

“We are on



**WHAT ARE THE RISK FACTORS FOR MACULAR DEGENERATION?**

- Age – Being 60 years of age and older
- Race – Whites are much more likely to lose vision from AMD than Blacks
- Gender – Women tend to be at greater risk for AMD than men
- Family history of AMD
- Smoking may increase the risk of AMD
- Obesity – Research studies suggest a link between obesity and the progression of early and intermediate stage AMD to advanced AMD

To schedule an appointment with a macular degeneration specialist please call 1-888-845-0002.

# the verge of a new treatment era in macular degeneration therapy”

Carmen A. Puliafito, M.D., M.B.A.

Age-related macular degeneration (AMD), a retinal disease which causes loss of central vision, is the leading cause of blindness and vision impairment among people 50 years of age and older. More than 1.7 million Americans over age 50 suffer from AMD and the number is expected to triple by the year 2020 as baby boomers age.

With age-related macular degeneration, central vision loss is irreversible, increasing the importance of early diagnosis and treatment. Although there is presently no cure for AMD, new treatments are rapidly advancing and changing every few months. “Bascom Palmer’s physicians are taking the lead in investigating revolutionary treatments for macular degeneration,” says Carmen A. Puliafito, M.D., M.B.A., professor and chairman of Bascom Palmer Eye Institute.

Puliafito leads a stellar team of physicians and scientists whose mission is to advance knowledge leading to the development of new treatments for macular degeneration and the leading causes of blindness.



The most common form of macular degeneration, **“dry” macular degeneration**, occurs when the light-sensitive cells at the macula in the center of the retina slowly break down, gradually blurring central vision in the eye. As the disease progresses and less of the macula functions properly, central vision in the affected eye may be lost. Dry AMD generally affects both eyes, but the amount of vision loss may be different in each eye.

The 2001 Age-Related Eye Disease Study (AREDS) was a major clinical trial sponsored by the National Eye Institute (NEI), one of the federal government’s National Institutes of Health. Designed to learn more about the natural history and risk factors of age-related macular degeneration, the study demonstrated that high levels of antioxidants and zinc significantly reduce the risk of advanced AMD and its associated vision loss.

Scientists have found that people at high risk of developing advanced stages of AMD lowered their risk by about 25 percent when treated with a high-dose combination of vitamin C, vitamin E, beta-carotene and zinc. In the same high-risk group, which includes people with intermediate AMD or advanced AMD in one eye but not the other eye, the nutrients reduced the risk of vision loss caused by advanced AMD by about 19 percent.

Although the AREDS vitamin and mineral formula is not a cure for dry AMD, it plays a key role in slowing the progression of the disease and helping people at high-risk maintain their remaining vision. For those study participants who had neither AMD nor early AMD, the nutrients provided no apparent benefit.

“Patients with AMD always ask what they should do to help maintain their vision,” says Puliafito. “I tell them three things: First and foremost, if they smoke, I tell them to stop; second, take the AREDS formula; and third, eat their

vegetables." Studies have suggested that people with diets rich in green, leafy vegetables have a lower risk of developing AMD. Several AREDS formula vitamin and mineral supplements are available over-the-counter, including Bausch & Lomb's Ocuvite® PreserVision™.

### "Wet" macular degeneration

(neovascular AMD), considered to be advanced AMD, is more severe than the dry form. Approximately 10-20 percent of dry AMD cases will progress to the more aggressive and debilitating wet form. Wet AMD is caused by abnormal blood vessels growing from the choroid under the retina in the macula. These blood vessels, known as choroidal neovascularization (CNV), leak blood and fluid that lift the macula from its normal place at the back of the eye. The result is a rapid progression of vision loss that leads to a complete loss of central vision in 85 percent of those affected.

Current treatments approved for wet macular degeneration which are available at Bascom Palmer include *thermal laser photocoagulation therapy* and *photodynamic therapy*. Although neither treatment is a cure for wet AMD, each treatment may slow the progression of vision decline or stop further vision loss.

Approximately 15 percent of patients with wet AMD are eligible for thermal laser photocoagulation. This procedure uses a laser to destroy the fragile, leaky blood vessels (CNV). With these or other successful treatments, wet macular degeneration is converted back to dry macular degeneration. Over time, vision loss may continue, but the outcome is far better than if the wet AMD was left untreated. Laser therapy however, is not useful for cases of wet AMD where the abnormal blood vessels are located under the center of the macula. This condition has limited the usefulness of laser photocoagulation.

