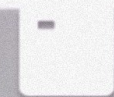
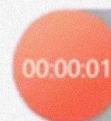
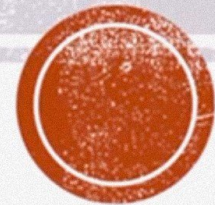


FUNDUS FLOURESCCEIN ANGIOGRAPHY

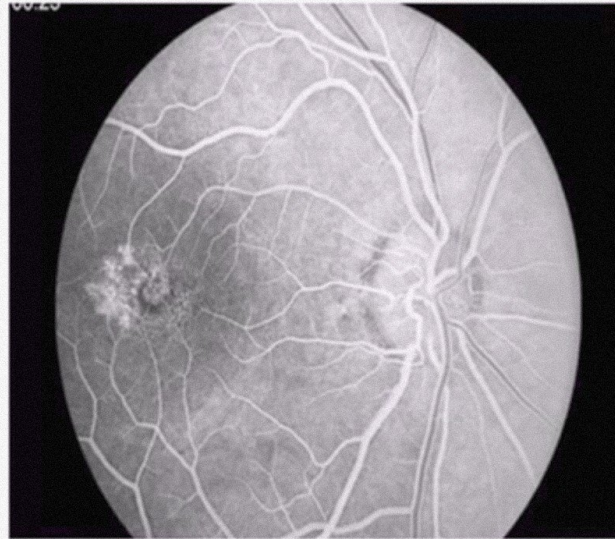
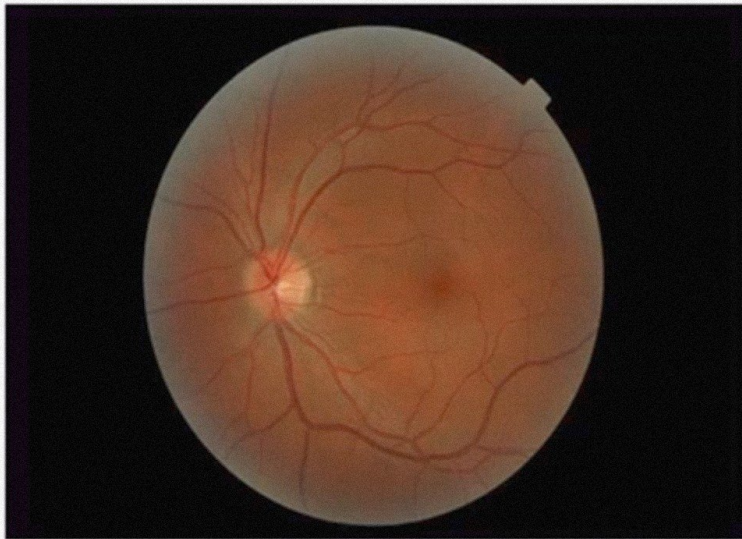
BASICS to ADVANCED by Dr Amrit



SCREEN
RECORDER

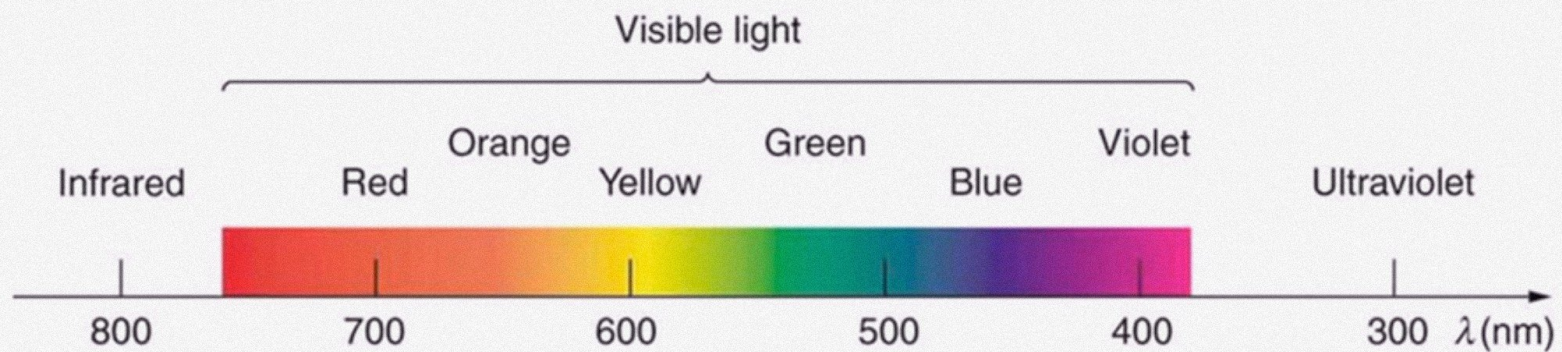


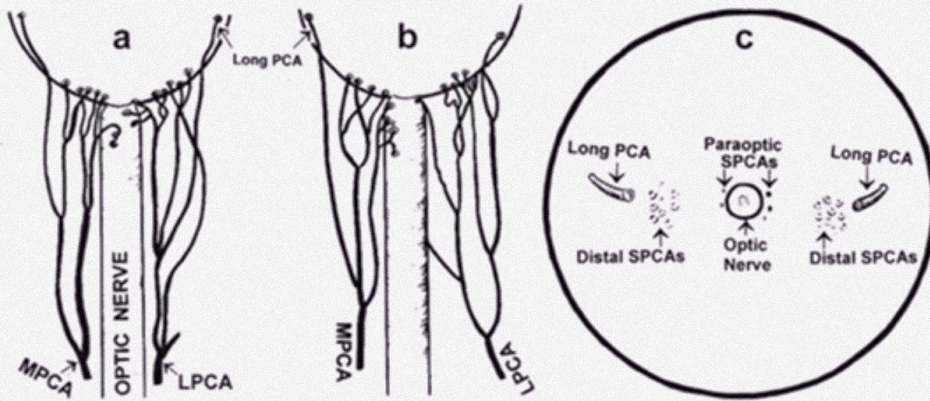
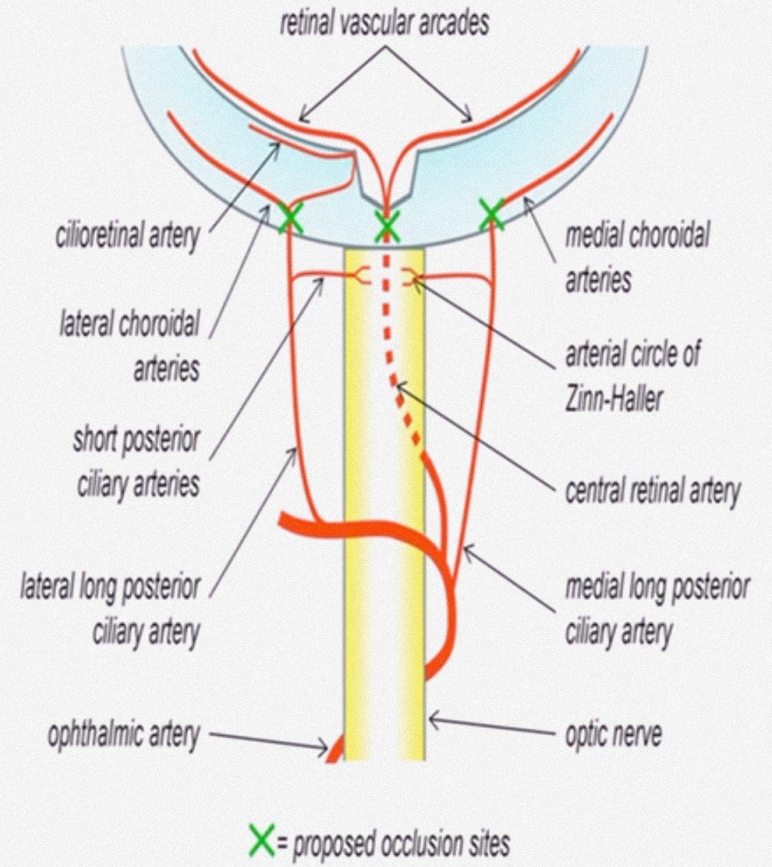
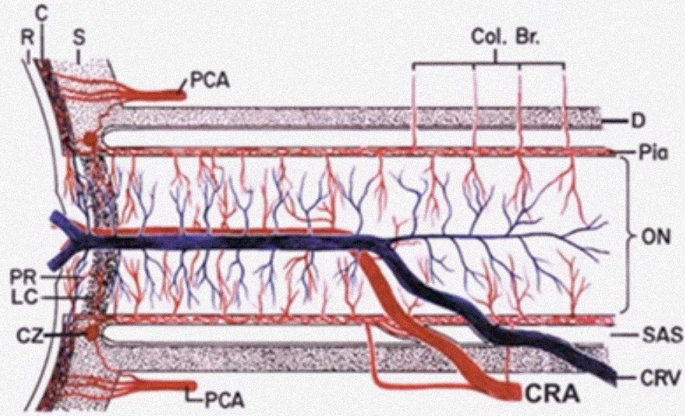
WHAT IS FUNDUS FLUORESCIN ANGIOGRAPHY ?

