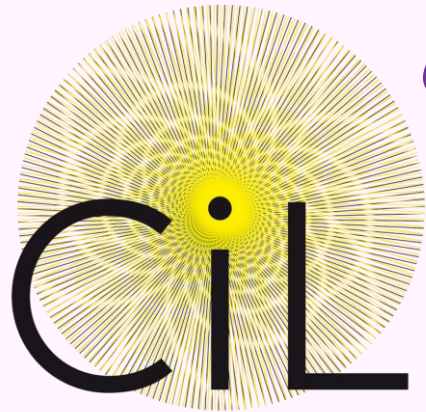


Subretinal Autofluorescent Lesions: Towards a clinical classification

Salomon Yves Cohen

Sarah Mrejen, Alain Gaudric, Eric Souied

Centre d'Imagerie et de Laser, Paris
Université Paris Est, Créteil, France

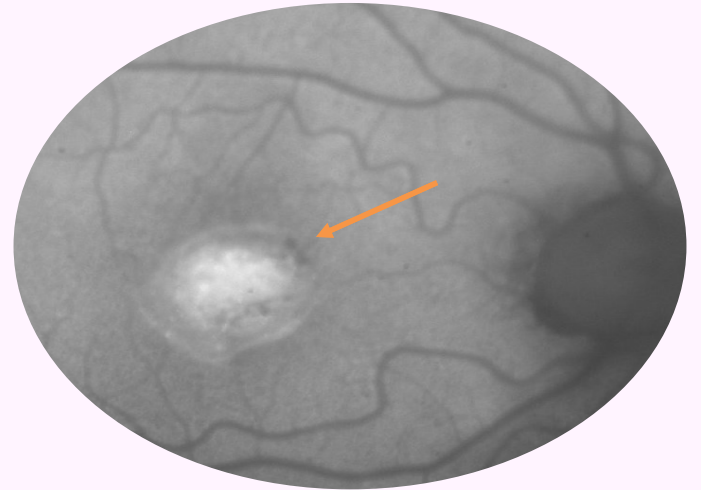
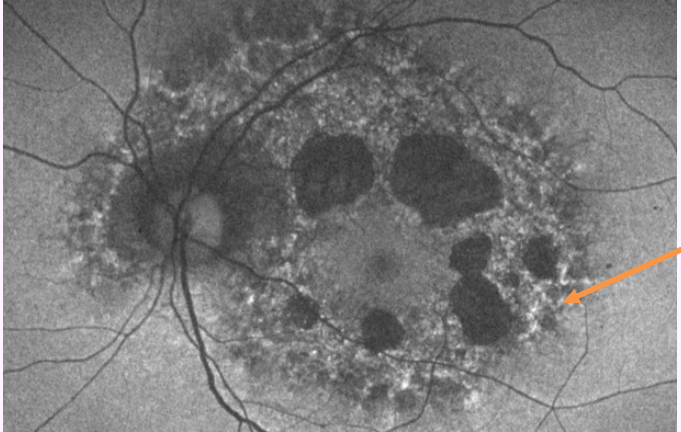


Disclosures

- Allergan
- Bayer
- Novartis
- Roche
- Thea

Subretinal Autofluorescent Lesions

- Lesions?: debris, deposits, material?

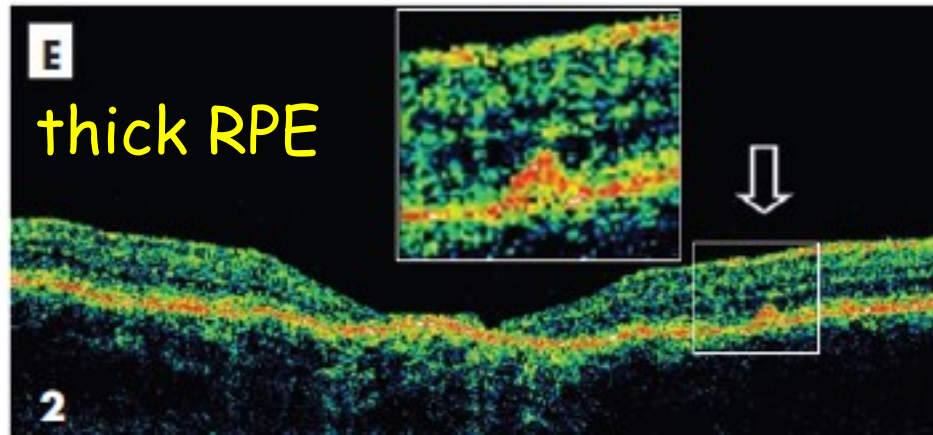
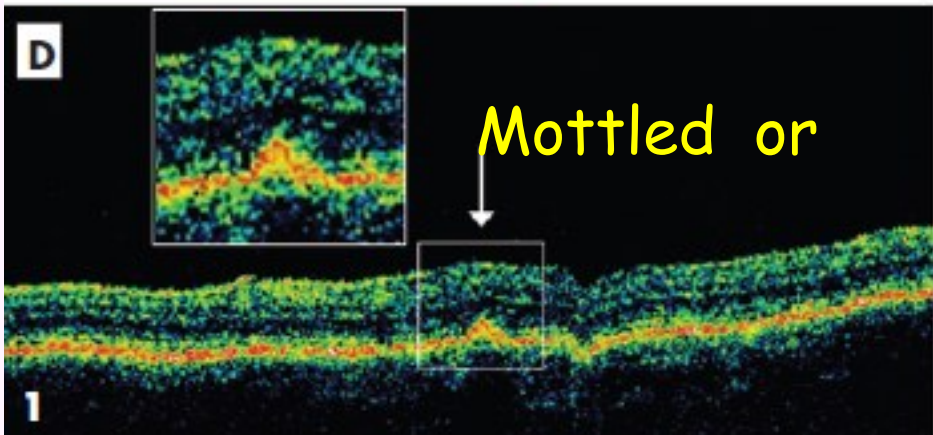
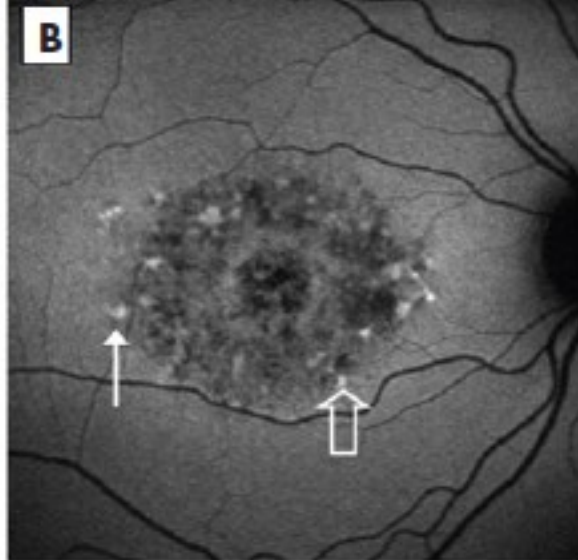
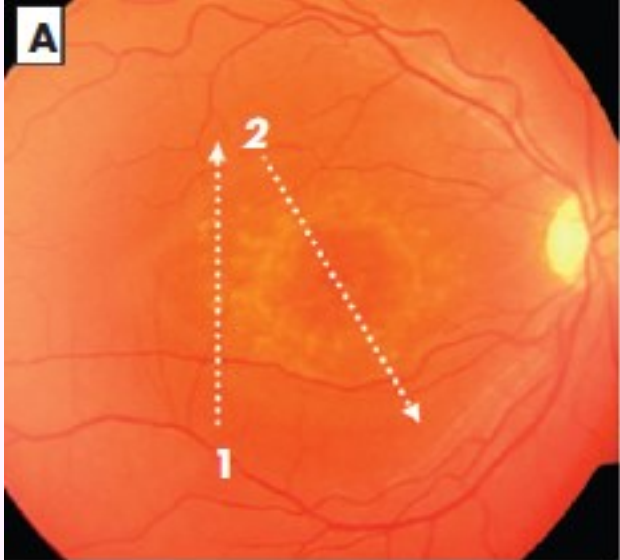


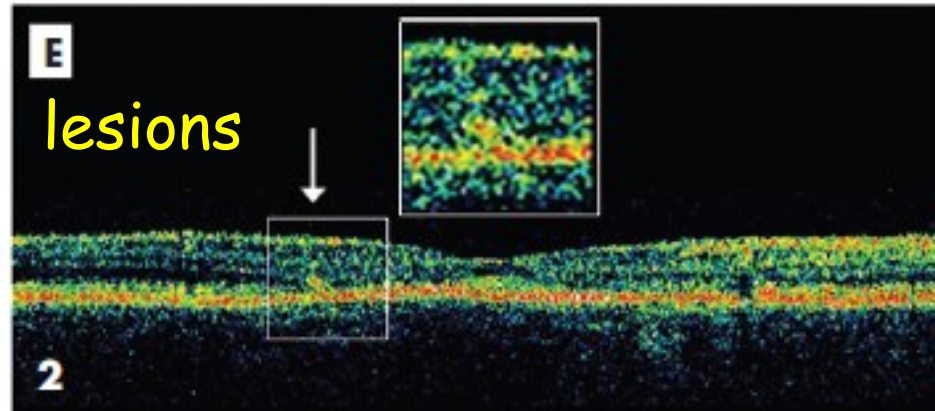
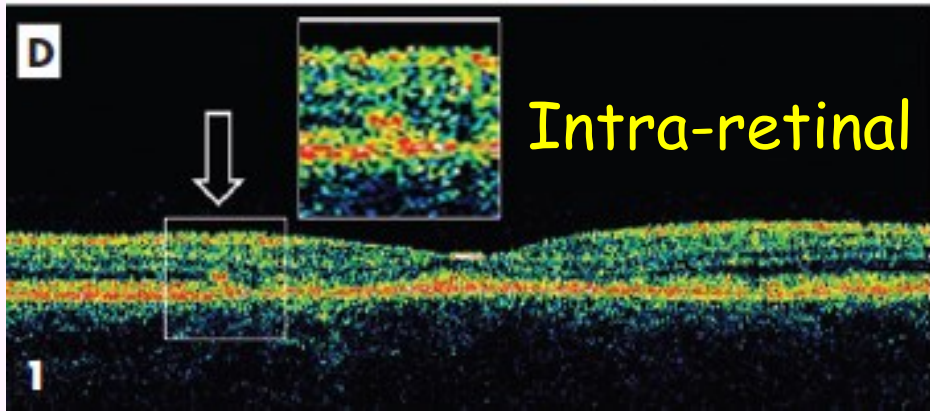
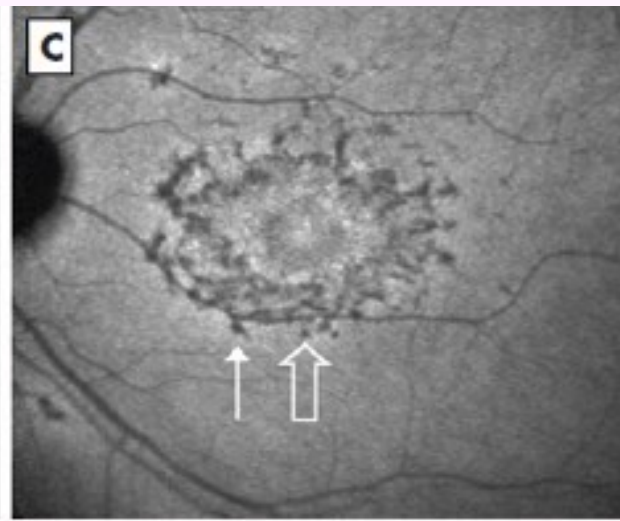
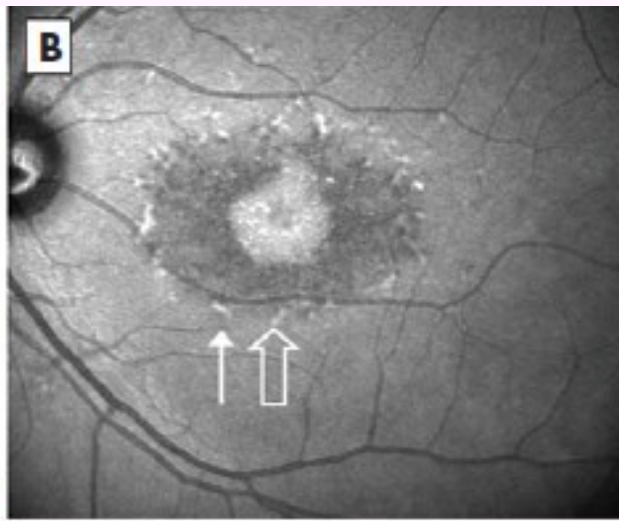
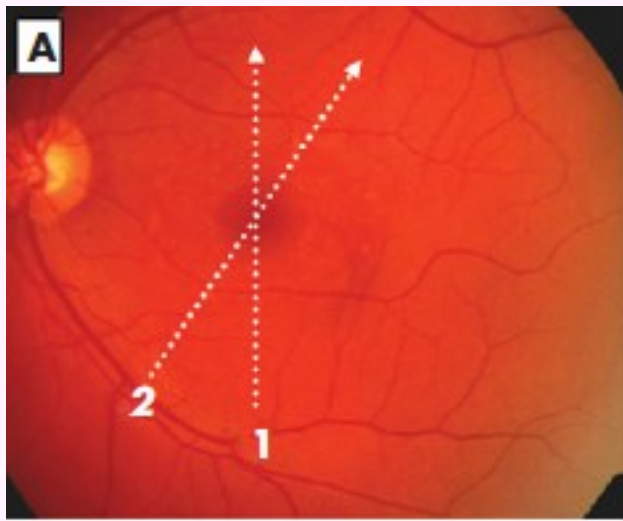
Subretinal Autofluorescent Lesions

- Lesions?: debris, deposits, material?
- Subretinal?:



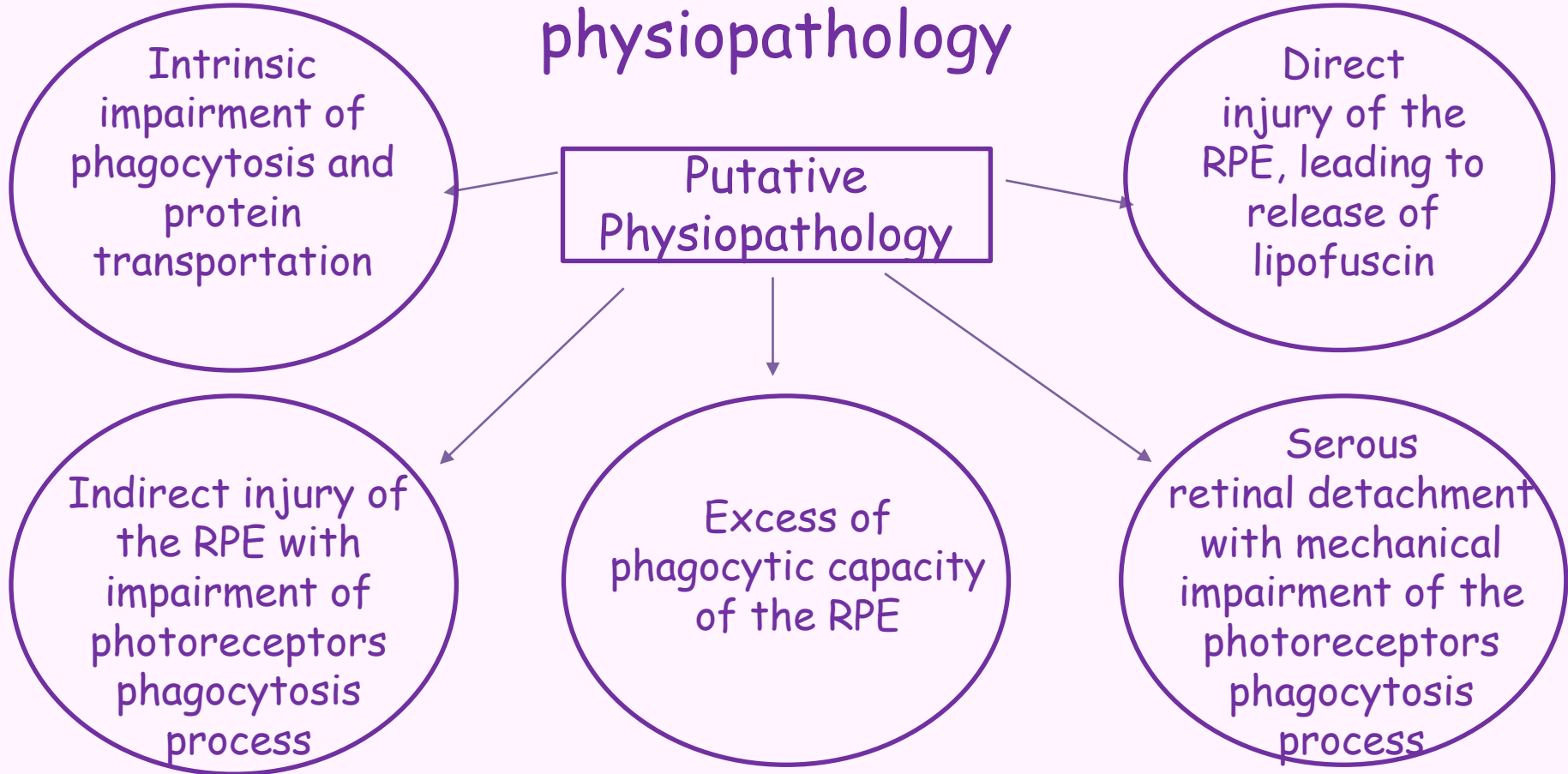
"True" Subretinal Autofluorescent Deposit:
Best vitelliform dystrophy





Stargardt's disease

According to the putative physiopathology

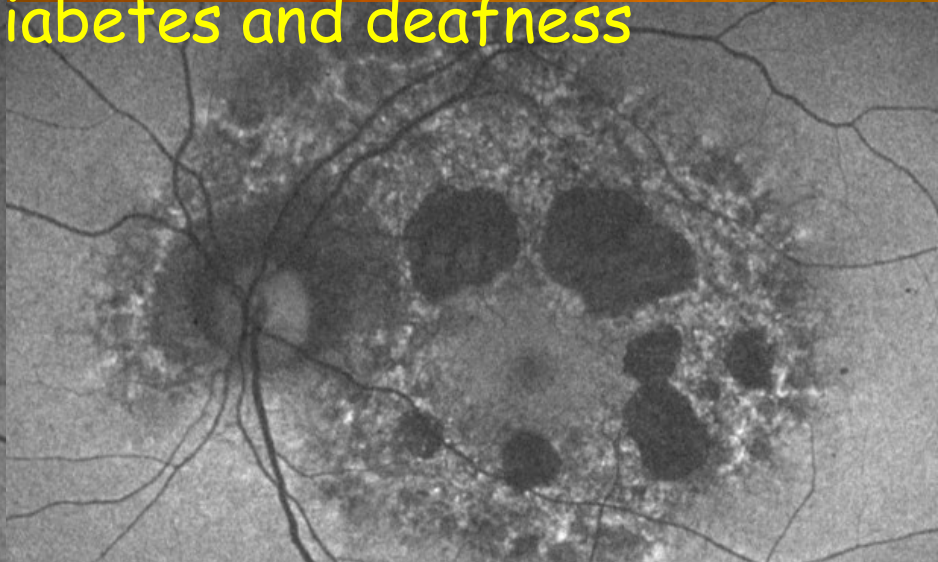
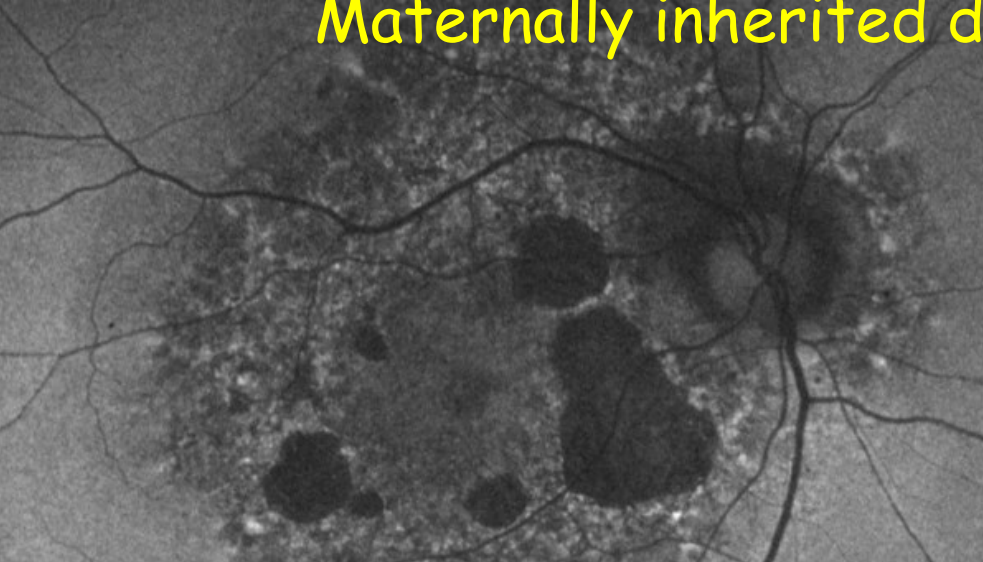


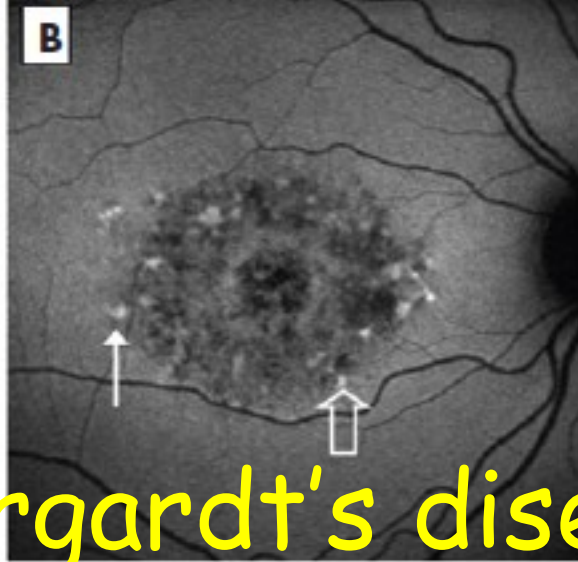
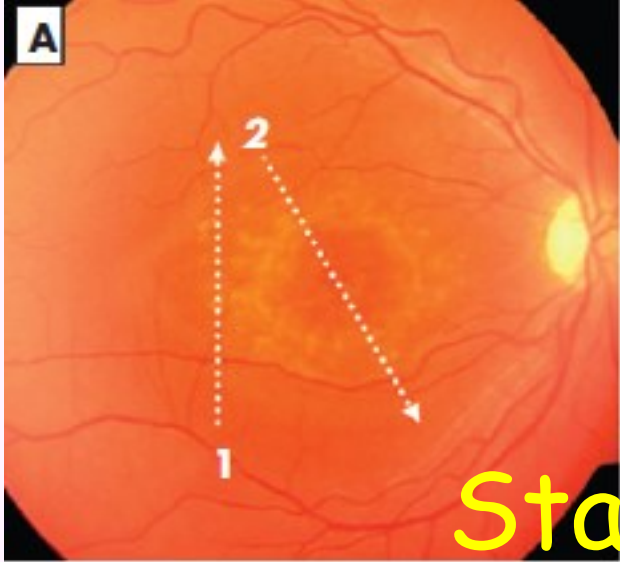
Various conditions

- Hereditary Inherited Conditions
- Congenital and/or Malformative Conditions
- Degenerative Disorders with Extracellular Deposits
- Vitreomacular Interface Disorders
- Tumors
- Malignant and Benign Immunoglobulinopathies
- Intraocular Lymphoma
- Immune and Inflammatory Conditions
- Pachychoroid Syndrome
- Toxic retinopathies and Iatrogenic disorders
- Miscellaneous

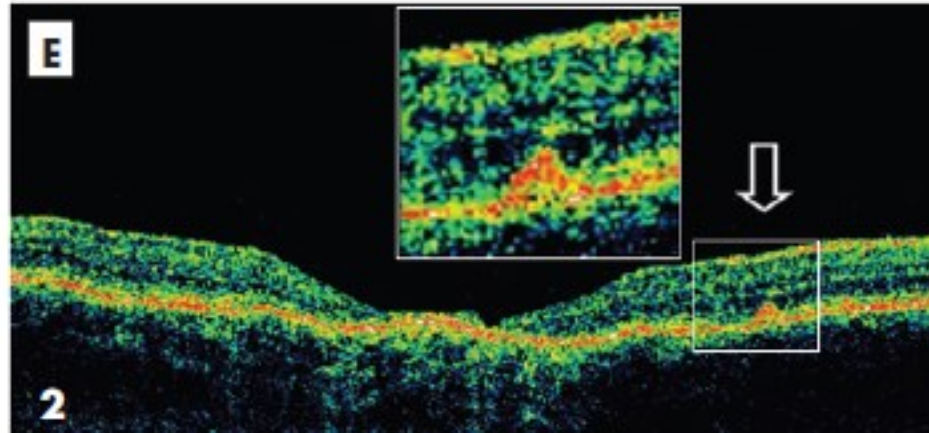
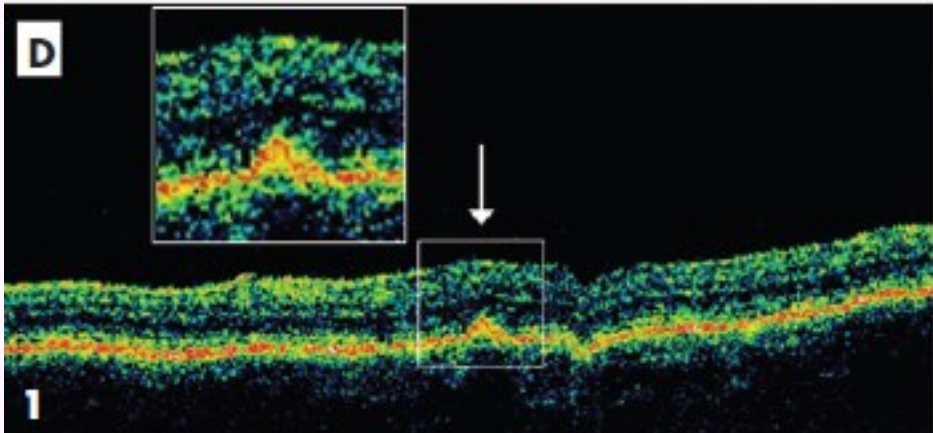