Some patients have benefited from photodynamic therapy using Visudyne®, a light-sensitive drug injected into the

patient's arm. The drug, developed by the Canadian firm QLT Inc. and Swiss drug maker Novartis AG, travels throughout the body and collects in the abnormal blood vessels under the macula. A non-burning laser light is shined into the eye which activates the medication causing it to create blood clots that halt the leaking within the abnormal blood vessels. Visudyne® treats only a particular type of macular degeneration, and Bascom Palmer has played a leading role in the investigation, effectiveness and safety of this treatment.

### Revolutionary change in treatment is on the horizon

"While laser therapy and photodynamic therapy are effective for certain types of AMD, *pharmacotherapy* (drug therapy) represents the new era in macular degeneration treatment," Puliafito says. "We are looking to stop the growth of the aggressive, abnormally growing blood vessels. Angiogenesis is the body's process of making new blood vessels, and we are testing new anti-angiogenesis drugs that can block the formation of these abnormal blood vessels."

Patients with macular degeneration have high levels of the vascular endothelial growth factor (VEGF) protein in the affected eyes. The VEGF protein causes the abnormal blood vessels to grow, leak blood and damage the macula. New anti-VEGF drugs work by blocking these proteins; and the formation of abnormal blood vessels. Puliafito and other Bascom Palmer vitreoretinal specialists, including Dr. Philip J. Rosenfeld, are currently conducting late-stage clinical trials with three anti-VEGF drugs. (See *related story* on page 8.)

As lead investigator of a national clinical trial, Puliafito recently presented trial results of the Macugen™ Collaborative Trial at the American Academy of Ophthalmology. Macugen™ is an experimental anti-VEGF drug being developed by Pfizer Inc. and Eyetech Pharmaceuticals Inc. Nearly 1,200 patients were enrolled in the 54-week late-

### WHAT ARE THE SYMPTOMS OF MACULAR DEGENERATION?

- Words appear blurry while reading requiring greater illumination to see details
- Inability to recognize faces at a distance
- Blurred or blind spot in the center of vision
- Straight lines appear wavy or crooked
- Rapid loss of central vision



Vision with age-related macular degeneration

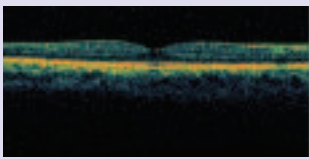


Normal vision

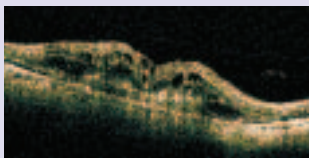
If you experience blurred or distorted central vision, you should visit your ophthalmologist immediately.

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The OCT diagnostic scan enables the doctor to evaluate the health of the retina by providing a unique cross-sectional image of the layers of the retina.

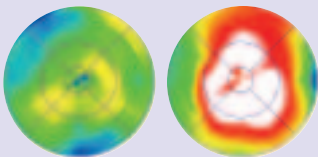


OCT image of a normal retina



OCT image of a swollen retina affected by macular degeneration

The OCT also shows the topographic elevation of the retina as viewed from the top. Colors indicate thickness of the retina. Blues and green indicate normal retina thickness.



Normal retina

Retina affected by macular degeneration

stage clinical trial with results showing the drug was 27 percent more effective than placebo at limiting vision loss for patients with the wet form of macular degeneration. Additionally, the drug, that is given every six weeks by injection into the eye, stabilized or improved vision in 33 percent of patients.

“There is significant hope in the very near future for those patients with wet AMD. Anti-VEGF drugs have the potential to revolutionize the care and treatment of this disease,” says Puliafito. “Advances in CNV drug therapy have significantly changed how patients with age-related macular degeneration are treated.”

Puliafito continues, “The ophthalmologist’s goal in every situation is to preserve and improve the patient’s vision. Drug therapy has the potential to address the form and structure of the disease. Additionally, imaging technology, such as optical coherence tomography, allows ophthalmologists to correlate how functional change is affected by structural changes in the eye.”

