



Dr Jim Borthwick

Ophthalmologist

Southern Eye Specialists, Christchurch

Saturday, August 13, 2016

(Room 10)

11:00 - 11:55 WS #89: Understanding Macular Degeneration

12:05 - 13:00 WS #100: Understanding Macular Degeneration



Macular Degeneration

JIM BORTHWICK



MACULAR
DEGENERATION
NEW ZEALAND

Macular Degeneration

0800 MACULA (622 852)

www.mdnz.org.nz

Macular degeneration

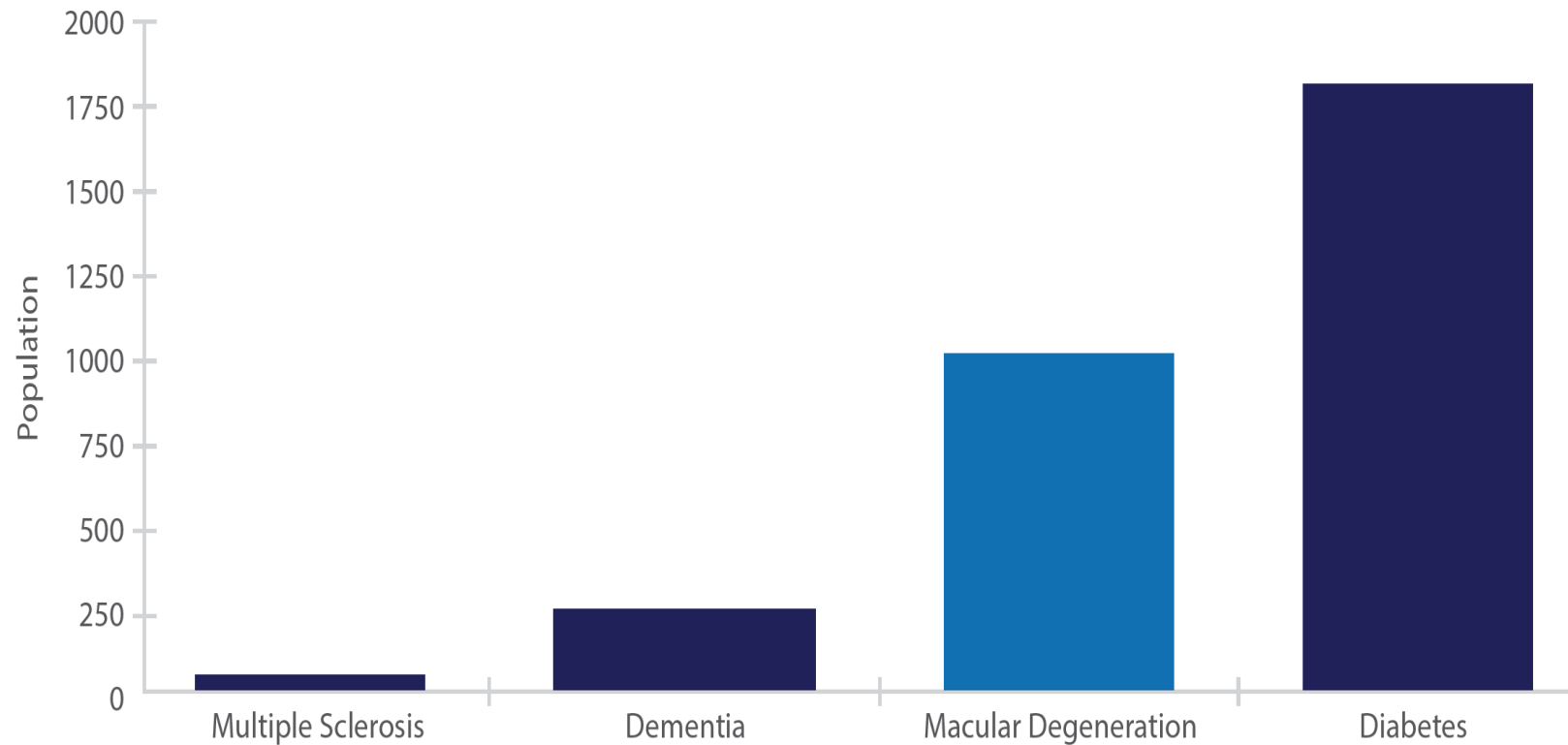
Progressive central
vision loss

Peripheral vision
remains

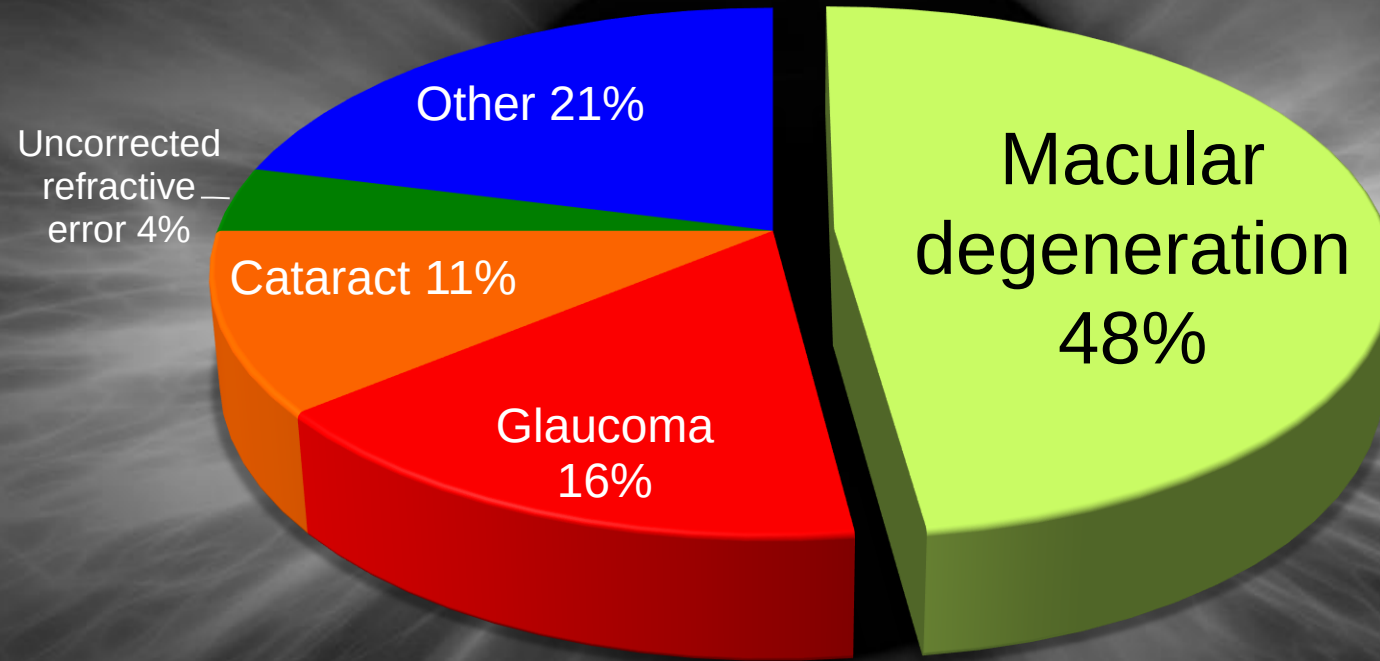
Not total blindness



3 x dementia, half diabetes



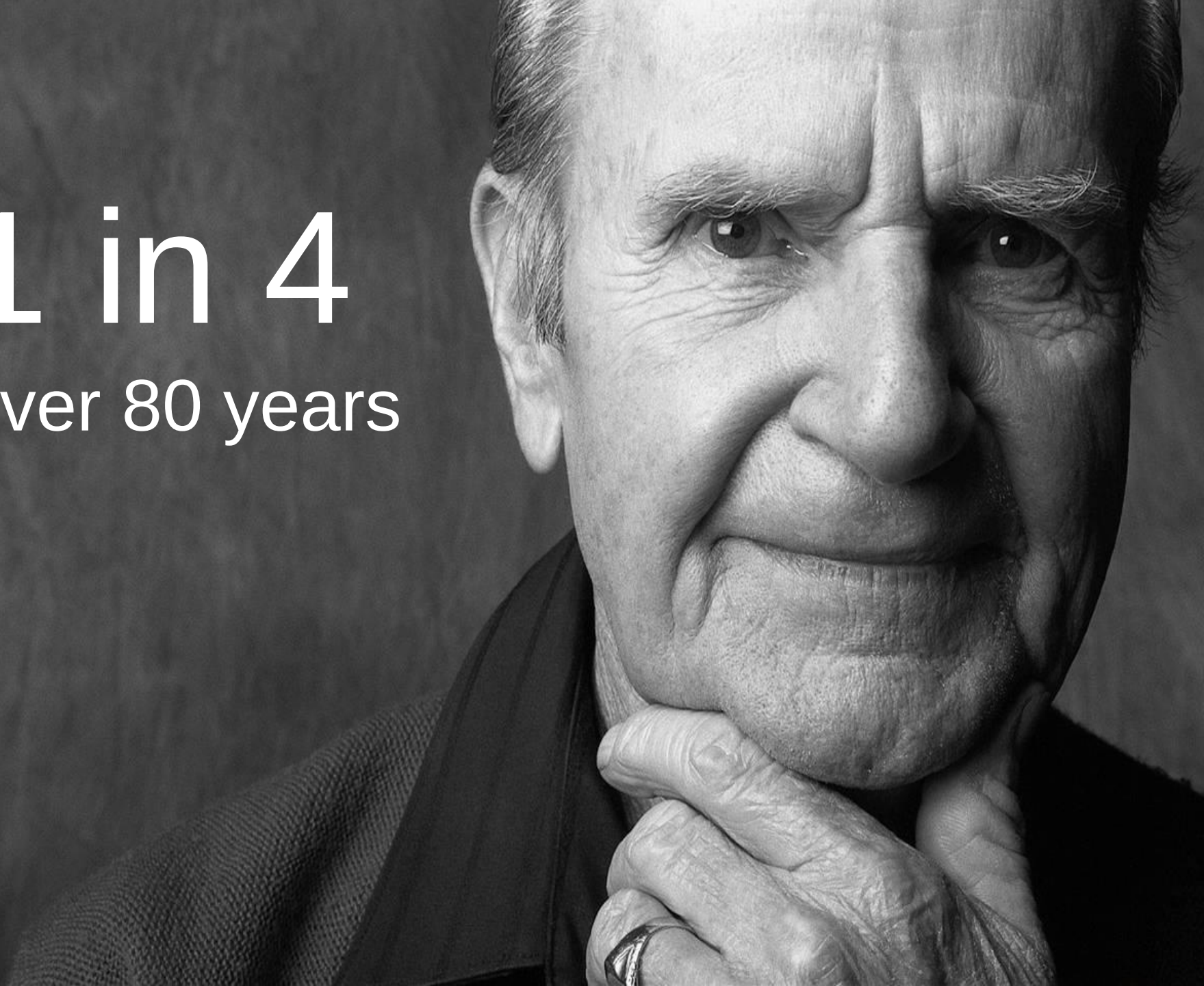
Leading cause of vision loss



1 in 7 over 50 years



1 in 4
over 80 years



2 x falls

3 x depression

8 x hip fracture

3 years earlier rest home



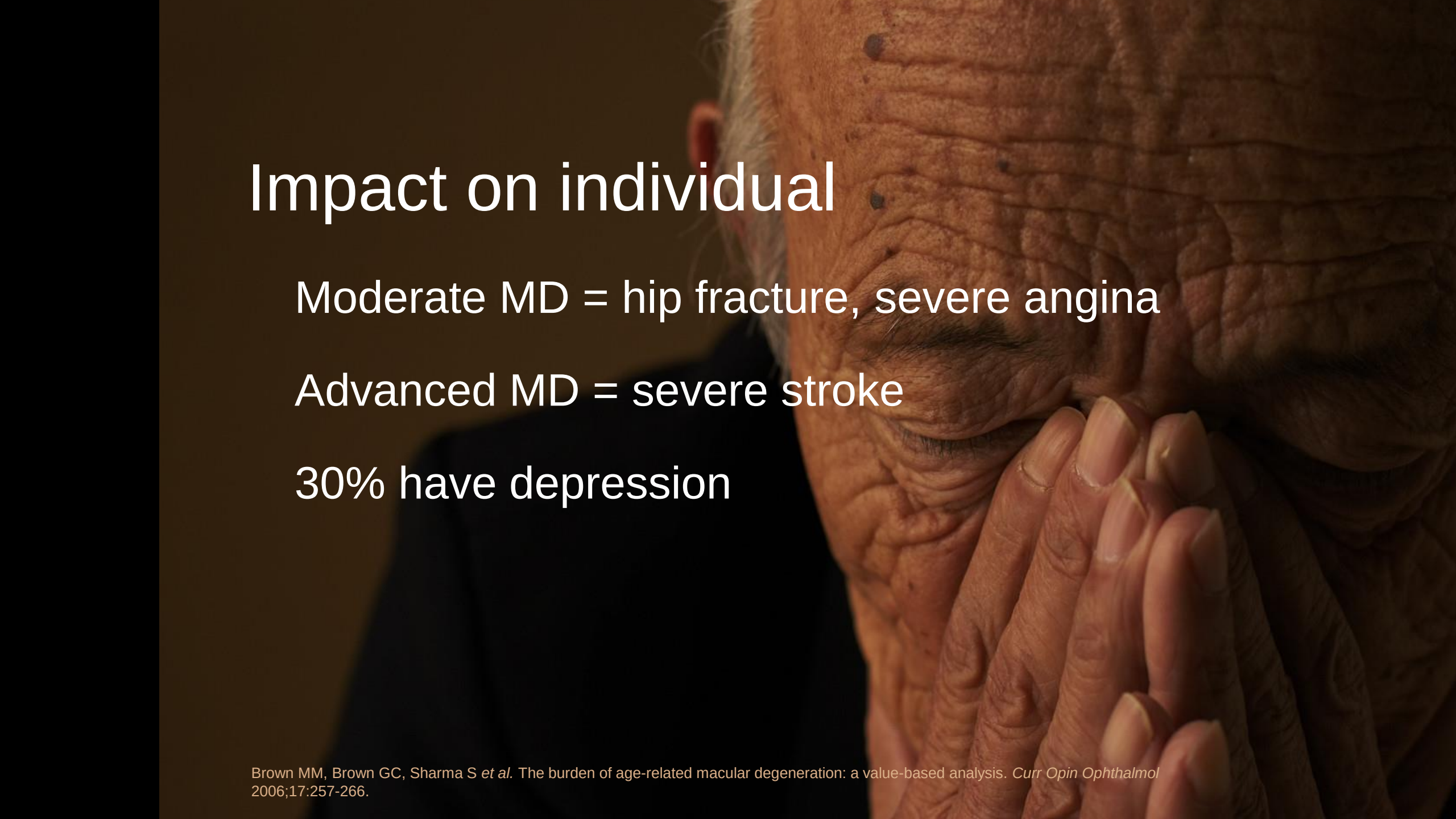


Difficulty with daily activities

Fear of blindness

Poor life satisfaction

Impact on family



Impact on individual

Moderate MD = hip fracture, severe angina

Advanced MD = severe stroke

30% have depression

4 x risk

10 years earlier



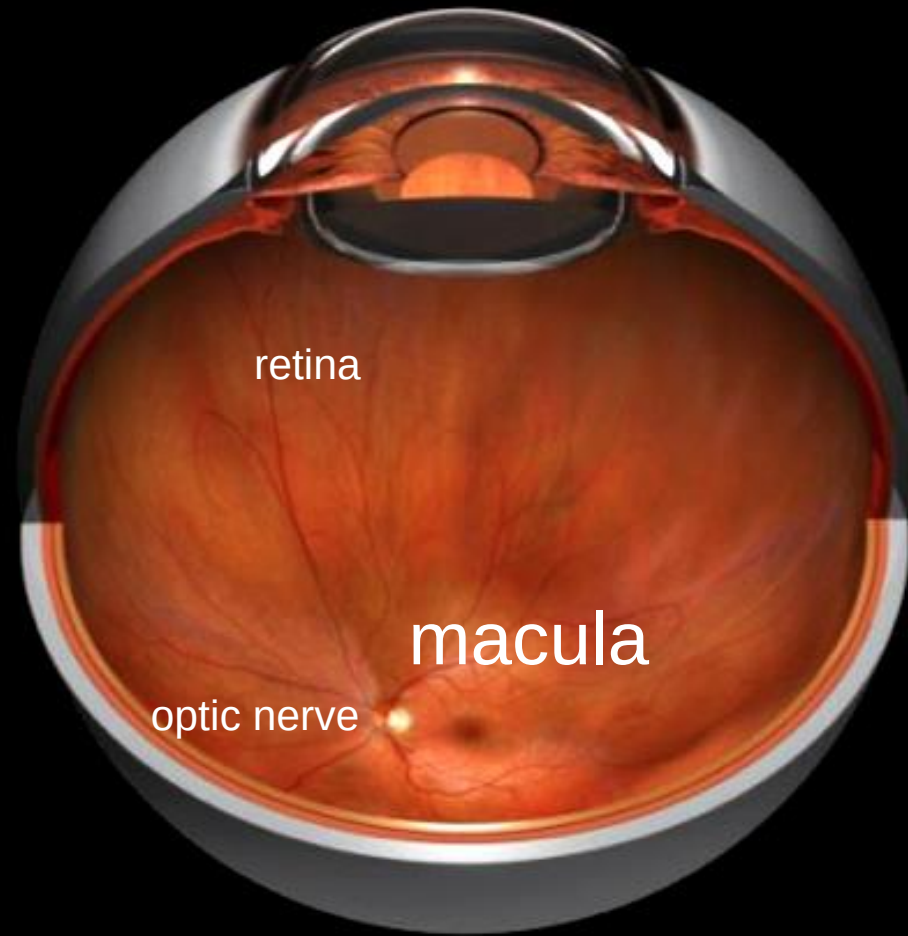
50%

chance if family history

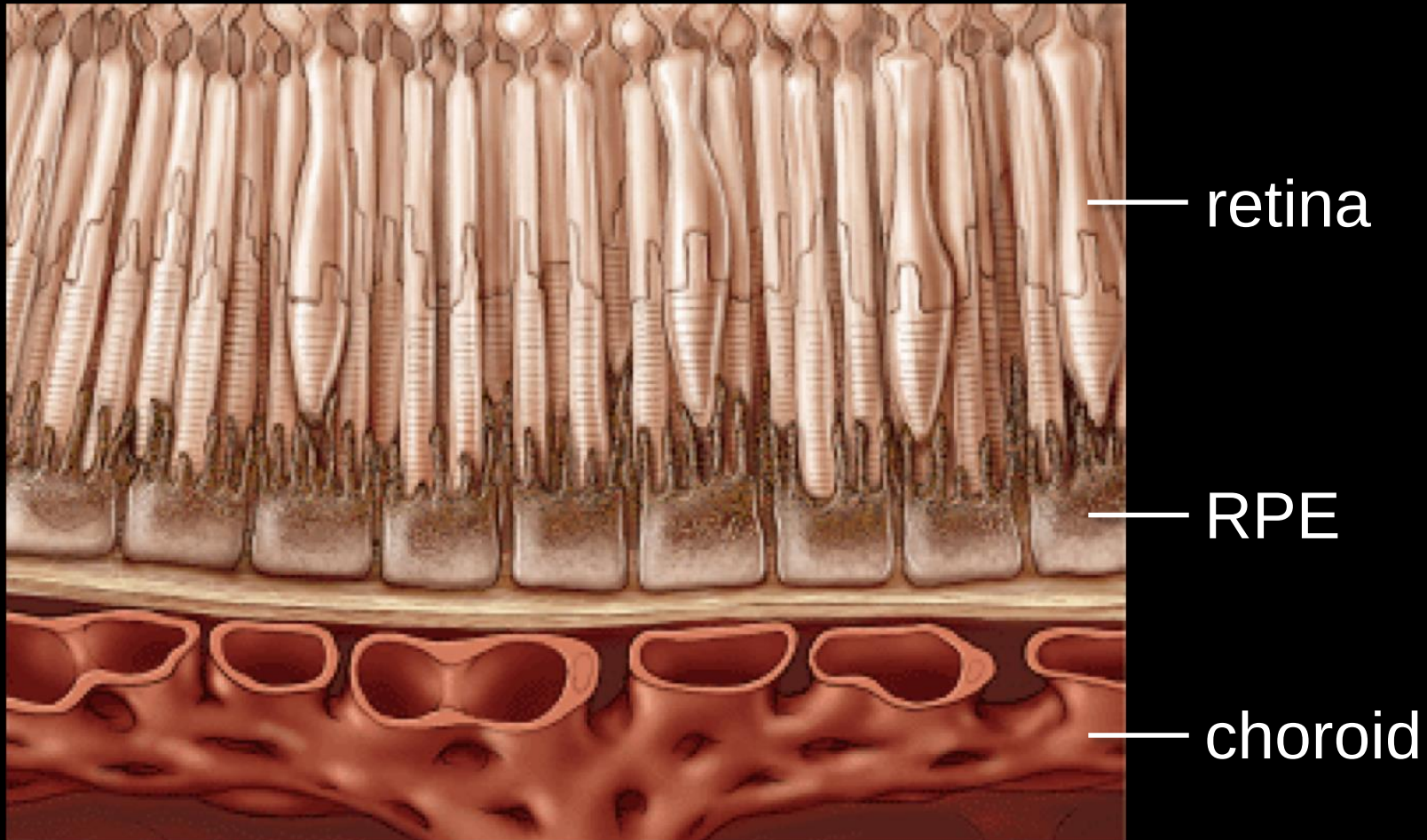
tell your family



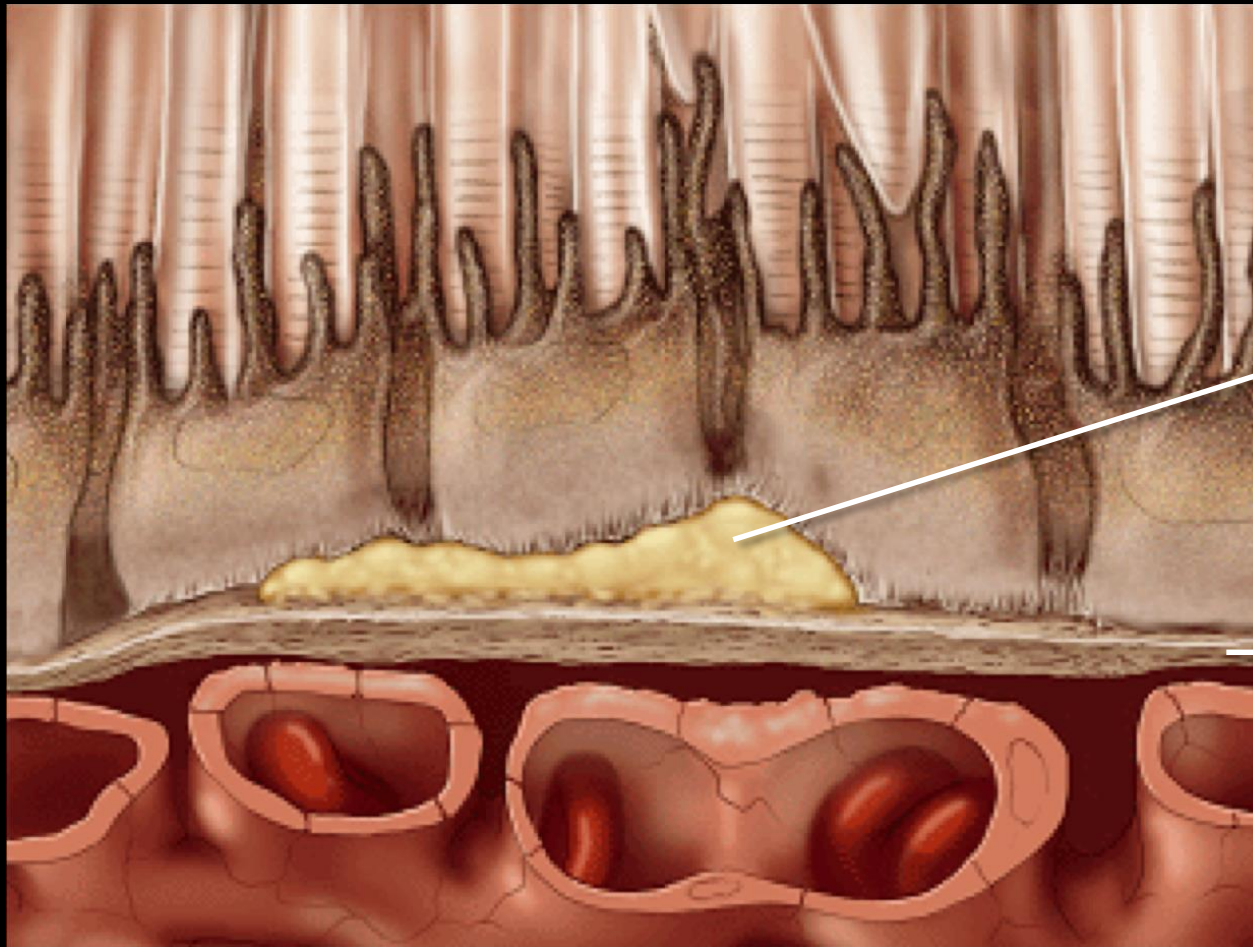
The macula



Healthy retina



Early changes

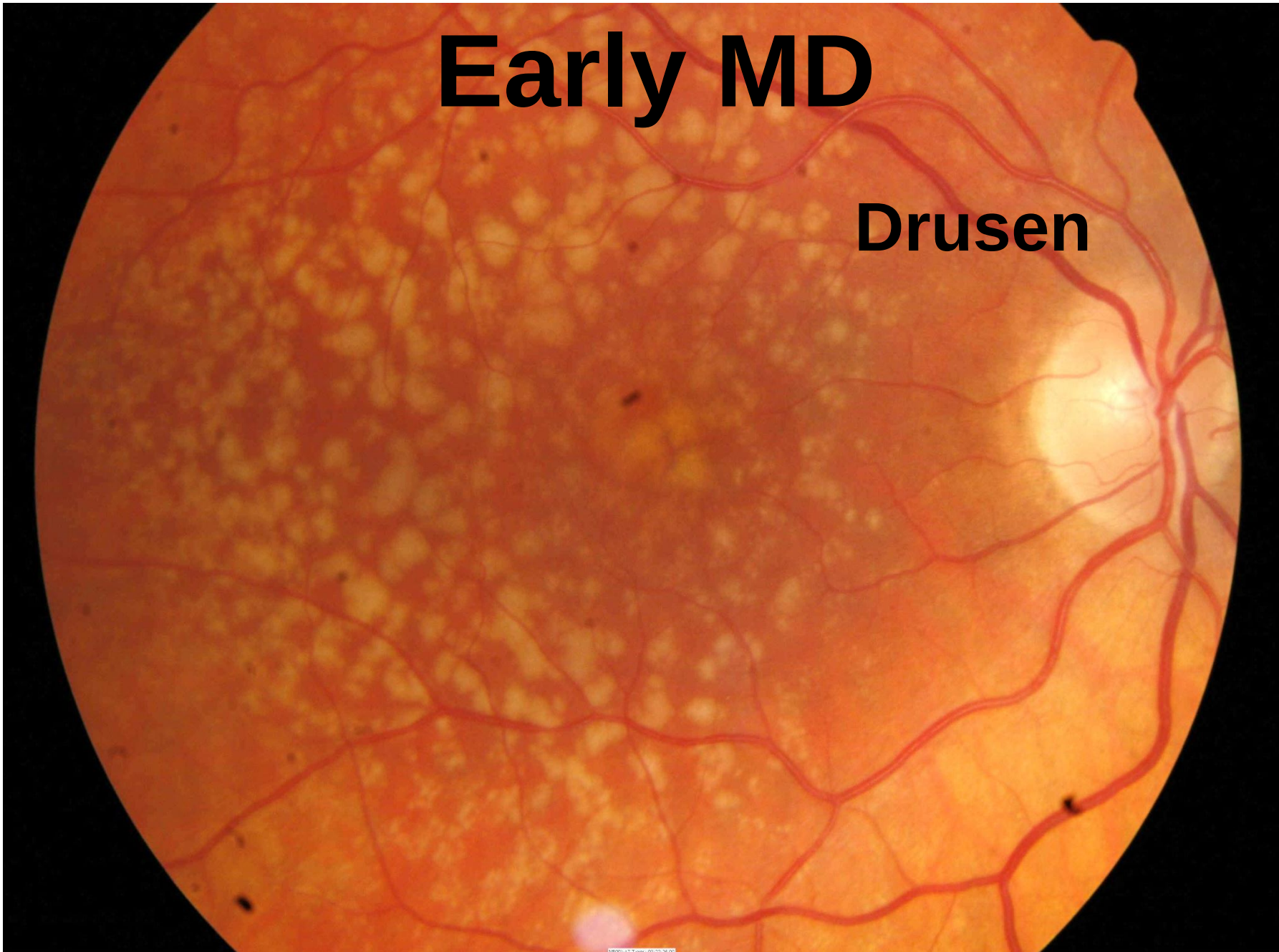