Maternally inherited diabetes and deafness





Stargardt's disease



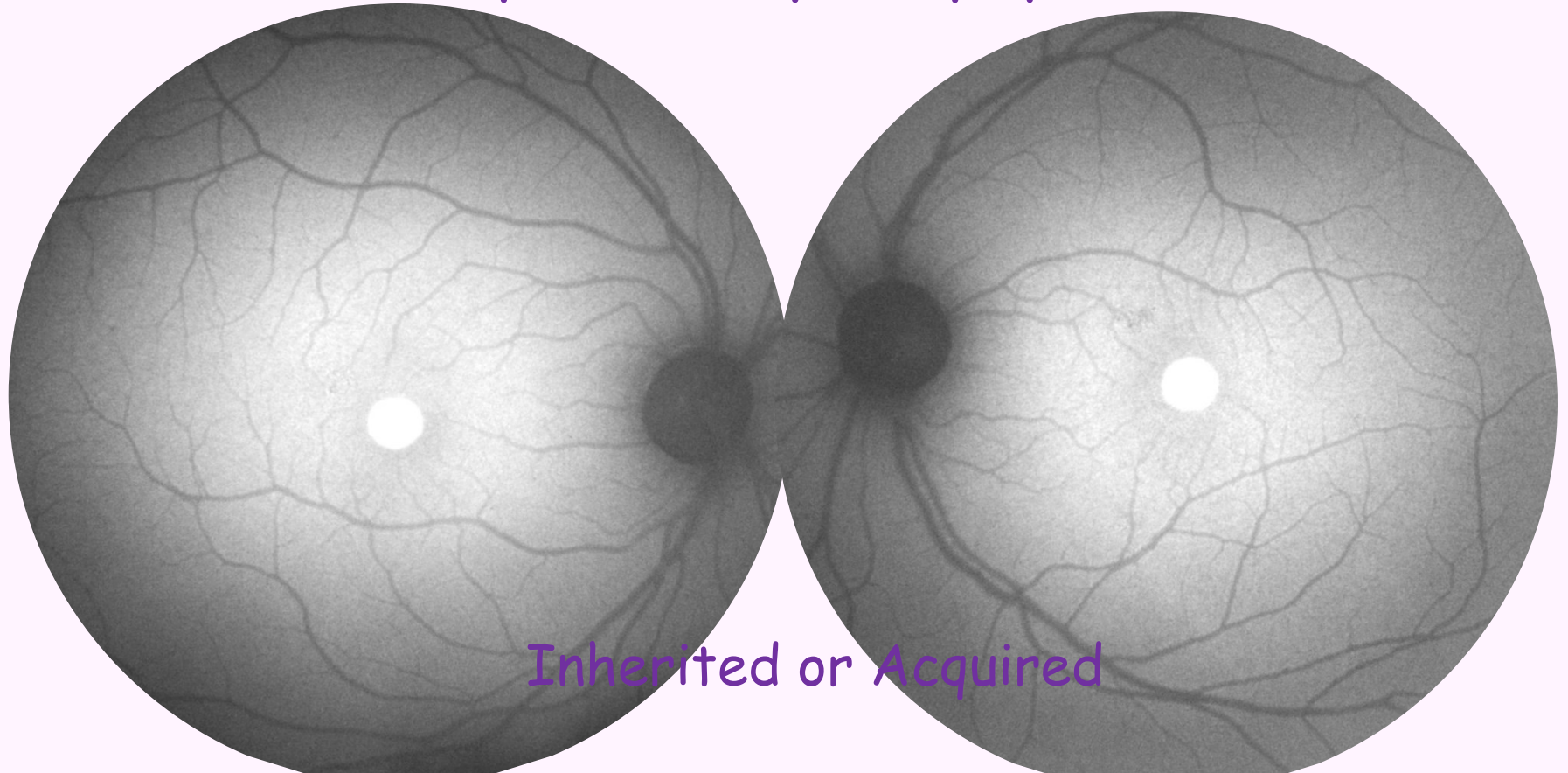


Best vitelliform dystrophy

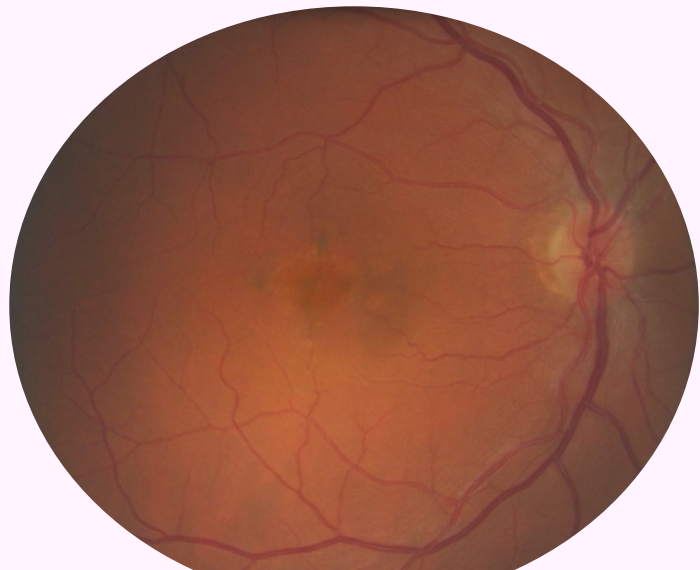
Autosomal Recessive Bestrophinopathies



Adult vitelliform macular dystrophy and pattern dystrophy



Inherited or Acquired

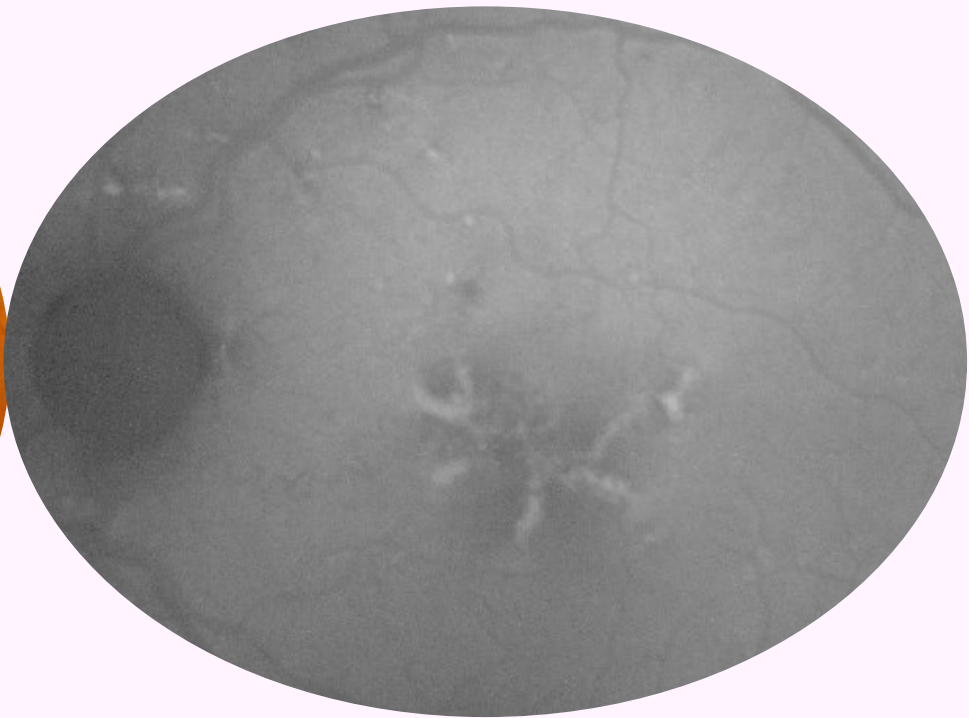


RE

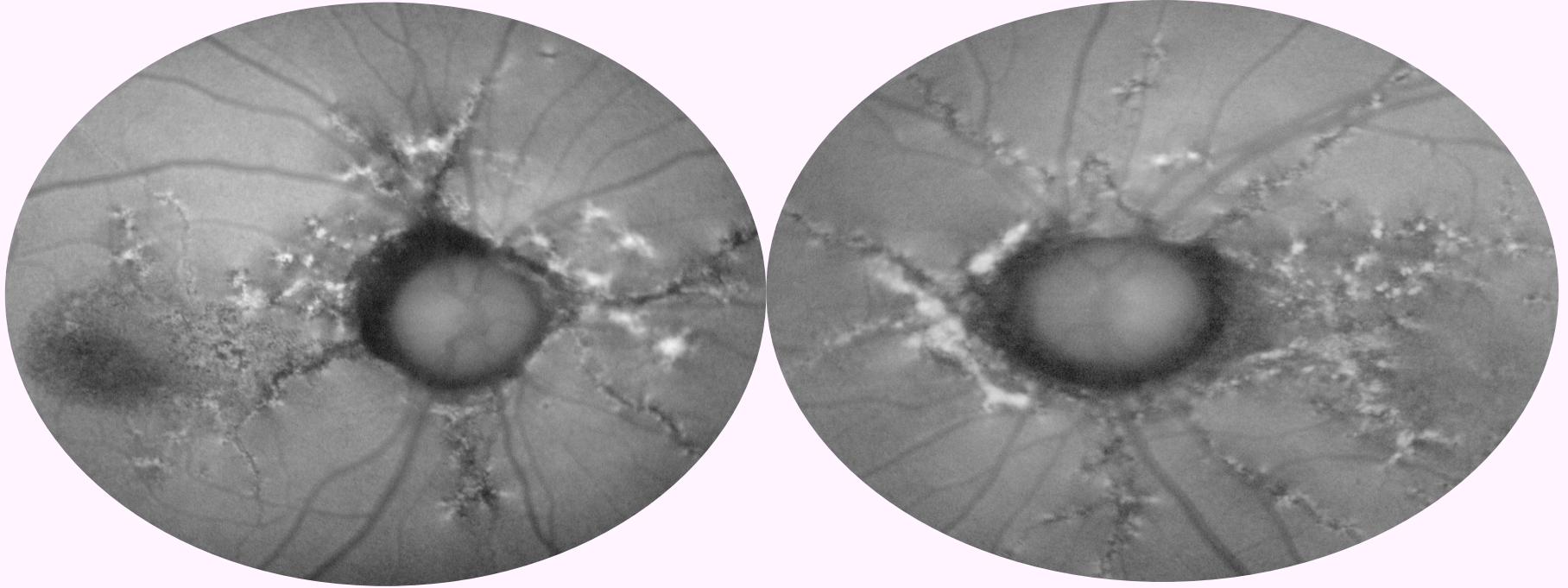


LE





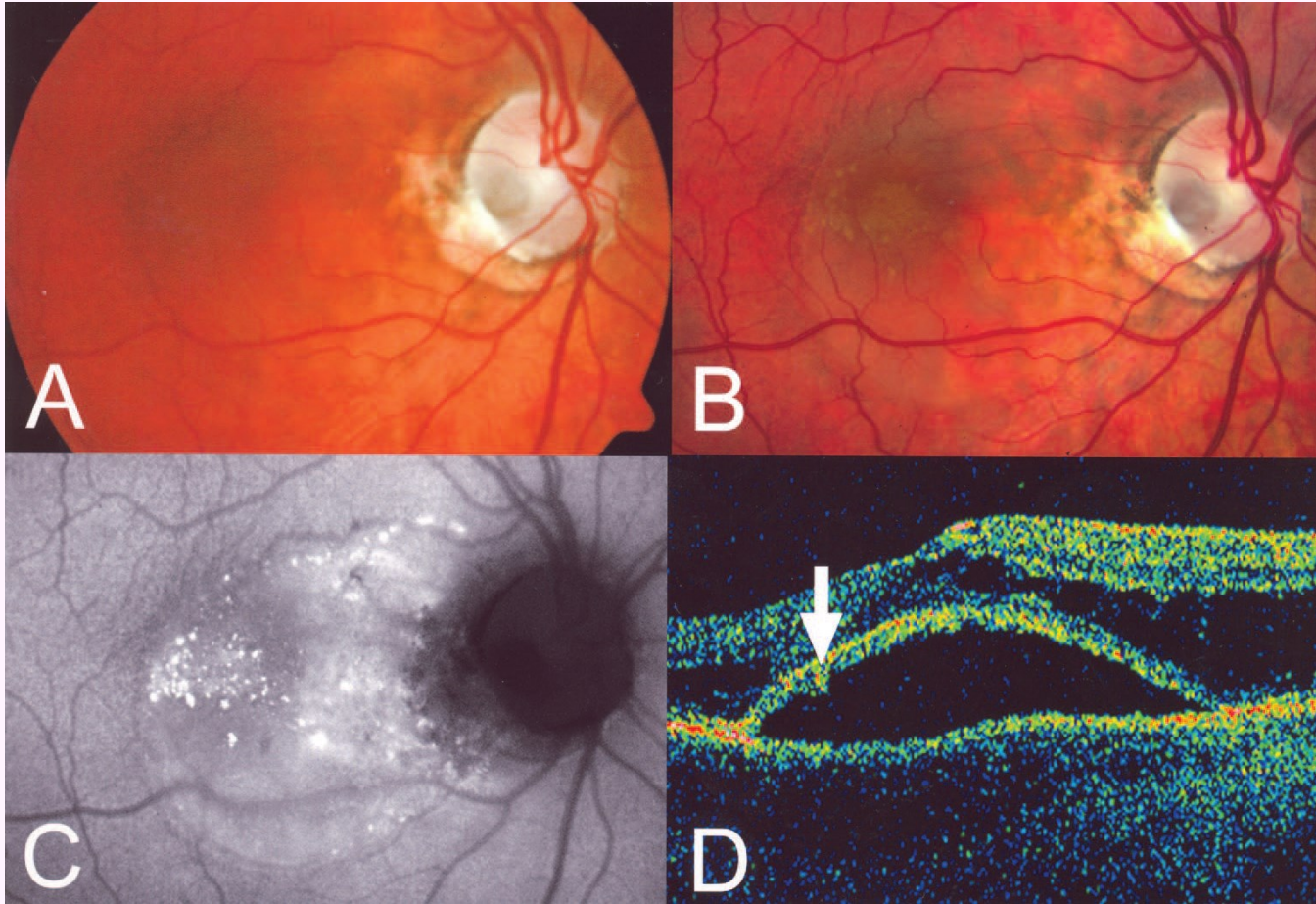
Pseudoxanthoma élasticum



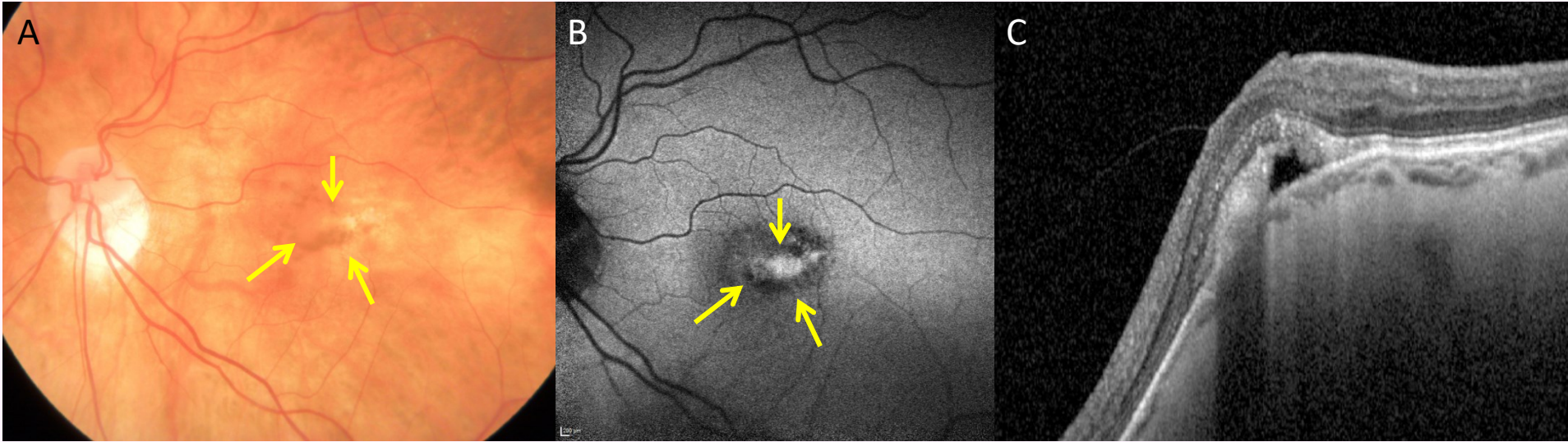
Congenital and/or malformative conditions

- Nanophthalmos and other Uveal effusions
- Optic pit maculopathy
- Tilted disc syndrome

Optic pit maculopathy



Tilted Disk Syndrome

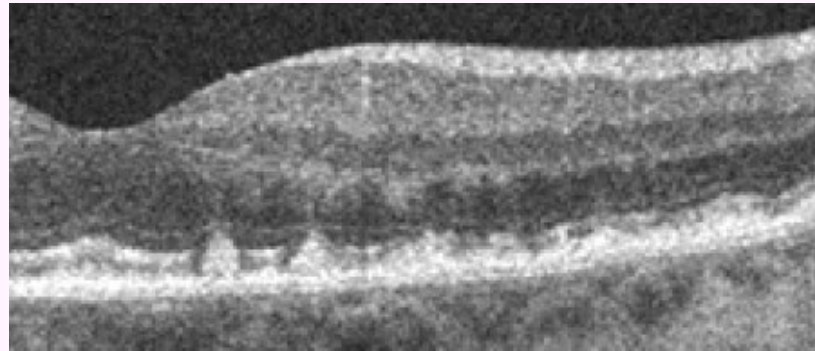
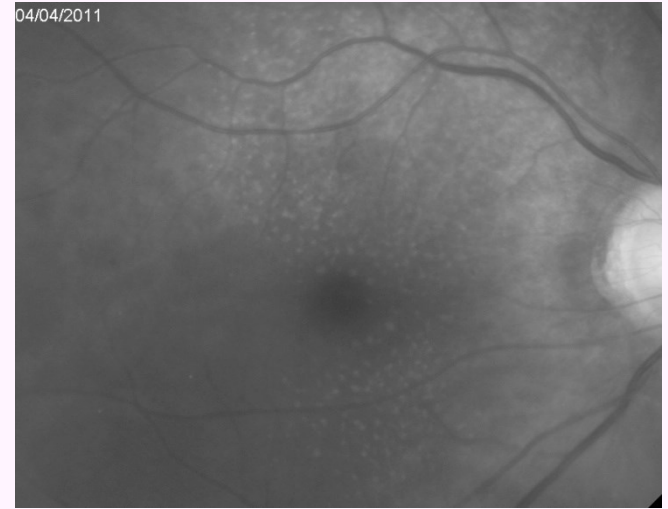


De Laage de Meux P, Souied E, Cohen SY: RETINA 2022, online access

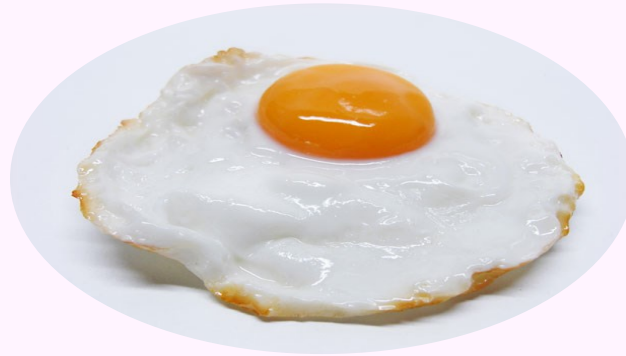
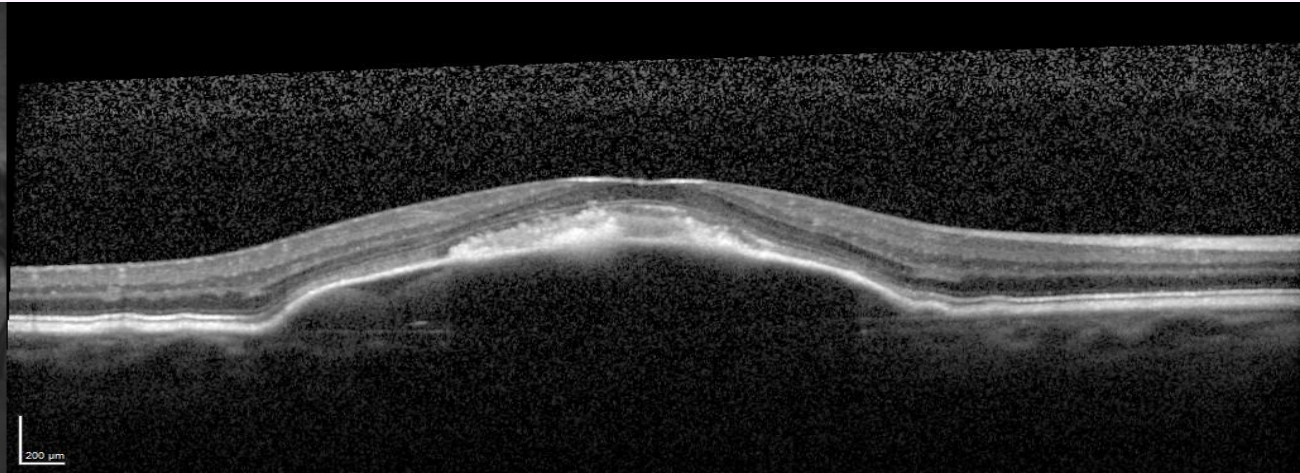
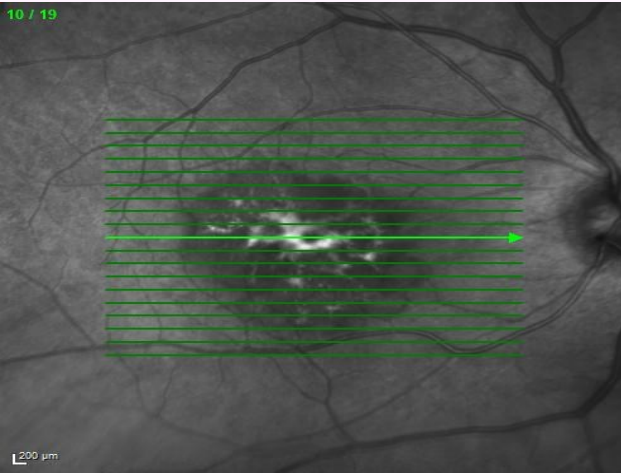
Degenerative disorders with extracellular deposits

- ARM
- Cuticular drusen with vitelliform macular detachment
- Amyloidosis
- Membranoproliferative glomerulonephritis

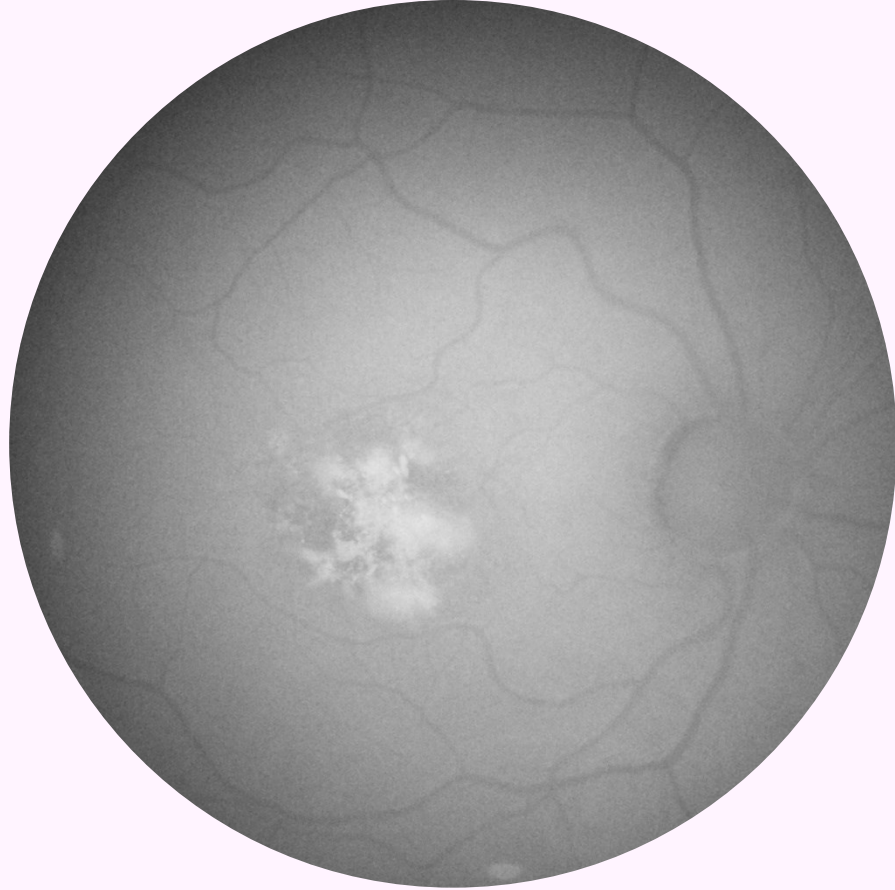
Reticular Pseudodrusen



Drusenoid PEDs and vitelliform lesions

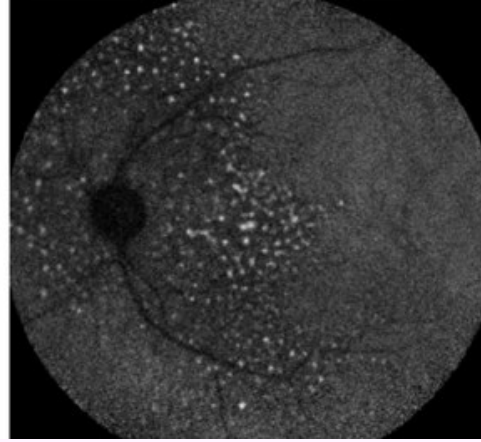
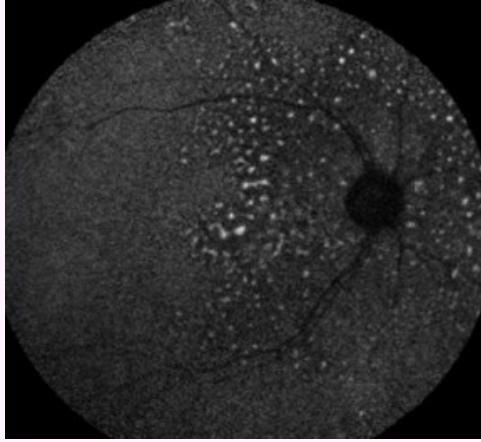


The "sunny-side up"

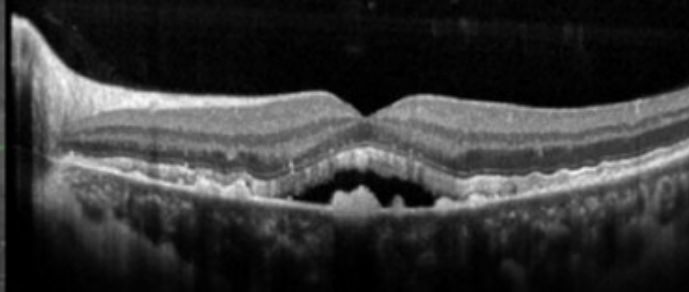
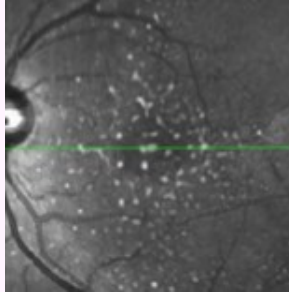




