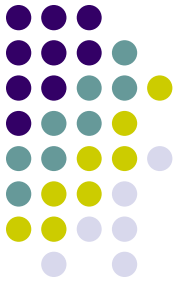
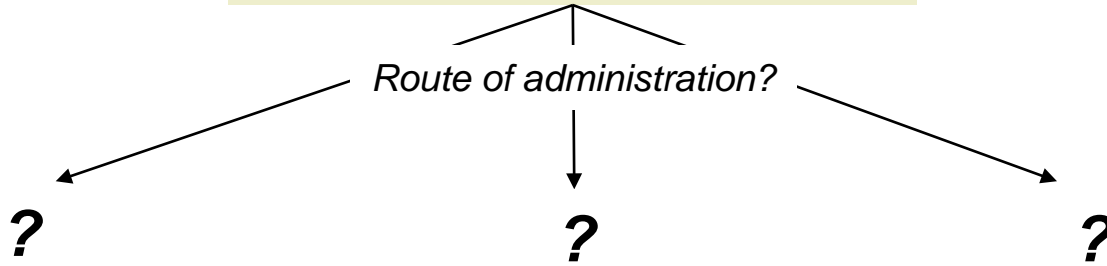


# Drug-Induced Uveitis



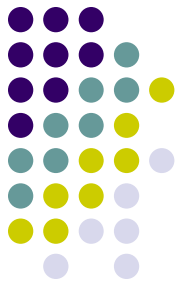
# Drug-Induced Uveitis

*Route of administration?*

Systemic

Topical

Intravitreal



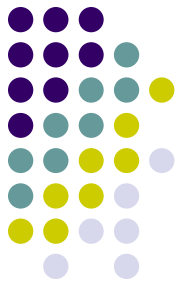
# Drug-Induced Uveitis

Systemic

Topical

Intravitreal

? An abx, it is the most notorious cause of all--if you only remember one, make it this one!



# Drug-Induced Uveitis

Systemic

Rifabutin

Topical

Intravitreal



# Drug-Induced Uveitis

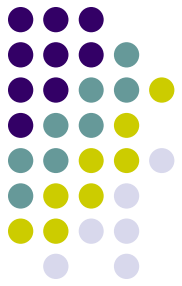
Systemic

Rifabutin

? On second thought, remember this one too. An antiviral.

Topical

Intravitreal



# Drug-Induced Uveitis

Systemic

Rifabutin

Cidofovir

Topical

Intravitreal



# Drug-Induced Uveitis

## Systemic

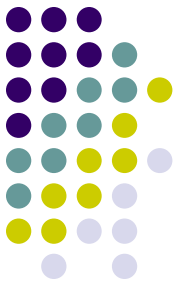
Rifabutin

Cidofovir

? A commonly Rx'd class (most are antibiotics)

## Topical

## Intravitreal



# Drug-Induced Uveitis

Systemic

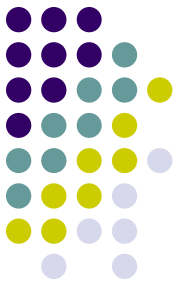
Rifabutin

Cidofovir

Sulfonamides

Topical

Intravitreal





# Drug-Induced Uveitis

## Systemic

Rifabutin

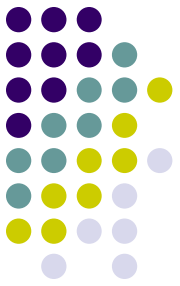
Cidofovir

Sulfonamides

? *A class of drugs used most often in elderly women*

## Topical

## Intravitreal



# Drug-Induced Uveitis

## Systemic

Rifabutin

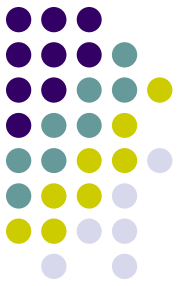
Cidofovir

Sulfonamides

Bisphosphonates

## Topical

## Intravitreal



# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

? *A commonly prescribed class, mainly to women of childbearing age*

## Topical

## Intravitreal

# Drug-Induced Uveitis

## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

## Topical

## Intravitreal



# Drug-Induced Uveitis

## Systemic

Rifabutin

Cidofovir

Sulfonamides

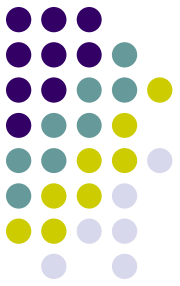
Bisphosphonates

OCPs

? Paradoxically, a class of drugs used to **treat** inflammation

## Topical

## Intravitreal



# Drug-Induced Uveitis

## Systemic

Rifabutin

Cidofovir

Sulfonamides

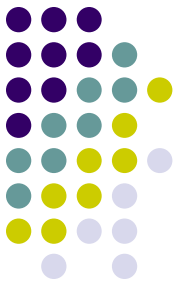
Bisphosphonates

OCPs

anti-TNF agents

## Topical

## Intravitreal



# Drug-Induced Uveitis

## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- ? *An antilarial*

## Topical

## Intravitreal



# Drug-Induced Uveitis

## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

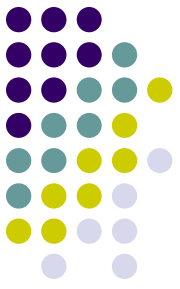
## Topical

## Intravitreal





# Drug-Induced Uveitis



## Systemic

- **Rifabutin**
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

*What is rifabutin used to treat?*

# Drug-Induced Uveitis

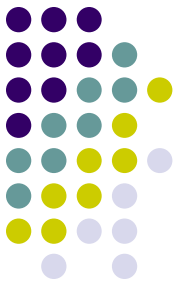


## Systemic

- **Rifabutin**
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

*What is rifabutin used to treat?*  
*Mycobacterium avium* complex infections in AIDS pts

# Drug-Induced Uveitis



## Systemic

— **Rifabutin**

— Cidofovir

— Sulfonamides

— Bisphosphonates

— OCPs

— anti-TNF agents

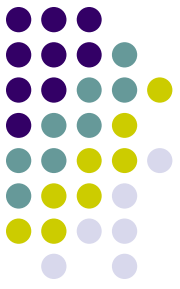
— Diethylcarbamazine

*What is rifabutin used to treat?*

*Mycobacterium avium complex infections in AIDS pts*

*How long after initiation of treatment does the uveitis typically occur?*

# Drug-Induced Uveitis



## Systemic

- **Rifabutin**
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

*What is rifabutin used to treat?*

*Mycobacterium avium complex infections in AIDS pts*

*How long after initiation of treatment does the uveitis typically occur?*

*Weeks to months*

# Drug-Induced Uveitis



## Systemic

— **Rifabutin**

— Cidofovir

— Sulfonamides

— Bisphosphonates

— OCPs

— anti-TNF agents

— Diethylcarbamazine

*What is rifabutin used to treat?*

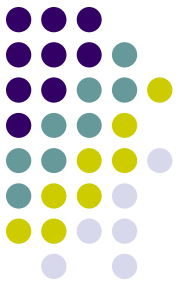
*Mycobacterium avium complex infections in AIDS pts*

