

Advances in Treating Macular Degeneration

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- Introduction
- How the eye works
- What is macular degeneration
- How is macular degeneration treated
- Questions



- Justin Kanoff, MD
- Medical and Surgical Retina Specialist at the Eye Care Center of Northern Colorado
- Education
 - University of Pennsylvania – BA
 - University of Texas Southwestern Medical School – MD
 - Harvard University – Internship, Residency, Chief Residency, Fellowship
- Lives in Longmont, CO



Eye Care Center of Northern Colorado

303-747-4748

www.eyecaresite.com

- Region's Leading Comprehensive Eye Care Group
- Diagnosis, Management, Medical and Surgical care of all eye care problems including:
 - Cataracts
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Advanced Vision Surgery Center

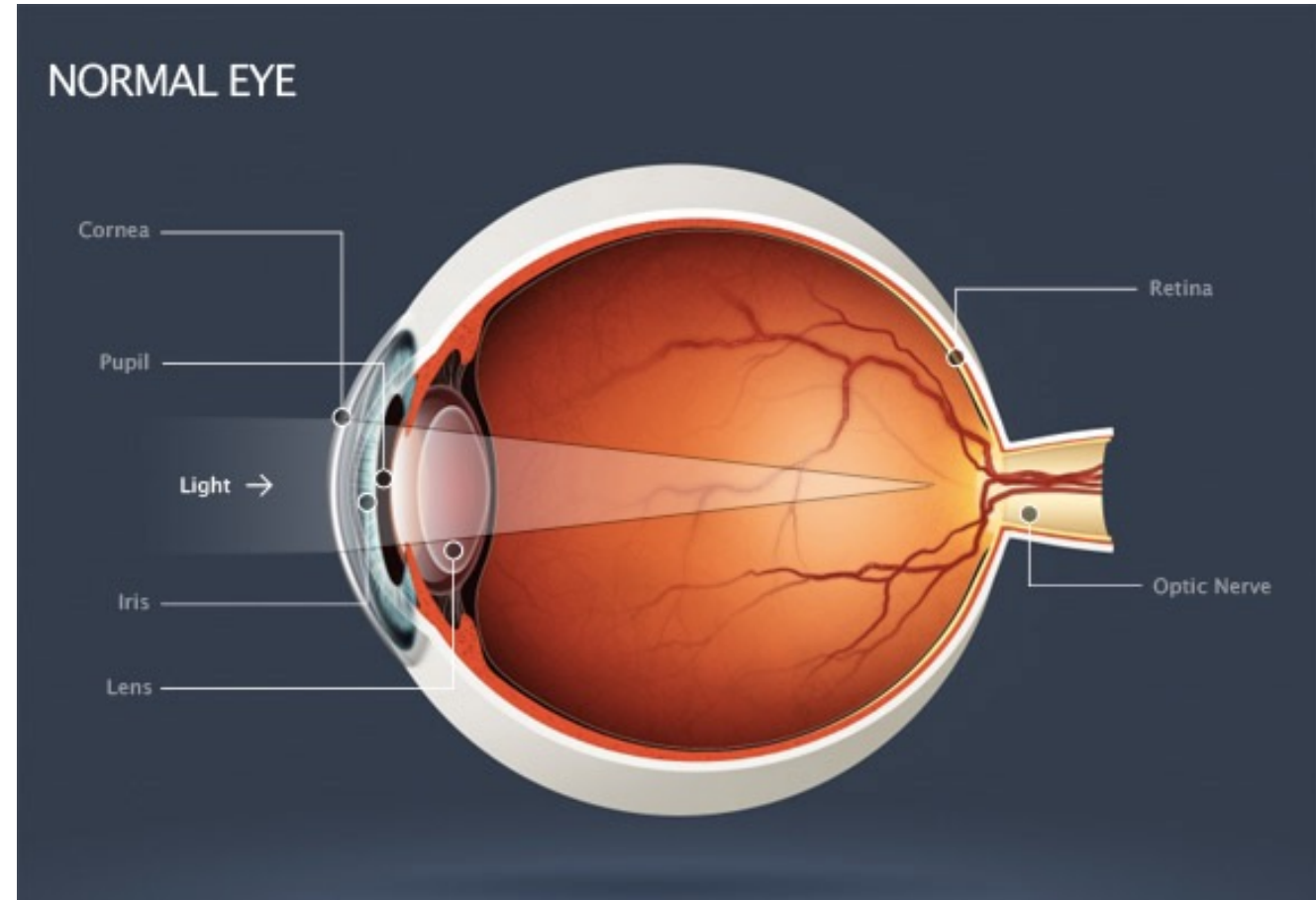


- Surgery center exclusively for eyes
- Two state of the art operating rooms and specially trained nurses and staff only for eyes



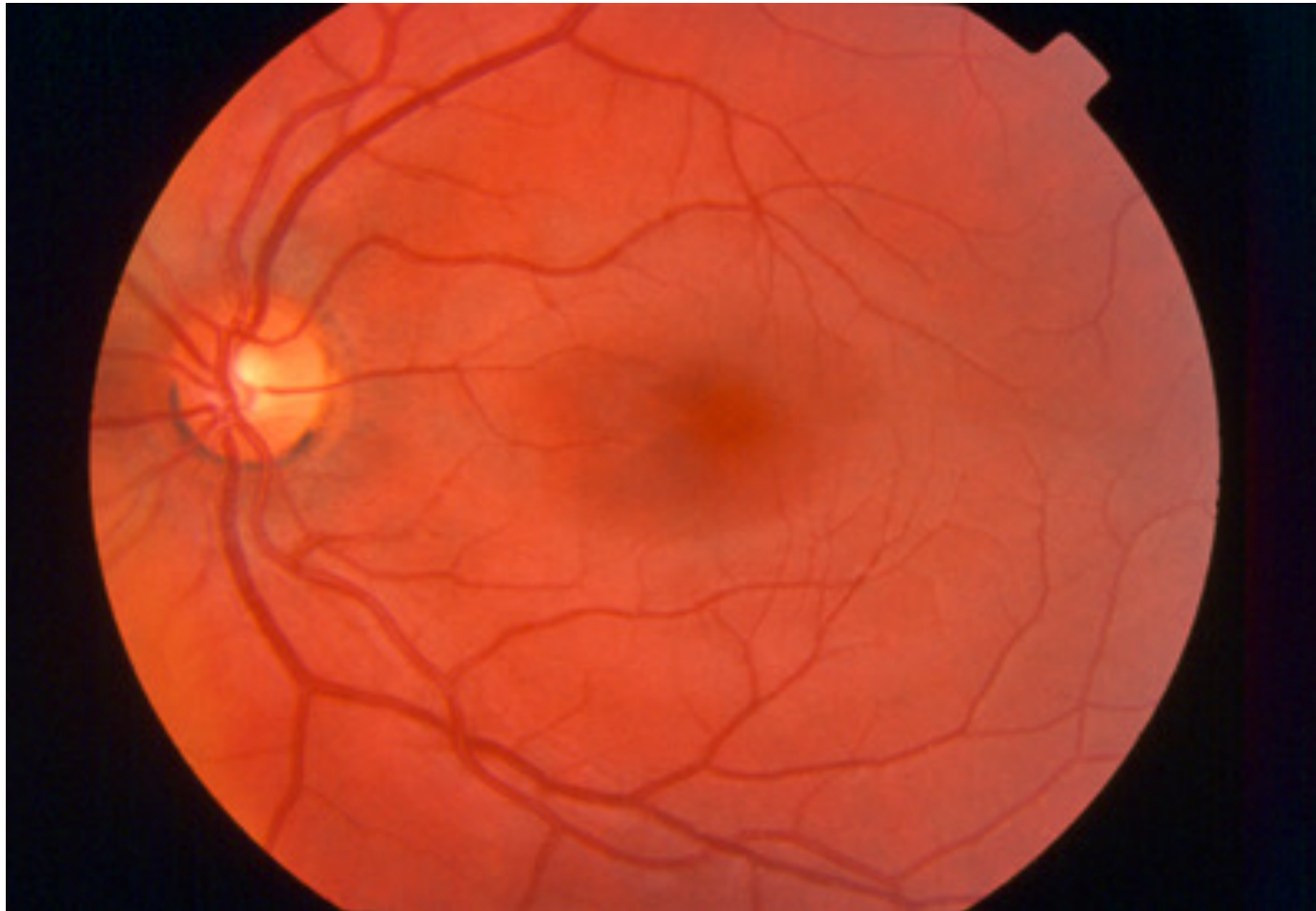
How the Eye Works

- Light enters the eye through the cornea, pupil and lens.
- The lens helps focus the light, and develops a CATARACT over time.
- Light is focused onto the retina, the light-sensitive tissue lining the back of the eye.



- Cornea is the clear window in the front of the eye that you look through.
- Lens is in the middle of the eye and focuses the light.
- Retina like film in a camera.
- Optic nerve carries information to the brain like a cable links a digital camera to a computer.





AGE RELATED MACULAR DEGENERATION

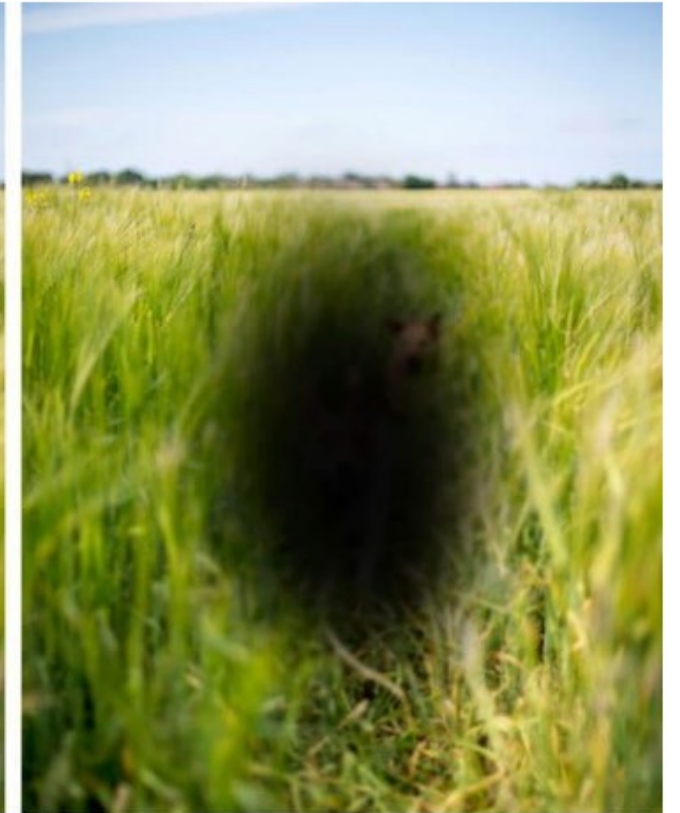
- A leading cause of severe vision loss in people over 65 years of age
- Not a part of the natural aging process
- Almost always in both eyes, but only one eye may have symptoms