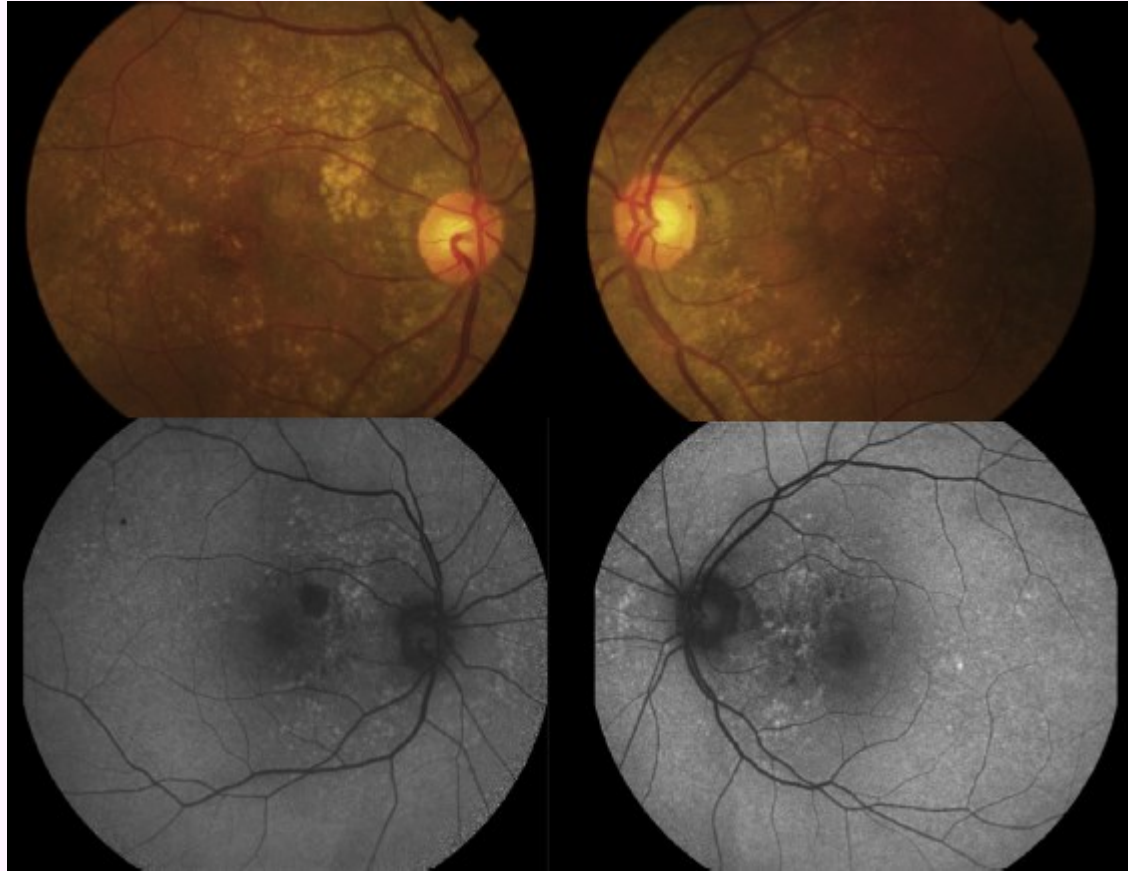
Cuticular drusen with vitelliform macular detachment



Light-chain (AL)
Amyloidosis

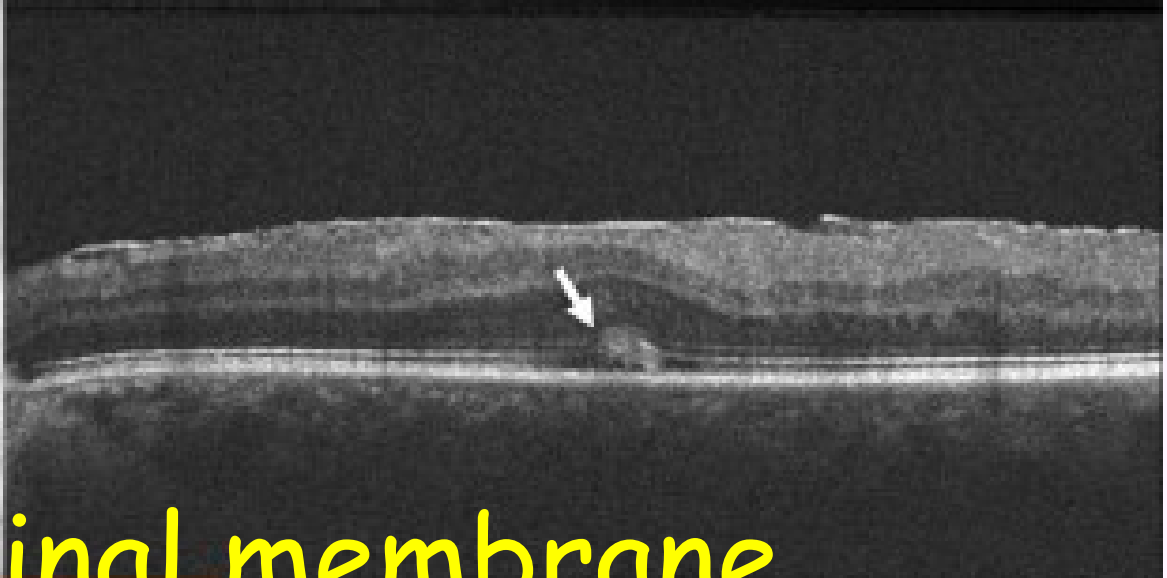
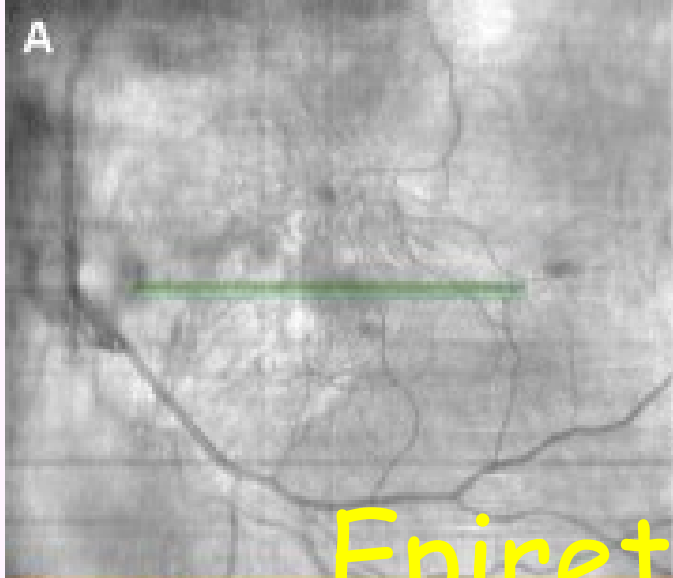


Membrano-Proliferative Glomerulonephritis

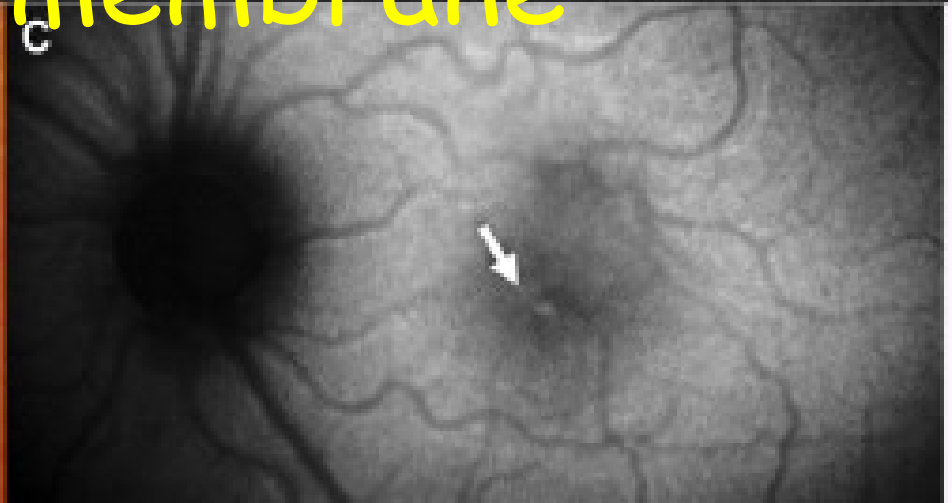


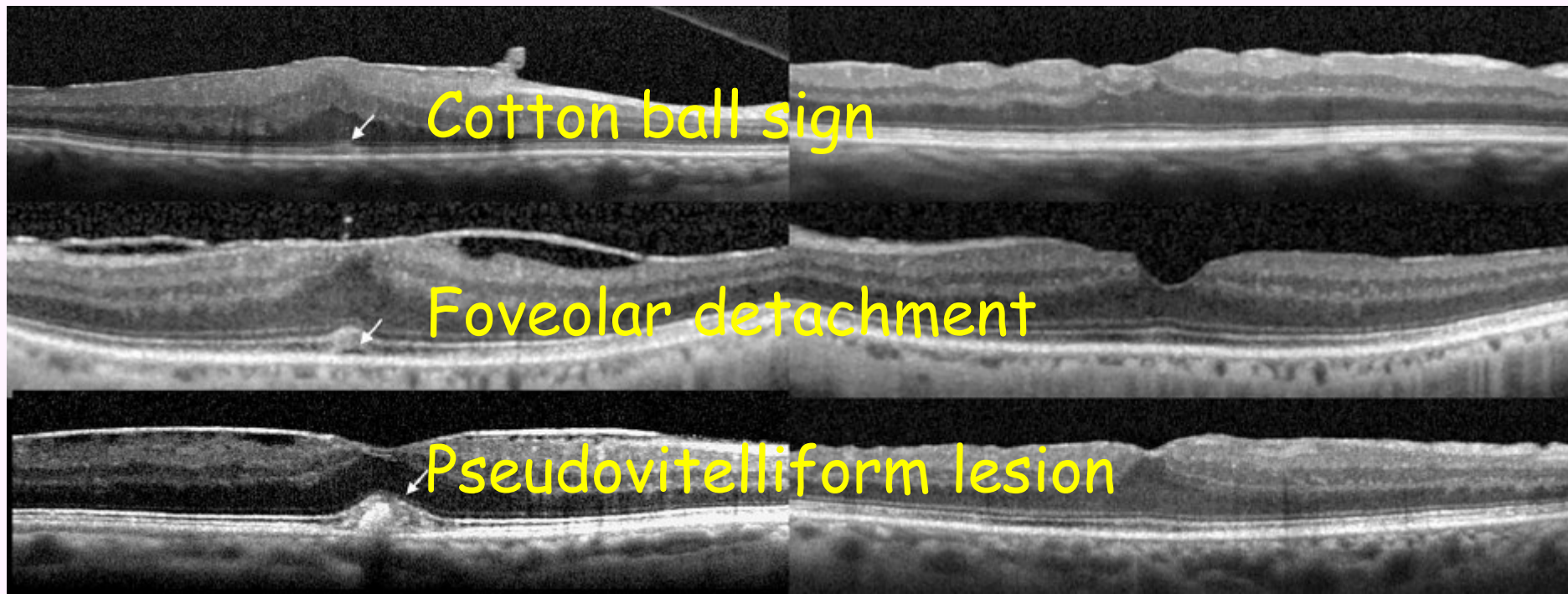
Vitreomacular interface disorders

- Epiretinal membrane (ERM)
- Vitreomacular tractions and ERM



Epiretinal membrane



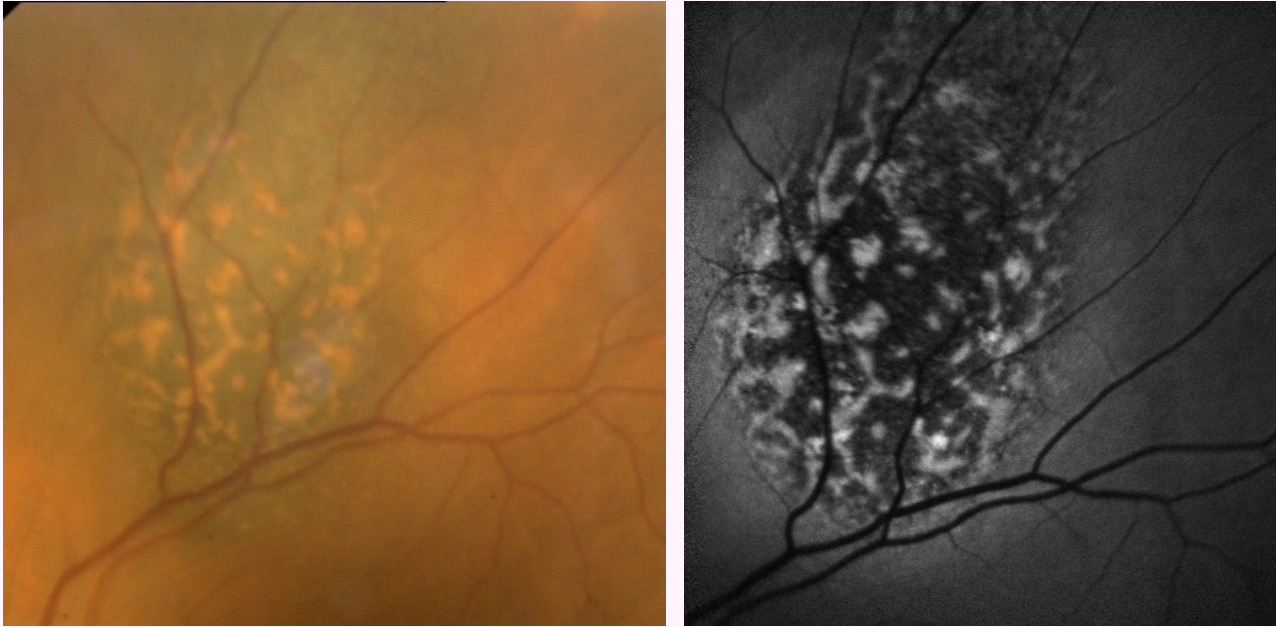


3 stages

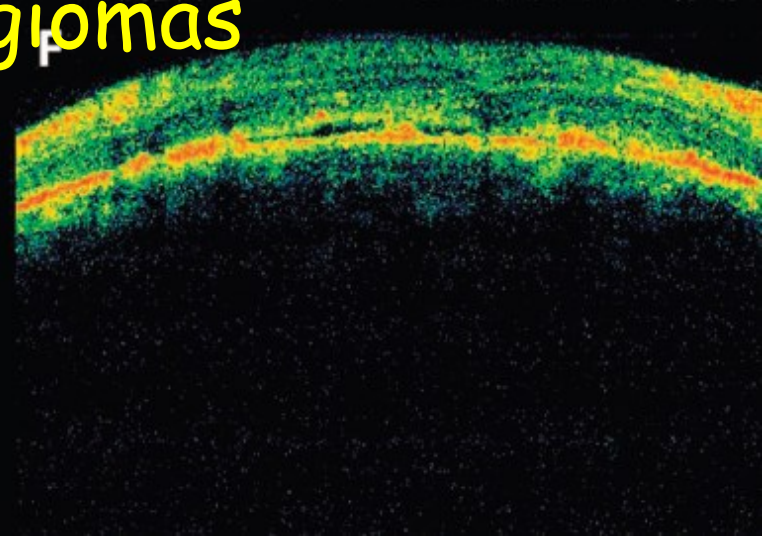
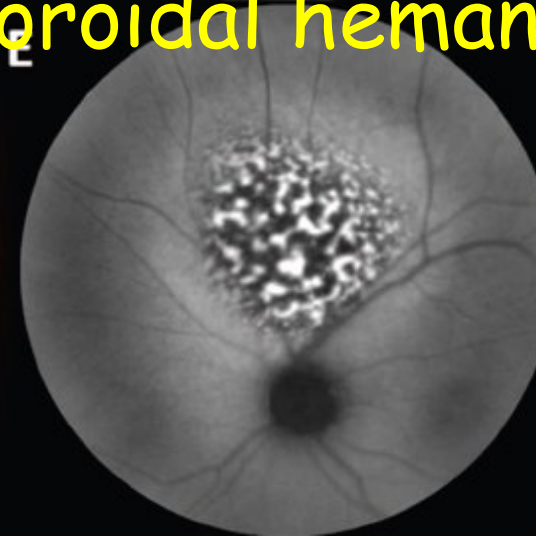
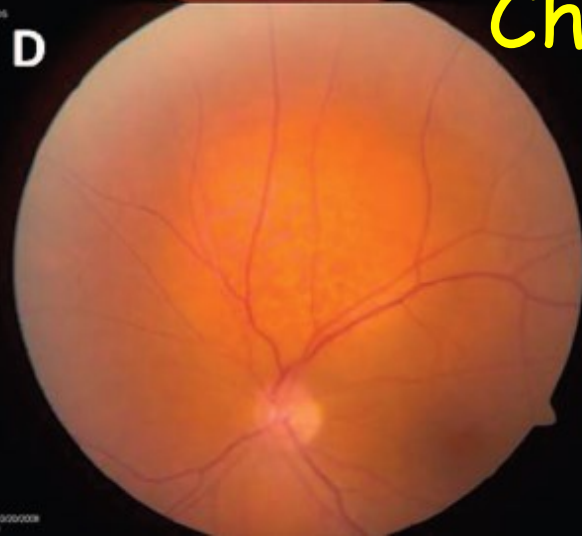
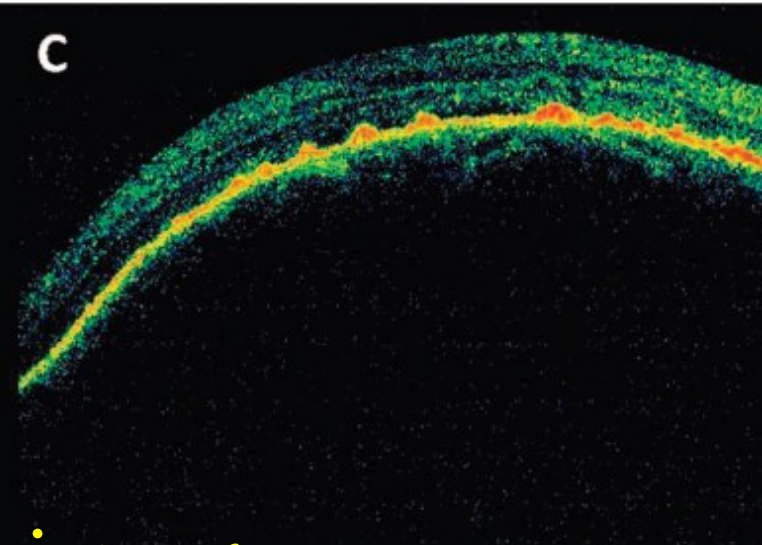
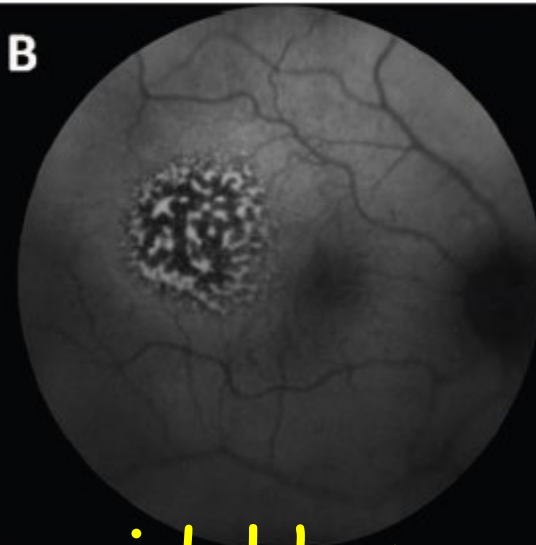
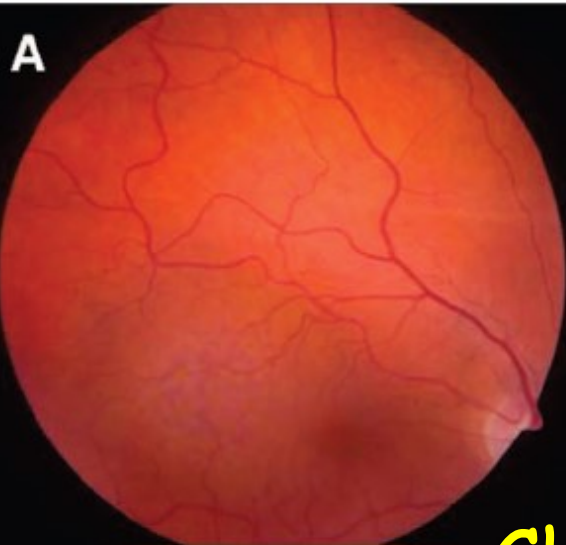
Tumors

- Choroidal melanoma
- Choroidal metastasis
- Choroidal hemangiomas

orange pigment



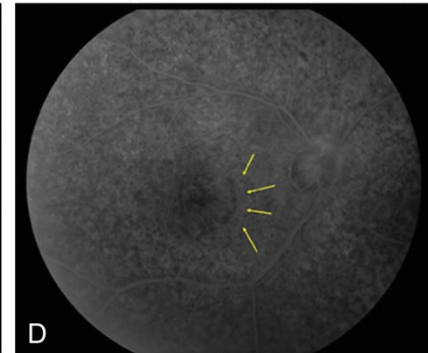
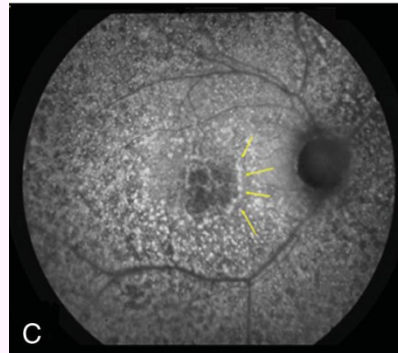
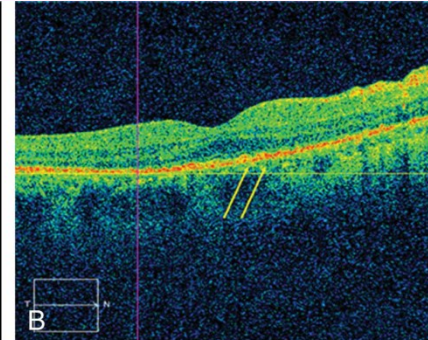
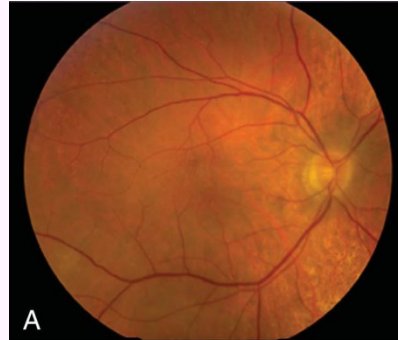
Typical of choroidal melanoma but not specific



Choroidal hemangiomas

Intra-Ocular Lymphoma

- Leopard-spot retinopathy

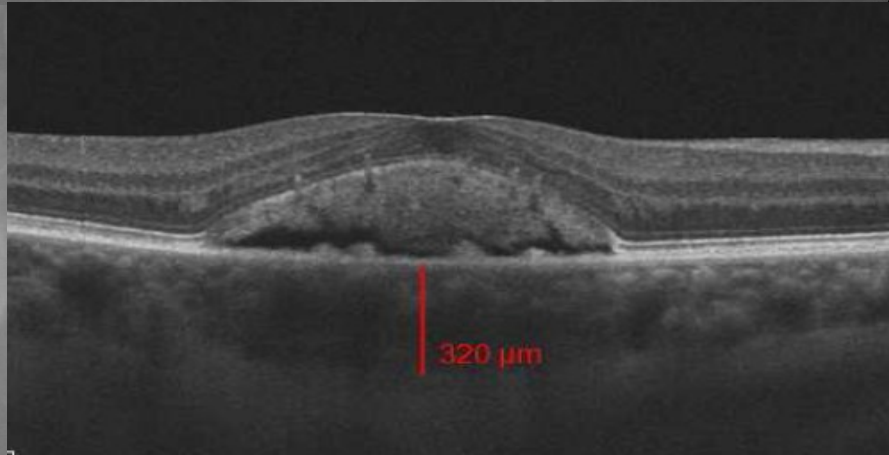


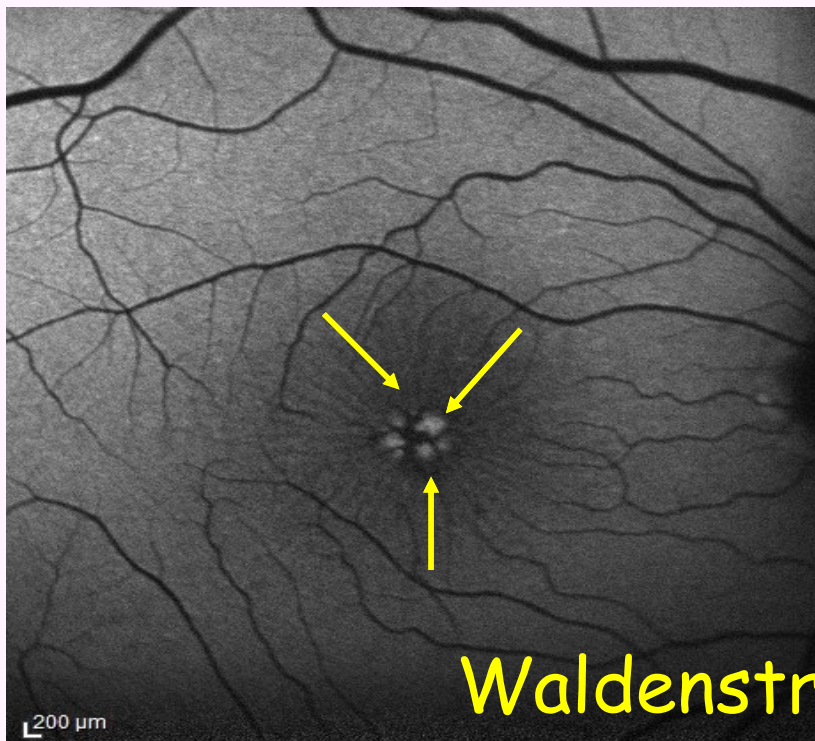


Malignant and Benign Immunoglobulinopathies

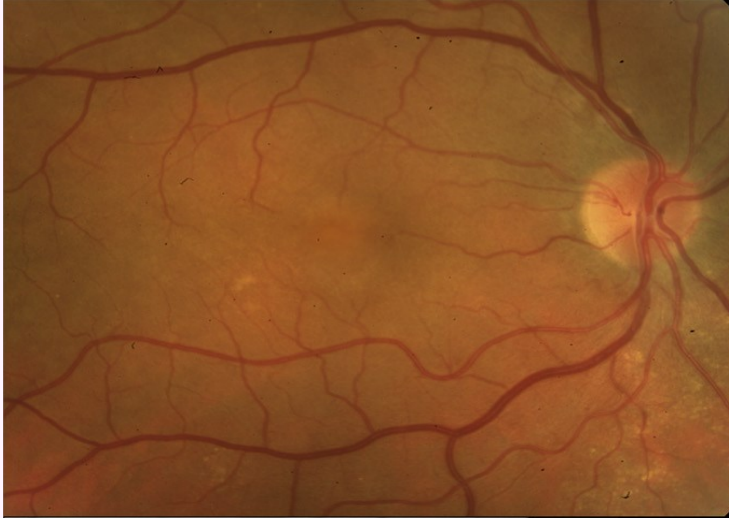
- Multiple myeloma (Kahler's disease)
- Waldenström's disease
- Benign monoclonal gammopathy
- Light chain deposition disease