drusen

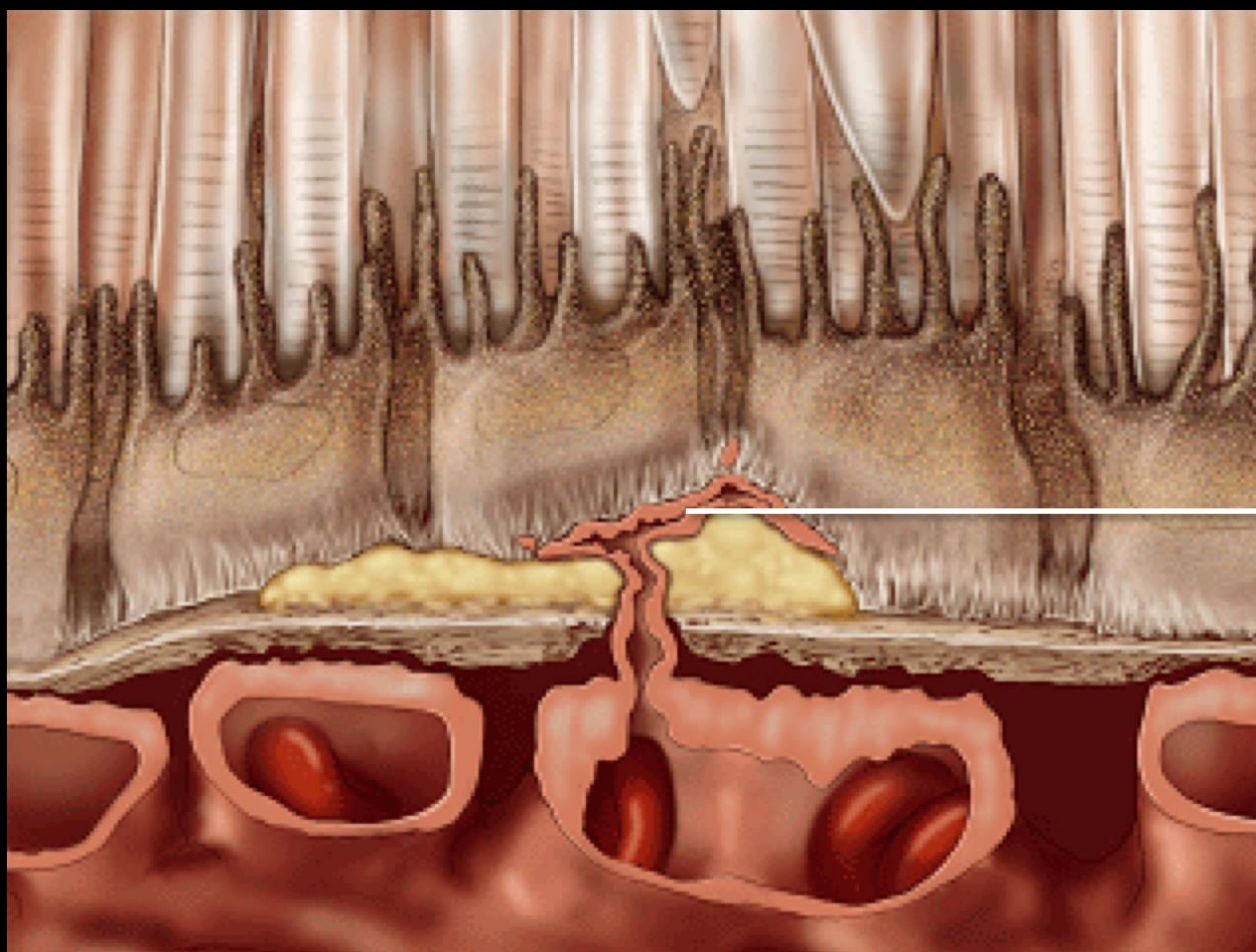
Bruch's
membrane
thickens

Early MD

Drusen

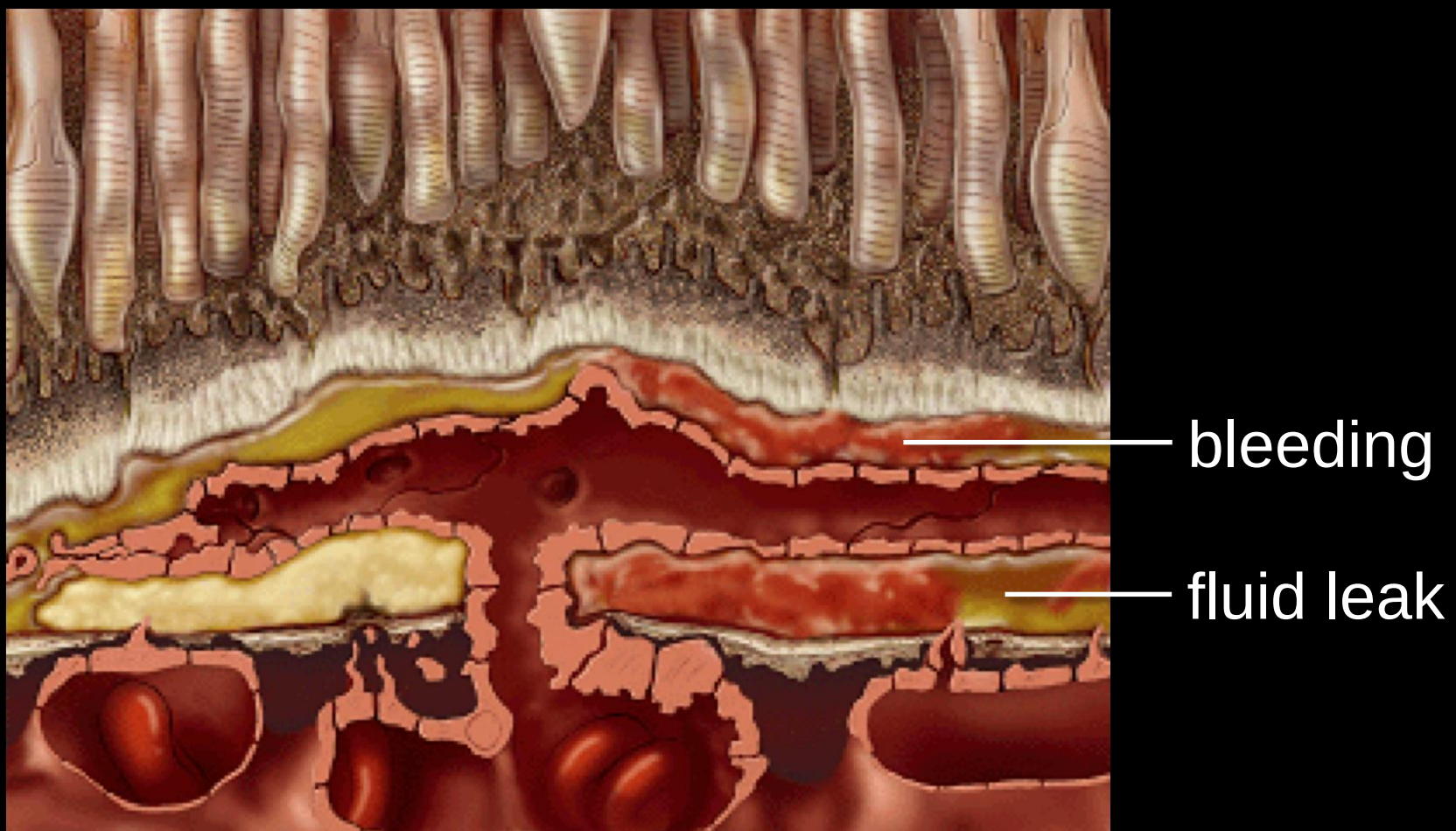


Wet MD



new
vessels

Wet MD



Dry

slow and gradual



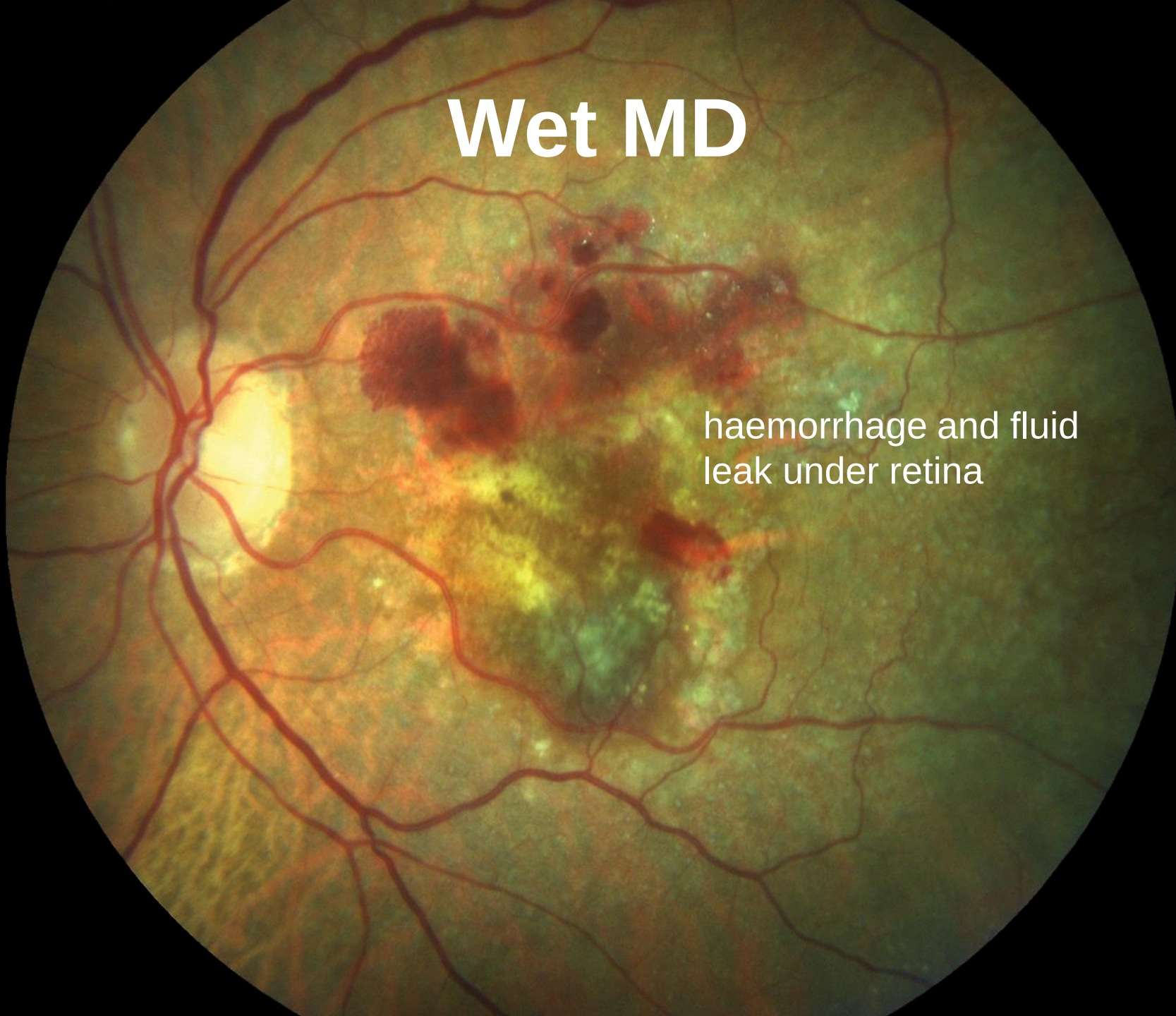
Wet

sudden and severe

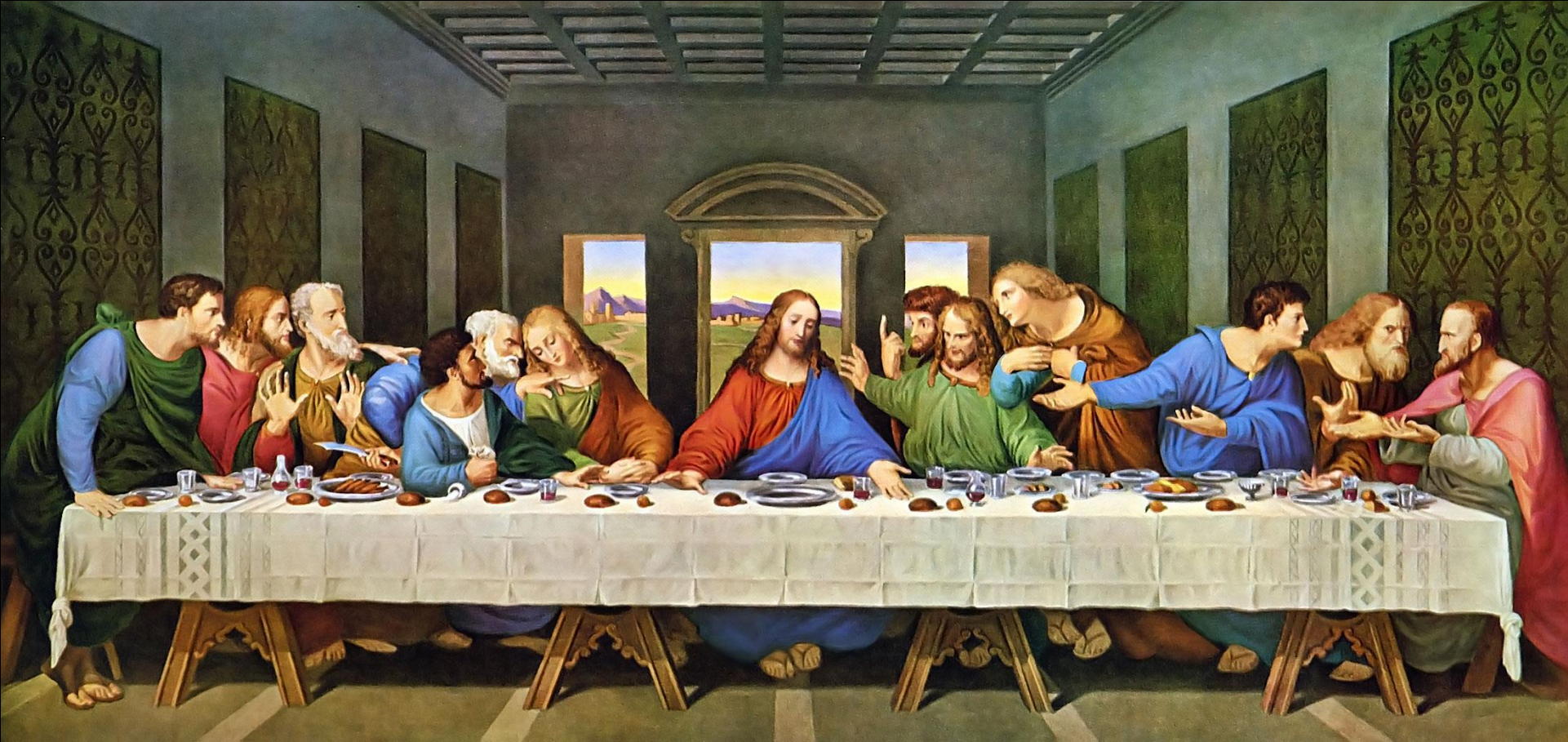


Wet MD

haemorrhage and fluid
leak under retina



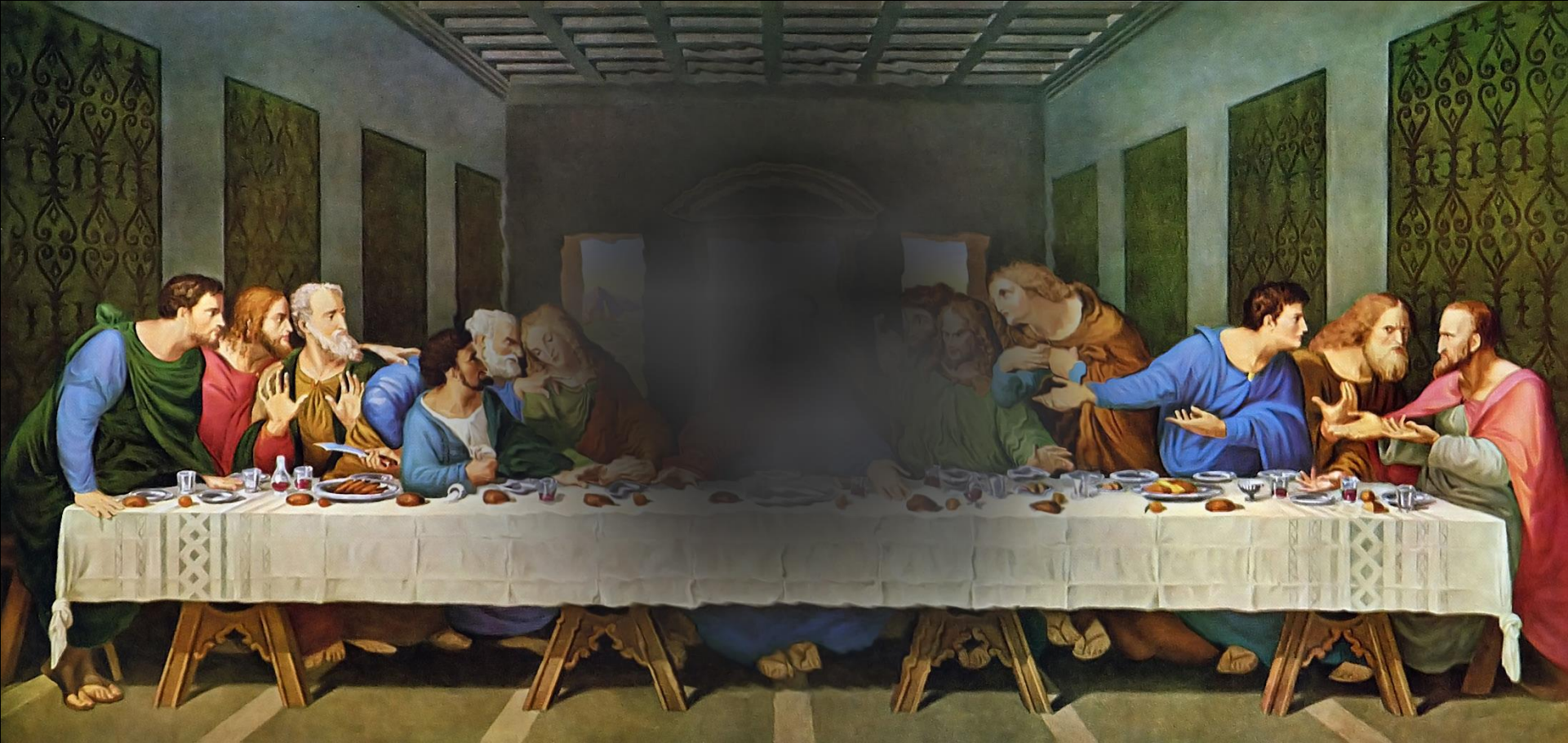
Symptoms



Symptoms



Symptoms



Blurred vision

Loss of contrast

With macular
degeneration, print
may appear distorted,
and parts of words
may be missing.

Distortion: straight lines are crooked



When Sampler CPU 1 boots up "Code Meter" automatically loads. This is a Wiboo application (free online from Wiboo.com). This is essential to recognize the DVZ-RT/Space/Library authorization USB key (dongle). This may be immediately visible because it's in the Windows Task Tray. This runtime program is actually installed on all the DVZ-RT computers (Control and Samplers).

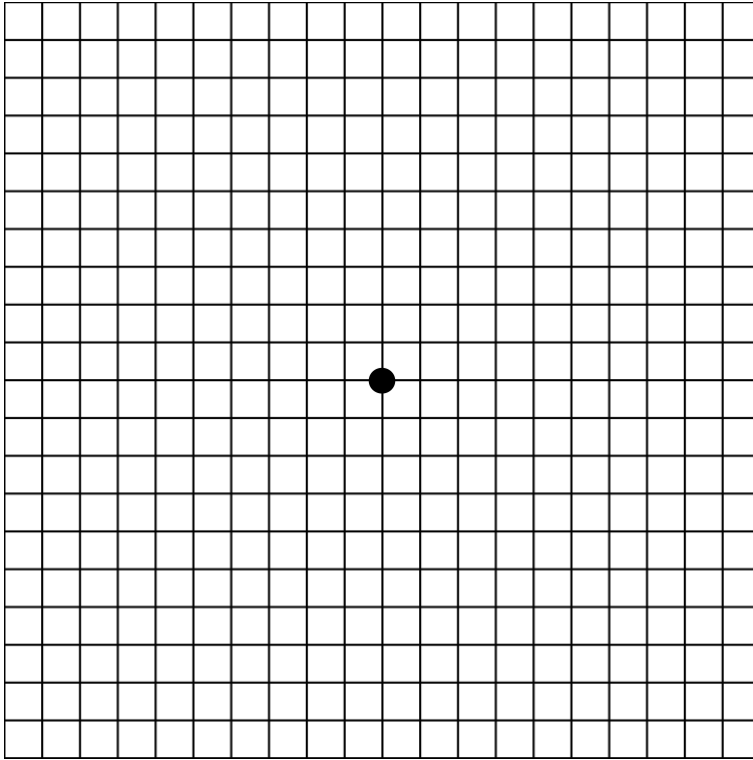
If the Code Meter task Tray icon is green, this means the authorization key is present on the computer being viewed. On those computers where the key is not installed, the icon will be gray, but it will work because the program accesses the valid key over the network.