- Prevalence

- Age 65 => 2.5%
- Age 70 => 6.7%
- Age 75 => 10.8%



NORMAL VISION



MACULAR DEGENERATION

- **Established Risk Factors**

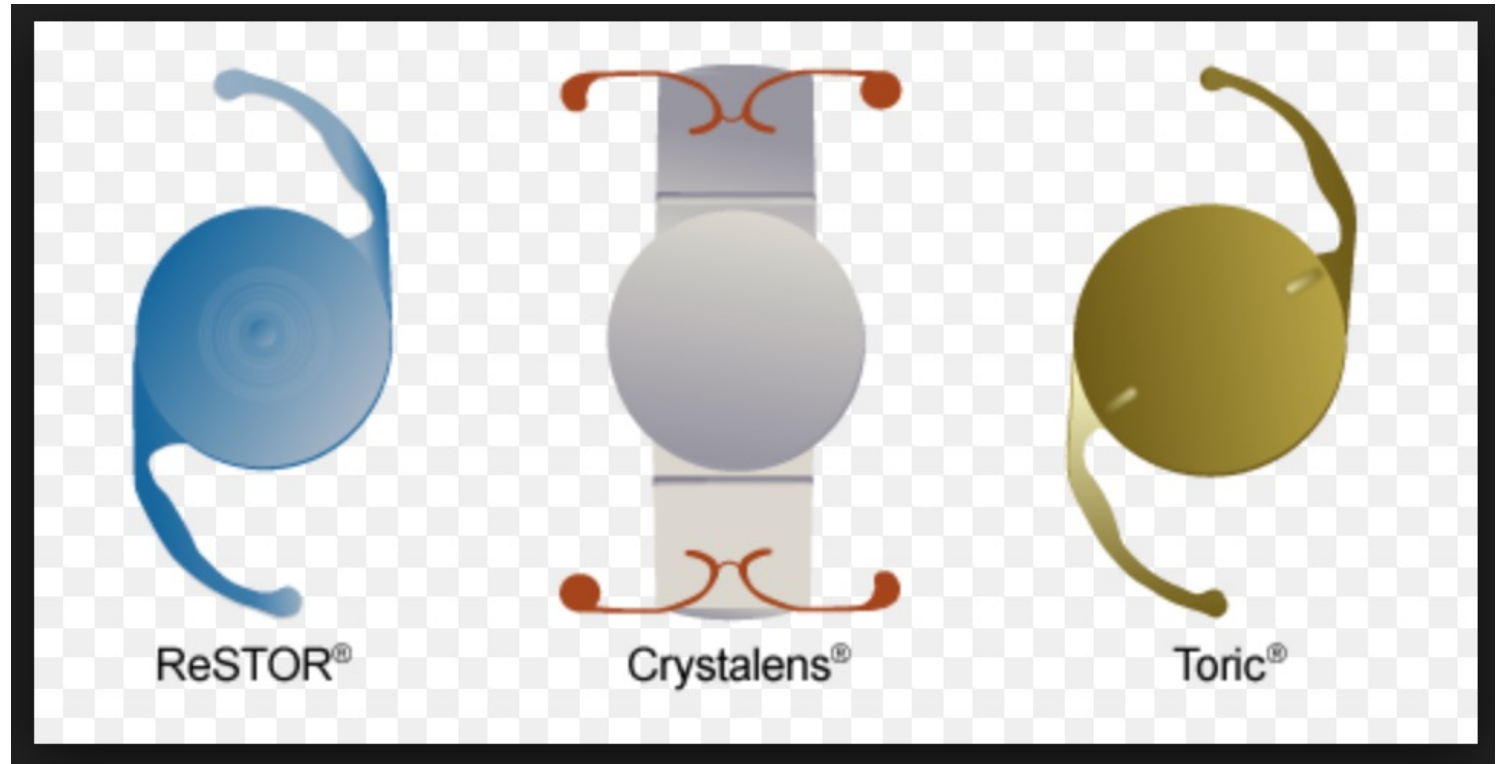
- Older age (> 60 years)
- Family history (3 fold higher)
- Cigarette smoking
- Low dietary intake or body concentrations of anti-oxidants, vitamins and zinc

- **Possible Risk Factors**

- Female sex
- Light-colored iris
- Cardiovascular disease
- Obesity, High Cholesterol and Lipids, Hypertension
- Sun exposure

AMD and Cataract Surgery

- Cataract surgery is not a risk factor.
- Cataract surgery is often beneficial for patients with macular degeneration.



AMD and Cataract Surgery

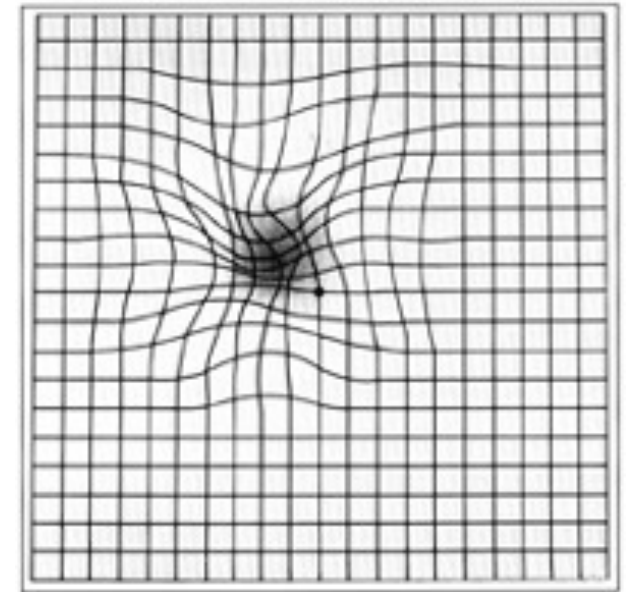
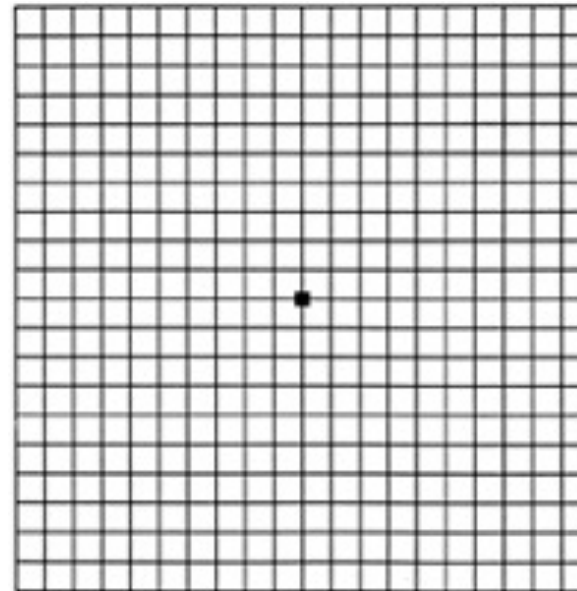
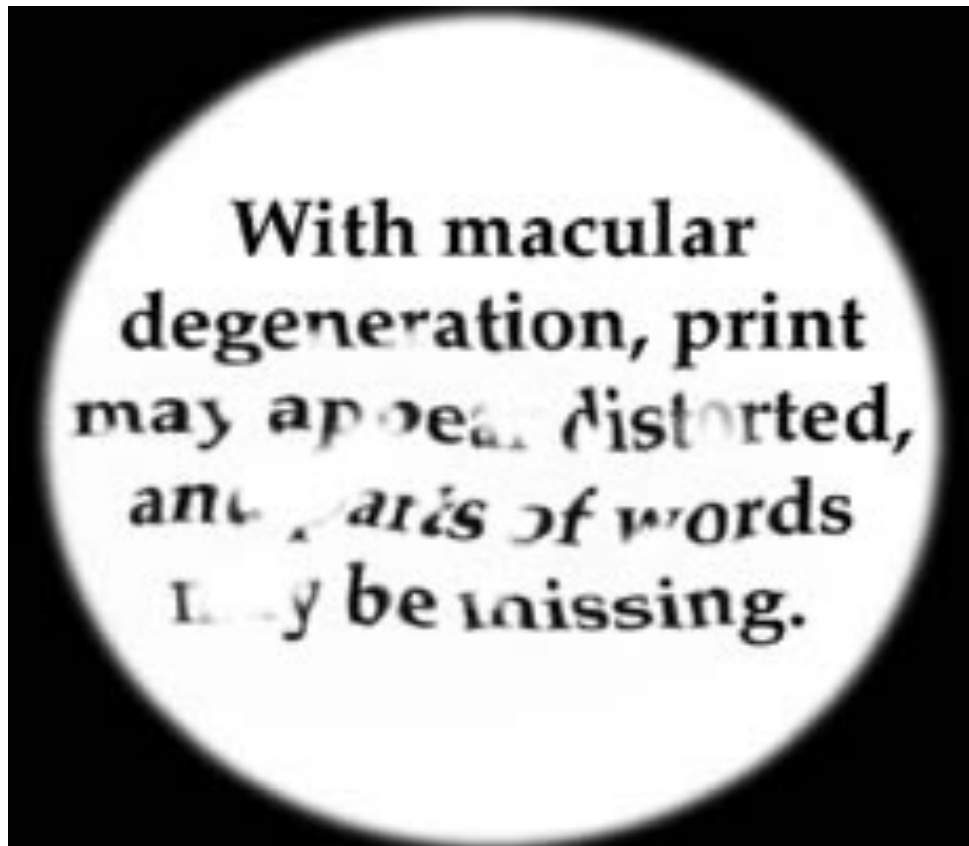
- Cataracts decrease contrast sensitivity.
- Macular degeneration decreases contrast sensitivity.
- Need to avoid “multifocal lenses”.



