



## Research to Prevent Blindness

# Advances in Eye Research: Diabetic Retinopathy

Diabetic retinopathy is one of the most common causes of vision loss in the U.S., affecting more than 7.6 million people. This condition is triggered by high blood sugar, which appears to damage first the cells in the retina, the light-sensitive layer of tissue at the back of the eye. In response to this damage, the body grows fragile new blood vessels within the retina, which can leak fluid and blood. The first clinically observable signs of the disease are the vascular (blood vessel) changes.

An estimated 25 million American children and adults have diabetes. Within 10 years of diagnosis, 75 percent have some degree of diabetic retinopathy.

Symptoms of diabetic retinopathy may include blurred vision, changes in central vision, floating spots and sudden vision loss. Blurred vision and changes in central vision are caused by swelling of the macula, the part of the retina that gives us sharp, central vision. This is called diabetic macular edema. Floating spots are droplets of blood from leaky blood vessels growing into the jelly-like center of the eye, known as the vitreous body. When these vessels bleed heavily and hemorrhage, vision may be blocked completely.

Diabetic retinopathy can also cause the retina to detach from the back of the eye, which sometimes looks like a billowy curtain and can cause permanent vision loss if not treated promptly.

A person with diabetic retinopathy might only notice symptoms after there is serious damage to the eye, but an eye doctor can detect vascular changes in the retina much sooner. Regular dilated eye exams by an eye care professional are extremely important to prevent vision loss.

### Keep in Mind



Diabetic retinopathy is a leading cause of blindness among working-age adults.



Controlling diabetes—by taking medications as prescribed, staying physically active, and maintaining a healthy diet—can prevent or delay vision loss.



Because diabetic retinopathy often goes unnoticed until vision loss occurs, people with diabetes should get a comprehensive dilated eye exam at least once a year.

Source: National Eye Institute



#### NORMAL VISION

**A majority of people with diabetes eventually develop retinopathy, but vision can be preserved in 90 percent of cases if treated early.**



#### DIABETIC RETINOPATHY

### Risk Factors

The most significant risk factor for diabetic retinopathy is having diabetes. Scientific studies funded by Research to Prevent Blindness (RPB) have helped to uncover additional risk factors that may speed the development of diabetic retinopathy:

- Preliminary evidence indicates smoking may accelerate the progression of diabetic retinopathy. If you stop smoking, you may reduce your risk.
- High blood pressure increases the risk of vision loss from diabetic retinopathy. Work with your doctor to ensure your blood pressure is at a healthy level.
- If you have kidney damage from diabetes, you may also be at a higher risk for diabetic retinopathy.

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## Prevention and Treatment

Prevention of diabetic retinopathy is the best way to save your vision. You can do this by maintaining tight control of your blood sugar levels—as close to normal as possible. The goal for people with diabetes is to have a hemoglobin A1c level of less than 7 percent.

For the past 40 years, the main treatment for proliferative diabetic retinopathy, in which the new blood vessels grow and leak, has been laser surgery known as panretinal photocoagulation. It involves burning holes in the retina with a laser, and this causes abnormal blood vessels to shrink.

Laser treatment can help preserve central vision, but may cause some loss of peripheral vision. It is most effective before the blood vessels have started to bleed.

## Hope Through Research

RPB's mission is to preserve and restore vision by supporting research to develop methods to prevent, treat and cure all conditions that damage and destroy sight. Scientists funded by RPB are investigating the causes of and treatment for diabetic retinopathy.

### Macular Degeneration Treatment Shows Promise

In a clinical trial, the drug ranibizumab (Lucentis), which is used to treat the wet form of macular degeneration as well as diabetic macular edema, was shown to be highly effective in treating the growth of abnormal blood vessels in proliferative diabetic retinopathy. This drug, which is injected into the eye, was as effective as traditional laser therapy in preserving vision. This finding demonstrates the first major advancement for proliferative diabetic retinopathy therapy in nearly 40 years.

### Targeting a Second Protein

Scientists have known for some time that a protein called vascular endothelial growth factor (VEGF) causes the growth of new blood vessels in diabetic retinopathy. Researchers recently identified a second protein that may also contribute to blood vessel growth. In early laboratory studies, researchers found that blocking both VEGF and the additional protein, called angiopoietin-like 4, reduced blood vessel growth even more. Future treatments that block both proteins may be even more effective.

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## Invest in Your Vision

You can join RPB in supporting critical research in the fight against vision loss by sending your tax-deductible donation to the address shown below or online at [www.rpbusa.org](http://www.rpbusa.org). RPB is a public 501(c)(3) foundation.



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Since 1960, RPB has led a research effort to preserve vision and restore sight, supporting nearly every major development in the treatment of blinding disorders.