

Science of **DME**

www.scienceofdme.org



LEARN, TRACK, SHARE A Patient Guide to **Diabetic Macular Edema**



This brochure will guide you,
as a person with diabetes, in
understanding Diabetic
Macular Edema and how it
may affect your everyday life.



The **Angiogenesis**
Foundation



INTRODUCTION: The Science of DME

Diabetic macular edema (DME) is a vision-threatening disease that can cause permanent vision loss. In 2010, it was estimated that 21 million people throughout the world have DME. With the growing prevalence of diabetes worldwide, this number is increasing.

Every person affected by DME can be empowered by understanding the practical steps they can take to fight vision loss.

Use this resource to learn:

- ▶ How diabetes can lead to severe and even permanent vision loss
- ▶ Why annual comprehensive eye exams are critical for anyone living with diabetes
- ▶ What you can do to prevent vision loss



Diabetes is the leading cause of new cases of blindness among adults aged 20–74 years.

OUR MISSION

Our mission at the Angiogenesis Foundation is to improve health globally and to empower patients to take an active role in fighting vision loss. We work with DME patients, their advocates, and healthcare providers around the world to disseminate knowledge about DME in order to preserve vision and improve patient outcomes.

TAKE ACTION

Take the necessary steps to understand DME

1. **LEARN** how DME develops
2. **TRACK** your diabetes and risk for DME with regular vision screenings
3. **DISCUSS** treatment options with your eye doctor
4. **KEEP UP** with treatment - saving your vision requires lifelong treatment, as with any chronic disease.
5. **SHARE** your knowledge about DME with your friends, family, and colleagues!

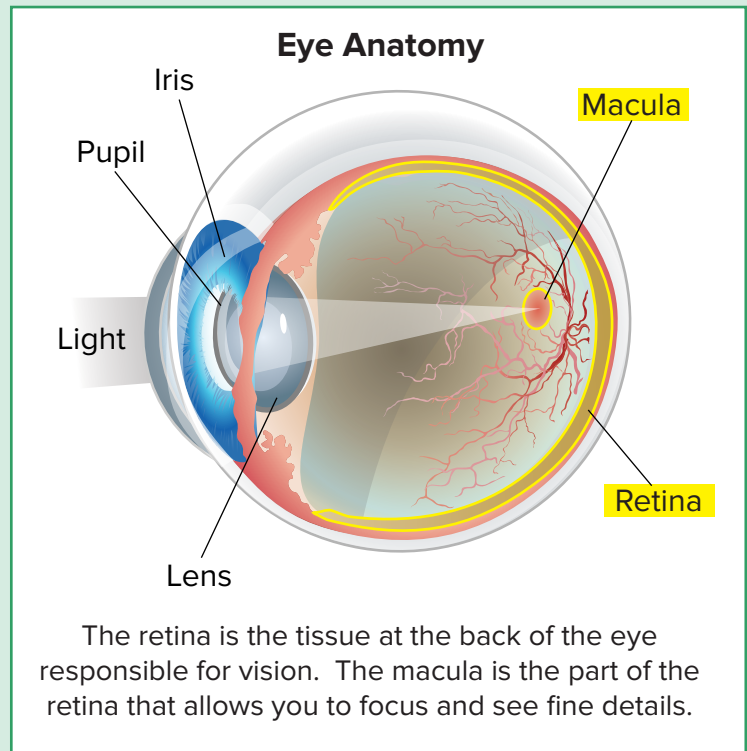


LEARN: The Science of DME

Diabetes, DR, and DME

Globally, the total number of people affected by diabetes was estimated to be 382 million in 2013. Diabetes is a chronic disease that needs consistent management. While there is currently no known cure, a number of treatments have been effective in maintaining patient quality of life.

DME develops from an eye condition called diabetic retinopathy (DR), which is a complication of type 1 and type 2 diabetes. Diabetic retinopathy is a disorder of the retina that occurs when retinal blood vessels are damaged. Over 20% of people living with type 1 diabetes and 14-25% of people with type 2 diabetes (depending on their use of insulin) will develop DME within ten years.