Difficulty in Recognizing Faces

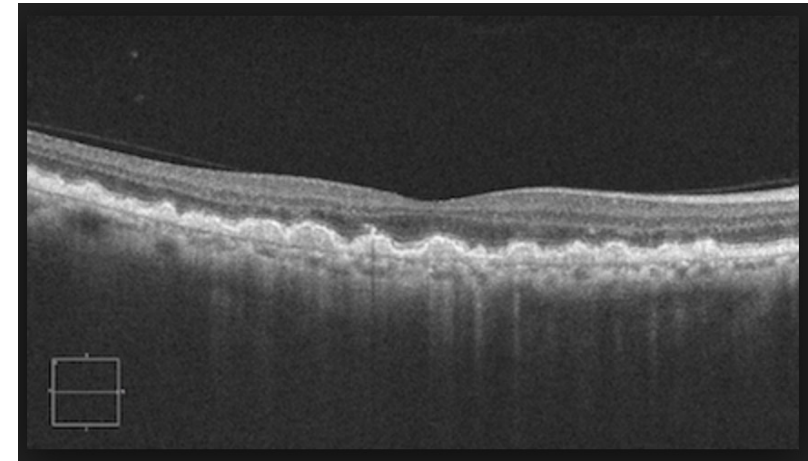


Distortions in Vision



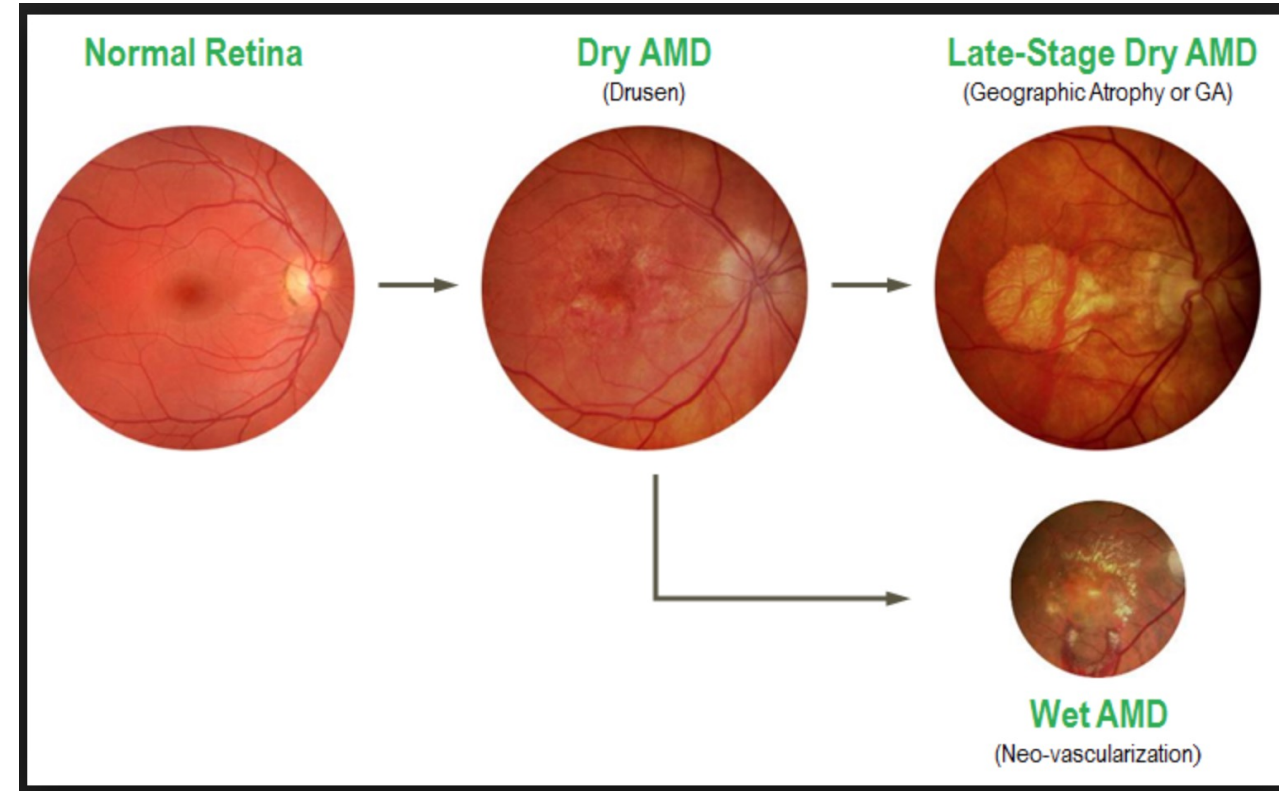
Office Testing

- Photos
- OCT
- Angiograms



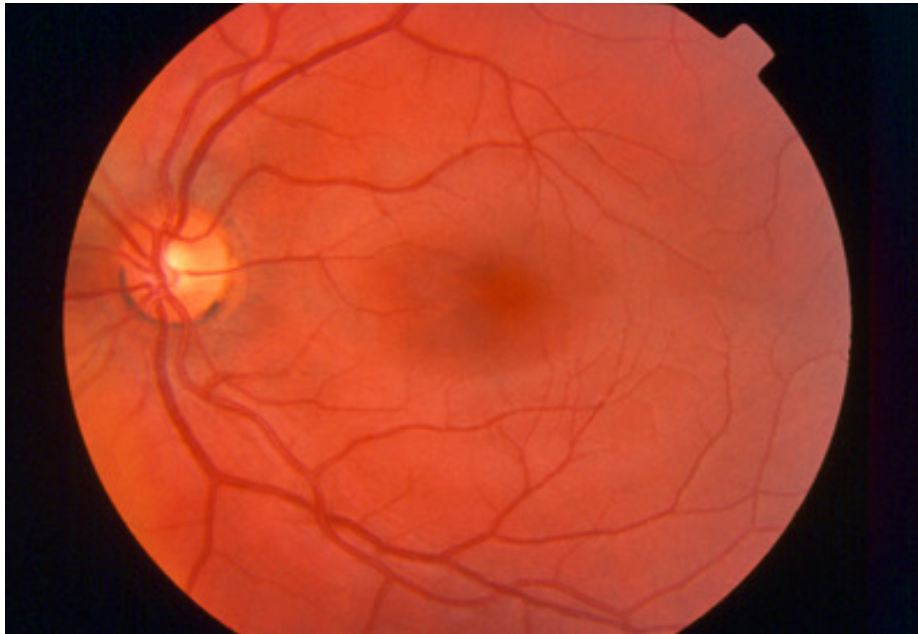
Types of AMD

- Dry (atrophic) Macular Degeneration
- Wet (exudative / neovascular) Macular Degeneration



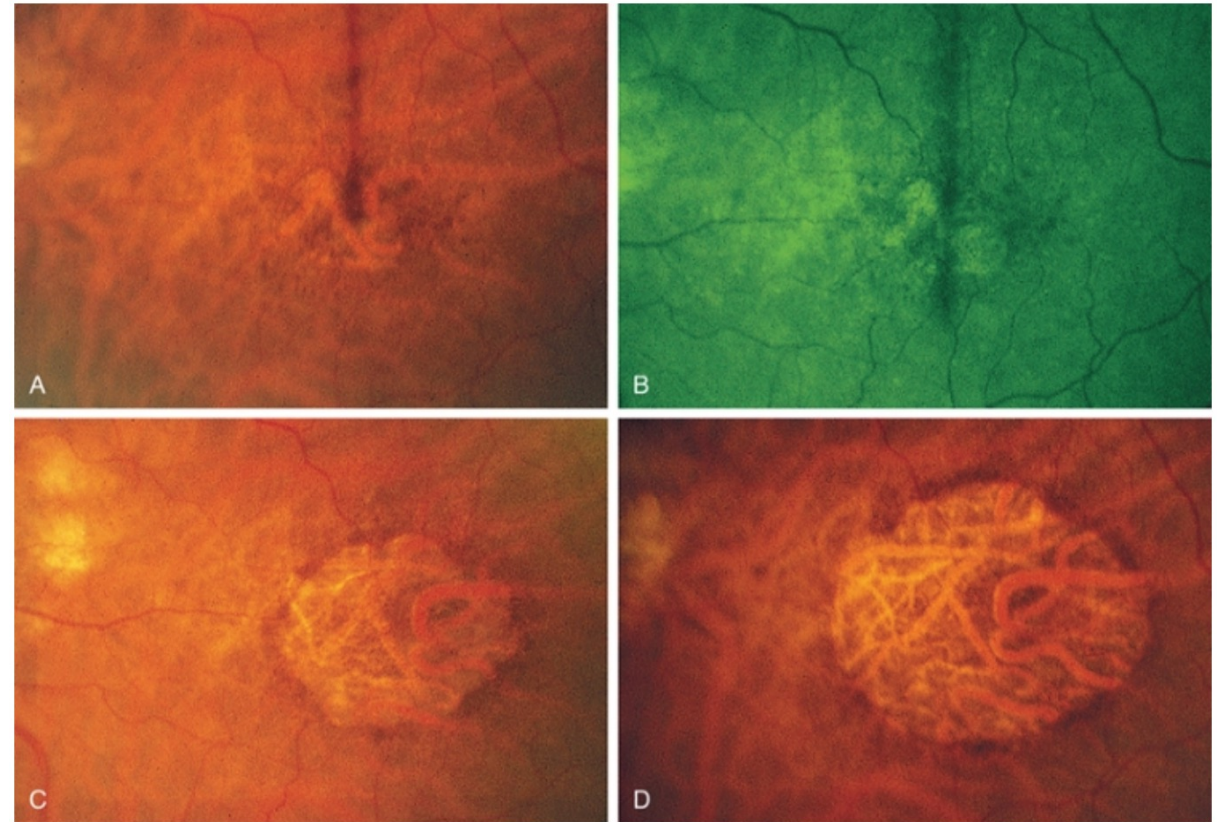
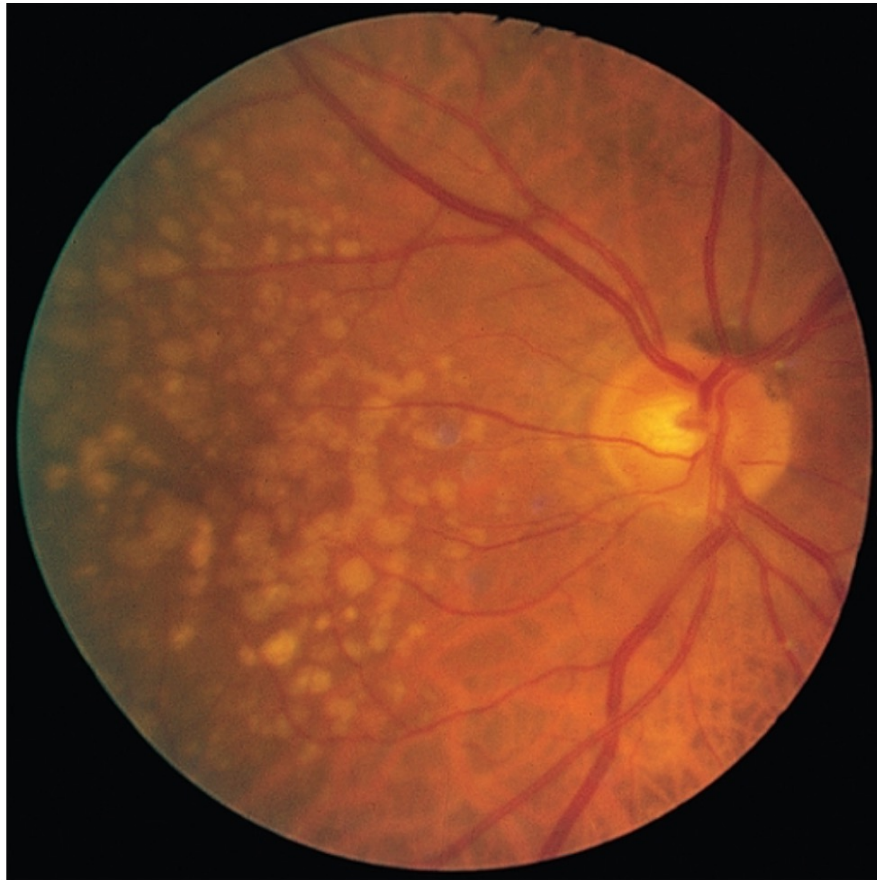
Dry Macular Degeneration

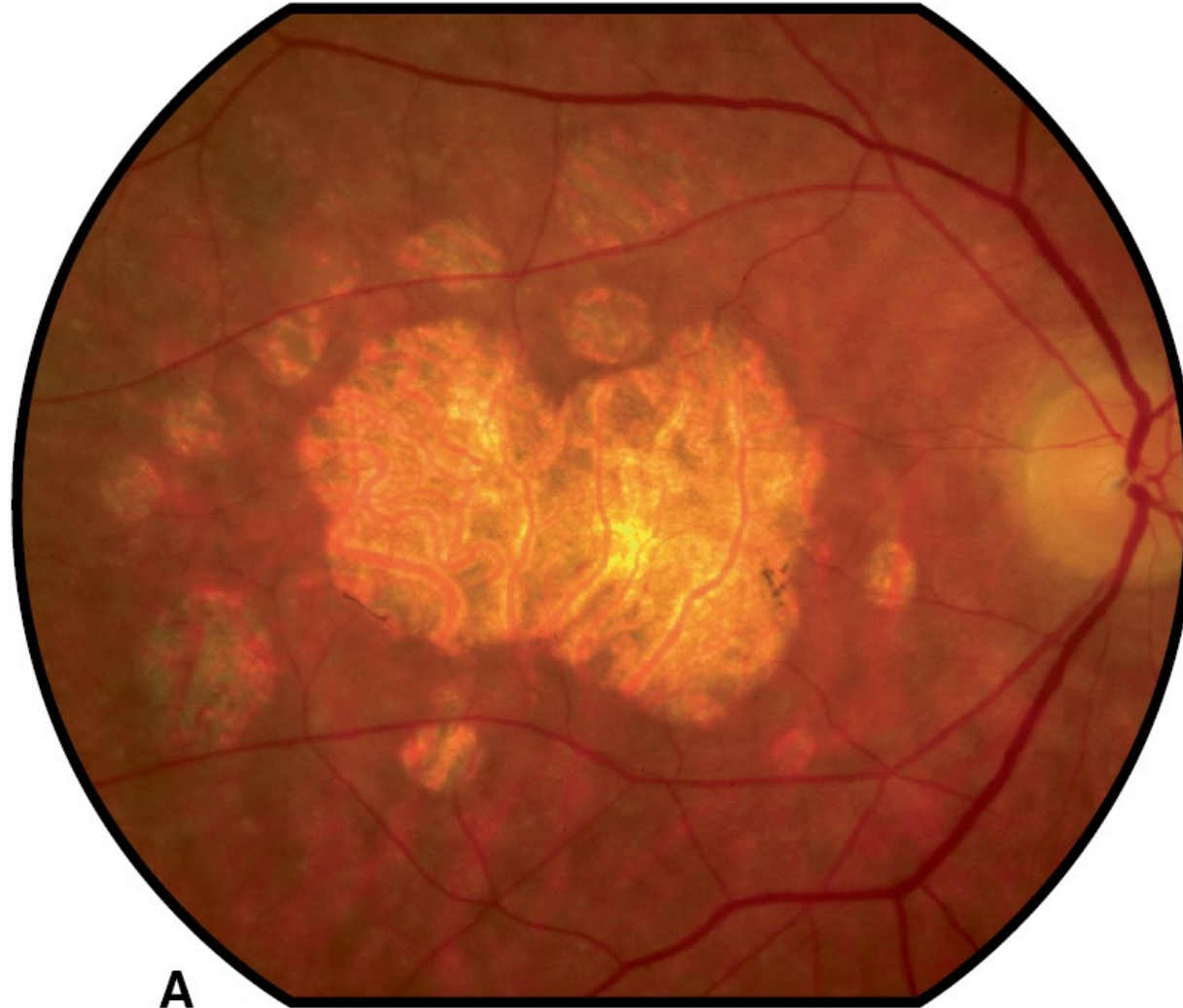
- Most common form
- Vision loss is gradual
- Thinning and atrophy of tissues



