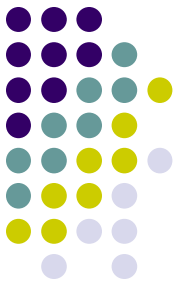
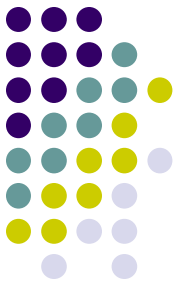


# Fluorescein Angiography



*What does it mean to say a substance fluoresces?*

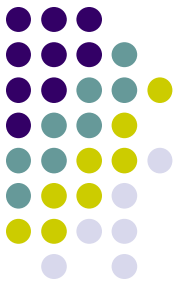
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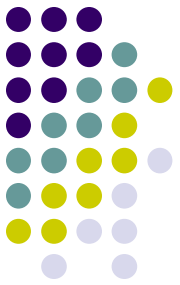


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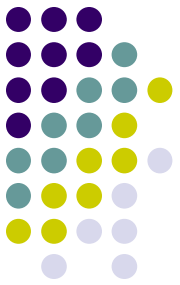
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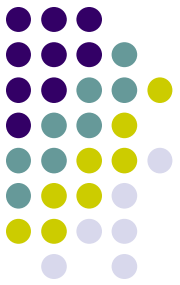
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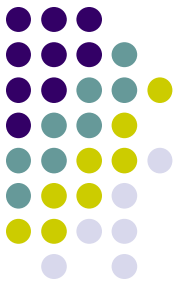
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A fluorescent dye is injected into the circulatory system. The dye used in FA absorbs blue light and releases yellow-green light. During FA, blue light is used to illuminate the retina, but a blue-blocking filter is placed in the camera.

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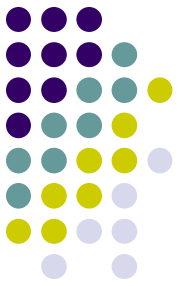
# Fluorescein Angiography

*What is the typical route by which fluorescein is introduced to the body?*





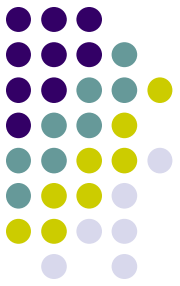
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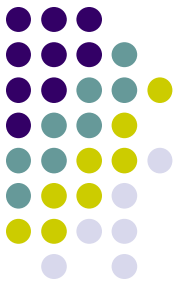


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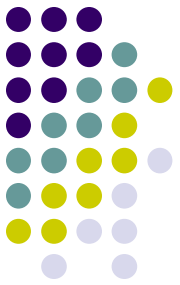


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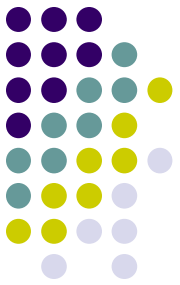
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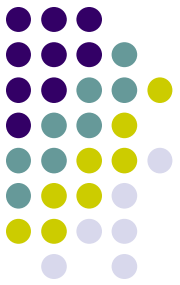
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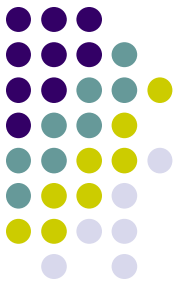
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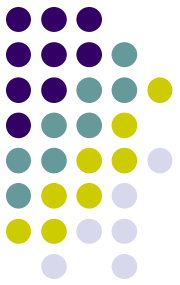
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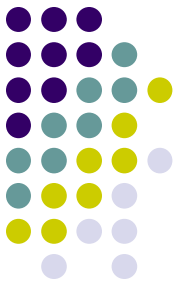
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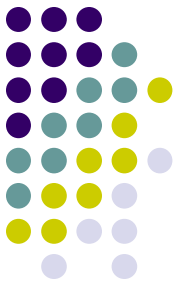
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*How long should the injection take?*

3-7 seconds

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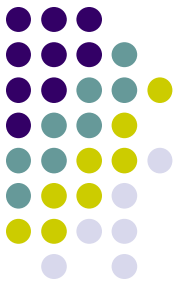
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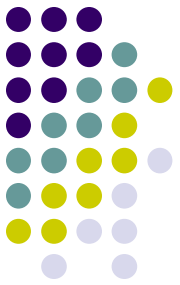
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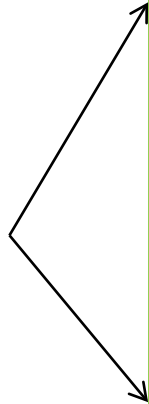
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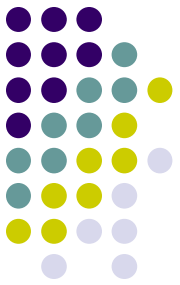
***Does it really matter how long it takes?***

**Yes**

We will see **why** it matters shortly...



# Fluorescein Angiography

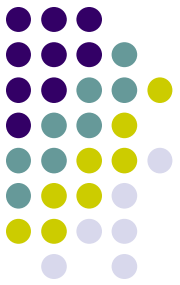


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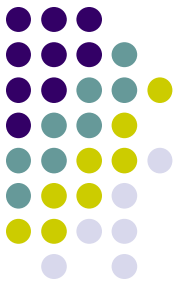
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Yes, if need be the dye can be given orally, although the resulting study is not nearly as informative

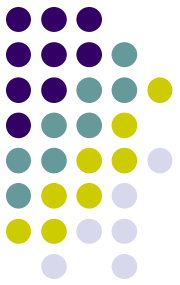
# Fluorescein Angiography



- Injection
- FA phases:
  - ?
  - ?
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  - ?

*What are the 5 phases in FA?*

# Fluorescein Angiography

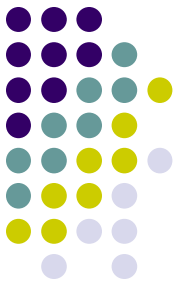



- Injection
- FA phases:
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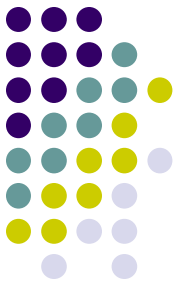
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*How long should it take for the dye to start showing up in the eye?*

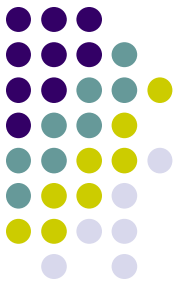
# Fluorescein Angiography



- Injection
  - FA phases:
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- 12-14 seconds
- 
- A yellow curved arrow pointing from the 'Injection' bullet point to the 'Choroidal' bullet point, indicating the time interval between them.

*How long should it take for the dye to start showing up in the eye?*  
12-14 seconds

# Fluorescein Angiography



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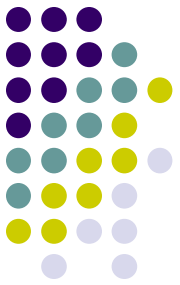


12-14 seconds =

*How long should it take for the dye to start showing up in the eye?  
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*What is this time-interval called?*

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12-14 seconds =  
*arm-to-choroid time*

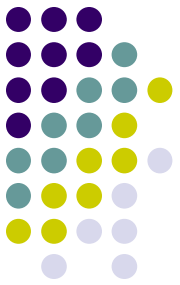
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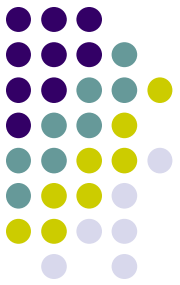
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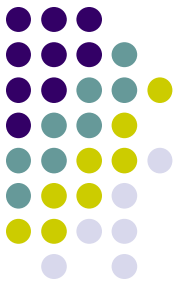
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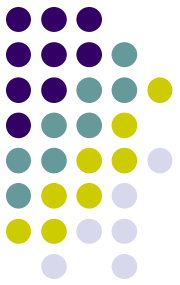
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*If presented with a case of delayed arm-to-choroid time on the OKAP, what condition should come to mind?*

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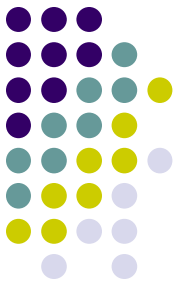
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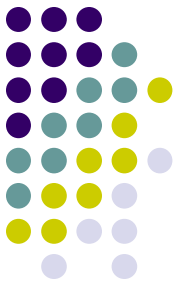
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***This** is why site-of-injection & dye push-time are important—performing the procedure in this particular way allows diagnostic inferences to be drawn from the arm-to-choroid time*

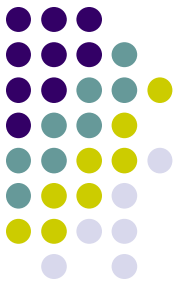
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*Why does the choroid light up before the retinal arterial tree?*

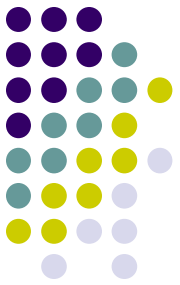
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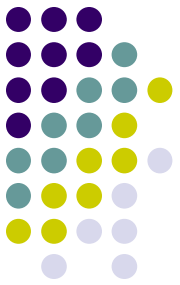


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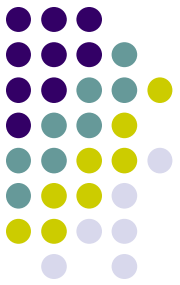


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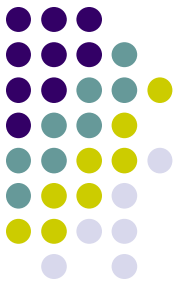
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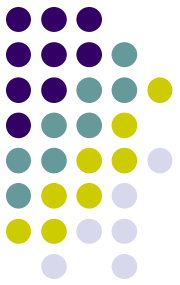
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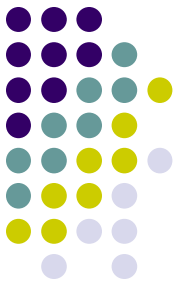
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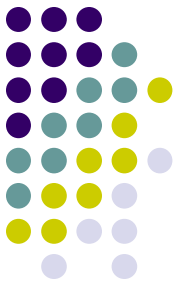
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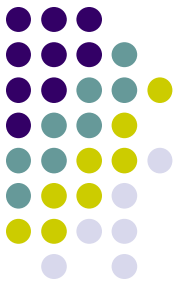
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*From what artery do they originate?*

The ophthalmic

*Where on the eye do they enter the sclera?*

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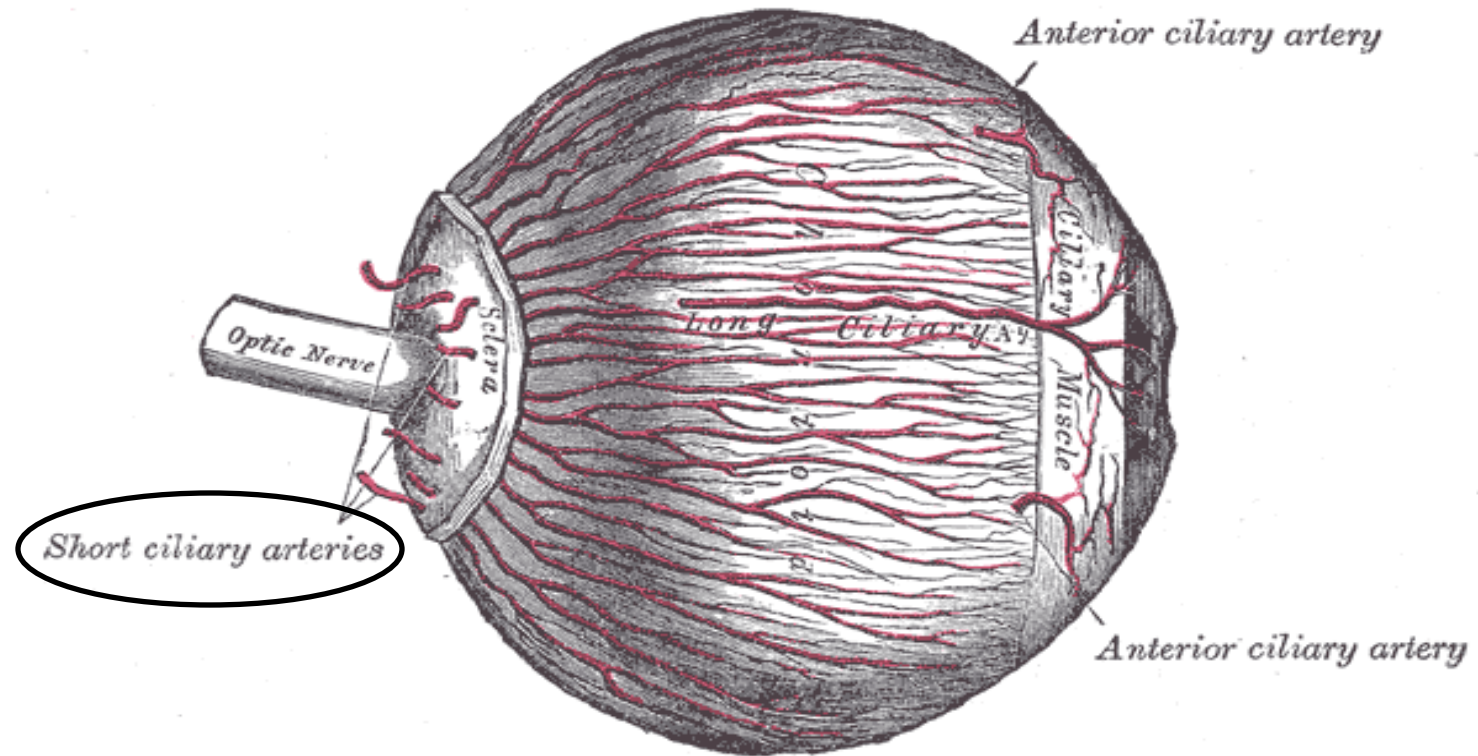
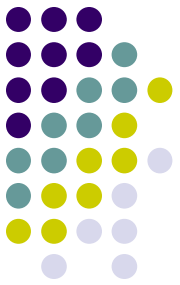
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*How many short posterior ciliary arteries are there?*  
About 20