Multiple myeloma

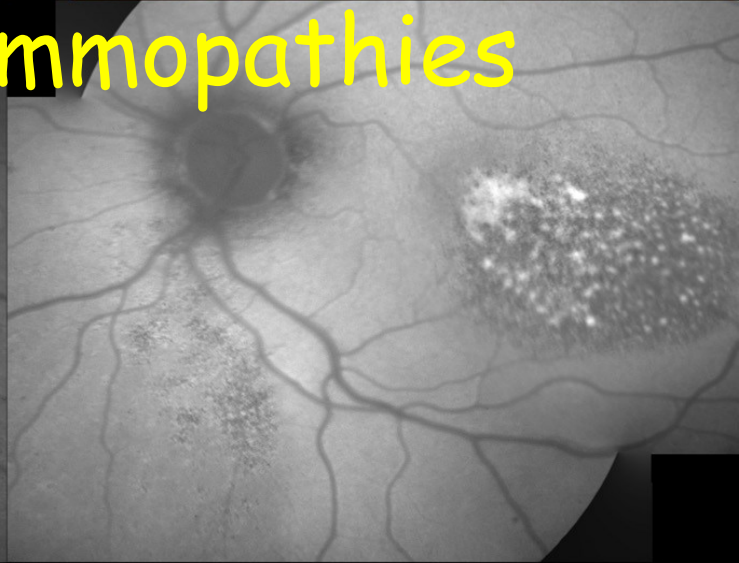
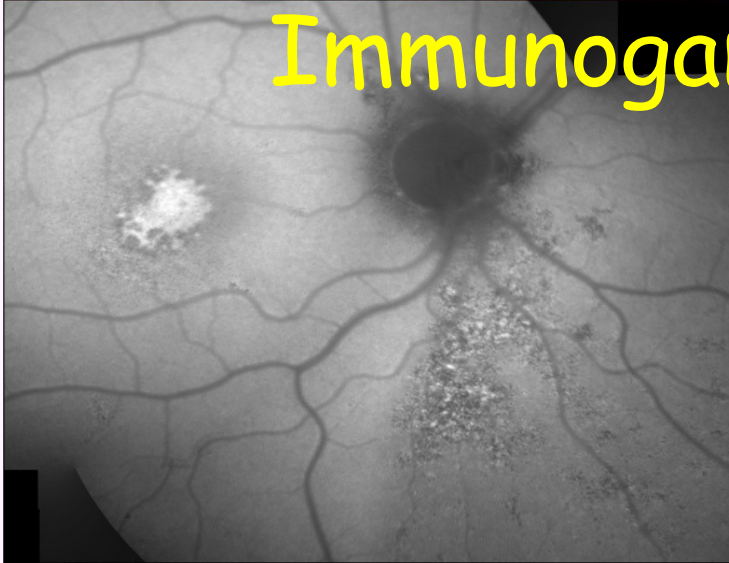




Waldenström's disease

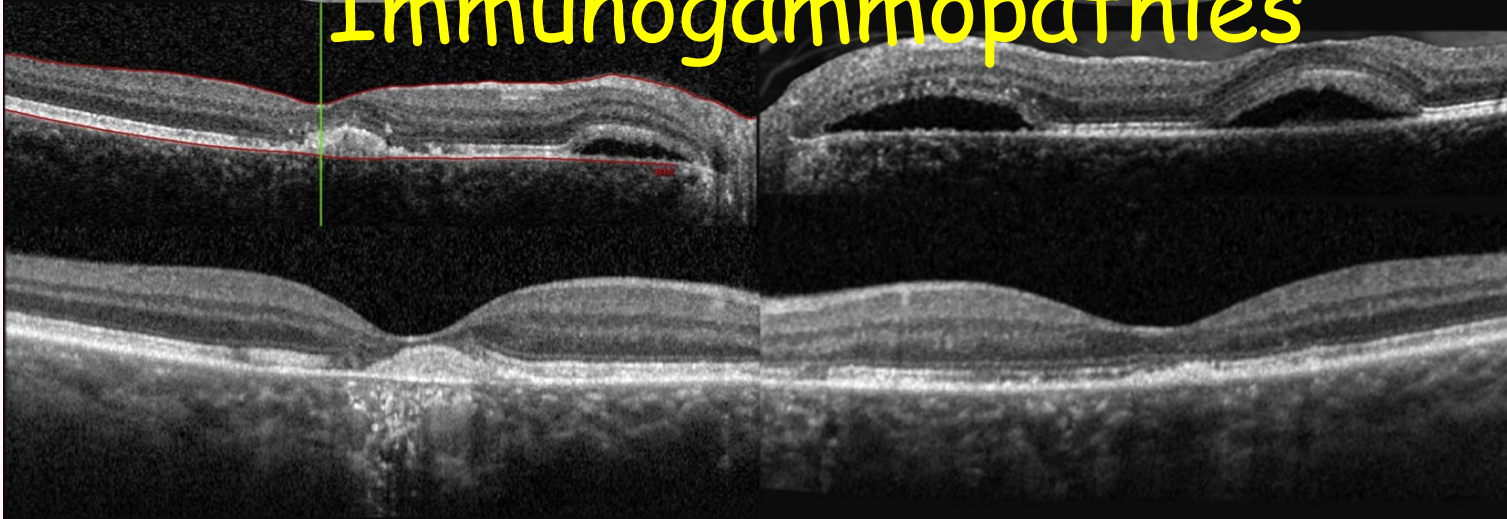


Immunoglobulinopathies



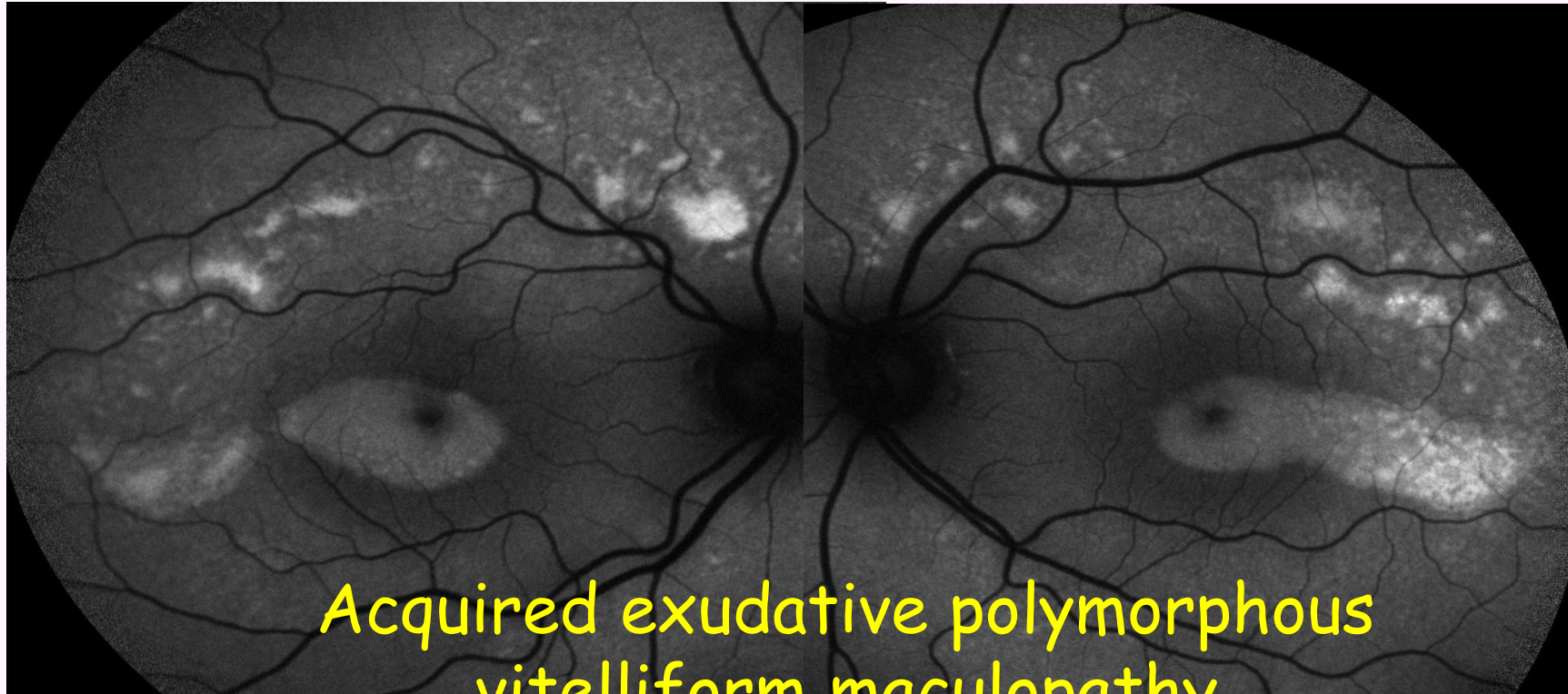


Immunoglobulins

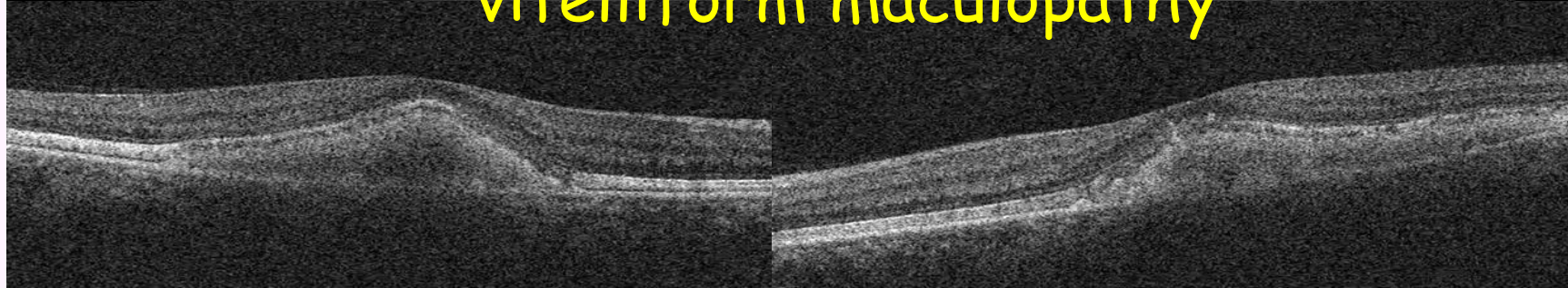


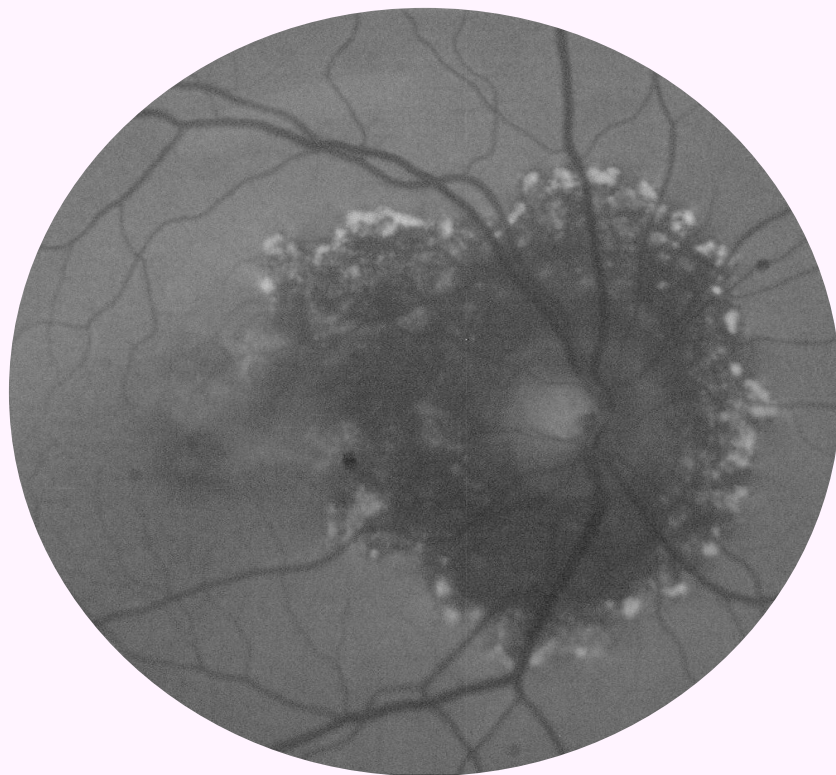
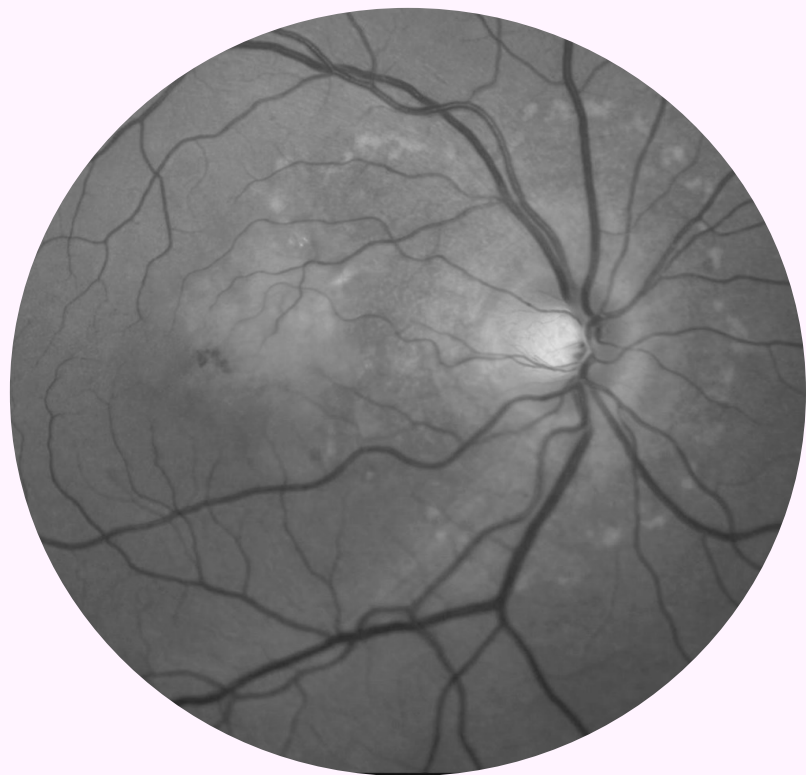
Immune and Inflammatory Conditions

- Acquired exudative polymorphous vitelliform maculopathy
- Sarcoidosis
- AZOOR
- Paraneoplastic syndromes
- Acute syphilitic posterior placoid chorioretinitis



Acquired exudative polymorphous
vitelliform maculopathy

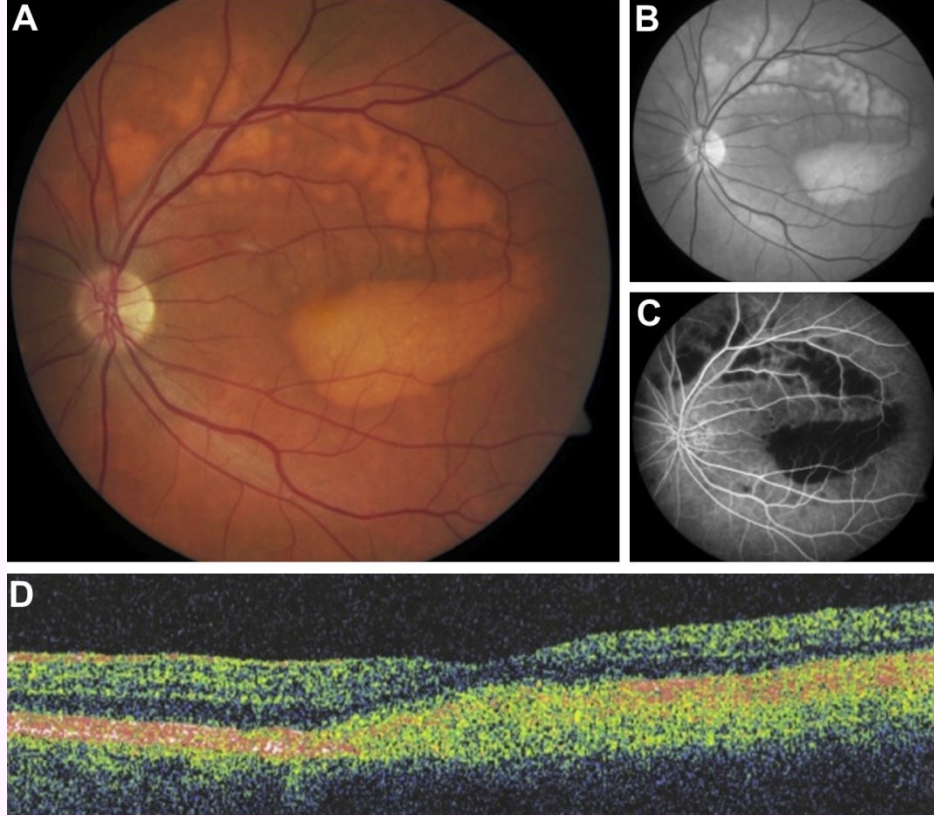




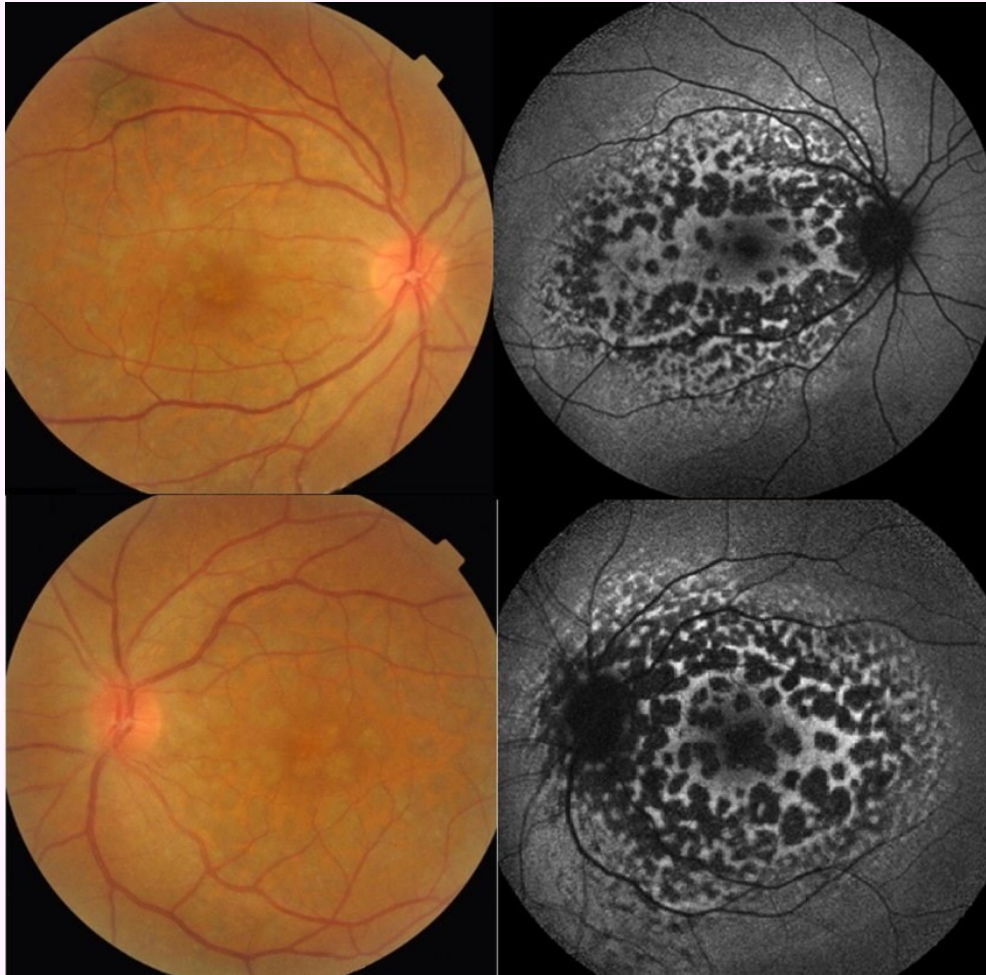
Peripapillary AZOOR

Paraneoplastic syndromes

- Cancer-associated retinopathy (CAR syndrome)
- Melanoma-associated retinopathy (MAR syndrome)
- Paraneoplastic vitelliform maculopathy
- Bilateral diffuse uveal melanocytic proliferation (BDUMP)
- Paraneoplastic optic neuropathy
- Polyneuropathy, organomegaly, endocrinopathy, monoclonal gammopathy, and skin changes syndrome (POEMS)



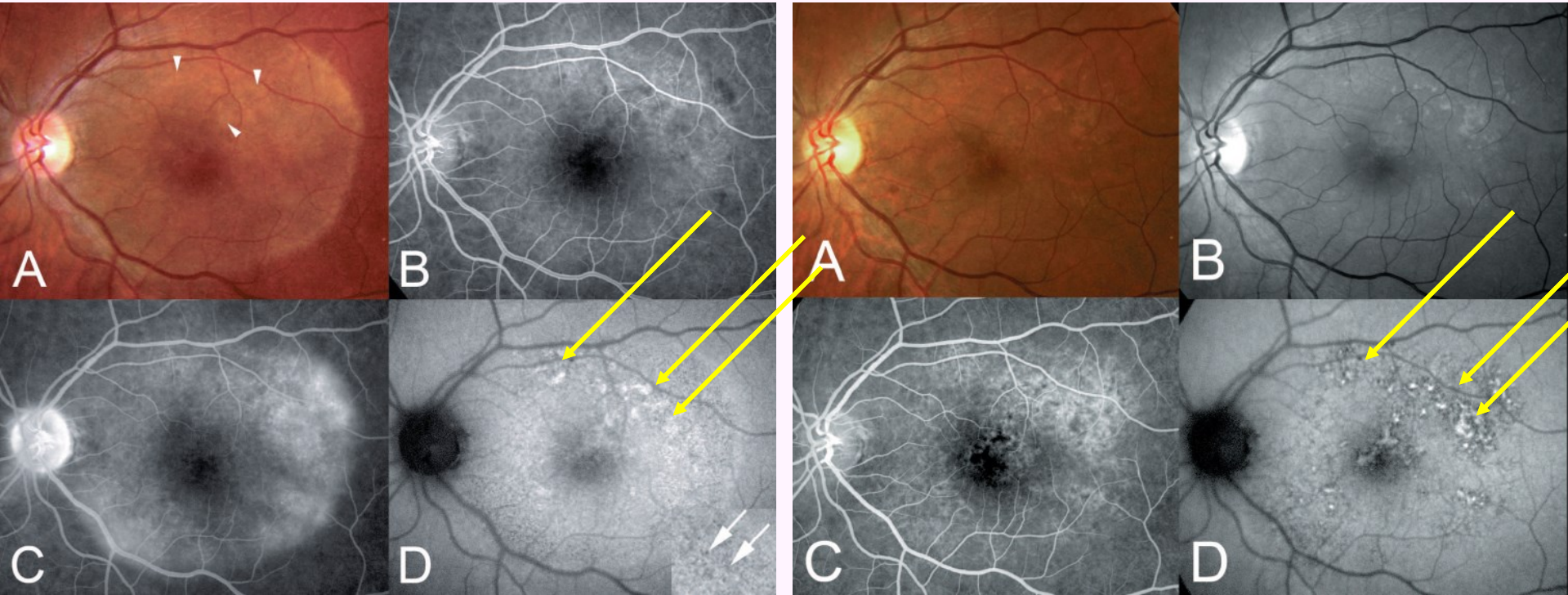
Paraneoplastic vitelliform maculopathy



Bilateral diffuse
uveal melanocytic
proliferation
(BDUMP)

