# AMD Part 1

EBO-Euretina Subspecialty Exam Course

October 6th 2023

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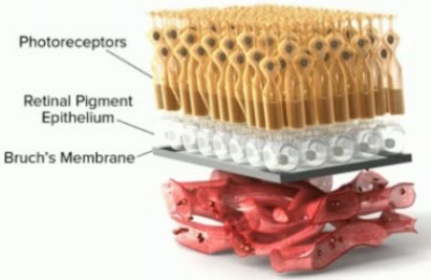
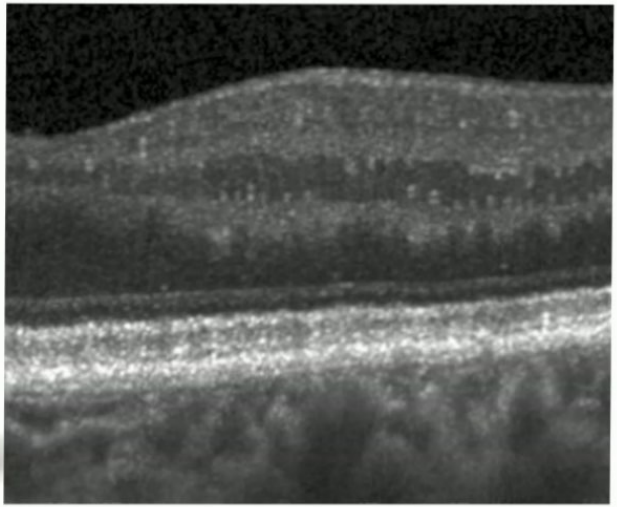
# Pathogenesis



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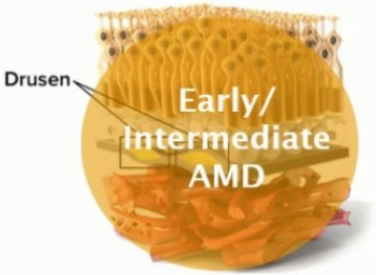


- Accumulation of debris between Bruch‘s membrane and RPE
- BM thickening -> obstruction of nutrient transport and waste exchange

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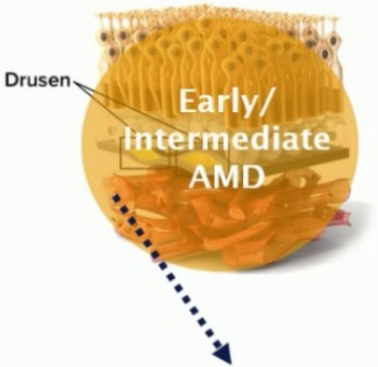


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- RPE/photoreceptor dysfunction
- RPE/photoreceptor cell death

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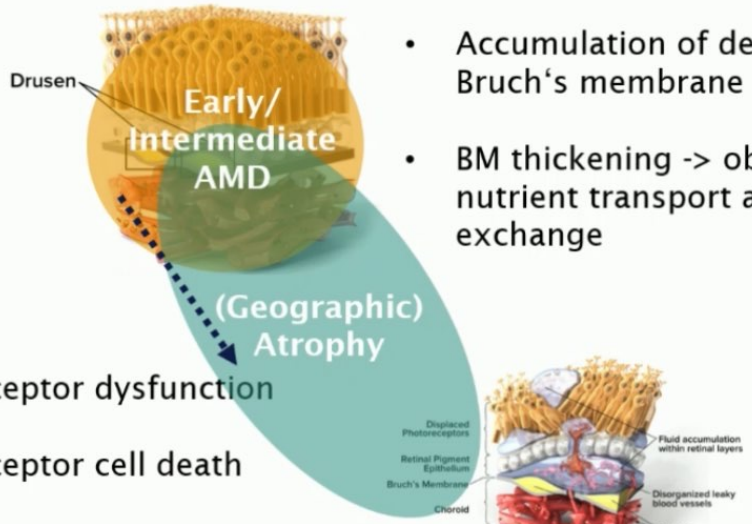