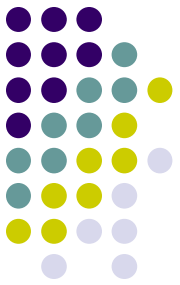
*From what artery do they originate?*  
The ophthalmic

*Where on the eye do they enter the sclera?*  
In a ring around the optic nerve



Short posterior ciliary arteries

# Fluorescein Angiography



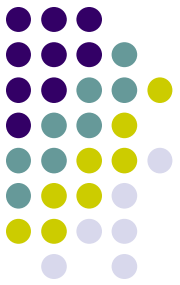
- Injection
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  - **Choroidal**
  - Arterial
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  - Venous
  - Recirculation

*Why does the choroid light up before the retinal arterial tree?*  
Because the dye reaches the choroid first

*Which vessels service the choroid?*  
The short posterior ciliary arteries

*What buzzword is used to describe the manner in which the choroid lights up on FA?*

# Fluorescein Angiography



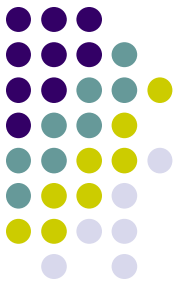
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'Patchy'

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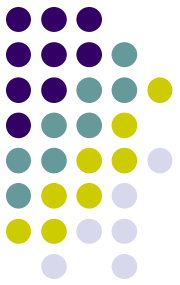
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*Why does the choroid light up in a patchy fashion?*

# Fluorescein Angiography



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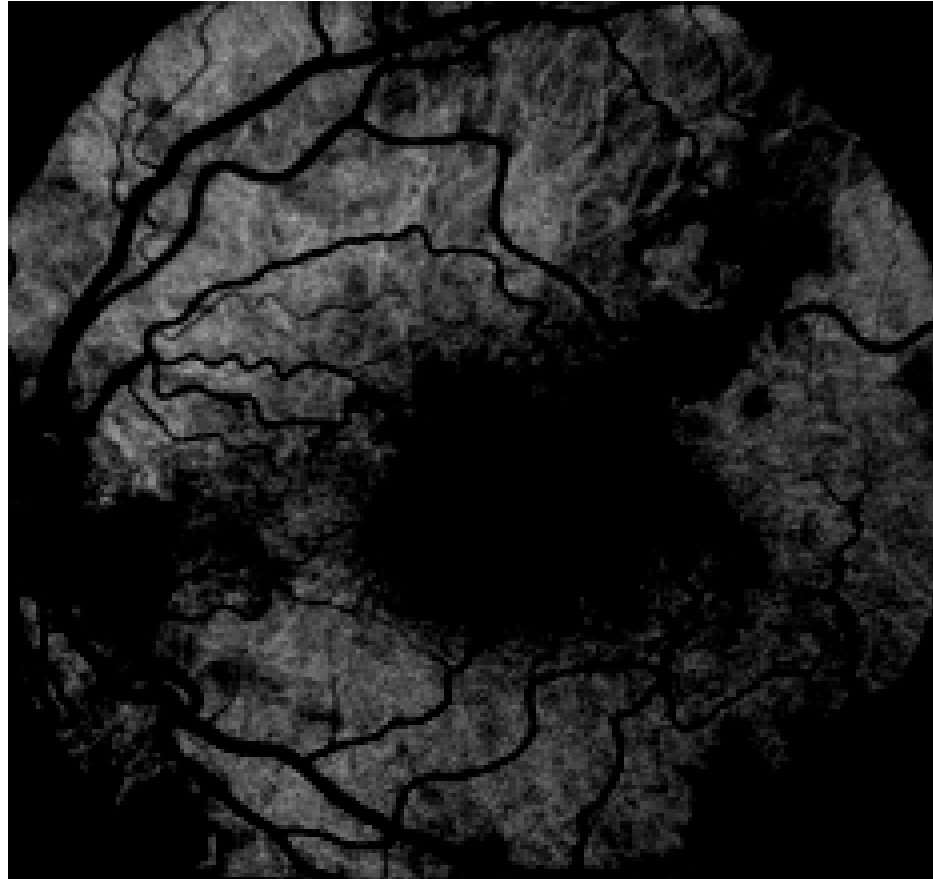
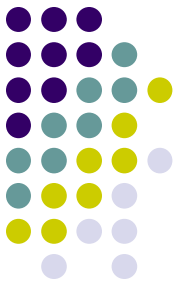
*Which vessels service the choroid?*  
The short posterior ciliary arteries

*What buzzword is used to describe the manner in which the choroid lights up on FA?*  
'Patchy'

*Why does the choroid light up in a patchy fashion?*  
The patchiness reflects differences in filling pressures among the short posterior ciliary arteries, which means some receive blood (and therefore dye) a fraction of a second before others, and therefore so too do the portions of choroid they fill

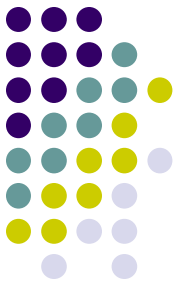


# Fluorescein Angiography



Choroidal phase

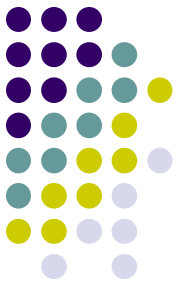
# Fluorescein Angiography



- Injection
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*What defines the arterial phase?*

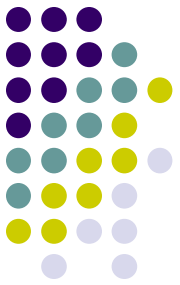
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*What defines the arterial phase?*  
The presence of dye in the retinal arterial tree, but not yet in the venous system

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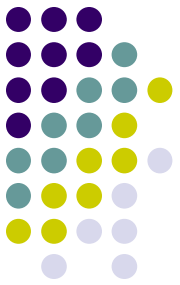
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*How long after the choroidal flush should it take for the dye to start showing up in the central retinal artery?*

# Fluorescein Angiography



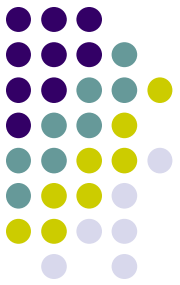
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- 1-3 seconds
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# Fluorescein Angiography



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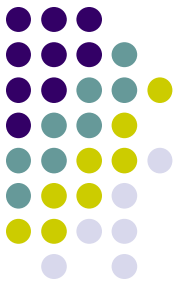
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*How long does the arterial phase last?*

# Fluorescein Angiography



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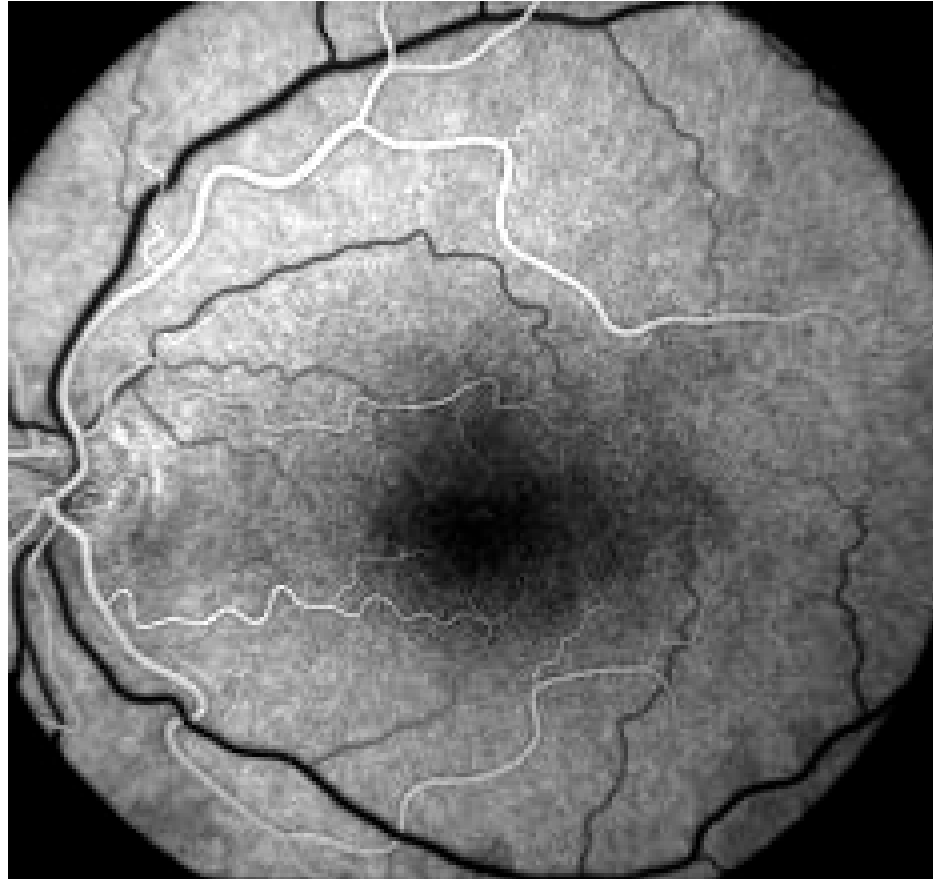
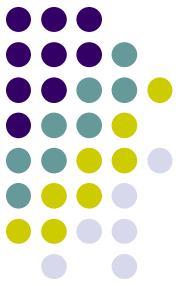
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The presence of dye in the retinal arterial tree, but not yet in the venous system

*How long after the choroidal flush should it take for the dye to start showing up in the central retinal artery?*  
1-3 seconds

*How long does the arterial phase last?*  
About a second, maybe two

# Fluorescein Angiography



Arterial phase





*What defines the arteriovenous (AV) phase?*

- Injection
- FA phases:
  - Choroidal
  - Arterial
  - **Arteriovenous**
  - Venous
  - Recirculation



- Injection
- FA phases:
  - Choroidal
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*What defines the arteriovenous (AV) phase?*  
The *incomplete* presence of dye in the retinal venous system



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The *incomplete* presence of dye in the retinal venous system

*What is the term-of-art commonly used to describe the appearance of the venous system during the AV phase?*



