Understanding Retinal Diseases

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Your retina is the light sensitive lining in the back of your eye. It contains millions of special nerve cells that react to light. These photoreceptors send electrical impulses to your optic nerve, which your brain converts into the images you see.

Most people never give their eyes – let alone their retinas – a second thought until something goes wrong. Yet, retinal diseases are the leading causes of blindness in adults in the United States.

At Cleveland Clinic’s Cole Eye Institute, our retina staff has the expertise to accurately diagnose and offer world-class treatment for retinal diseases, including age-related macular degeneration, diabetic retinopathy, retinal detachment as well as more uncommon conditions such as retinal inflammatory disease. Cole Eye Institute is among the world’s most advanced eye institutes, ranked by *U.S. News & World Report* as one of “America’s Best” ophthalmology programs, making it the top-ranked program in Ohio.

Seeking treatment as soon as possible is often critical when it comes to many retinal diseases. Don’t delay. In many cases, early diagnosis and treatment can help stop vision loss.
At Cleveland Clinic’s Cole Eye Institute, our retina staff is internationally recognized for its expertise in diagnosing and treating the full range of retinal disorders, including age-related macular degeneration, diabetic retinopathy and retinal detachments.

By choosing Cole Eye Institute, you can take comfort in knowing you have quick and easy access to our entire team of specialists and subspecialists should you require additional vision care.

As a patient, you will not only benefit from our clinical experience. You also have the advantage of an active research team, which bridges the gap between laboratory research and patient care and offers access to the latest clinical trials – should you qualify. These research studies not only provide treatments not otherwise available, but they also help us expand our overall understanding of eye diseases.

Last year, patients traveled from an estimated 37 states and 34 countries to receive care at Cole Eye Institute.
New surgical procedures developed by our team are now used worldwide for people suffering from diseases such as retinal detachment, diabetic macular edema, diabetic traction detachments, macular holes and retinopathy of prematurity. Team members also have helped develop the next generation of medications, laser treatment, imaging and vitreoretinal surgical devices.

Diagnostic Technology

Thorough evaluation and accurate diagnosis is critical to receiving the most appropriate treatment. At the Cole Eye Institute, we offer the most state-of-the-art imaging technology available, including:

- **Spectral Domain Optical Coherence Tomography (OCT)** – This latest generation of imaging technology (15 times more sensitive than conventional ultrasound) provides high-resolution information regarding retinal and ophthalmic tissue anatomy, facilitating diagnosis and guiding management.

- **Fluorescein Angiography (FA)** – A technique for examining the retina’s circulation using a dye tracing method.

- **Indocyanine Green (ICG) Angiography** – A special dye test used to evaluate the circulation of the choroid, the layer just behind the retina.

- **Ultra Widefield Fundus Photography and Angiography** – A special imaging technique that allows for visualization of the far retinal periphery, assisting in diagnosis and management.

- **Intraoperative OCT** – Integrating OCT technology in the operating room that allows for high-resolution anatomic visualization of tissues during surgical procedure and image-guided surgical interventions.
Common retinal diseases treated by Cleveland Clinic’s Cole Eye Institute include:

**Age-related Macular Degeneration** – In the United States, age-related macular degeneration (AMD) is the No. 1 cause of legal blindness in adults. One of several types of macular degeneration, AMD occurs when the small central portion of the retina (the macula) breaks down and obstructs the eye’s ability to distinguish fine details.

Most patients have the “dry” form, in which yellow deposits (drusen) are present in the macula. Drusen may be asymptomatic or their accumulation may cause dimming or distortion. In advanced stages, tissue death can cause blind spots and central vision loss.

About 10 percent of AMD patients develop the “wet” form, in which abnormal blood vessels grow from the choroid and under the retina. The vessels leak blood and fluid into the retina, distorting vision (making straight lines look wavy), and creating blind spots and central vision loss.

There is no cure for AMD, but early detection and treatment can delay or reduce its severity. Cole Eye Institute’s retina staff works with patients and their families to determine the best treatment option. Several options are available, including:

**Anti-vascular endothelial growth factor drugs** – Currently used as first-line therapy for wet AMD, the results of recent clinical trials of local injections of ranibizumab (Lucentis®), aflibercept (Eylea®), and bevacizumab (Avastin®) for active wet AMD showed visual stability in approximately 95 percent of patients and visual gain in approximately 35 percent of patients.

**Vitamins** – A combination of vitamins C, E, beta carotene, zinc and copper have been shown to decrease the risk of vision loss in patients with intermediate to advanced dry AMD.

**Laser therapy** — High-energy light is occasionally used for select subtypes of wet AMD to destroy active growing abnormal blood vessels.