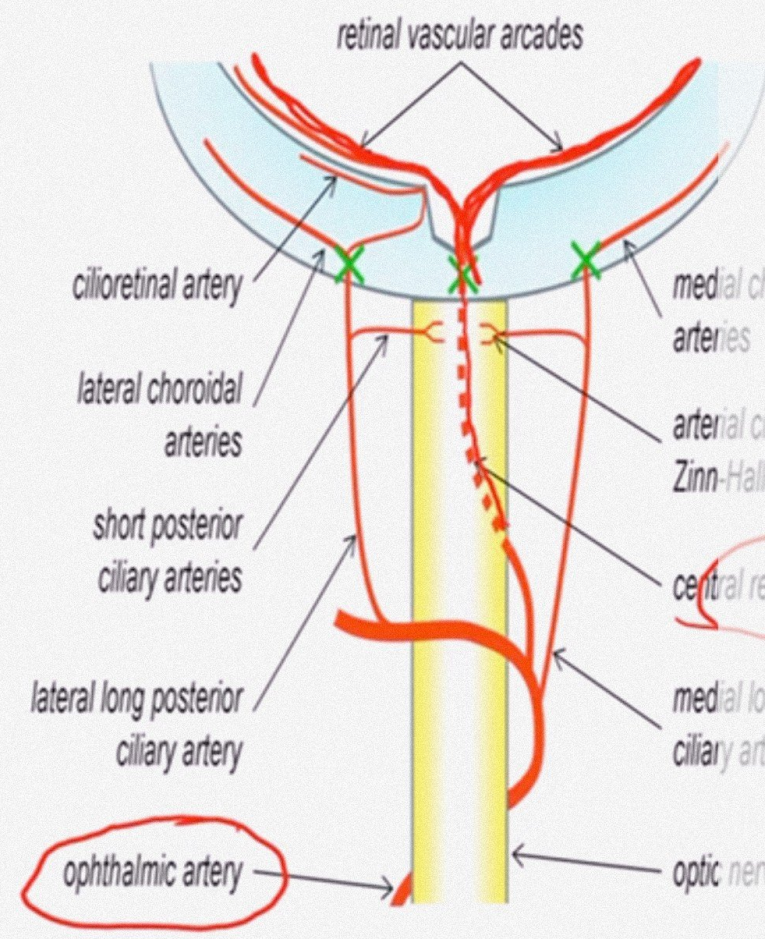
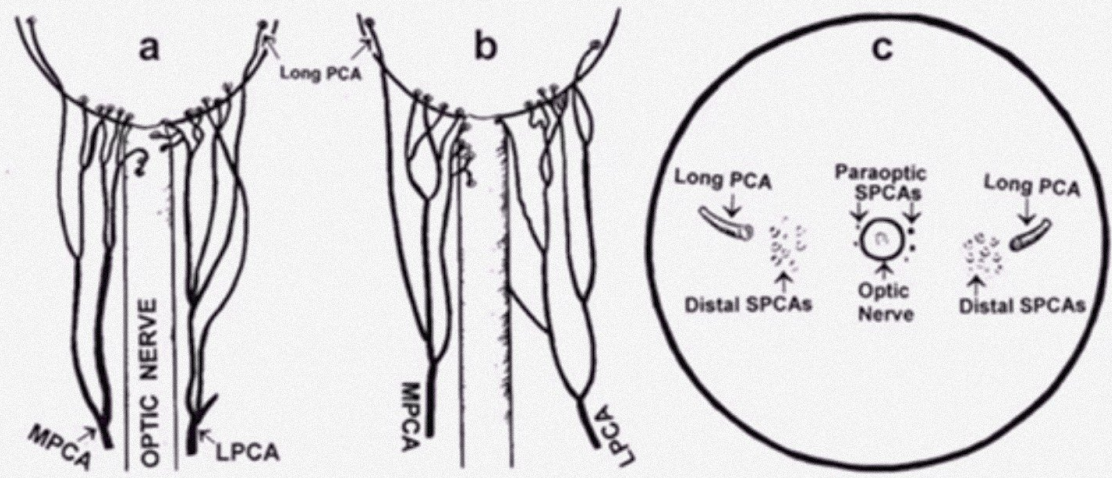
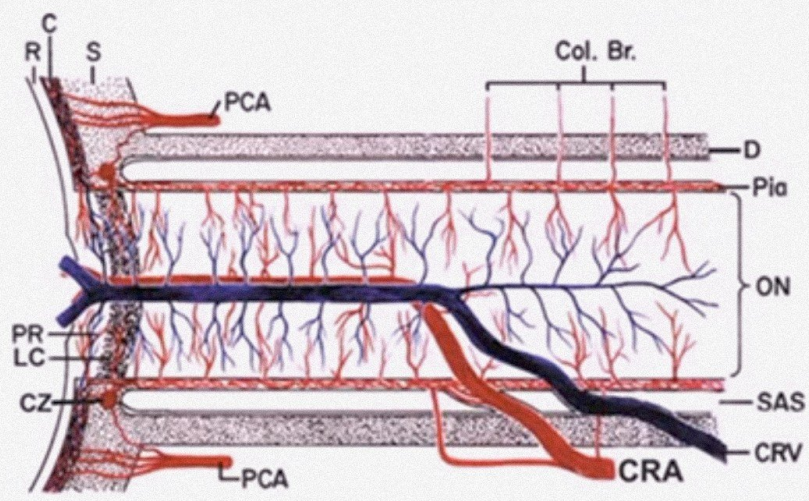


WHAT IS FLORESCENCE?

- It is the property of certain molecules to emit light energy of a longer wavelength when stimulated by light of a shorter wavelength .