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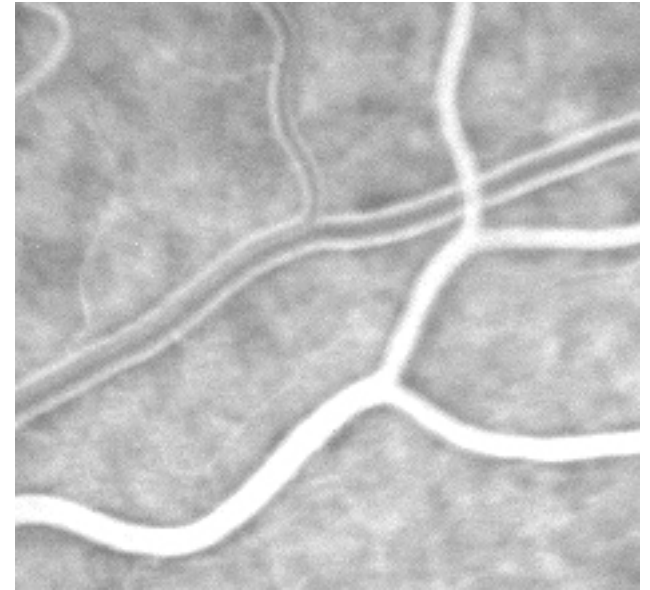
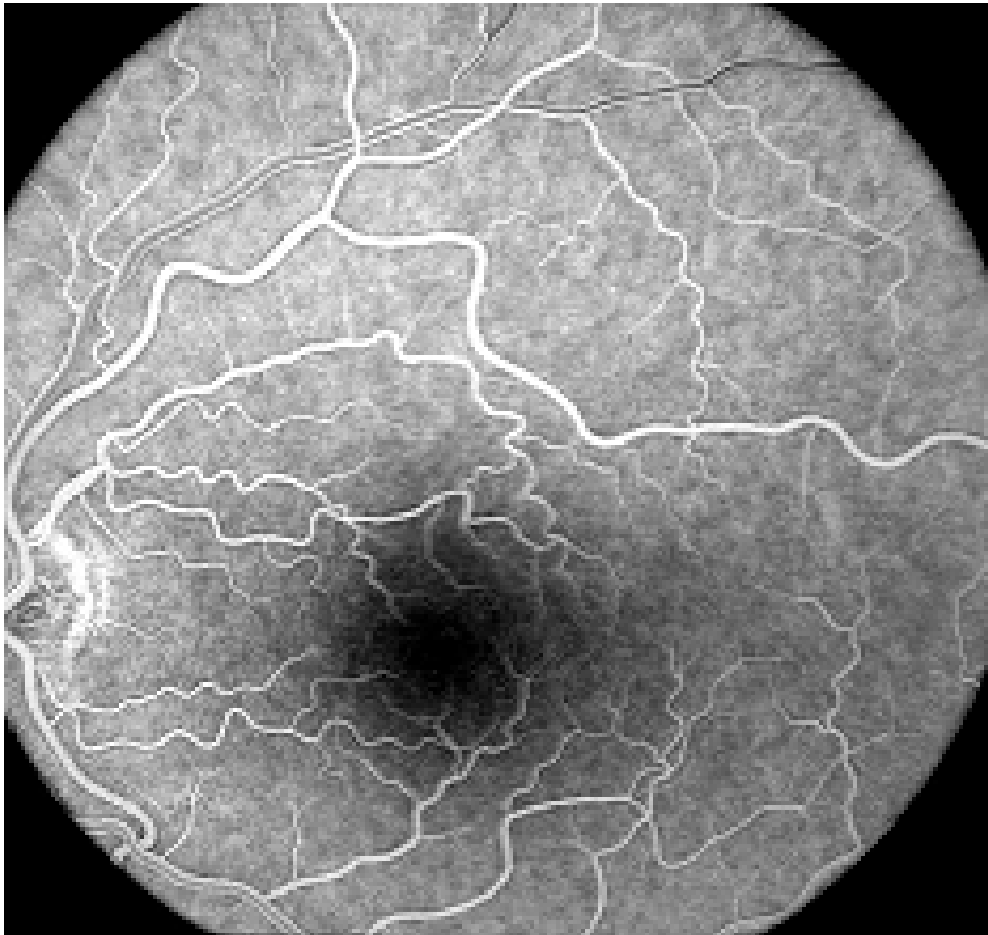
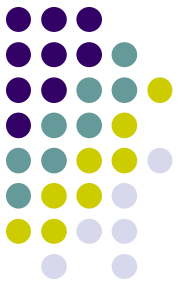
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*What is the term-of-art commonly used to describe the appearance of the venous system during the AV phase?*

'Laminar flow'

# Fluorescein Angiography



Arteriovenous phase: 'Laminar flow'



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*What produces the laminar appearance?*



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*What produces the laminar appearance?*

The concentration of dye in the outer portions of the blood column



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The concentration of dye in the outer portions of the blood column

*Why is the dye peripheralized like this?*

1)

2)

3)





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The concentration of dye in the outer portions of the blood column

*Why is the dye peripheralized like this?*

- 1) When the tiny venules dump dye into larger vessels, they do so at the margin of the vessel's lumen
- 2) The outer regions of the column are flowing slower
- 3) RBCs tend to occupy the central portion, and 'crowd out' the dye



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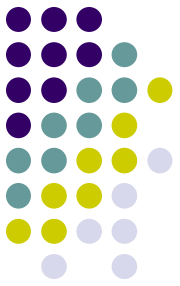
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*How long does the AV phase last, ie. how long from the first appearance of laminar flow until the venous system is completely filled with dye?*

Just a few seconds

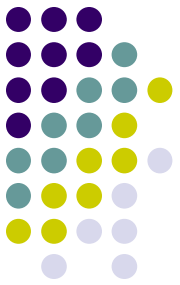
# Fluorescein Angiography



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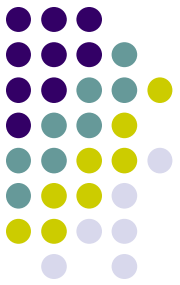


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*What defines the venous phase?*

The complete presence of dye in the retinal venous system during its initial pass through the eye

# Fluorescein Angiography



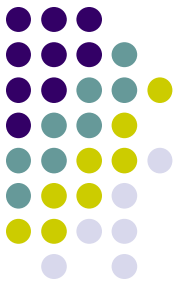
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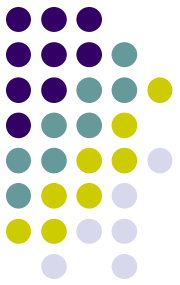
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The venous phase is when the FA is maximally bright, and the contrast between the light and dark portions is the highest

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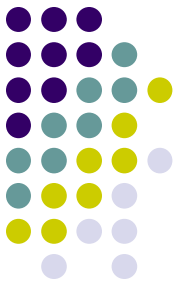
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*How long does it last?*



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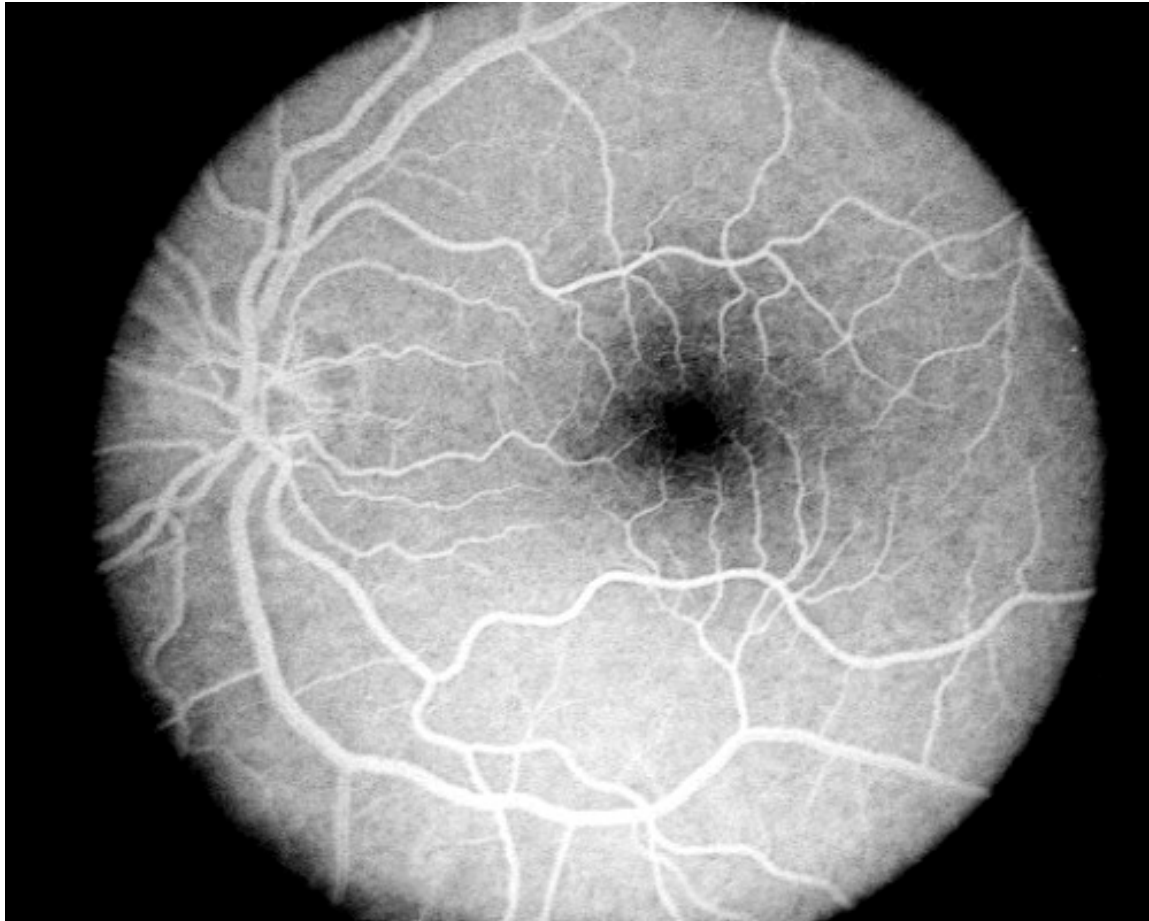
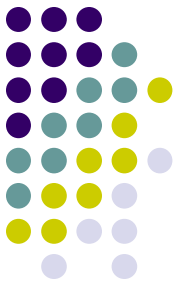
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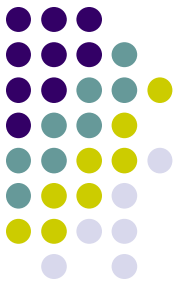
Not long; after a few seconds, the dye quickly drains from the venous side and re-enters general circulation

# Fluorescein Angiography



Venous phase

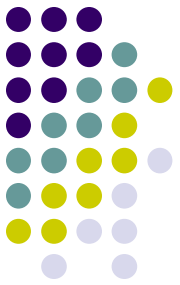
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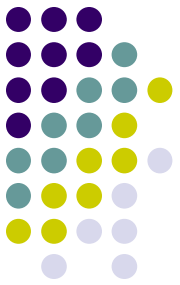
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*What defines the recirculation phase?*  
The re-appearance of circulating dye within the retinal vasculature

# Fluorescein Angiography



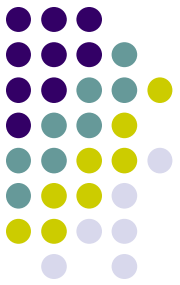
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*Relative to the initial IV push of dye, at what time-point during an FA does it start?*

# Fluorescein Angiography



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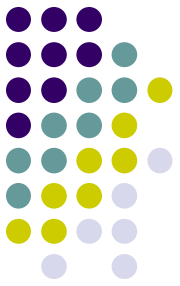
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At about the 30-second mark

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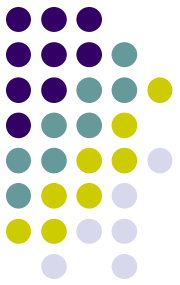
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At about the 30-second mark

*How long does it last?*

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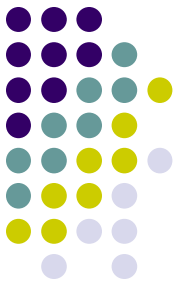
At about the 30-second mark

*How long does it last?*

A long time. It's customary to take pictures for at least 5-10 minutes post-injection, often longer

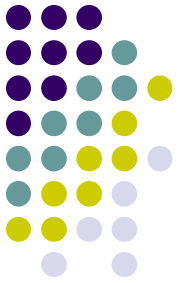


# Fluorescein Angiography

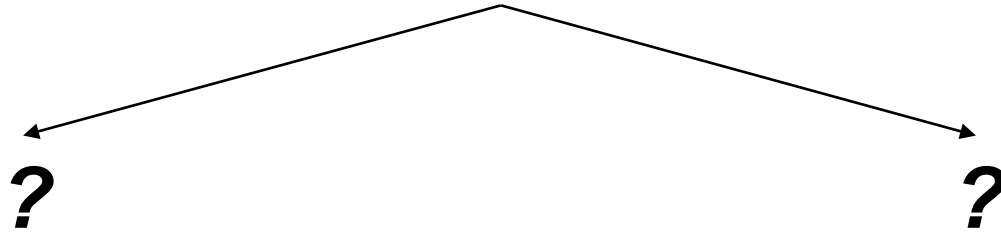


Recirculation phase

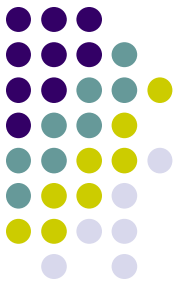
# Fluorescein Angiography



## FA Abnormalities



# Fluorescein Angiography

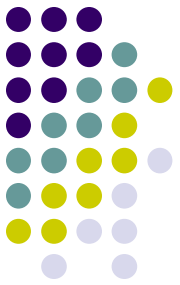


## FA Abnormalities

Hyperfluorescence

Hypofluorescence

# Fluorescein Angiography



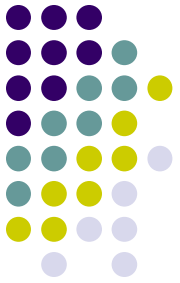
## FA Abnormalities

Hyperfluorescence

Hypofluorescence

*Take note! **All FA findings come down to this:** Either a structure/area is too bright (hyperfluorescent) or too dark (hypofluorescent)*

# Fluorescein Angiography



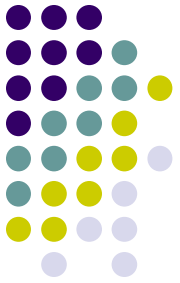
## FA Abnormalities

Hyperfluorescence

Hypofluorescence

— ?  
— ?  
— ?  
— ?  
— ?