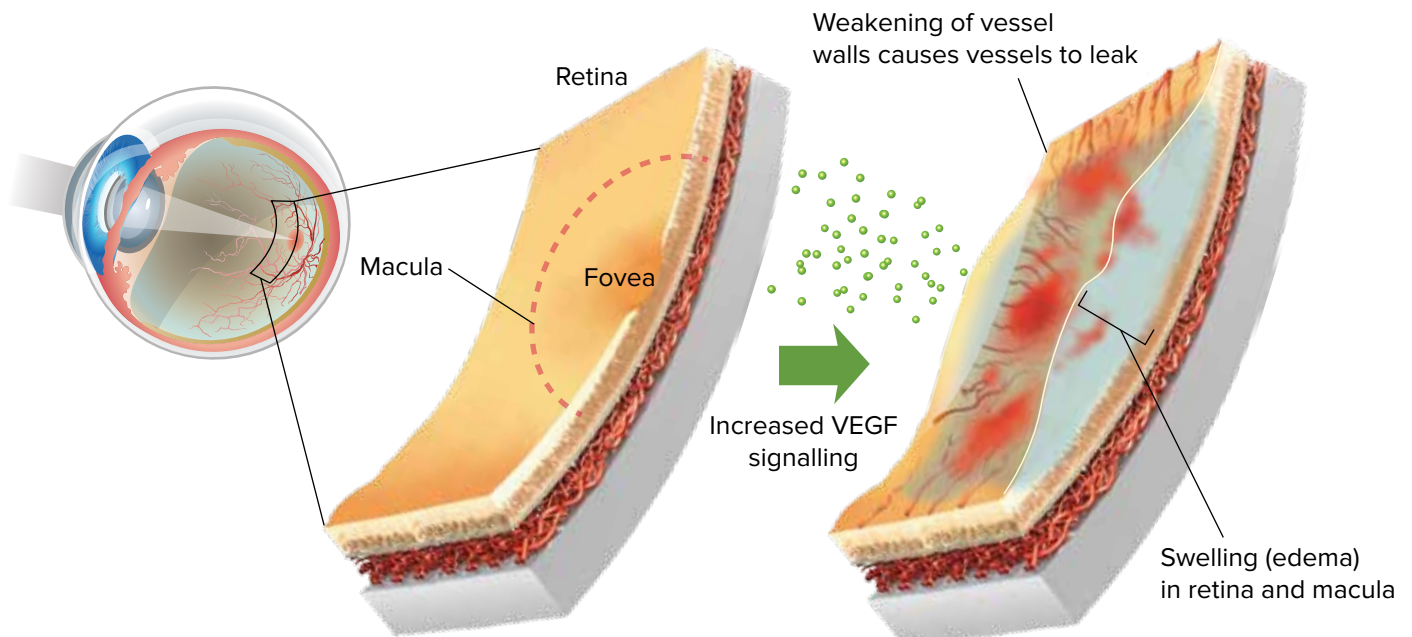


Development of DME

In people with diabetes, elevated blood glucose levels damage the blood vessels in the retina, starving it of essential oxygen and nutrients. This causes the tissue to release the large amounts of the protein VEGF (vascular endothelial growth factor). High levels of the VEGF protein weaken vessel walls and cause blood vessels to become leaky.

As the vessels leak fluid and blood into the retina and the macula, the macula swells and thickens; this is the condition known as **macular edema**.

The swelling of the macula reduces visual acuity, blurs sight, and ultimately causes severe vision loss.



DR and DME: RISK FACTORS

ARE YOU AT RISK FOR DR and DME?

A risk factor is anything that affects your chances of getting a disease.

Diabetic retinopathy and DME both develop as a complication of diabetes and have similar risk factors.

