

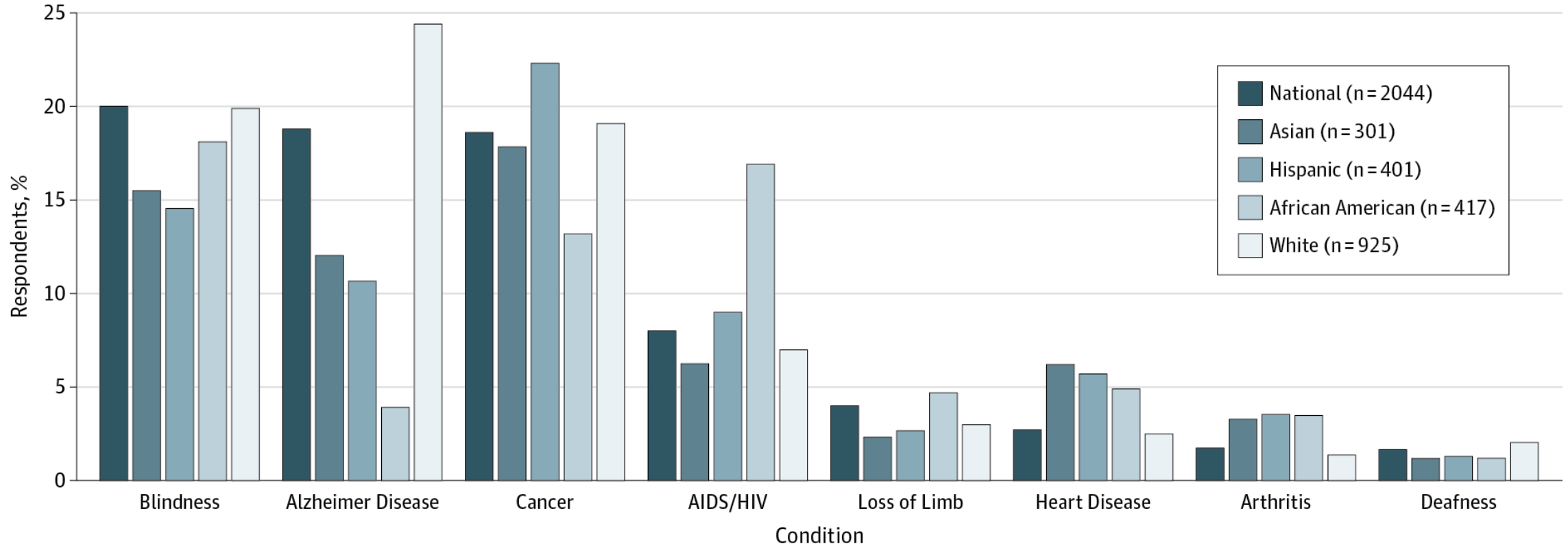
Sehverlust im Alter: State-of-the-art Therapie und Neues aus der Forschung

Hendrik P.N. Scholl



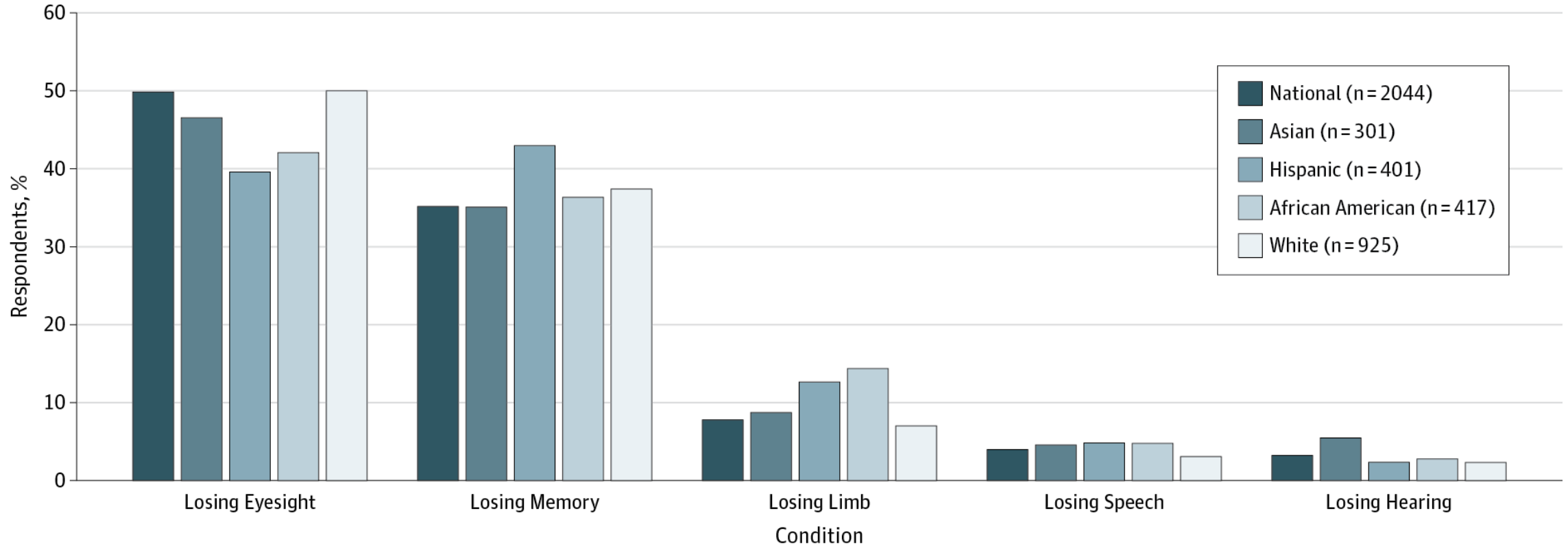
Trendtage
Gesundheit
Luzern

Rangliste der schlimmsten Erkrankungen



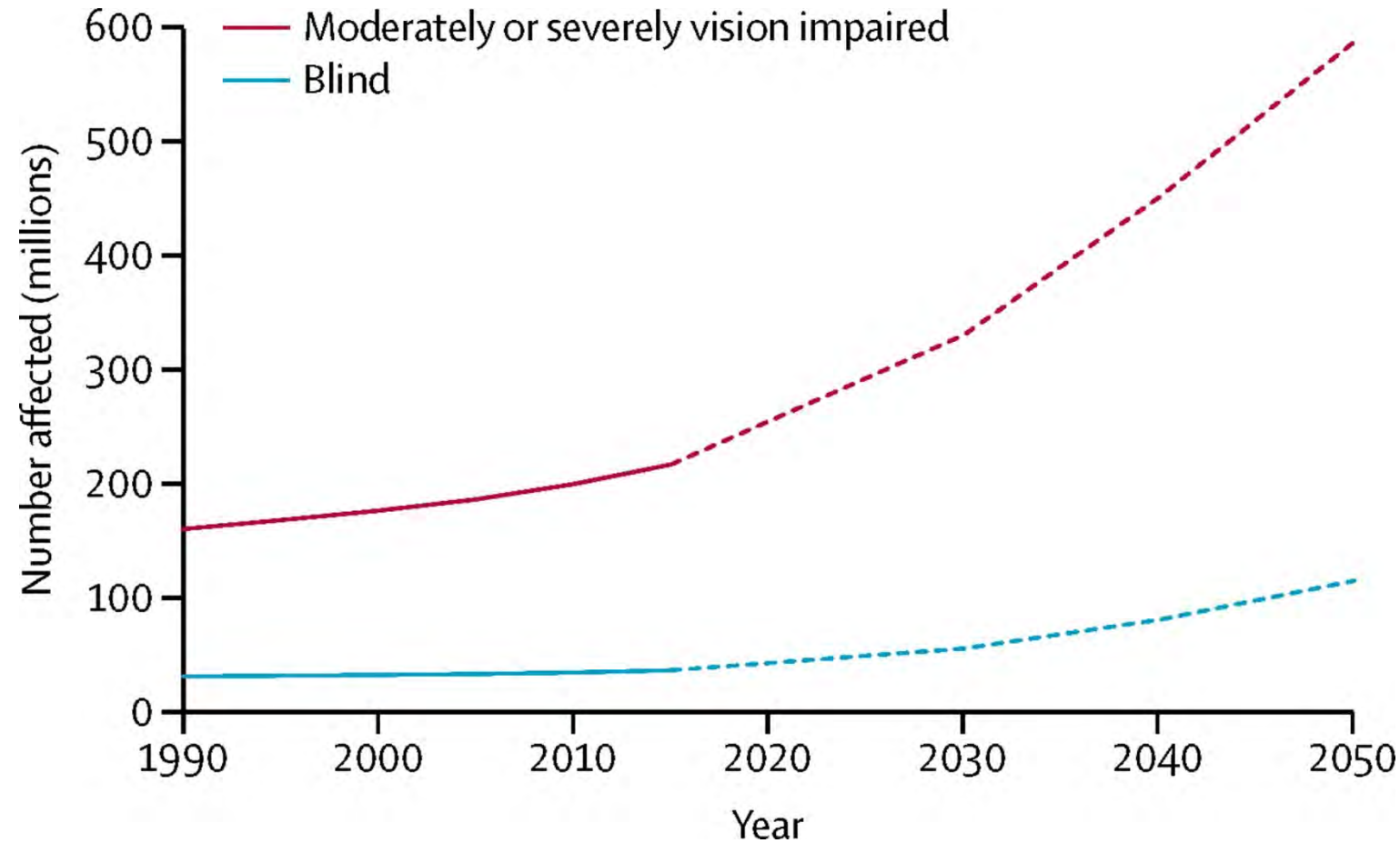
Scott AW, Bressler NM, Ffolkes S, Wittenborn JS & Jorkasky J (2016) Public Attitudes About Eye and Vision Health. JAMA Ophthalmol. 134: 1111-1118.

Erkrankungen mit den grössten Auswirkungen auf das tägliche Leben



Scott AW, Bressler NM, Ffolkes S, Wittenborn JS & Jorkasky J (2016) Public Attitudes About Eye and Vision Health. JAMA Ophthalmol. 134: 1111-1118.

