



## Goals and Accomplishments

Congress established the National Eye Institute (NEI) in 1968 to protect and prolong the vision of the American people.

NEI leads the federal government's efforts to eliminate vision loss and improve quality of life through vision research...driving innovation, fostering collaboration, expanding the vision workforce, and educating the public and key stakeholders. NEI supports basic and clinical science programs to develop sight-saving treatments and to broaden opportunities for people with vision impairment of all ages. NEI-supported research has also advanced our knowledge of how the visual system—from the eyes to the brain—works in health and disease.

NEI supports vision research through approximately 2,100 research grants and training awards made to scientists at more than 150 medical centers, universities, and other institutions across the country and around the world. NEI also conducts laboratory and patient-oriented research at its own facilities on the National Institutes of Health (NIH) campus in Bethesda, Maryland.

Because of continued Congressional and public support, our national investment in vision research has led to major advances in the prevention and treatment of eye diseases and visual disorders, including the following:

### Preventing and reversing vision loss

**Diabetic retinopathy.** NEI-funded research has established treatments for this potentially blinding diabetic eye disease. For example, NEI-supported clinical trials showed that laser eye surgery, intensive blood sugar control, and lipid-lowering therapies can slow diabetes-related vision loss.

**Age-related macular degeneration (AMD).** NEI-supported clinical trials showed that for people with AMD, taking supplements with high levels of antioxidants and zinc can reduce the risk of vision loss from advanced AMD.

**Glaucoma.** NEI has supported research on effective drugs that reduce elevated eye pressure, a significant risk factor for this blinding disease.

**Amblyopia.** NEI-funded trials have shown that this common childhood condition, in which one eye is weaker than the other, can be treated by temporarily preventing use of the stronger eye with an eye patch or eye drops. These treatments strengthen the weaker eye by keeping it active and enhancing its connections to the brain.

**Corneal stromal keratitis.** NEI research discovered that an oral antiviral drug significantly decreases the recurrence of herpes of the eye and reduces the recurrence of corneal stromal keratitis, a severe form of the disease.

## Understanding and treating rare eye diseases

**Retinopathy of prematurity (ROP).** NEI-funded research led to a treatment called cryotherapy for this eye disease, which can affect premature infants. Cryotherapy involves briefly freezing the outer parts of the retina and can prevent blindness from ROP.

**Leber congenital amaurosis (LCA).** NEI-supported scientists have used gene therapy to partially restore vision to people with this blinding disease that begins in childhood. The gene responsible for LCA was isolated at NEI.

**Retinitis pigmentosa.** NEI-funded researchers have isolated genes and gene mutations at the root of retinitis pigmentosa (RP), a group of inherited diseases that affects more than 100,000 Americans. These researchers have moved on to develop gene therapy approaches that are showing promise for preventing RP-related vision loss.

**Uveitis.** Safe and effective drugs have been introduced against forms of this potentially blinding inflammation inside the eye.

## Developing new treatments and technology

**Anti-VEGF drugs.** NEI-funded research helped show that a protein called VEGF stimulates abnormal blood vessel growth that occurs in advanced stages of diabetic retinopathy and AMD. NEI has funded comparison trials of anti-VEGF drugs to provide doctors and patients with the information they need to choose the best treatment options.

**Noninvasive imaging.** With support from NEI, scientists have developed a technology called optical coherence tomography (OCT) to see tissues deep inside the eye, noninvasively and in real time. Doctors are using this OCT to look for early signs of disease and to monitor disease progression and treatment response.

**Laser treatments.** NEI has contributed to the development of medical lasers to treat the wet form of AMD, to diagnose and treat patients with glaucoma, and to correct myopia and other refractive errors.

## Spreading the word about eye health

Part of the NEI mission is to disseminate information to improve visual health. To meet this objective, NEI established the National Eye Health Education Program (NEHEP), which promotes the importance of early detection and timely treatment of eye disease, and the use of vision rehabilitation services. NEHEP partners with more than 60 professional, civic, and voluntary organizations and government agencies concerned with eye health. The program builds upon and extends NEI-supported research, by bringing evidence-based information to health professionals, patients, and the public.

# The Future

NEI continues to pioneer new advances in the prevention and treatment of vision loss:



**Artificial intelligence.** Scientists are leveraging computer technology to detect signs of disease earlier and more accurately. With NEI funding, researchers at the University of Iowa developed an artificial intelligence-based system to help primary-care providers screen patients for diabetic eye disease. A technician with minimal training can scan a patient's retinas and get results indicating whether they should be sent to an eye specialist for follow-up evaluation or return for another scan in 12 months..



**Regenerative medicine.** Many eye diseases irreversibly damage nerve cells in the retina, the tissue that detects light and sends signals to the brain. Often, this damage causes permanent vision loss or blindness. The NEI is coordinating the development of therapeutic approaches for regeneration of the retina and its connections to the brain.



**Stem cells.** Scientists at NEI are conducting a clinical trial of stem cell therapy for AMD. The trial is investigating whether replacing damaged tissues in the retina with cells derived from patients' own cells can prevent or restore lost vision.



**Gene therapy.** Researchers are continuing to develop gene-based treatments for a variety of inherited eye diseases. While some therapies to replace defective genes have moved into clinical trials, researchers are also exploring approaches in gene repair.



**Genetics of complex diseases.** The causes of glaucoma and AMD remain mysterious. Most cases are not inherited, but genetics does play a role. NEI-funded researchers have identified many genetic risk factors for AMD and glaucoma. Further study of these genes is helping to unravel disease biology and to guide discovery of new strategies for prevention and treatment.



National Eye Institute

For more information visit:  
[www.nei.nih.gov](http://www.nei.nih.gov)