Dry Macular Degeneration

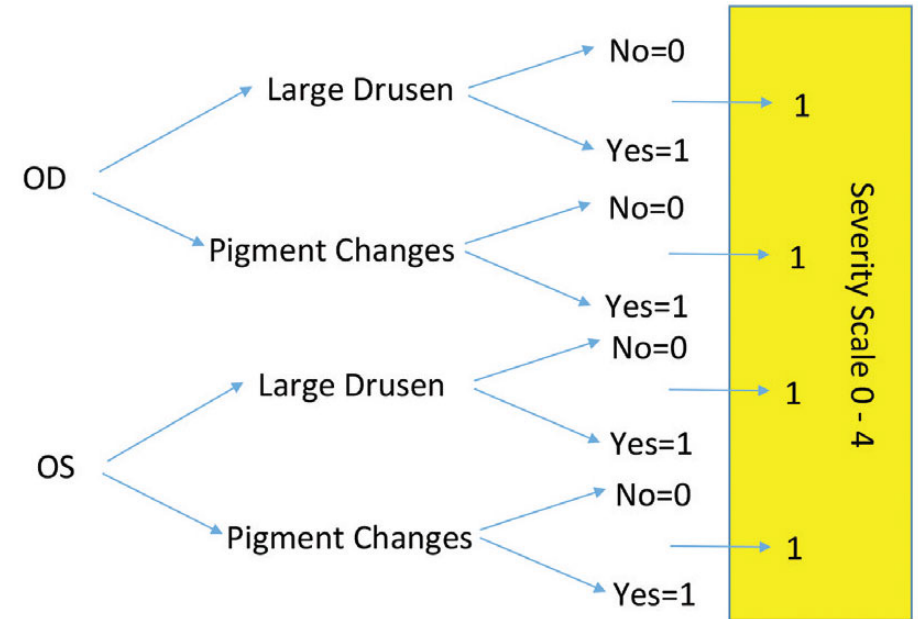
- Early vs. Intermediate vs. Late





- Assign 2 additional points if the other eye has wet AMD

Table 2. AREDS Risk Assessment Tool²¹



Score	Chance to progress to advanced AMD in five years (%)
0	0.5
1	3.0
2	12.0
3	25.0
4	50.0

- Vitamin Supplements
 - AREDS 2
 - Vitamin C (500mg) and E (400 IU)
 - Lutein 10mg
 - Zeaxanthin 2mg
 - Minerals Zinc 80mg and Copper (2mg)
 - Multivitamin



Doctor's Suggested Use: Take 4 capsules once daily with a meal.

Supplement Facts

Serving Size: 4 Capsules
Servings Per Container: 30

Amount Per Serving		% DV
Vitamin A (as betacarotene)	1,500 mcg RAE	167%
Vitamin C (as ascorbic acid)	100 mg	111%
Zinc (as oxide)	25 mg	227%
Copper (as chelate)	2 mg	222%
Taurine	600 mg	*
Berry Vision Complex	300 mg	*
Black Currant Extract (fruit), Maqui Berry Powder (<i>Aristotelia chilensis</i> , fruit), Goji Berry Extract (<i>Lycium barbarum</i> , fruit), Bilberry Extract (fruit)		
Carrot Powder (root)	260 mg	*
N-Acetyl L-Cysteine	260 mg	*
Schisandra Extract (berry)	160 mg	*
Lutemax® 2020 [§] Lutein (from marigold flower)	20 mg	*
Setria®† L-Glutathione (from fermentation)	20 mg	*
Lutemax® 2020 [§] Zeaxanthin isomers (from marigold flower; containing a minimum of 1 mg of mesozeaxanthin)	4 mg	*
Lycopene (from tomato fruit)	3 mg	*

*Daily Value (DV) not established.

Other ingredients: Microcrystalline cellulose, gelatin, magnesium stearate, silica

Note: Pregnant or lactating women should consult a health care professional before taking this product.

Keep out of reach of children.

†Setria® is a registered trademark of KYOWA HAKKO BIO Co., Ltd.

§Lutemax® 2020 is a trademark of OmniActive Health Technologies, Ltd.

This product contains nutraceutical ingredients; therefore, some color variations may occur.



Reducing Risk

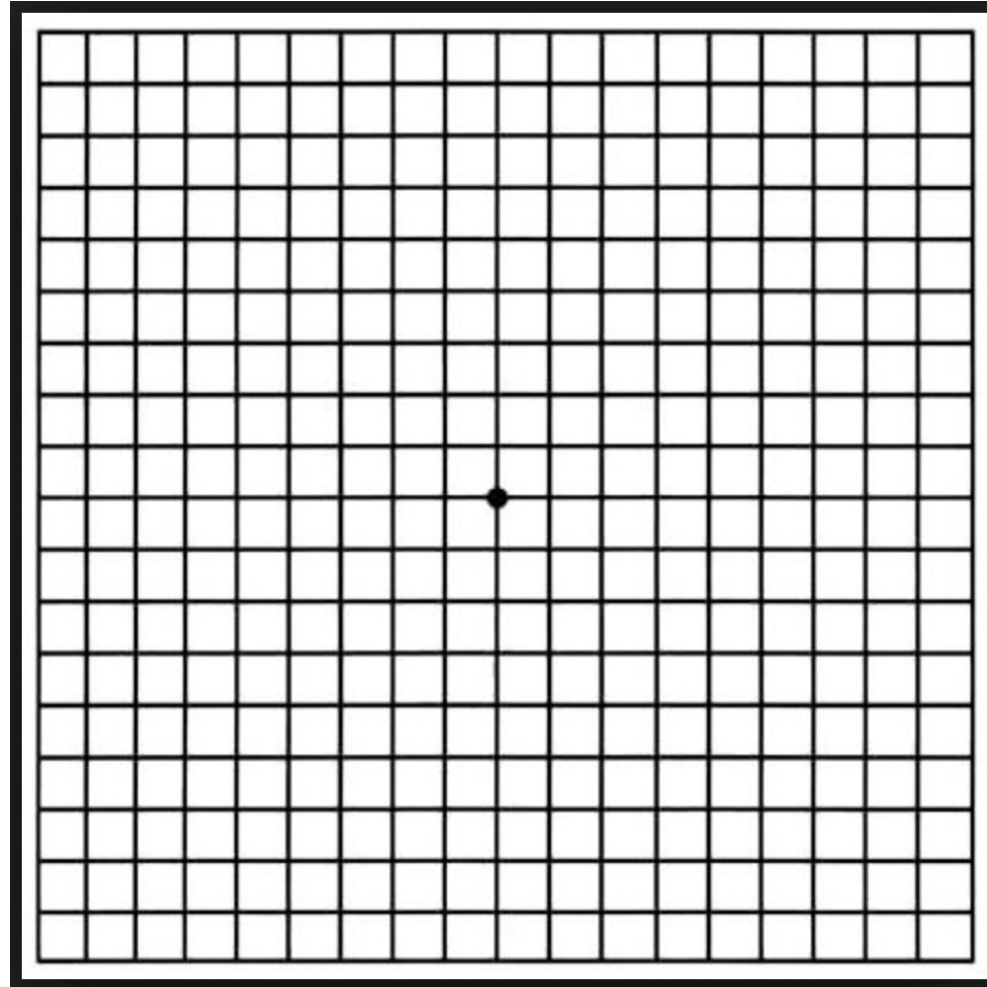
- Healthy Diet
 - Mediterranean Diet
 - Green, leafy vegetables

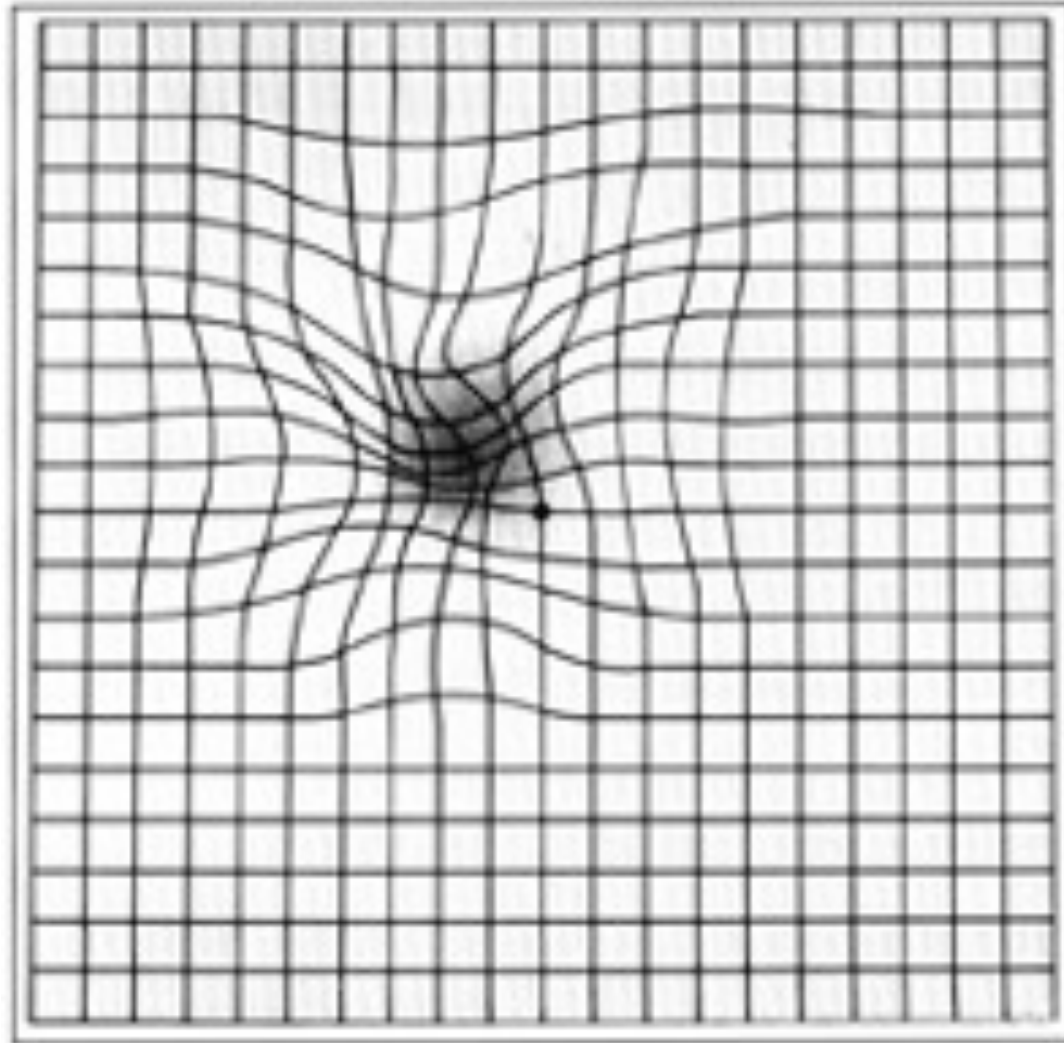


- Avoiding tobacco products!