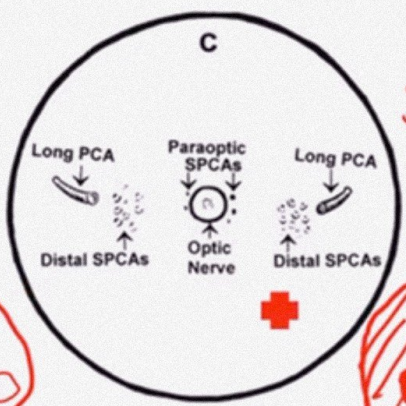
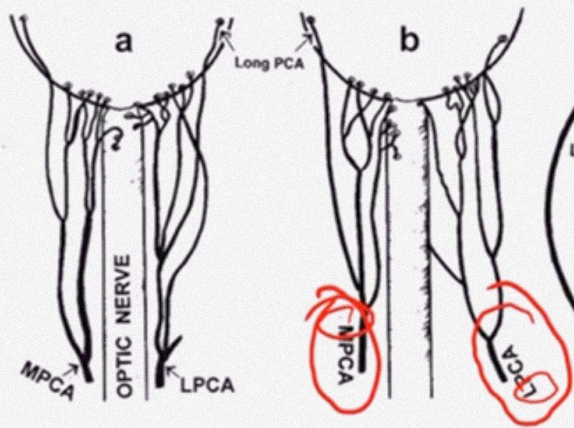
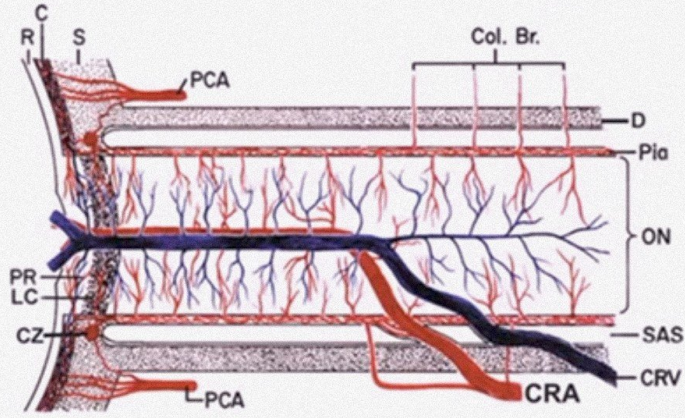




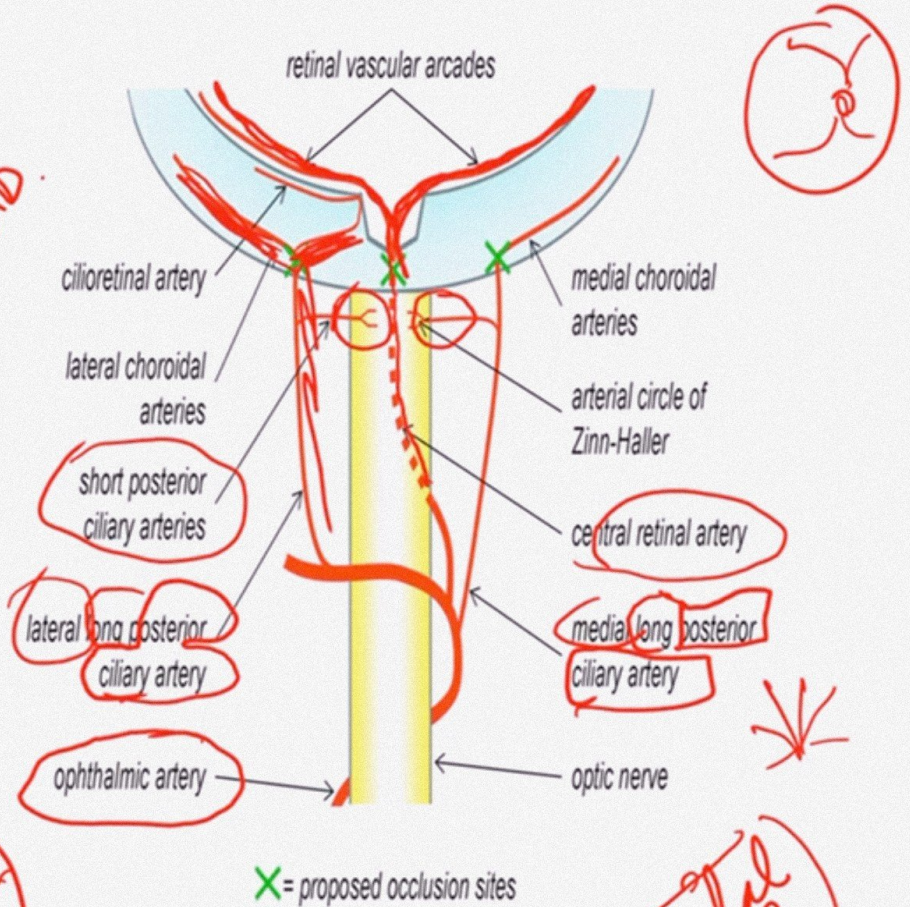
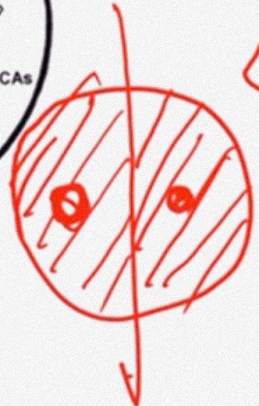