**Photodynamic laser therapy** – This treatment involves the injection of a light-sensitive drug into the bloodstream. After being absorbed by the abnormal blood vessels, the drug is activated with a cold laser, which destroys the unwanted blood vessels in select cases of wet AMD.

Cole Eye Institute also offers the latest clinical trials for AMD – both for newly diagnosed patients and those who have been told there is no hope.
**Diabetic Retinopathy** – Diabetic retinopathy is an eye condition that affects people with diabetes. It occurs as a result of high blood glucose, or sugar, that people with diabetes often have over a prolonged period of time. Too much blood glucose can damage the blood vessels in the back of the eye, preventing the retina from receiving the proper amount of nutrients it needs to maintain vision. In most cases, patients do not notice a significant change in their vision until late in the disease.

Diabetic retinopathy occurs when diabetes damages the tiny blood vessels in the retina. In the early stages of the disease, (called non-proliferative retinopathy), these blood vessels may leak fluid resulting in edema. In the more advanced stage, (called proliferative), fragile new blood vessels grow around the retina and in the vitreous humor (a clear substance that fills the eye). If left untreated, these blood vessels may bleed and cloud vision, or may scar and detach the retina.

Cole Eye Institute retina staff plays a leading role in managing the visual complications of diabetes through their expertise in the field, and providing access to the most promising therapies and researching tomorrow’s treatments. Patients benefit from both our imaging technology expertise and our experience in developing a comprehensive treatment to optimize visual outcomes.
Treatment for diabetic retinopathy may include:

- **Regular monitoring** of the retina with dilated fundus exams and cutting-edge imaging technologies (such as optical coherence tomography).

- **Medications** – Now becoming the first line treatment for many types of diabetic eye disease, these medications include anti-vascular endothelial growth factor inhibitors (such as ranibizumab, bevacizumab) and steroids (such as triamcinolone). Studies show that stability and improvement in visual acuity appears to be more significant with these therapies.

- **Laser surgery** – In many cases, laser surgery is utilized to reduce the risk of future vision loss. A procedure called laser photocoagulation can be performed to seal or destroy growing or leaking blood vessels in the retina. Although the procedure is not painful, laser surgery may lower a person’s night vision and ability to see color. The Cole Eye Institute utilizes PASCAL lasers in many cases. These lasers decrease patient treatment time and increase patient comfort.

- **Vitrectomy** – In some people with diabetic retinopathy, the blood that leaks from blood vessels in the retina also may leak into the vitreous humor, clouding vision. These vessels also may cause scar tissue or retinal detachment. A surgical procedure called a vitrectomy can be used to remove the blood or repair a retinal detachment. At the Cole Eye Institute, we perform sutureless small-gauge surgery that increases patient comfort and speeds recovery.

- **Be sure to receive close follow-ups from your primary care physician and/or endocrinologist** to optimize systemic control of blood sugar, and if elevated or abnormal, blood pressure and blood lipids.

If diabetic retinopathy is diagnosed in time, almost 90 percent of people with late-stage, or proliferative retinopathy, can be saved from blindness.

Our retina staff also collaborates, as needed, with endocrinologists in the Diabetes Center at Cleveland Clinic’s Endocrinology and Metabolism Institute, which is continually recognized in the Top 10 nationwide by *U.S. News & World Report* and top-ranked in Ohio.
**Retinal Detachment**

Retinal detachment is a very serious condition that occurs when the retina pulls away from its supporting tissues. Since the retina cannot work properly under these conditions, permanent vision loss might occur if a detachment is not repaired quickly.

Nearsightedness, previous trauma, family history of retinal detachment, and previous eye surgery increase risk for retinal detachment, but retinal detachment also may be spontaneous.

There are a number of approaches to treating a detached retina. These include:

**Laser (thermal) or freezing (cryopexy)** – Both of these approaches can repair a retinal tear if it is diagnosed early enough.

**Pneumatic retinopexy** – This procedure can be used to repair select retinal detachments that are amenable to this procedure based on the features of the detachment. Cryopexy is first used to seal the tear. A small gas bubble is injected into the vitreous where it then rises and presses against the retina, closing the tear.

**Scleral buckle** – This procedure involves placing a silicone band (buckle) around the eye to hold the retina in place. This band is not visible and remains permanently attached. Cryo treatment closes the tear. A gas bubble is often used to help reattach the retina. This procedure is effective as much as 95 percent of the time.