*How long after initiation of treatment does the uveitis typically occur?*

*Weeks to months*

*Is it associated with a hypopyon?*

# Drug-Induced Uveitis



## Systemic

— **Rifabutin**

— Cidofovir

— Sulfonamides

— Bisphosphonates

— OCPs

— anti-TNF agents

— Diethylcarbamazine

*What is rifabutin used to treat?*

*Mycobacterium avium complex infections in AIDS pts*

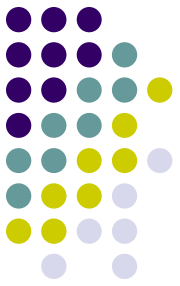
*How long after initiation of treatment does the uveitis typically occur?*

*Weeks to months*

*Is it associated with a hypopyon?*

*Yes! Always ask about rifabutin use when evaluating hypopyon uveitis.*

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

**Cidofovir**

Sulfonamides

Bisphosphonates

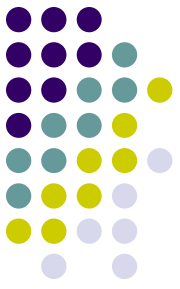
OCPs

anti-TNF agents

Diethylcarbamazine

(Because of its potential **bad side effect**, cidofovir is rarely given systemically anymore. For this reason, we will cover it with the Intravitreals)

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

— Rifabutin

— **Cidofovir**

— Sulfonamides

— Bisphosphonates

— OCPs

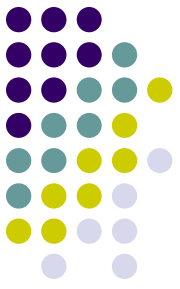
— anti-TNF agents

— Diethylcarbamazine

(Because of its potential nephrotoxicity, cidofovir is rarely given systemically anymore. For this reason, we will cover it with the Intravitreals)



# Drug-Induced Uveitis



## Systemic

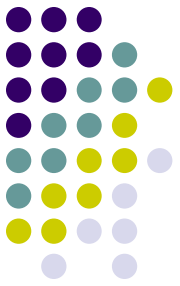
- Rifabutin
- Cidofovir
- **Sulfonamides**
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazepine

## Topical

*What conditions are sulfonamides used to tx?*

## Intravitreal

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- **Sulfonamides**
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazepine

## Topical

## Intravitreal

*What conditions are sulfonamides used to tx?*

Most are antimicrobials. They are commonly used to treat bacterial UTIs, but have efficacy against toxoplasmosis, pneumocystis and other bugs. Some have been found to be effective anti-seizure meds. At least one is a diuretic.

# Drug-Induced Uveitis



## Systemic

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- Cidofovir
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*Which sulfonamide is the most infamous for its ability to induce significant ophthalmic side effects?*

# Drug-Induced Uveitis



## Systemic

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Trimethoprim-sulfamethoxazole

# Drug-Induced Uveitis



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- Rifabutin
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## Topical

## Intravitreal

*What conditions are sulfonamides used to tx?*

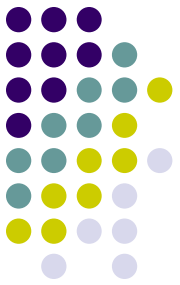
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Trimethoprim-sulfamethoxazole

*What is the name for the syndrome of these significant side effects?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- **Sulfonamides**
- Bisphosphonates
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- Diethylcarbamazepine

## Topical

## Intravitreal

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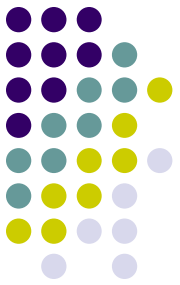
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Stevens-Johnson syndrome (SJS)

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

**Sulfonamides**

Bisphosphonates

OC

anti-TNF agents

Diethylcarbamazine

*What conditions are sulfonamides used to tx?*

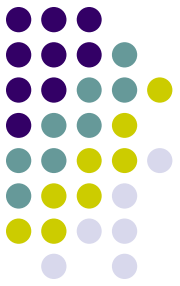
Most are antimicrobials. They are commonly used to treat bacterial UTIs, but have efficacy against toxoplasmosis, pneumocystis and other bugs. Some have been found to be effective anti-seizure meds. At least one is a diuretic.

*SJS is also known as...*

*What is the name for the syndrome of these significant side effects?*

**Stevens-Johnson syndrome (SJS)**

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

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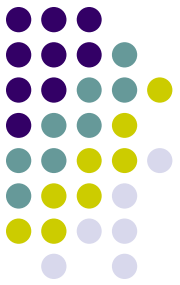
**SJS is also known as...erythema multiforme major**

*What is the name for the syndrome of these significant side effects?*

**Stevens-Johnson syndrome (SJS)**



# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

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Bisphosphonates

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Diethylcarbamazine

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*Severe cases may meet the definition of...*

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# Drug-Induced Uveitis



## Systemic

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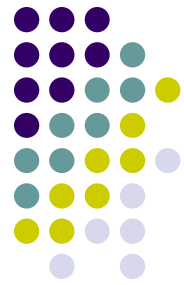
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**Severe cases may meet the definition of...toxic epidermal necrolysis (TEN)**

*What is the name for the syndrome of these significant side effects?*

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# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

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*What is the name for the syndrome of these significant side effects?*

**Stevens-Johnson syndrome (SJS)**

*Three other drugs/drug classes are most commonly implicated. What are they?*

--

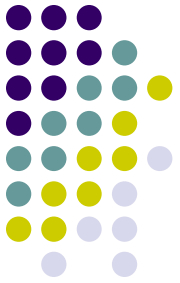
*Mnemonic forthcoming...*

--

--**Sulfonamides**

--

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

**Sulfonamides**

Bisphosphonates

OC

anti-TNF agents

Diethylcarbamazine

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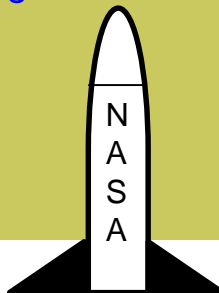
*What are they?*

--N

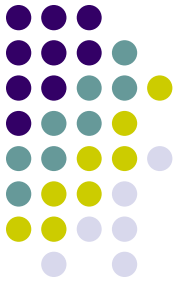
--A

--Sulfonamides

--A



# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

**Sulfonamides**

Bisphosphonates

OC

anti-TNF agents

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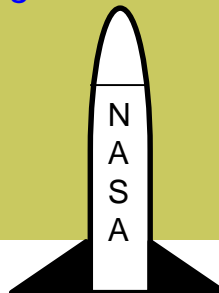
*What are they?*

--NSAIDs

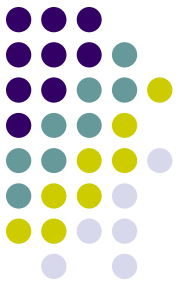
--Anticonvulsants

--Sulfonamides

--Allopurinol



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- **Bisphosphonates**
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

## Intravitreal

*What are bisphosphonates used to treat?*

# Drug-Induced Uveitis



## Systemic

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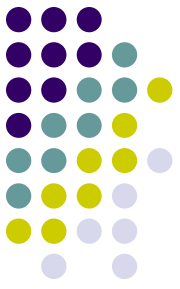
## Topical

## Intravitreal

*What are bisphosphonates used to treat?*

The most common indication is  prevention. They are used also to treat  associated with various conditions.