Also, on all Samplers, you will see an AI Crypt VST Host (Helix) icon. That also loads automatically upon boot up. This AI Crypt info remains only to beta turn-key systems, and will change later.

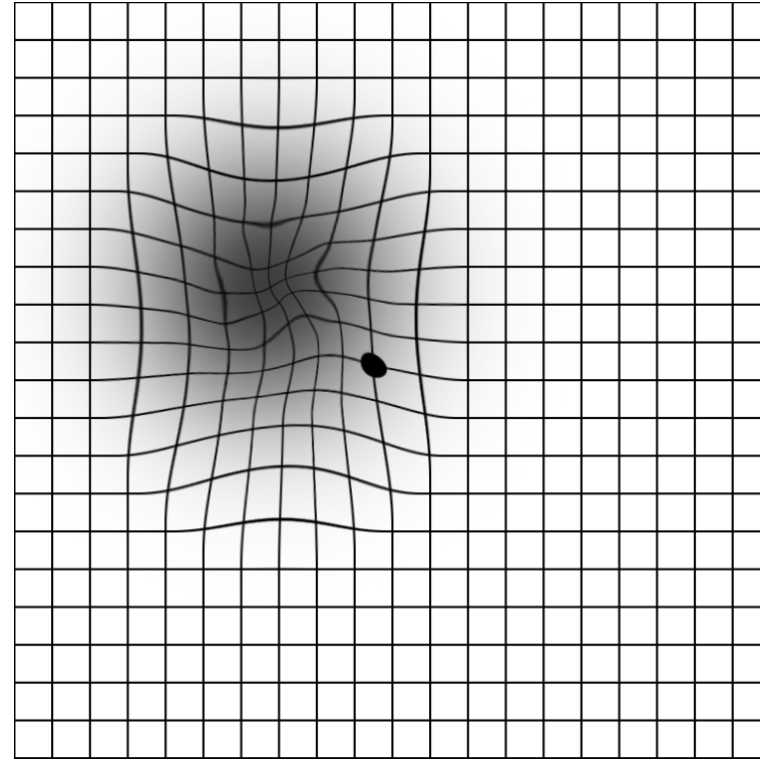
If the icon is not present, launch it from the desktop icon, or look in the Start Menu - Programs/Audio Impressions/AI Synaps and launch AI Crypt. If it isn't there, it failed to load or the Wiboo key is not connected so please make sure it's present on one of the computers, that they're all networked correctly together, etc.

If it's loaded, right-click on the icon and a context menu will come up. The first item will be Disconnect if all loaded correctly. Don't select this. If the first item is "Mount" then select this (this mounts the library). If you Mount, you have to choose the image, and that's located on the sample drive and named "aist" (Audio Impressions Symphonic Image). You select it and mount it to x (using the dropdown menu). No letter other than x will function correctly. Note: All this will occur automatically in the final release and even in beta you shouldn't have to do the mounting if the boot process works correctly.

Amsler grid

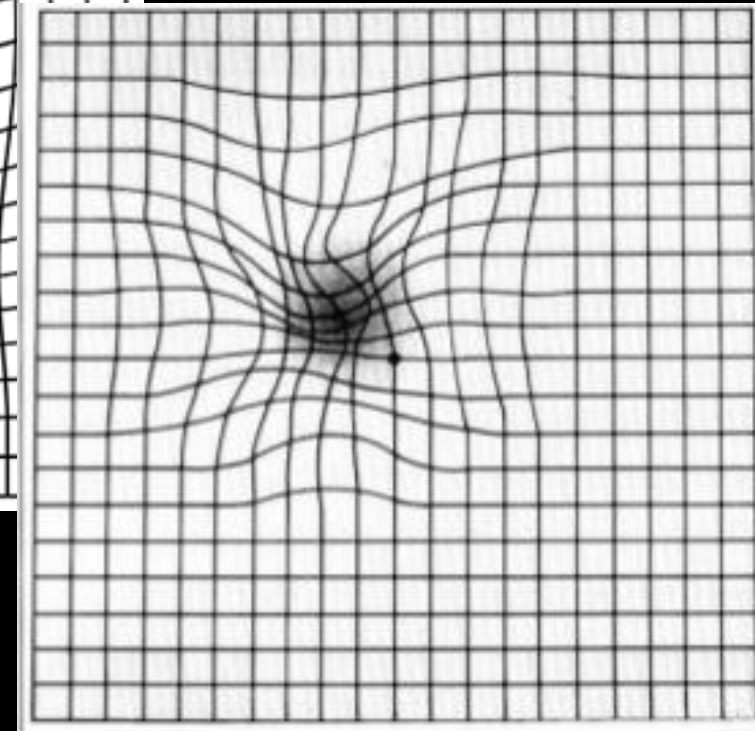
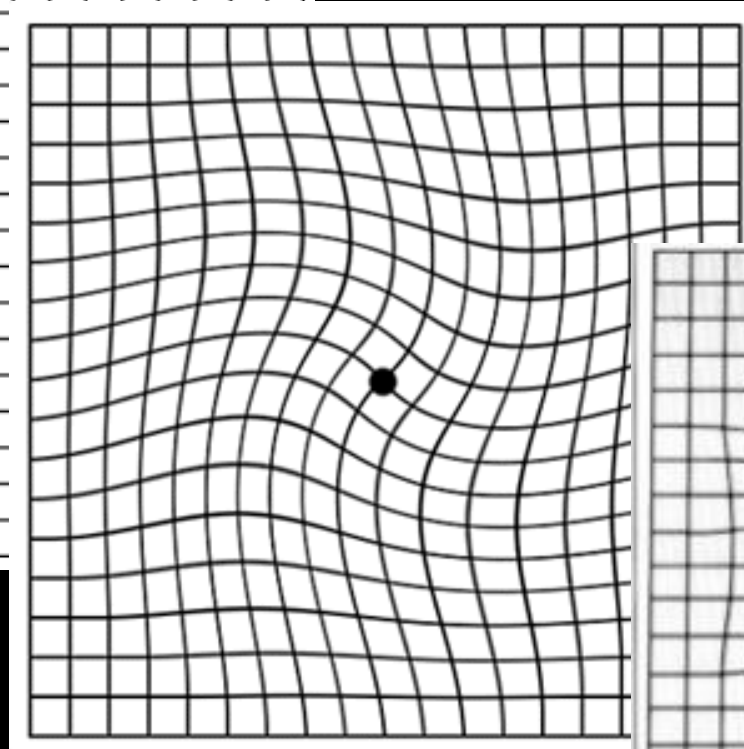
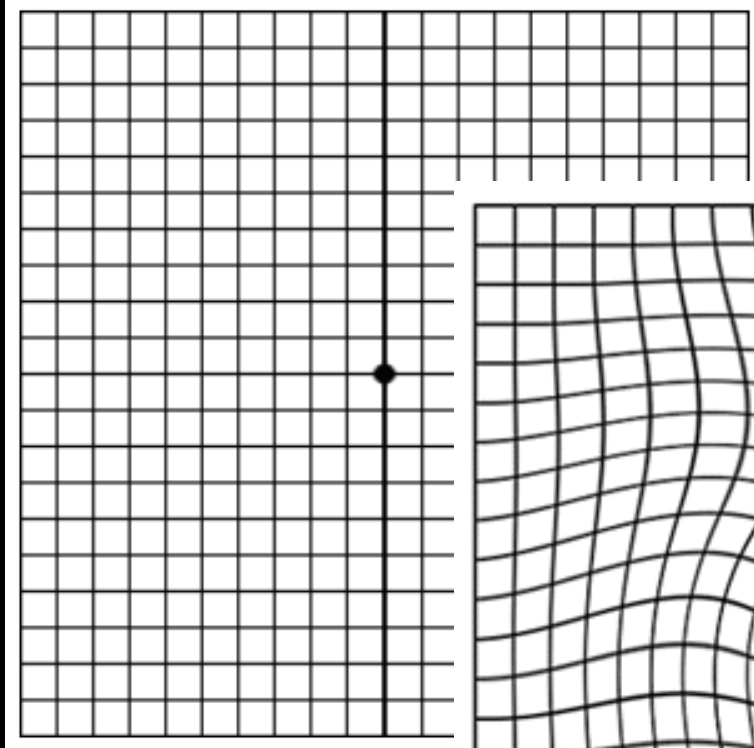