The morphologic issues and the importance of optical coherence tomography in the treatment of eye diseases prompted Bascom Palmer to organize a landmark symposium, *Angiogenesis 2004*, held this past February in Miami. Organized and directed by Dr. Rosenfeld, the conference brought together the world’s foremost scientists and physicians currently doing work in the basic molecular mechanisms of

angiogenesis and the use of pharmacotherapy to treat ophthalmic diseases. (See *related story on page 26.*)

Central to treating patients with eye disease and evaluating the effectiveness of drug treatments, the medical imaging technique called optical coherence tomography (OCT) is used. Co-invented by Puliafito and Massachusetts Institute of Technology (MIT) engineer James G. Fujimoto, Ph.D., OCT produces a high resolution, high speed, cross-sectional image of the retina that is used for diagnostic purposes. Puliafito and Fujimoto share the Rank Prize, the world’s most prestigious award in optoelectronics, for their revolutionary work on the OCT.

OCT technology is best compared to ultrasound, except that it uses short wavelength light instead of sound. An OCT examination is a non-invasive procedure that produces a clear, sharp image in less than ten minutes. Thanks to OCT’s high resolution, which is ten times greater than ultrasound or magnetic resonance imaging (MRI), microscopic early signs of disruption in retinal tissues can be detected and treated.

New drug treatments for macular degeneration coupled with advanced imaging techniques, looks promising for the future for patients with macular degeneration. “All of our efforts at Bascom Palmer Eye Institute relate to the common



Dr Puliafito presenting an autographed copy of *Optical Coherence Tomography* to Dr. Daniel Ferguson.

goal of preventing blindness,” Puliafito says. “Bascom Palmer will continue to be the world leader in meeting that goal through our tradition of innovative vision research, outstanding education, and unsurpassed patient care.”

An exceptional ophthalmologist and true visionary, Puliafito was named one of the country’s top ten medical retinal specialists in a 24-state survey of his peers. He joined Bascom Palmer in July 2001, after serving as professor and chairman of the Department of Ophthalmology at Tufts University School of Medicine in Boston, founding director of the New England Eye Center, and adjunct professor of electrical engineering and computer science at Tufts University. Dr. Puliafito holds Bascom Palmer’s Stanley and Kathleen Glaser Chair in Ophthalmology.

He was also founding director of the Morse Laser Center at the Massachusetts Eye and Ear Infirmary, associate professor of ophthalmology at Harvard Medical School and associate professor in the Health Sciences Technology Division, MIT. Puliafito was editor-in-chief of both *Lasers in Surgery and Medicine*, the leading academic journal in the field of biomedical lasers, and *Ophthalmic Surgery and Lasers*. He has served as president of the American Society for Laser Medicine and Surgery, and trustee and president of the Association for Research in Vision and Ophthalmology.

A native of Buffalo, New York, he received a Bachelor of Arts degree *cum laude* from Harvard University, medical degree *magna cum laude* from Harvard Medical School, and a Master of Business Administration degree from the Wharton School of the University of Pennsylvania. He completed a residency in ophthalmology at the Massachusetts Eye and Ear Infirmary of Harvard Medical School, and there completed fellowships in both ophthalmic pathology and vitreoretinal diseases and surgery.

Although Puliafito went to Harvard knowing he wanted to be a physician, his interest in ophthalmology was affected by the friendship he developed with his college roommate, Paul Parravano. Parravano, currently special assistant to the president at MIT, had survived a battle with retinoblastoma, a childhood cancer of the eye that left him blind. Puliafito not only learned the effects of blindness but recognized that the field of ophthalmology would stimulate his interests in medicine, technology and science.

Often called a “renaissance man” Puliafito is a world-class stamp collector, marathon runner, tennis player, and rabid sports fan. He often travels to Boston to watch his beloved Red Sox, but his loyalties lie with the Florida Marlins. He lives in Pinecrest with his wife, Janet Pine, M.D., a psychiatrist at the University of Miami, their three children, and two labrador retrievers.

## HOW IS MACULAR DEGENERATION DIAGNOSED?

Age-related macular degeneration (AMD) is detected during a comprehensive eye examination that includes:

- Visual Acuity Test to measure vision at a distance
- Dilated pupil exam to see the retina and optic nerve
- Having the patient look at an Amsler grid to detect if the grid pattern appears wavy, distorted or missing
- Possible fluorescein angiography diagnostic test. During this test, a dye is injected into the arm and quickly travels throughout the blood system. Once the dye reaches the blood vessels in the back of the eye, photographs are taken of the eye. The dye allows the ophthalmologist to detect any leaking blood vessels and recommend treatment.

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