# Fluorescein Angiography



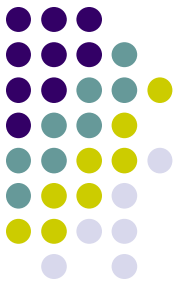
## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

### Hypofluorescence

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

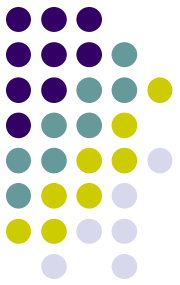
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### Hypofluorescence

?

?

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

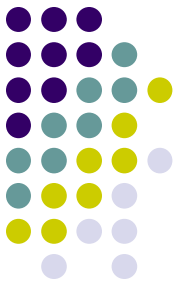
- Autofluorescence
- Window defect
- Leaking
- Pooling
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### Hypofluorescence

Blocking

Filling defect





## FA Abnormalities

*What is the key difference between autofluorescence and all other forms of hyperfluorescence?*

### Hyperfluorescence

**Autofluorescence**

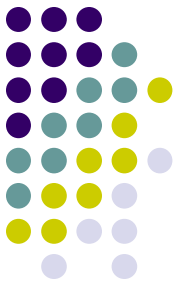
Window defect

Leaking

Pooling

Staining

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

**Autofluorescence**

Window defect

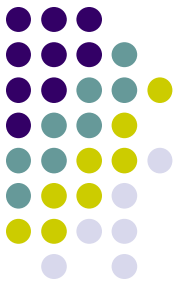
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*What is the key difference between autofluorescence and all other forms of hyperfluorescence?*  
Autofluorescence is noted prior to the injection of dye

# Fluorescein Angiography



## FA Abnormalities

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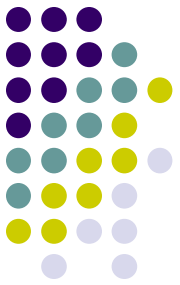
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*Autofluorescence at the optic nerve head is usually indicative of what condition?*

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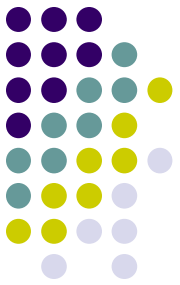
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*Optic nerve head drusen*



# Fluorescein Angiography



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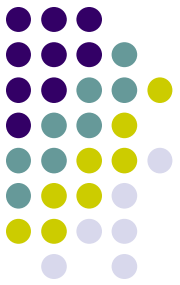
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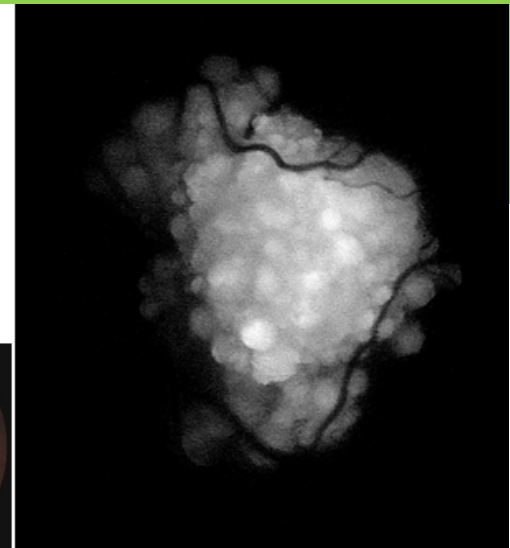
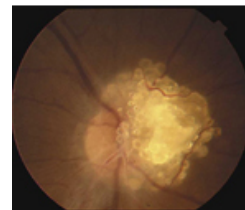
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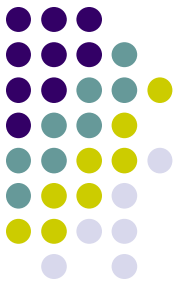
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Astrocytic hamartoma



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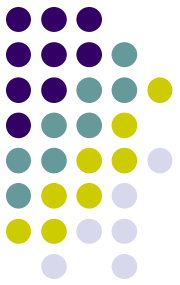
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*With what congenital condition is astrocytic hamartoma usually associated?*

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

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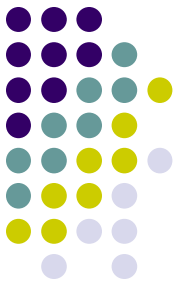
Astrocytic hamartoma

*With what congenital condition is astrocytic hamartoma usually associated?*

Tuberous sclerosis



# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

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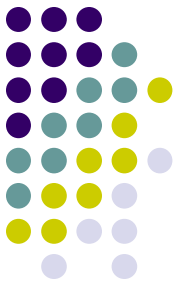
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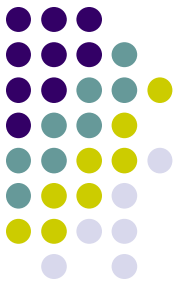
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It means choroidal fluorescence that should be blocked by overlying tissue is 'shining through' an abnormal section of the overlying tissue

# Fluorescein Angiography



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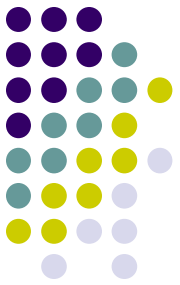
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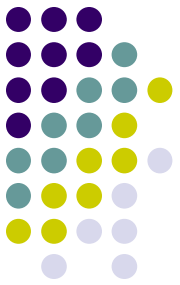
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The RPE

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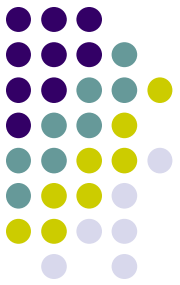
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*At what point during FA is a window defect most noticeable?*

# Fluorescein Angiography



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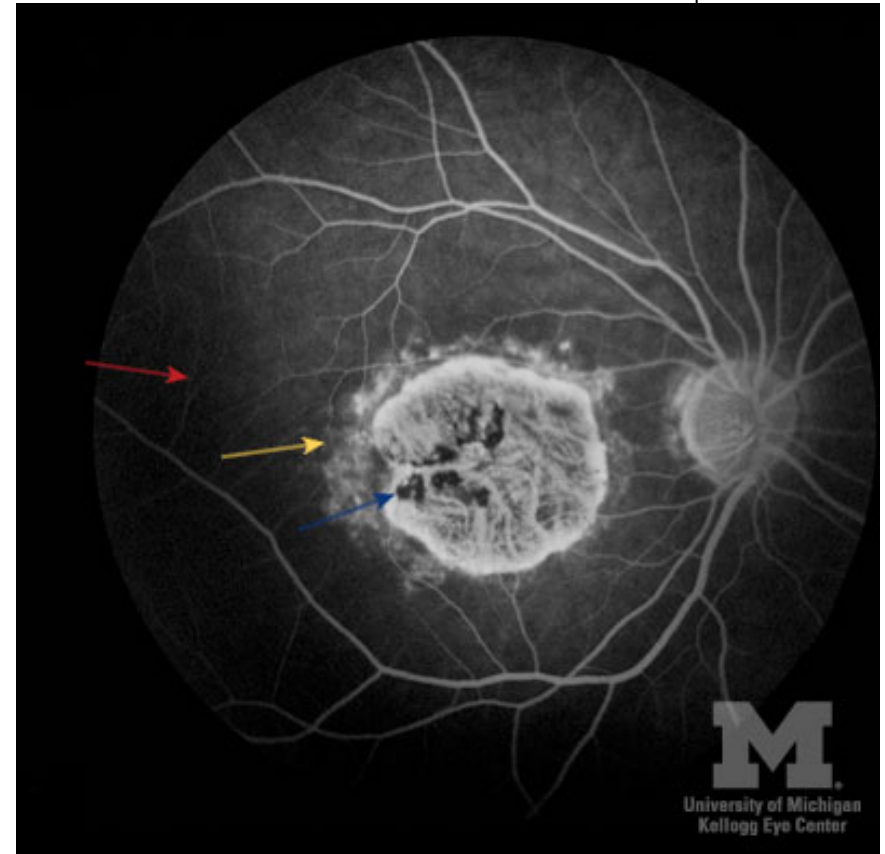
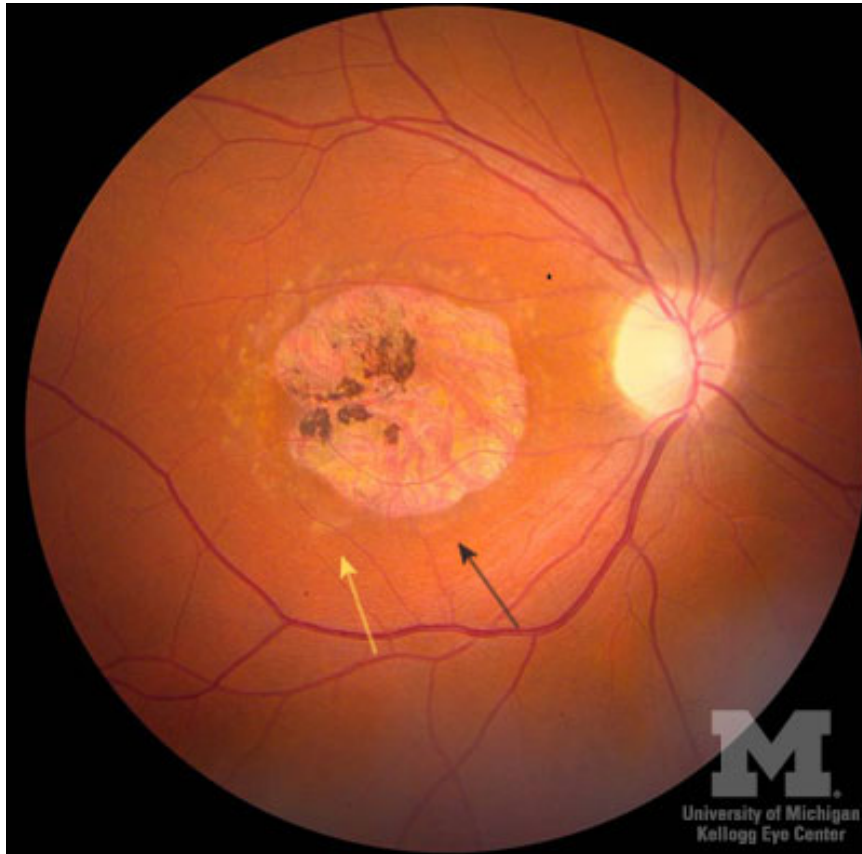
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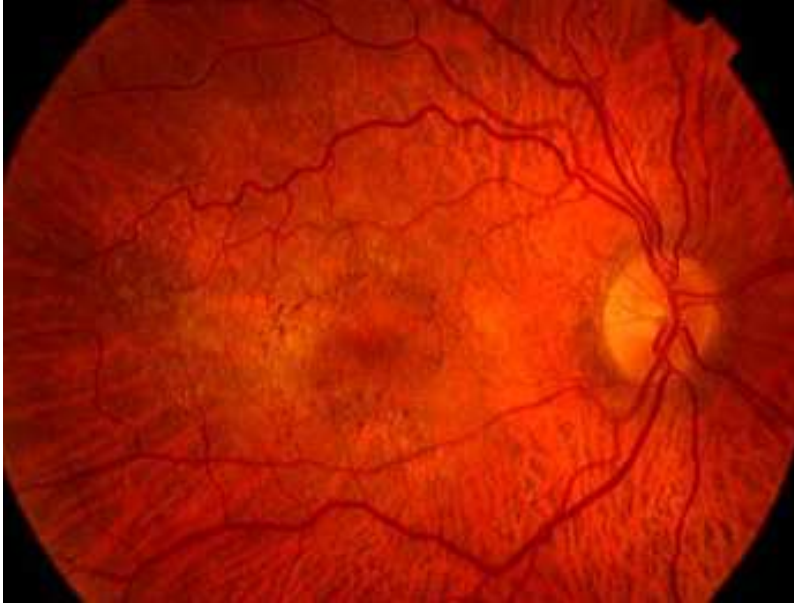
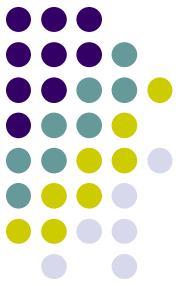
The choroidal phase