Normal



See an eye care
professional

Amsler grid



LUTEIN



2 to 3 times a week

salmon, tuna, anchovies, sardines



Age Related Eye Disease Studies

National Eye Institute, USA



AREDS 1



25%

risk reduction of developing advanced MD

19%

reduced risk vision loss in moderate to advanced MD

AREDS 1 and 2

Vitamin C 500 mg

Vitamin E 400 IU

Zinc 80 mg

Copper 2 mg

Lutein 10 mg

Zeaxanthin 2 mg



Recommendations

AREDS supplement
for moderate and
advanced MD

Lutein if > 50, positive
family history and
insufficient green leafy
vegetables



72% over 50
have ever heard of MD

59%
know it affects the eye



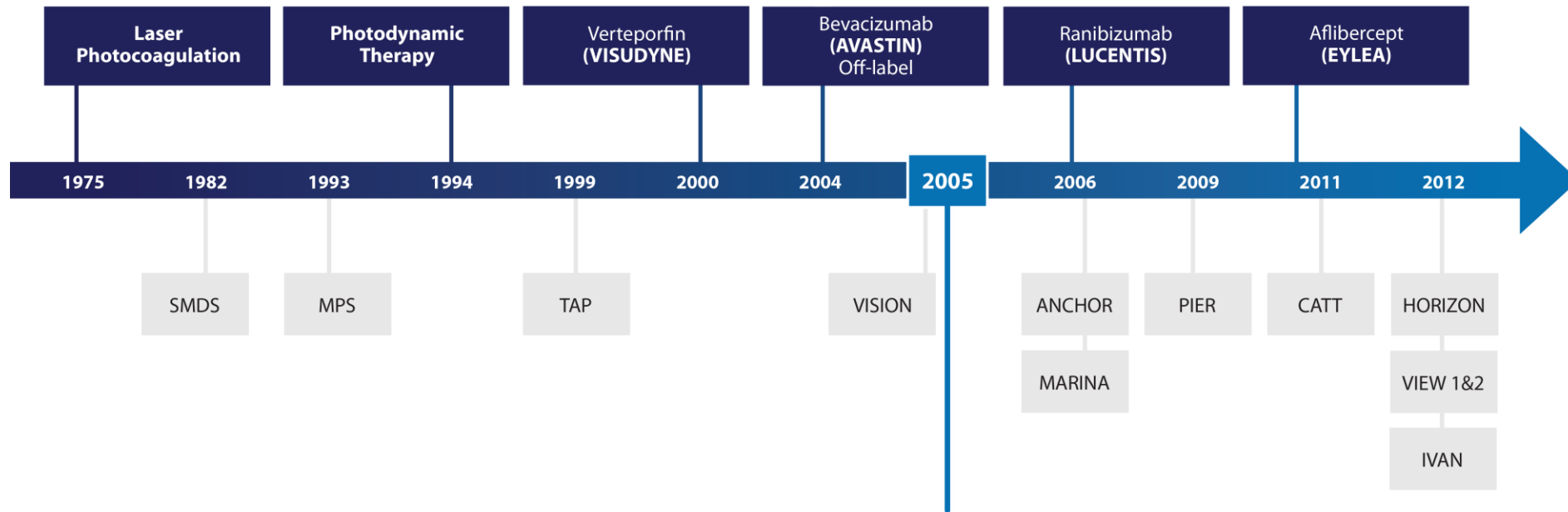
75% lose vision

with wet MD after 3 years no treatment

50%

at 3 months





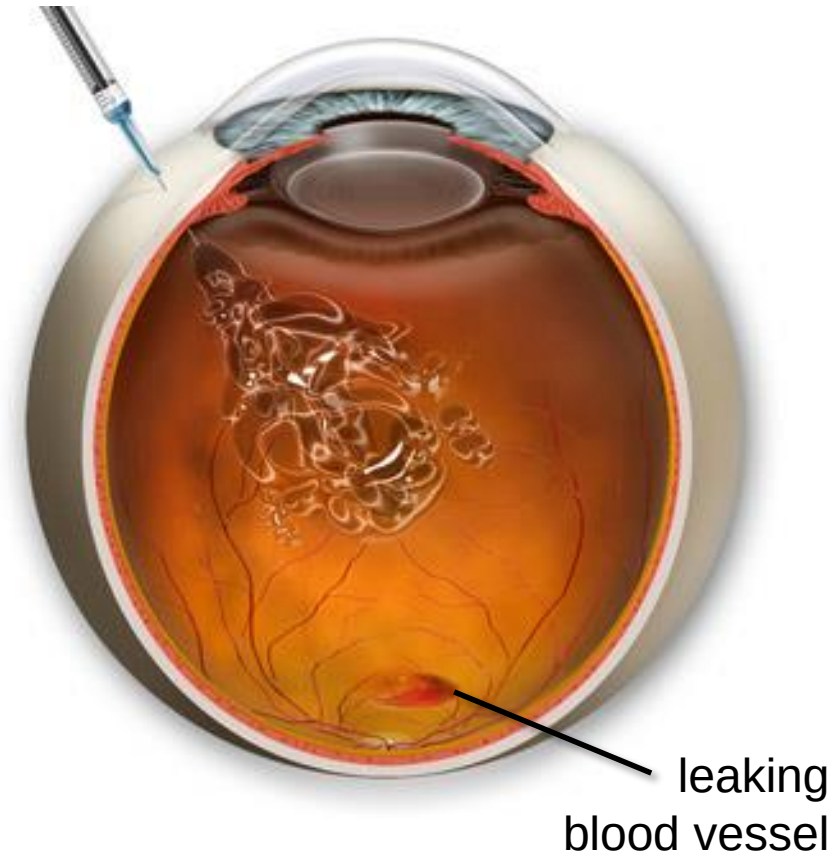
Introduction of anti-VEGF
treatments in New Zealand

Treatment of Wet MD

VEGF causes blood vessels to grow

Avastin, Lucentis and Eylea block VEGF

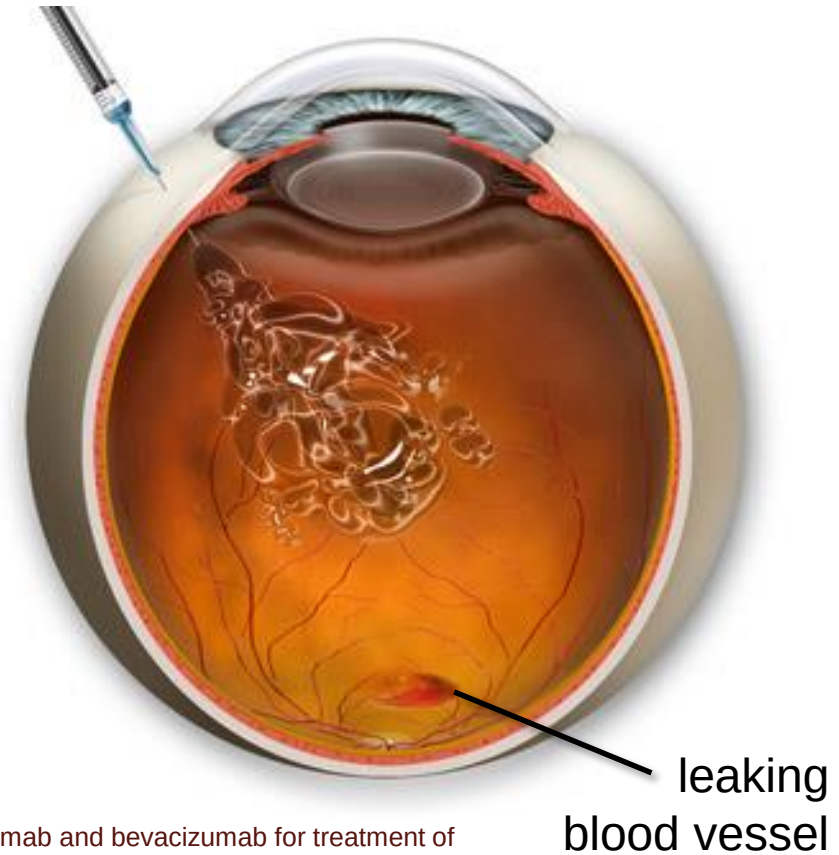
Stabilise vision and prevent further loss



Avastin and Lucentis

4 weekly injection

Equivalent effects¹⁻³



1. CATT Research Group, Martin DF, Maguire MG, Fine SL *et al.* Ranibizumab and bevacizumab for treatment of neovascular age-related macular degeneration: two-year results. *Ophthalmology* 2012;119:1388-1398.
2. CATT Research Group, Martin DF, Maguire MG, Ying GS *et al.* Ranibizumab and bevacizumab for neovascular age-related macular degeneration. *N Engl J Med* 2011;364:1897-1908.
3. Chakravarthy U, Harding SP, Rogers CA *et al.* Alternative treatments to inhibit VEGF in age-related choroidal neovascularisation; 2-year findings of the IVAN randomised controlled trial. *Lancet* 2013;382:1258-1267.

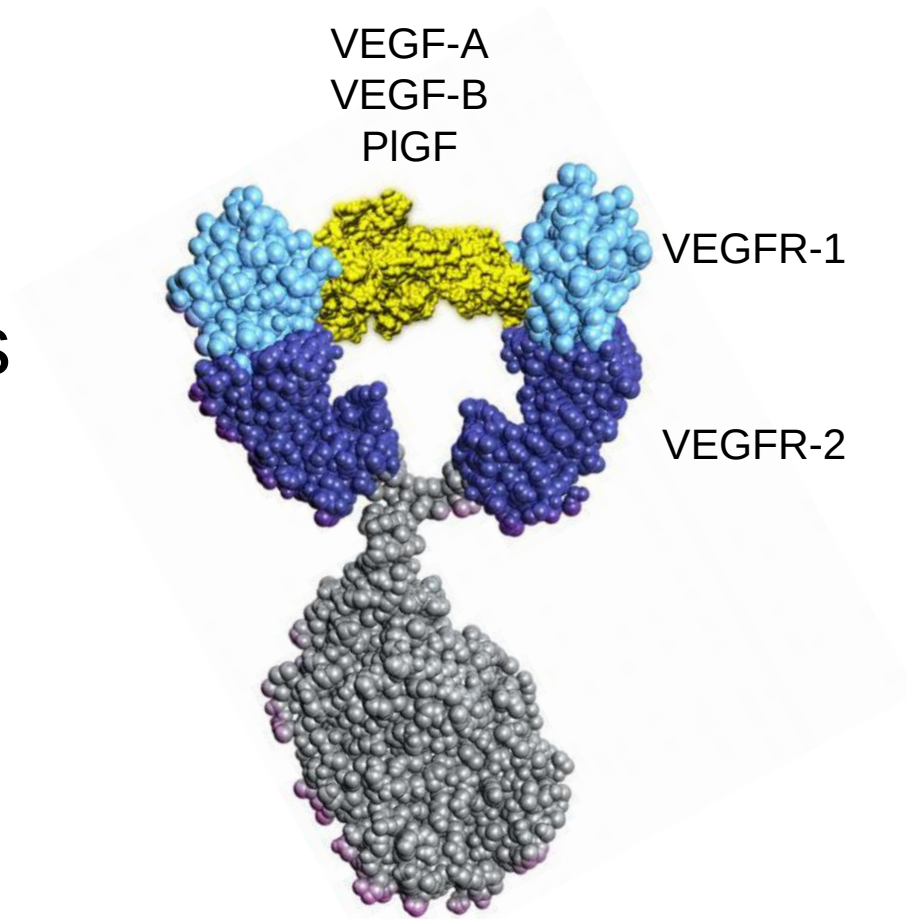
Eylea (aflibercept)

Stronger for longer

3 monthly loading doses

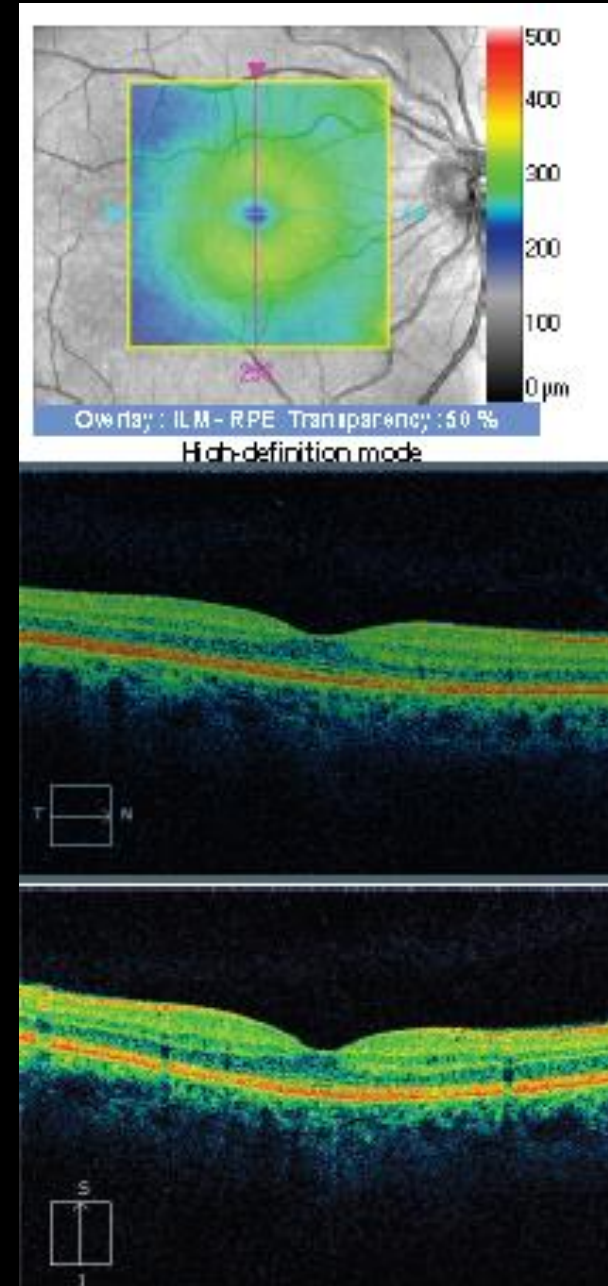
8 weekly injection¹

Fewer injections²



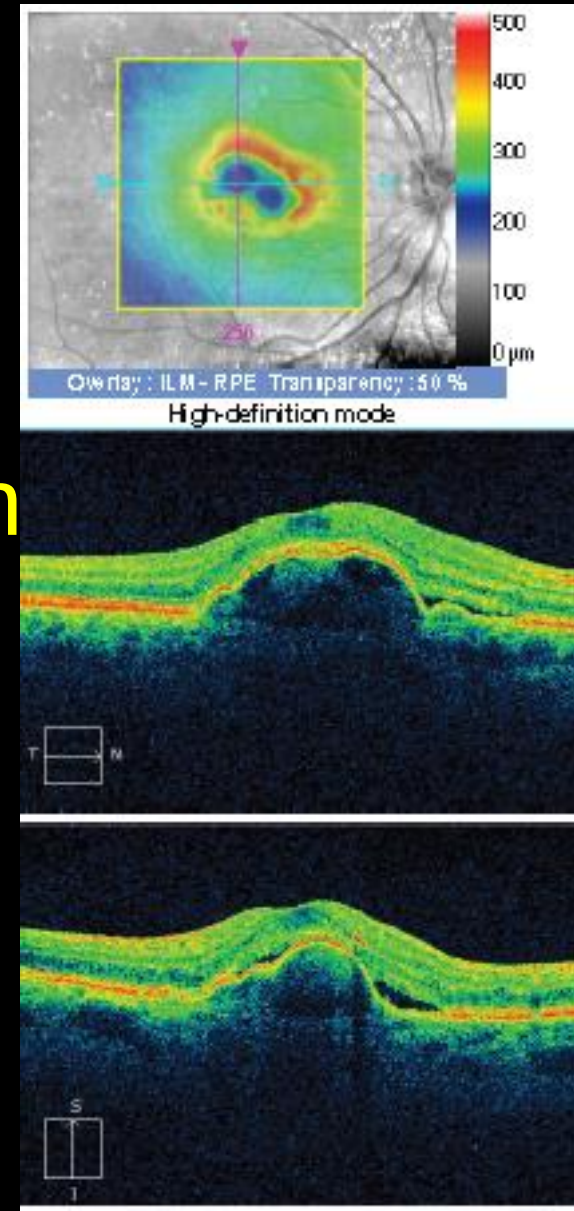
1. Heier JS, Brown DM, Chong V *et al.* VIEW 1 and VIEW 2 Study Groups. Intravitreal aflibercept (VEGF Trap-Eye) in wet age-related macular degeneration. *Ophthalmology* 2012;119:2537-2548.
2. Schmidt-Erfurth U, Kaiser PK, Korobelnik JF *et al.* Intravitreal aflibercept injection for neovascular age-related macular degeneration; ninety-six-week results of the VIEW studies. *Ophthalmology* 2013 [Epub ahead of print]

Normal macula

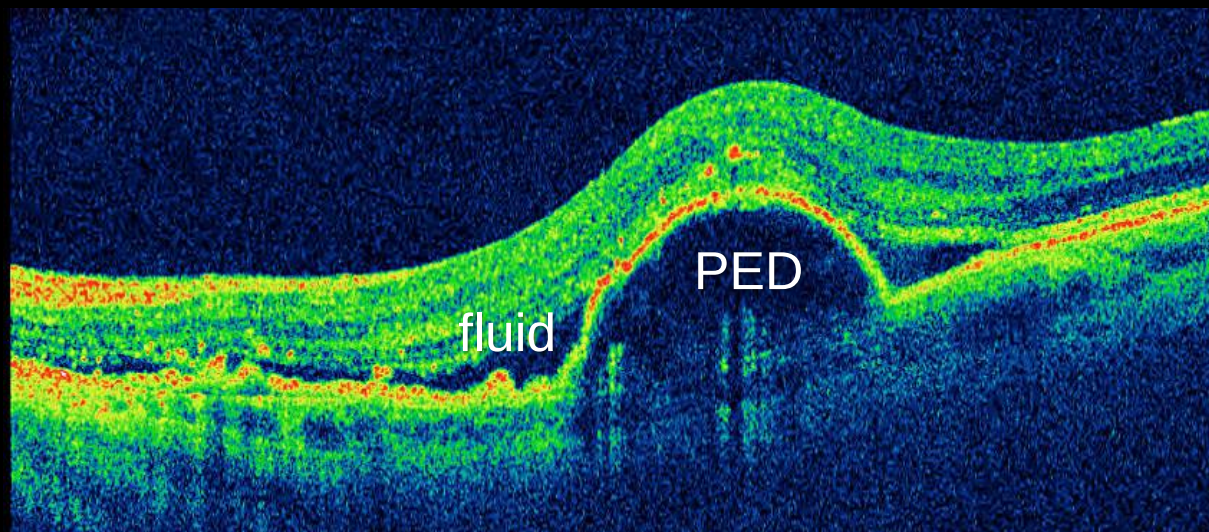


Swelling **UNDER** the Retina:

Wet Macular Degeneration

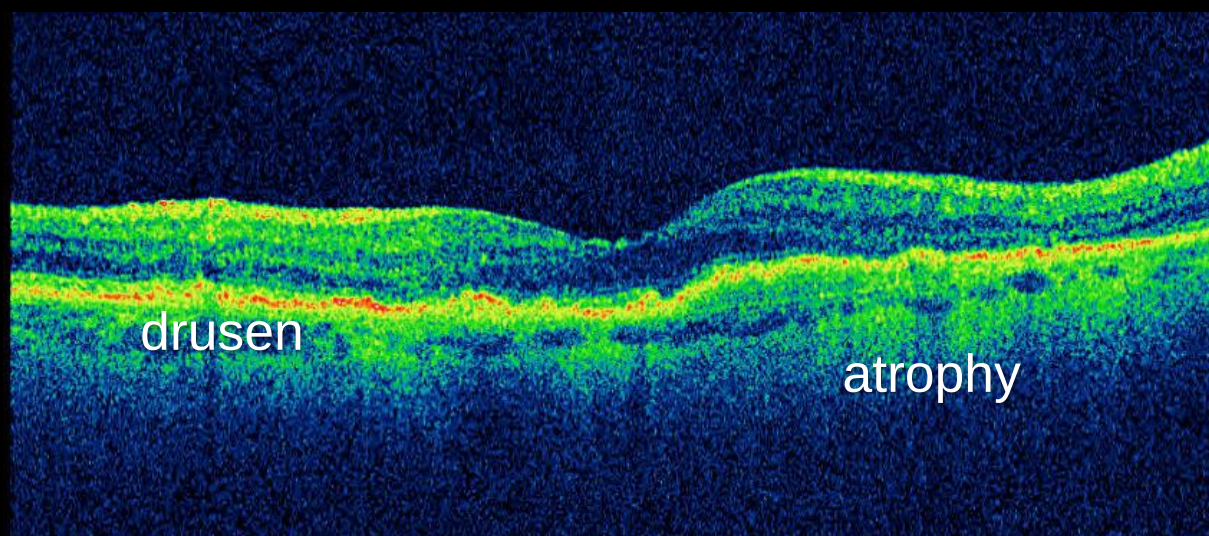


6/24



6/9

4 weeks after
Eylea



Moment of boredom!
MR L age 67yr
Positive family history for AMD

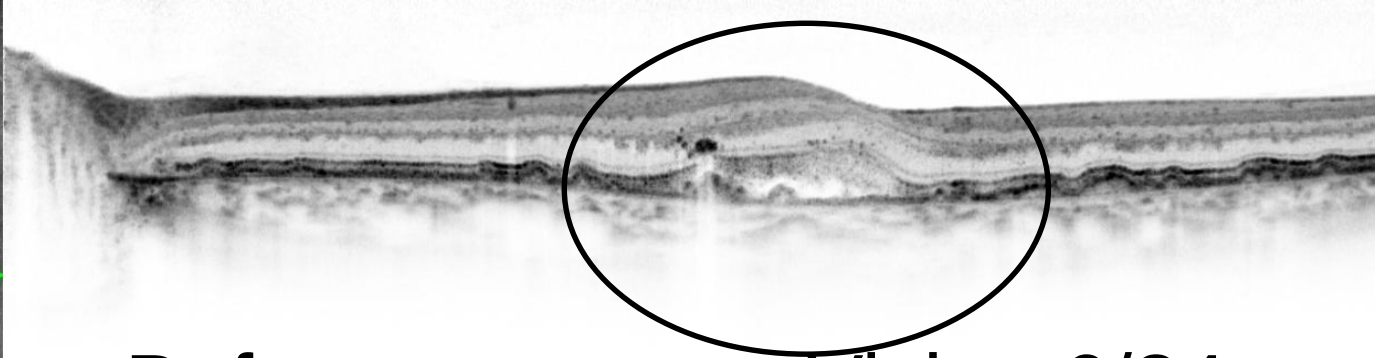
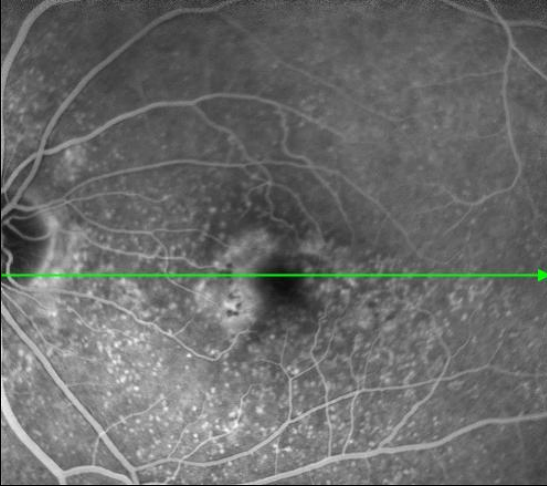


RE: 6/5

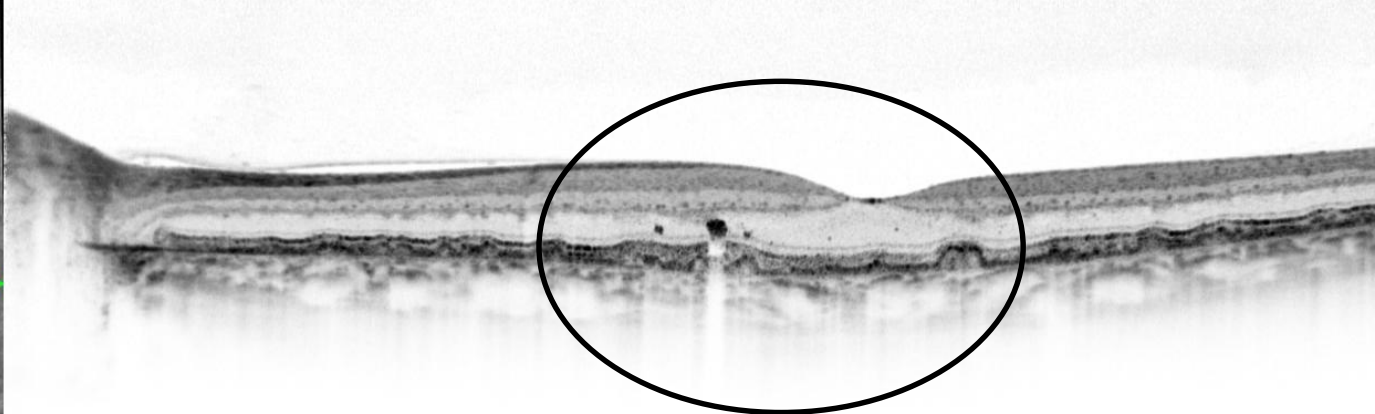
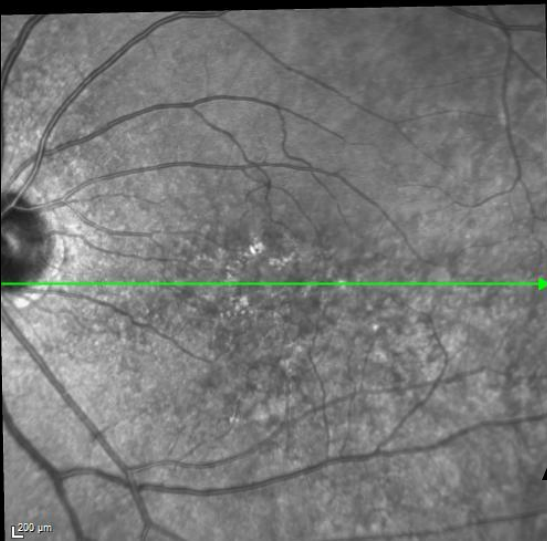


LE: 6/24





Before treatment. Vision 6/24

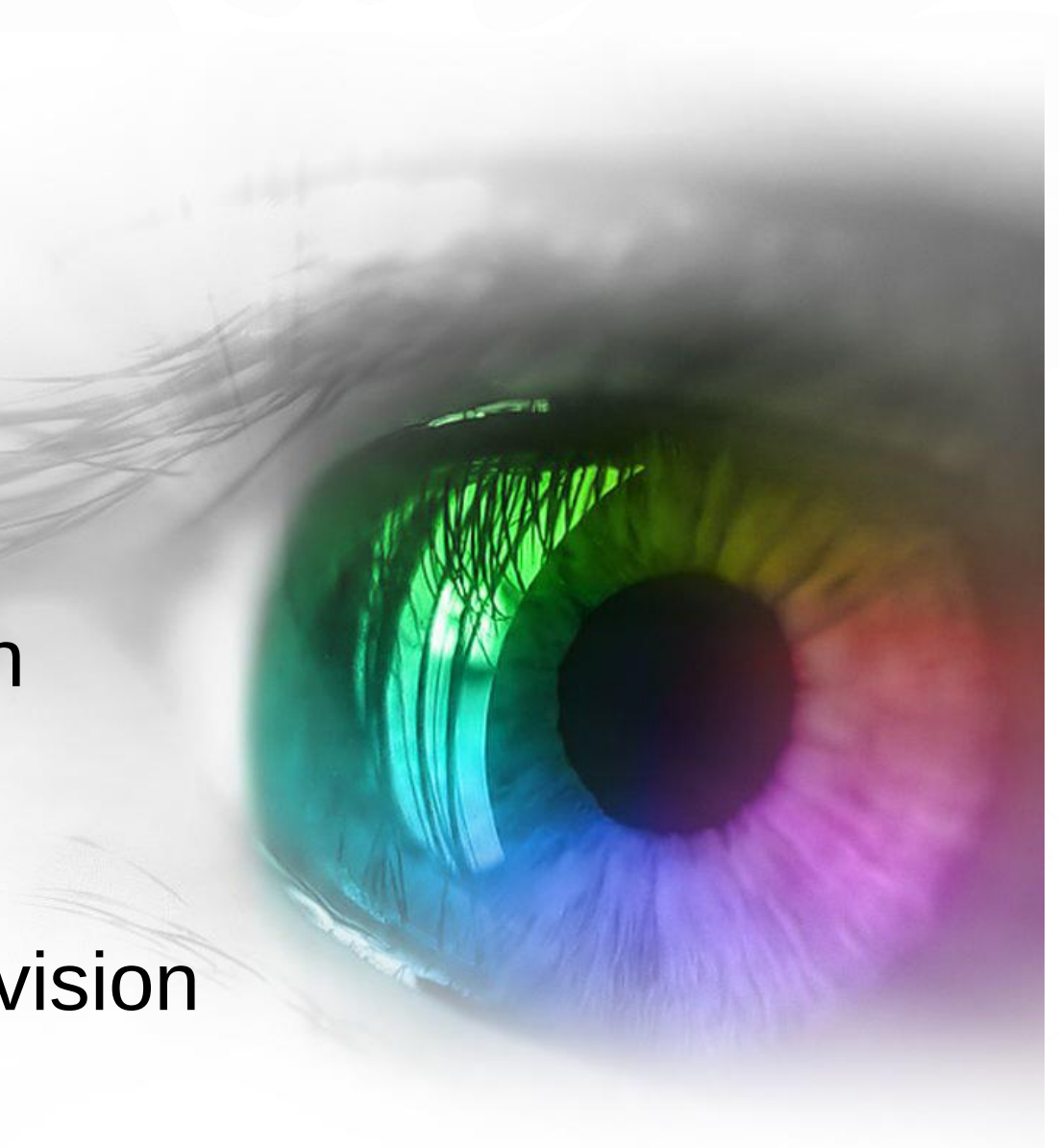


After 3 months treatment. Vision 6/6

95% stable vision

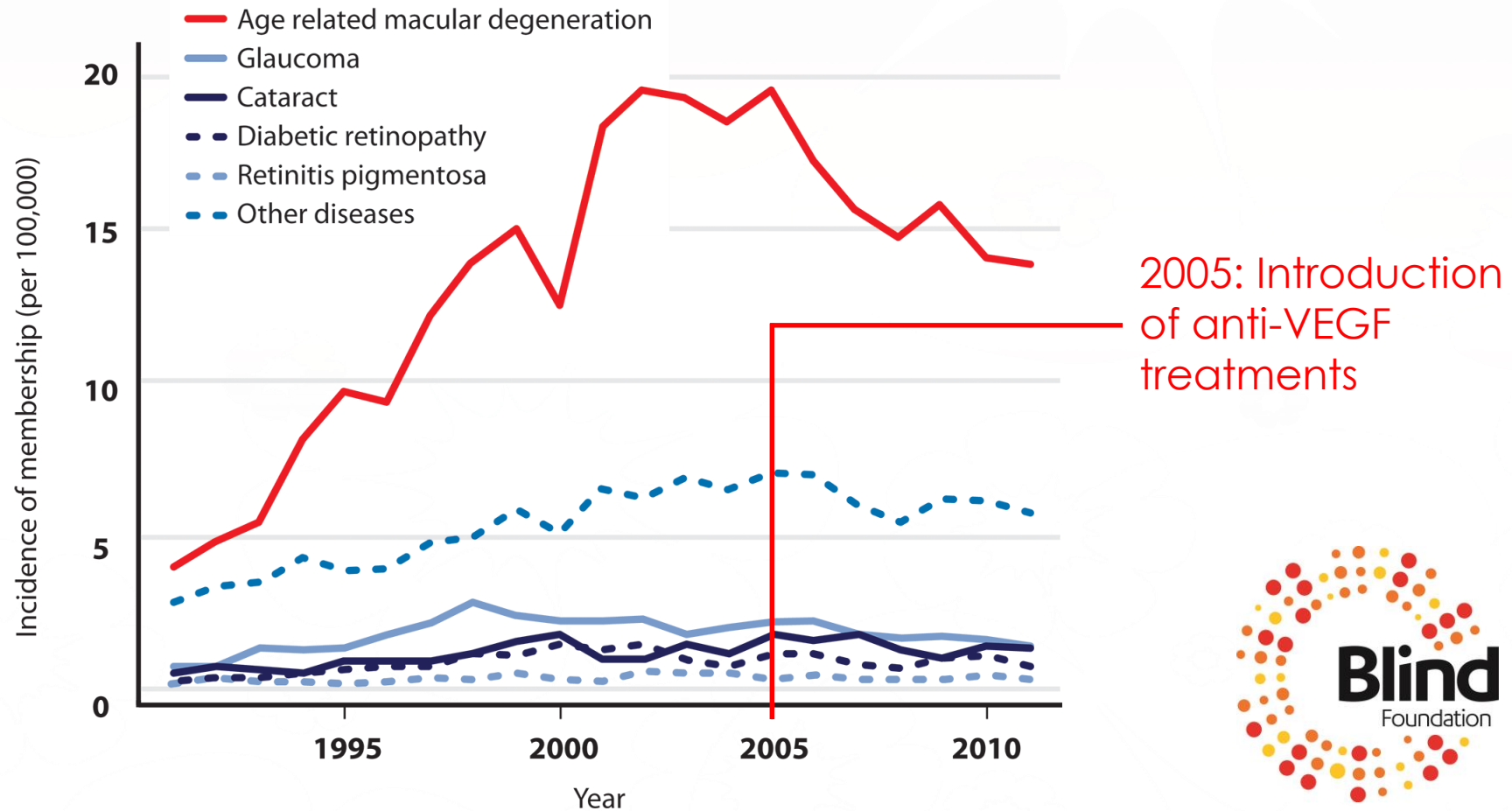
40% driving vision

30% gain 3 lines vision



1. Bloch SB, Larsen M, Munch IC. Incidence of legal blindness from age-related macular degeneration in Denmark: year 2000 to 2010. *Am J Ophthalmol* 2012;153:209-213.
2. Skaat A, Chetrit A, Belkin M *et al*. Time trends in the incidence and causes of blindness in Israel. *Am J Ophthalmol* 2012;153:214-221.
3. Cackett P *et al*. Intravitreal ranibizumab treatment of wet macular degeneration in SE Scotland – effect on blindness rates and 5 year follow up data. Presented at ARVO, 5 May 2013, Seattle WA, USA.

Less blindness





50% less in **Denmark**¹



51% less in **Israel**²



59% less in **Scotland**³

1. Bloch SB, Larsen M, Munch IC. Incidence of legal blindness from age-related macular degeneration in Denmark: year 2000 to 2010. *Am J Ophthalmol* 2012;153:209-213.
2. Skaat A, Chetrit A, Belkin M *et al*. Time trends in the incidence and causes of blindness in Israel. *Am J Ophthalmol* 2012;153:214-221.
3. Cackett P *et al*. Intravitreal ranibizumab treatment of wet macular degeneration in SE Scotland – effect on blindness rates and 5 year follow up data. Presented at ARVO, 5 May 2013, Seattle WA, USA.

*“Anti-VEGFs for wet MD is remarkable,
one of the greatest recent advances across all
medicine in past decade”*

Prof. Gary Brown

Director Wills Eye Institute Retina Service

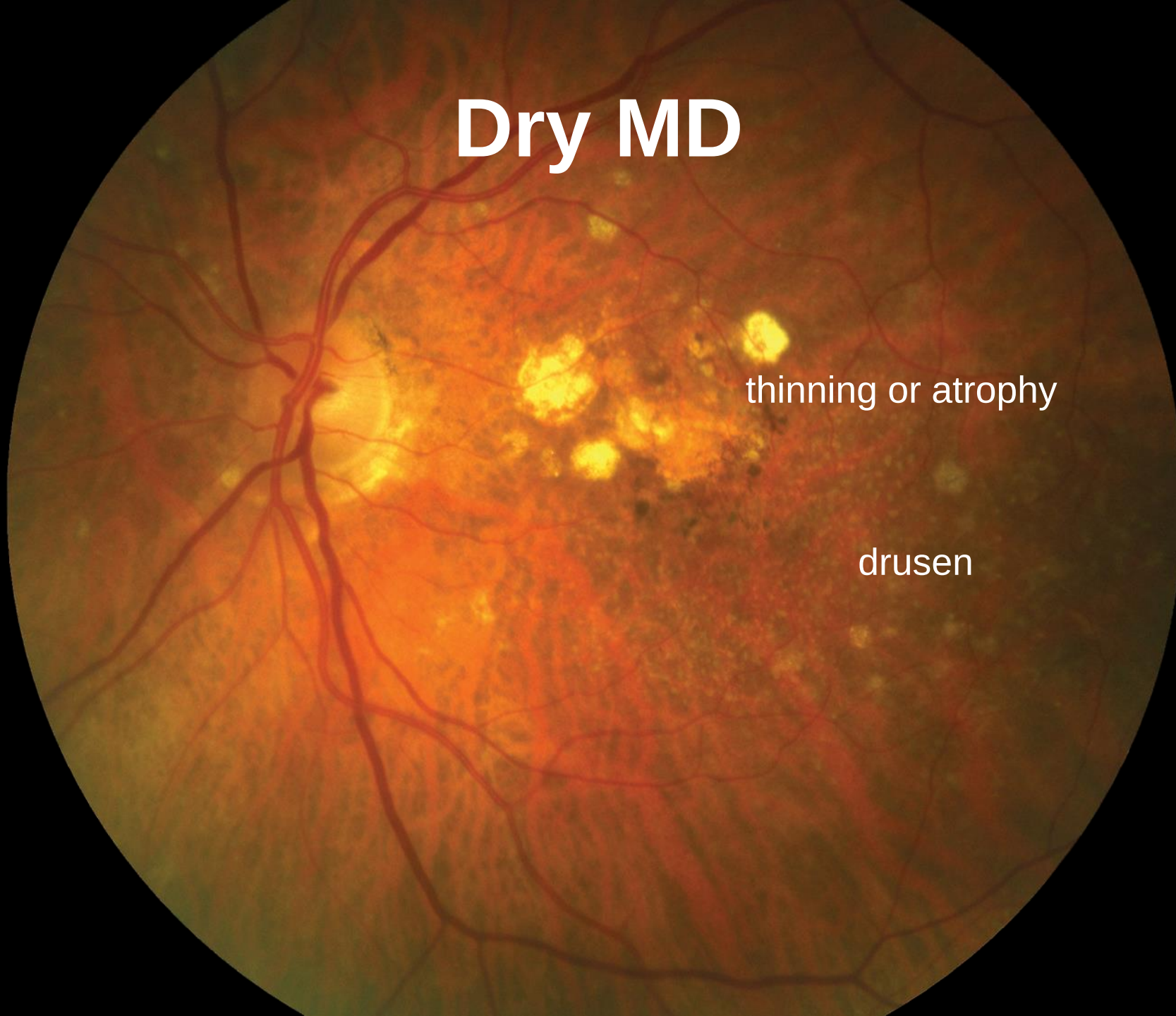
Co-director of the Centre for Value-Based Medicine



Dry MD

thinning or atrophy

drusen



In 2RT
3ns =
1m



0.000000003 seconds
33 million times shorter! than 0.1 sec

Ellex 2RT



If 2RT laser
treatment
energy =
your height



500 – 1000 times less energy
than thermal laser

**2RT laser pulse
has no time to
create thermal
damage**

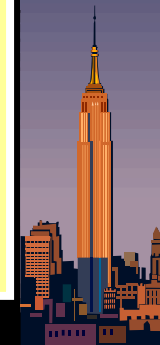
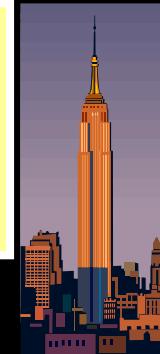
2RT laser produces
completely different, non-
thermal effects in the RPE
100,000 Watts with every
pulse!
But over 0.000000003
seconds
VERY good at producing
small
bubbles (boiling) around
very small pigments.