Duration of Diabetes	Everyone with type 1 or 2 of diabetes is at risk of getting diabetic retinopathy (DR). The longer you have lived with diabetes, the greater the chances of developing DR and DME.
Hyperglycemia	Chronic high levels in blood sugar increase the risk of developing DR and DME, and increase the rate of disease progression.
Dyslipidemia	Abnormal levels of blood lipids (cholesterol and triglycerides) in patients with diabetes increase the risk of developing DR and DME.
Hypertension	Elevated blood pressure increases the risk of developing DR and DME.
Other Diabetes Complications	Recent research suggests that the risk of developing DME is associated with the presence of other diabetes complications, such as diabetic neuropathy.
Other	Other risk factors include smoking, pregnancy, cardiovascular disease, kidney disease, anemia, sleep apnea, glitazone usage, obesity, genetics, frequent alcohol consumption, and sedentary lifestyle.



WHAT YOU CAN DO

There are steps that you can take to prevent or delay vision loss, and manage your condition and treatment:

- **Regular Screening:** Get a comprehensive dilated eye exam at least once a year. If you have diabetic retinopathy, you may need to have eye exams more often.
- **Control Blood Glucose:** Keep your blood glucose levels within normal ranges. Hyperglycemia initiates many other risk factors, so controlling blood glucose can prevent other diabetic complications and may slow down or even prevent the development of retinopathy.
- **Control Blood Pressure:** Studies have demonstrated that keeping your blood pressure within normal ranges reduces the risk of blood vessel complications by about 33%.
- **Control Blood Lipids:** Keeping your cholesterol levels within normal ranges reduces the risk of complications. High levels of total cholesterol or triglycerides can double or triple your risk of developing DME.

DR and DME: SYMPTOMS and TESTING

MONITORING

Diabetic retinopathy develops without early symptoms or causing pain. Macular edema can develop at any stage of diabetic retinopathy without affecting vision. It is important not to wait for symptoms.

SYMPTOMS

If retinal vessels bleed into the eye, you may experience temporary vision changes. However, if left untreated, bleeding may reoccur and damage vision permanently.

Go see an eye care professional at the first sign of any of these symptoms:

- ▶ Blurring of vision and difficulty seeing sharp details, up close and from a distance
- ▶ Colors look “washed out” or faded
- ▶ Blind or dark spots in vision
- ▶ Straight lines appear wavy or fractured in parts of the visual field
- ▶ Distortions of lines and object shapes, such as crooked doorframes

When to Get Tested

Type 1 Diabetes

Patients with type 1 diabetes aged ten years or older should have their first comprehensive dilated eye exam within 5 years of developing diabetes.

Type 2 Diabetes

Patients with type 2 diabetes should have their first comprehensive dilated eye exam as soon as their diabetes is diagnosed.

Both type 1 and 2 diabetes patients should continue to receive subsequent eye exams on an annual basis. Exams will be more frequent if retinopathy is progressing. Work with your ophthalmologist or optometrist to identify the best frequency of testing for you.

Normal Vision



Vision with DME



TESTING

For testing, find an ophthalmologist or optometrist who is experienced in diagnosing DME.

A comprehensive eye exam typically includes a dilated eye exam, visual acuity test and tonometry. These tests can detect early signs of DR or DME, such as:

- ▶ Retinal blood vessels that leak
- ▶ Damage or any change to the blood vessels
- ▶ Swelling or thickening of the retina



WARNING: Diabetic retinopathy & DME develop with NO symptoms! Up to 50% of diabetes patients do not get their eyes examined or are diagnosed when it is too late for treatment to be effective.

ANTI-VEGF THERAPY

ANTI-VEGF THERAPY

A major development in treating vision loss in people with DME has been the introduction of anti-VEGF drugs, which leverage recent advances in our understanding of the different mechanisms that cause DME. These drugs are designed to attack specific factors that contribute to DME development and are improving our ability to treat this condition.

Anti-VEGF agents target and block the glycoprotein VEGF (vascular endothelial growth factor). In DME, VEGF is produced at higher than normal amounts in the retina. Lowering levels of VEGF with anti-VEGF drugs reduces its effects on retinal blood vessels, prompting a reduction in macular edema.