# Drug-Induced Uveitis



## Systemic

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- Cidofovir
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- **Bisphosphonates**
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## Topical

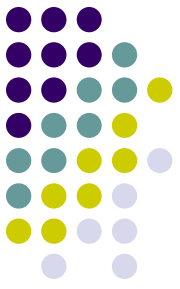
## Intravitreal

*What are bisphosphonates used to treat?*

The most common indication is osteoporosis prevention. They are used also to treat hypercalcemia associated with various conditions.



# Drug-Induced Uveitis



## Systemic

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- Cidofovir
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## Topical

## Intravitreal

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*Which bisphosphonate is most strongly associated with uveitis?*

# Drug-Induced Uveitis



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## Topical

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IV pamidronate

# Drug-Induced Uveitis



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## Topical

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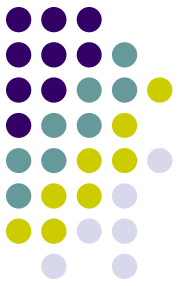
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*Is it associated with development of a hypopyon?*

# Drug-Induced Uveitis



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- Cidofovir
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- **Bisphosphonates**
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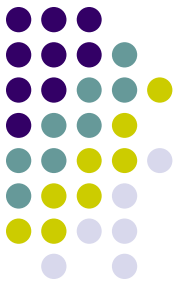
*Which bisphosphonate is most strongly associated with uveitis?*

IV pamidronate

*Is it associated with development of a hypopyon?*

No. But it is associated with , , or

# Drug-Induced Uveitis



## Systemic

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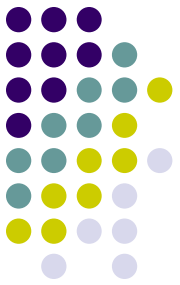
*Which bisphosphonate is most strongly associated with uveitis?*

IV pamidronate

*Is it associated with development of a hypopyon?*

No. But it is associated with conjunctivitis, episcleritis or scleritis

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- **Bisphosphonates**
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

## Intravitreal

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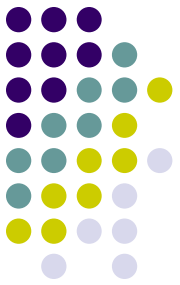
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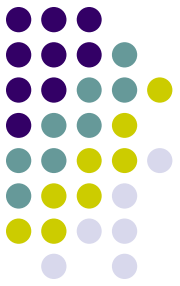
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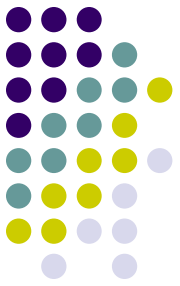
*Is bisphosphonate anterior uveitis typically unilateral, or bilateral?*

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# Drug-Induced Uveitis



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Bilateral

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**Unilateral**

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- **anti-TNF agents**
- Diethylcarbamazine

## Topical

## Intravitreal

*What are the anti-TNF agents used to treat?*

# Drug-Induced Uveitis



## Systemic

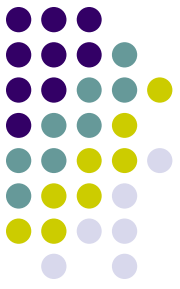
- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- **anti-TNF agents**
- Diethylcarbamazine

## Topical

## Intravitreal

*What are the anti-TNF agents used to treat?*  
Autoimmune conditions

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- **anti-TNF agents**
- Diethylcarbamazine

## Topical

## Intravitreal

*What are the anti-TNF agents used to treat?  
Autoimmune conditions*

*Are they used to treat ocular inflammatory disease?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
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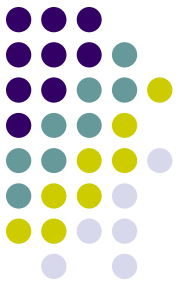
## Topical

## Intravitreal

*What are the anti-TNF agents used to treat?*  
Autoimmune conditions

*Are they used to treat ocular inflammatory disease?*  
In select cases, yes

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

**anti-TNF agents**

Diethylcarbamazine

*What are the anti-TNF agents used to treat?  
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*Are they used to treat ocular inflammatory disease?  
In select cases, yes*

*Which anti-TNF agent has been singled out as particularly likely to  
cause uveitis?*

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

**anti-TNF agents**

Diethylcarbamazine

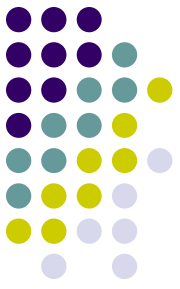
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*Etanercept (brand name: )*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
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## Topical

## Intravitreal

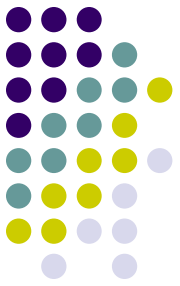
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Etanercept (brand name: Enbrel )*



# Drug-Induced Uveitis



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## Topical

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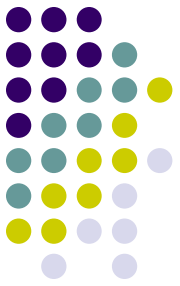
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*Weirdly, the anti-TNF agents have been biopsy-proven to induce a common systemic inflammatory condition. What is it?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- **anti-TNF agents**
- Diethylcarbamazine

## Topical

## Intravitreal

*What are the anti-TNF agents used to treat?*  
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*Are they used to treat ocular inflammatory disease?*  
In select cases, yes

*Which anti-TNF agent has been singled out as particularly likely to cause uveitis?*  
Etanercept (brand name: Enbrel )

*Weirdly, the anti-TNF agents have been biopsy-proven to induce a common systemic inflammatory condition. What is it?*  
Sarcoidosis

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

**anti-TNF agents**

Diethylcarbamazine

*What are the anti-TNF agents used to treat?  
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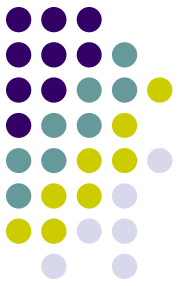
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*Can they induce **ocular** sarcoidosis?*

# Drug-Induced Uveitis



## Systemic

## Topical

## Intravitreal

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Cidofovir

Sulfonamides

Bisphosphonates

OCPs

**anti-TNF agents**

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# Drug-Induced Uveitis



## Systemic

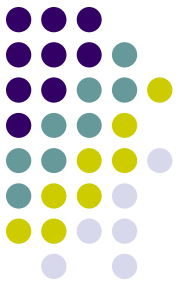
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- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
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## Topical

## Intravitreal

*What does it mean to say a med is 'antifilarial'?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- **Diethylcarbamazine**

## Topical

## Intravitreal

*What does it mean to say a med is 'antifilarial'?*  
It means the med is an effective antihelminthic

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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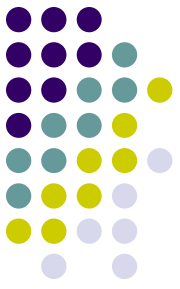
## Topical