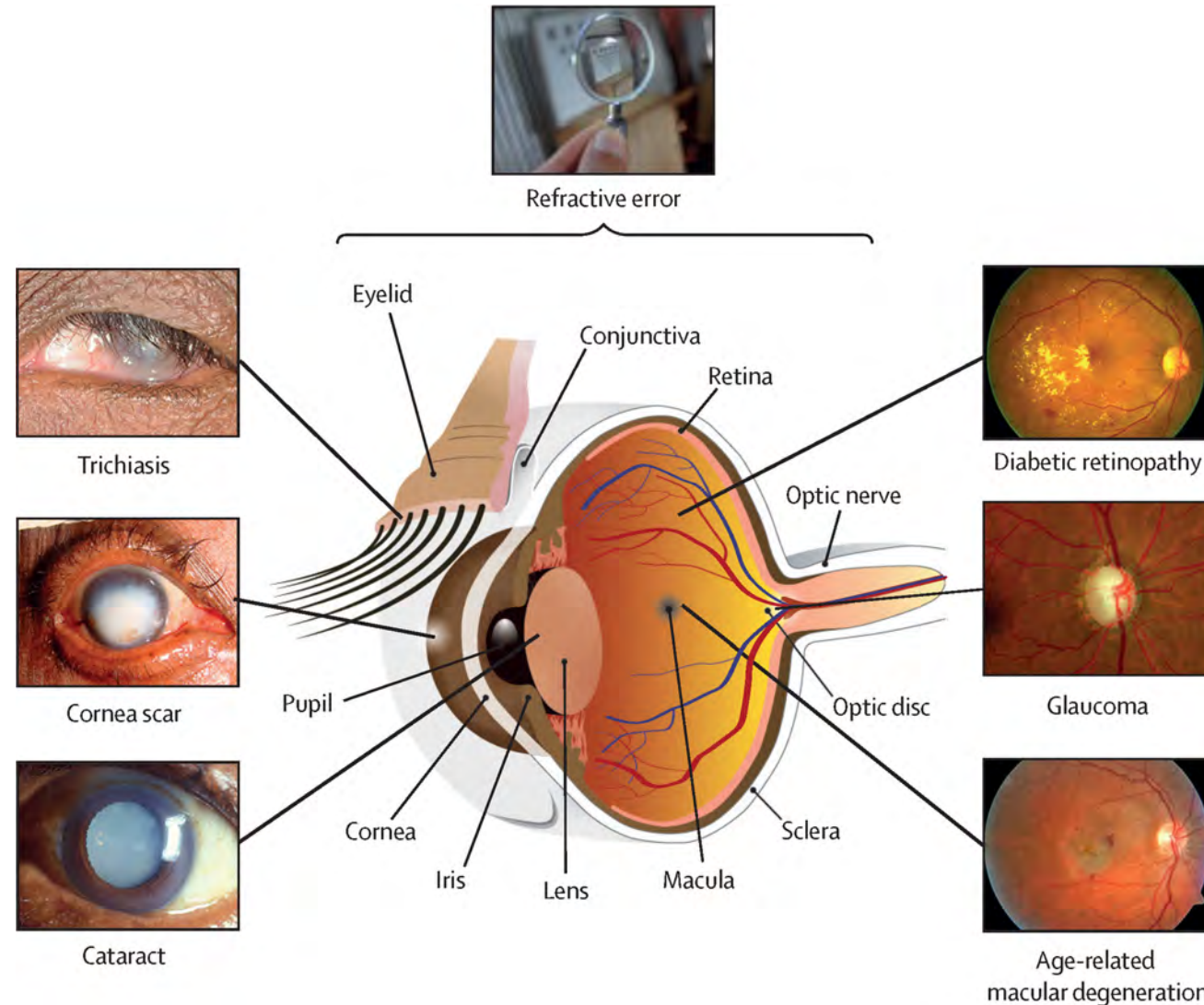
Sehbehinderung und Blindheit nehmen weltweit zu



Global trends and predictions of numbers of people who are blind or moderately and severely vision impaired, from 1990–2050

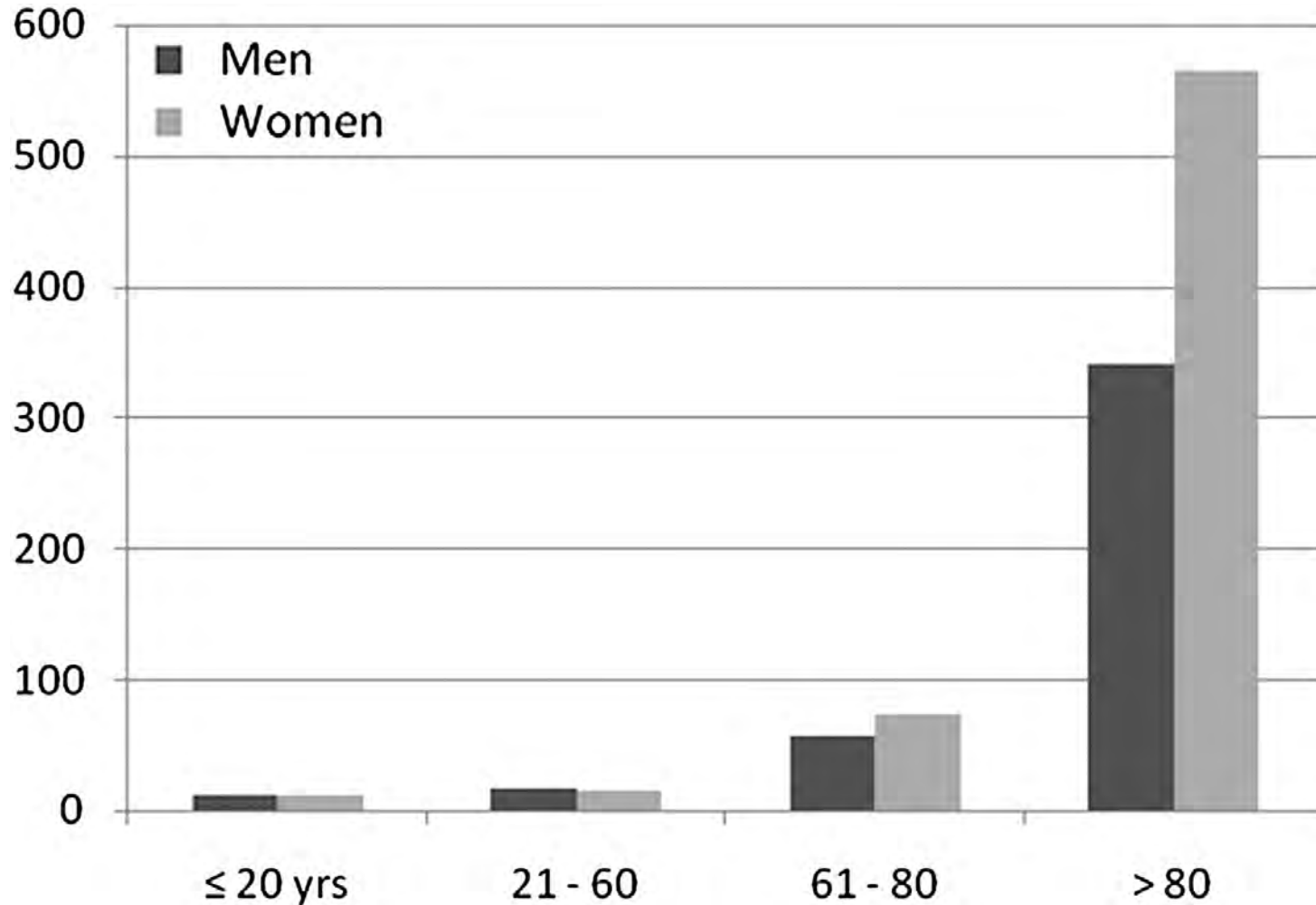
Bourne RRA et al.; Vision Loss Expert Group (2017) Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: a systematic review and meta-analysis. *Lancet Glob Health*. 5: e888-e897.

Hauptursachen für Blindheit in der Welt



Burton MJ et al. (2021) The Lancet Global Health Commission on Global Eye Health: vision beyond 2020. Lancet Glob Health. 9: e489-e551.

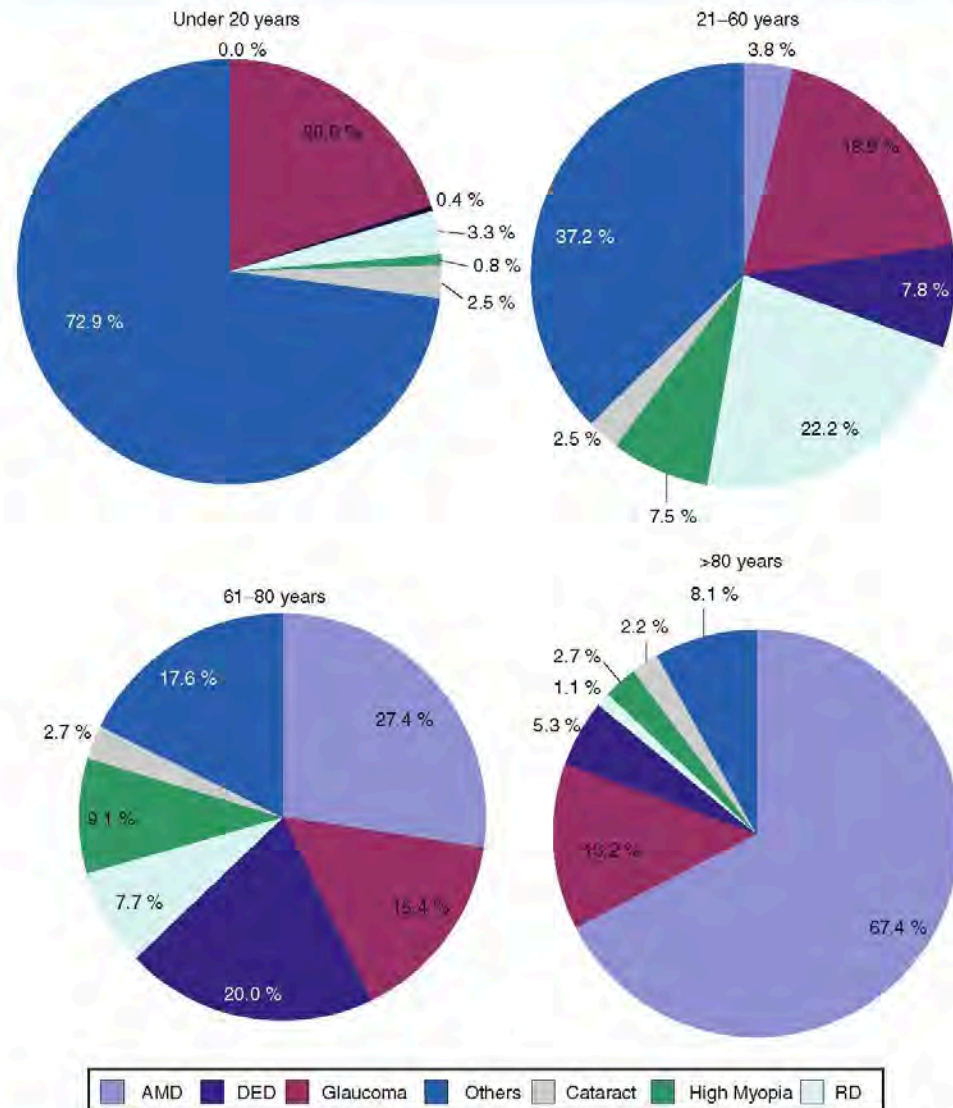
Prävalenz von Blindheit in Deutschland



- 63% aller Fälle von Erblindung wurden durch Netzhauterkrankungen verursacht.
- Rechnet man das Glaukom hinzu sind es 78%.
- Das Durchschnittsalter aller von Blindheit Betroffenen beträgt 72 Jahre.