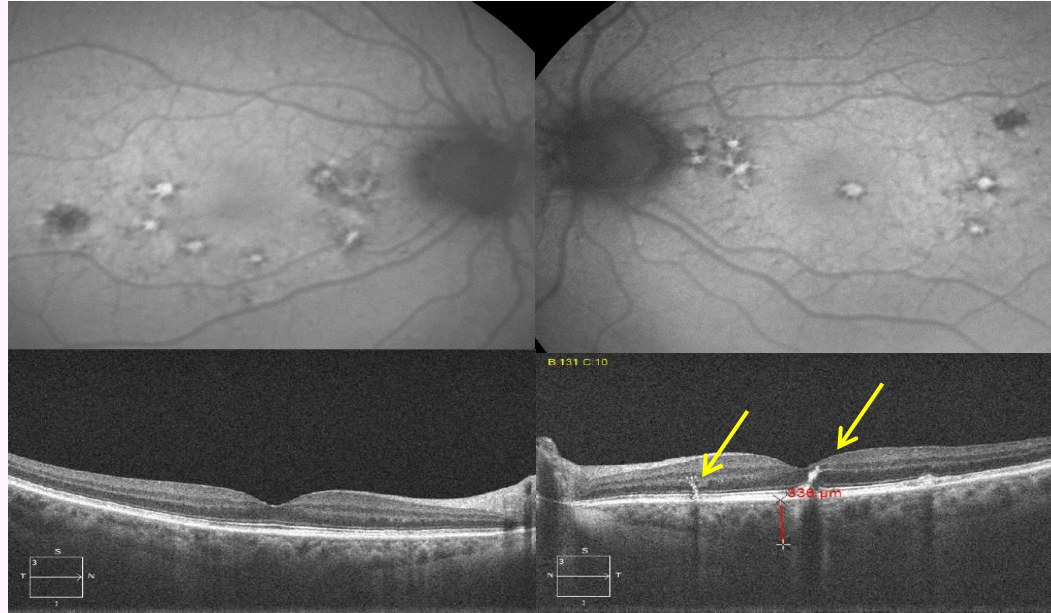
Giraffe pattern

Acute syphilitic posterior placoid chorioretinitis



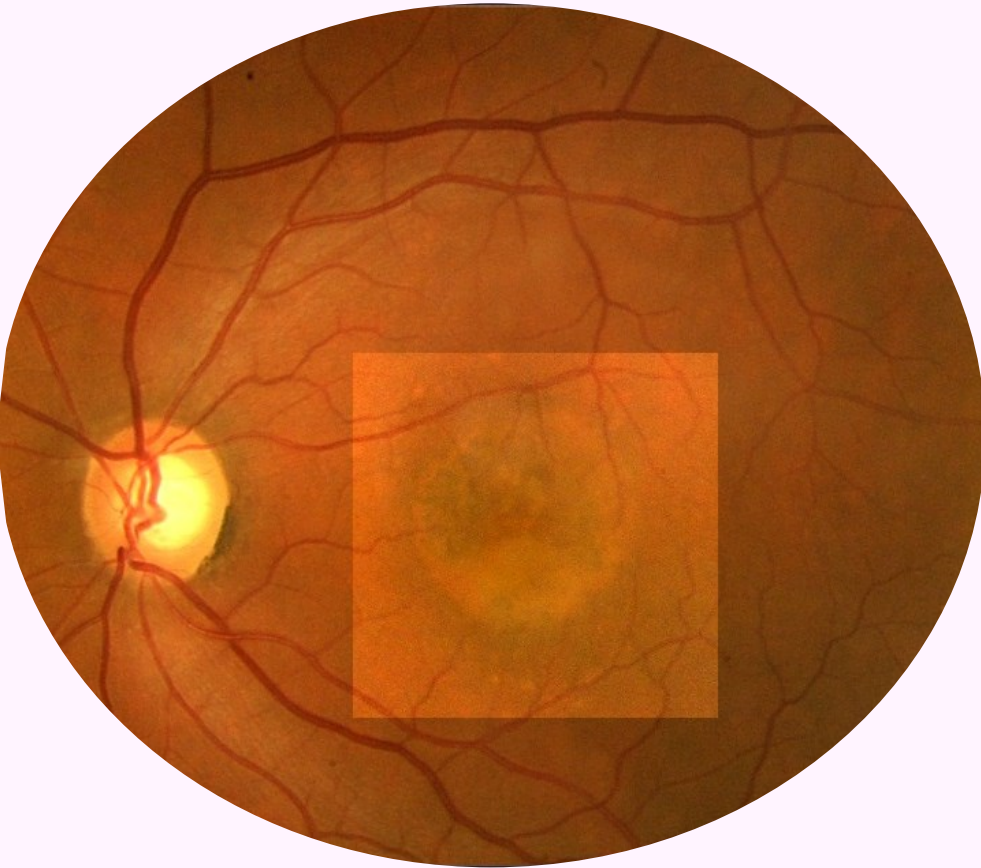
Pachychoroid Syndrome

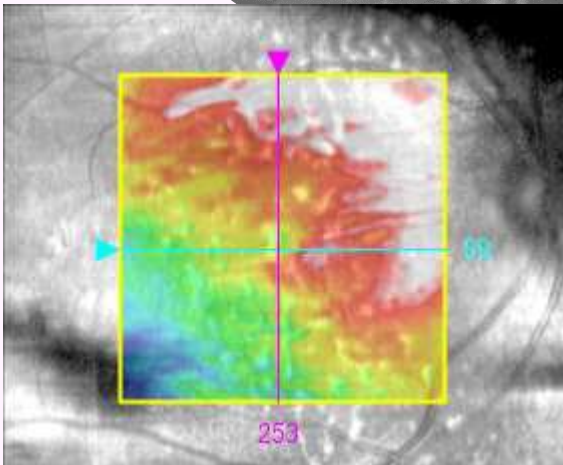
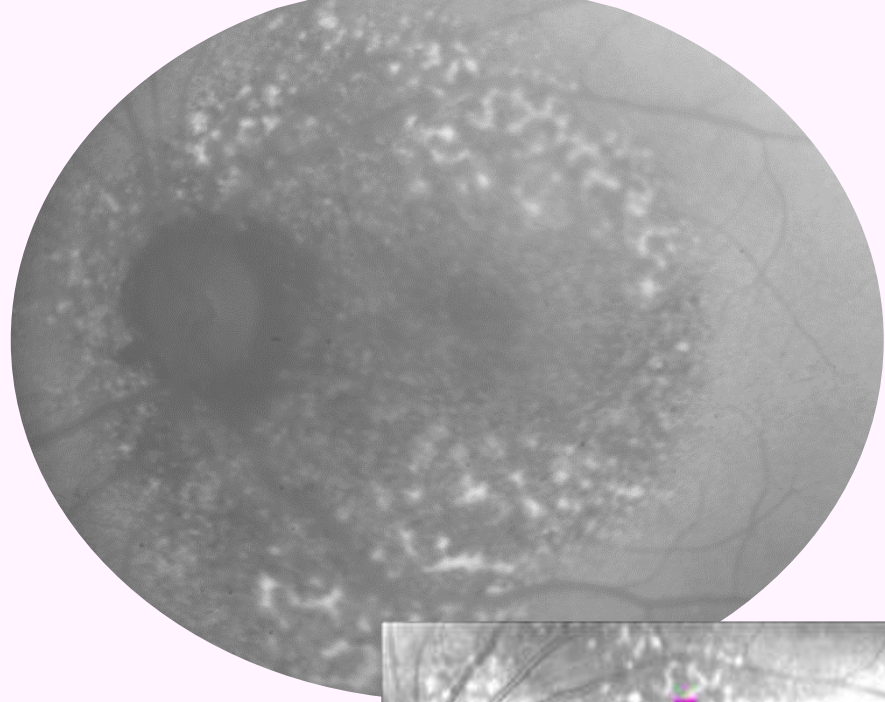
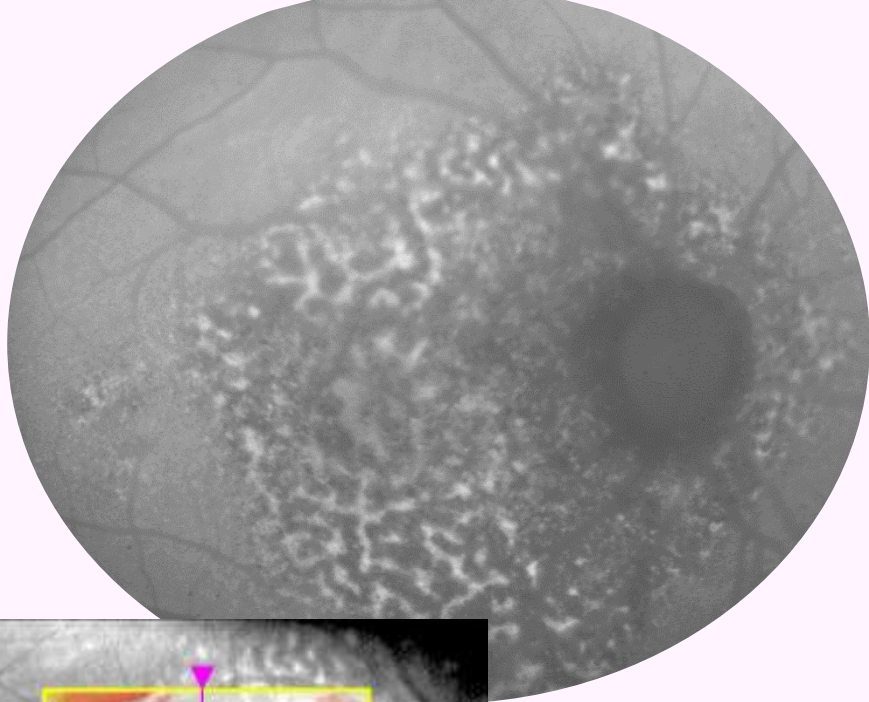
- Pachychoroid Pigment Epitheliopathy (PPE)
- Central Serous Chorioretinopathy (CSC)
- Pachychoroid Peripapillary Syndrome (PPS)
- Also: Pachydrusen, PCV, Pachyvessels...



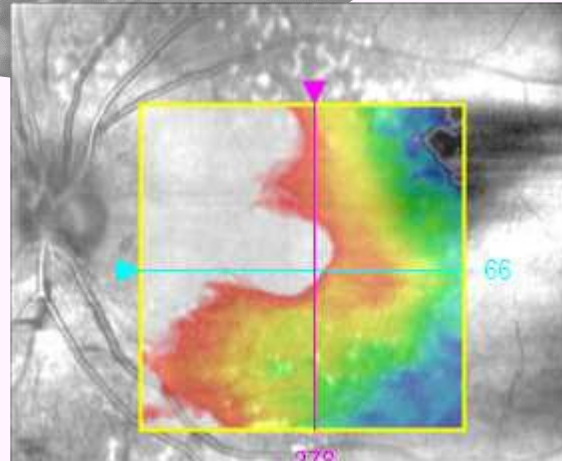
Pachychoroid Pigment Epitheliopathy (PPE)

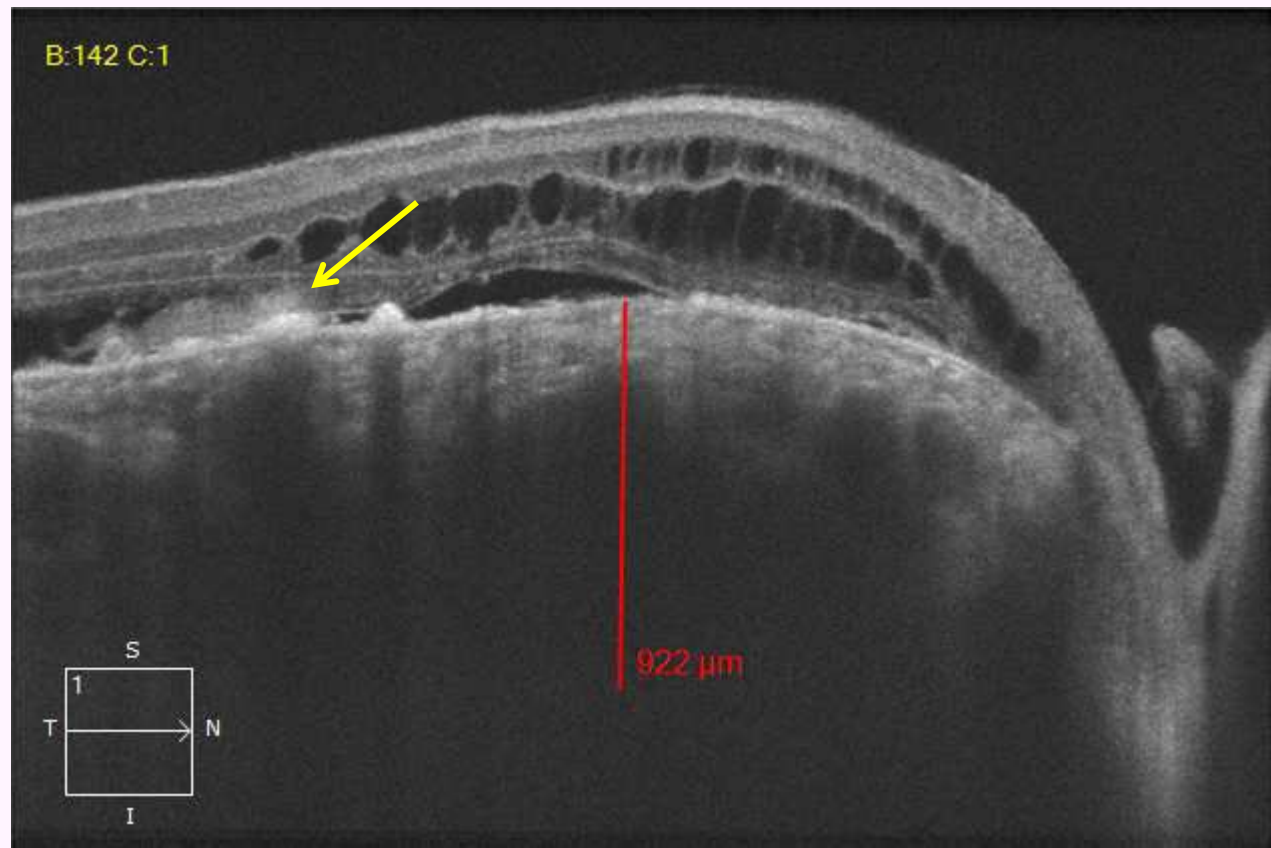
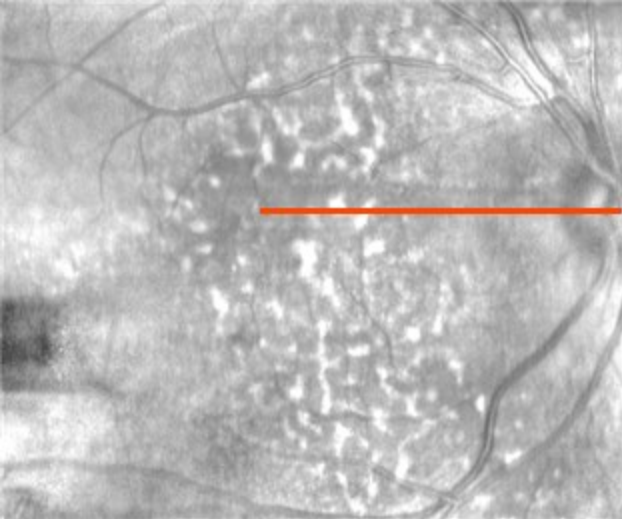
Central serous chorioretinopathy





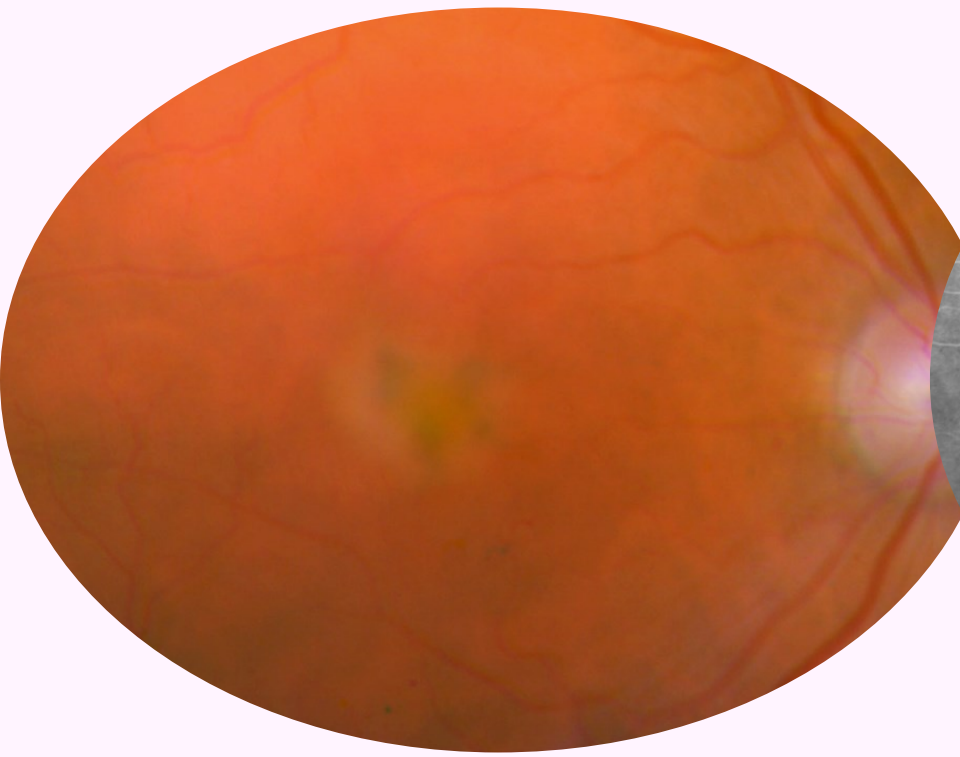
Pachychoroid Peripapillary Syndrome (PPS)





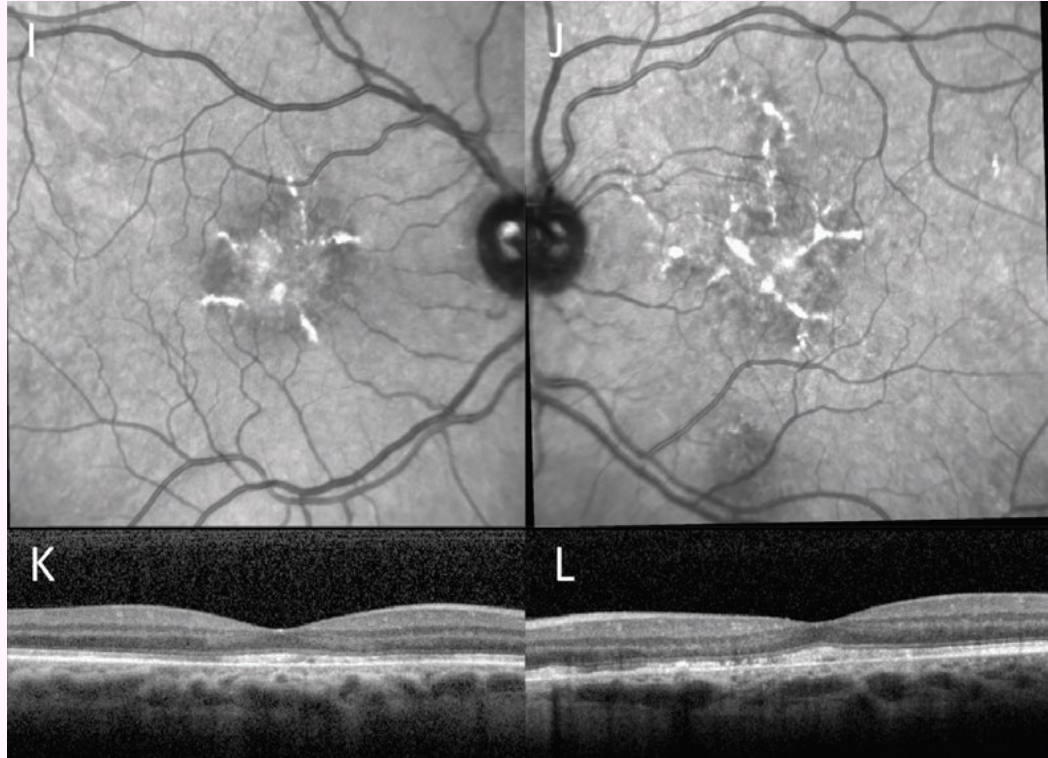
Toxic retinopathies and Iatrogenic disorders

- Deferoxamine
- Mannitol
- Immune checkpoint inhibitors
- Heparanase inhibitors (Pentosan)
- Ocriplasmin
- Laser photic injury
- Retinal detachment surgery



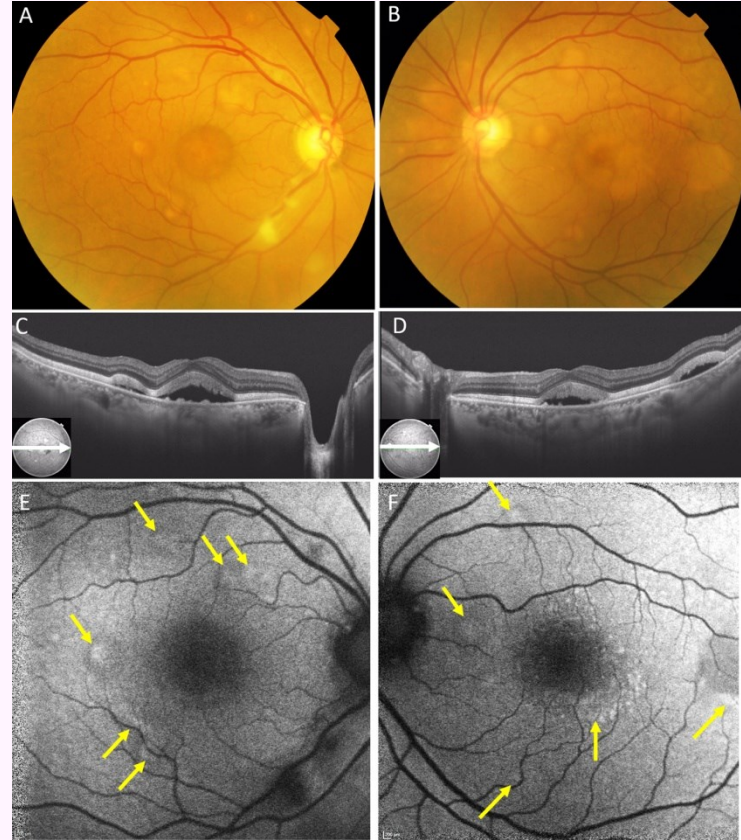
Mannitol

Intravenous mannitol maculopathy

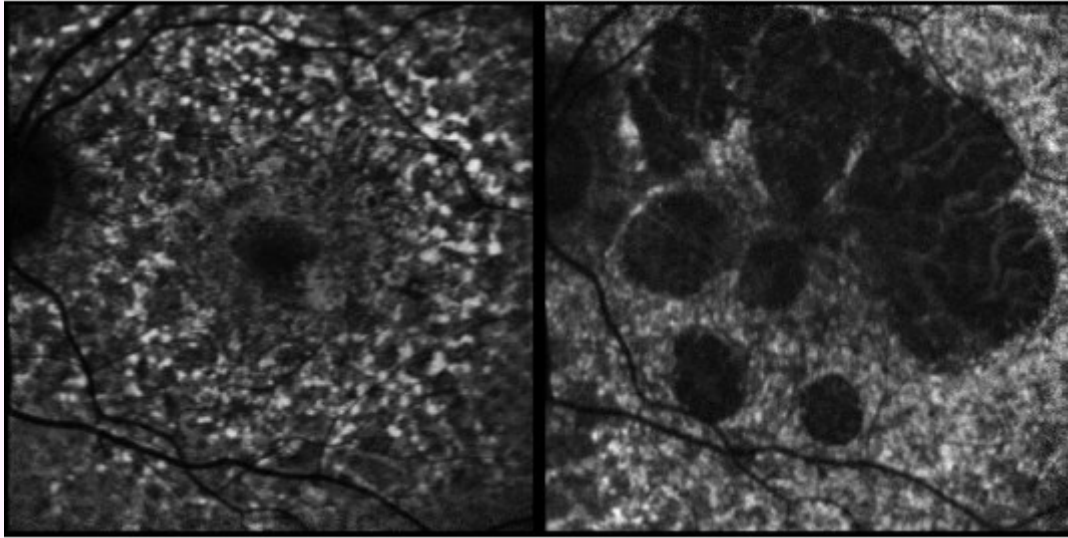


Immune checkpoint inhibitors

- Multiple areas of serous retinal detachment with spontaneous regression



Heparanase inhibitors (Pentosan)



4 years course

Kalbag NS, Maganti N, Lyon AT, Mirza RG. Maculopathy Secondary to Pentosan Polysulfate Use: A Single-Center Experience. Clin Ophthalmol. 2021 Feb 11;15:513-519.

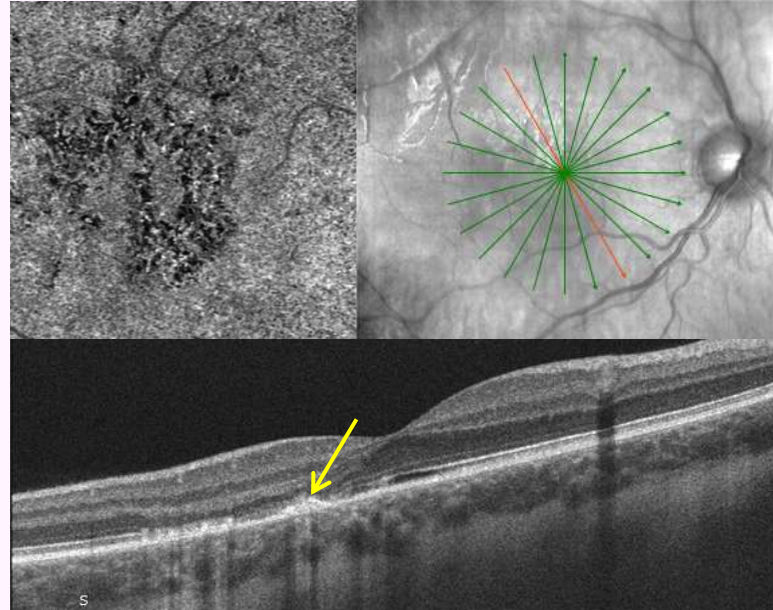
Laser-induced photic injury

- Yellow macular linear streaks with a vertical pattern in the superior macula. Uneven autofluorescence