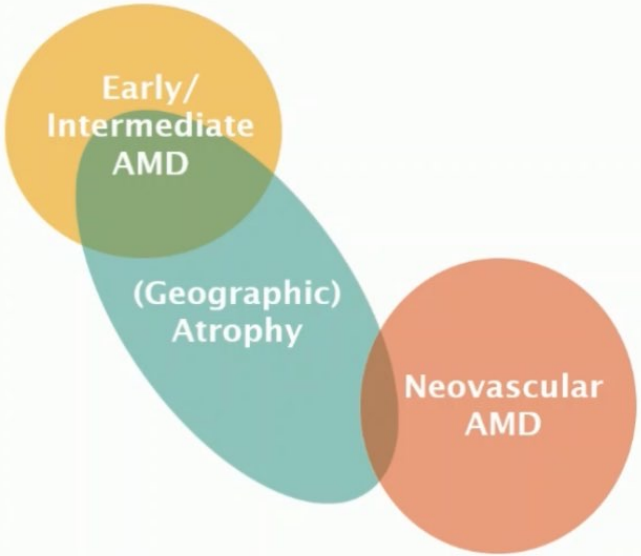

- Accumulation of debris between Bruch‘s membrane and RPE
- BM thickening -> obstruction of nutrient transport and waste exchange

- RPE/photoreceptor dysfunction
- RPE/photoreceptor cell death

- Proinflammatory and proangiogenic (VEGF) cytokines

→ neovascularization

# Classification



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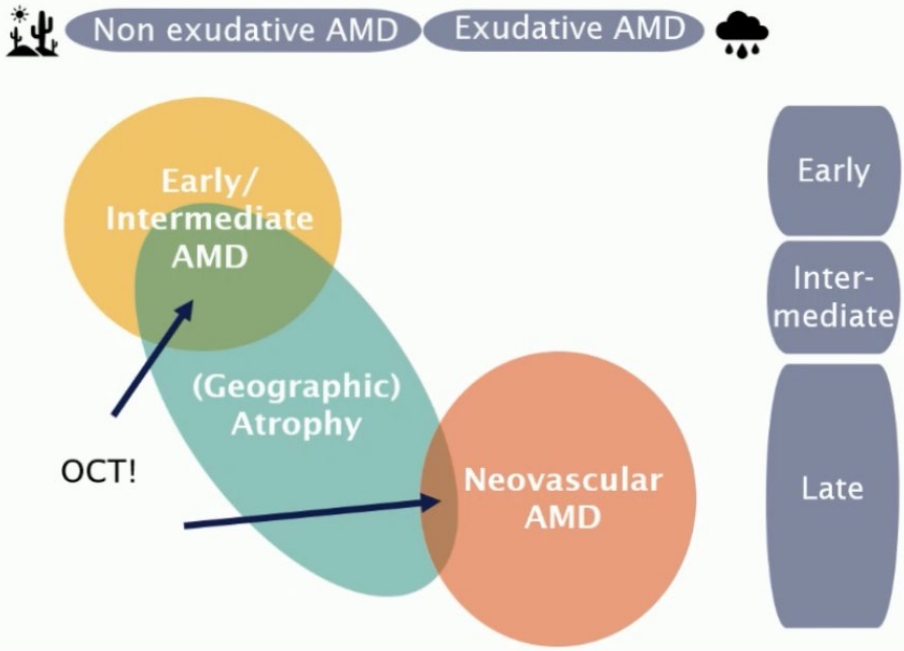
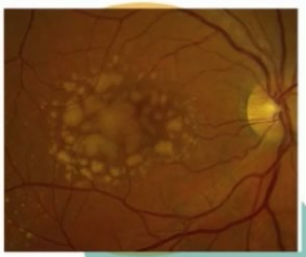