## Intravitreal

*What does it mean to say a med is 'antifilarial'?*  
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*Is it available in the US?*

# Drug-Induced Uveitis



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## Topical

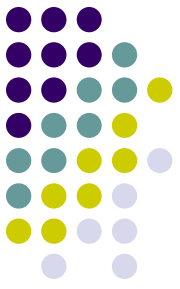
## Intravitreal

*What does it mean to say a med is 'antifilarial'?*  
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*Is it available in the US?*  
Not commercially (it can be requested from the CDC)



# Drug-Induced Uveitis



## Systemic

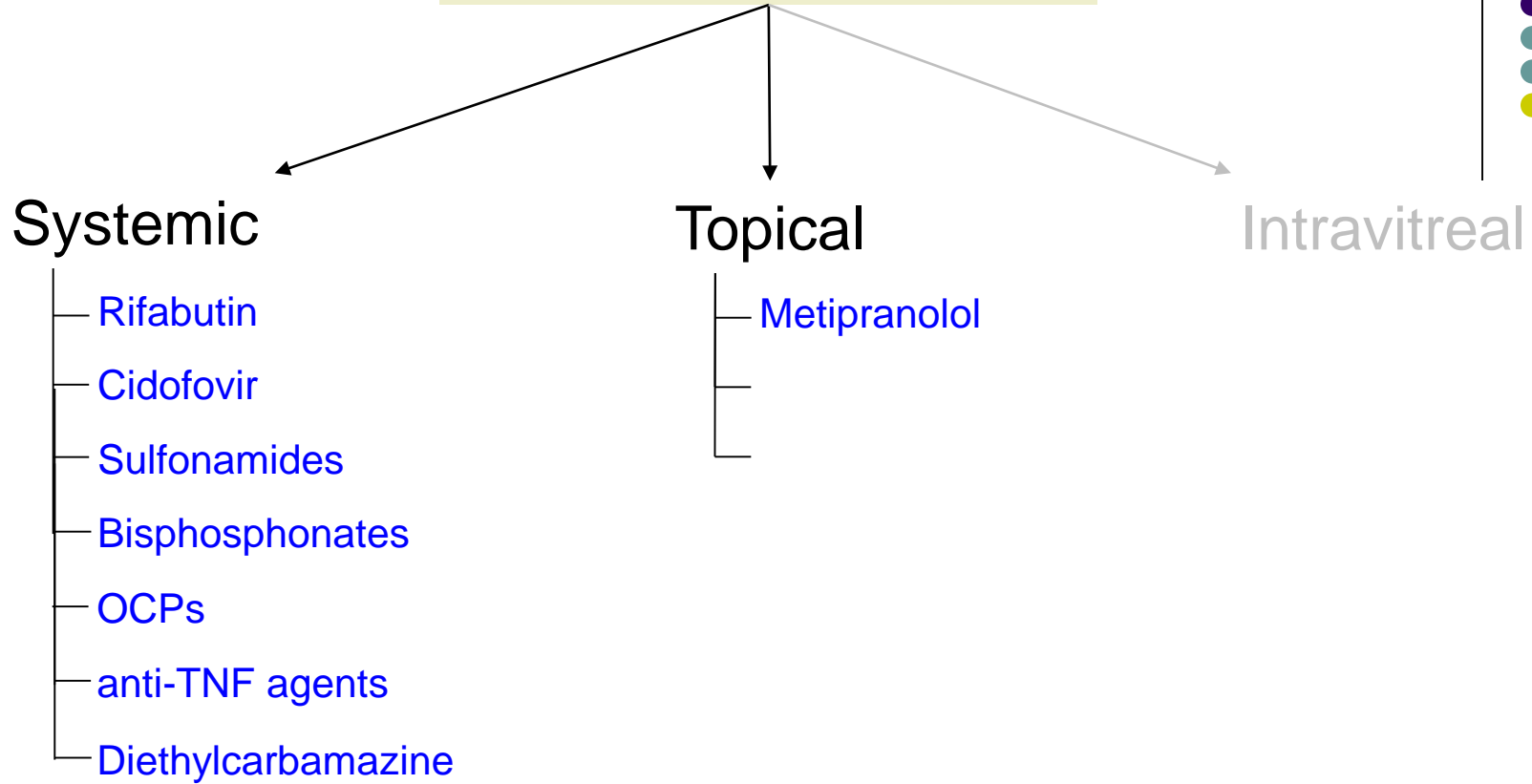
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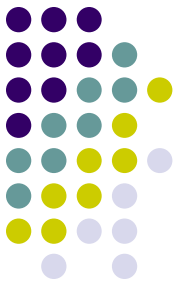
- ? *A  $\beta$  blocker rarely prescribed in the US*
- 
- 

## Intravitreal

# Drug-Induced Uveitis



# Drug-Induced Uveitis



## Systemic

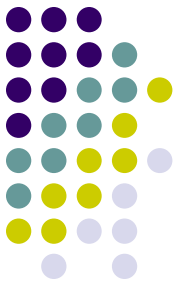
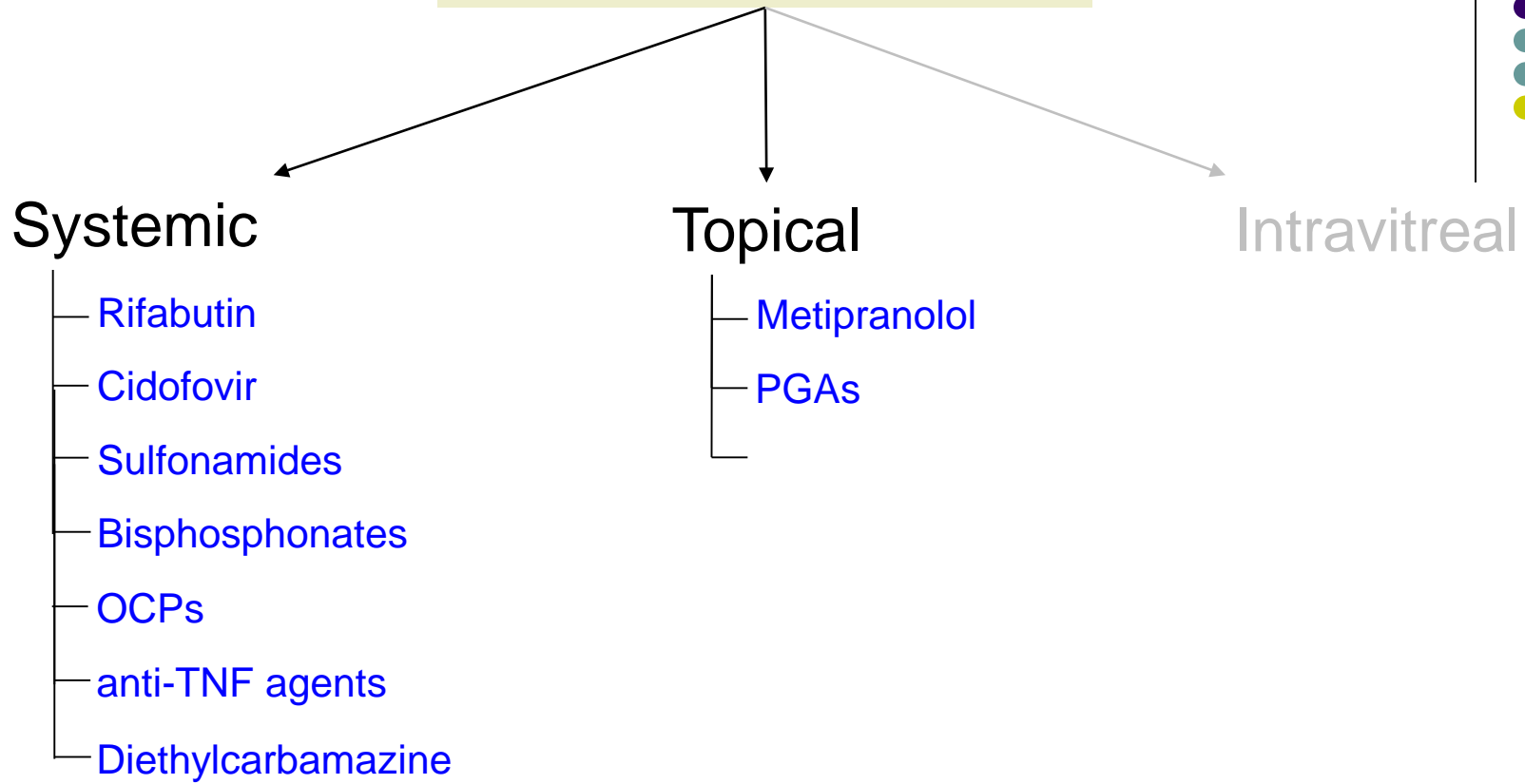
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## Topical