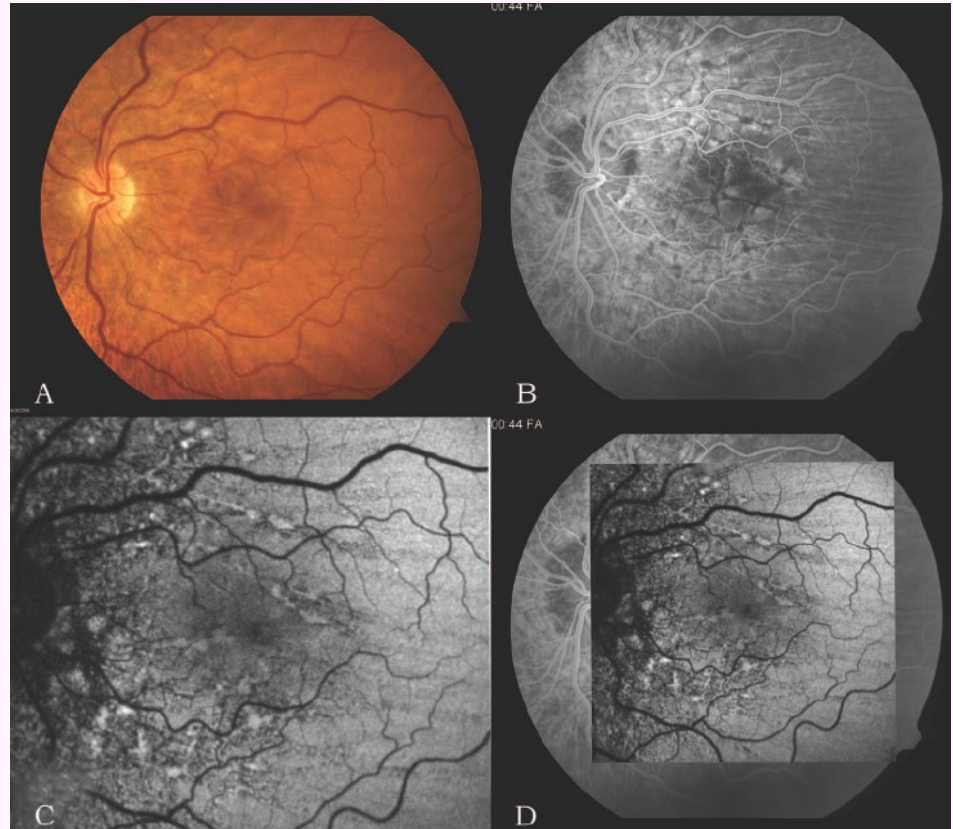
Laser-induced photic injury

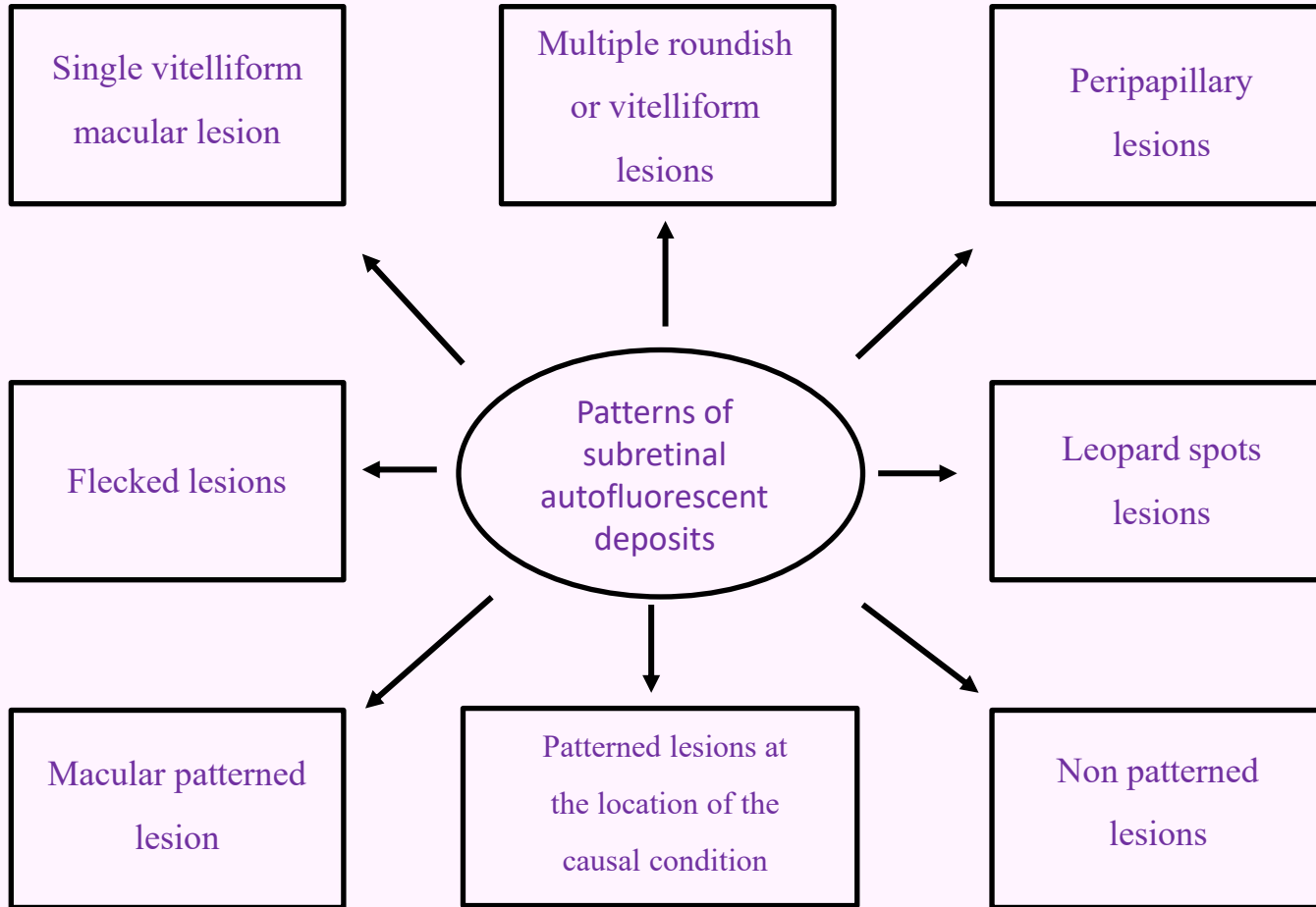
- Yellow macular linear streaks with a vertical pattern in the superior macula. Uneven autofluorescence



Miscellaneous: Chorioretinal folds

- Autofluorescence imaging findings in long-standing chorioretinal folds.
- Autofluorescent lesions at the site of CRF

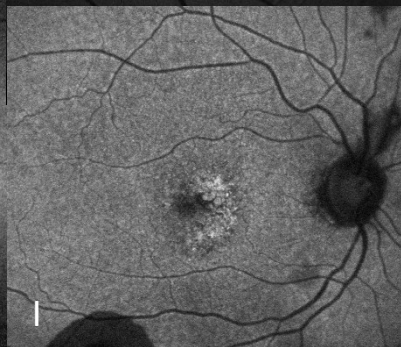
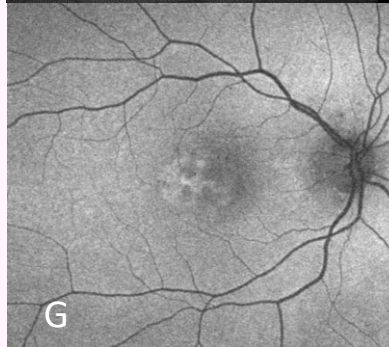
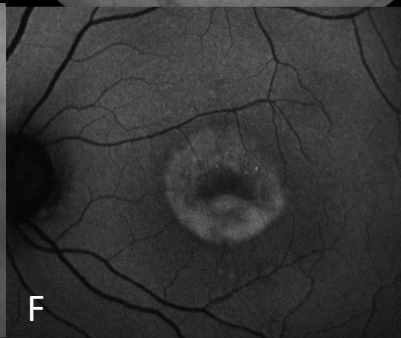
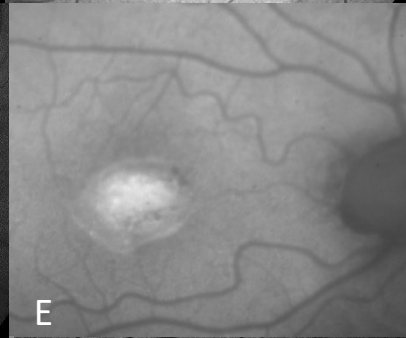
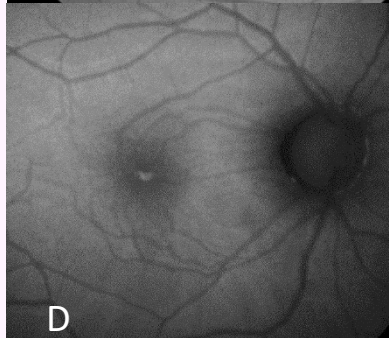
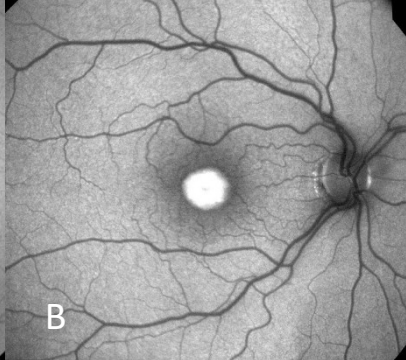




Subretinal Autofluorescent Deposits

Towards a clinical classification

- According to
 - 1. mostly the shape and location
 - 2. also the acute or non acute occurrence
- Vitelliform macular lesion
- Roundish or vitelliform multiple lesions
- Patterned
- Flecked
- Leopard spots
- Non patterned



BEST

A

B

C

D

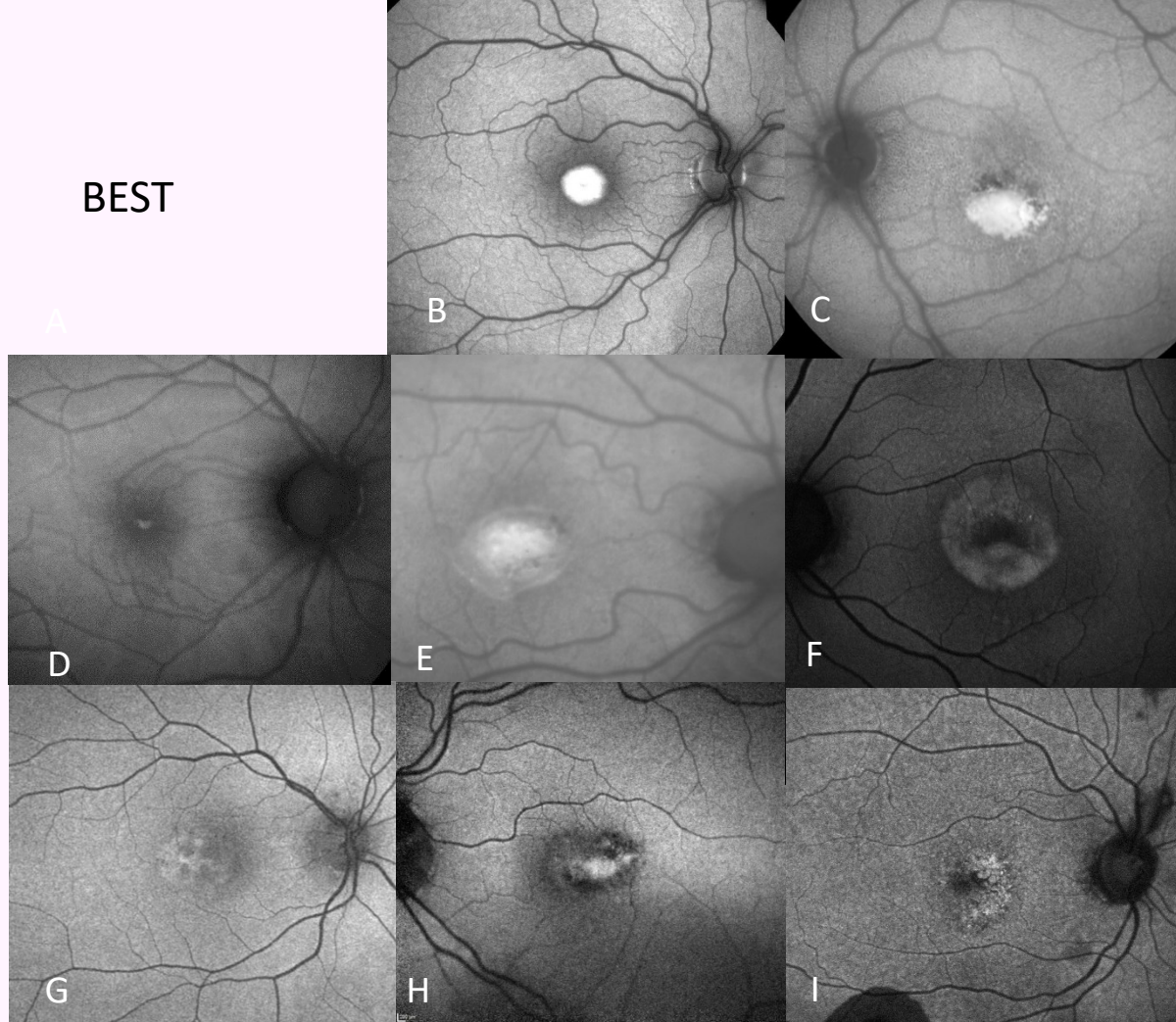
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F

G

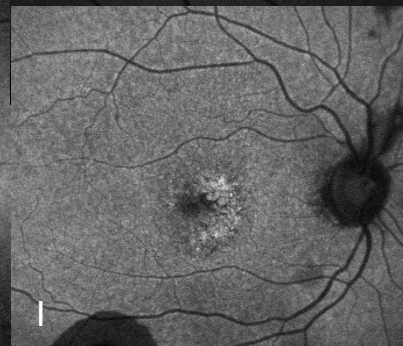
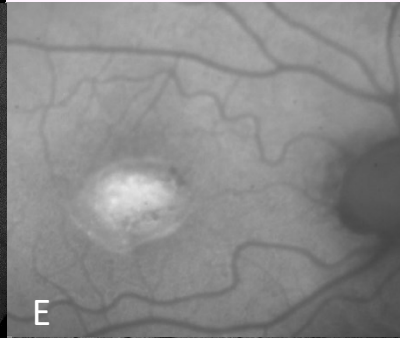
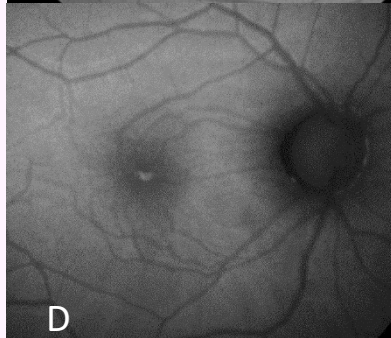
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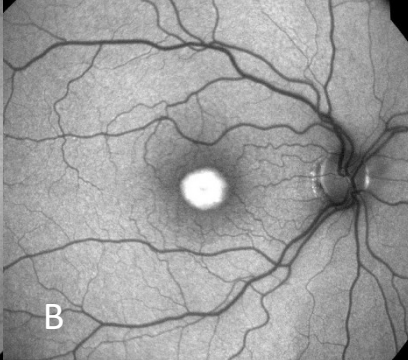
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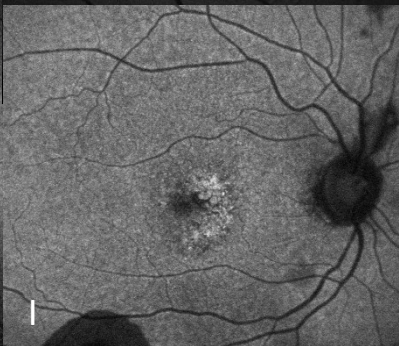
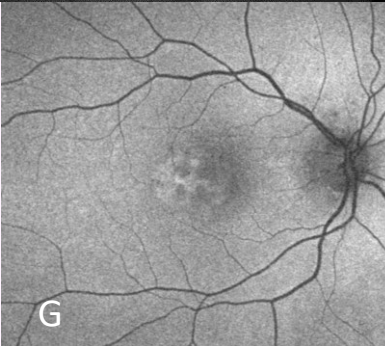
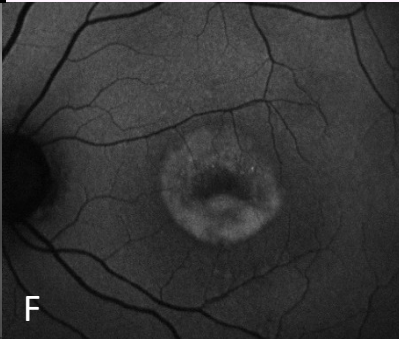
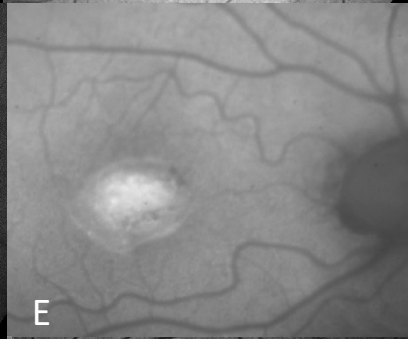
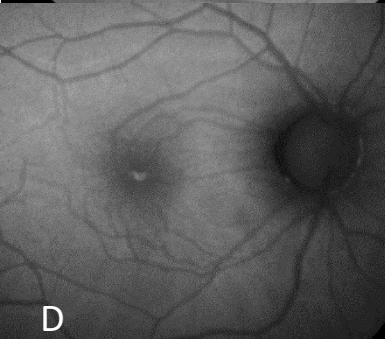
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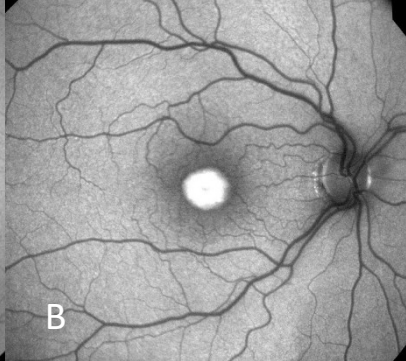




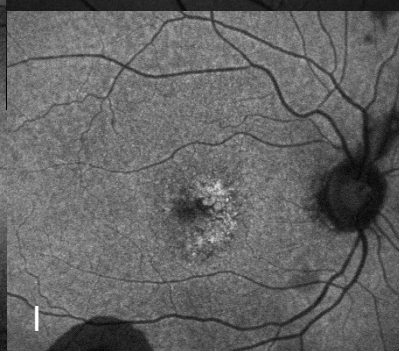
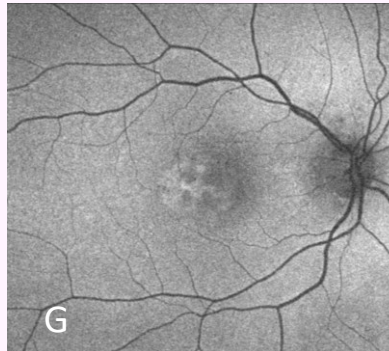
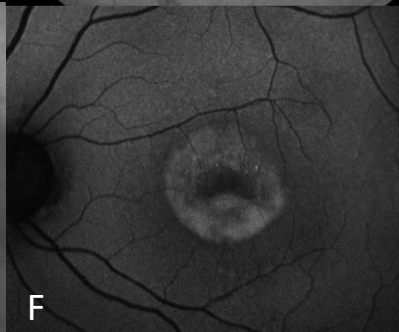
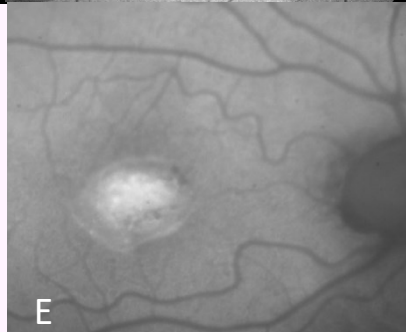
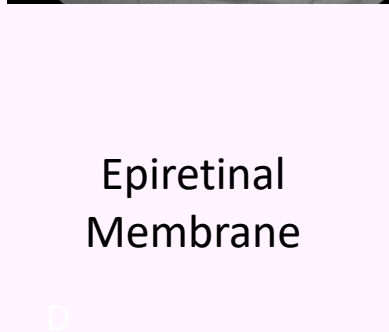
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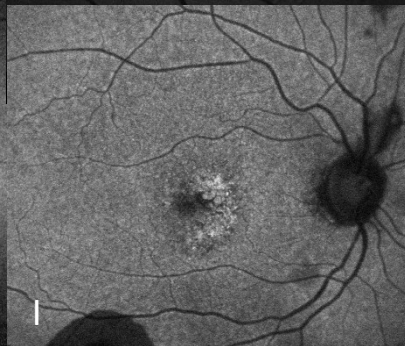
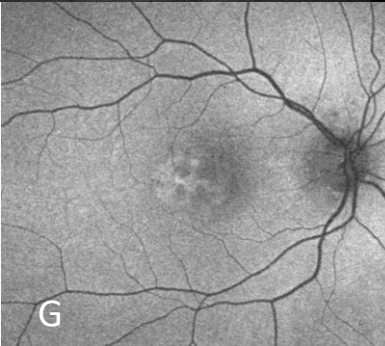
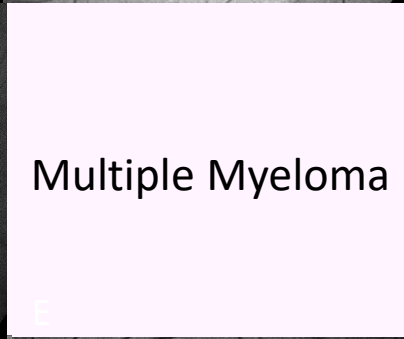
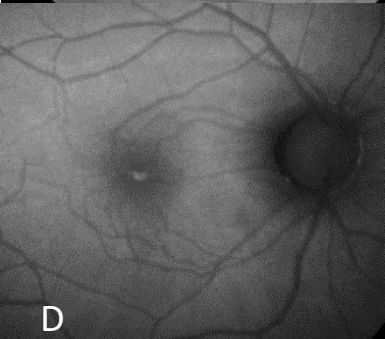
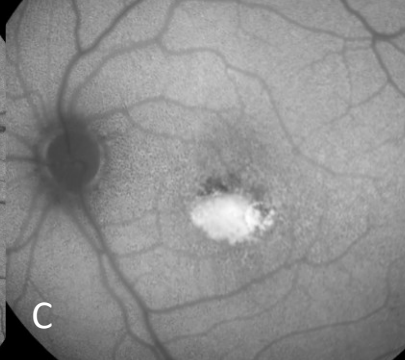
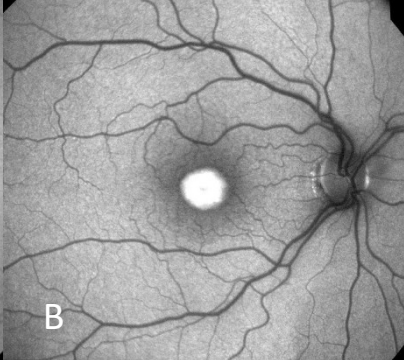
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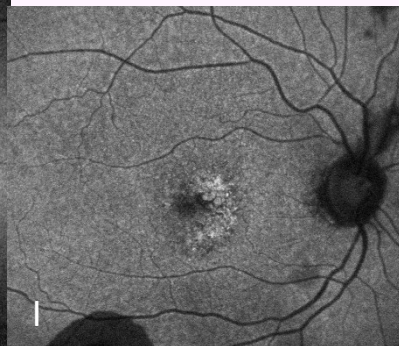
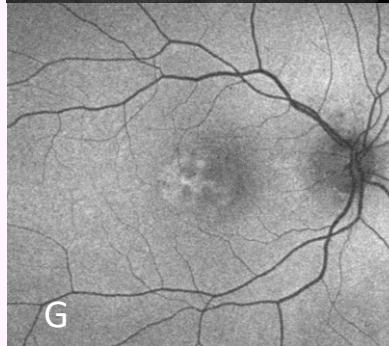
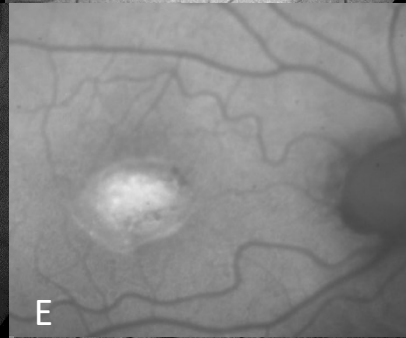
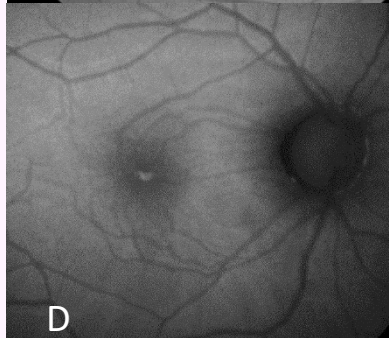
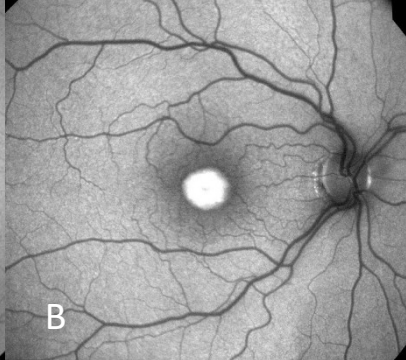




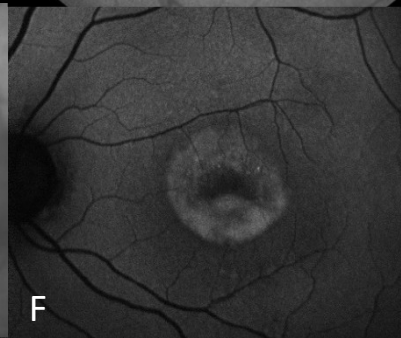
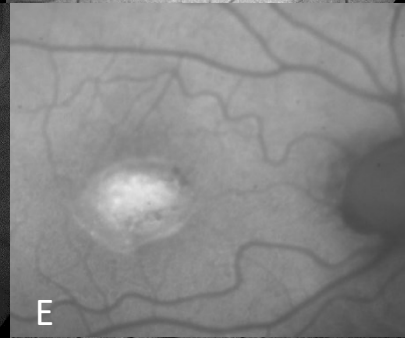
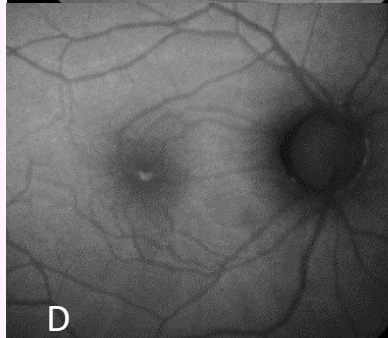
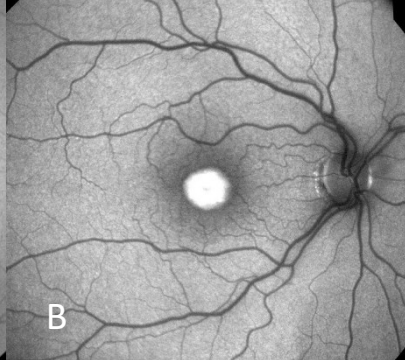
Epiretinal
Membrane



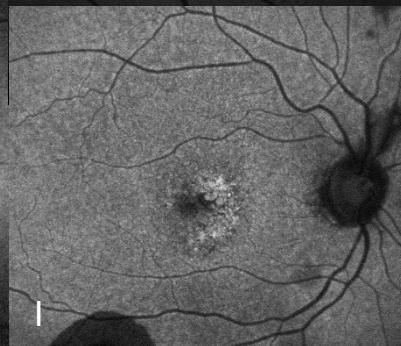


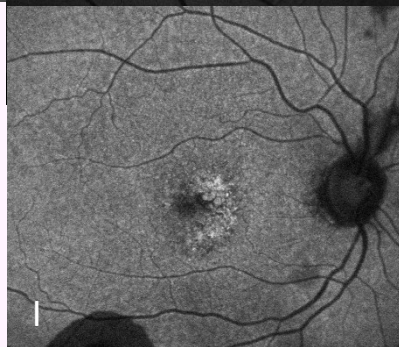
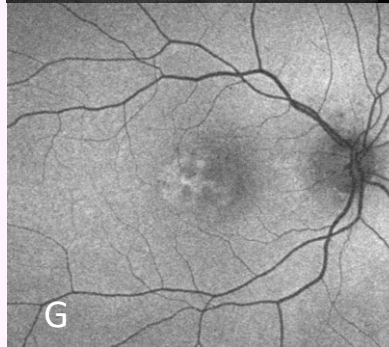
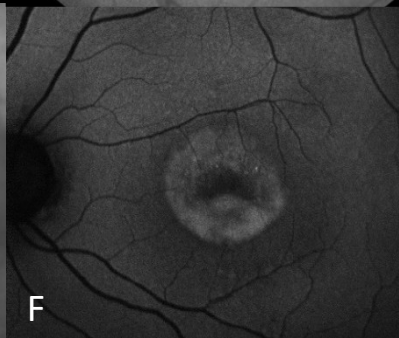
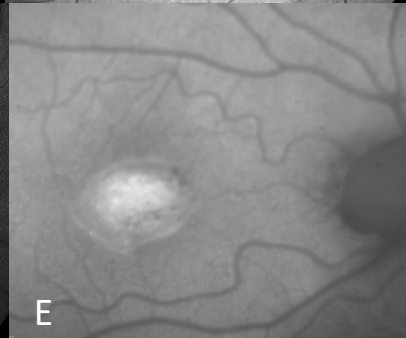
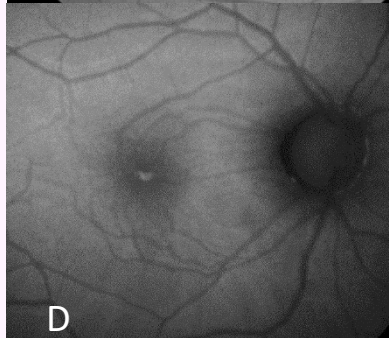
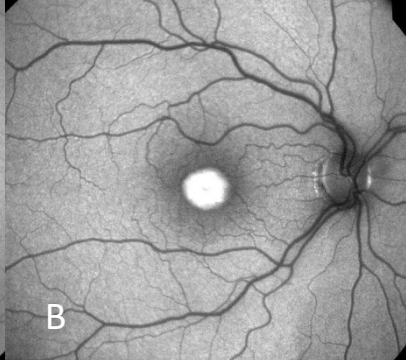