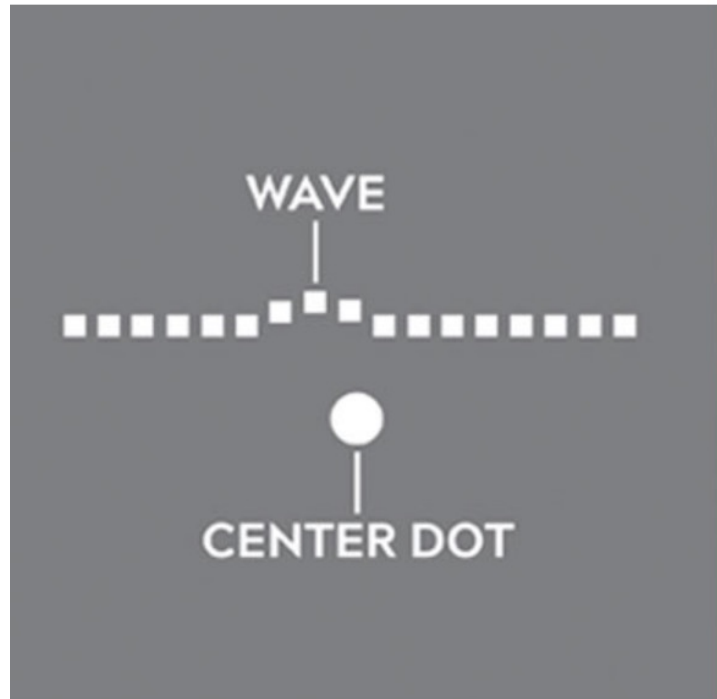


AMSLER GRID





- Foresee Home



Low Vision Specialists

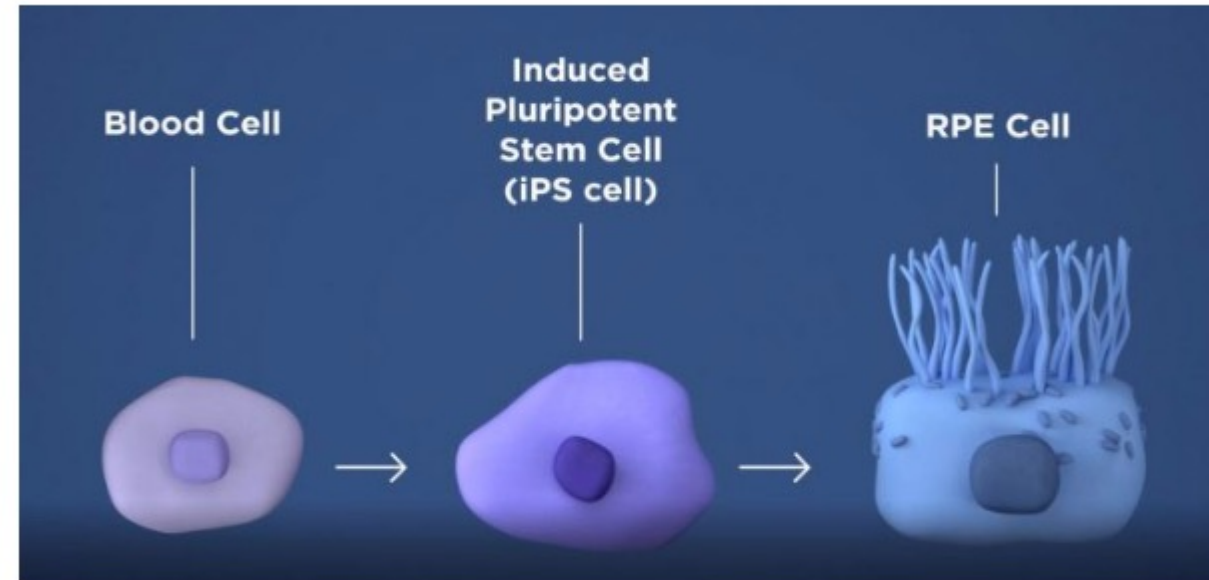
- Low-vision aids (magnifier, telescope, closed caption television)
- Visual rehabilitation
- Assistive and adaptive technology
- Orientation & mobility



Low Vision Aids

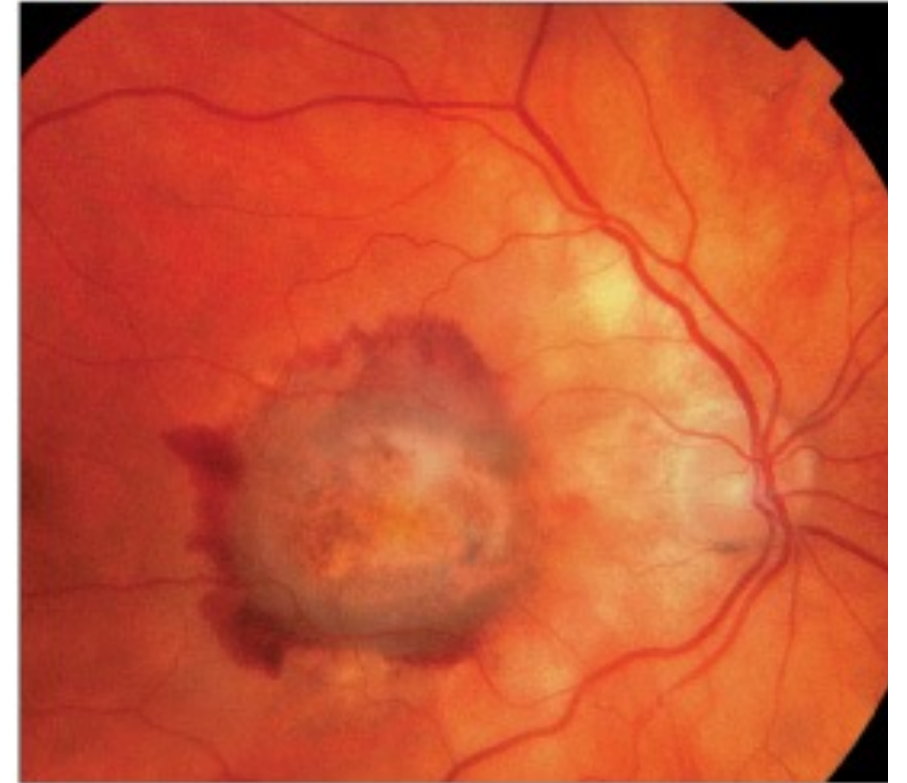


- Multiple drugs in clinical trials
- Stem Cell Transplants
 - RPE cells vs. Photoreceptors
 - Dangers of unregulated clinics



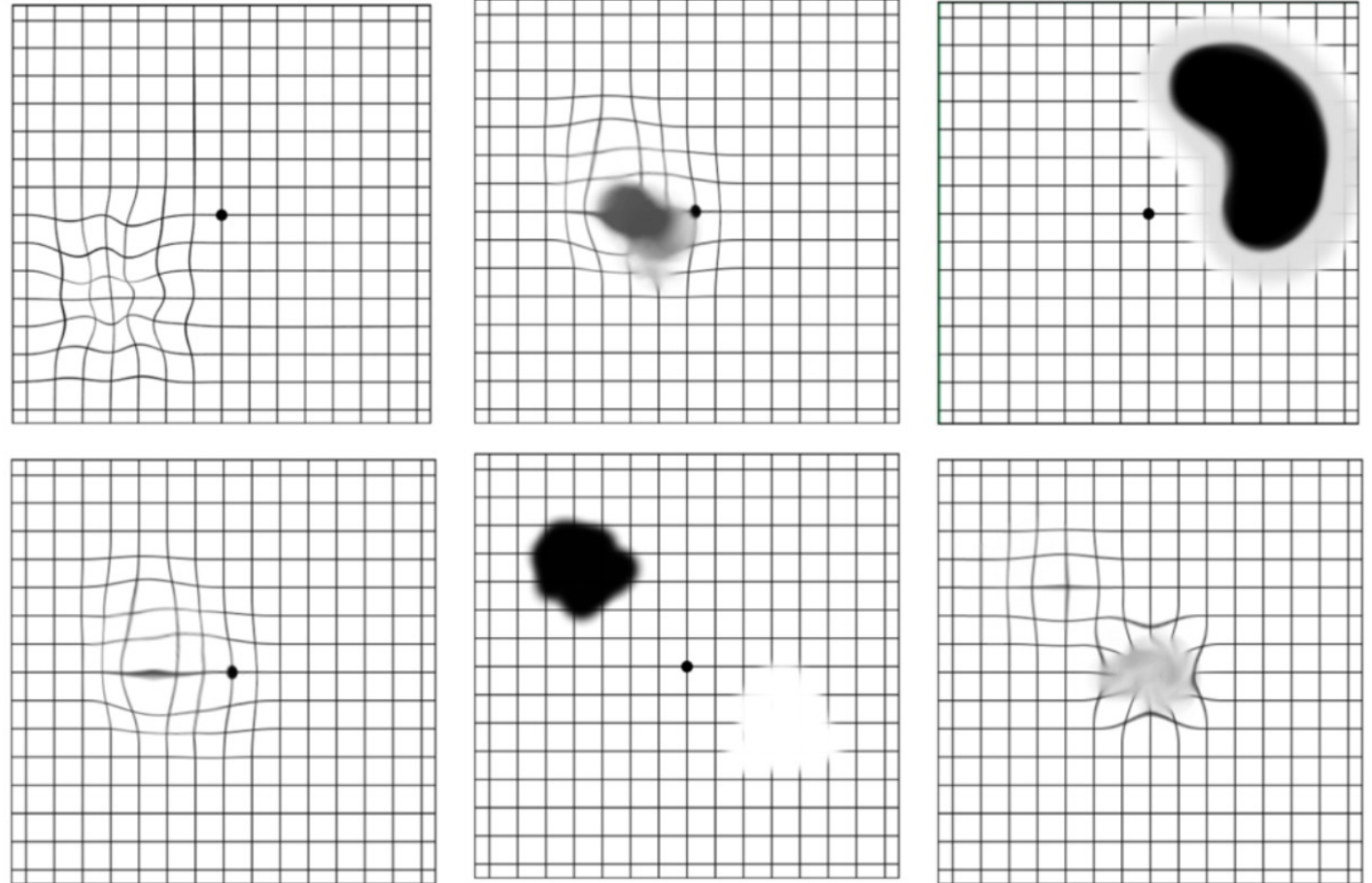
Wet Macular Degeneration

- Caused by abnormal blood vessels that grow under the retina.
- Leaking of blood and fluid lead to loss of central vision.
- Sudden, severe and rapid vision loss.
- 10% of macular degeneration patients will convert to the wet form.
- 35% of people with Wet AMD in one eye will get Wet AMD in the other eye.