Then standard laser =
0.1sec
**CIRCUMFERENCE OF
THE EARTH**

**standard
photocoagu
lator energy**

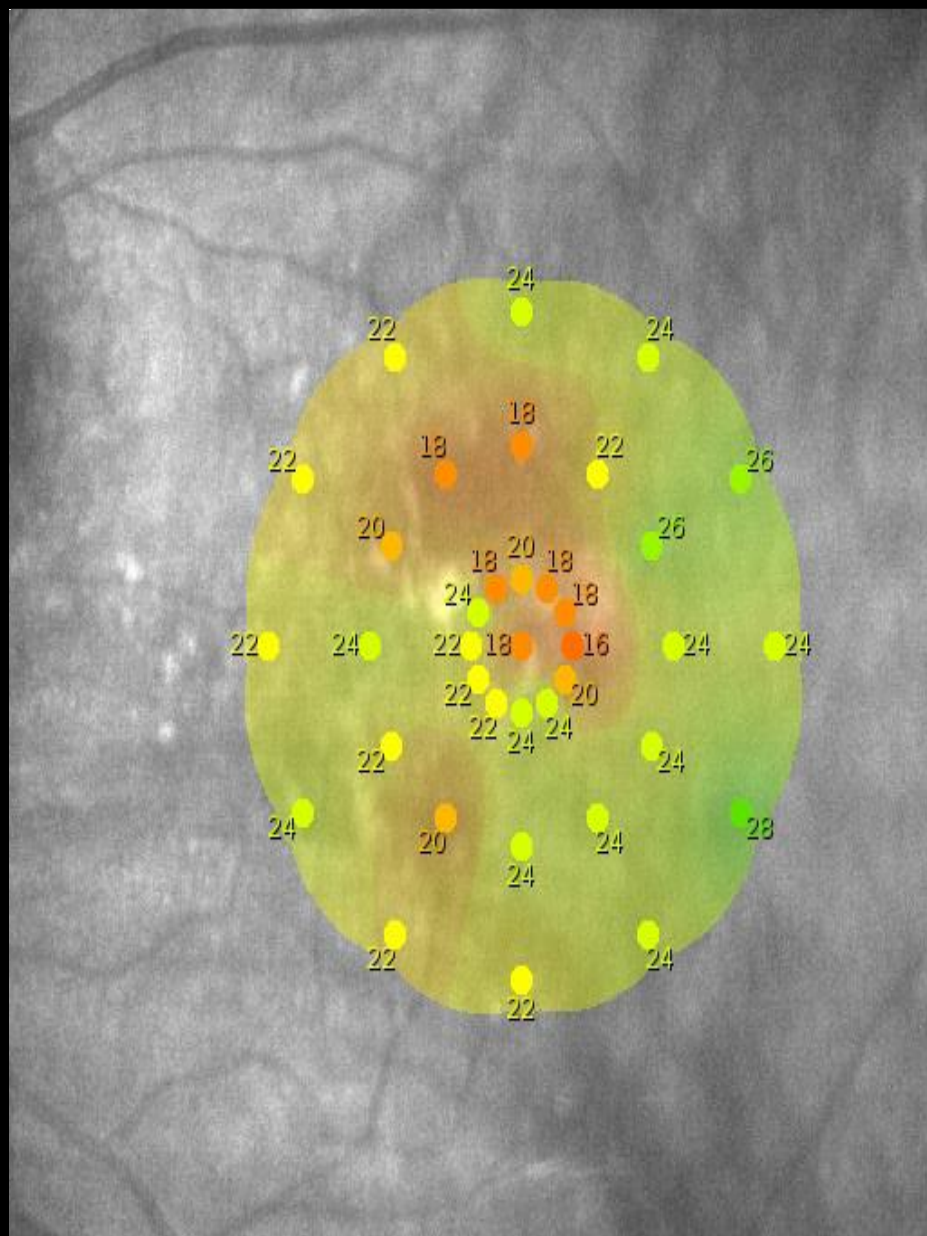
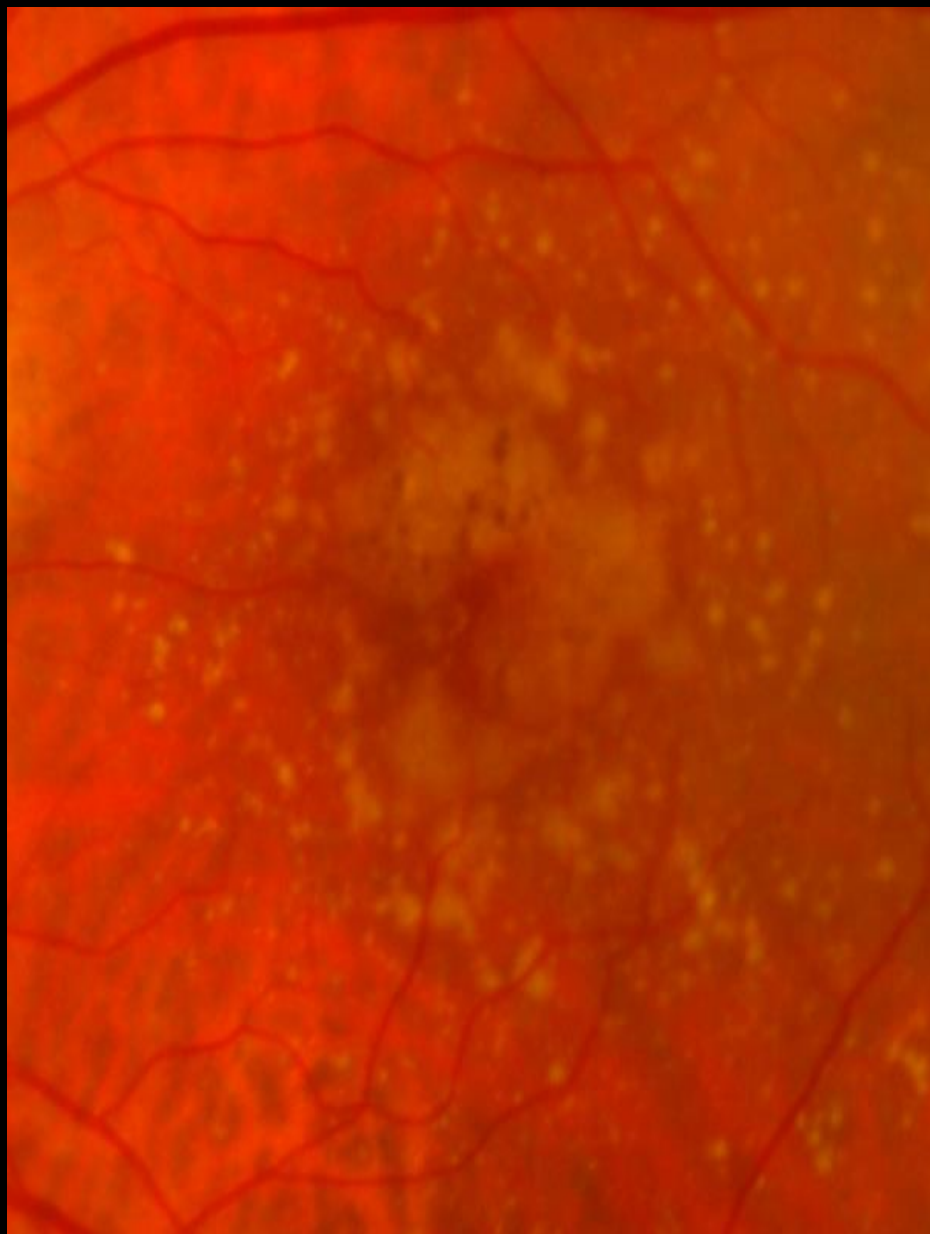
=
**4 x height
of Empire
State
building**



NML example



- 55 year old lady
- Sister AMD
- Non smoker
- R 6/7.5 L 6/12





16/07/2014, OD
BAF 30° ART(99) [HR]

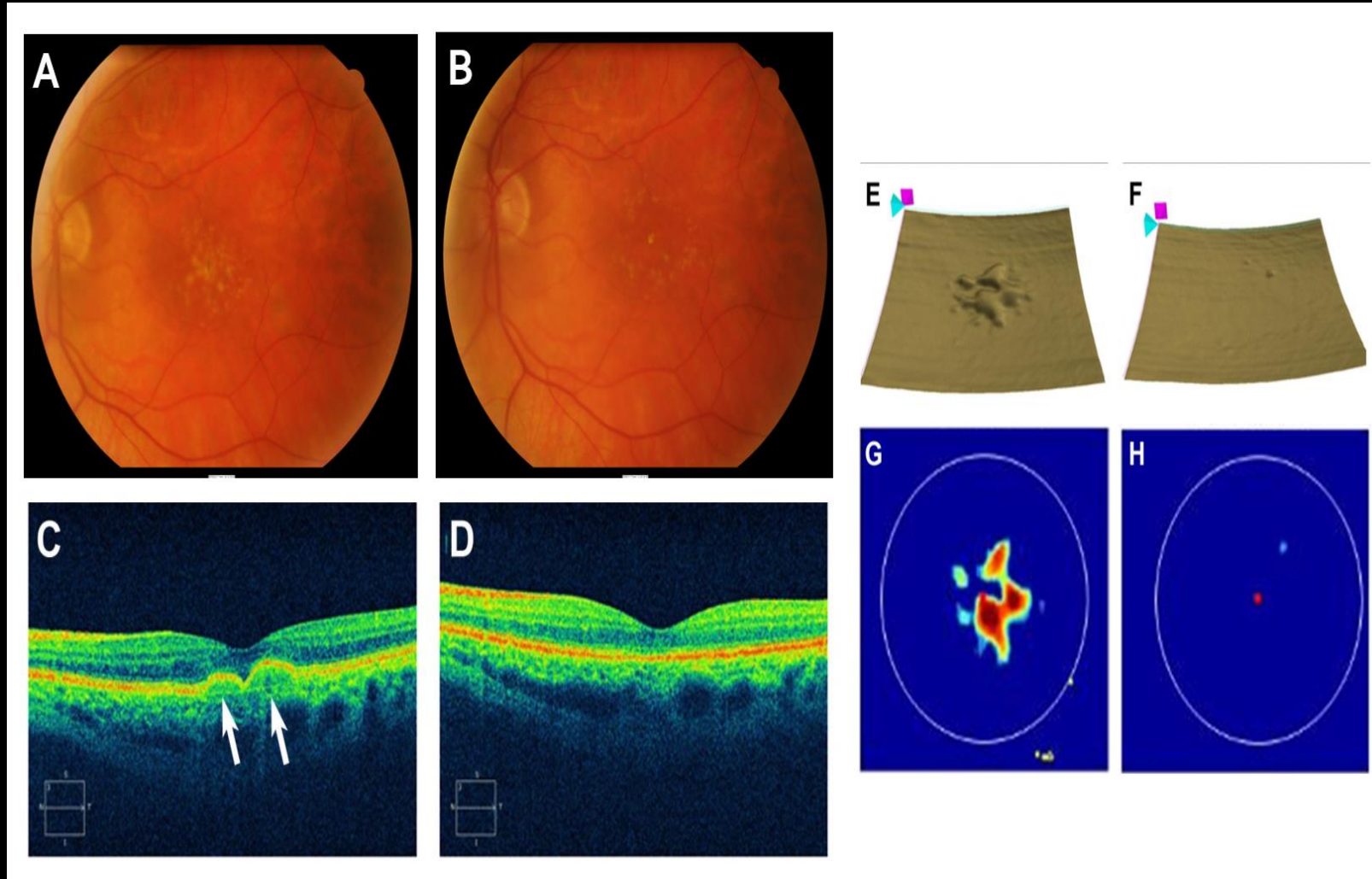
HEIDELBERG
engineering



17/12/2014, OD
BAF 30° ART(100) [HR]