X = proposed occlusion sites





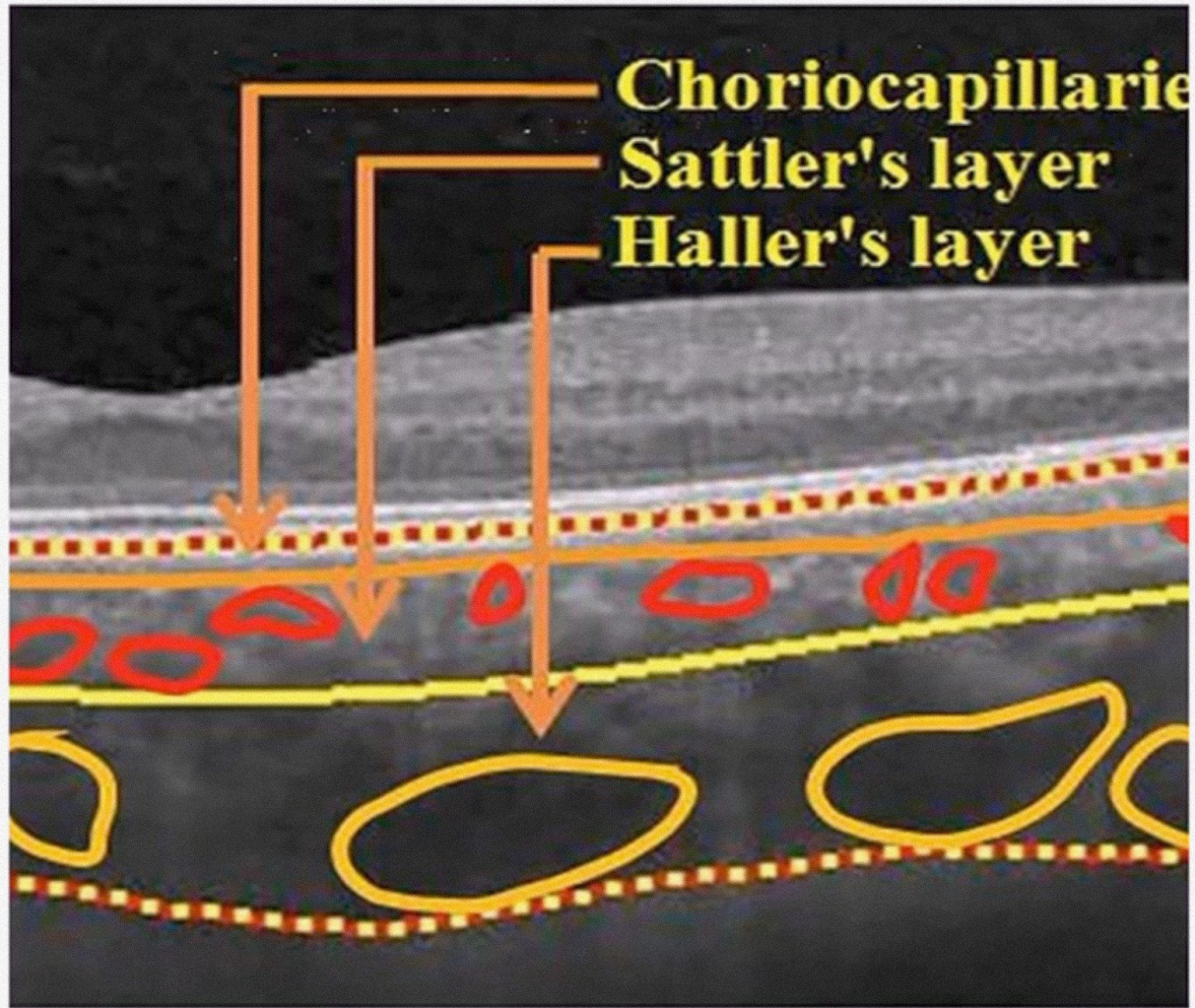
WATERSHED ZONE OF CHOROID

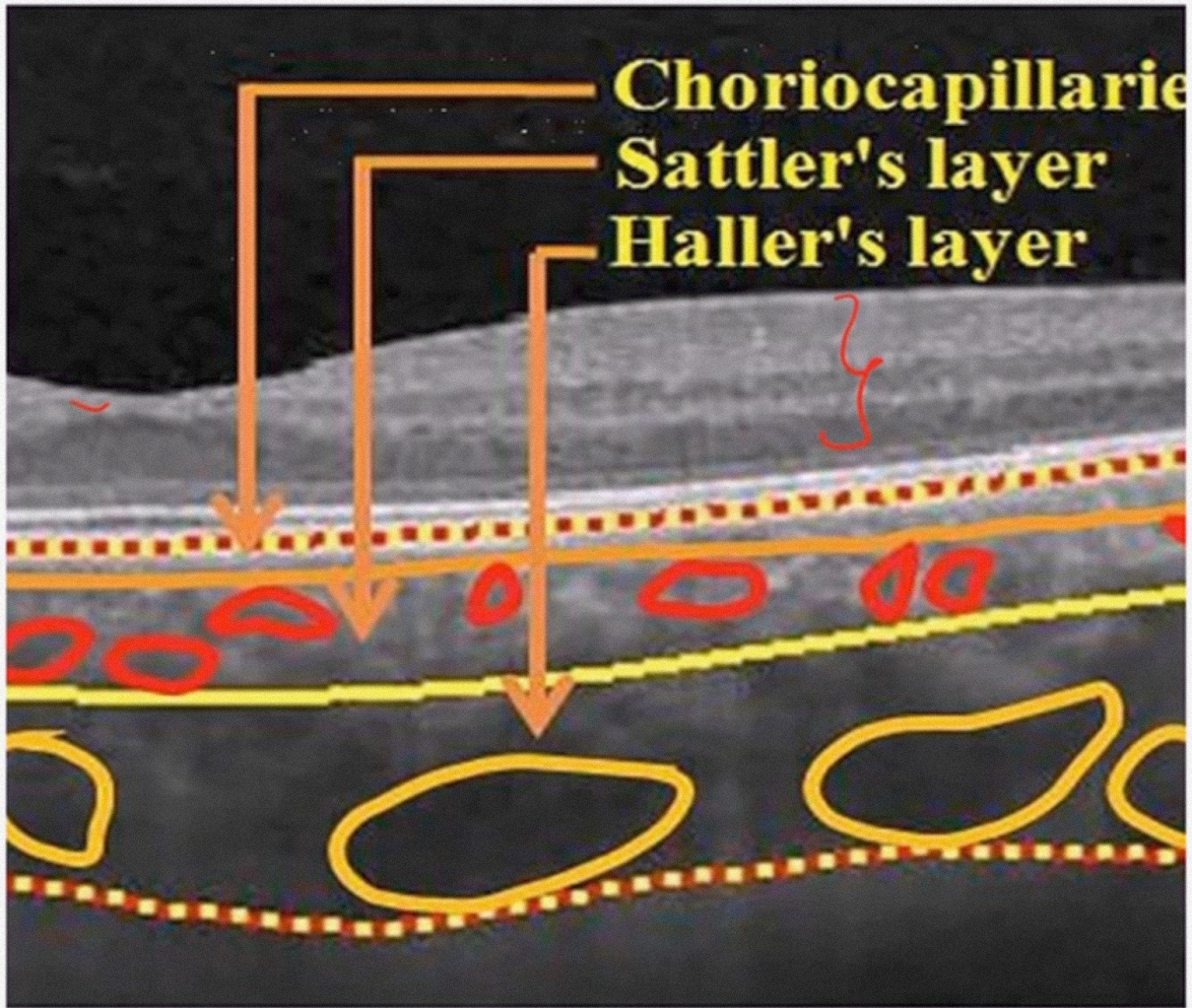


X = proposed occlusion sites

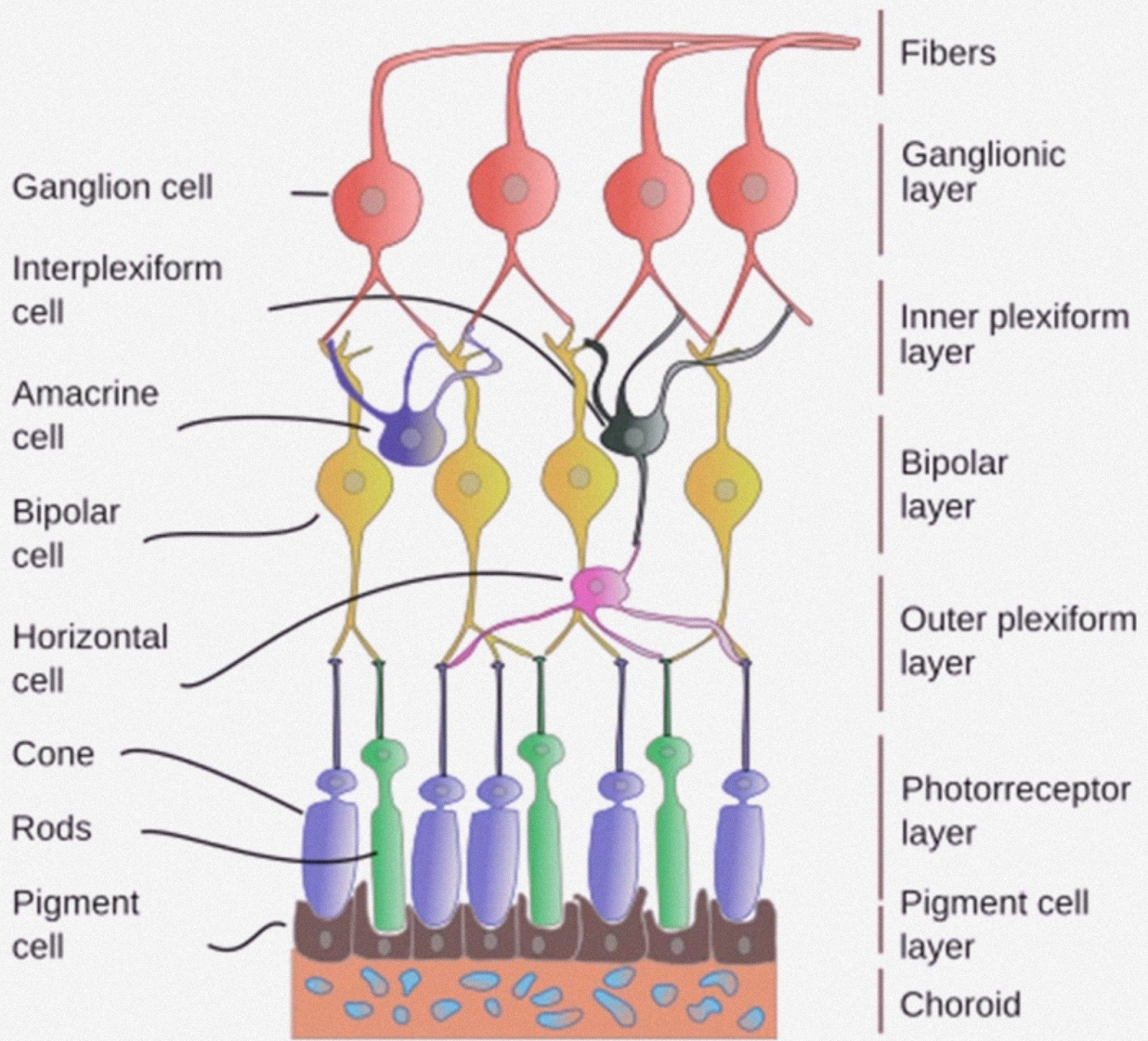
F FA
→ choroidal flush



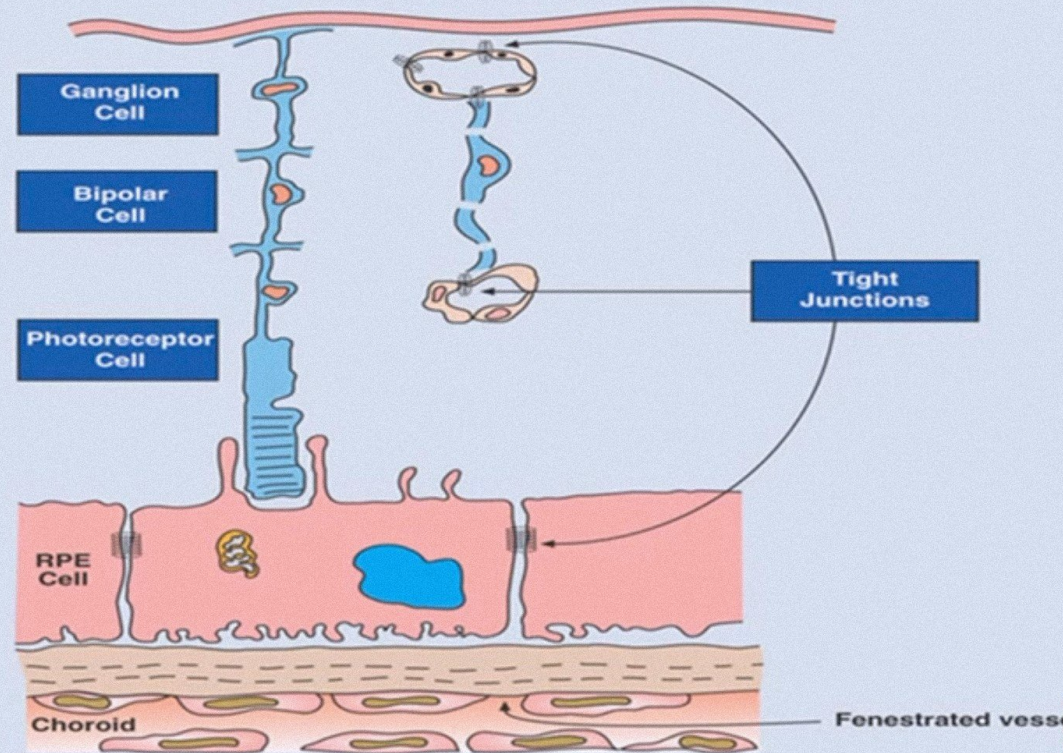




No fenestrations?



BLOOD RETINAL BARRIER



00:00:02

SCREEN RECORDER



WHAT DYE WE USE ?

- SODIUM FLOURESCCEIN(orange color dye)

ABSORBS BLUE LIGHT → 465nm-
495nm

EMITS GREEN LIGHT → 520nm-
530nm

**10% -20 % is
most commonly
used**

**6mg in 3 ml
solution (20%)**

**5 mg in 5ml
(10%)**

00:02:01



SCREEN
RECORDER



TECHNIQUE \ HOW TO DO A FFA?



- A syringe with 23 G winged infusion set / scalp vein needle
- Injection is coordinated with the photographic process
- RAPID INJECTION (2-3 seconds)

TAKE PHOTOGRAPHS at 1 sec intervals

Between 5 seconds to 25 seconds

And LATE PHOTOGRAPH (@10 minutes)