# Fluorescein Angiography

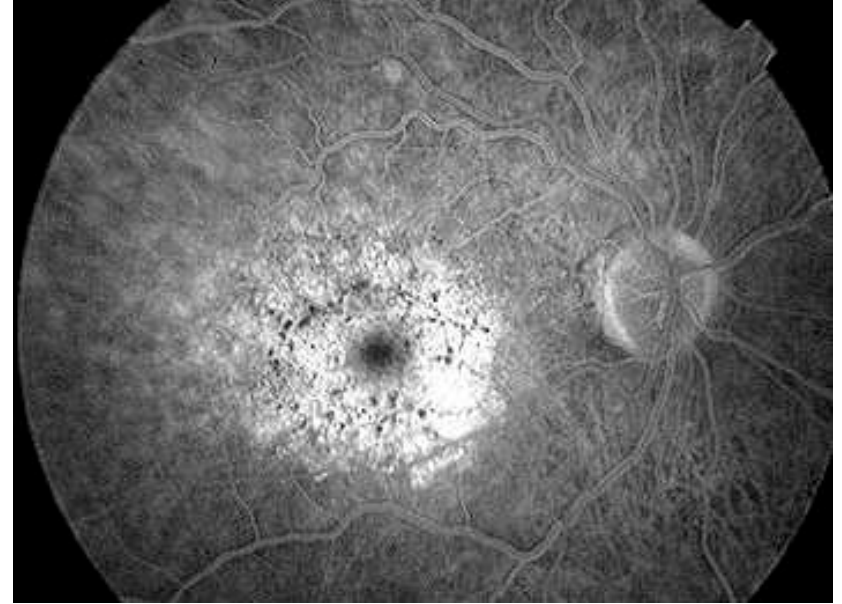


Window defect: Geographic atrophy

# Fluorescein Angiography



Dry ARMD. Note the areas of RPE atrophy

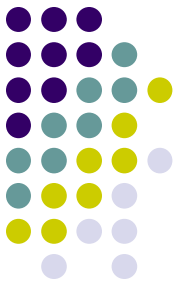


FA of same eye. Hyperfluorescence in the macula due to RPE window defect allowing choroidal fluorescein to show through

Window defect: Dry ARMD



# Fluorescein Angiography



## FA Abnormalities

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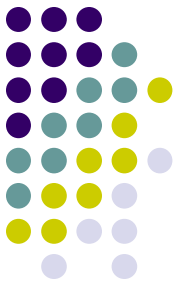
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*What is meant by the term leaking?*

# Fluorescein Angiography



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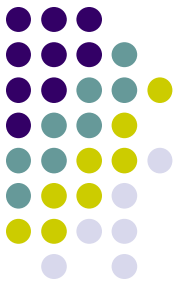
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*What is meant by the term leaking?*

The extravasation of fluorescein into the extracellular space

# Fluorescein Angiography



## FA Abnormalities

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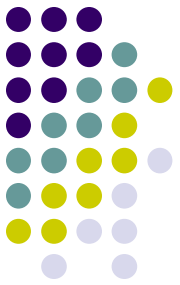
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*What is the classic description of leakage?*

# Fluorescein Angiography



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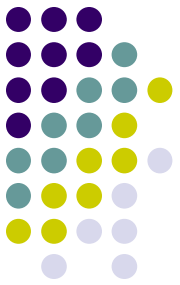
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Hyperfluorescence that 'appears early and increases in size and/or intensity with time'



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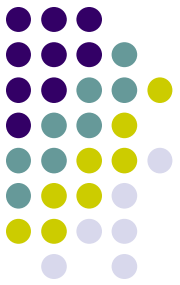
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Hyperfluorescence that 'appears early and increases in size and/or intensity with time'

*How do the margins of the hyperfluorescent area evolve over the course of the study?*



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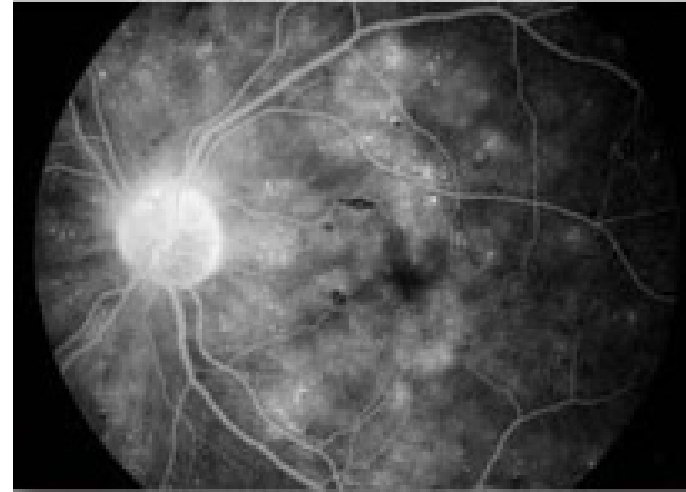
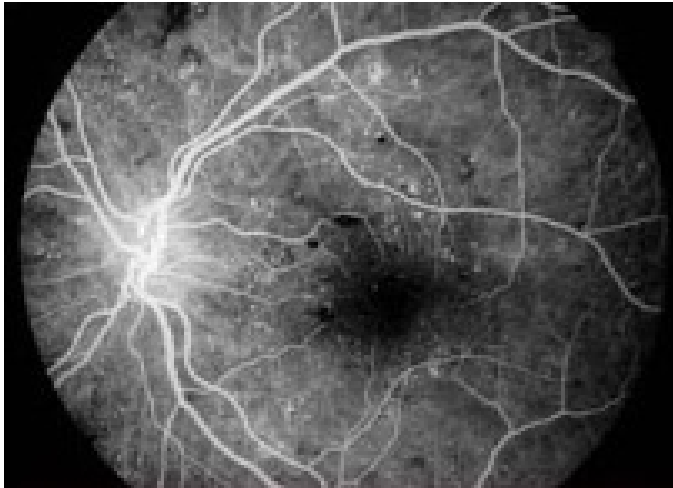
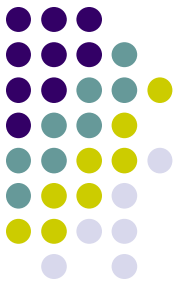
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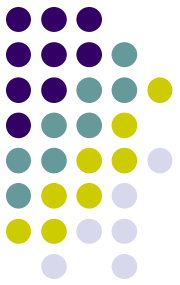
They grow larger and 'fuzzier'

# Fluorescein Angiography

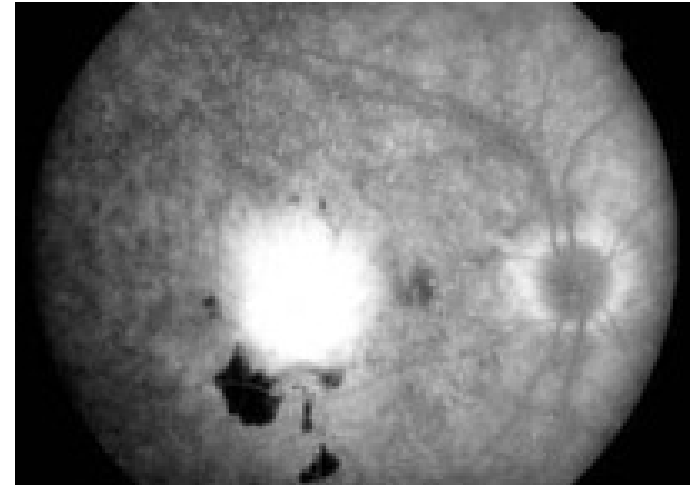
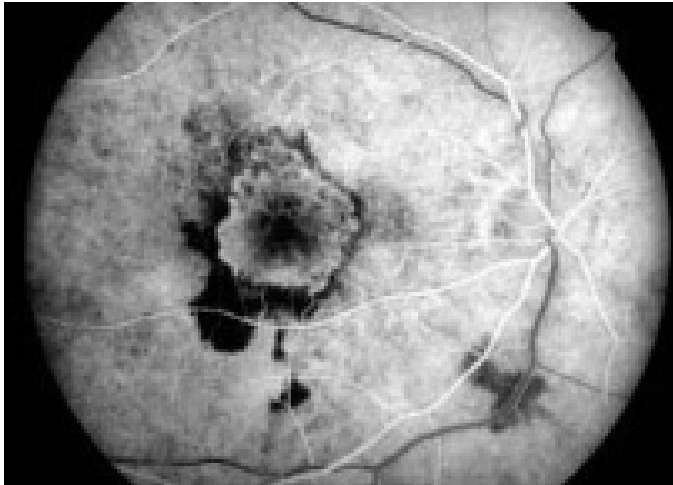


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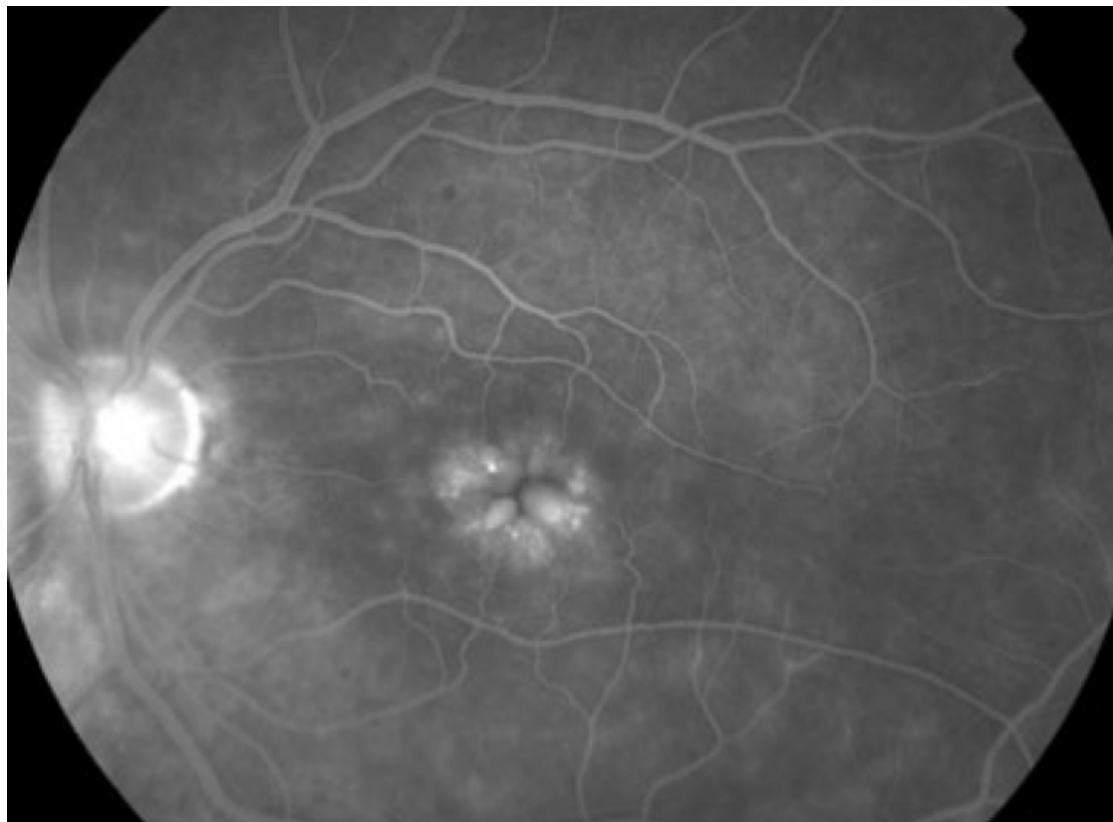


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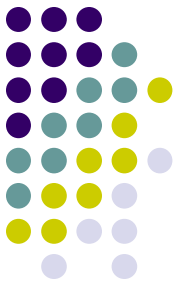