Finger RP, Fimmers R, Holz FG, Scholl HPN (2011) Prevalence and causes of registered blindness in the largest federal state of Germany. Br J Ophthalmol. 95: 1061-7.

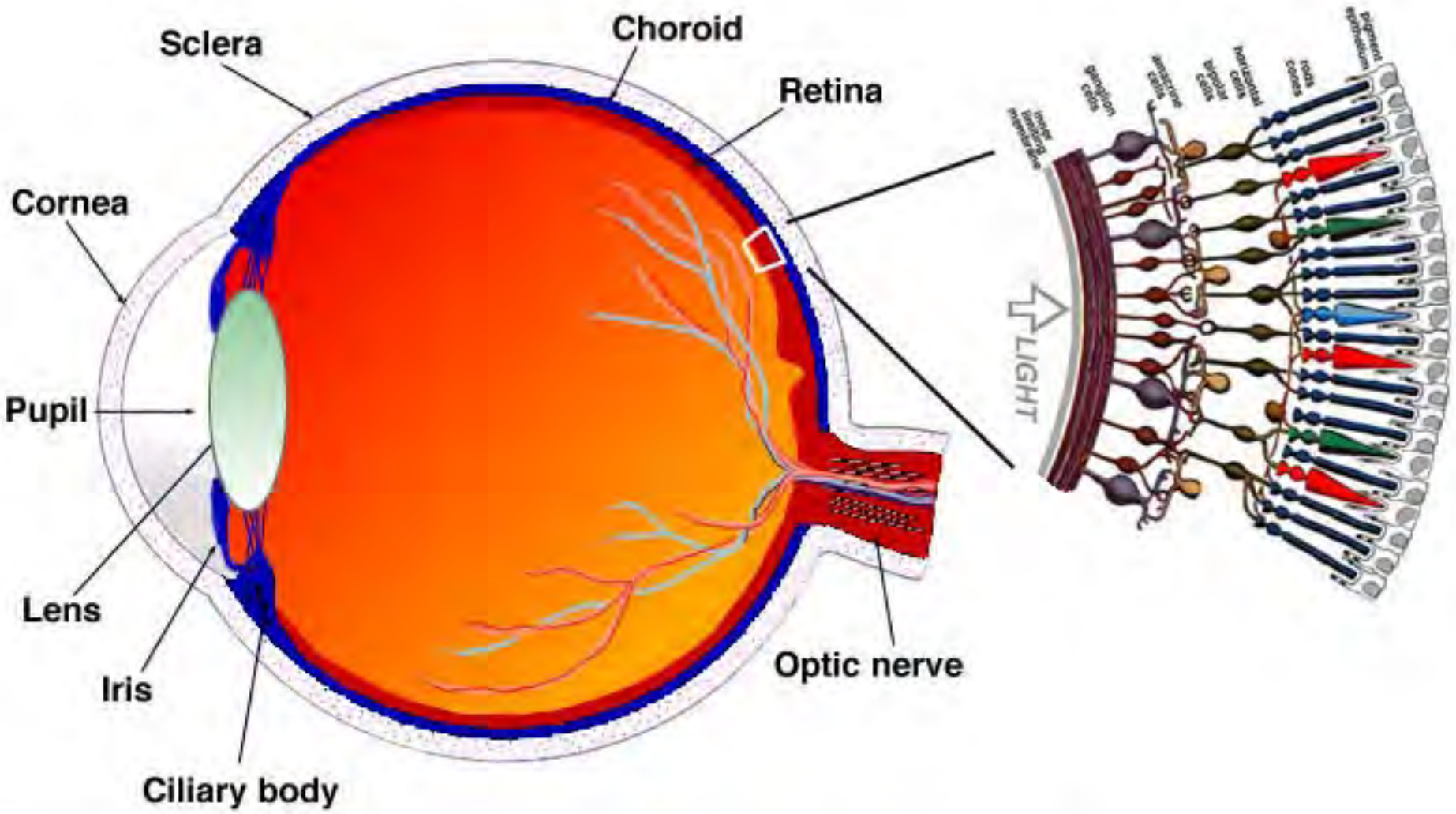
Blindheitsursachen in Deutschland



Finger RP & Scholl HPN (2013) Blindness and Visual Impairment: High-Income Countries. In: Scholl HPN, Massof RW, West SK (2013) Ophthalmology and the Ageing Society (Essentials in Ophthalmology; Singh AD, series editor). Heidelberg New York Dordrecht London: Springer.

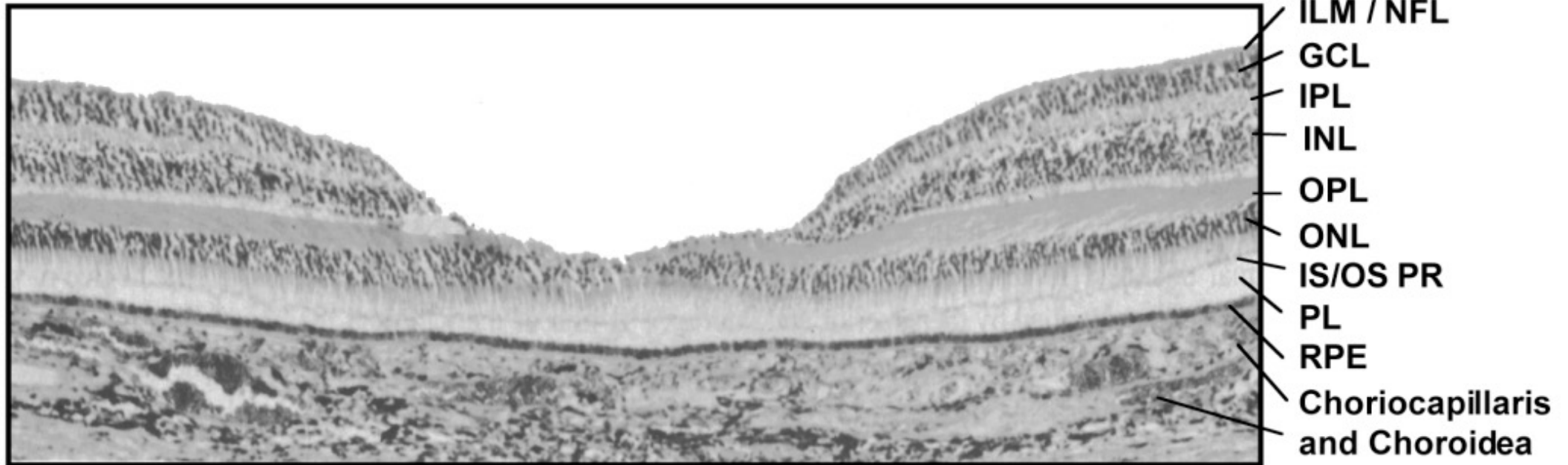
Adapted from: Finger RP, Fimmers R, Holz FG, Scholl HPN (2011) Prevalence and causes of registered blindness in the largest federal state of Germany. Br J Ophthalmol. 95: 1061-7.

Anatomie des menschlichen Auges

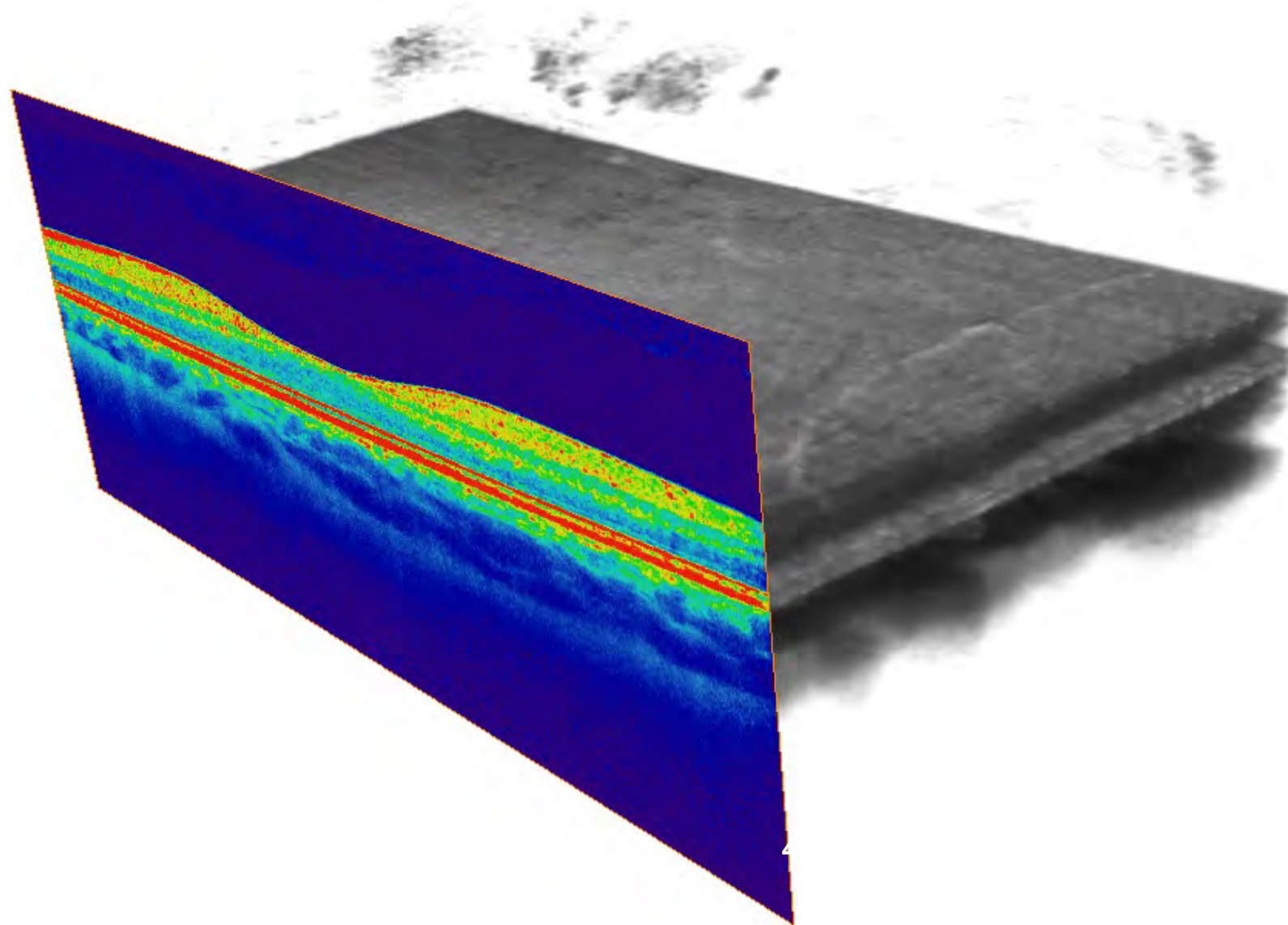


Humane Makula: Histologie (ex vivo)