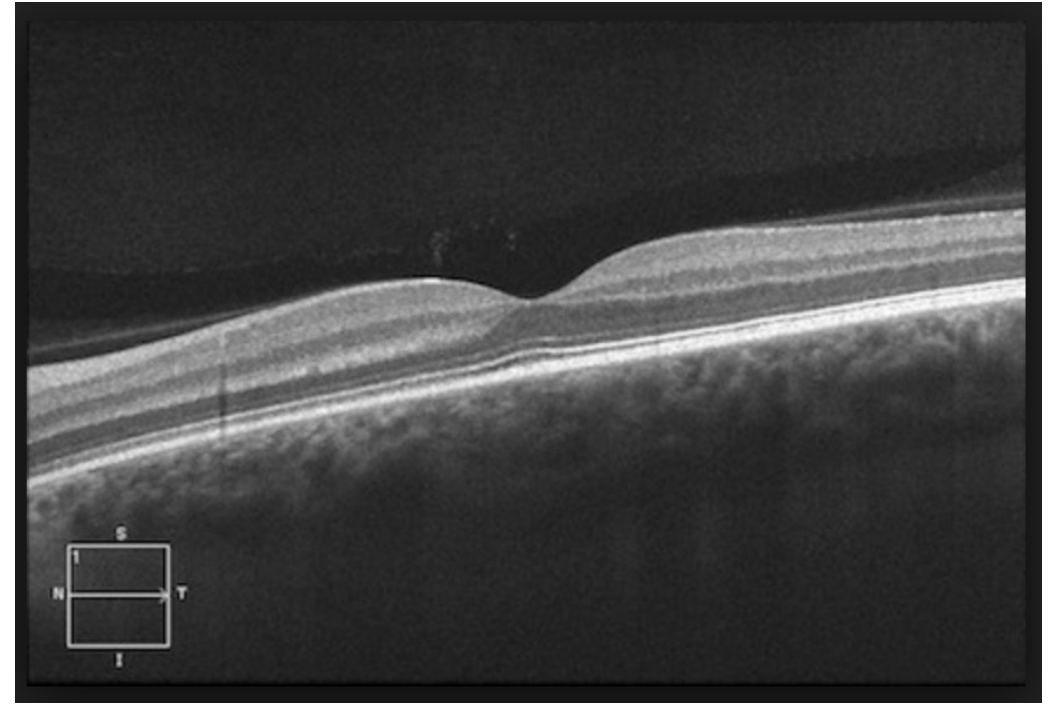
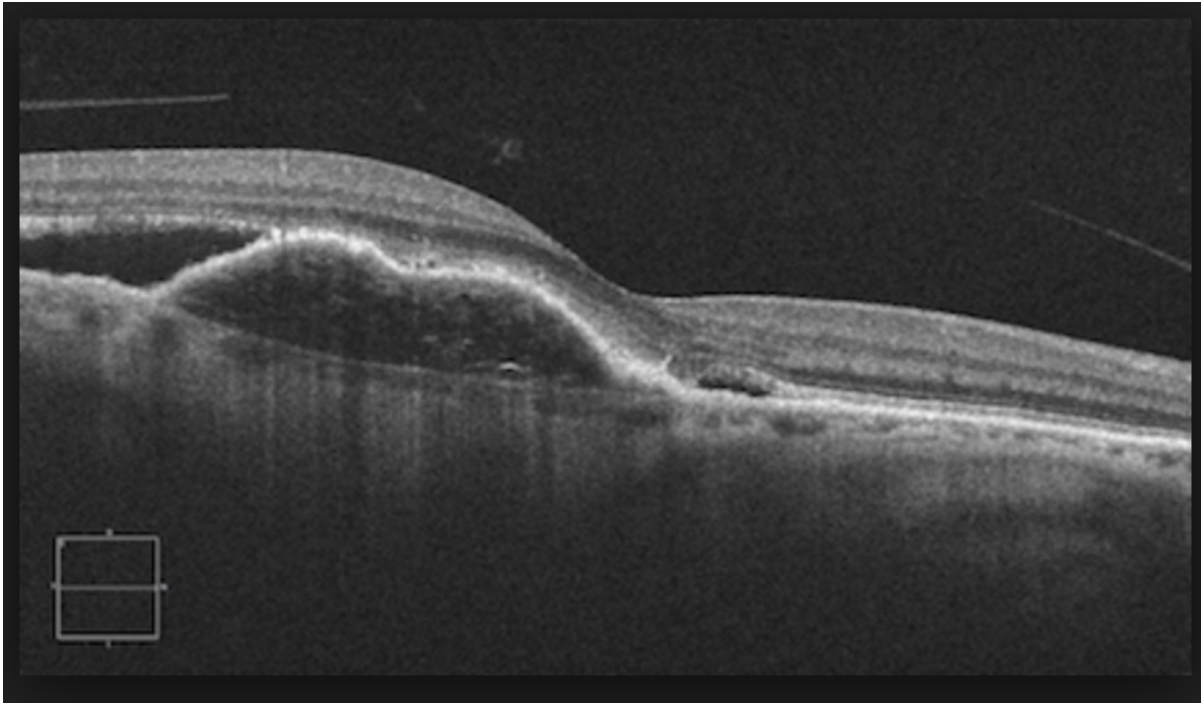


Wet AMD Symptoms

- New distortions
- Lines are wavy
- Difficult to see



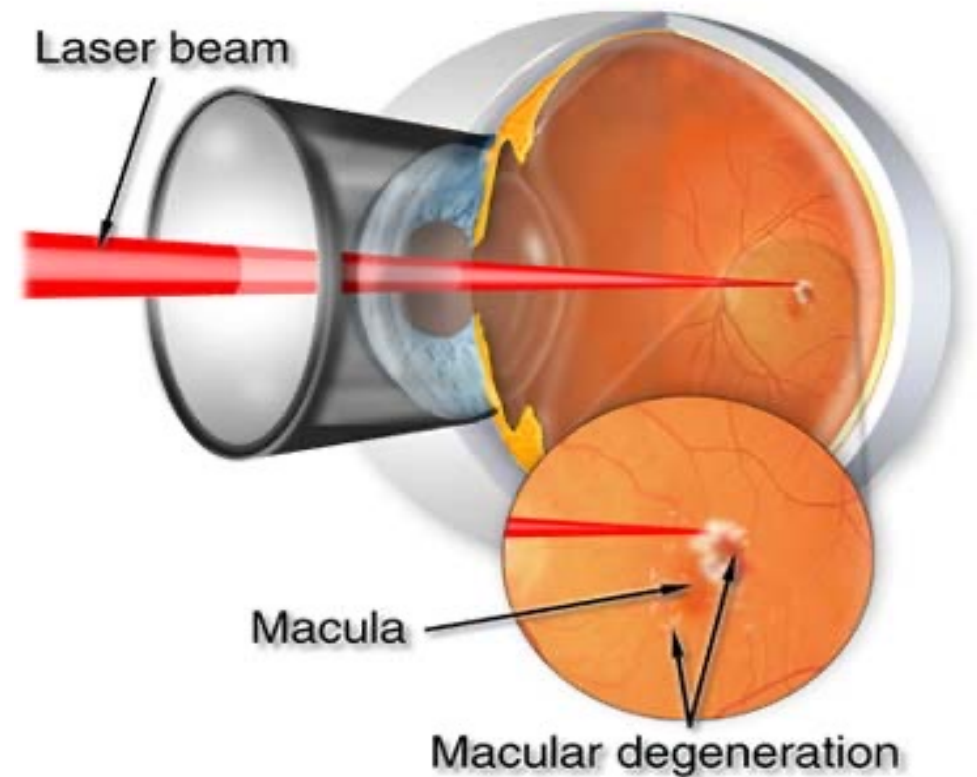
Wet Macular Degeneration



Thermal Laser Therapy:

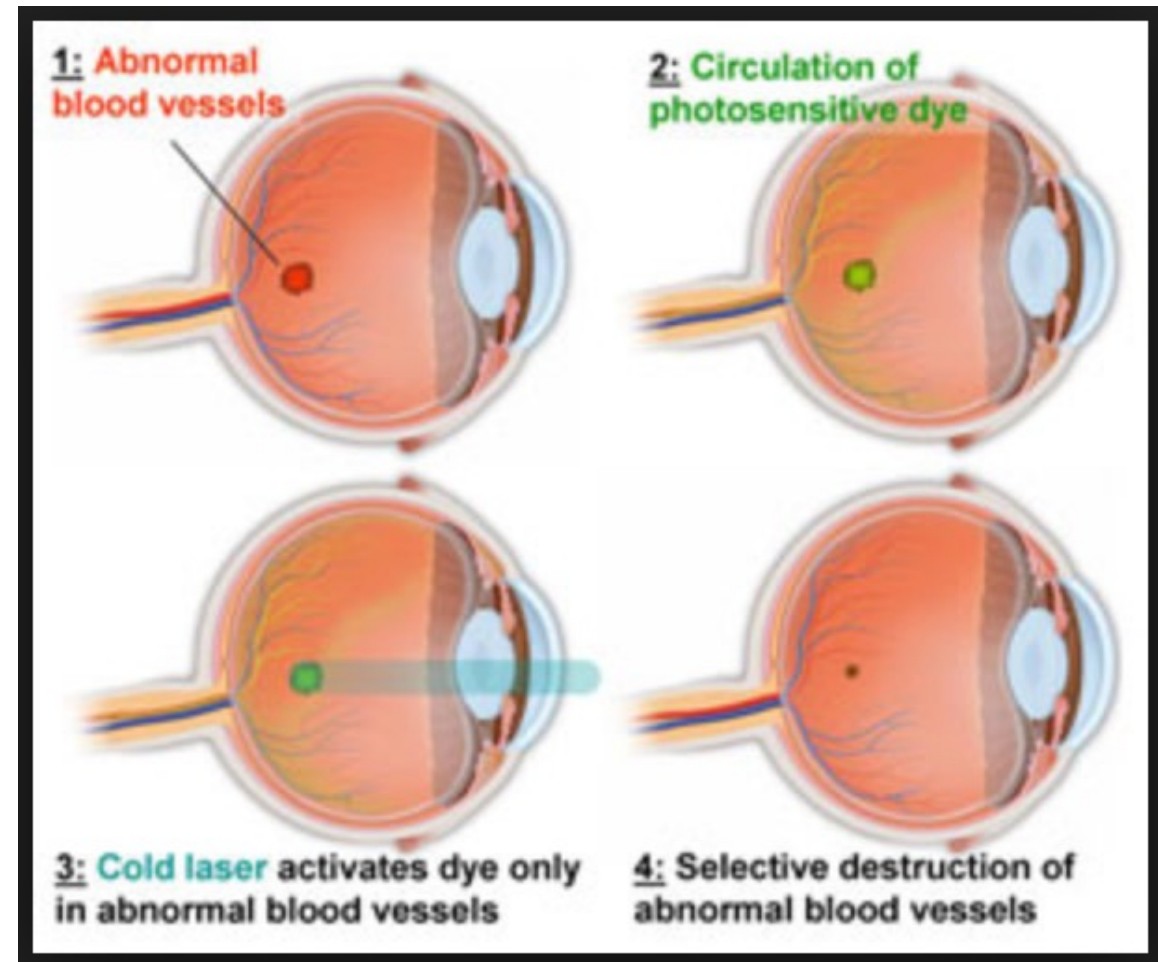
- High-energy, focused light beam treats tiny area of retina by “burning” it; destroys abnormal underlying blood vessels.
- **Rarely, if ever, used anymore.**