Approved Anti-VEGF Therapy:

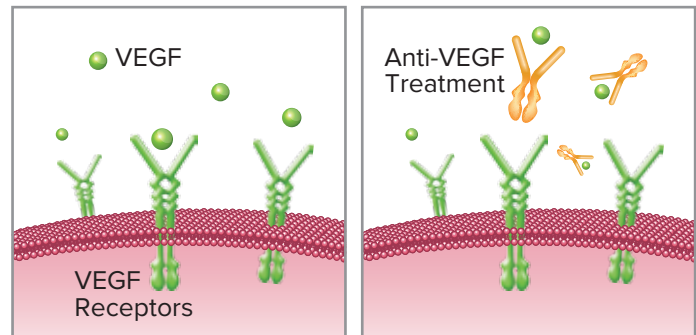
Lucentis (ranibizumab) is a type of anti-VEGF drug known as a monoclonal antibody fragment. It is injected directly into the eye and can stabilize or even improve vision in DME. Lucentis is FDA approved for the treatment of multiple eye diseases, including diabetic macular edema (DME), wet age-related macular edema (wet AMD), and macular edema following retinal vein occlusion (RVO).

Eylea (aflibercept) is a type of anti-VEGF drug known as a fusion protein. It is injected directly into the eye and can stabilize or even improve vision in DME. Aflibercept is FDA approved for the treatment of multiple eye diseases, including DME, wet AMD, and macular edema following central retinal vein occlusion (CRVO).

Learn more about these treatments and find detailed clinical trial information on our website: www.scienceofdme.org/treat



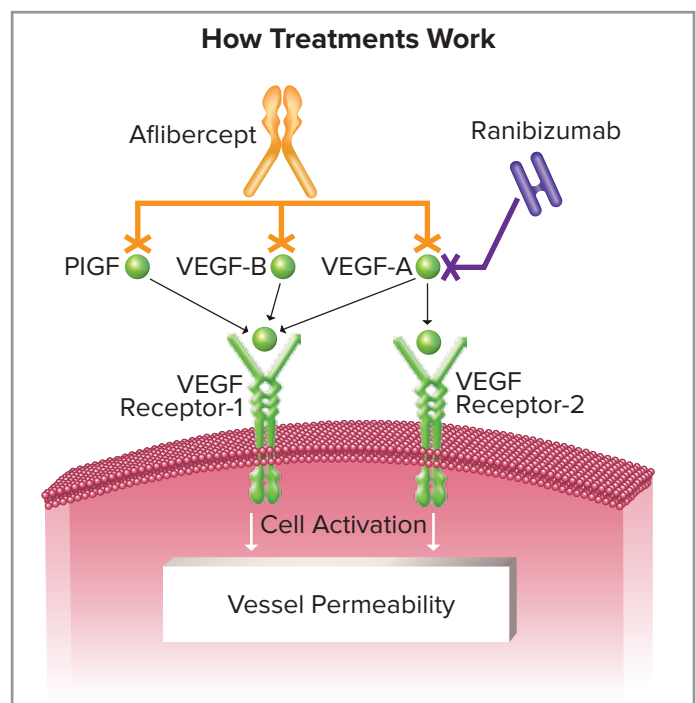
The advent of anti-VEGF therapy has revolutionized treatment of DME and offers patients new promise for maintaining a higher quality of life.



Anti-VEGF therapy can result in:

- 1) Reduced vascular permeability
- 2) Decreased thickening of the macula and retina
- 3) Improved visual acuity

Once VEGF is halted, its effects subside and blood vessels stop leaking, reducing DME. Repeat injections are necessary to maintain benefit.



Anti-VEGF therapy is the preferred treatment for DME with visual impairment and clinical trials have demonstrated that it is more effective in reducing DME and improving vision than corticosteroid therapy or laser photocoagulation without causing complications associated with the former treatments. However, response is not always uniform among patients and combination therapy may be appropriate for some patients.