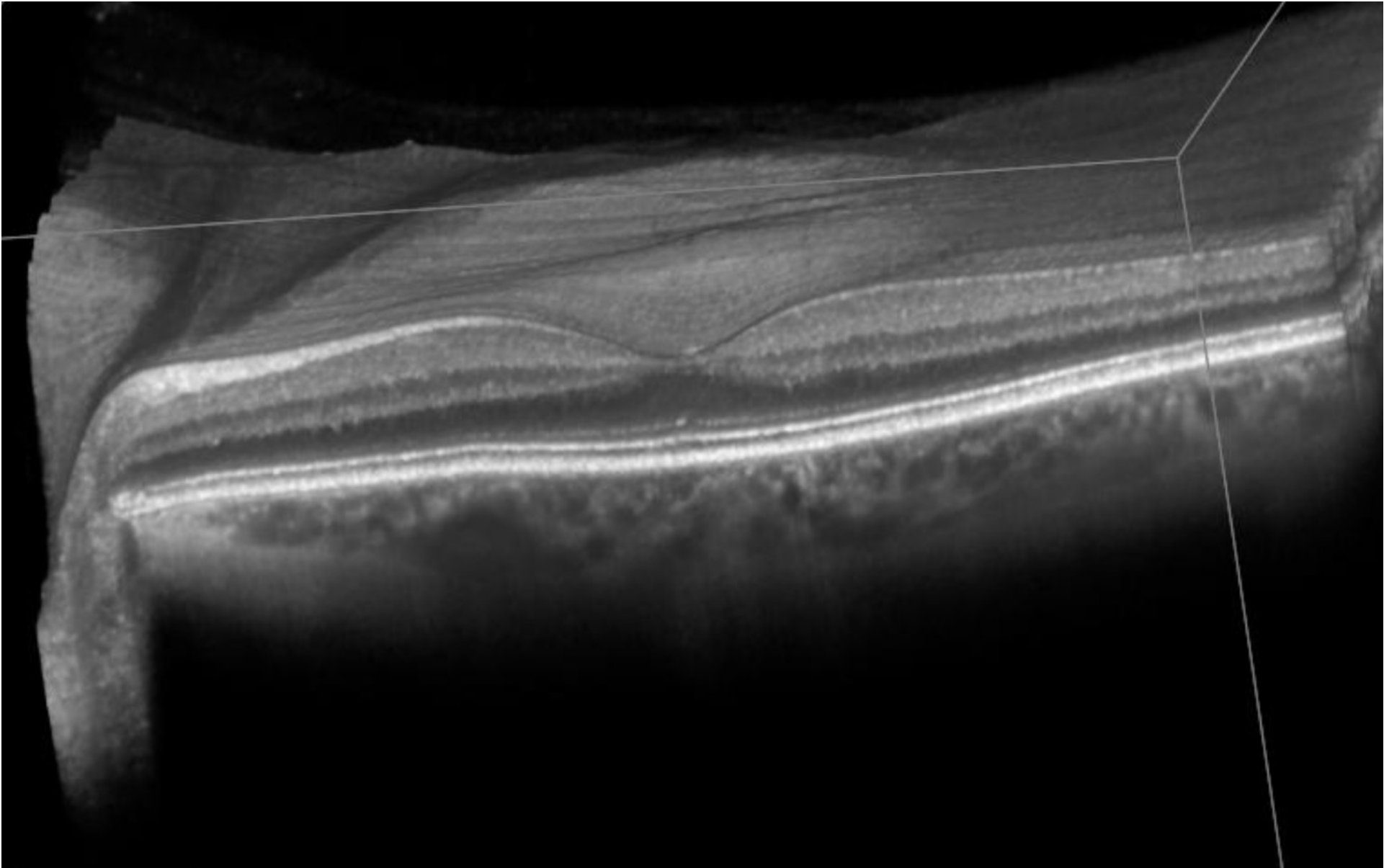
250 μ m



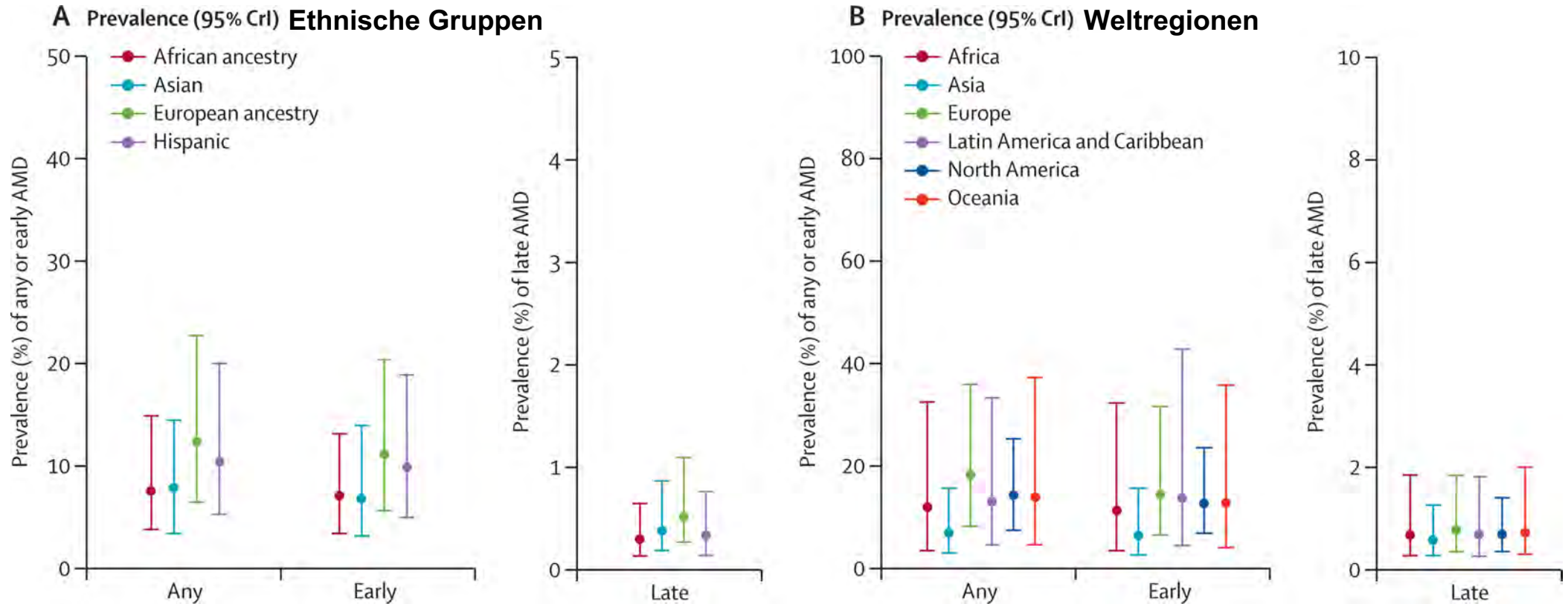
Live Retinal Imaging: Optische Kohärenztomographie (OCT)



Live Retinal Imaging: Optische Kohärenztomographie (OCT)



Weltweite Prävalenz der AMD

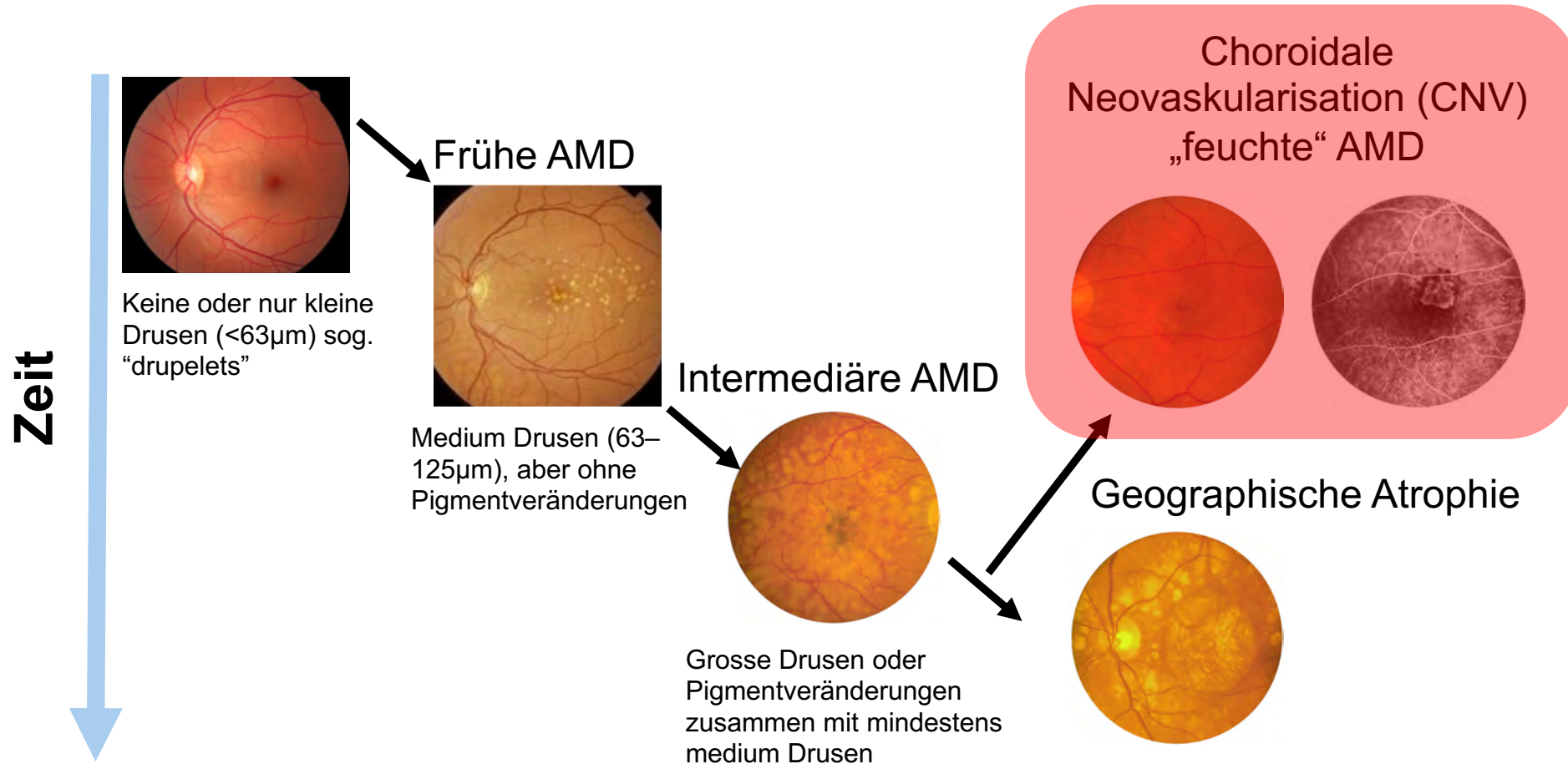


Number of people with AMD
 Projected number of people with AMD

178 million in 2018
 196 million by 2020
 288 million by 2040

Wong WL et al. (2014): Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. *Lancet Glob Health*. 2: e106-16.