00:02:58

SCREEN
RECORDER



80% of fluorescein is plasma protein bound

20 % is available for fluorescence

00:00:02

SCREEN
RECORDER



**READILY DIFFUSES
THROUGH the
CHORIOCAPILLARIES**

**DOES NOT DIFFUSE
THROUGH RETINAL
VASCULAR ENDOTHELIUM
or THE RPE**

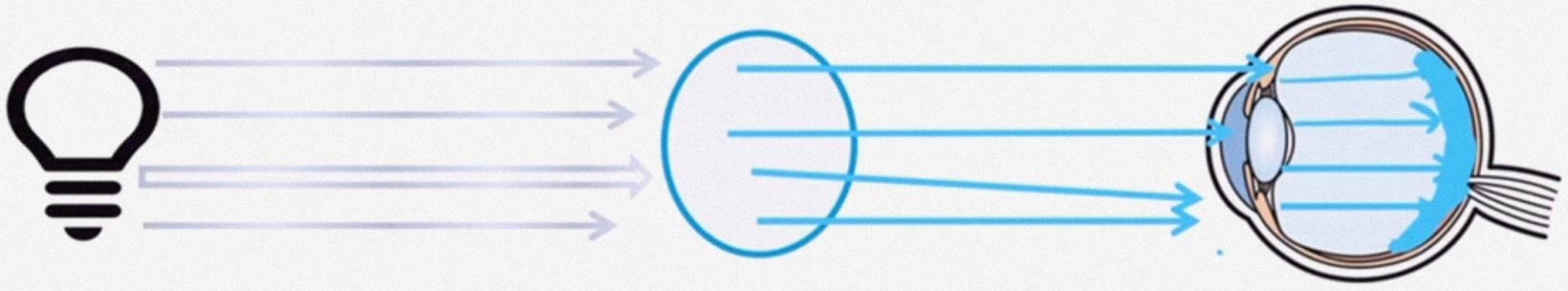
00:00:21

SCREEN
RECORDER

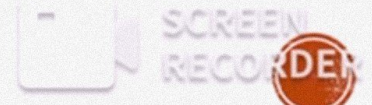
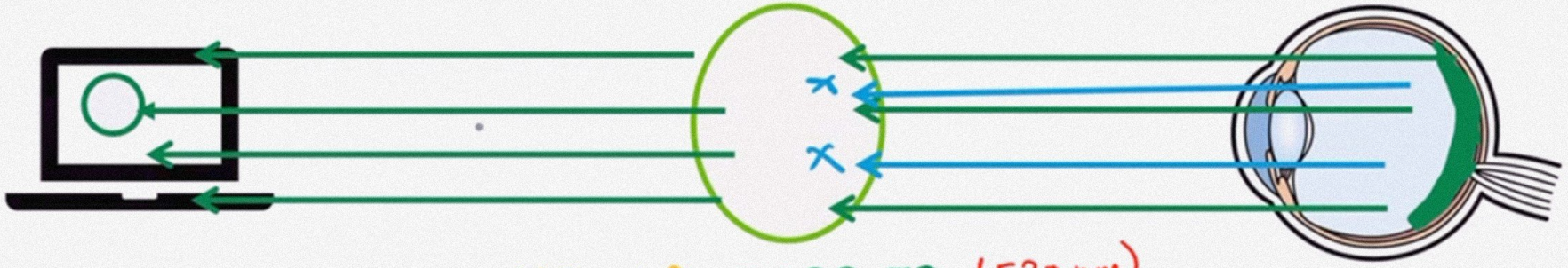


(465-495 nm)

COBALT BLUE
EXCITATION
FILTER

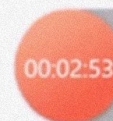


YELLOW BARRIER (530 nm)
GREEN FILTER



PHASES OF FFA (FUNDUS FLUORESCEIN ANGIOGRAPHY)

- THE CHOROIDAL PHASE (pre-arterial phase)
- THE ARTERIAL PHASE
- EARLY ARTERIOVENOUS PHASE
- LATE ARTERIOVENOPUS PHASE
- RECIRCULATION PHASE



CHOROIDAL PHASE

- **9-15** seconds after the dye injection
- **PATCHY LOBULAR** filling of the choroid
- **CHOROIDAL FLUSH** (faint diffuse filling)

A **CILIORETINAL ARTERY** if present will fill at this time because it is derived from posterior ciliary circulation

MACULA Looks dark due to **TALL RPE** Cells and pigments in the macula blocking the choroidal florescence.



SCREEN
RECORDER

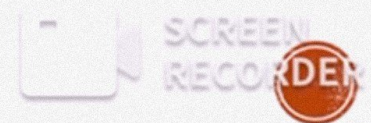
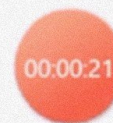


CHOROIDAL PHASE

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00:02:44

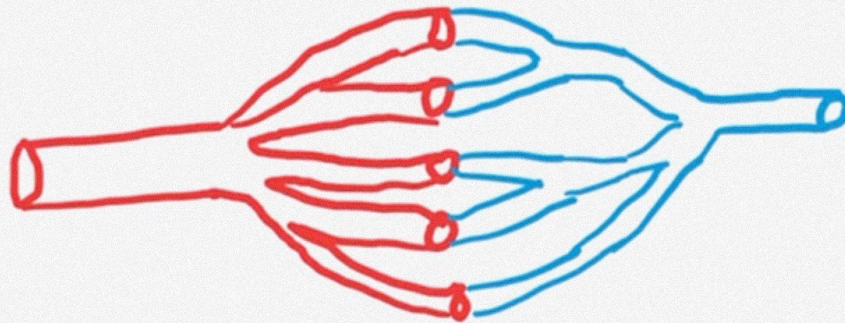


SCREEN
RECORDER



ARTERIAL PHASE

- Starts about a second after the onset of choroidal florescence

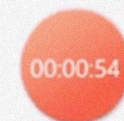
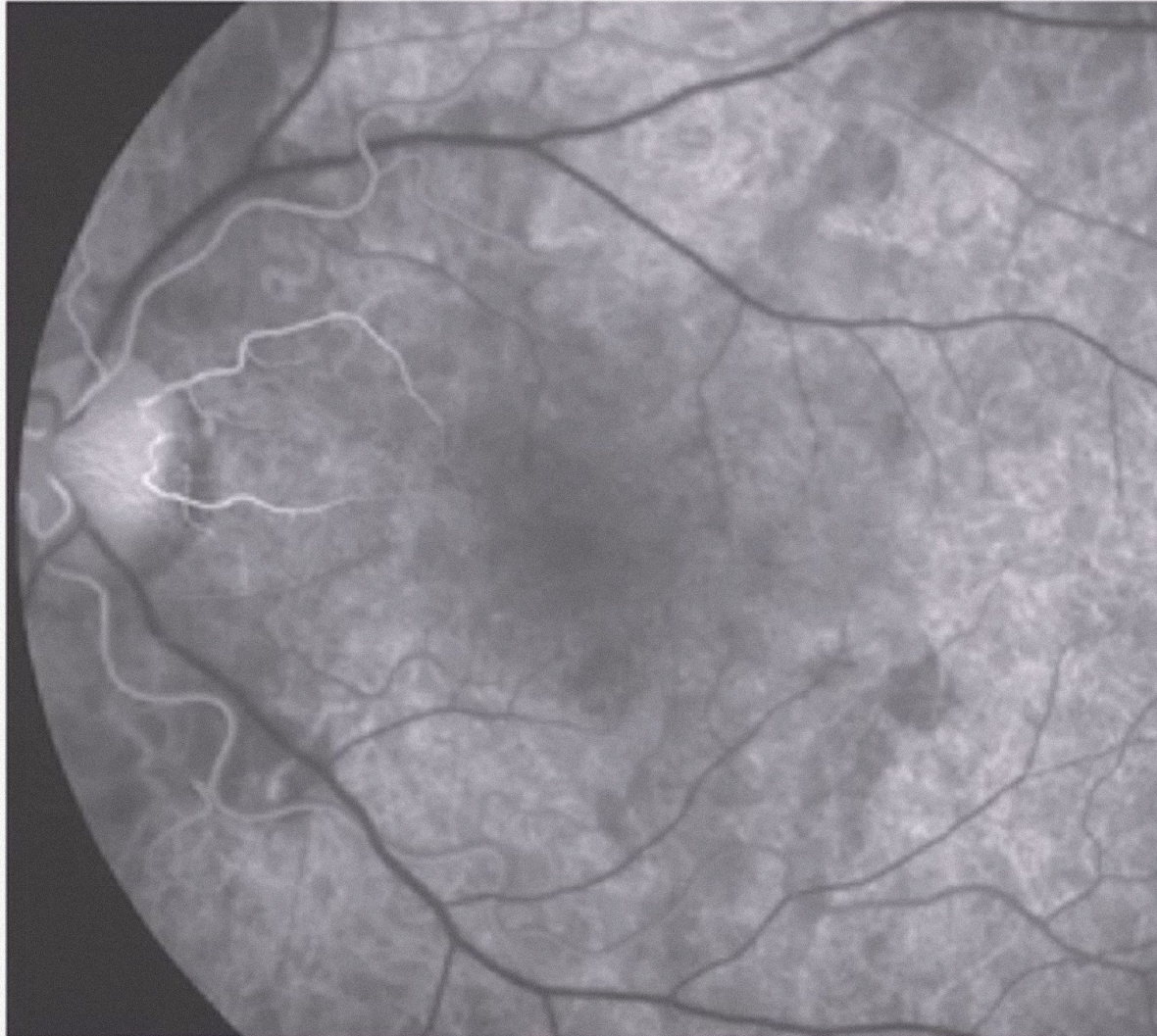