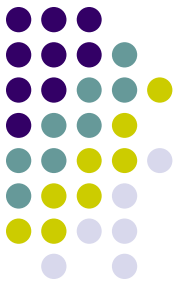
- Metipranolol
- ? *A glaucoma drug class VERY commonly prescribed in the US*

## Intravitreal

# Drug-Induced Uveitis



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
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## Topical

- Metipranolol
- PGAs
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## Intravitreal

# Drug-Induced Uveitis

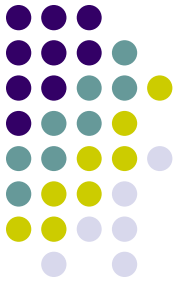
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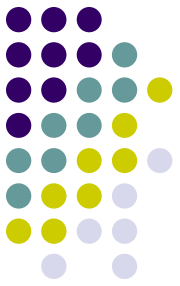
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- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal



# Drug-Induced Uveitis



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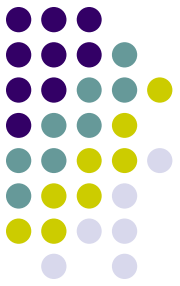
## Topical

- Metipranolol
- PGAs
- **Cholinesterase inhibitors**

## Intravitreal

Note: The latest (at the time of this writing) version of the *Uveitis* book incorrectly refers to these as “anticholinesterase inhibitors.” The meds in question can be classified as ‘cholinesterase inhibitors,’ or as ‘anticholinesterases,’ but not as anticholinesterase inhibitors (I’m not sure such a med is even a thing).

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
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- anti-TNF agents
- Diethylcarbamazine

## Topical

— **Metipranolol**

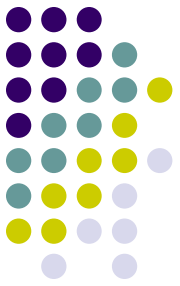
— BCAs

*Is anterior uveitis common among metipranolol pts?*

## Intravitreal



# Drug-Induced Uveitis



## Systemic

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- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

— **Metipranolol**

— BCGs

*Is anterior uveitis common among metipranolol pts?*

No, it is quite uncommon. Further, it was associated with a formulation no longer commercially available in the US.

## Intravitreal

# Drug-Induced Uveitis



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## Intravitreal

*Is anterior uveitis common among metipranolol pts?*

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# Drug-Induced Uveitis



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OCPs

anti-TNF agents

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## Topical

**Metipranolol**

BCAs

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# Drug-Induced Uveitis



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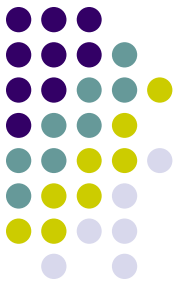
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*What is unusual about the uveitis it induces?*

It is granulomatous, complete with mutton-fat KP and posterior synechiae

## Intravitreal

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbal

## Topical

— **Metipranolol**

— BCCAs

## Intravitreal

*Is anterior uveitis common among metipranolol pts?*

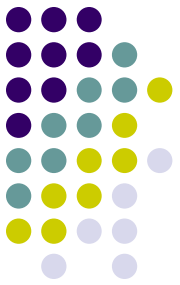
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*What other topical glaucoma med also causes a granulomatous uveitis (hint: It's not on the list above)?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazepine

## Topical

— **Metipranolol**

— BCCAs

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**Brimonidine**

# Drug-Induced Uveitis



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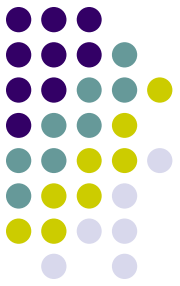
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**Brimonidine**

*Why isn't brimonidine on the list?*

## Intravitreal

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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— **Metipranolol**

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**Brimonidine**

*Why isn't brimonidine on the list?*

Because the *Uveitis* book doesn't mention it by name



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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## Topical

— **Metipranolol**

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**Brimonidine**

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Because **the Uveitis book doesn't mention it by name**

*Given this, why mention it at all?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
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## Topical

— **Metipranolol**

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**Brimonidine**

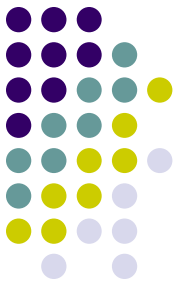
*Why isn't brimonidine on the list?*

Because **the Uveitis book doesn't mention it by name**

*Given this, why mention it at all?*

Because the *Glaucoma* book **does** mention it by name, along with the granulomatous-uveitis side effect

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamaz

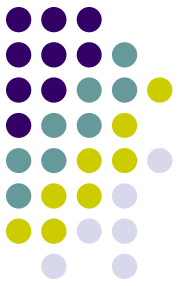
## Topical

- Metipranolol
- **PGAs**

## Intravitreal

*Is anterior uveitis a common complication of PGA use?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamaz

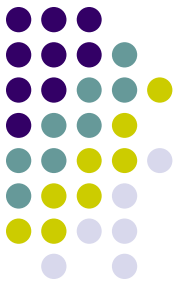
## Topical

- Metipranolol
- **PGAs**

## Intravitreal

*Is anterior uveitis a common complication of PGA use?*  
No; it occurs in only % of pts