Stadien der Altersabhängigen Makuladegeneration (AMD)

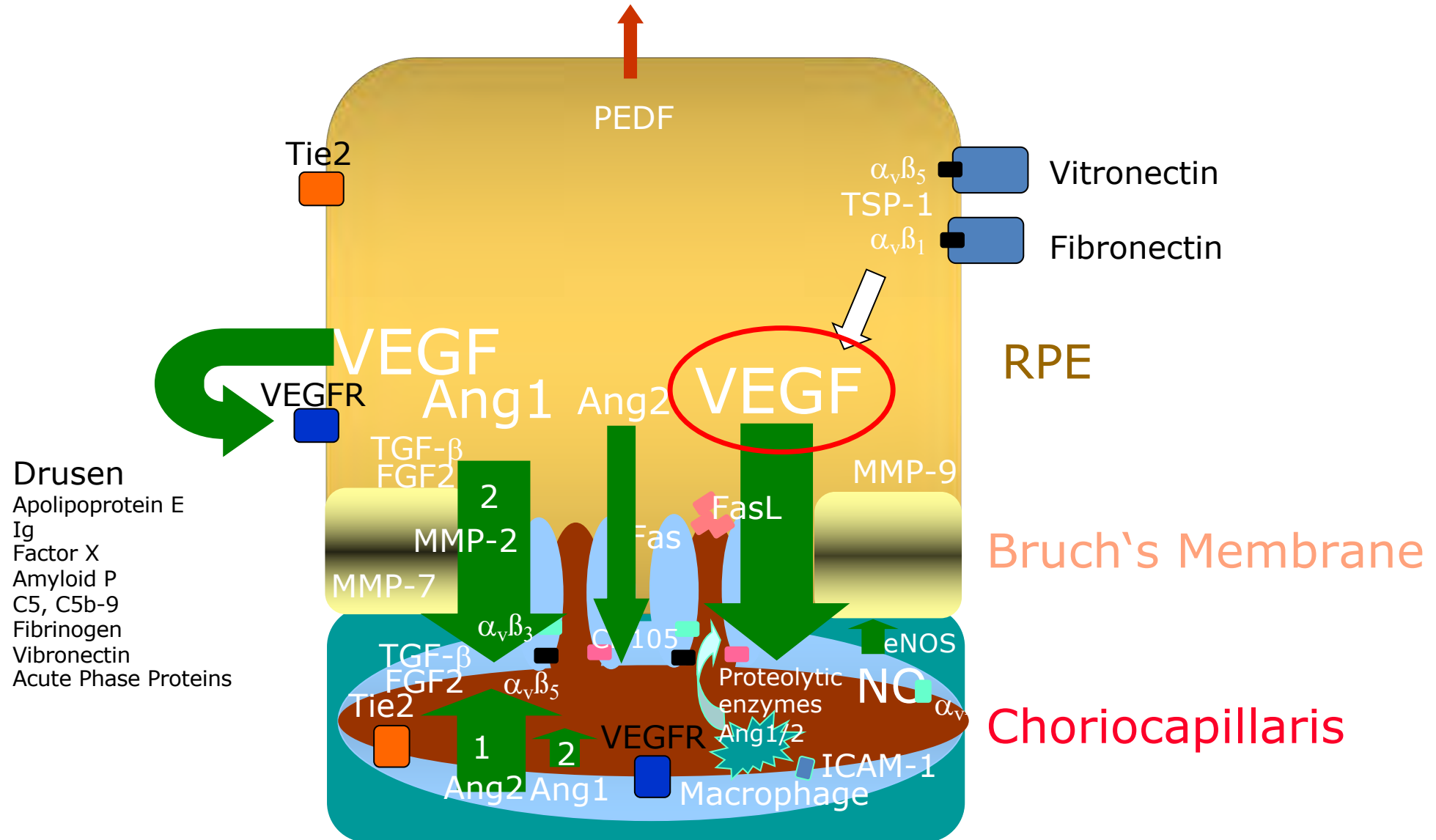


Ferris FL 3rd, Wilkinson CP, Bird A, et al. (2013) Clinical classification of age-related macular degeneration. Ophthalmology 120:844–51.



Source: National Eye Institute:
<http://www.nei.nih.gov>

Vascular Endothelial Growth Factor (VEGF)



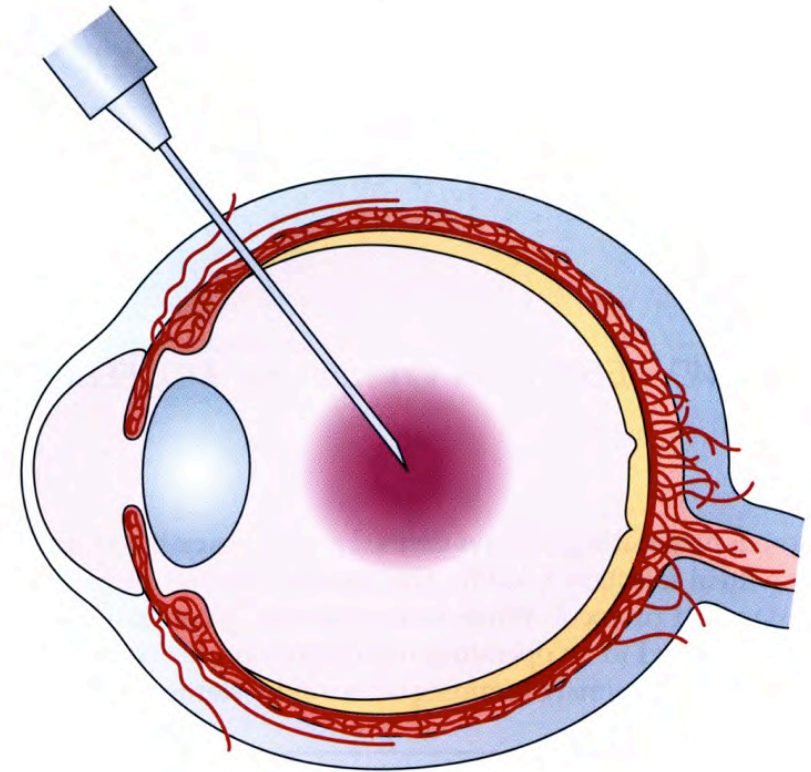
Verfügbare Medikamente

- Avastin ® (bevacizumab)
- Lucentis ® (ranibizumab)
- Eylea ® (aflibercept)
- Beovu ® (brolucizumab)
- Vabysmo ® (faricimab)

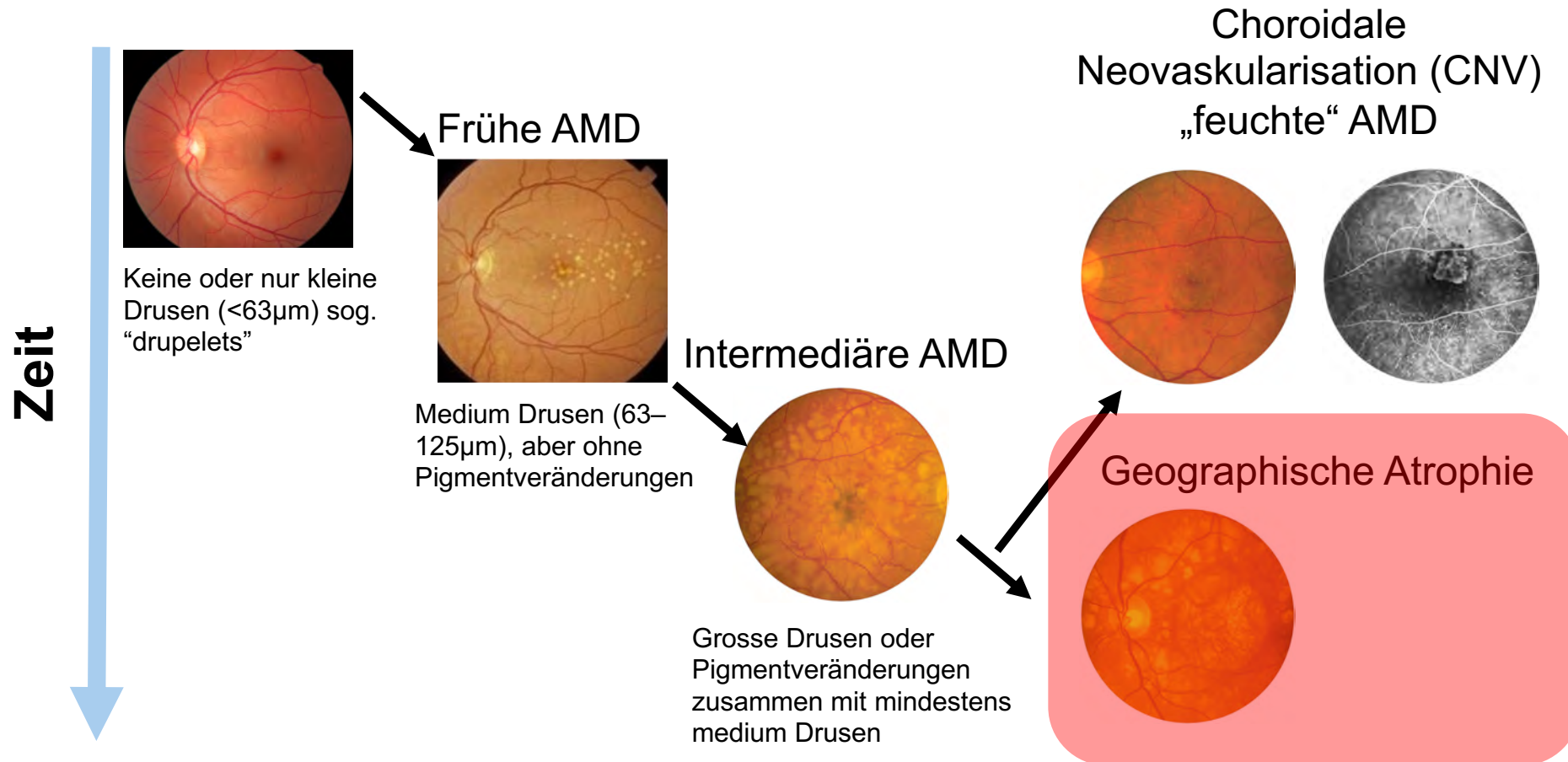
American Society of Retinal Specialists, Stand 03/2024

