University, Ohio, and earned his medical degree from Northeastern Ohio Universities College of Medicine, Rootstown. Dr. Patterson attended Yale College, and received her medical degree from the University of Arizona.

Admission into the program is extremely competitive, says residency program director

Robert J. Noecker, MD. The program is small, but offers extensive clinical and surgical experience in the subspecialty areas of glaucoma, strabismus, retina, external disease and oculoplastic surgery. Residents also are required to complete a research project annually.

"This program is demanding, but very rewarding. Residents are given the tools they need to enter either general ophthalmology practice or pursue further subspecialty training," Dr. Noecker says.



▲ Neil Atodaria, MD, and Emily Patterson, MD

Clinical Trials at UA Ophthalmology

GLAUCOMA

Phase III-B Drug Study Sponsored by Allergan

Robert Noecker, MD, principal investigator

Evaluate the safety and efficacy of a new glaucoma medication.
Status: Enrollment complete

Phase IV Long-Term Safety Study Sponsored by Pharmacia & Upjohn Safety

Robert Noecker, MD, principal investigator

Evaluate the long-term safety and efficacy of Xalatan®, an eye pressure reducing medication used in the treatment of glaucoma.
Status: Enrollment complete

Drug Study Sponsored by Allergan

Robert Noecker, MD, principal investigator

Compare the effect of glaucoma medications on the surface of the eye.
Status: Enrollment complete

Drug Study Sponsored by Allergan

Robert Noecker, MD, principal investigator

Compare the safety and efficacy of a new glaucoma medication to the most widely used marketed glaucoma eye drop.
Status: Enrollment complete

DRY EYE STUDIES

Drug Study Sponsored by Allergan

Robert Snyder, MD, PhD, principal investigator

Evaluate the safety and efficacy of cyclosporine 0.05% ophthalmic emulsion treatment compared to Refresh® treatment alone in patients with mild to moderate dry eye syndrome.
Status: Enrollment complete

PEDIATRIC STUDIES

Myopia in Children Study Sponsored by Valley Forge

Joseph Miller, MD, principal investigator

Evaluate a new investigational medication that may halt or slow down the progression of nearsightedness in children.
Status: Enrollment complete

Amblyopia Treatment Study Sponsored by JAEB Center for Health Research Pediatric Eye Disease Group

Joseph Miller, MD, principal investigator

Determine the best treatment regimen for children with amblyopia (lazy eye).
Status: Open for enrollment
Contact: Toby, 694-1422

RETINAL STUDIES

Pharmacia & Upjohn Age-Related Macular Degeneration Study

Richard Ober, MD, principal investigator

Evaluate an intravenous medication for the treatment of wet macular degeneration.
Status: Enrollment complete

Projecto VER—Evaluating Visual Impairment Among Hispanic Americans Study

Robert Snyder, MD, PhD, & Richard Schultz, MD, co-investigators

Survey blindness and visual impairment among Hispanics.
Status: Enrollment complete

OPTIC/REFRACTIVE SURGERY

Assessment of Visual Performance Pre and Post LASIK Sponsored by The Whitaker Foundation

Jim Schwiegerling, PhD, principal investigator

Compare measurements of the human eye before and after LASIK (laser vision corrective surgery) to create a computer model of the eye and to evaluate changes in the model following refractive surgery.
Status: Enrollment open
Contact: Jennie, 694-1470

Abberation Study

Jim Schwiegerling, PhD, principal investigator

Evaluate a new instrument designed to measure optical aberrations in the human eye.
Status: Enrollment open
Contact: Sue, 694-1419

For an update, visit our website at <http://www.eyes.arizona.edu>

PUBLICATIONS AND PRESENTATIONS

CHAPTERS

Dugel PU, Ober RR: Posterior segment manifestations of closed-globe contusion injury. In: Ryan SJ (eds.), *Retina*, 3rd ed., Vol. 3, CV Mosby Co., St. Louis, 2001, pp. 2386-2399.

Ober RR: Pregnancy-induced hypertension (preeclampsia-eclampsia). In: Ryan SJ (ed.), *Retina*, 3rd ed., Vol. 2, CV Mosby Co., St. Louis, 2001, pp. 1393-1403.

Noecker RJ: Clinical Ocular Toxicology. In: Sullivan JB, Krieger GR (eds.), *Clinical Environmental Health and Toxic Exposures*, 2nd edition. Lippincott Williams & Wilkins, Philadelphia, 2001, p. 270.

ARTICLES

Dobson V, Sales B: The science of infanticide and mental illness. *Psychology, Public Policy, and Law* 2001;6:1098-1112.