# Classification

Non exudative AMD | Exudative AMD



(Geographic) Atrophy

Neovascular AMD

Early

Inter-mediate

Late

# Clinical Classification of Age-related Macular Degeneration

*Frederick L. Ferris III, MD,[1] C. P. Wilkinson, MD,[2] Alan Bird, MD,[3] Usha Chakravarthy, MD,[4] Emily Chew, MD,[1] Karl Csaky, MD,[5] SriniVas R. Sadda, MD,[6] on behalf of the Beckman Initiative for Macular Research Classification Committee**

| Classification of AMD | Definition (lesions assessed within 2 disc diameters of fovea in either eye) |
|---|---|
| No apparent aging changes | No drusen and<br>No AMD pigmentary abnormalities* |
| Normal aging changes | Only drupelets (small drusen ≤63 μm) and<br>No AMD pigmentary abnormalities* |
| Early AMD | Medium drusen >63 μm and ≤125 μm and<br>No AMD pigmentary abnormalities* |
| Intermediate AMD | Large drusen > 125 μm and/or<br>Any AMD pigmentary abnormalities* |

# Classification

Non exudative AMD | Exudative AMD

Early

Inter-mediate

Late

Geographic Atrophy „vs.“ cRORA (OCT term)

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| Late AMD | Neovascular AMD and/or<br>Any geographic atrophy |

# Epidemiology & Risk Factors


**Prevalence[1]**

| Early | Late | Any |
|---|---|---|
| 8.01% | 0.37% | 8.69% |

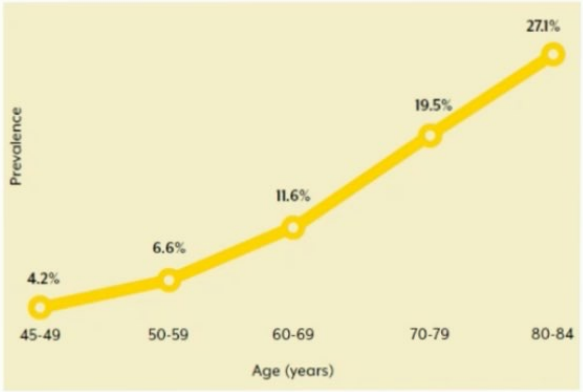
**15 year incidence[2]**

| Early | Late |
|---|---|
| 22.7% | 6.8% |

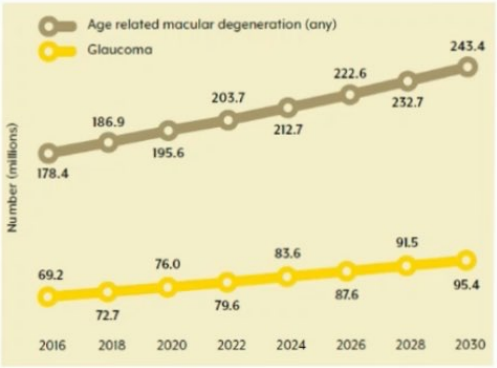
[1] Wong WL, Su X, Li X et al. Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. Lancet Glob Health. 2014 Feb;2(2):e106-16. doi: 10.1016/S2214-109X(13)70145-1.
[2] Joachim N, Mitchell P, Burlutsky G et al. The Incidence and Progression of Age-Related Macular Degeneration over 15 Years: The Blue Mountains Eye Study. Ophthalmology. 2015 Dec;122(12):2482-9. doi: 10.1016/j.ophtha.2015.08.002.

# Epidemiology & Risk Factors

- **Age**
  - Estimated prevalence increase from 196 million (2020) to 288 million (2040)




*Adapted from:* Wong WL, Su X, Li X, Cheung CM, Klein R, Cheng CY, et al. Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. The Lancet Global health. 2014;2(2):e106-16.