Filling of CRA
↓
Retinal arterioles
↓
capillaries
↓

00:03:24

SCREEN RECORDER



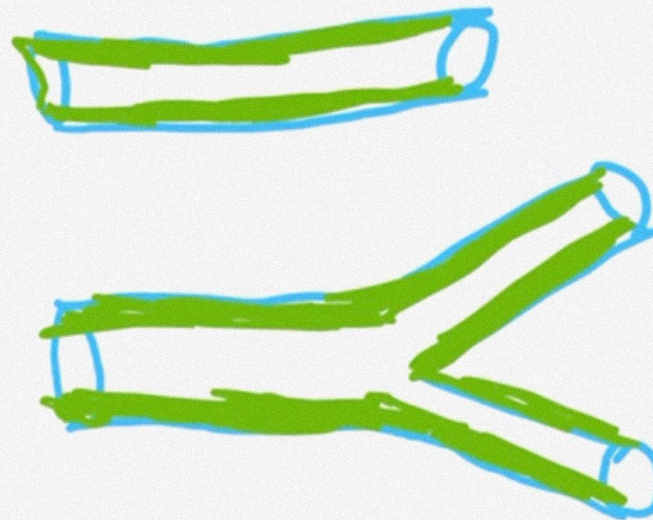


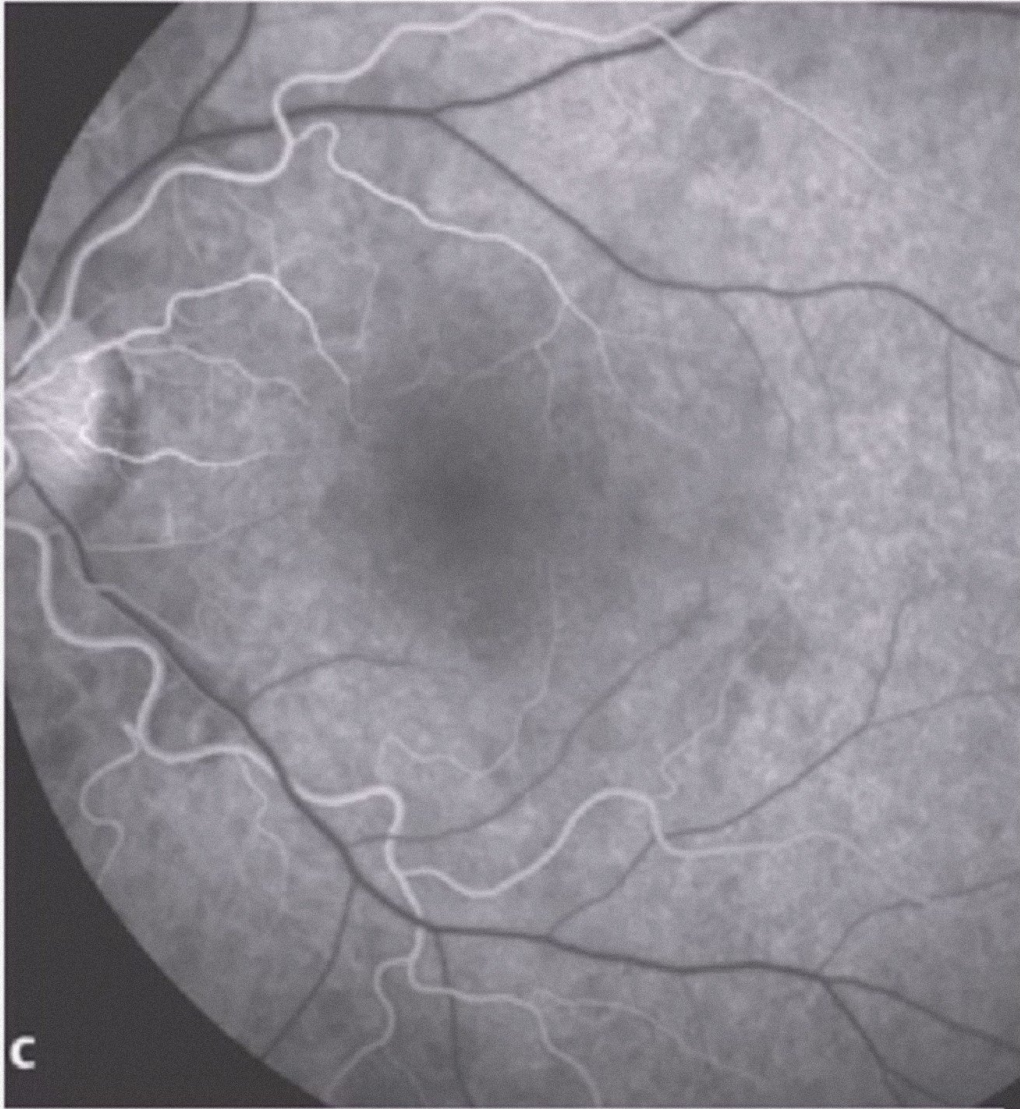
SCREEN
RECORDER



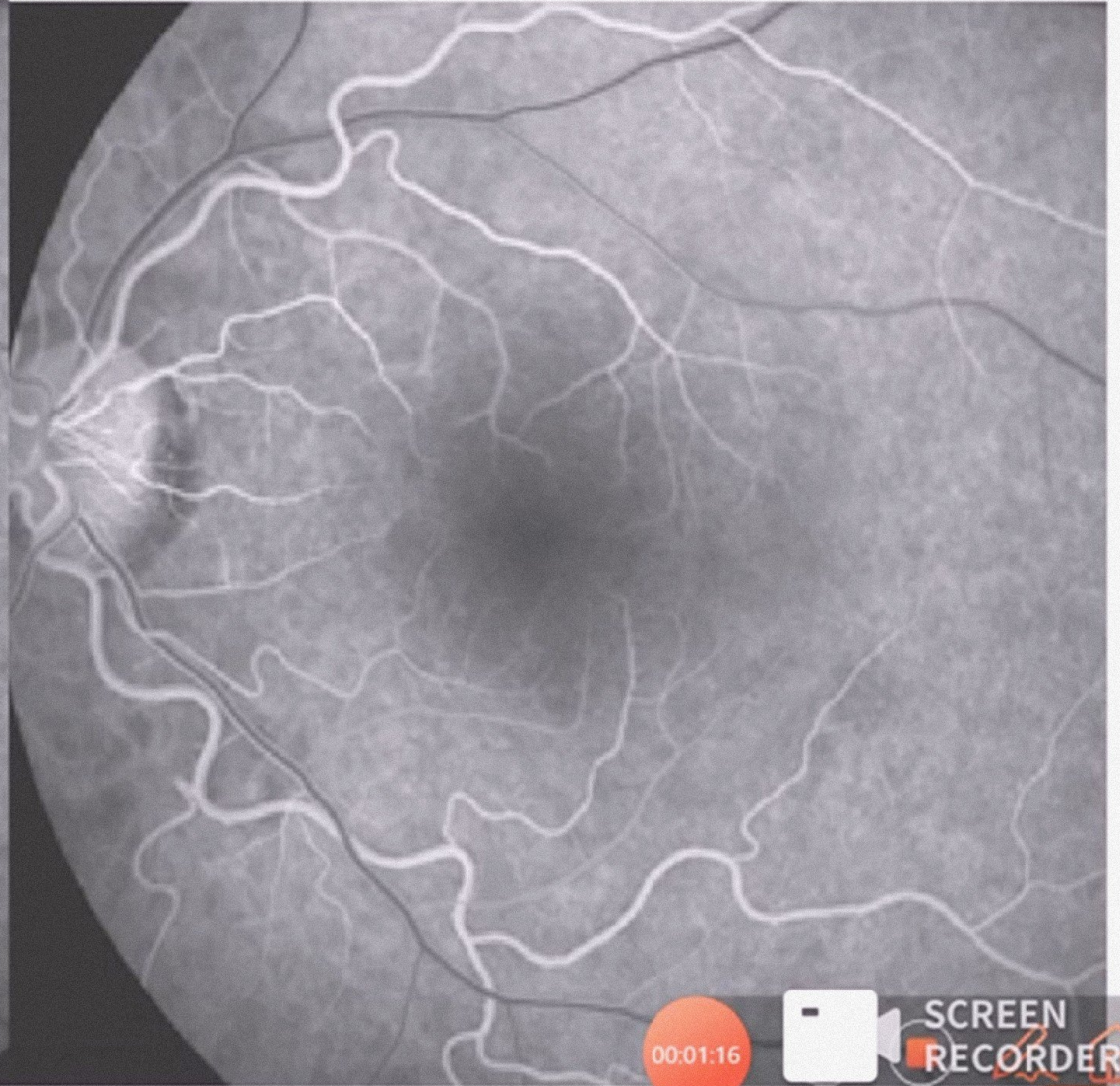
EARLY ARTERIO-VENOUS PHASE

- 13-14 seconds
- Flow from postcapillary venules to the veins
- LAMINAR FLOW
- TRIMANINAR FLOW





c



00:01:16



SCREEN RECORDER



LATE A-V PHASE \ VENOUS PHASE

- Dye completely fills the vein
- EARLY VENOUS : 14-15 seconds
- MID VENOUS : 16-17 seconds
- LATE VENOUS : 18-20 seconds

AV TRANSIT TIME
8-10 seconds

PERFOVEAL CAPILLARY NETWORK IS BEST VISUALISED IN THIS
PHASE (20-25 seconds)

00:02:13

SCREEN
RECORDER





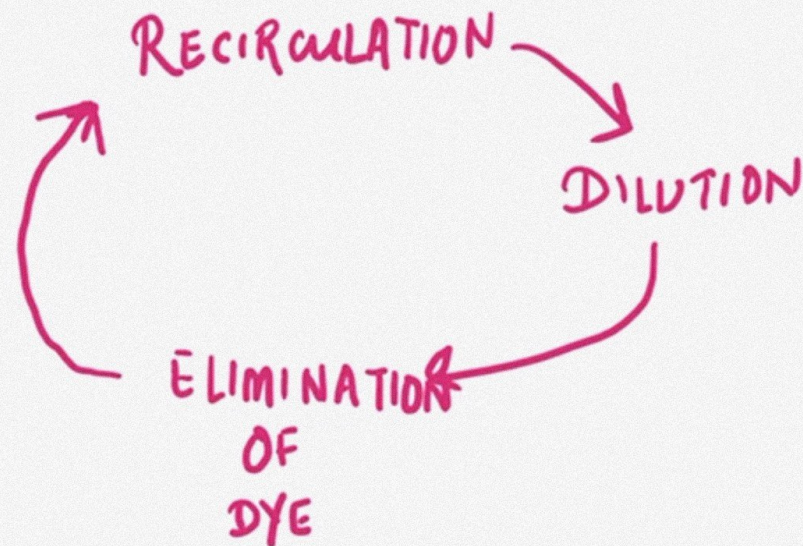
00:03:11

SCREEN RECORDER



RECIRCULATION PHASE