Cryotherapy for Retinopathy of Prematurity Cooperative Group: Effect of retinal ablative therapy for threshold retinopathy of prematurity: Results of Goldmann perimetry at age 10 years. *Arch Ophthalmol* 2001;119:1120-5. (Writing committee: Quinn GE (chair), Dobson V, Weleber R, Hardy RJ, Palmer EA, Phelps DL, Summers CG, Tung B)

Cryotherapy for Retinopathy of Prematurity Cooperative Group: Contrast sensitivity at age 10 years in children who had threshold retinopathy of prematurity. *Arch Ophthalmol* 2001;119:1129-33. (Writing committee: Dobson V (chair), Quinn GE, Hardy RJ, Palmer EA, Phelps DL, Summers CG, Tung B)

West SK, Klein R, Rodriguez J, Munoz B, Broman AT, Sanchez R, Snyder R: Diabetes and diabetic retinopathy in a Mexican American population: Proyecto VER. *Diabetes Care* 2001;24:1204-1209.

Noecker RJ: Ophthalmic preservatives: Considerations for long-term use in patients with dry eye or glaucoma. *Rev Ophthalmol* 2001;8(6):73-80.

Auestad N, Halter R, Hall RT, Blatter M, Bogle M, Burks W, Erickson JR, Fitzgerald KM, Dobson V, Innis SM, Singer LT, Montalto MB, Jacobs JR, Qiu W, Bornstein MH: Growth and development in term infants fed long-chain polyunsaturated fatty acids: A double-masked, randomized, parallel, prospective, multivariate study. *Pediatrics* 2001;108:372-81.

PRESENTATIONS

Ober RR: (1) Basics of Laser Photocoagulation, (2) Diabetic Macular Edema, (3) Retinal Vein Occlusions, and (4) Management of Retinal Breaks. Sonora Ophthalmological Society, Nogales, Mexico, June 9, 2001.

Miller JM: Duane's Syndrome. Department of Ophthalmology, Tufts University, June 18, 2001.

Stamer WD: Myocilin: Evidence for a Vesicle Tether. Tucson Traffic Jam Symposium, Tucson, Arizona, July 2001.

Miller JM: The Lancaster Course in Ophthalmology, Colby College, ME. Optics and Refraction. July 2001, Course Instructor.

Snyder RW: The Optics of LASIK: Wavefront and Other Technologies. Alabama Academy of Ophthalmology Annual Meeting, SanDestin, FL, July 21, 2001.

Snyder RW: Improving Surgical Outcomes from a Pharmacologic Approach. Alabama Academy of Ophthalmology Annual Meeting, SanDestin, FL, July 21, 2001.

Snyder RW: Practical and Theoretical Optics for the Refractive Surgeon. Pan American Association of Ophthalmology, Buenos Aires, Argentina, July 22, 2001.

Miller JM: The Stanford Basic Science in Ophthalmology Course, Stanford College, Palo Alto, CA. Optics and Refraction. July 2001, Course Instructor.

Dobson V: Pros and Cons of the MTI Photoscreener. Downtown Lions Club, Tucson, Arizona, July 26, 2001.

Stamer WD: Molecular Physiology of Aqueous Humor Outflow. The University of Arizona, Physiological Sciences Graduate Program Seminar Series, Tucson, August 2001.

EXPLANATION OF PUBLICATION AND PRESENTATION INFORMATION

Publications

Author(s): Article title. *Journal* Year Published; Journal Number: Journal Page Number(s).

Presentations

Presenter: Presentation Title. Name of Conference/Organization, Presentation Location, Conference/Presentation Date(s).

AN EYE TO THE FUTURE newsletter is published by the UA Department of Ophthalmology to share news and showcase research activities. Correspondence or inquiries should be addressed to: Newsletter, UA Department of Ophthalmology, 655 N. Alvernon Way, Suite 108, Tucson, AZ 85711; phone (520) 626-7219.

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Our Mission Is to Benefit the People of Arizona, the Southwest and Beyond

Entering the 21st Century

In the U.S., one child in 20 may suffer abnormal eye development. These children are at risk for serious vision problems that may lead to permanent vision loss.

Glaucoma is the leading cause of preventable blindness in the United States, affecting an estimated 3 million Americans. It is a silent villain that, with little or no warning, robs a person of their ability to see. Once destroyed, vision lost to glaucoma cannot be restored.

Age-related macular degeneration causes visual loss in about 1.2 million people in the U.S. By age 60, nearly 15 percent of Americans develop symptoms or ARMD; by age 80, the percentage rises to nearly 40 percent.

With the latest laser applications, computers and other new technologies, we enter the 21st century with far greater hope for preservation of vision. However, we continue to seek better answers for eye conditions such as glaucoma and retinal diseases that are still major causes of blindness.

UA Department of Ophthalmology

The UA Department of Ophthalmology is dedicated to preserving healthy eyesight and preventing blindness through innovative research and comprehensive eye care for all patients whose vision is threatened by eye disease or injury.

Become an Annual Member of the VISIONaries

We invite you to support the exciting work of the University of Arizona Department of Ophthalmology. Gifts of all sizes have been utilized throughout the Department, in the clinics, and in the research laboratories, helping the Department increase medical knowledge and offer the best possible vision care.

◆ **Donors of \$1,000 or more will have their name listed on the permanent donor recognition wall at the Lions Eye Care Center.**

To find out more about the many other ways in which you can participate in our mission, contact the UA Ophthalmology Development Director, phone (520) 322-3800, ext. 228.

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