*Adapted from:* Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040: a systematic review and meta-analysis. Ophthalmology. 2014;121(11):2081-90; and Wong WL, Su X, Li X, Cheung CM, Klein R, Cheng CY, et al. Global prevalence of age-related macular degeneration and disease burden projection for 2020 and 2040: a systematic review and meta-analysis. The Lancet Global Health. 2014;2(2):e106-16.

World report on vision. Geneva: World Health Organization; 2019.

# Epidemiology & Risk Factors

- Age
- **Family History and Ethnicity (Genetics!)**
  - Prevalence higher in people of European ancestry compared to Hispanics and people of Asian and African ancestry
  - Many genetic associations, most notable CFH and ARMS2/HTRA1 (dysregulation of complement pathway)

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- Family History and Ethnicitiy (Genetics!)
- Gender

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- Smoking: most consistently identified modifiable risk factor
- **Sunlight Exposure**: inconclusive – encourage general exposure while minimizing eye exposure

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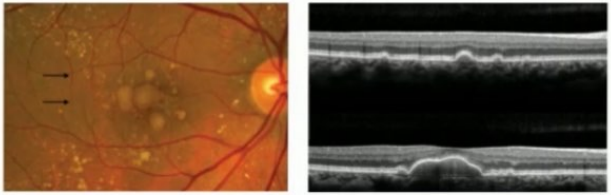
- Smoking: most consistently identified modifiable risk factor
- Sunlight Exposure: inconclusive – encourage general exposure while minimizing eye exposure
- Diet: carotenoids, unsaturated fats, AREDS 2 supplements
- **Arterial hypertension, obesity, lack of exercise**

***Complex interaction between genetic and environmental factors!***

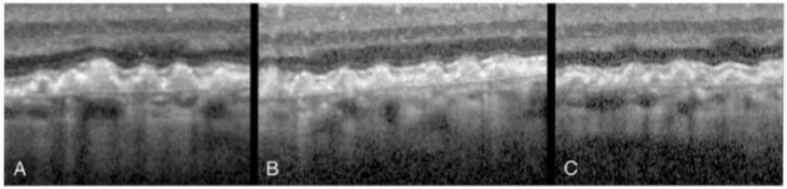
# Early and intermediate AMD – is it all about drusen...?

## Sub-RPE Drusen

"soft": >63µm, can be confluent, risk for progression

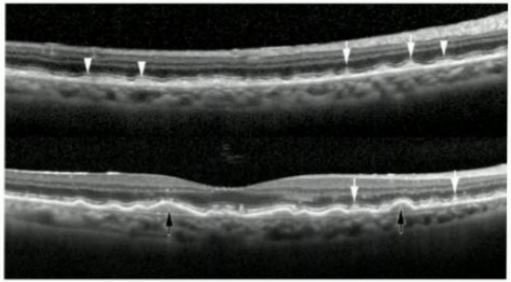


- Cuticular: association also with non-AMD diseases also clustered, saw-tooth-pattern