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamaz

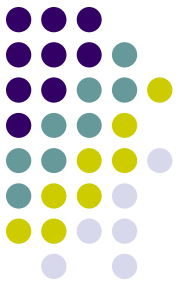
## Topical

- Metipranolol
- **PGAs**

## Intravitreal

*Is anterior uveitis a common complication of PGA use?*  
No; it occurs in only ~1% of pts

# Drug-Induced Uveitis



## Systemic

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- Cidofovir
- Sulfonamides
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- anti-TNF agents
- Diethylcarbamaz

## Topical

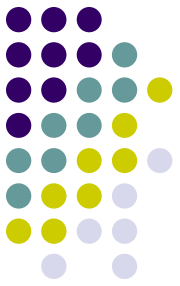
- Metipranolol
- **PGAs**

## Intravitreal

*Is anterior uveitis a common complication of PGA use?*  
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*Is it associated with development of a hypopyon?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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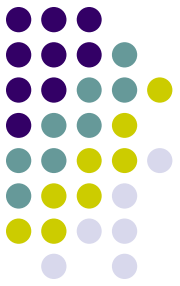
- Metipranolol
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No

# Drug-Induced Uveitis



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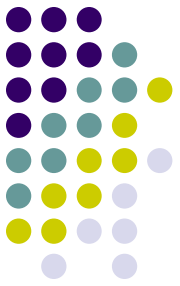
*Is anterior uveitis a common complication of PGA use?*  
No; it occurs in only ~1% of pts

*Is it associated with development of a hypopyon?*  
No

*Does it resolve rapidly upon cessation of the PGA?*



# Drug-Induced Uveitis



## Systemic

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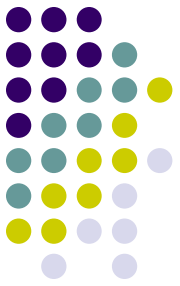
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No; it occurs in only ~1% of pts

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No

*Does it resolve rapidly upon cessation of the PGA?*  
Yes

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF
- Diethylcarbamazepine

## Topical

- Metipranolol
- **PGAs**

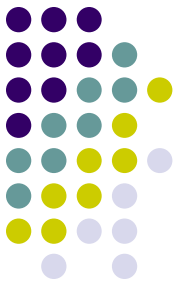
## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects. Identify 5 of them:*

- 1)
- 2)
- 3)
- 4)
- 5)

Yes

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF
- Diethylcarbamazepine

## Topical

- Metipranolol
- **PGAs**

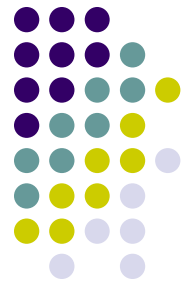
## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects. Identify 5 of them:*

- 1) Eyelash growth
- 2) Conjunctival hyperemia
- 3) Darkening of irides
- 4) Cystoid macular edema (CME)
- 5) PG-associated periorbitopathy

Yes

# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

anti-TNF

Diethylcarbamazepine

## Topical

Metipranolol

**PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

*Identify 5 of them:*

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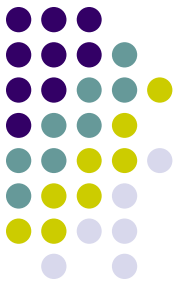
**What is Prostaglandin-Associated Periorbitopathy (PAP)?**

A constellation of orbital/periorbital changes including:

--  
--  
--  
--

*Hints forthcoming*

# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

anti-TNF

Diethylcarbamazepine

## Topical

Metipranolol

**PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

*Identify 5 of them:*

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- 3) Darkening of irides
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- 5) **PG-associated periorbitopathy**

**What is Prostaglandin-Associated Periorbitopathy (PAP)?**

A constellation of orbital/periorbital changes including:

--Deepening of the one word

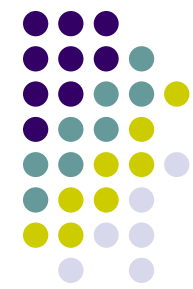
--Atrophy of two words

--Enophthalmos

-- one word eyelids

*these two go along with this one, but...*

# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

anti-TNF

Diethylcarbamazepine

## Topical

Metipranolol

**PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

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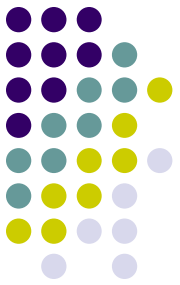
**What is Prostaglandin-Associated Periorbitopathy (PAP)?**

A constellation of orbital/periorbital changes including:

- Deepening of the one word
- Atrophy of two words
- Enophthalmos
- one word eyelids

*these three do **not** seem to go along with this one*

# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

anti-TNF

Diethylcarbamazepine

## Topical

Metipranolol

**PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

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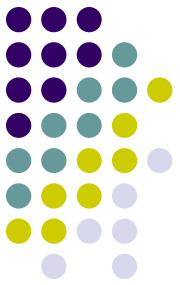
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- 3) Darkening of irides
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**What is Prostaglandin-Associated Periorbitopathy (PAP)?**

A constellation of orbital/periorbital changes including:

- Deepening of the sulcus
- Atrophy of periorbital fat
- Enophthalmos
- 'Tight' eyelids

# Drug-Induced Uveitis



## Systemic

Rifabutin

Cidofovir

Sulfonamides

Bisphosphonates

OCPs

anti-TNF

Diethylcarbamazine

## Topical

Metipranolol

**PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

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*What is Prostaglandin-Associated Periorbitopathy (PAP)?*

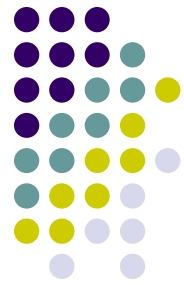
*A constellation of orbital/periorbital changes including:*

- Deepening of the sulcus
- Atrophy of periorbital fat
- Enophthalmos
- 'Tight' eyelids

*PGA-induced uveitis readily reverses upon cessation of the drug. Likewise, is PAP reversible?*



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF
- Diethylcarbamazine

## Topical

- Metipranolol
- **PGAs**

## Intravitreal

*In addition to uveitis, PGAs have a number of notable potential side effects.*

*Identify 5 of them:*

- 1) Eyelash growth
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*What is Prostaglandin-Associated Periorbitopathy (PAP)?*

*A constellation of orbital/periorbital changes including:*

- Deepening of the sulcus
- Atrophy of periorbital fat
- Enophthalmos
- 'Tight' eyelids

*PGA-induced uveitis readily reverses upon cessation of the drug. Likewise, is PAP reversible? It is unknown at this time*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

? *We already mentioned this one*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

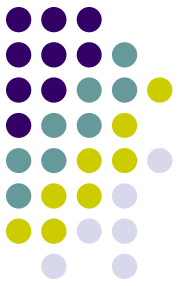
## Topical

- Metipranolol
- PGAs
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## Intravitreal

- Cidofovir

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

- Cidofovir
- ? *A category of IVit drugs very commonly employed in the US*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

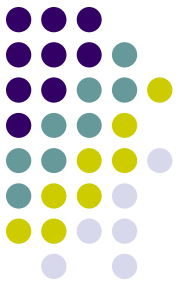
## Topical

- Metipranolol
- PGAs
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## Intravitreal

