

Advanced Personalized Preventive Medicine for Age Related Macular Degeneration (AMD)

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Most people will agree that prevention in medicine, as in anything else, is better and less expensive than the cure - but what does prevention mean in the context of AMD?

AMD is a disease that arises due to complex interactions between genetics, epigenetics, aging, and environmental factors. AMD is responsible for the majority of cases of blindness in industrialized nations and is currently the 3rd leading cause of blindness globally. Large epidemiological studies have investigated the risk factors associated with AMD and its progression. While some risk factors have been debated over the years, several factors have been undoubtedly validated. **Advanced age** is the most important risk factor in this disease, but it is obviously an un-manageable risk factor. **Cigarette smoking** constitutes a major preventable risk factor. Smoking tobacco increases the risk of AMD by 2-3 times that of someone who has never smoked, and may be the most important modifiable factor in its prevention. Every patient should be advised to discontinue smoking.

Another modifiable factor for individuals with the early or intermediate stages of this disease is **body mass index (BMI)**. Overall and abdominal obesity double the risk for progression to advanced AMD. **Genetic associations** have been found to play a role in the development of AMD, in the risk of progression to severe vision loss, and in the response to therapy. The recent outburst in genetic and genomic studies has dramatically enhanced our understanding of some of the pathogenetic and pharmacogenetic mechanisms involved in AMD.

The Age related Eye Disease (AREDS) study was a large randomized trial that investigated the effect of **oral supplements of antioxidants and minerals** on the progression of AMD and vision loss. AREDS 1 concluded that the intake of both antioxidant and zinc supplements in a high-risk subgroup of patients resulted in a 25% decrease in the risk of developing advanced AMD and a 19% decrease in the risk of at least moderate vision loss. AREDS 2 concluded that the addition of lutein+zeaxanthin or long chain polyunsaturated fatty acids did not further lower the chances of progression to advanced AMD.

Personalized preventive medicine approach is the modern approach to prevent loss of vision from AMD. Predictive algorithms have been formulated which employ elements including demographic (age), environmental (smoking, body mass index), ocular (macular drusen size), genetic (single nucleotide polymorphisms (SNP's) in high-risk genes such as CFH, ARMS2/HTRA1, C3, C2, and CFB), family history of AMD, and the presence of advanced AMD in one eye. The newest evidence suggests that the selection of appropriate eye vitamin therapies for a patient should be based on their combined genotype at the CFH and ARMS2 loci. A pharmacogenetic analysis of AREDS concluded that **49%** of patients with moderate disease in at least one eye would derive greater benefit from a treatment regimen **other than** the AREDS formulation, e.g. antioxidants without zinc.

Ocular Vitamin Pharmacogenetic Calculator please see our website: (http://www.louisvilleeye.org/clin_schaal) is used by our retina specialists to formulate a specific timetable for follow up, and to decide upon the appropriate therapy to minimize the chance to progressive vision loss.

To schedule an appointment at the Kentucky Lions Eye Center, please call 502-852-5466.

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Eye Specialists of Louisville/University of Louisville Ophthalmology has been a center of excellence for clinical eye care, treating a broad range of eye disorders from pediatric eye diseases to age-related macular degeneration. As the largest multi-specialty team of ophthalmologists in Louisville, we are at the forefront of leading-edge treatments and research in subspecialties including Retina, Uveitis, Glaucoma, Oculoplastics, Pediatrics, Cornea, Neuro-Ophthalmology and Low Vision.

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