<https://www.asrs.org/patients/retinal-diseases/2/agerelated-macular-degeneration>

Intravitreale Injektion



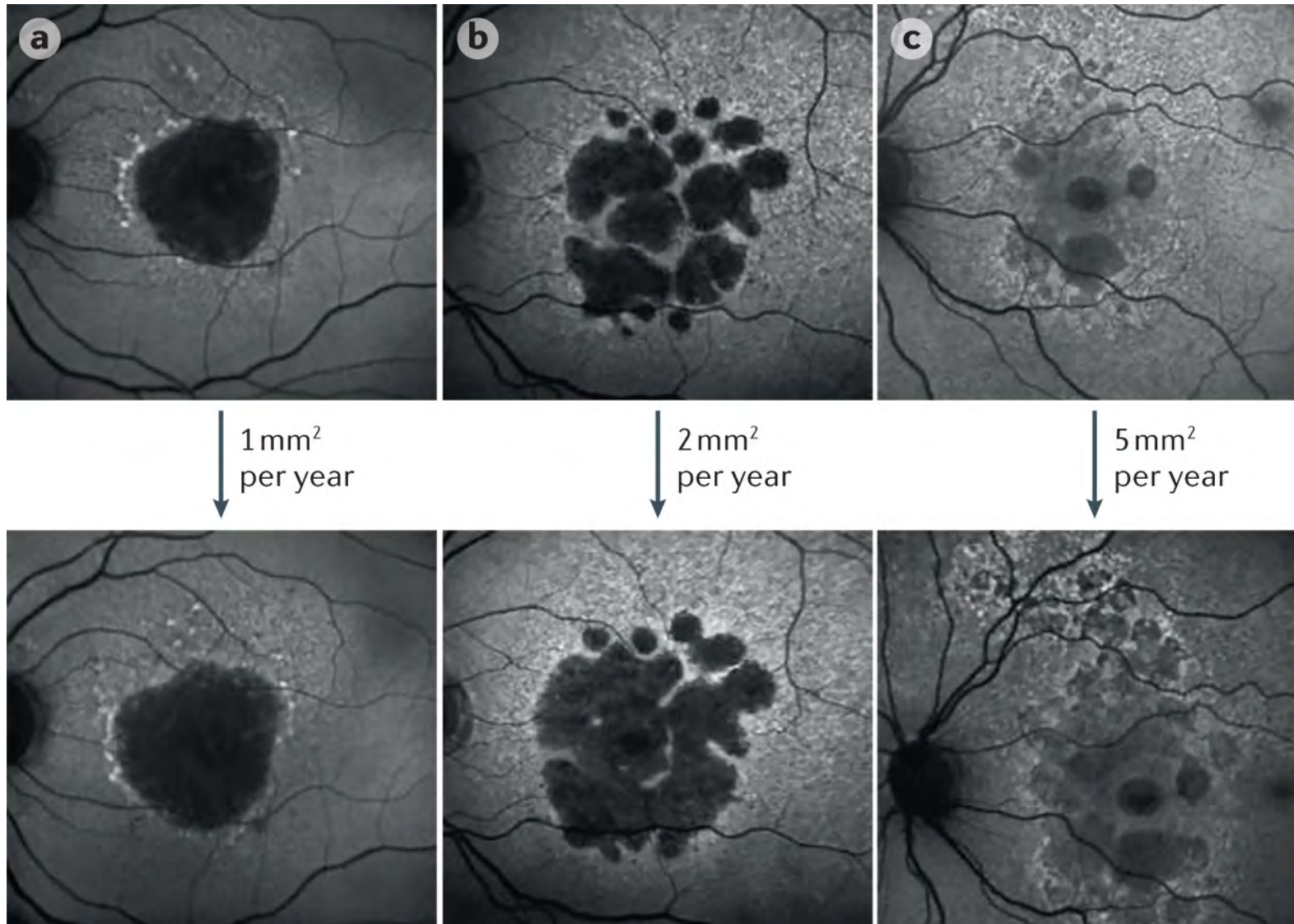
Stadien der Altersabhängigen Makuladegeneration (AMD)



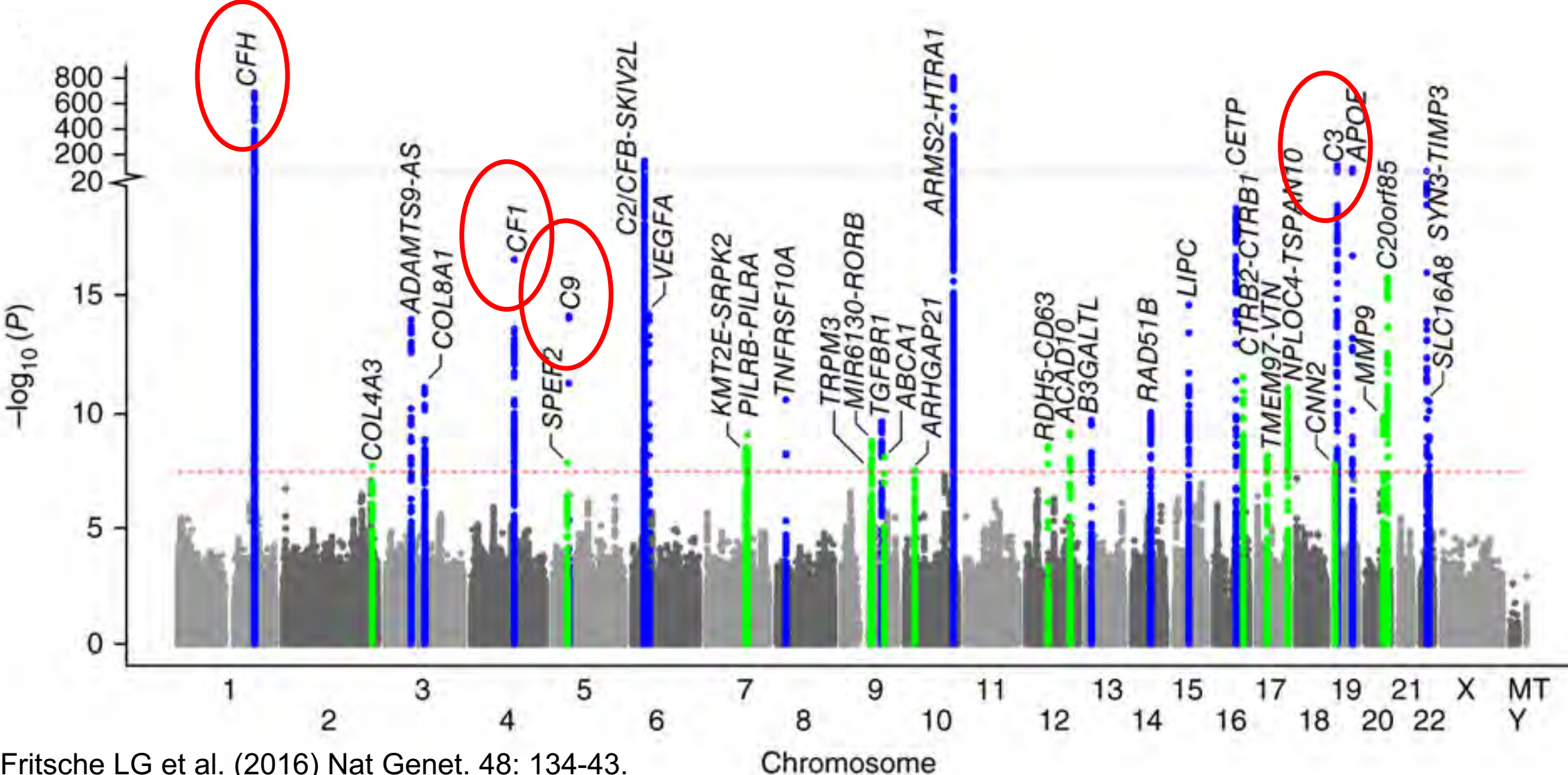
Ferris FL 3rd, Wilkinson CP, Bird A, et al. (2013) Clinical classification of age-related macular degeneration. Ophthalmology 120:844–51.

Progression der Geographischen Atrophie

Longitudinale Bildgebung mittels Fundus-Autofluoreszenz



International AMD Genomics Consortium (IAMDGCC)



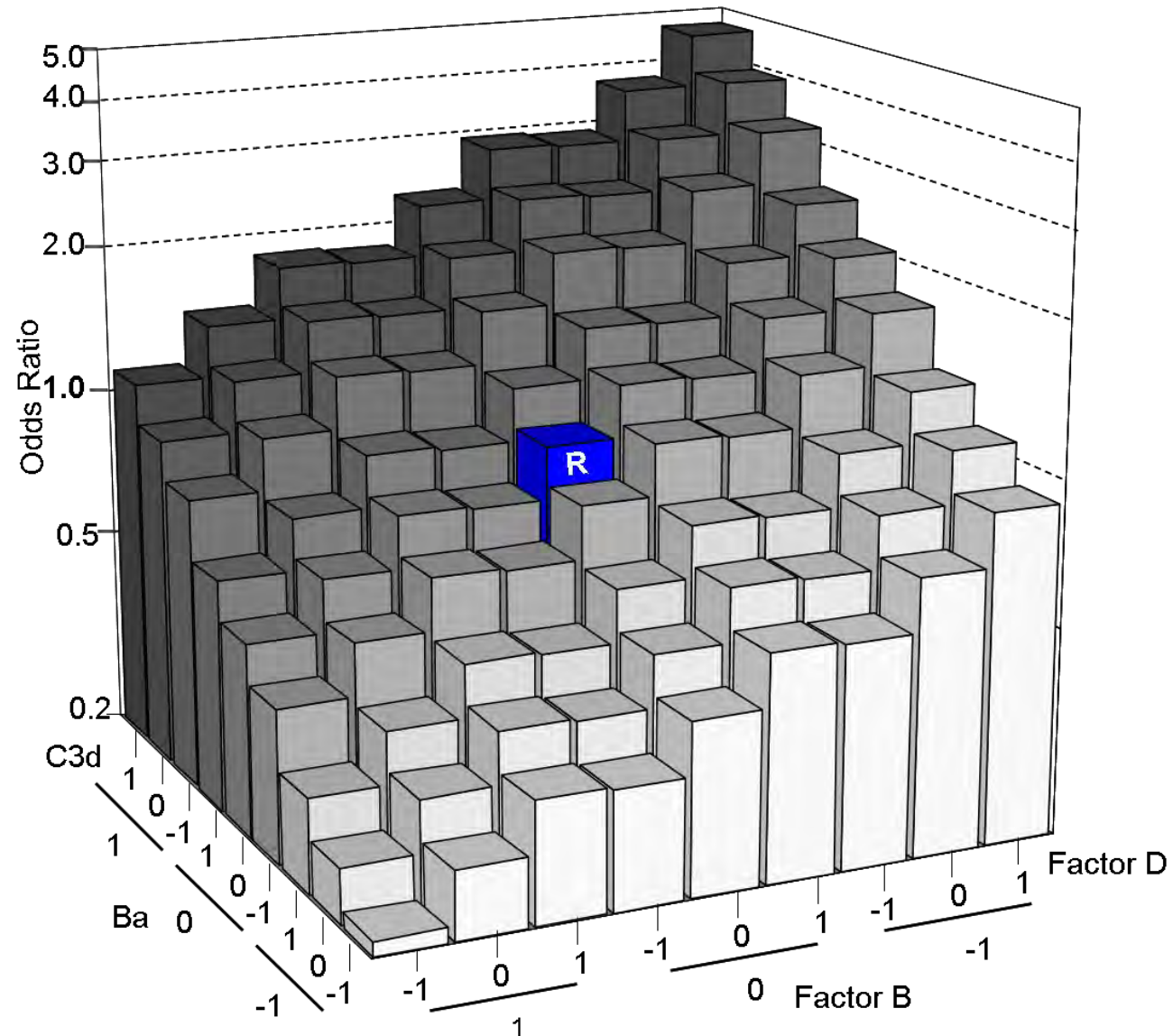
Fritsche LG et al. (2016) Nat Genet. 48: 134-43.