Laser Treatment of Wet Macular Degeneration



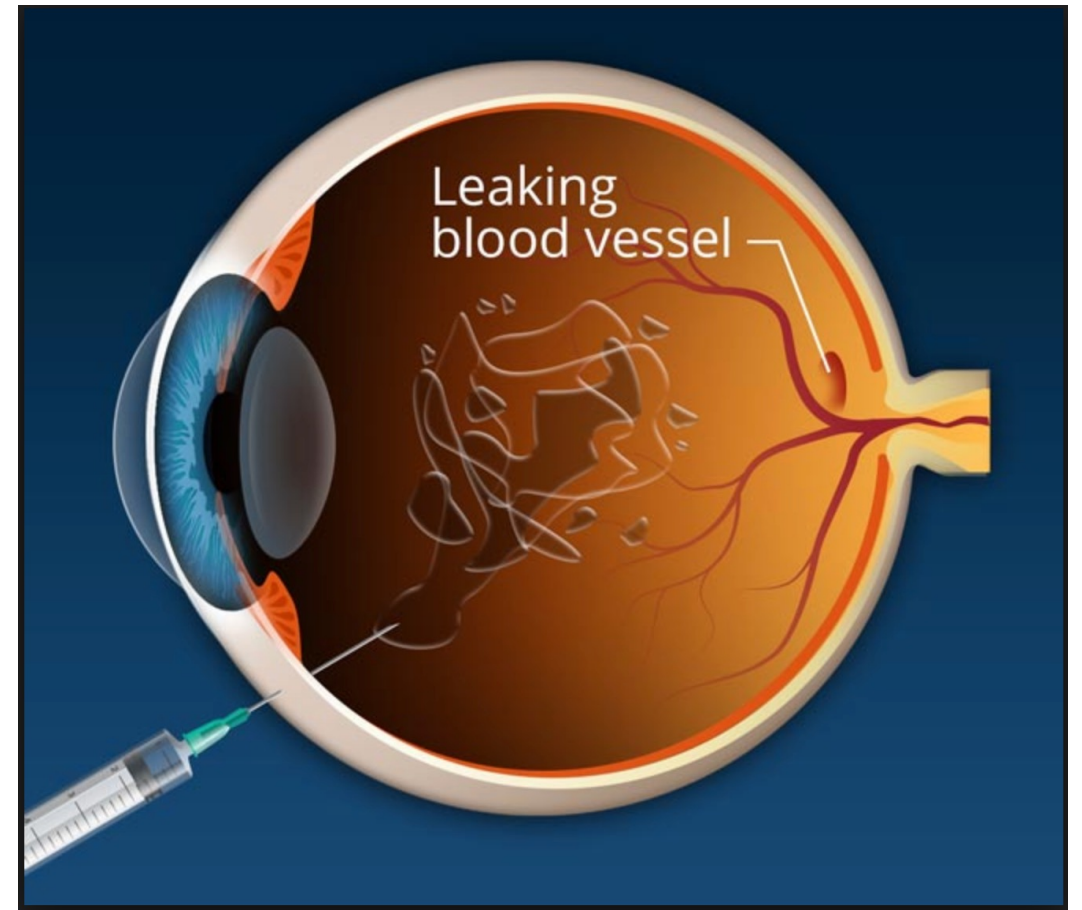
Photodynamic Therapy (PDT):

- Currently used only in selected cases.
- Light sensitive dye injected into veins.
- “Cold laser” activates medicine and destroys abnormal blood vessels.

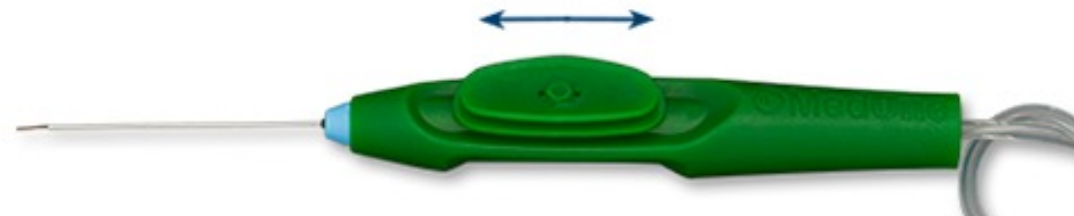
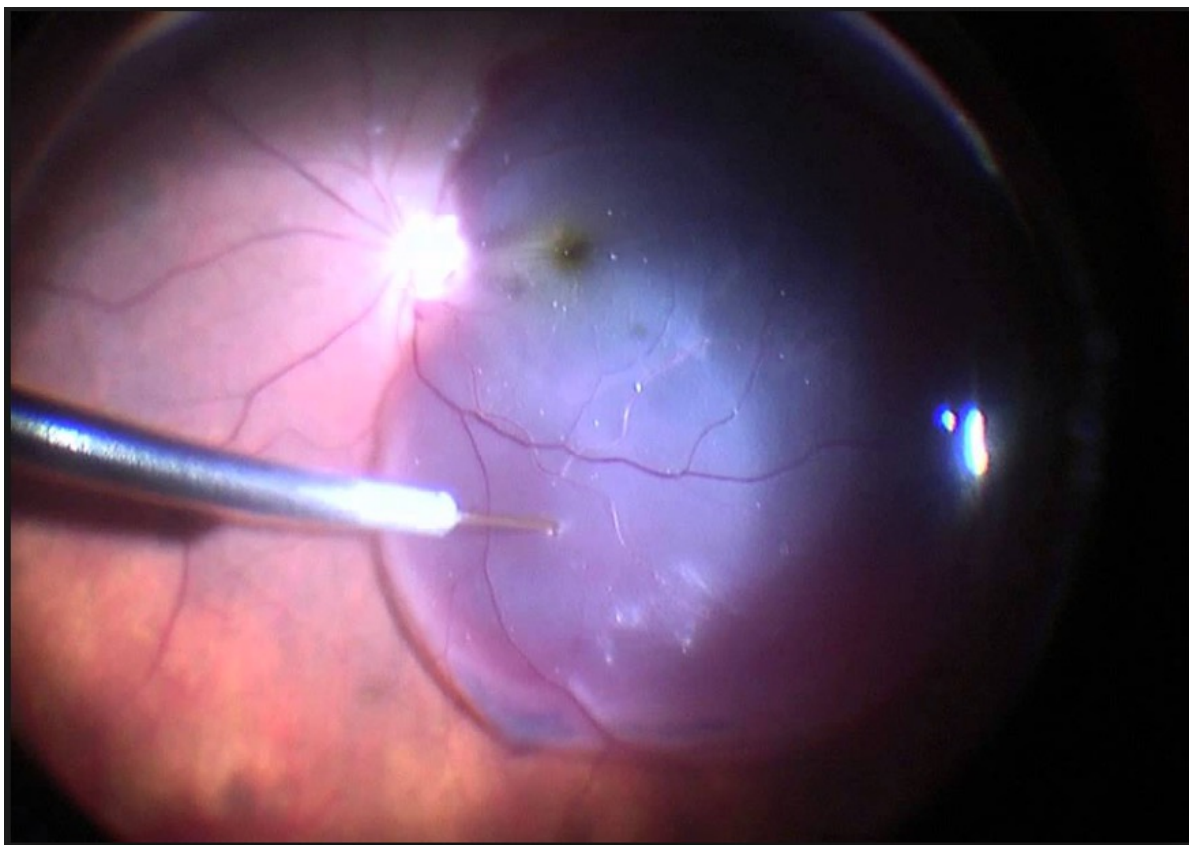


Eye Injections:

- Injections of “Anti-VEGF”
- Avastin, Lucentis, Eylea, Beovu
- 95% chance of maintaining vision
- 30-40% chance of improving vision



- Can successfully do surgery for “massive” bleeding under retina.



- Which medication should be started?
- How often will I need the medications?
- How long will I need the medications?
- Will the injection hurt?

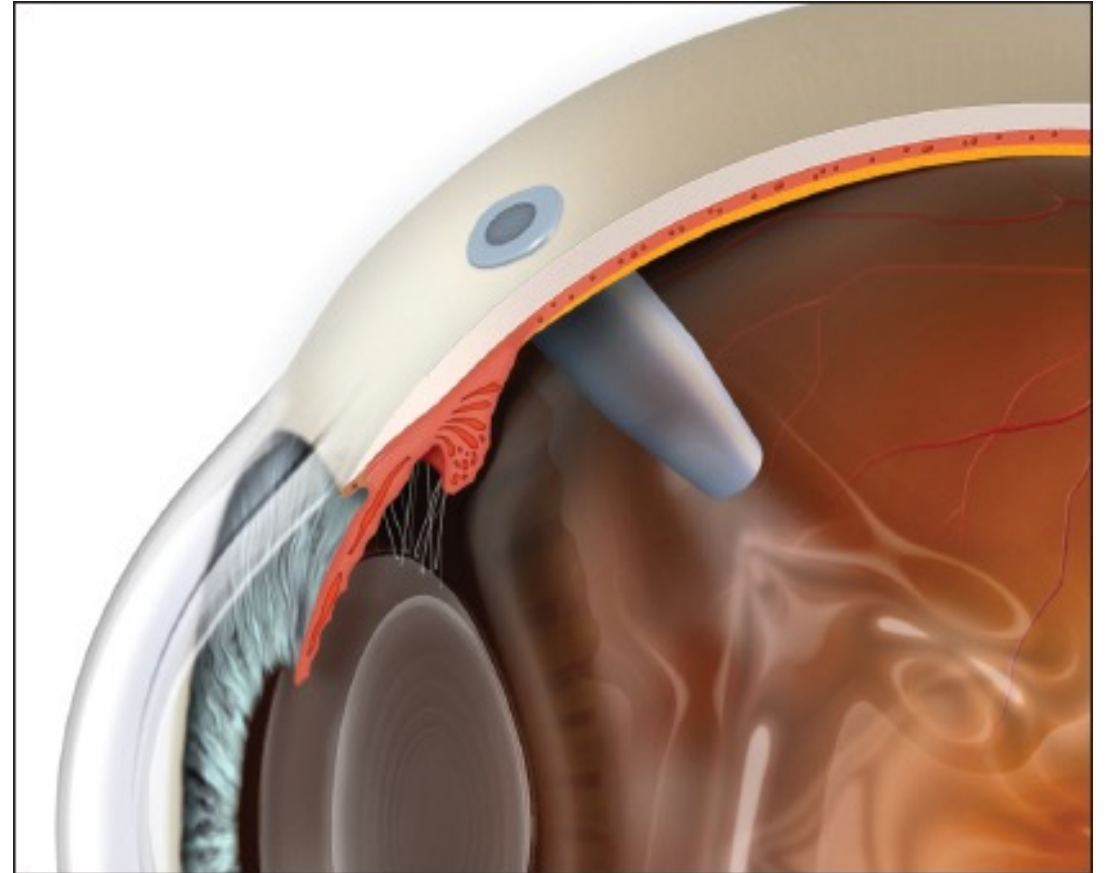
- Four current choices
 - Avastin – FDA approved for treatment of colon cancer
 - 15+ years of data to support ophthalmic use
 - Usually equivalent to more expensive medications
 - ~\$80 per dose
 - Lucentis and Eylea – FDA approved for treatment of wet macular degeneration
 - ~\$1600-\$2000 per dose
 - Can be superior in some selected cases
 - Beovu – FDA approved for wet AMD
 - Recent issues with ocular inflammation
 - Used on only very specific selected cases

How Often and How Long?

- Treatments are started with monthly injections.
- Patients are examined at each appointment to determine response.
- If poor response, another medication can be tried.
- After good response (resolution of fluid), will switch to either “as needed” or “treat and extend”.
 - As needed – examine each appointment, inject if active disease
 - Treat and extend – if no active disease, keep lengthening interval between appointments

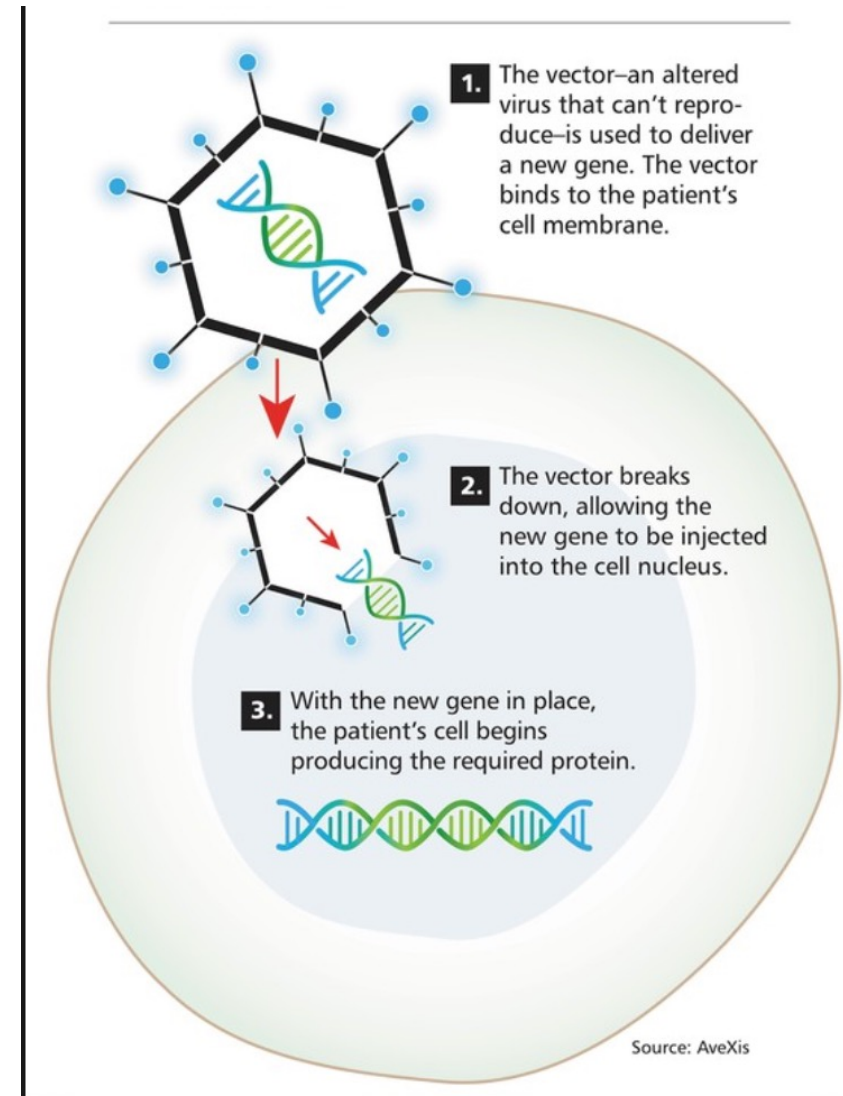
- For 95% of my patients, injections cause only minor discomfort.
- Pressure sensation
- Many types of anesthesia can be tried to make sure its comfortable.