CSC

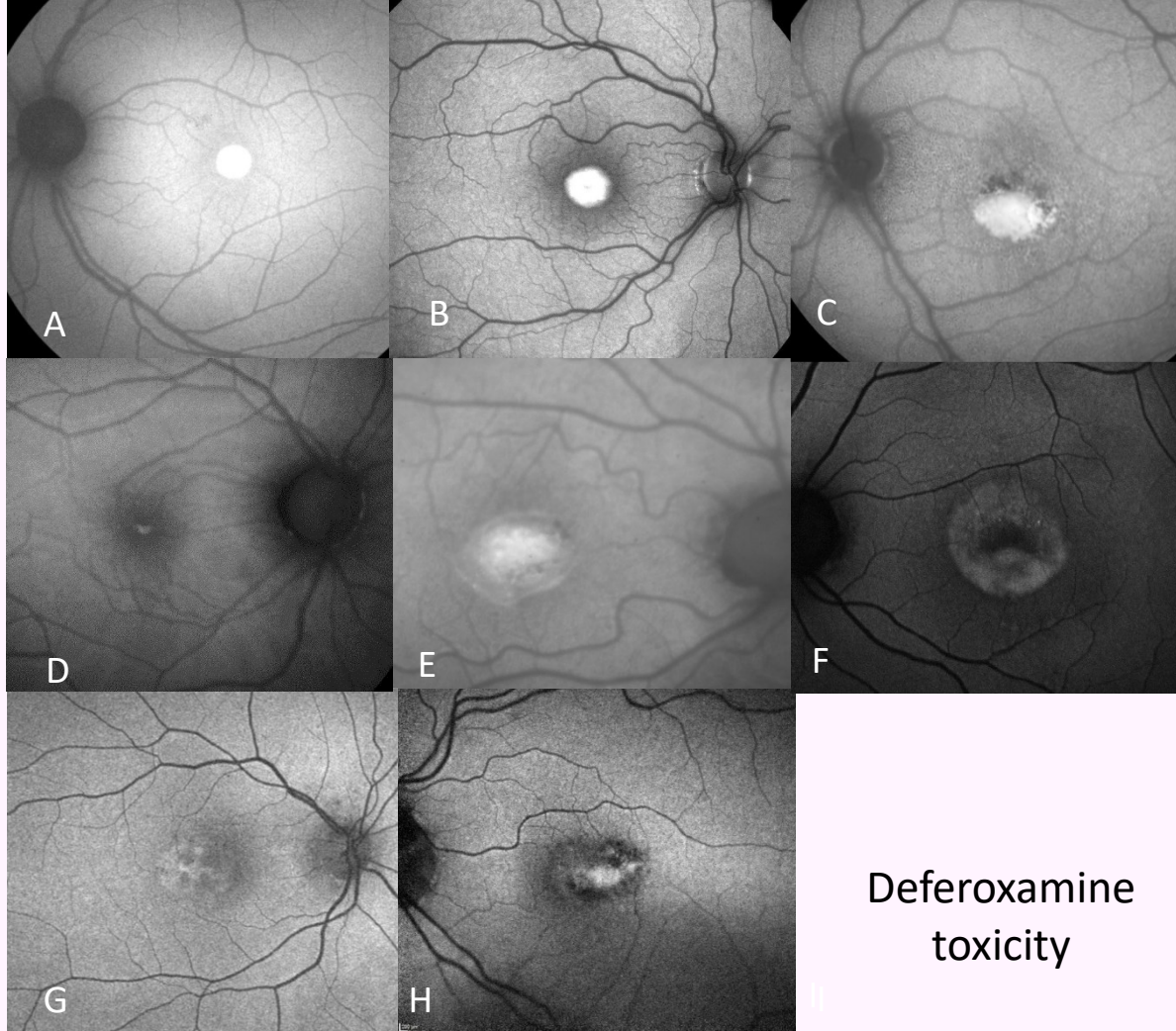


Age-related
Maculopathy

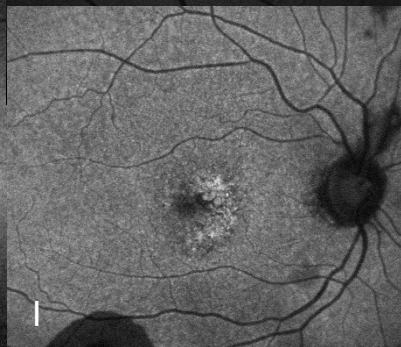
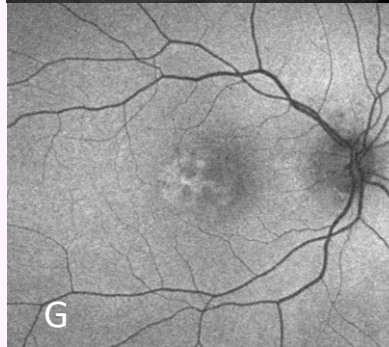
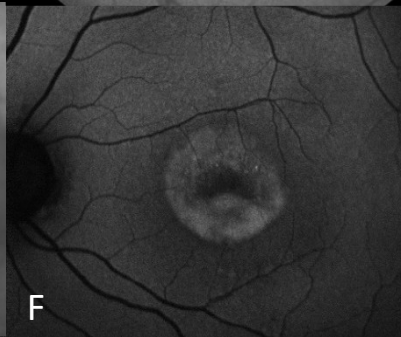
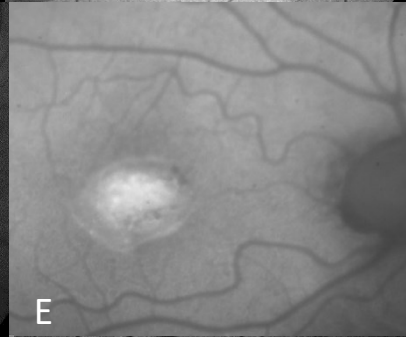
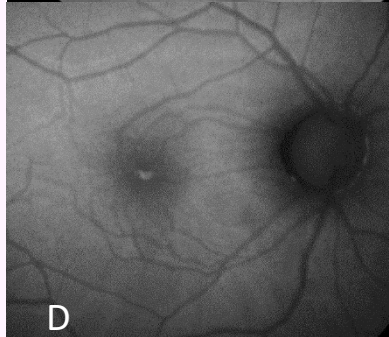
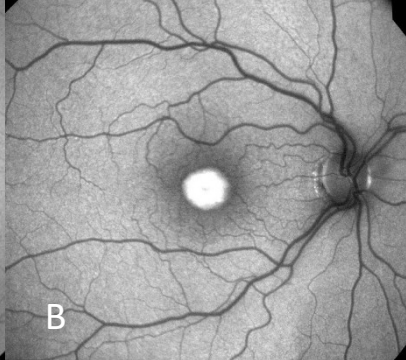


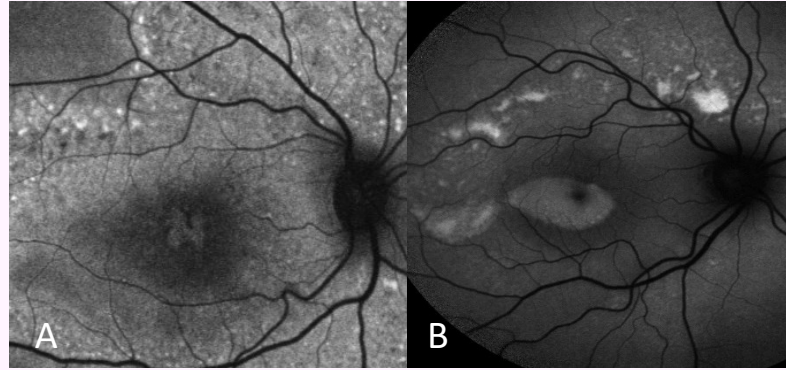


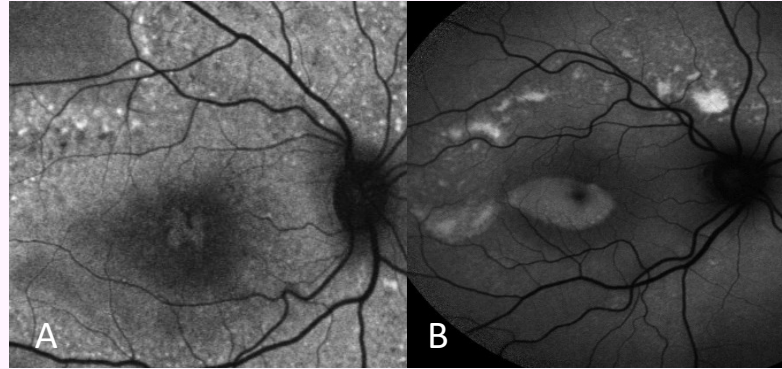
Tilted Disk
Syndrome



Deferoxamine
toxicity

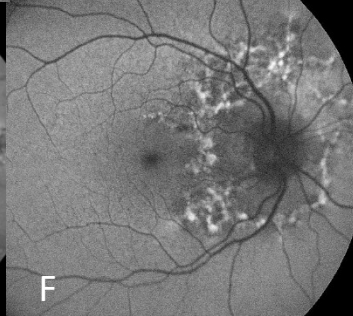
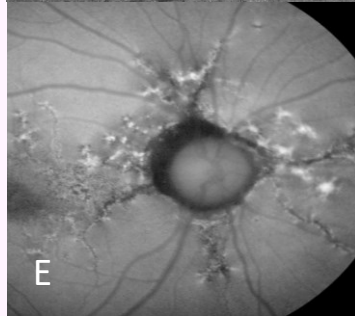
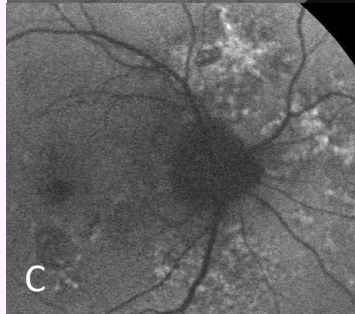
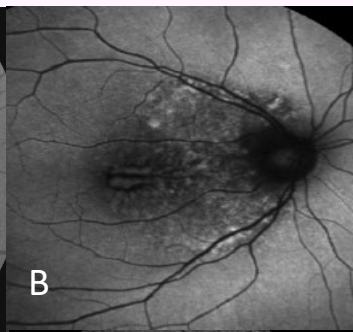
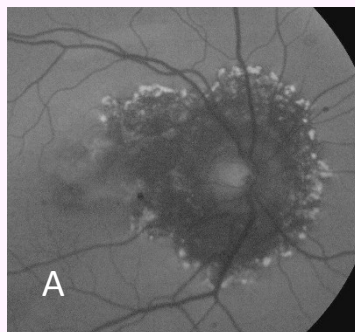






Autosomal
Recessive
Bestrophinopathy

Acute Exudative
Polymorphous
Vitelliform
Maculopathy



Peripapillary AZOOR

A

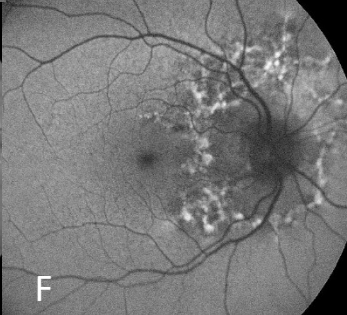
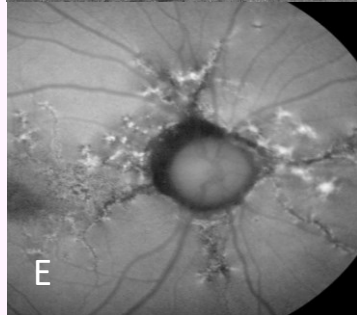
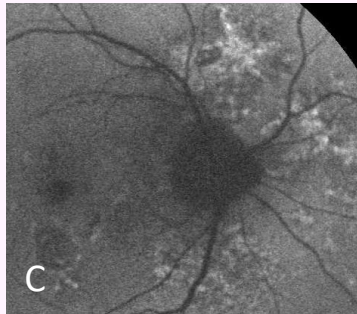
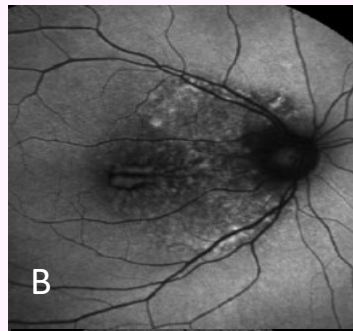
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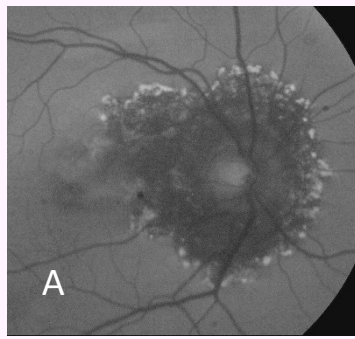
C

D

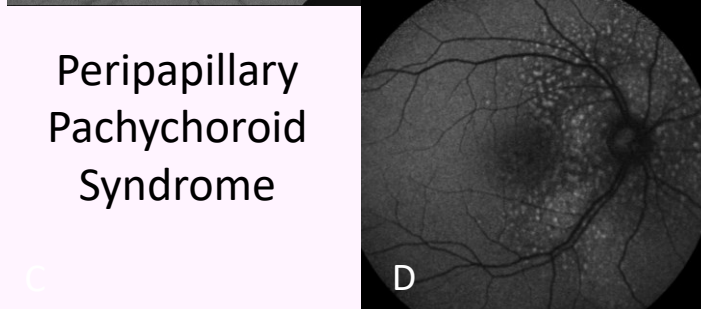
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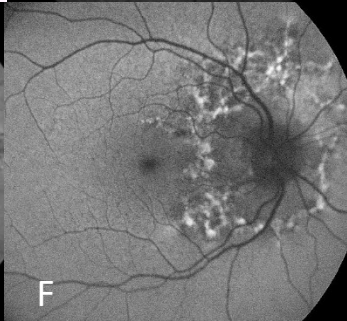
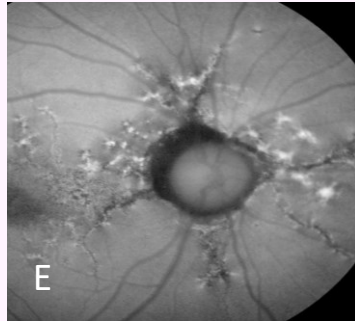


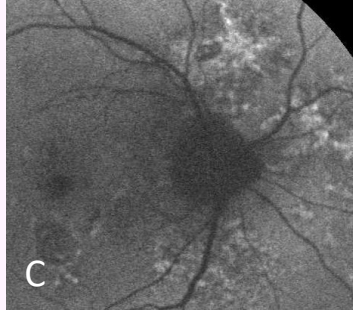
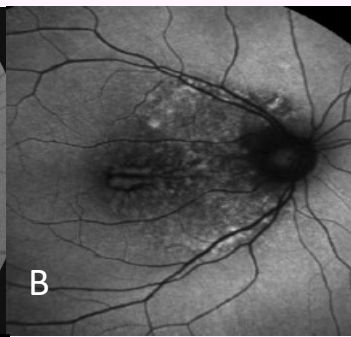
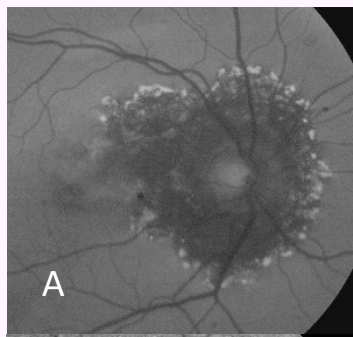


Peripapillary
Pachychoroid
Syndrome

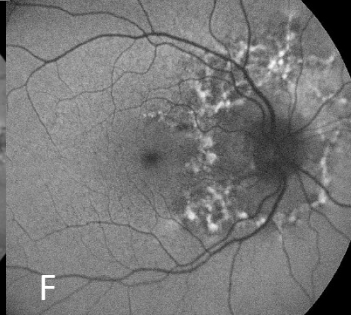
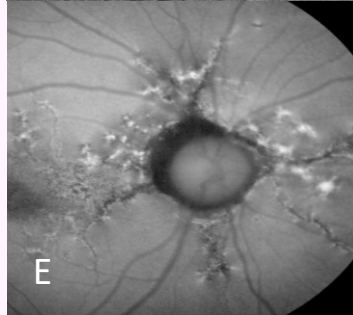


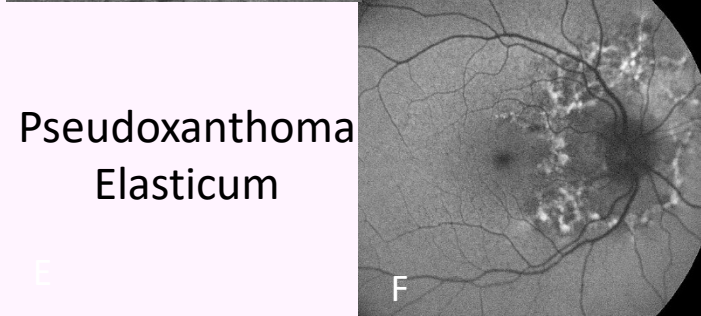
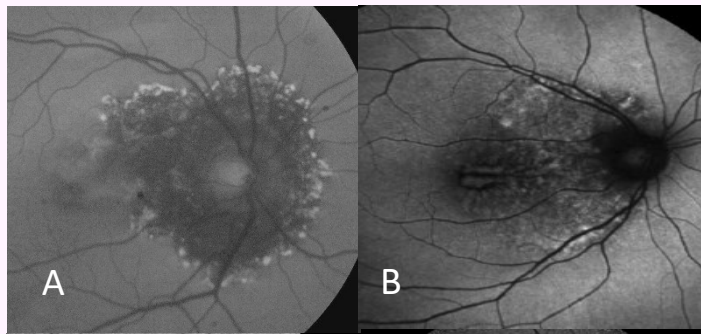
Peripapillary
Pachychoroid
Syndrome





Amyloidosis

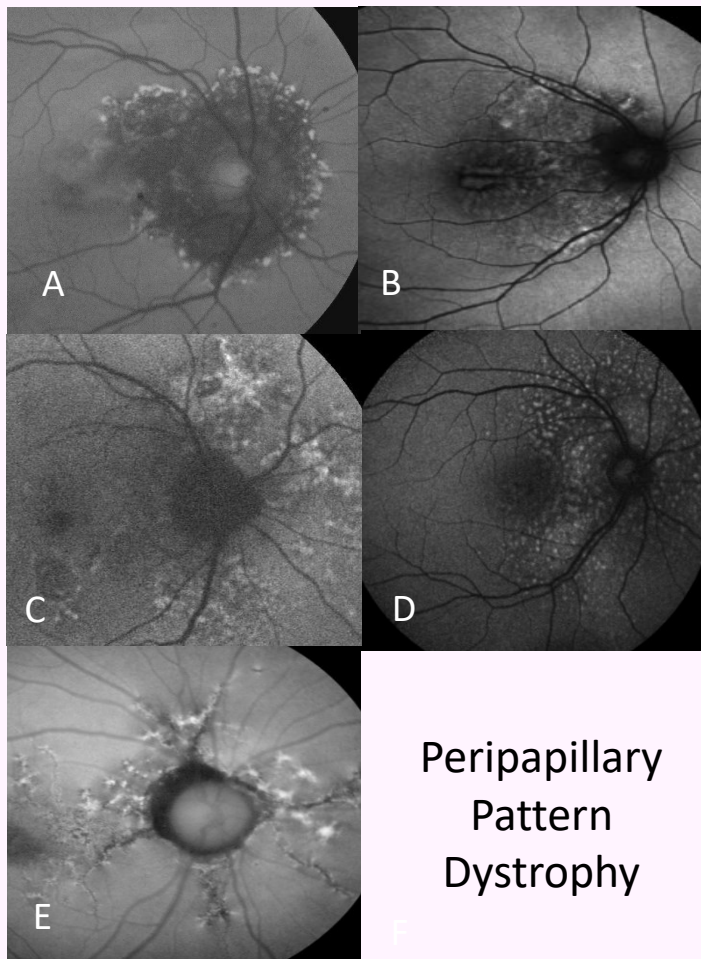




Pseudoxanthoma
Elasticum

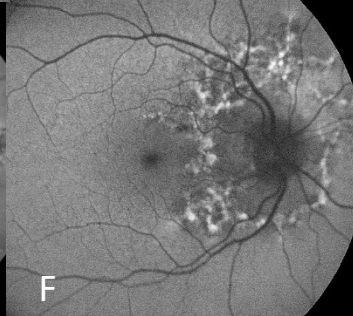
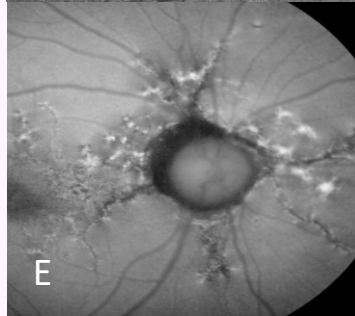
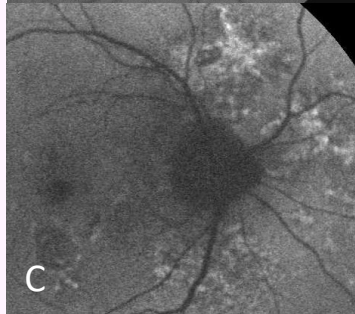
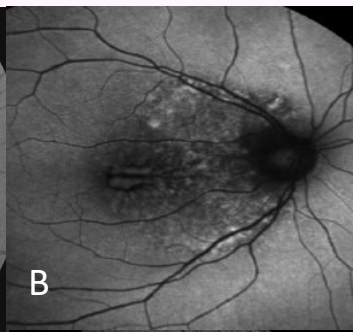
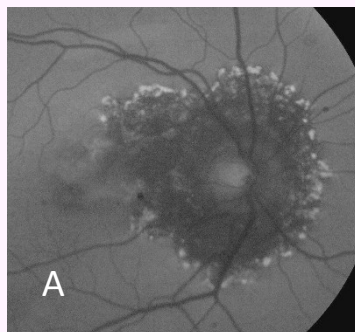
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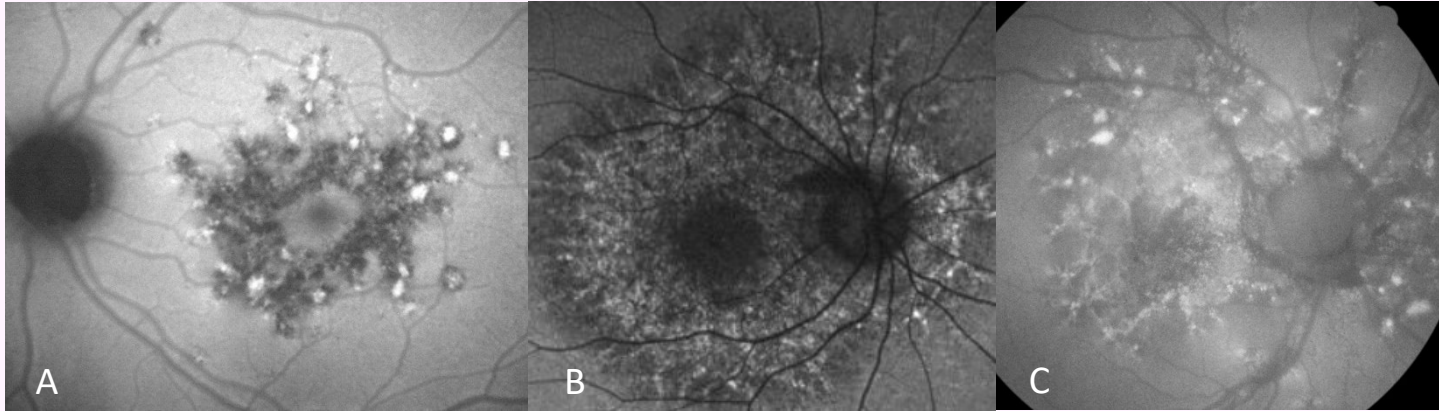
F