# Fluorescein Angiography



Classic 'petaloid' leakage pattern in cystoid macular edema

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

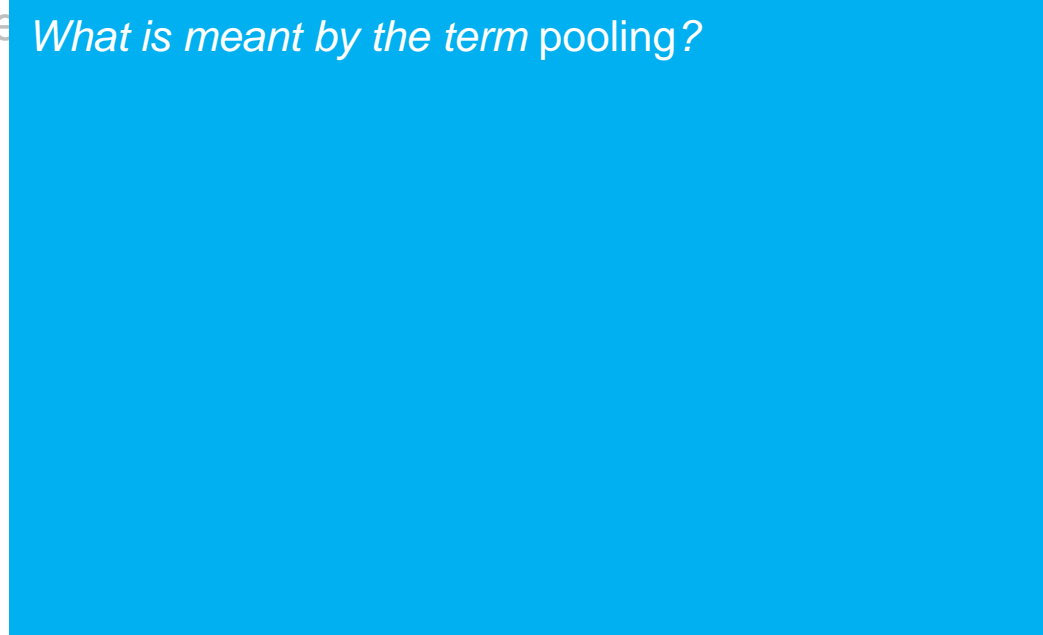
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- Leaking
- Pooling**
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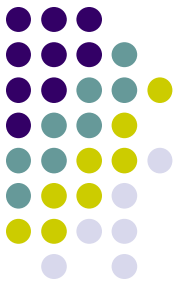
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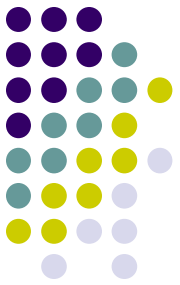
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The accumulation of extravasated fluorescein within a confined space

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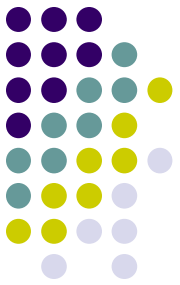
The accumulation of extravasated fluorescein within a confined space

*Where are these spaces commonly located?*

--Between the...

--Between the...

# Fluorescein Angiography



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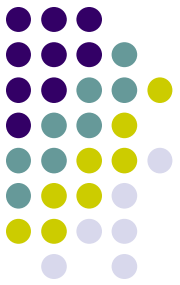
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The accumulation of extravasated fluorescein within a confined space

*Where are these spaces commonly located?*

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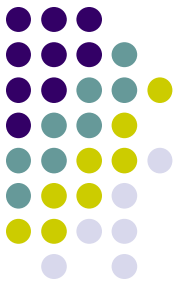
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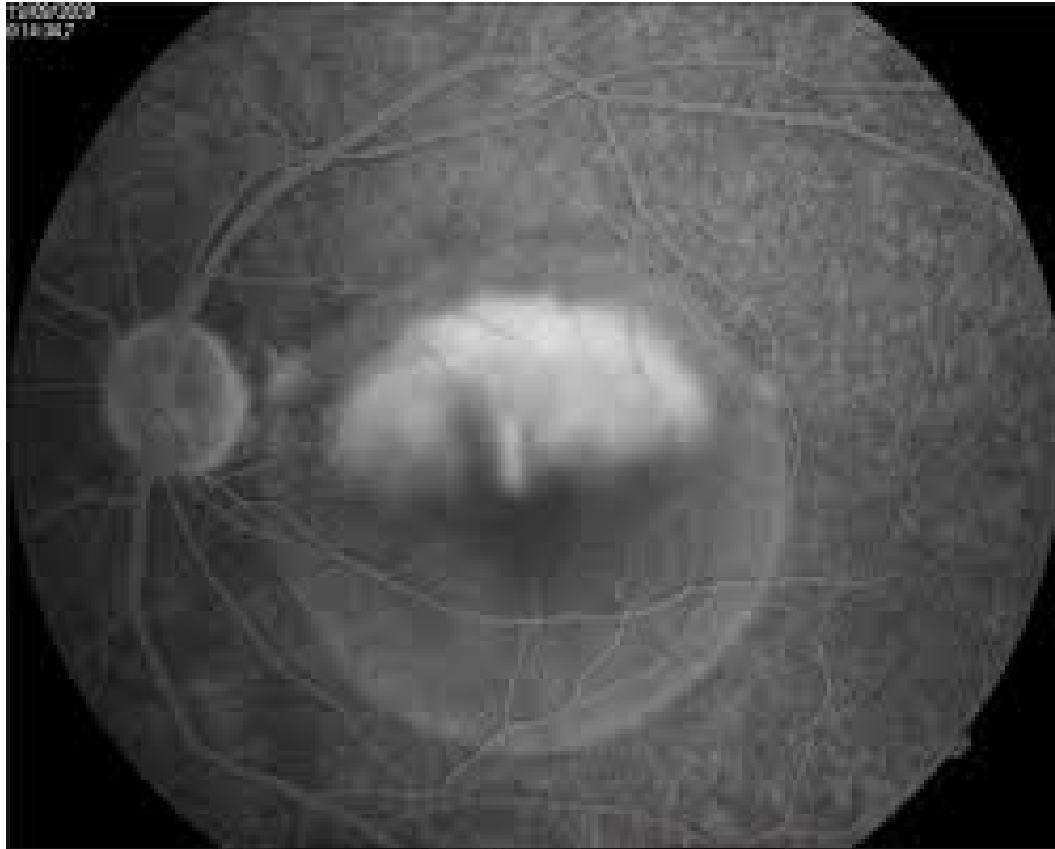
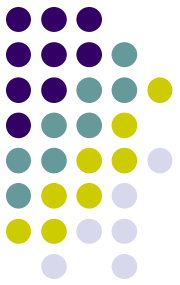
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*What condition results when fluid accumulates in this space?*  
A serous or exudative retinal detachment

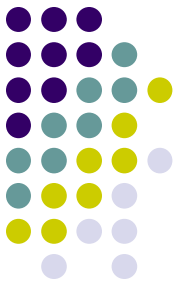
# Fluorescein Angiography



Pooling: Sub-retinal (in central serous chorioretinopathy, CSCR)



# Fluorescein Angiography



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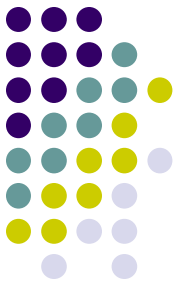
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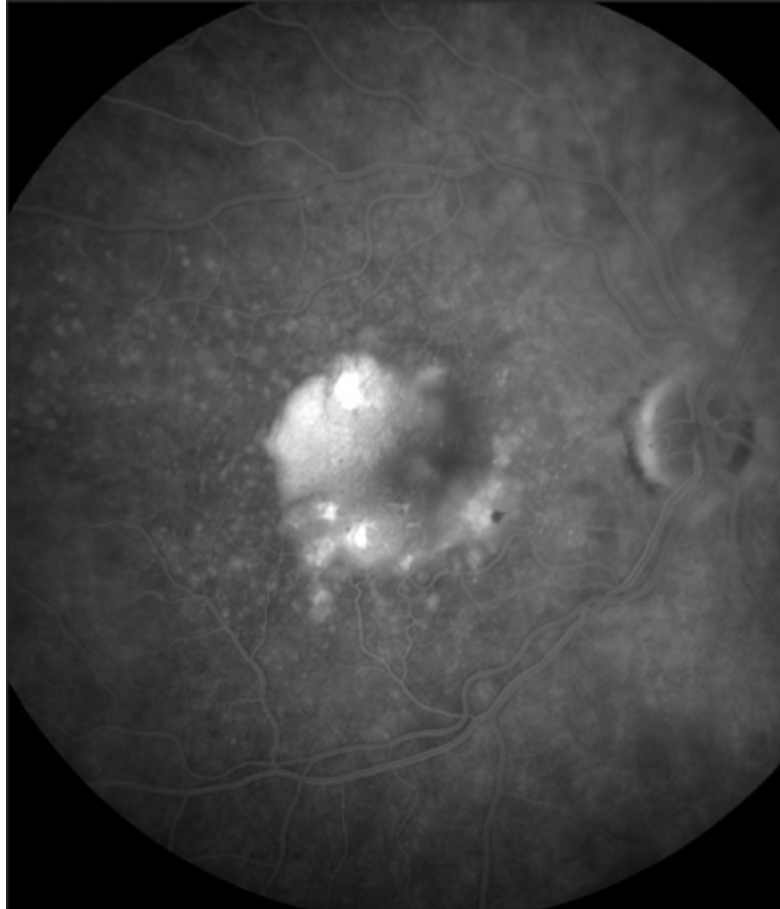
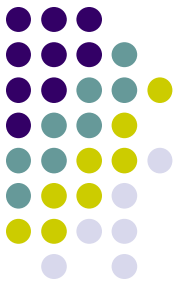
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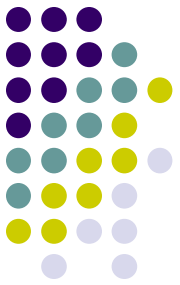
*What condition results when fluid accumulates in this space?*  
A pigment epithelium detachment (PED)

# Fluorescein Angiography



Pooling: PED (in retinal angiomatous proliferation)

# Fluorescein Angiography



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Staining

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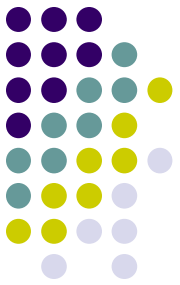
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*How do the margins of the hyperfluorescent area evolve over the course of the study?*



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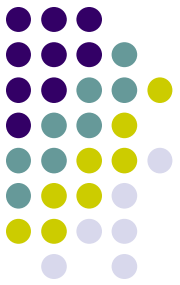
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*How do the margins of the hyperfluorescent area evolve over the course of the study?*

Once the area fills, its margins remain constant and distinct

# Fluorescein Angiography



## FA Abnormalities

Hyperfluorescence

Hypofluorescence

Autofluorescence

Window defe

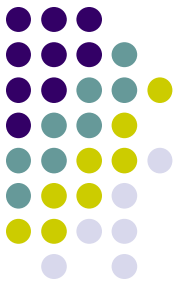
Leaking

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**Staining**

*What is meant by the term staining?*

# Fluorescein Angiography



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Autofluorescence

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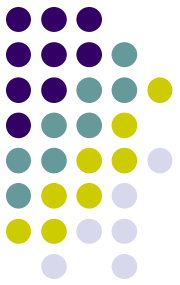
Pooling

**Staining**

### Hypofluorescence

*What is meant by the term staining?*  
The accumulation of fluorescein within tissue

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

Autofluorescence

Window defect

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**Staining**

### Hypofluorescence

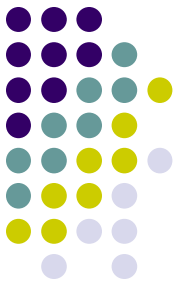
*What is meant by the term staining?*

The accumulation of fluorescein within tissue

*What component of tissue is responsible for absorbing the dye?*



# Fluorescein Angiography



## FA Abnormalities

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Autofluorescence

Window defect

Leaking

Pooling

**Staining**

### Hypofluorescence

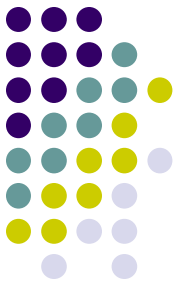
*What is meant by the term staining?*

The accumulation of fluorescein within tissue

*What component of tissue is responsible for absorbing the dye?*

Collagen

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

Autofluorescence

Window defect

Leaking

Pooling

**Staining**

### Hypofluorescence

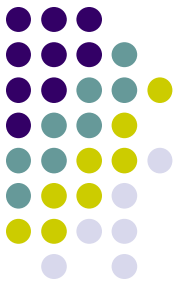
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*How does staining present on FA?*