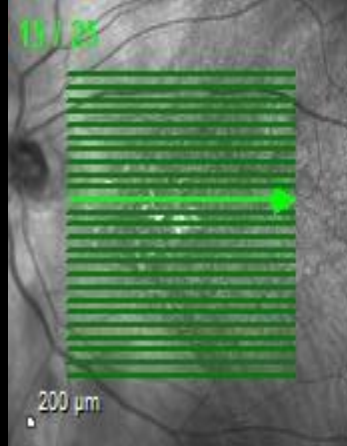
HEIDELBERG
engineering

Human: Drusen reduction

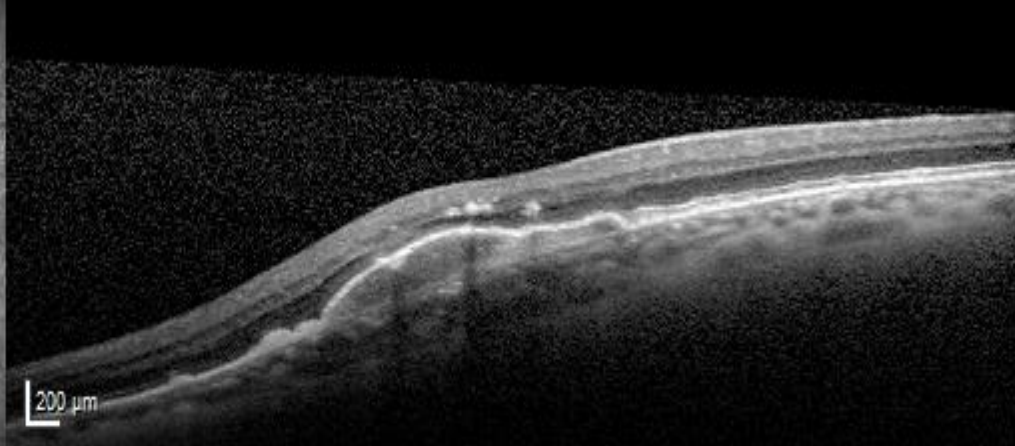




4302014 OS
SWT 30° ART(126) [HS]



200 μm



200 μm

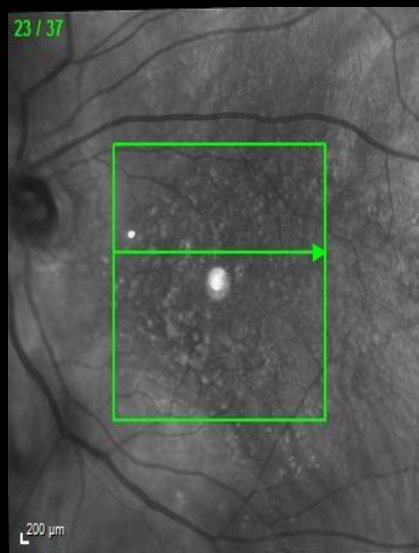
4/04/2014, OS

IR&OCT 30° ART [HS] ART(26) Q: 21

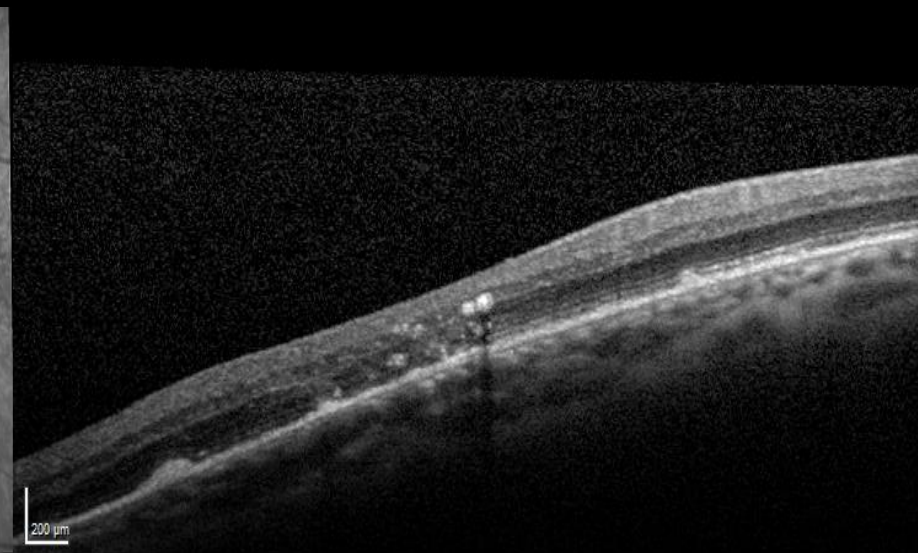
HEIDELBERG
ENGINEERING



25082014 OS
SWT 30° ART(15) [HR]



200 μm



200 μm

28/08/2014, OS

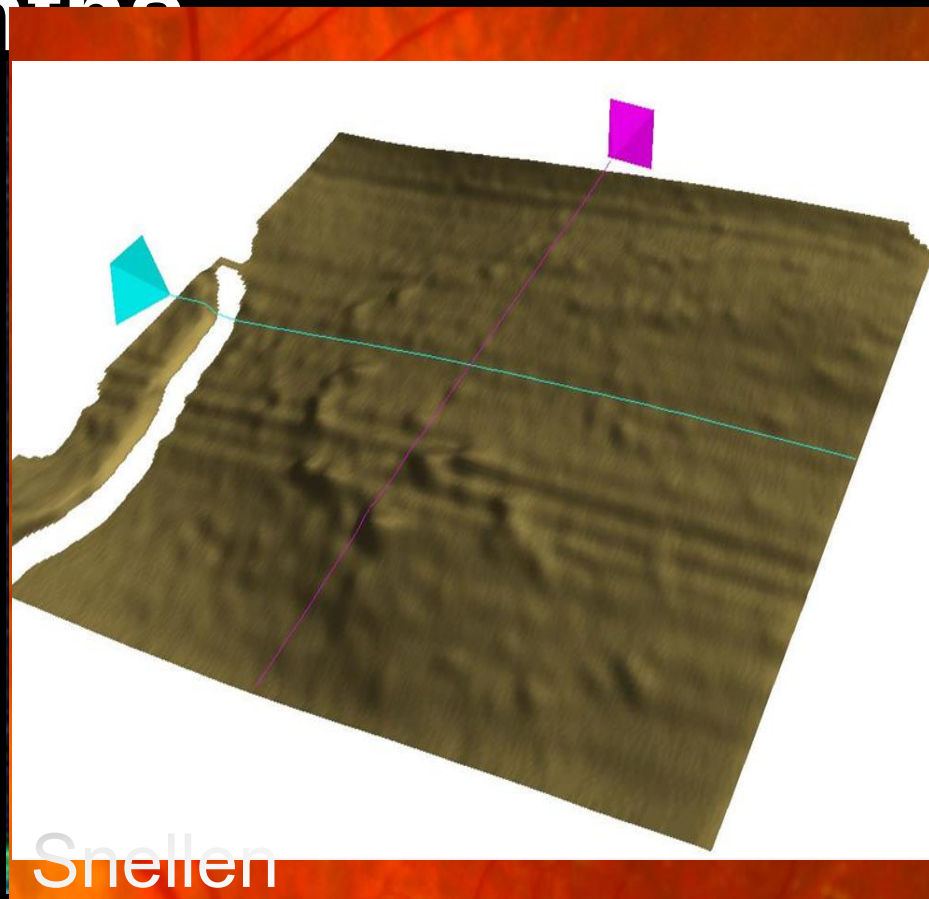
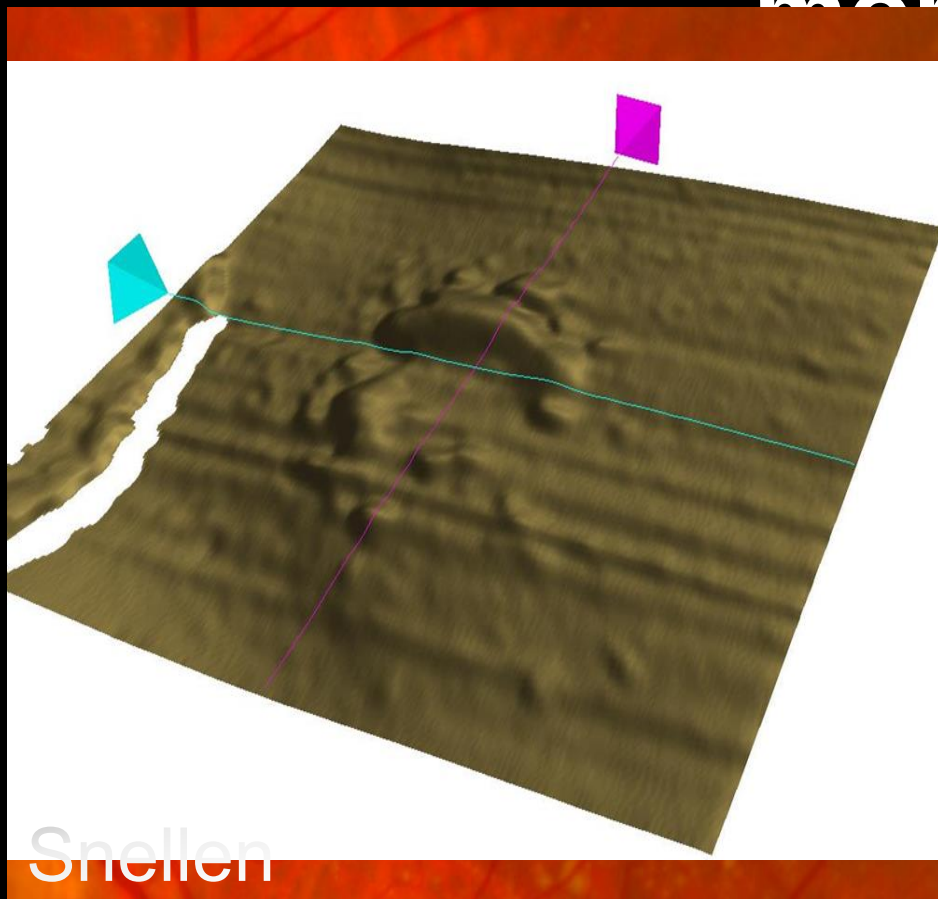
IR&OCT 30° ART [HR] ART(15) Q: 25

HEIDELBERG
ENGINEERING

Pre Rx

Post Rx 9

months



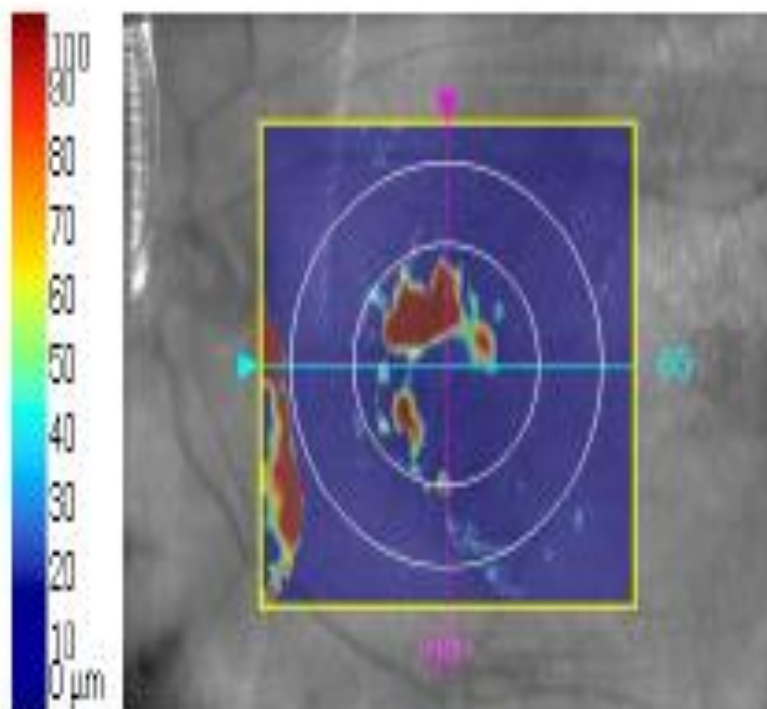
Advanced RPE Analysis : Macular Cube 512x128

OD



OS

Prior Visit

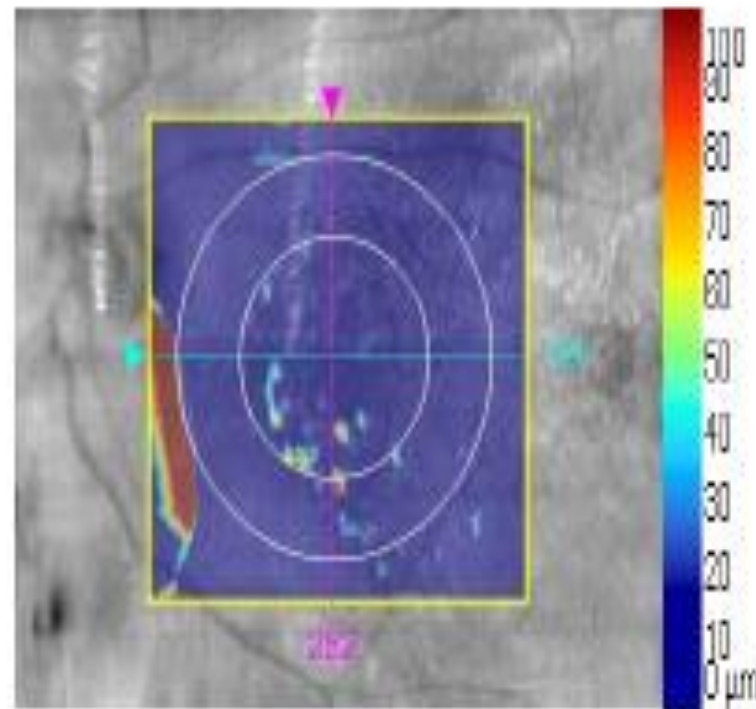


Fovea: 257, 85

50% Transparency

RPE
Elevation
Map

Current Visit



Fovea: 252, 84

50% Transparency



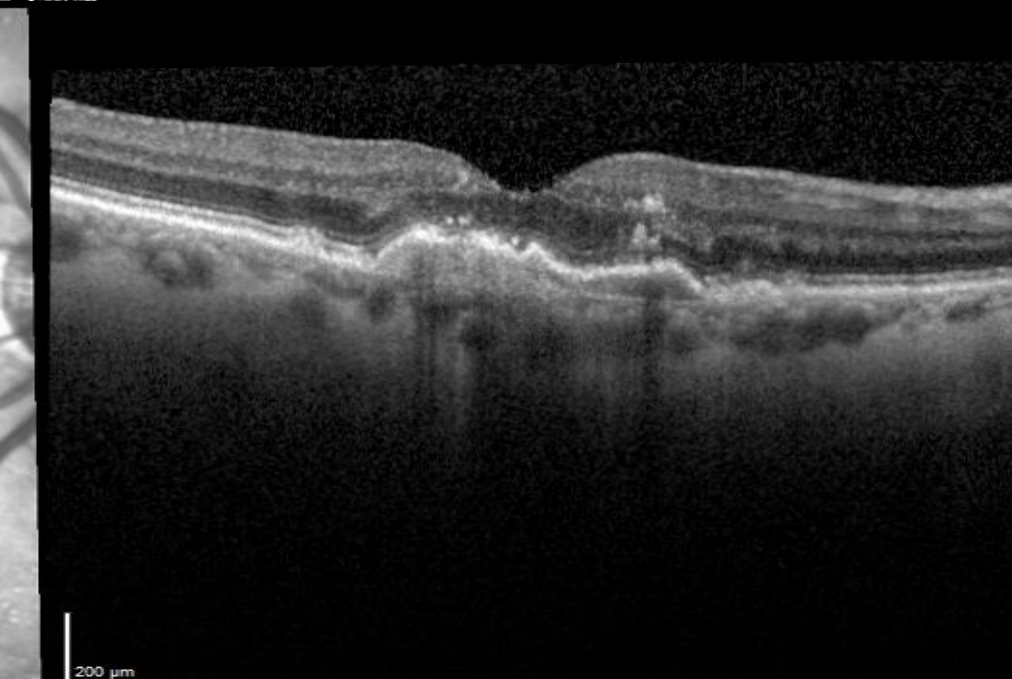
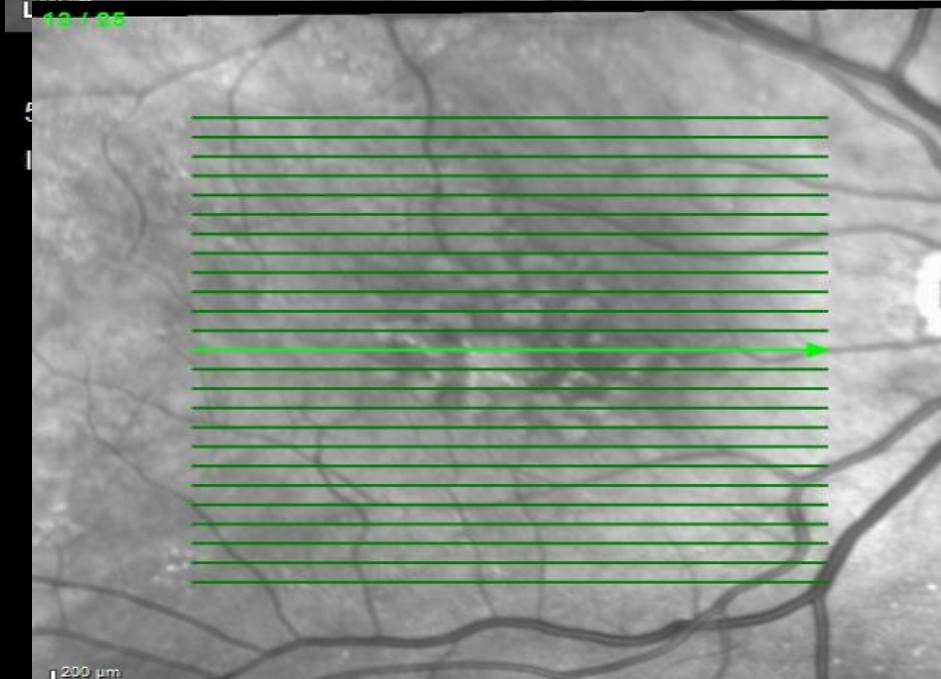
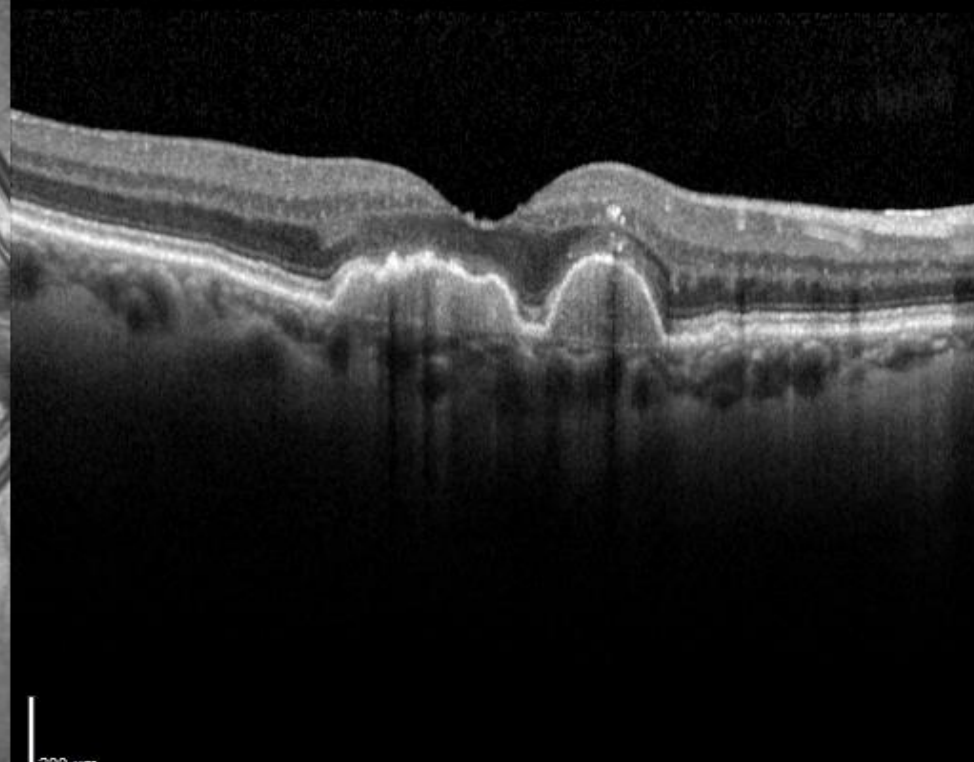
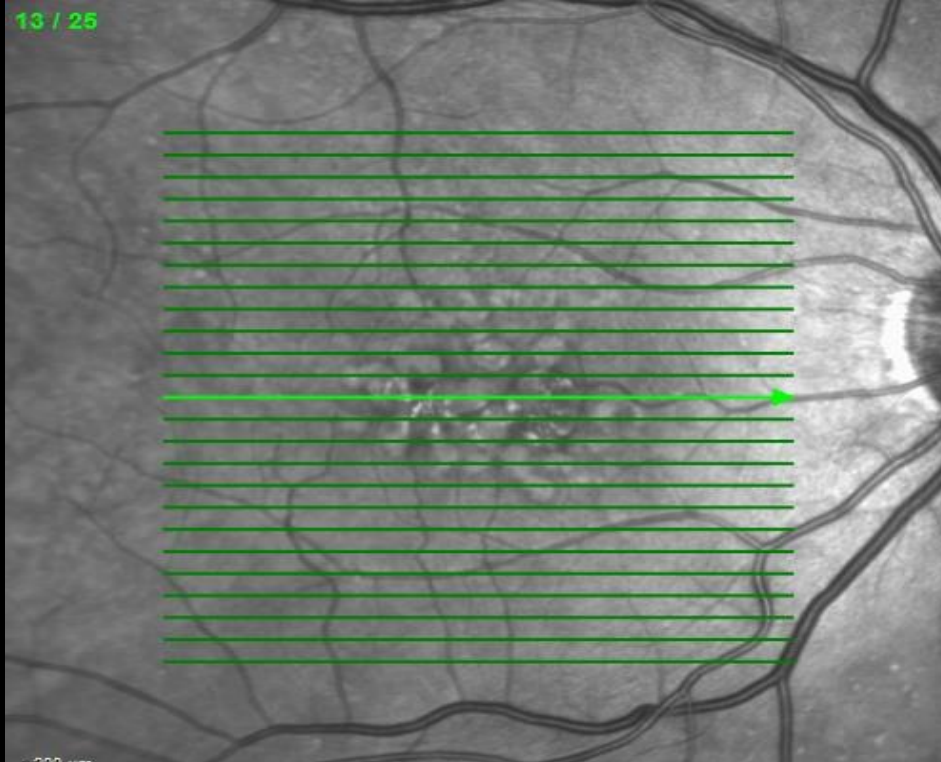
5/01/2015, OD