- THE FIRST PASS OF FLUORESCHEIN CIRCULATION IS COMPLETED : 30 SECONDS



FLOURESCEIN WILL
DISSAPPEAR FROM
RETINAL
CIRCULATION IN 10
MINUTES

00:03:59

SCREEN
RECORDER

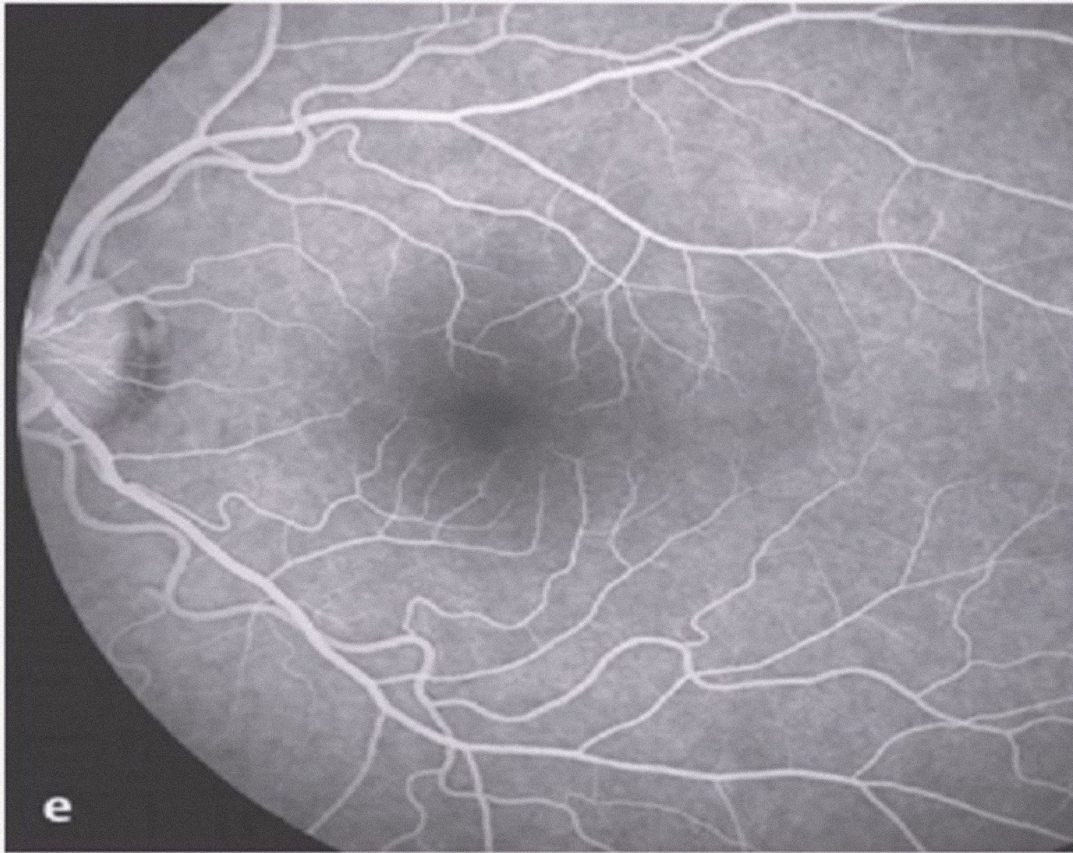




00:04:59

SCREEN
RECORDER






00:05:19

SCREEN RECORDER

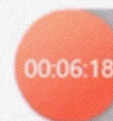


- Staining of the BRUCHS , CHOROID, SCLERA result in diffuse background florescence 
- DISC remains fluorescent in LATE FILMS also due to staining.



FAZ (FOVEAL AVASCULAR ZONE)

- Absence of blood vessels in FAZ
- Blockage of the background choroidal florescence by increased density of pigments (XANTHOPHYLL and MALANIN)
- Large and TALL RPE cells at the fovea{ contyain more melanin and lipofuschin then else where in retina.



SCREEN
RECORDER





00:06:37

SCREEN RECORDER