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

Autofluorescence

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Pooling

**Staining**

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*What is meant by the term staining?*

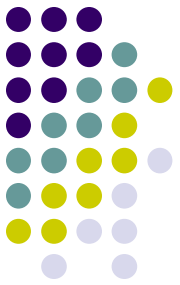
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*What component of tissue is responsible for absorbing the dye?*  
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*How does staining present on FA?*

As the gradual appearance of mild hyperfluorescence

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

Autofluorescence

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**Staining**

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*What is meant by the term staining?*

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*What structures stain?*

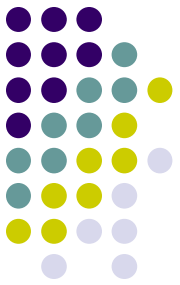
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# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

Autofluorescence

Window defect

Leaking

Pooling

**Staining**

### Hypofluorescence

*What is meant by the term staining?*

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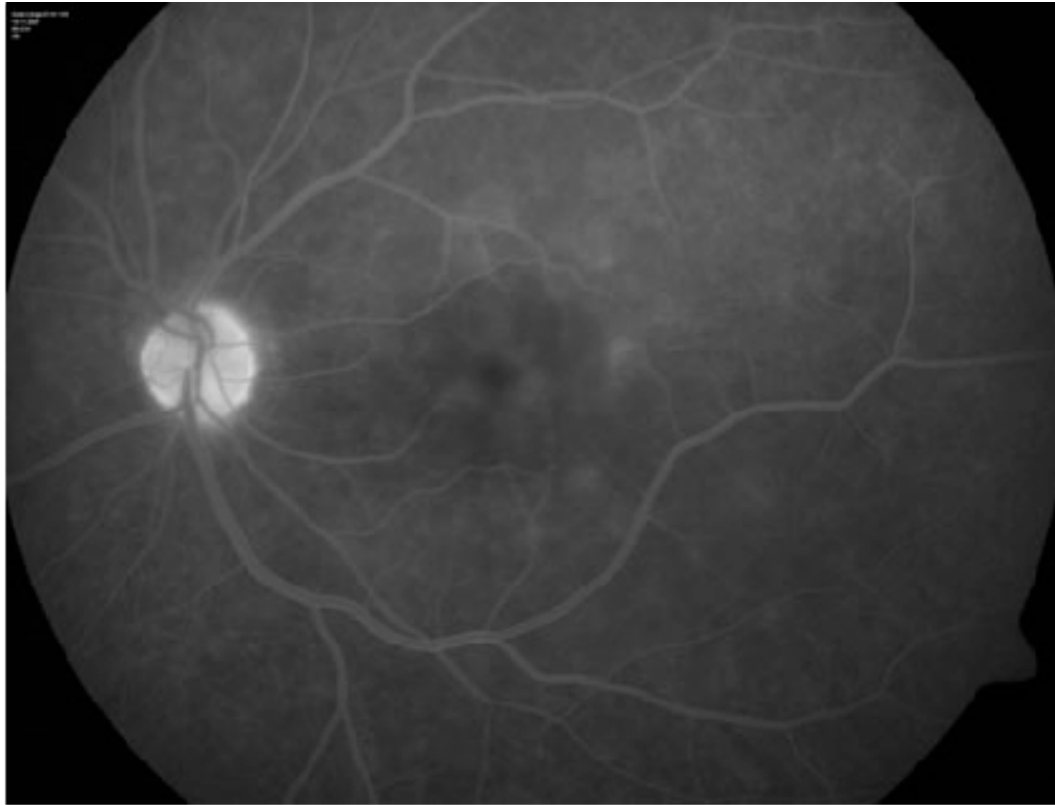
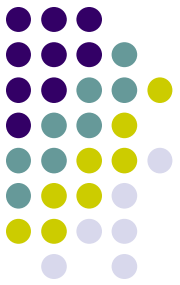
--The optic nerve

--Sclera

--Chorioretinal scars

--Large drusen

# Fluorescein Angiography



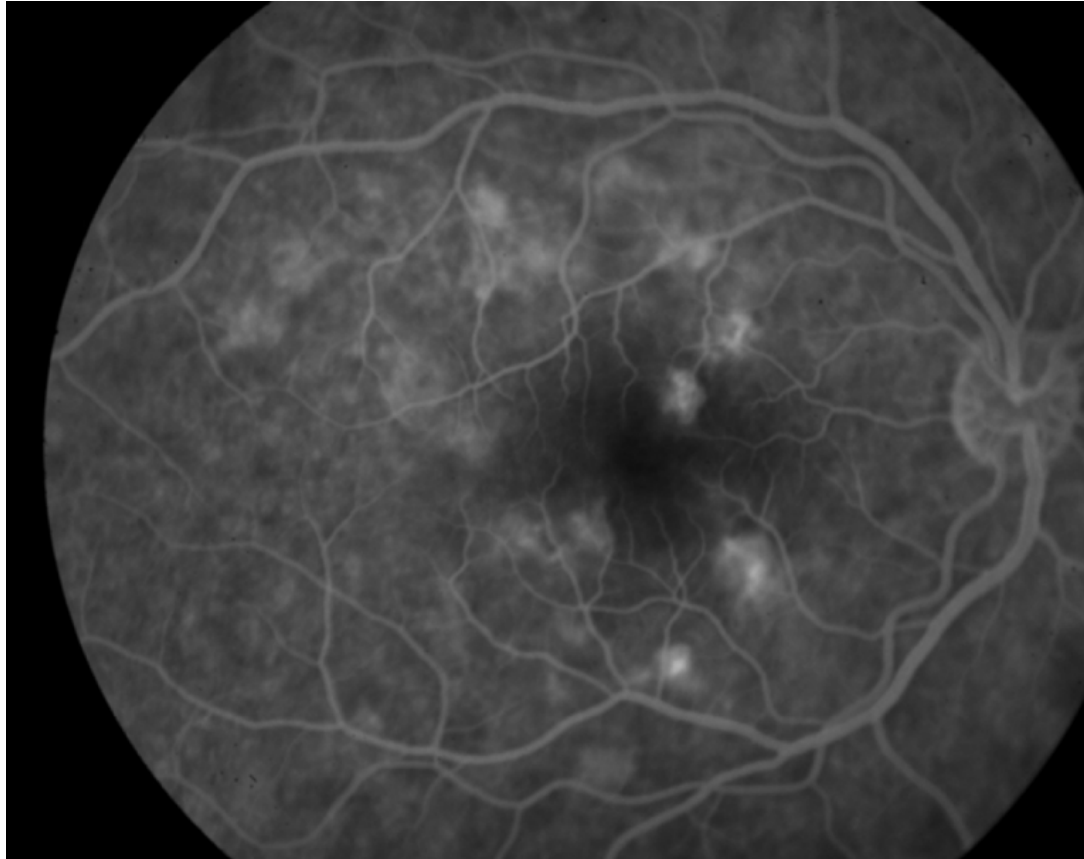
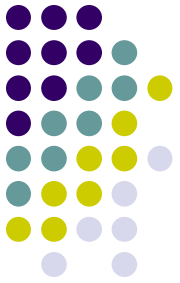
Staining: ONH

# Fluorescein Angiography



Staining: Scar

# Fluorescein Angiography

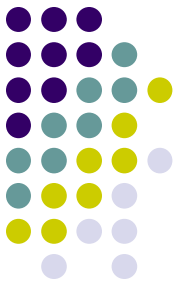


*A classic example of staining:* Late staining in acute posterior multifocal placoid pigment epitheliopathy (APMPPE)

Staining



# Fluorescein Angiography



## FA Abnormalities

Hyperfluorescence

*What is meant by the term blocking?*

Hypofluorescence

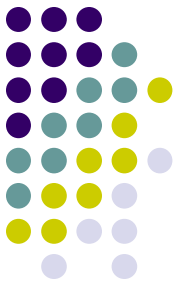
**Blocking**

Filling defect

Filling

Staining

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

*What is meant by the term blocking?*  
The obscuration of normal brightness by an overlying material

Filling

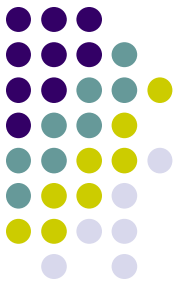
Staining

### Hypofluorescence

**Blocking**

Filling defect

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

*What is meant by the term blocking?*  
The obscuration of normal brightness by an overlying material

*What are some common causes?*

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Pooling

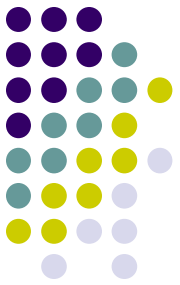
Staining

### Hypofluorescence

**Blocking**

Filling defect

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

*What is meant by the term blocking?*  
The obscuration of normal brightness by an overlying material

*What are some common causes?*

- Heme
- Scar tissue
- Hyperpigmentation

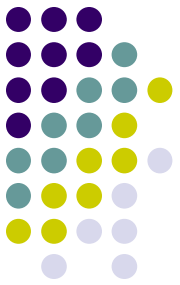
Staining

### Hypofluorescence

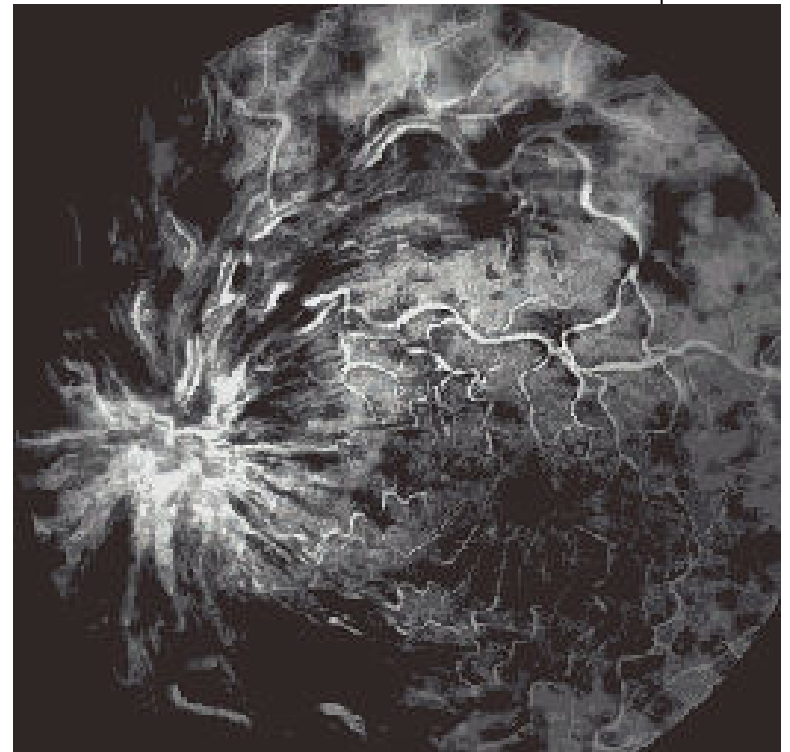
**Blocking**

Filling defect

# Fluorescein Angiography



CRVO



FA, same eye. Note how the blood blocks underlying fluorescence

Blockage

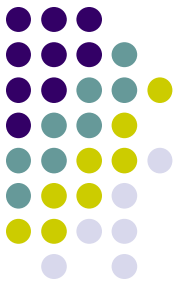
# Fluorescein Angiography



Blocking of choroidal hyperfluorescence  
from subretinal blood

Blockage

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

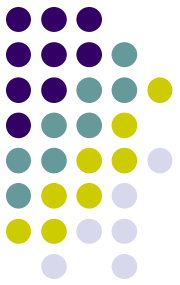
### Hypofluorescence

Blocking

**Filling defect**

*What is meant by a filling defect?*

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

### Hypofluorescence

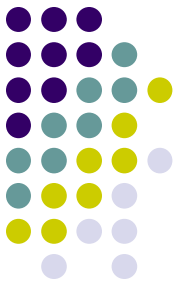
Blocking

**Filling defect**

*What is meant by a filling defect?*  
Absent fluorescence secondary to reduced perfusion



# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

### Hypofluorescence

Blocking

**Filling defect**

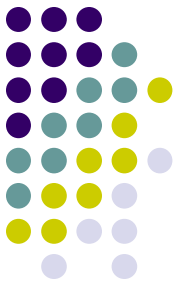
*What is meant by a filling defect?*

Absent fluorescence secondary to reduced perfusion

*Which structures can be involved?*

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# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