- Port Delivery System
- Surgically implanted
- Refilled in the clinic



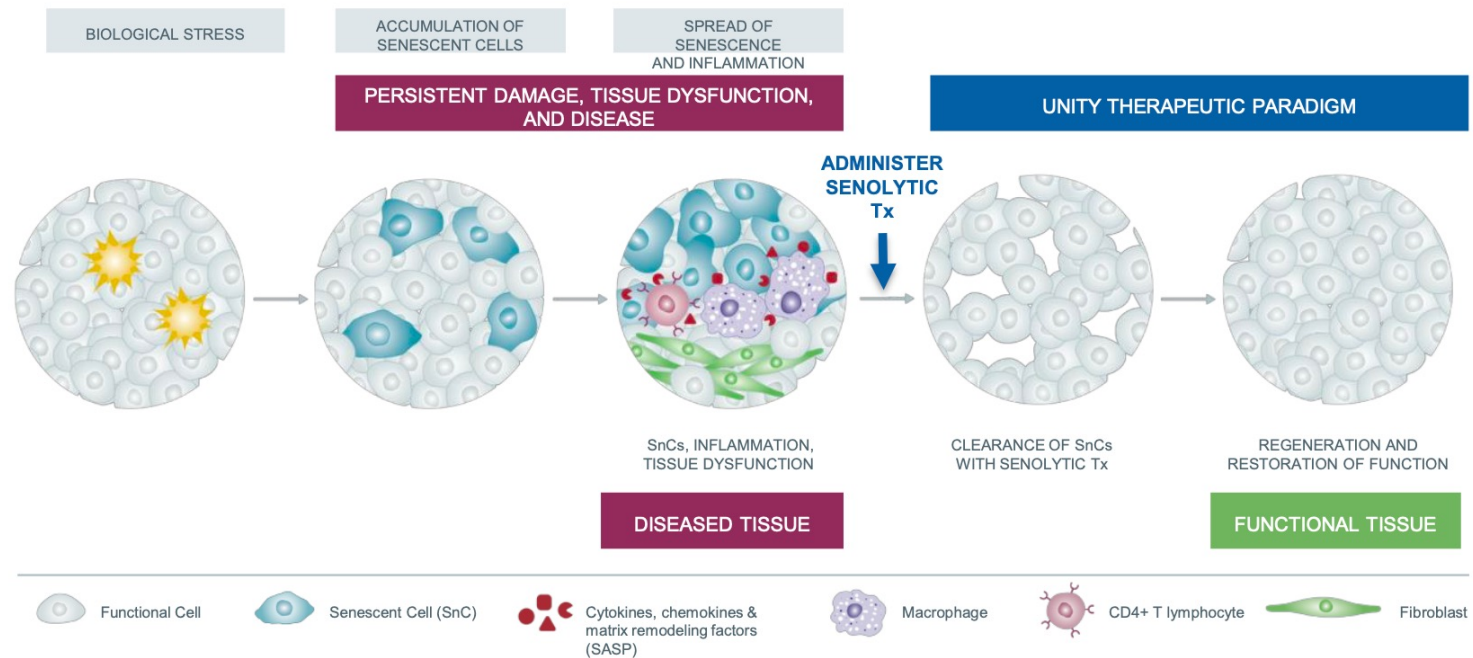
- Medications by mouth or eye drops
- Multiple new injections are in clinical trials
- Less frequent injections
 - Longer lasting drugs
 - New drug targets/combination target
 - Faricimab (Ang2/VEGF) likely FDA approval this year

- Gene therapy
- Safely designed virus “transporter” injected into eye, new gene inserted into cells and allows eye to make “its own drug”

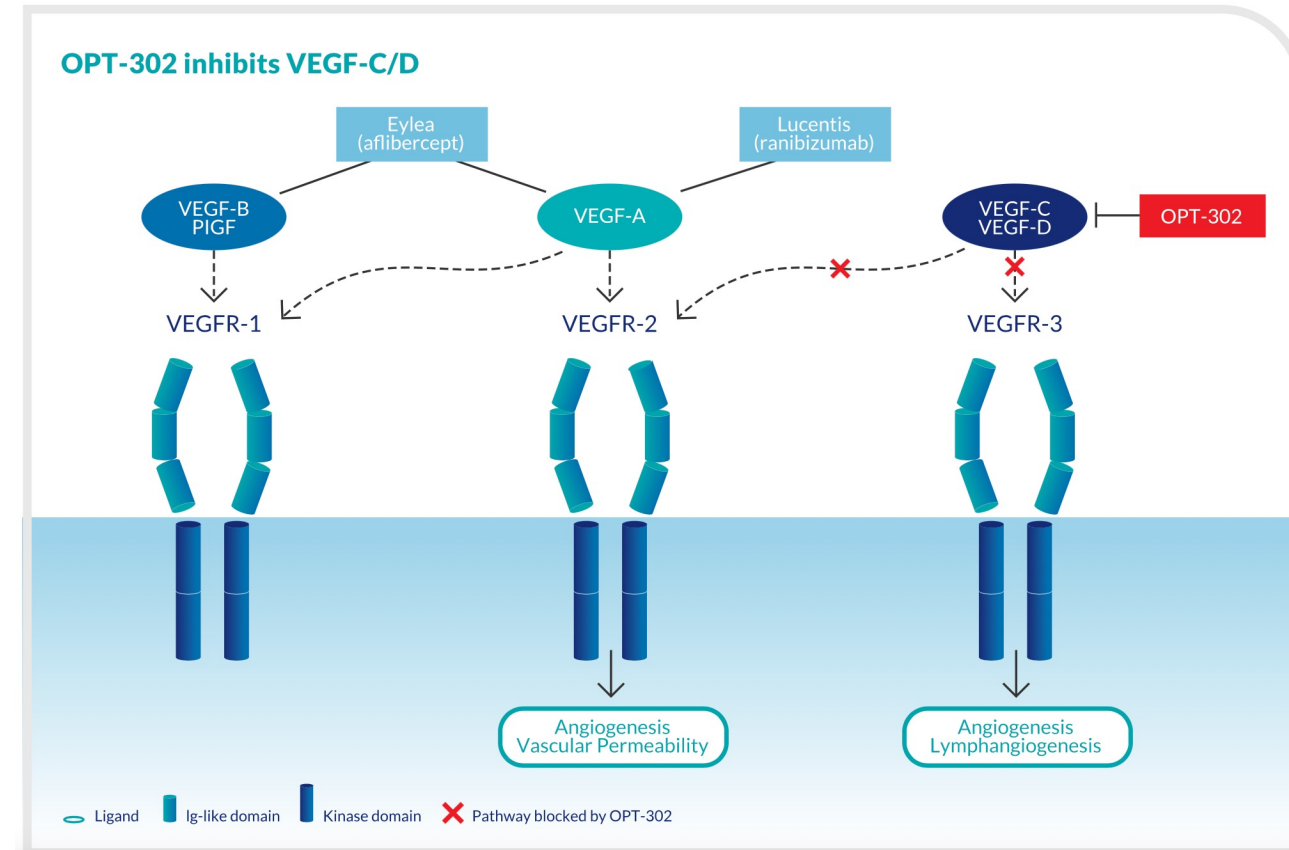


- Advanced Vision Research Institute
 - Only ophthalmic research department in Boulder County
- Macular Degeneration Clinical Trials
 - Unity Trial
 - Opthea Trial
 - Alexion Trial

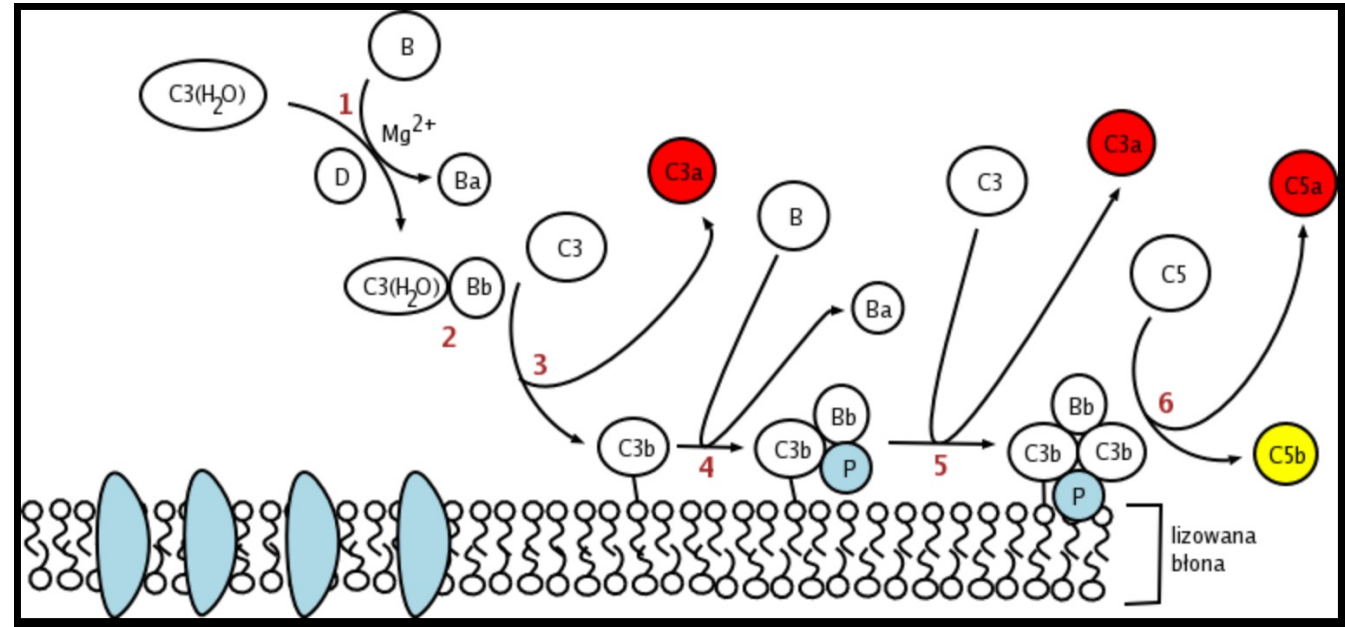
- Unity Trial for Wet Macular Degeneration
- Patients with active disease but incomplete response to current medications



- New patients with wet macular degeneration who have never received treatment
- Testing a second medication to see if patients respond better to the combination therapy



- Trial for patients with dry macular degeneration
- No FDA approved treatments
- Pill by mouth to decrease inflammation
- Try to stop progression of thinning



Questions?



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