Systemic Complement Activation in Age-Related Macular Degeneration

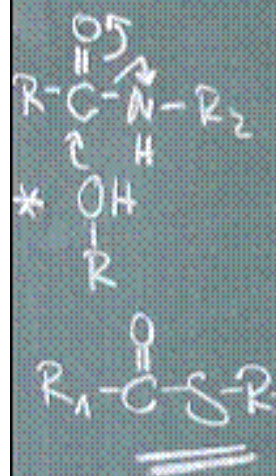
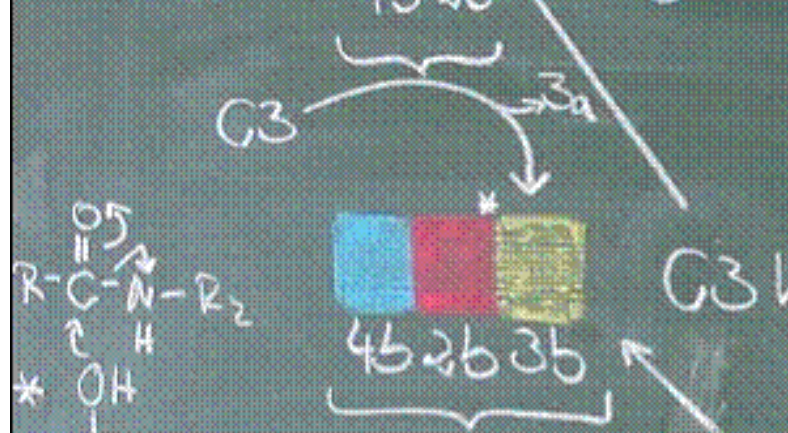
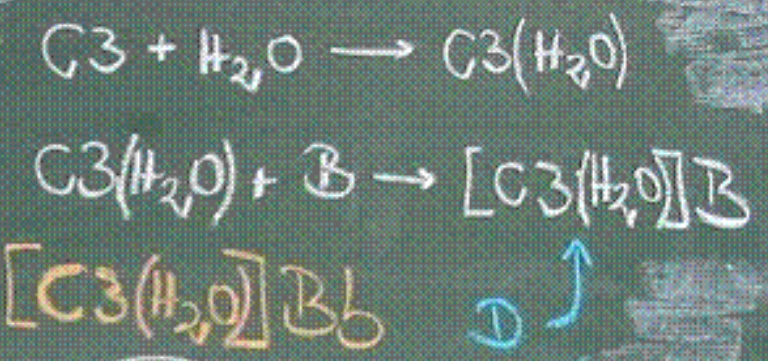
Hendrik P. N. Scholl¹✉, Peter Charbel Issa¹✉, Maja Walier², Stefanie Janzer¹, Beatrix Pollok-Kopp³, Florian Börncke³, Lars G. Fritsche⁴, Ngaihang V. Chong⁵, Rolf Fimmers², Thomas Wienker², Frank G. Holz¹, Bernhard H. F. Weber⁴, Martin Oppermann^{3*}

1 Department of Ophthalmology, University of Bonn, Bonn, Germany, 2 Institute of Medical Biometry, Informatics and Epidemiology, University of Bonn, Bonn, Germany, 3 Department of Cellular and Molecular Immunology, University of Göttingen, Göttingen, Germany, 4 Institute of Human Genetics, University of Regensburg, Regensburg, Germany, 5 Oxford Eye Hospital, University of Oxford, Oxford, United Kingdom

AMD Risiko: Proteine des Komplementsystems



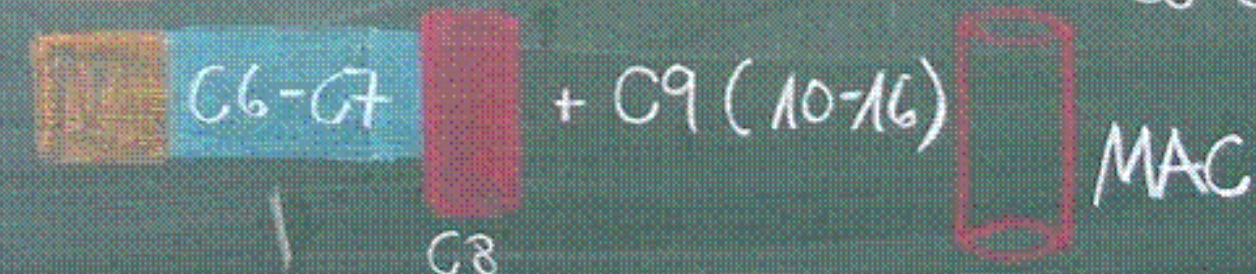
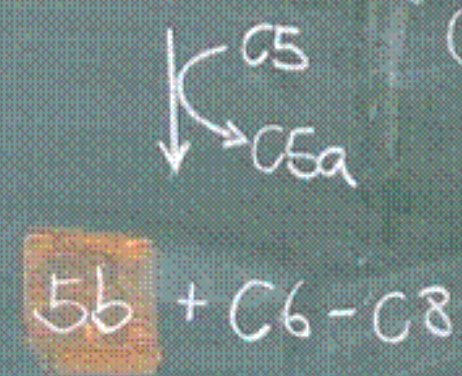
Hecker LA, Edwards AO, Ryu E, Tosakulwong N, Baratz KH, Brown WL, Charbel Issa P, Scholl HPN, Pollok-Kopp B, Schmid-Kubista KE, Bailey KR, Oppermann M (2010)