### Hypofluorescence

Blocking

**Filling defect**

*What is meant by a filling defect?*

Absent fluorescence secondary to reduced perfusion

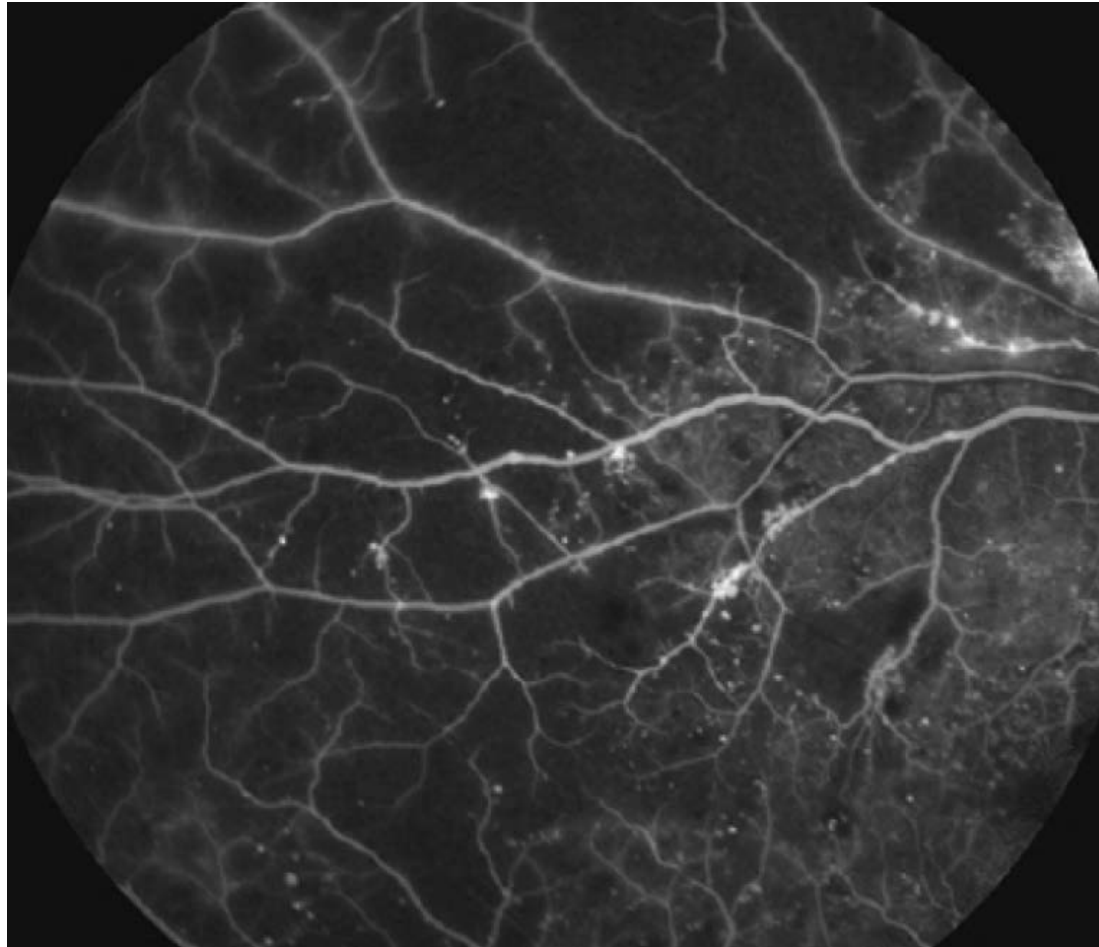
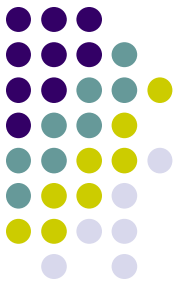
*Which structures can be involved?*

--Choroid

--Retina

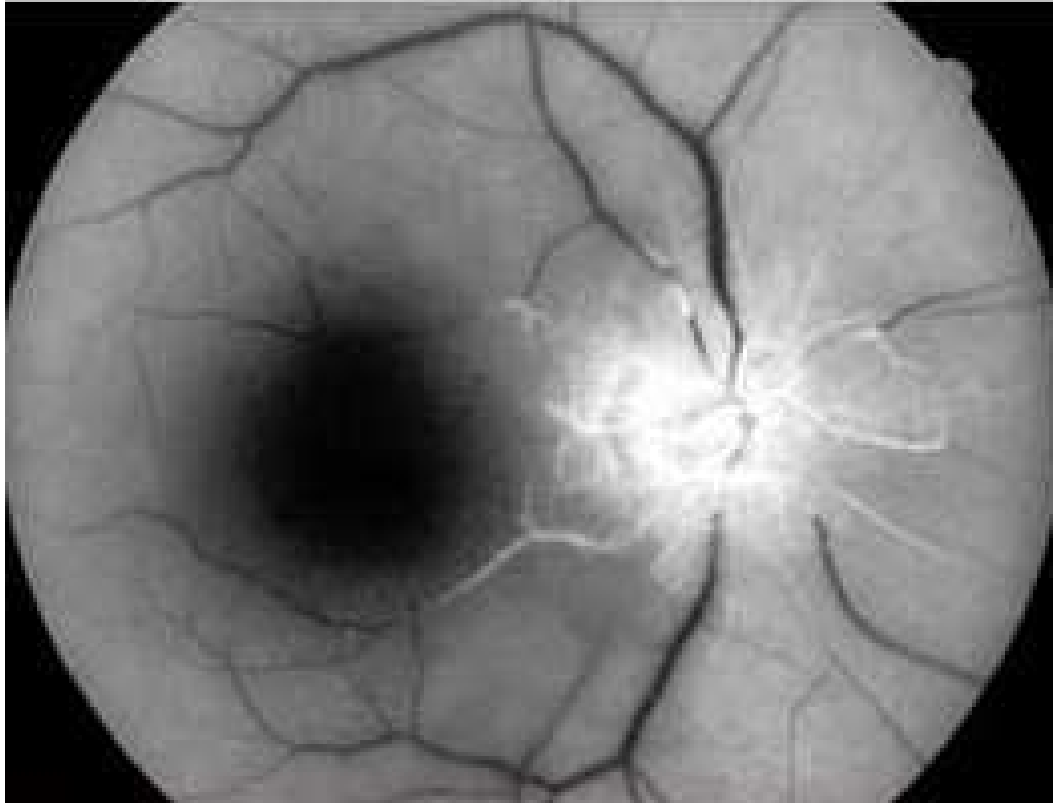
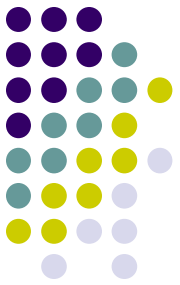
--Optic nerve head

# Fluorescein Angiography



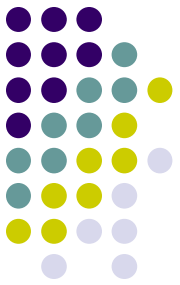
Filling defect: Capillary dropout in DBR

# Fluorescein Angiography



Central retinal artery occlusion with  
non-perfusion of the retinal vasculature

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

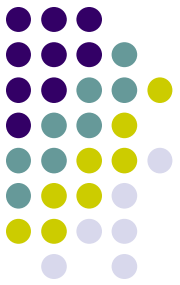
### Hypofluorescence

**Blocking**

**Filling defect**

*What's the easiest way to determine if hypofluorescence is due to blocking vs a filling defect?*

# Fluorescein Angiography



## FA Abnormalities

### Hyperfluorescence

- Autofluorescence
- Window defect
- Leaking
- Pooling
- Staining

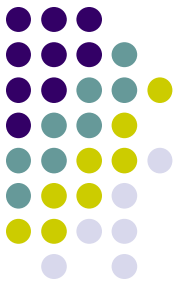
### Hypofluorescence

**Blocking**

**Filling defect**

*What's the easiest way to determine if hypofluorescence is due to blocking vs a filling defect?*  
Compare the FA with a color (or red-free) photo. If it's blocking, the responsible material should be apparent.

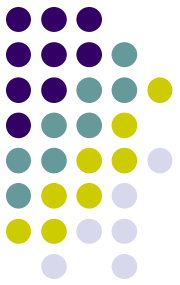
# Fluorescein Angiography



- FA: Side effects

- Yellowing of skin for  , urine for

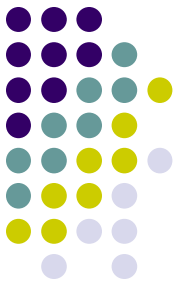
# Fluorescein Angiography



- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36



# Fluorescein Angiography

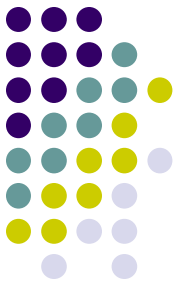


- FA: Side effects

- **Yellowing of skin** for **6-12 hours**, urine for **24-36**

*What percentage of FA pts will manifest yellowing of skin and urine?*

# Fluorescein Angiography

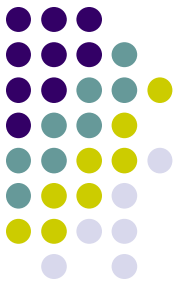


- FA: Side effects

- **Yellowing of skin** for **6-12 hours**, urine for **24-36**

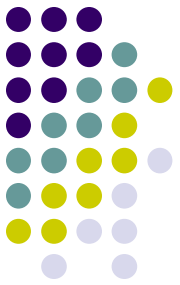
*What percentage of FA pts will manifest yellowing of skin and urine?*  
All of them. These are universal.

# Fluorescein Angiography



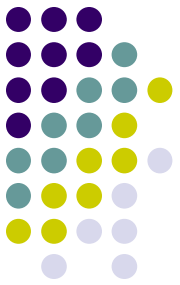
- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in %

# Fluorescein Angiography

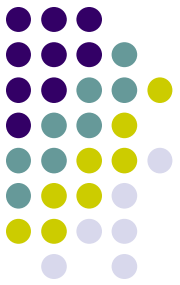


- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%

# Fluorescein Angiography

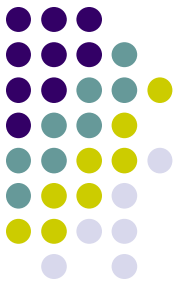


- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in %

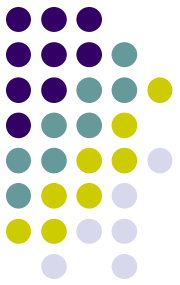


- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%

# Fluorescein Angiography

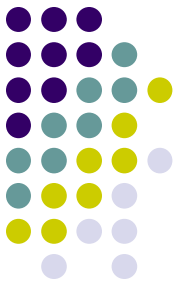


- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%
  - Anaphylaxis rate: 1 in big number

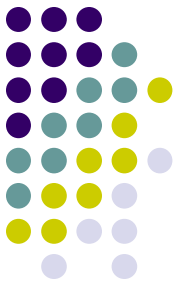


- **FA:** Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%
  - Anaphylaxis rate: 1 in 100,000

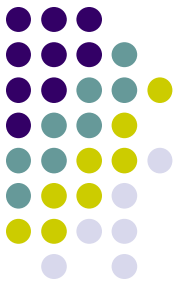




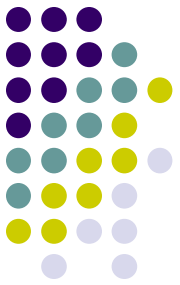
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  - Rash in 5%
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  - Death rate: 1 in  bigger number



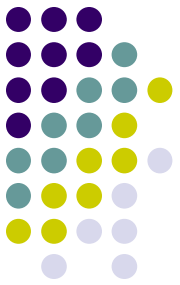
- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%
  - Anaphylaxis rate: 1 in 100,000
  - Death rate: 1 in 225,000



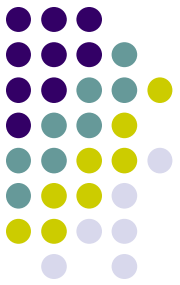
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  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
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  - Anaphylaxis rate: 1 in 100,000
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- Is fluorescein...
  - ...cross-reactive with iodine/shellfish allergy?



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  - Rash in 5%
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  - Death rate: 1 in 225,000
- Is fluorescein...
  - ...cross-reactive with iodine/shellfish allergy? No



- **FA:** Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%
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  - Death rate: 1 in 225,000
- Is fluorescein...
  - ...cross-reactive with iodine/shellfish allergy? No
  - ...teratogenic?



- FA: Side effects
  - Yellowing of skin for 6-12 hours, urine for 24-36
  - Nausea/vomiting in 5%
  - Rash in 5%
  - Anaphylaxis rate: 1 in 100,000
  - Death rate: 1 in 225,000
- Is fluorescein...
  - ...cross-reactive with iodine/shellfish allergy? No
  - ...teratogenic? No (but avoid in pregnancy anyway)