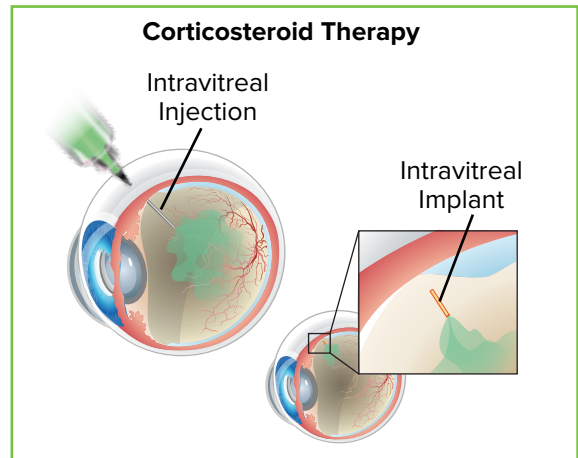
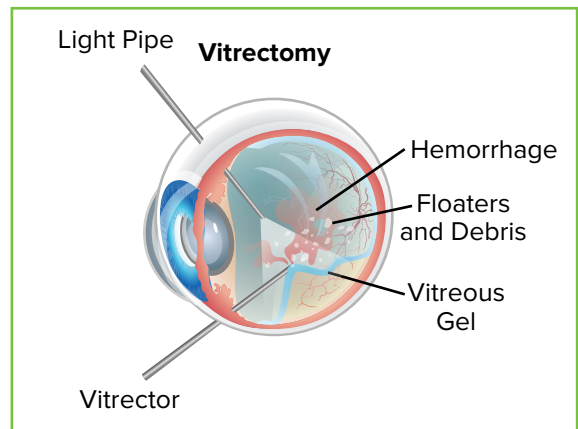
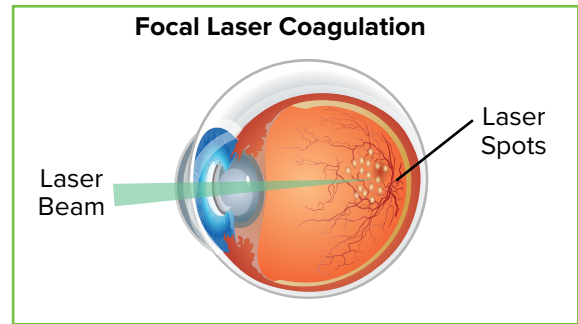
ADDITIONAL TREATMENTS

ADDITIONAL EXISTING TREATMENTS

Focal laser photocoagulation: This procedure has, until recently, been the standard treatment for DME. It stabilizes vision and can prevent vision loss caused by DME, but rarely improves visual acuity. Laser therapy has not been effective in most patients with diffuse DME. During laser photocoagulation, areas of leakage in the retina are exposed to small laser burns that decrease the quantity of fluid and slow down leakage. If you have DME in both eyes, laser therapy will be applied to one eye at a time, with procedures typically separated by several weeks. Laser therapy can cause discomfort during the procedure and potential damage or scarring to the retina.

Vitrectomy: If too much blood has leaked into the vitreous or the retina has detached from the eye, your doctor may recommend getting a vitrectomy. Vitrectomy is a procedure in which the vitreous is replaced with a salt solution, improving visual acuity and maintaining the anatomy of the eye. Vitrectomy has been successful with restoring sight in the short term by removing blood, but it is not as effective for re-attaching the retina.

Corticosteroids: This therapy works by targeting two of the different mechanisms that cause the disease: inflammation (swelling) and VEGF expression. Corticosteroids can be delivered by intravitreal injection or by sustained release implants. Implants may have the benefit of less frequent dosing than injections. Corticosteroid therapy has been found to have greater short-term benefit than laser treatment, in terms of visual acuity gain. However, their benefit declines after several months and ultimately becomes inferior to laser by the second and third year. Corticosteroid therapy may cause other eye complications such as cataracts or an increase in intraocular pressure, which is a major risk factor for glaucoma.



To learn more and get involved in our awareness program, visit our website: www.scienceofdme.org.



The Angiogenesis Foundation is the world's first nonprofit organization dedicated to conquering disease using a groundbreaking approach based on angiogenesis, the growth of new capillary blood vessels in the body. Angiogenesis is the “common denominator” in health, including conditions such as diabetic retinopathy and diabetic macular edema.

The Angiogenesis Foundation built this resource to provide accurate, easy to understand, and useful information about DME. We believe everyone affected by DME can be empowered with the practical steps they can take to fight vision loss.

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Website QR code

Acknowledgements

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