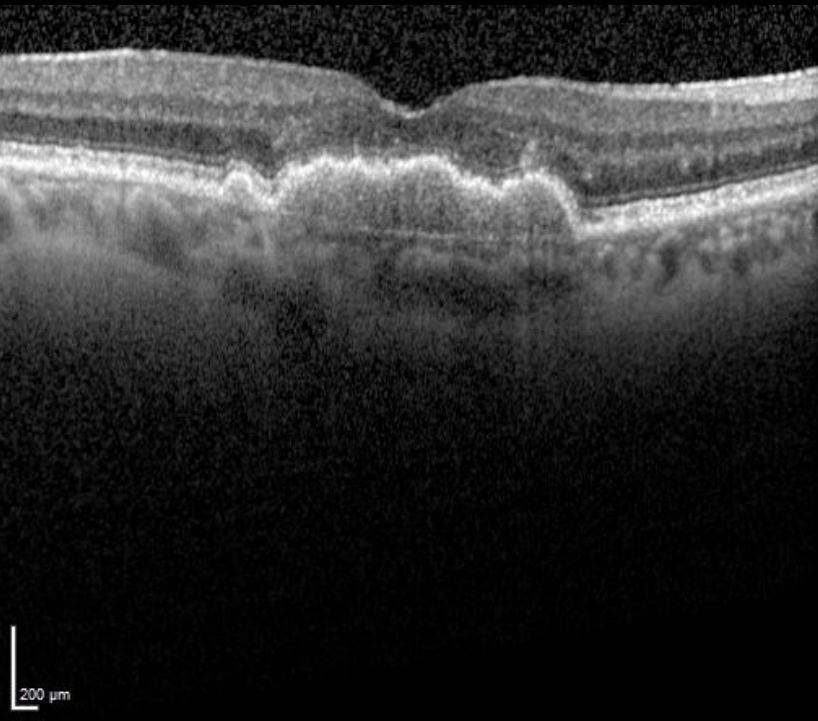
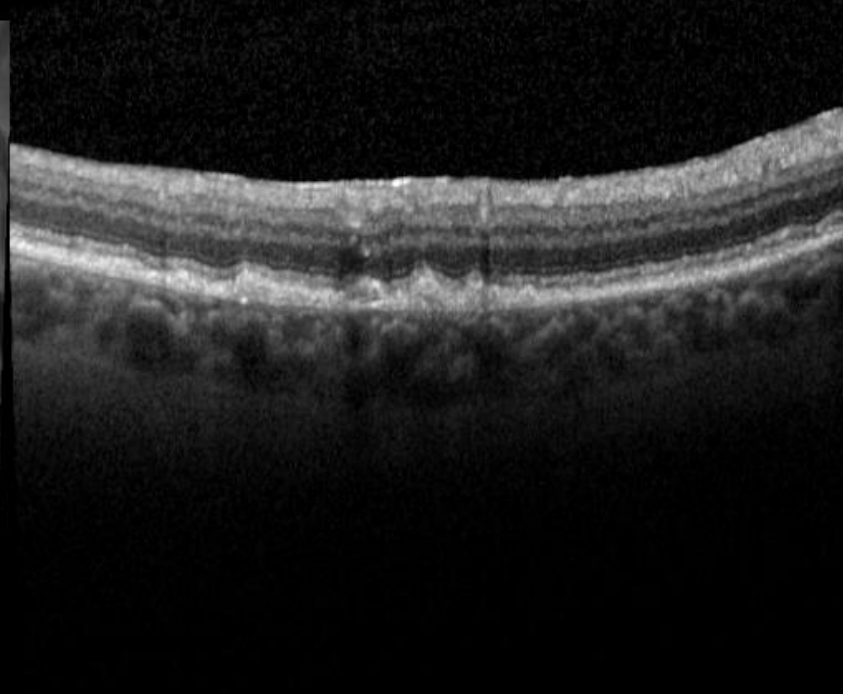
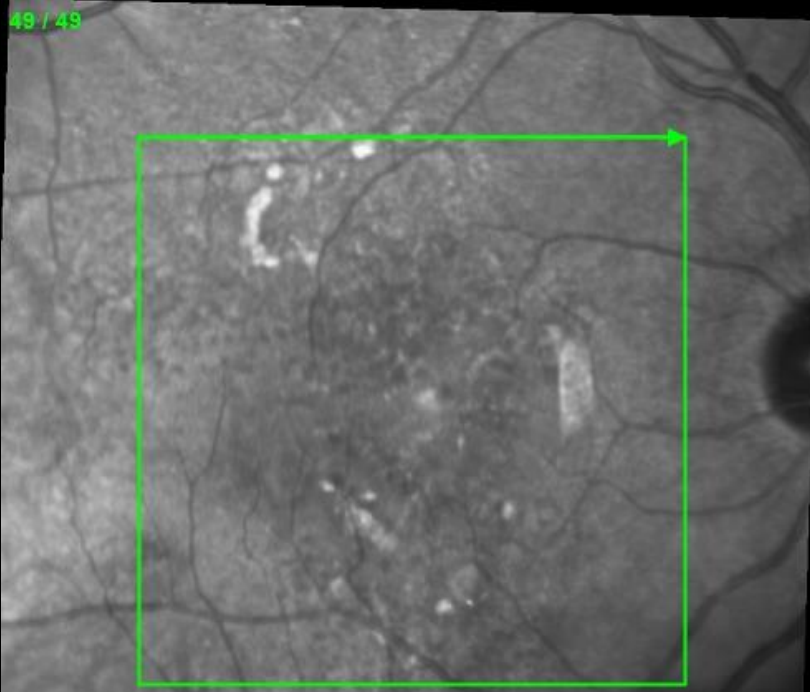
MS L 300 ART(100)



5/01/2015, OD

BAF 30° ART(100)



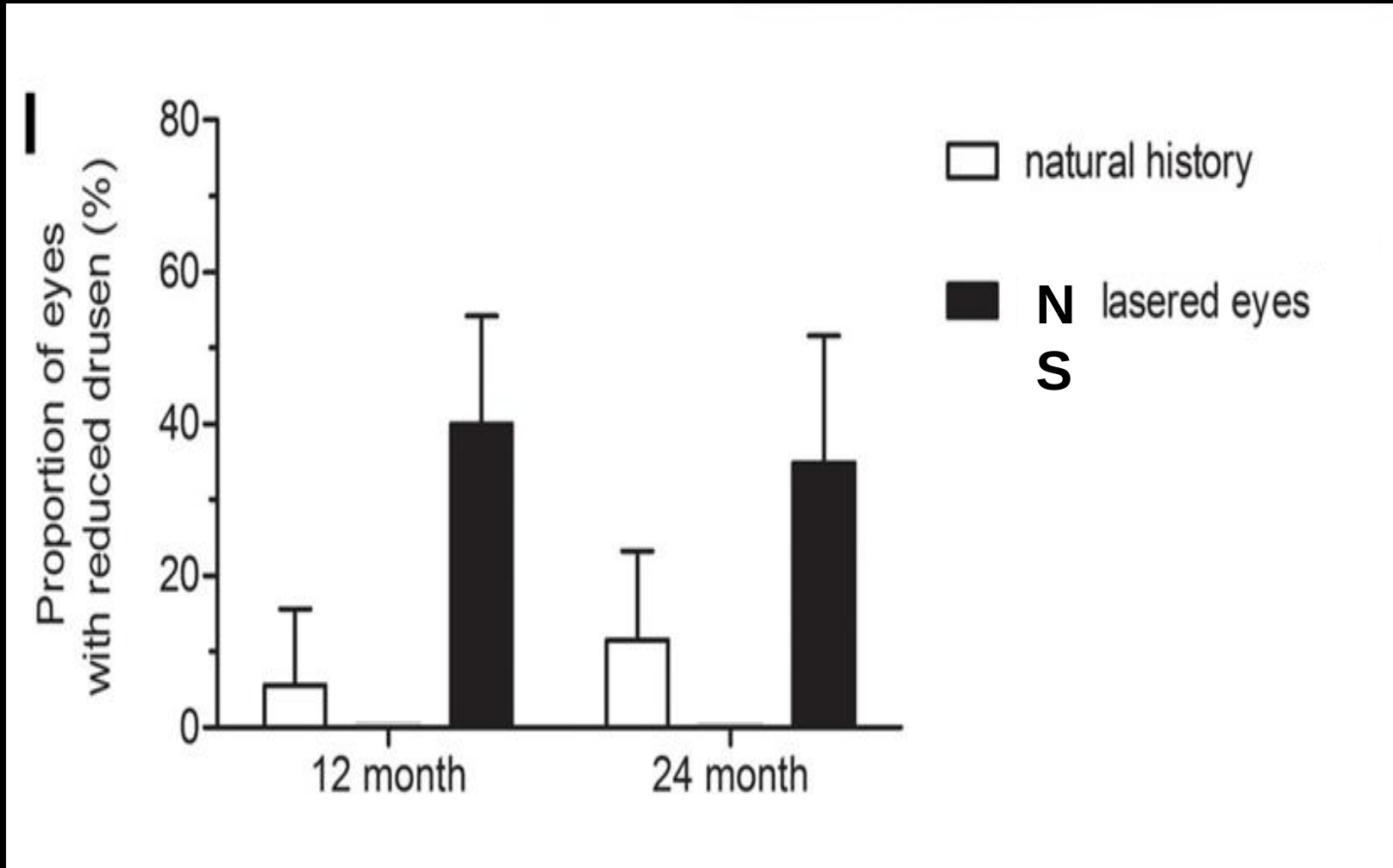


NML: 24 month results of pilot study

12 months after a single treatment:

- Drusen - no progression (no increase in volume) in 75% of treated eyes
- Drusen - decreased volume in 40% of treated eyes
- Central visual function (VA and/or MAIA) - improved in 50% of treated eyes

NML: 24 month results of pilot study



Low vision aids

Lighting

Magnification

Contrast



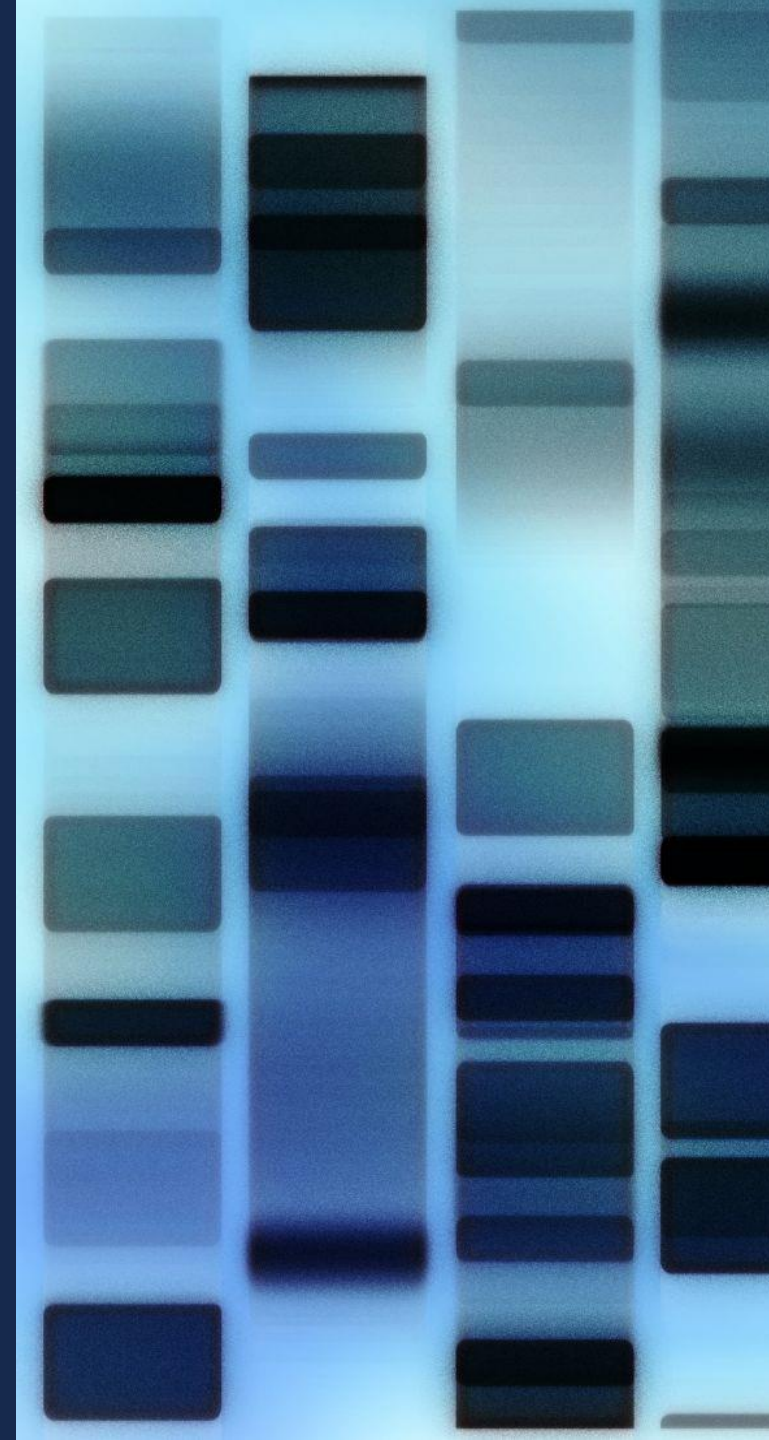
Gene therapy

Corrective gene in engineered virus

Injected into eye¹

Benefits some eye disease² but not yet MD as multiple genes involved

1. Dalkara D, Byrne LC, Klimczak RR, *et al.* In vivo-directed evolution of a new adeno-associated virus for therapeutic outer retinal gene delivery from the vitreous. *Sci Transl Med.* 2013;5:189ra76
2. Bainbridge JW, Smith AJ, Barker SS, *et al.* Effect of gene therapy on visual function in Leber's Congenital Amaurosis. *NEJM* 2008;358:2231-2239.



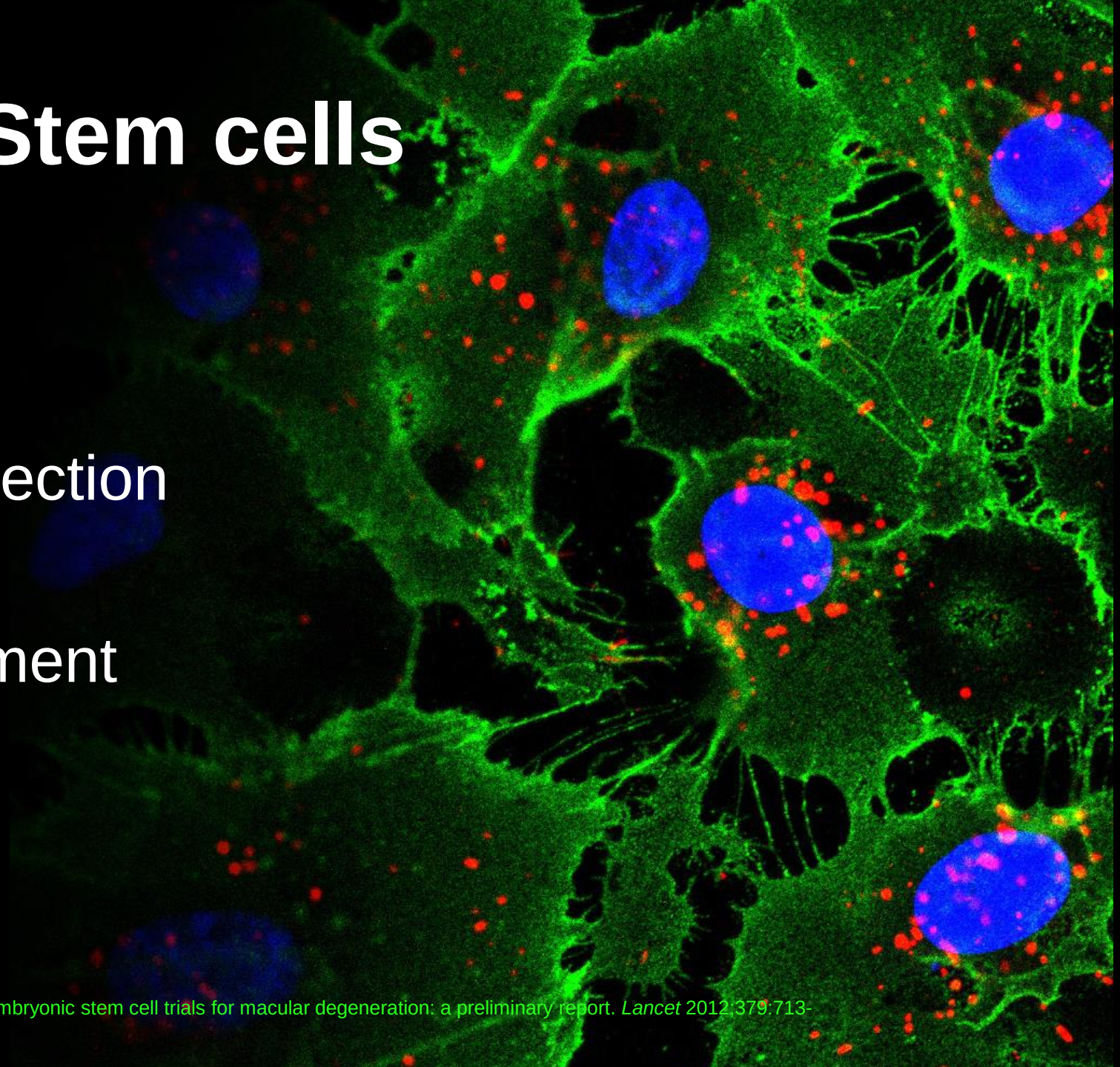
Stem cells

Ethical controversy

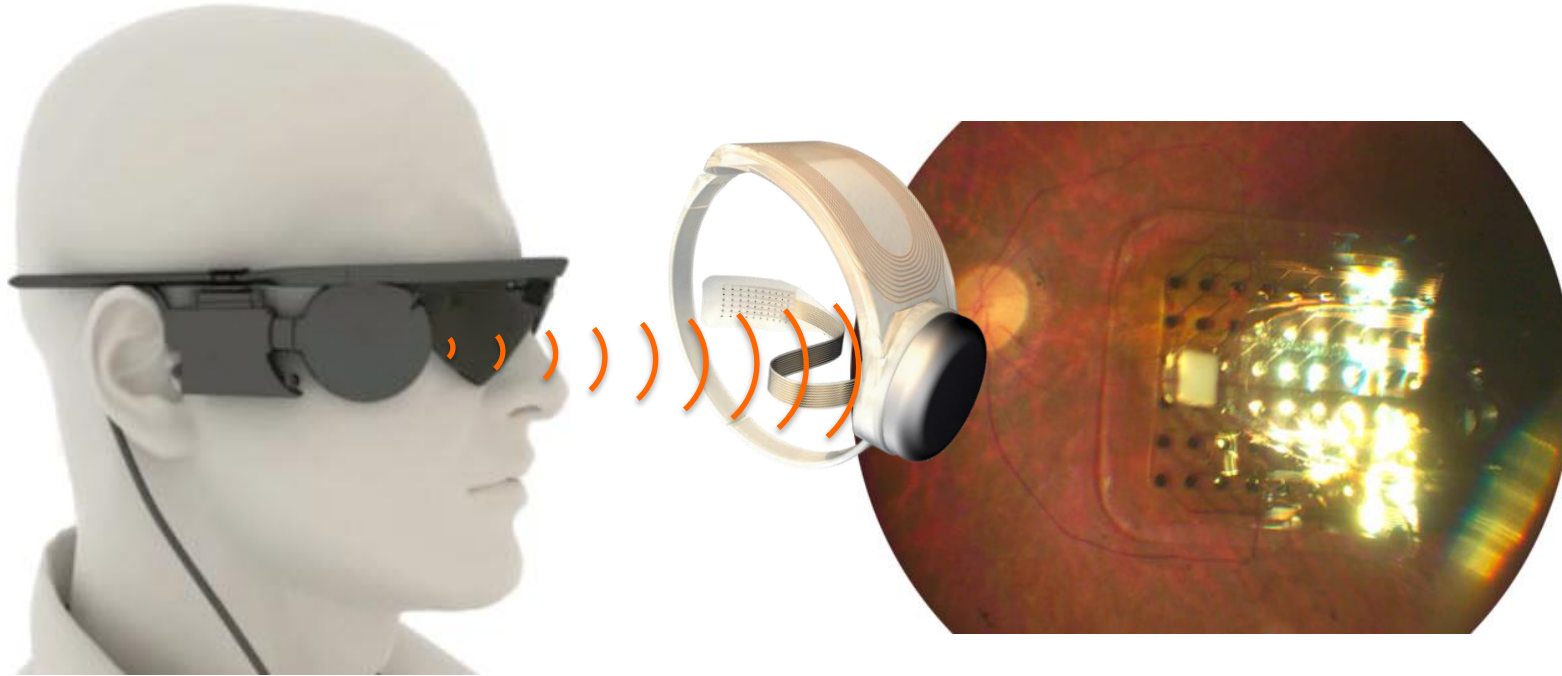
Teratoma formation, rejection

Limited visual improvement

Phase 2 trials



Bionic eye



Camera in glasses
Video processing unit
Wireless transmission

Retinal implant
Electronic stimulation
Visual information to brain



**MACULAR
DEGENERATION
NEW ZEALAND**

0800 MACULA (622 852)

www.mdnz.org.nz

RANZCO



The Royal Australian
and New Zealand
College of Ophthalmologists

THE MEDICAL EYE SPECIALISTS



**MACULAR
DEGENERATION**
NEW ZEALAND

Thank you



Southern Eye Specialists

Expert care for all eye conditions