**Vitrectomy** – This procedure is used for large tears. During a vitrectomy, the vitreous is removed from the eye and replaced with a saline solution. A gas bubble and laser is typically used at the time of vitrectomy to facilitate repair. Its success rate is similar to that of the scleral buckle.
Macular Pucker

The macula normally lies flat against the inside back surface of the eye. Sometimes cells can grow on the inside of the retina contracting and pulling on the macula. Occasionally, an injury or medical condition creates strands of scar tissue inside the eye. These are called epiretinal membranes, and they can pull on the macula. When this pulling makes the macula wrinkle, it is also called macular pucker. In some eyes, this will have little effect on vision, but in others it can be significant leading to distorted vision.

Sometimes macular pucker is the result of an injury or a medical condition, such as diabetes, that affects the eye. Epiretinal membranes can sometimes form after eye surgery. The cause of most cases of macular pucker is not known.

Macular Hole

A macular hole occurs when the nerve cells of the macula become separated from each other and pull away from the back surface of the eye. Sometimes macular holes are the result of an injury or a medical condition that affects the eye. In most people, it seems to be a side effect of the changes that normally occur in the eye as we age.

Our experts work with patients to determine whether surgery, which is usually the recommended treatment, or watchful waiting is preferable.

In surgery to treat a macular hole, a surgeon first performs a vitrectomy (removal of the gel-like vitreous fluid from the eye) as well as removal of any small pieces of tissue near the macula. The fluid in the eye is exchanged with a sterile gas, which keeps pressure on the macular hole until it heals. Patients will need to maintain a face-down position for a short period of time to keep the gas bubble in place. The success of macular hole anatomic closure has reached 99 percent at Cole Eye Institute over the past few years. We use the latest small gauge surgical techniques to improve patient comfort and decrease surgical time. In the near future, medical therapy using a novel enzyme (such as ocriplasmin) will be available for treating select macular hole.

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Image-guided Surgical Interventions

At the Cole Eye Institute, our retinal experts utilize cutting-edge technology to optimize surgical care (such as for macular pucker and macular hole), including intraoperative optical coherence tomography. This allows the surgeon to visualize if the surgical objectives have been achieved before leaving the operating room.
Retinal Inflammatory Disease

Retinal inflammatory disease includes a wide variety of conditions that cause problems with vision. These conditions may be limited to the eye (such as inflammation caused by a virus, fungus), or may be part of a disease that affects multiple organ systems (such as autoimmune disorders). It may be rapidly progressive, making it difficult to treat. Retinal uveitis also may be caused by viruses including those related to shingles or herpes, bacteria (such as tuberculosis or syphilis), or parasites (such as toxoplasmosis).

Cole Eye Institute retina doctors work closely with patients to diagnose retinal inflammatory diseases. Treatments vary depending upon the cause of the inflammation and may include medications or surgery. Treatments are targeted at the particular diagnosis, such as antibiotics for a bacterial infection or steroids for a primary inflammatory disorder. We have extensive experience in managing such retinal inflammatory diseases to minimize their impact on quality of life and to manage relapses. Retina surgeons at Cole Eye Institute also have extensive experience in the use of long-acting implants (steroidal) in the treatment of these conditions, such as the Retisert® and Ozurdex® implants.

More than 1,500 retinal surgeries performed annually
Pediatric Retinal Diseases

Retinal diseases affect children of all ages. In premature babies, a number of factors, including exposure to oxygen and low birth weight, lead to a process by which abnormal blood vessels can lead to retinal detachment and blindness if not detected and treated properly. This disease is called retinopathy of prematurity (ROP). Fortunately, premature babies at risk for ROP in newborn nurseries are examined for its presence. Cole Eye Institute pediatric retina specialists are active in screening babies for this disorder. Laser treatment is effective in preventing retinal detachment and vision loss. Babies who do not respond may need additional vitreo-retinal surgery. In addition to diagnosing and treating patients with ROP, Cole Eye Institute physicians and researchers are investigating the underlying causes of this disease in the laboratory in order to improve outcomes.

Systemic diseases in children can often have retinal complications, including diabetes, sickle cell anemia, inflammatory disorders, neurodegenerative diseases, and a variety of inherited metabolic syndromes. Cole Eye Institute pediatric specialists are experienced in detecting retinal complications of these diseases, collaborating with pediatricians and other physicians, and providing therapy as needed.

Children are commonly involved in injuries that result in vitreous hemorrhage and/or retinal detachment. Members of Cole Eye Institute’s vitreoretinal team are able to operate on such children and reattach the retina, improving chances for visual recovery.
Retinal tumors, although rare, also can affect children. Retinoblastoma is the most common type in pediatric patients. Cole Eye Institute’s ocular oncology staff has extensive experience in the diagnosis and management of children with retinoblastoma and collaborates, when needed, with experts from Cleveland Clinic’s Taussig Cancer Institute.