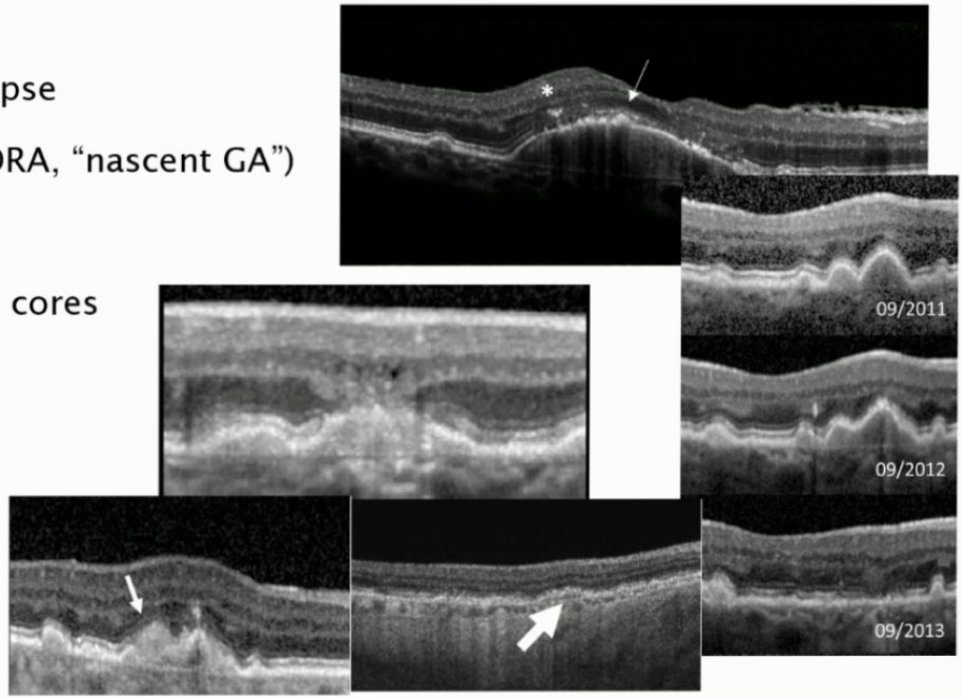

## Subretinal Drusenoid Deposits / Reticular Pseudodrusen

Above the RPE, stages 1-4, risk for progression, type III MNV

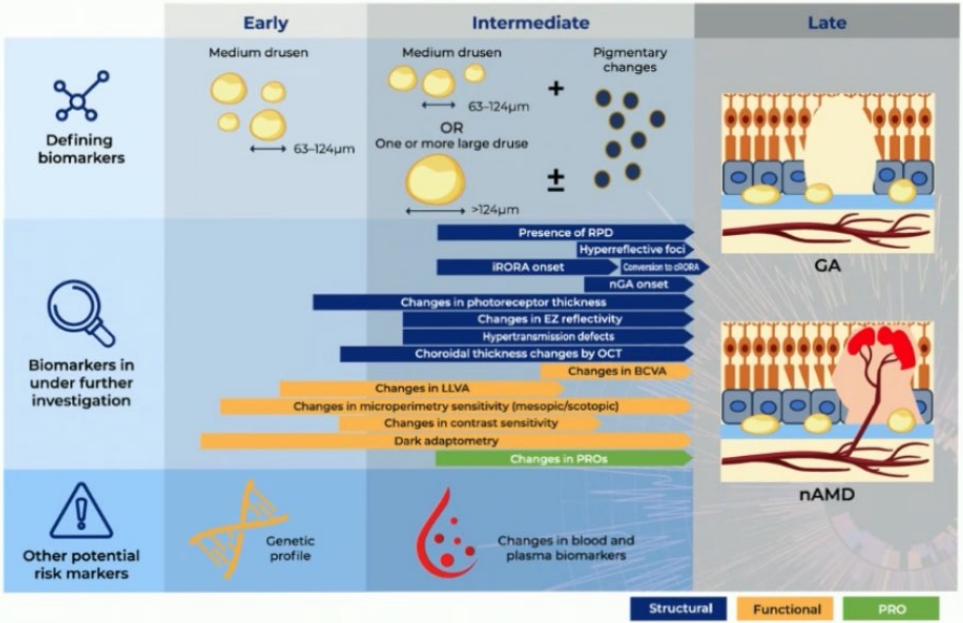


# ...not entirely.

- Drusen build-up/collapse
- Atrophic features (iRORA, “nascent GA”)
- Hyperreflective foci
- Hyporeflective drusen cores
- Vitelliform lesions
- Double layer sign



# High Risk Features of Progression




Lad EM, Finger RP, Guymer R. Biomarkers for the Progression of Intermediate Age-Related Macular Degeneration. Ophthalmol Ther. 2023 Sep 29. doi: 10.1007/s40123-023-00807-9. Epub ahead of print. PMID: 37773477.