$C3$ Konvertase \rightarrow



$C5$ Konvertase

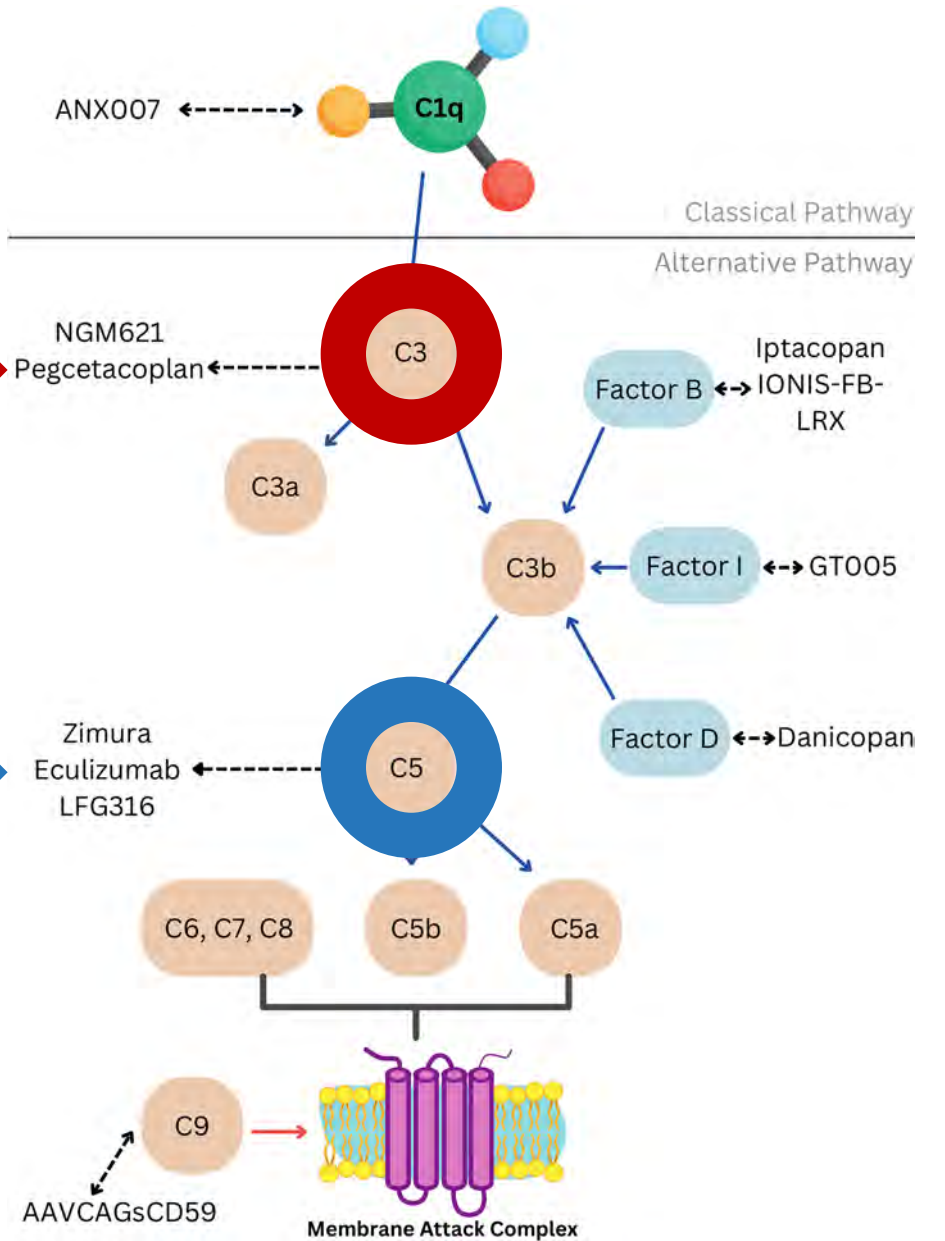


Blockade von C3 oder C5 verlangsamt die Progression



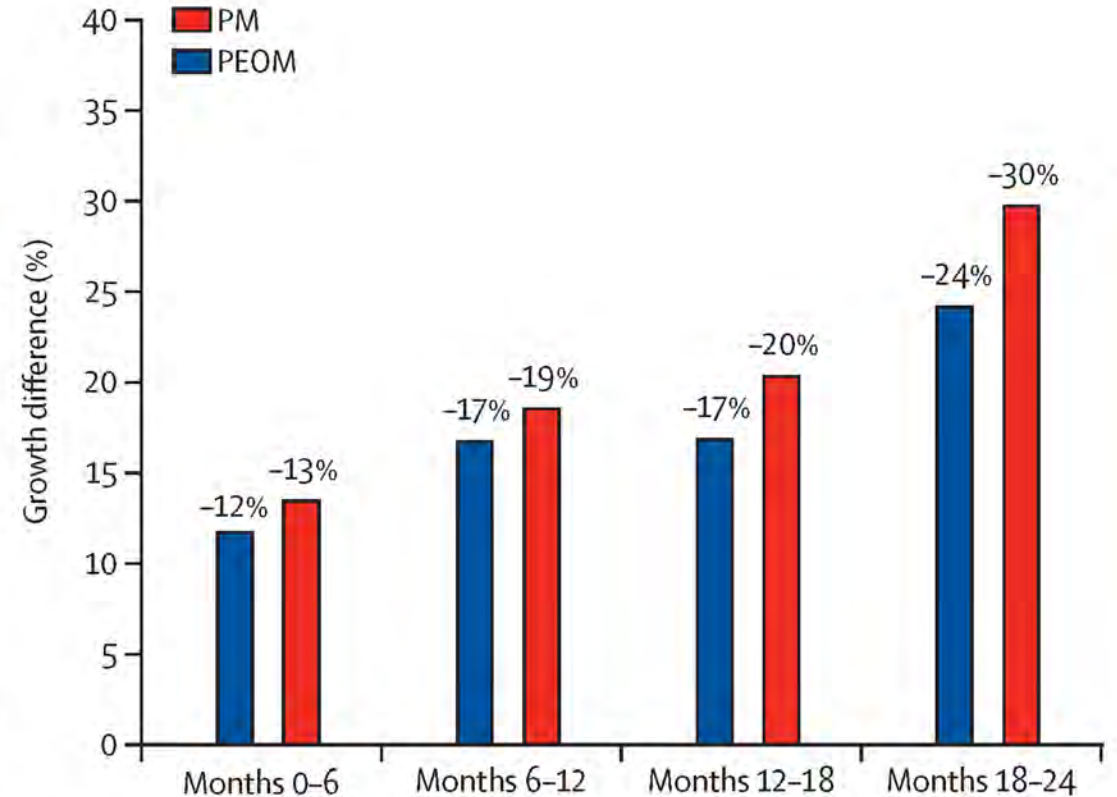
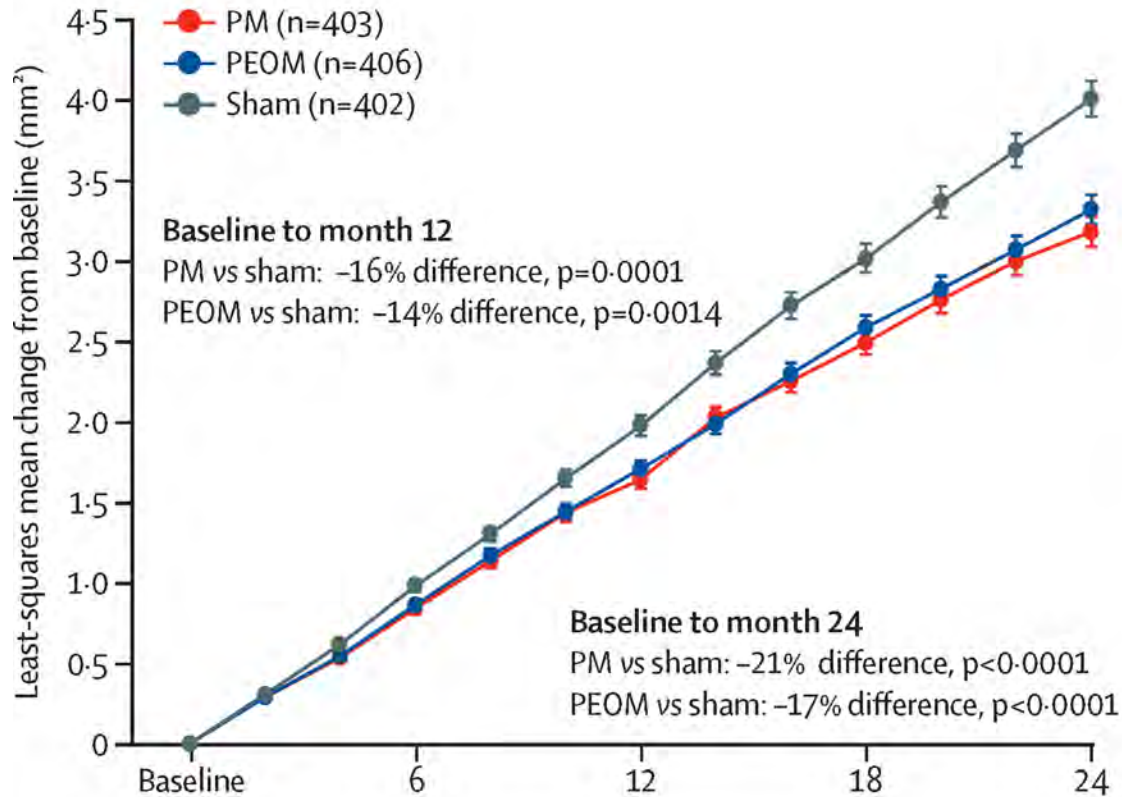
Zugelassen durch die FDA am 13.02.2023

Zugelassen durch die FDA am 05.08.2023



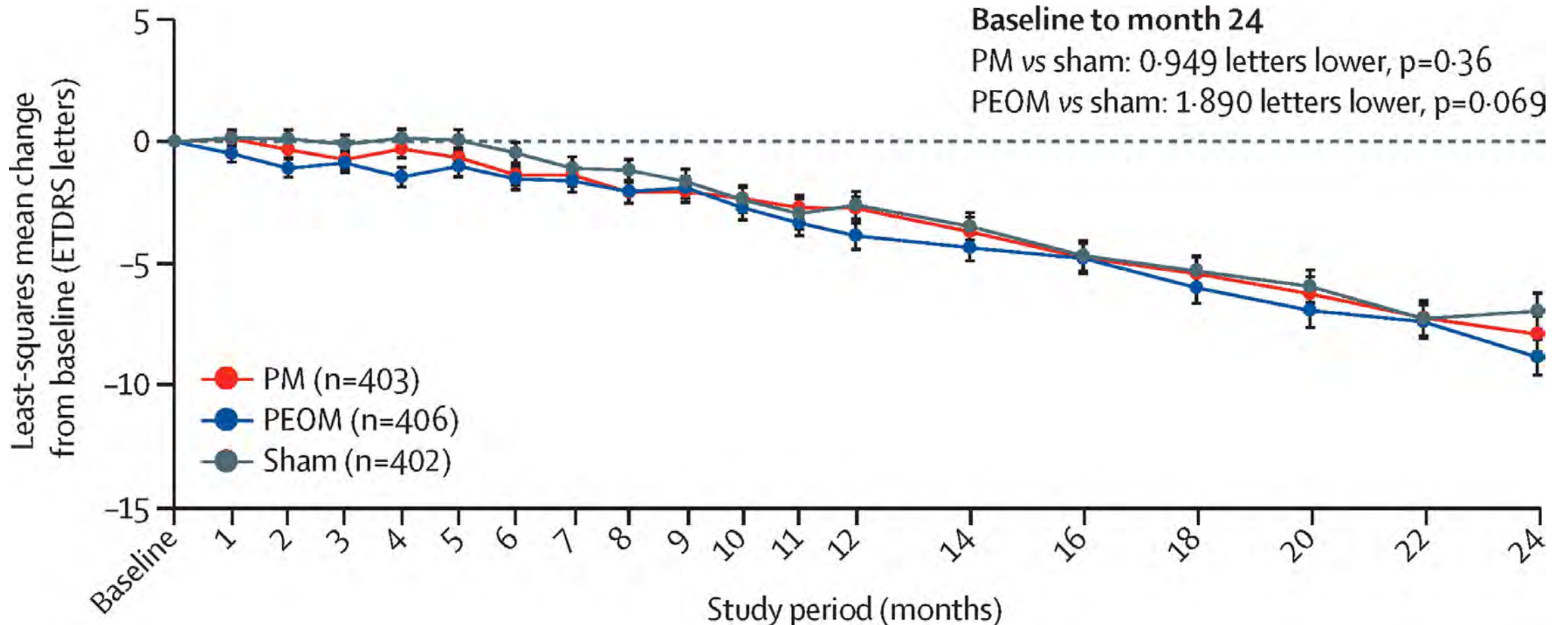
Girgis S, Lee LR (2023) Treatment of dry age-related macular degeneration: A review. Clin Exp Ophthalmol. 51: 835-852.

Pegcetacoplan (Syfovre®) verlangsamt die GA Progression



Heier JS et al. (2023) Pegcetacoplan for the treatment of geographic atrophy secondary to age-related macular degeneration (OAKS and DERBY): two multicentre, randomised, double-masked, sham-controlled, phase 3 trials. *Lancet* 402: 1434-1448.

Pegcetacoplan (Syfovre®) zeigte keinen Effekt auf die Sehfunktion



Heier JS et al. (2023) Pegcetacoplan for the treatment of geographic atrophy secondary to age-related macular degeneration (OAKS and DERBY): two multicentre, randomised, double-masked, sham-controlled, phase 3 trials. *Lancet* 402: 1434-1448.

Zusammenfassung

- Augenkrankheiten und in Folge der Verlust des Sehens betreffen vor allem die ältere Bevölkerung.
- $\frac{3}{4}$ aller Erkrankungen, die Blindheit verursachen, betreffen die Netzhaut und den Sehnerv (Neurodegeneration).
- Vor allem aufgrund der Alterung der Gesellschaften wird ein signifikanter Anstieg der Prävalenz von Sehbehinderung und Blindheit prognostiziert.
- Die wichtigste Erkrankung ist die altersabhängige Makuladegeneration (AMD).
- Die mikroskopisch genaue Live-Bildgebung (OCT) und die mikrochirurgische Zugänglichkeit (intravitreale Injektion) zusammen mit der Anwendung von Innovationen aus der Onkologie haben erlaubt, die «feuchte» AMD effektiv behandeln zu können.
- Über die Erforschung der komplexen Genetik der AMD und dem Nachweis der Komplement-Aktivierung sind Medikamentenentwicklungen gelungen, die den Krankheitsfortschritt der späten «trockenen» AMD verlangsamen. Neurodegeneration des ZNS kann also tatsächlich pharmakologisch behandelt werden.

Vielen Dank
für die Aufmerksamkeit.