Center for Genetic Eye Diseases

Genetically determined retinal dystrophies and degenerations are one of the leading causes of congenital blindness in developed countries. They also can appear later in childhood and the teenage years. Some examples of these diseases include Leber congenital amaurosis, Stargardt disease and retinitis pigmentosa. Cole Eye Institute provides a specialized retinal dystrophy clinic with advanced diagnostics, genetic counseling, and genetic testing. Some of the patients examined at Cole Eye Institute have gone on to receive gene therapy for their disease.

Ophthalmic Imaging Center

Cutting-edge imaging technologies have transformed the clinical and surgical care for vitreoretinal diseases. Cole Eye Institute’s Ophthalmic Imaging Center houses leading research programs in novel imaging technologies, such as intraoperative optical coherence tomography. The Ophthalmic Imaging Center includes vitreoretinal specialists, engineers and researchers focusing on translating these technologies to patient care.

Making an appointment

Call 216.444.2020 or 800.223.2273 to make an appointment with any of our retina experts in Cleveland Clinic’s Cole Eye Institute. In many instances, same-day appointments for new patient and follow-up visits are available.
Our Physicians

Physicians who specialize in treating retinal diseases include:

<table>
<thead>
<tr>
<th>Name</th>
<th>Specialty</th>
<th>Location</th>
<th>Phone Number</th>
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<tbody>
<tr>
<td>Daniel F. Martin, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
<td></td>
</tr>
<tr>
<td>Ryan Deasy, MD</td>
<td>Adult and pediatric medical and surgical treatment of the retina.</td>
<td>Lorain, 440.988.4040</td>
<td></td>
</tr>
<tr>
<td>Justis Ehlers, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020; Mayfield Heights, 440.461.4733</td>
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<tr>
<td>Peter K. Kaiser, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
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<tr>
<td>Andrew P. Schachat, MD</td>
<td>Adult medical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
<td></td>
</tr>
<tr>
<td>Jonathan E. Sears, MD</td>
<td>Pediatric and adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
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<tr>
<td>Amy Babiuch, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Lorain, 440.988.4040</td>
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<tr>
<td>Rishi P. Singh, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020; Twinsburg, 330.888.4000</td>
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<tr>
<td>Sunil Srivastava, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Lorain, 440.988.4040</td>
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<tr>
<td>Elias I. Traboulsi, MD</td>
<td>Inherited retinal disease and pediatric retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
<td></td>
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<tr>
<td>Richard Wyszynski, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Lorain, 440.988.4040</td>
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<tr>
<td>Alex Yuan, MD</td>
<td>Adult medical and surgical treatment of the retina.</td>
<td>Cleveland Clinic Main Campus, 216.444.2020</td>
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About the Cole Eye Institute

Cleveland Clinic’s Cole Eye Institute is the top-ranked ophthalmology program in Ohio according to *U.S. News & World Report*, and one of the few dedicated, comprehensive eye institutes in the world.

Our fully integrated model helps us provide patients with quick and easy access to specialty and subspecialty care for a wide spectrum of eye conditions – from the routine to the complex.

All care at Cole Eye Institute is provided in the most patient-friendly and effective way. Each year, our internationally recognized staff carries out more than 140,000 patient visits and performs more than 5,000 surgeries – volumes among the highest in the nation.

The Cole Eye Institute has a reputation for innovation and superior outcomes and its research team is dedicated to understanding eye diseases in hopes of finding tomorrow’s cures.

Cleveland Clinic Eye Care Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Phone</th>
</tr>
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</table>
| **Main Campus**  | 9500 Euclid Ave.  
Cleveland, OH 44195  
216.444.2020       |                      |
| **Beachwood**    | One Chagrin Highlands  
2000 Auburn Drive, Ste. 100  
Beachwood, OH 44122  
216.831.0120       |                      |
| **Independence** | 5001 Rockside Road  
Crown Center II  
Independence, OH 44131  
216.986.4000       |                      |
| **Lorain**       | Lakeland Eye Surgeons  
5570 Cooper Foster Park Road  
Lorain, OH 44053  
440.204.7400       |                      |
| **Mayfield Heights** | Hillcrest Hospital  
Atrium Medical Building  
6770 Mayfield Road, Suite 326  
Mayfield Heights, OH 44124  
440.461.4733       |                      |
| **Strongsville** | 16761 SouthPark Center  
Strongsville, OH 44136  
440.878.2500       |                      |
| **Twinsburg**    | 2365 Edison Blvd.  
Twinsburg, OH 44087  
330.963.4843       |                      |
Directions To The Cleveland Clinic Cole Eye Institute

- Parking is available in a lot behind the building, located at the corner of E. 105 Street and Euclid Avenue. Valet parking is also offered.
- Enter the Cole Eye Institute and check in at main desk on the second floor.