- Cidofovir
- Anti-VEGF agents

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

- Cidofovir
- Anti-VEGF agents
- ? *Another commonly employed category (but not nearly as common as the above)*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

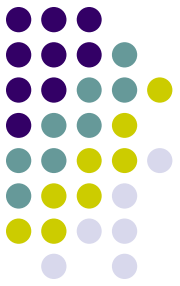
## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

- Cidofovir
- Anti-VEGF agents
- Antibiotics

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol

## Intravitreal

- **Cidofovir**

*What is cidofovir?*

agents



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol

## Intravitreal

- **Cidofovir**

agents

*What is cidofovir?*  
An antiviral used to treat CMV retinitis in AIDS

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
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## Topical

- Metipranolol

## Intravitreal

- **Cidofovir**

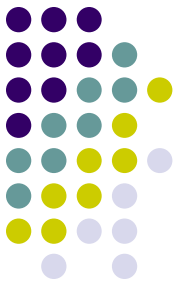
agents

*What is cidofovir?*

*An antiviral used to treat CMV retinitis in AIDS*

*Is anterior uveitis common after intravitreal cidofovir?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
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## Topical

- Metipranolol

## Intravitreal

- **Cidofovir**

agents

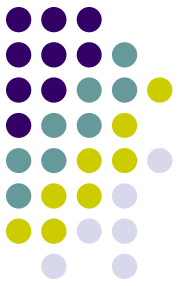
*What is cidofovir?*

An antiviral used to treat CMV retinitis in AIDS

*Is anterior uveitis common after intravitreal cidofovir?*

Very--it occurs after roughly % of injections

# Drug-Induced Uveitis



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- Rifabutin
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- Sulfonamides
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## Topical

- Metipranolol

## Intravitreal

- **Cidofovir**

agents

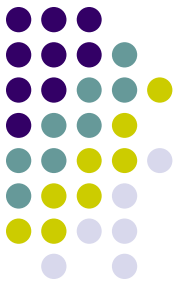
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Very--it occurs after roughly 25% of injections

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## Topical

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## Intravitreal

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agents

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Very--it occurs after roughly 25% of injections

*Is it associated with development of a hypopyon?*

# Drug-Induced Uveitis



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## Topical

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## Intravitreal

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agents

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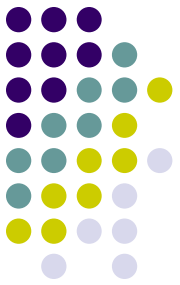
*Is anterior uveitis common after intravitreal cidofovir?*

Very--it occurs after roughly 25% of injections

*Is it associated with development of a hypopyon?*

No, but it is associated with **one word**, which can, rarely, be severe

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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agents

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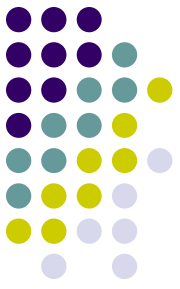
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# Drug-Induced Uveitis



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- Metipranolol
- PGAs

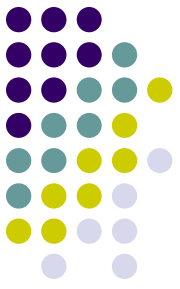
## Intravitreal

- Cidofovir
- **Anti-VEGF agents**

*Which anti-VEGF agents have been implicated as causing uveitis?*



# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
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## Topical

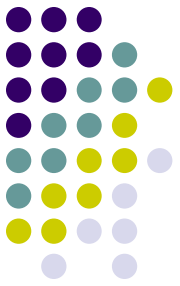
- Metipranolol
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## Intravitreal

- Cidofovir
- **Anti-VEGF agents**

*Which anti-VEGF agents have been implicated as causing uveitis?*  
Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

# Drug-Induced Uveitis



## Systemic

- Rifabutin
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## Topical

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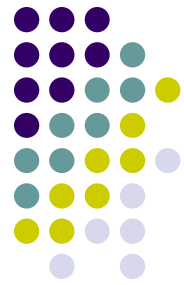
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*What is the rate of anterior uveitis after intravitreal:*  
--Ranibizumab?  
--Bevacizumab?  
--Aflibercept?

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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- Bisphosphonates
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## Topical

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--Aflibercept?

# Drug-Induced Uveitis



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## Topical

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--Aflibercept? Much less data available; what's there suggests the rate is higher vs lower than that of rani/bevacizumab

# Drug-Induced Uveitis



## Systemic

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## Topical

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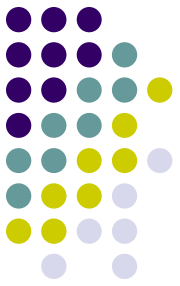
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# Drug-Induced Uveitis



## Systemic

- Rifabutin
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*What is the rate of anterior uveitis after intravitreal:*

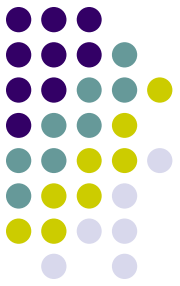
--Ranibizumab? Between .1% and 1%

--Bevacizumab? Same

--Aflibercept? Much less data available; what's there suggests the rate is lower than that of rani/bevacizumab

*Is the uveitis usually mild, or severe?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol
- PGAs

## Intravitreal

- Cidofovir
- **Anti-VEGF agents**

*Which anti-VEGF agents have been implicated as causing uveitis?*  
Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

*What is the rate of anterior uveitis after intravitreal:*

--Ranibizumab? Between .1% and 1%

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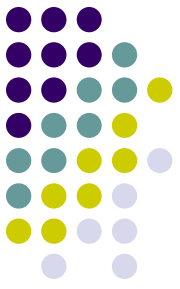
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*Is the uveitis usually mild, or severe?*

Mild



# Drug-Induced Uveitis



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- Cidofovir
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- anti-TNF agents
- Diethylcarbamazine

## Topical

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- PGAs

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*Which anti-VEGF agents have been implicated as causing uveitis?*  
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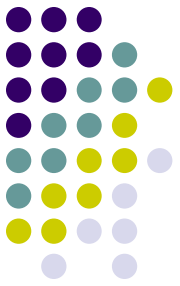
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*Is the uveitis usually mild, or severe?*

Mild

*Are anti-VEGF agents associated with development of a hypopyon?*

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
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- anti-TNF agents
- Diethylcarbamazine

## Topical

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- PGAs

## Intravitreal

- Cidofovir
- **Anti-VEGF agents**

*Which anti-VEGF agents have been implicated as causing uveitis?*  
Pretty much all of them: Ranibizumab, bevacizumab and aflibercept (pegaptanib too)

*What is the rate of anterior uveitis after intravitreal:*

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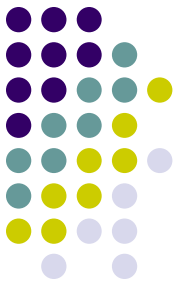
*Is the uveitis usually mild, or severe?*

Mild

*Are anti-VEGF agents associated with development of a hypopyon?*

In rare cases only (and these likely represent contaminants)

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
- Sulfonamides
- Bisphosphonates
- OCPs
- anti-TNF agents
- Diethylcarbamazine

## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

- Cidofovir
- Anti-VEGF agents
- Antibiotics

?