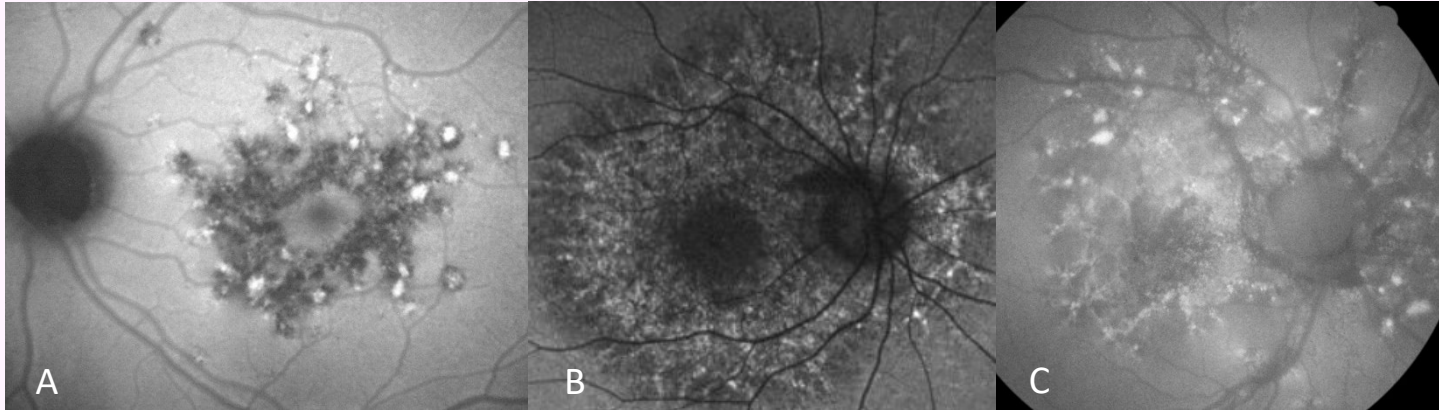
Peripapillary
Pattern
Dystrophy

F





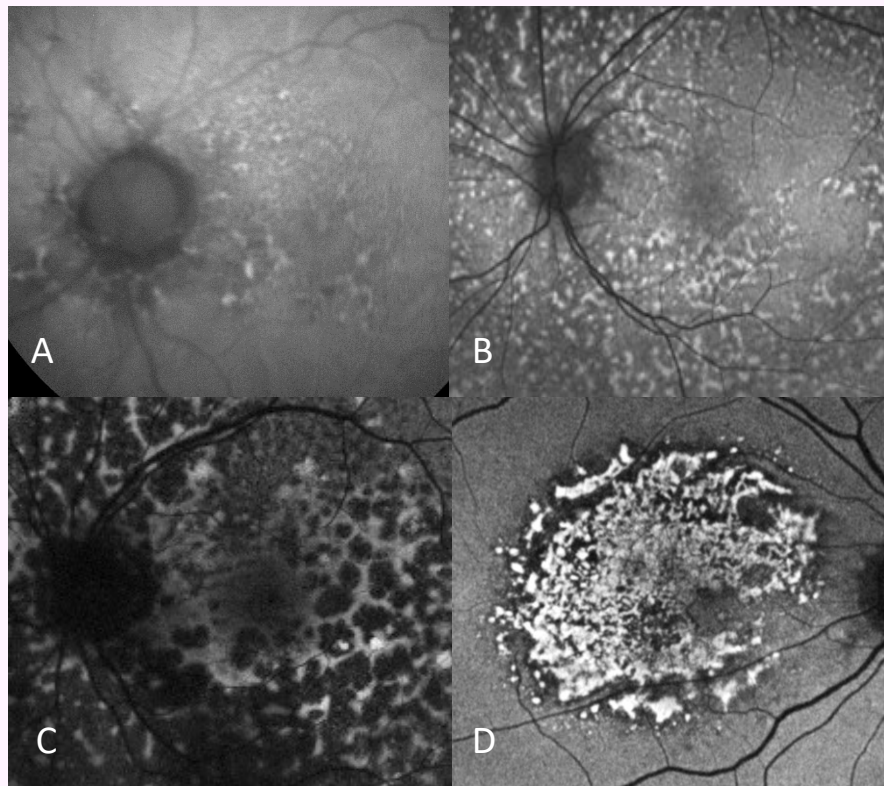
Flecked lesions



Stargardt's disease

Pentosan Maculopathy

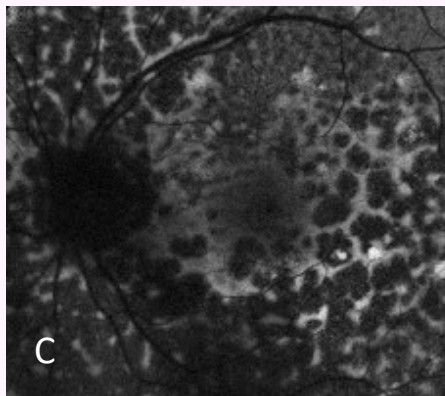
Pseuxanthoma Elasticum



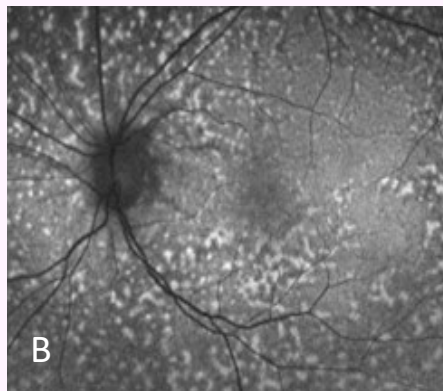
Leopard-spot lesions

Intraocular Lymphoma

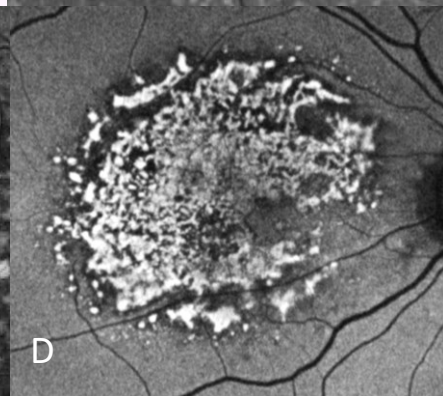
A



B

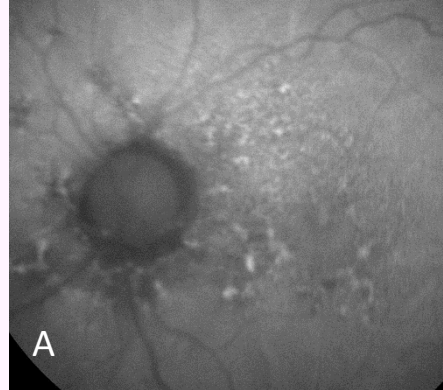


D



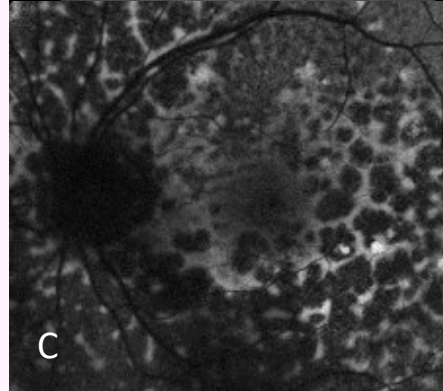
C

Uveal Effusion Syndrome

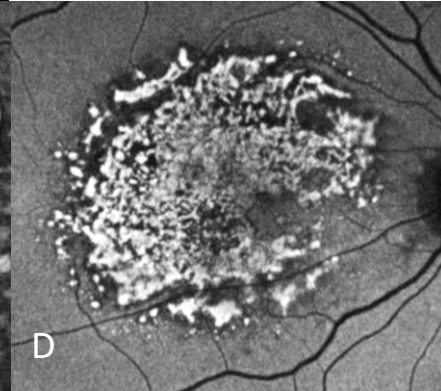


A

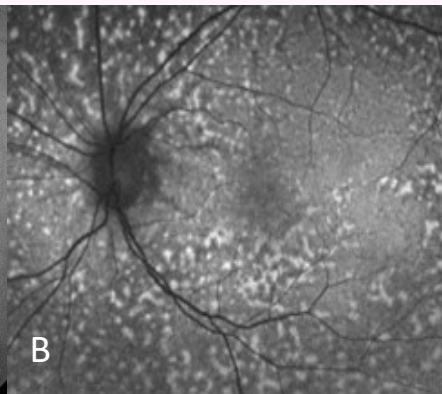
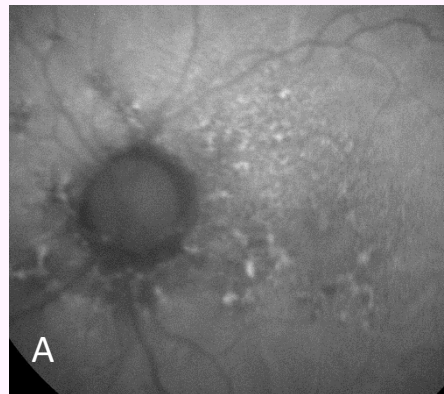
B



C

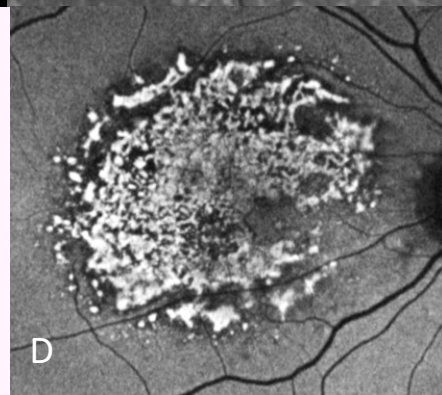


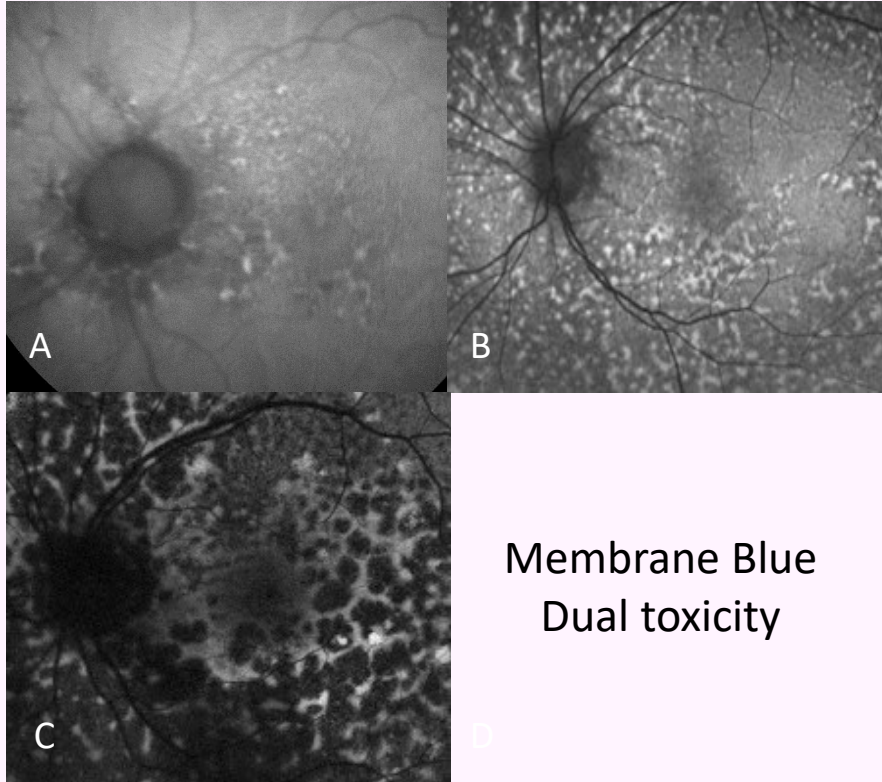
D

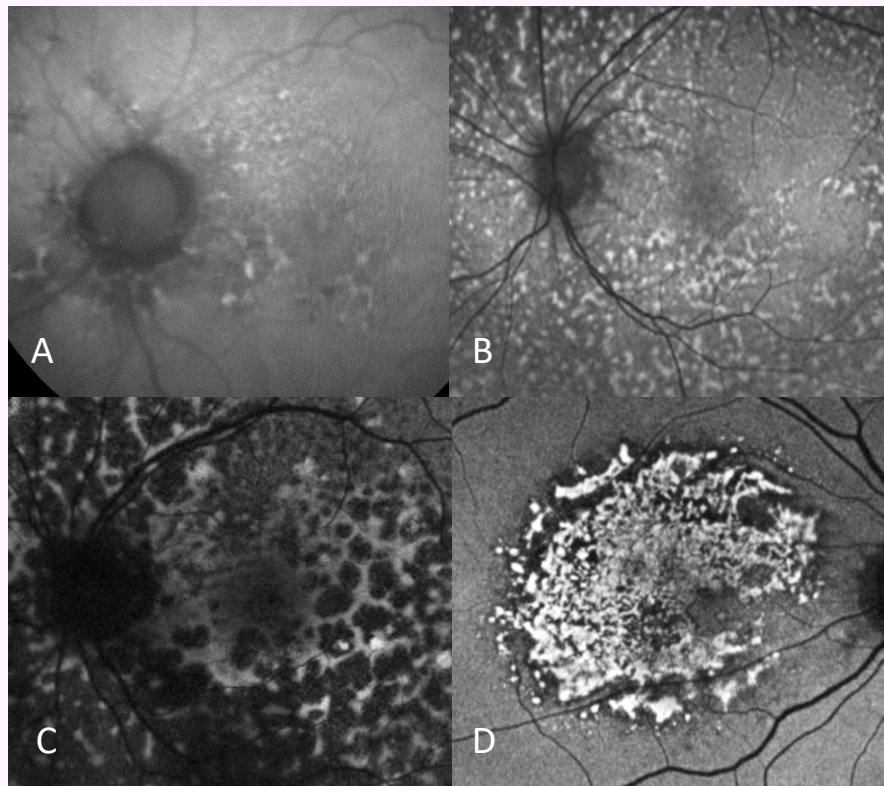


BDUMP

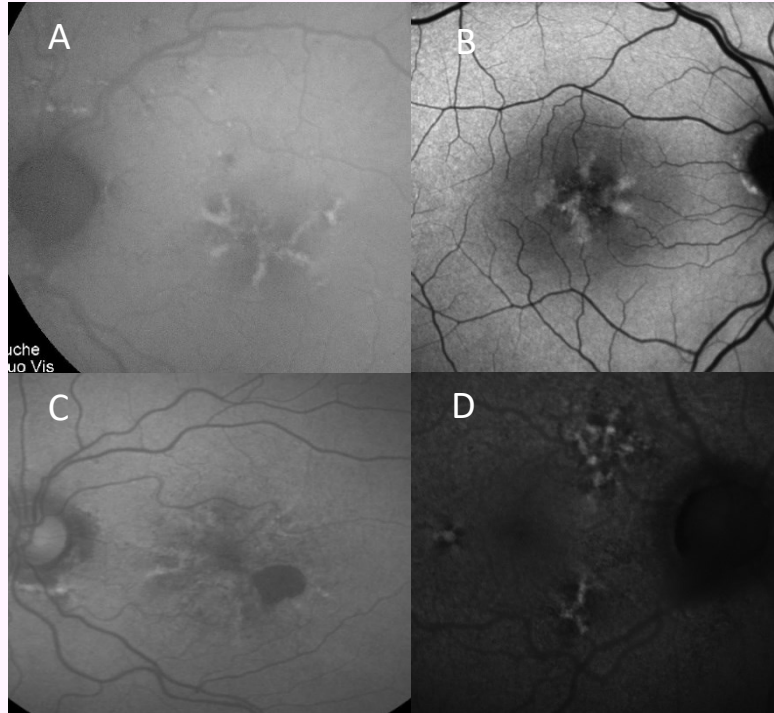
C







Leopard-spot lesions



Macular patterned

A

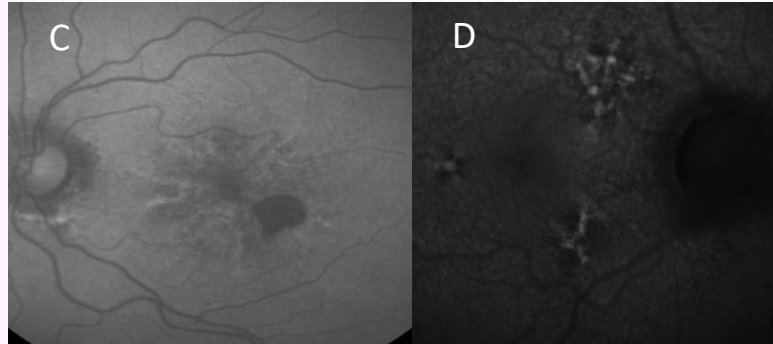
B

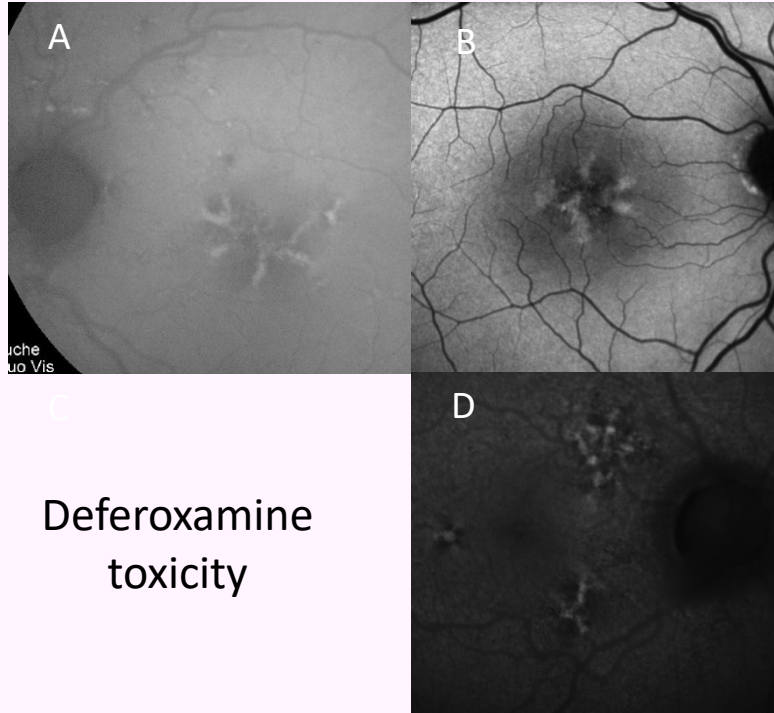
Pattern
Dystrophy

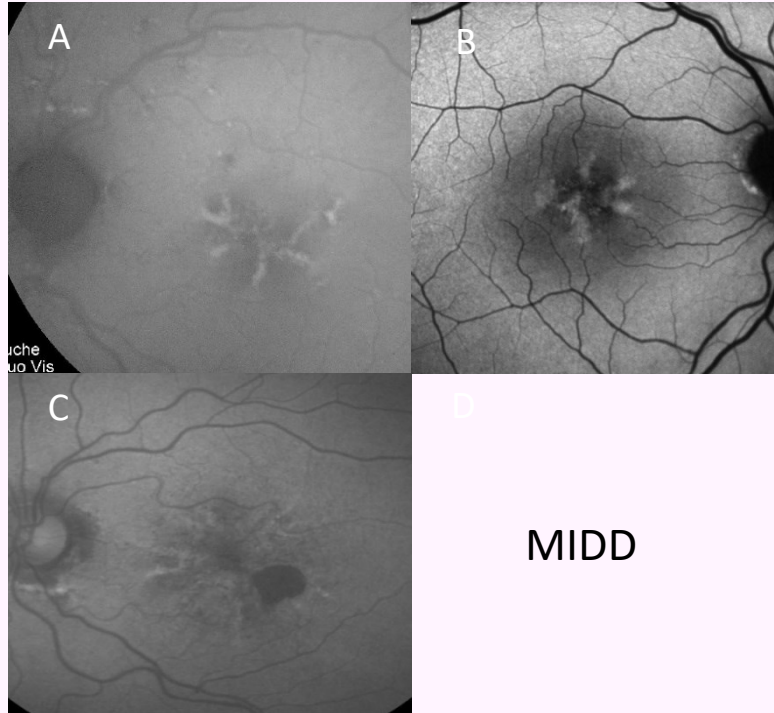
Pattern
Dystrophy

C

D

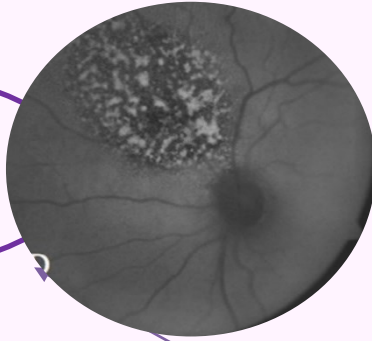




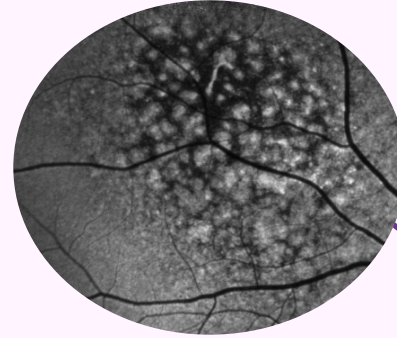


Non macular Patterned

Choroidal
Melanoma

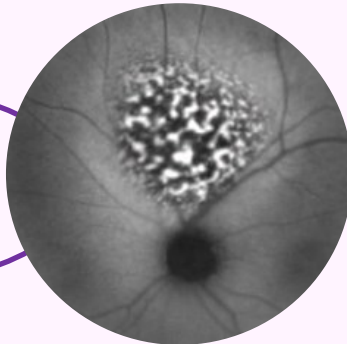


Choroidal
Metastasis

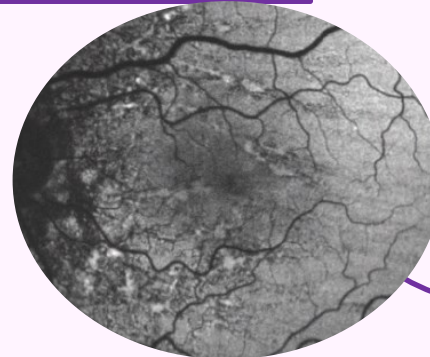


Patterned at the location
of the causal condition

Choroidal
Hemangioma



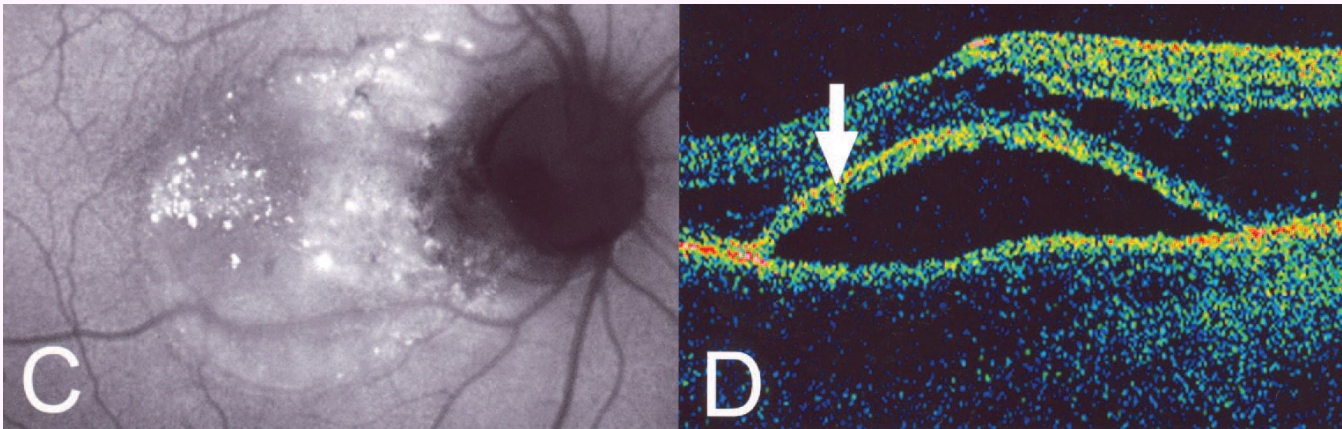
Chorioretinal
Folds



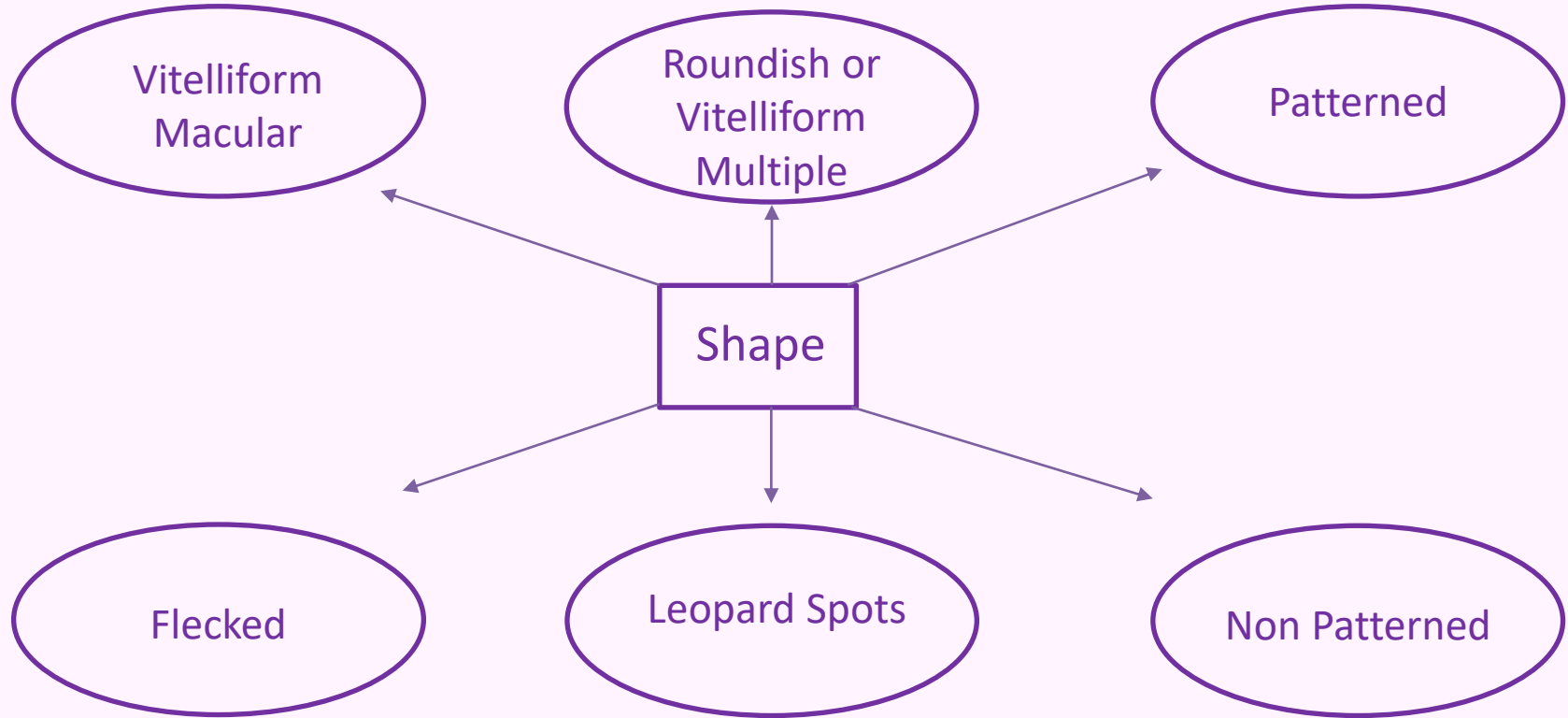
According to the shape and location

Non Patterned

Usually associated to a long standing serous retinal detachment with autofluorescent lesions at the site of the SRD



« According to the shape and location »
is the most important for clinicians



Clinical Classification of Subretinal Autofluorescent Deposits

- According to the number, shape and location
- According to the acute or non acute occurrence may also help to classify

Subretinal Autofluorescent Deposits

- Most of them are related to a purely ophthalmic condition: Best, Stargardt, Pattern dystrophy, cuticular drusen with vitelliform detachment, AZOOR, Epiretinal membrane, Intraocular tumors, Pachychoroid syndrome...

Subretinal Autofluorescent Deposits

- However, others may be the first manifestation of a potentially severe, and even, life-threatening condition, such as lymphomas, malignant immunoglobulinopathies, paraneoplastic retinopathies, or be the ocular side-effect of a systemic drug
- Be careful when the case is not fully typical of an ophthalmic condition

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- www.cil-paris.fr
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- Les taches blanches du fond d'œil: 17 Novembre 2023, with Larry Yannuzzi