?

**Hint:** These two are Injections given to either prevent or diagnose illness

# Drug-Induced Uveitis



## Systemic

- Rifabutin
- Cidofovir
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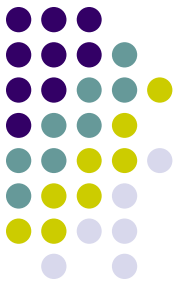
- Cidofovir
- Anti-VEGF agents
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*Vaccines*

*TB skin test*

**Hint:** These two are Injections given to either prevent or diagnose illness

# Drug-Induced Uveitis



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- Cidofovir
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## Topical

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*Vaccines*

## Intravitreal

- Cidofovir
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*What is the 'active ingredient' in the TB skin test?*

# Drug-Induced Uveitis



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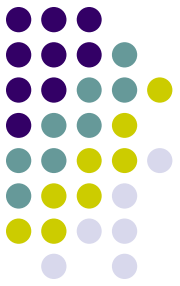
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*Are ocular inflammatory reactions to PPD common?*

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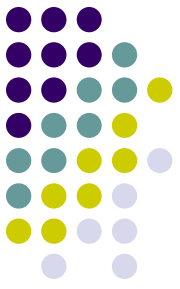
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No, they are exceedingly rare--only a few cases have  
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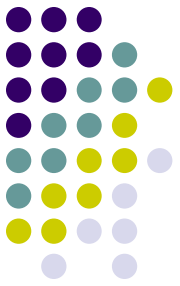
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*Have the reported reactions been mild, or severe?*

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Severe, eg,  ;*

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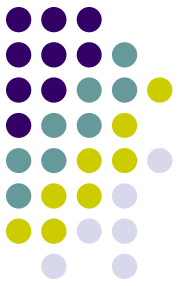
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No, they are exceedingly rare--only a few cases have been reported*

*Have the reported reactions been mild, or severe?  
Severe, eg, panuveitis ; VKH*

# Drug-Induced Uveitis



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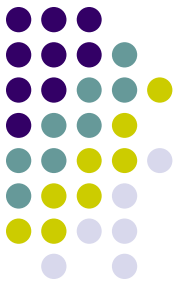
*What does VKH stand for in this context?*

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**VKH**

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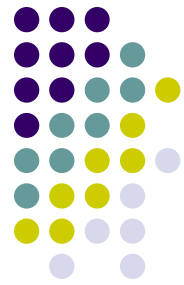
*Briefly, what is VKH?*

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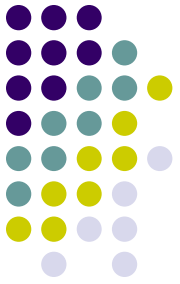
*A bilateral panuveitis absent a hx of ocular trauma associated with a variety of skin and hair changes*

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*A bilateral panuveitis absent a hx of ocular trauma associated with a variety of skin and hair changes*

*Who is at risk?*

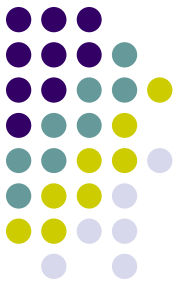
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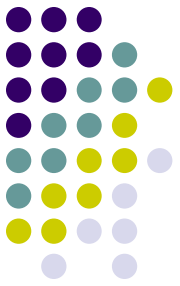
*Adults of Asian, Middle Eastern, and Hispanic ancestry*

*Systemic reactions to PPD common?  
Highly rare--only a few cases have*

*Systemic reactions been mild, or severe?  
Uveitis (VKH)*

**VKH**

# Drug-Induced Uveitis



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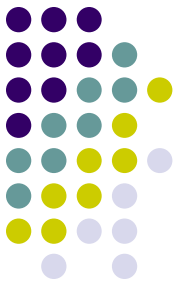
*Vaccines*

*TB skin test*

*?*      *?*

*Two specific vaccines*

# Drug-Induced Uveitis



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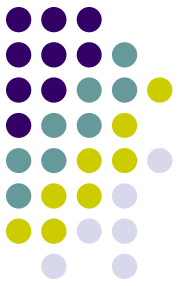
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## Intravitreal

- Cidofovir
- Anti-VEGF agents
- Antibiotics

*Vaccines* → *Flu*    *TB skin test* → *BCG*

# Drug-Induced Uveitis



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- Anti-VEGF agents
- Antibiotics

*Vaccines*

- *Flu*
- *BCG*

*TB skin test*

*Are ocular inflammatory reactions to the flu vaccine common?*

# Drug-Induced Uveitis



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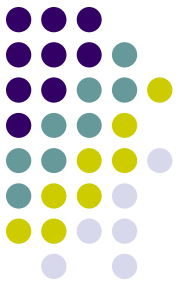
*Vaccines*

*Flu*      *BCG*

*TB skin test*

*Are ocular inflammatory reactions to the flu vaccine common?  
No, they are exceedingly rare--only scattered case reports exist*

# Drug-Induced Uveitis



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*Two specific forms of severe reaction been reported--what are they?*

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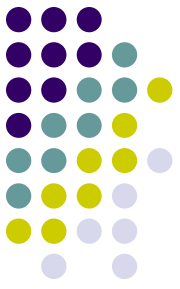
*Two specific forms of severe reaction been reported--what are they?*

one word

and

abb.

# Drug-Induced Uveitis



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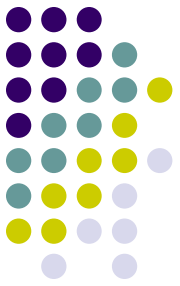
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Panuveitis and APMPE*



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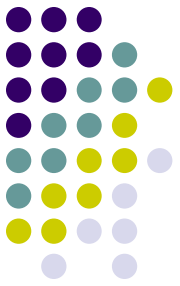
*Adverse reactions to the flu vaccine common?*

*Uncommon--rarely rare--only scattered case reports exist*

*Two specific forms of severe reaction been reported--what are they?*

*Panuveitis and **APMPPE***

# Drug-Induced Uveitis



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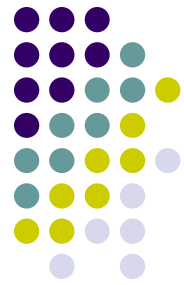
*BCG*

*What does APMPE stand for in this context?  
Acute posterior multifocal placoid pigment epitheliopathy*

*Adverse reactions to the flu vaccine common?  
Surprisingly rare--only scattered case reports exist*

*Two specific forms of severe reaction been reported--what are they?  
Panuveitis and **APMPPE***

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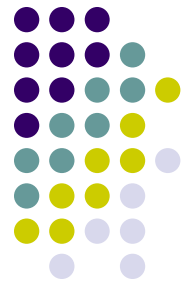
In three words (including 'syndrome'), what sort of condition is it?

A two words syndrome

Adverse reactions to the flu vaccine common?  
Extremely rare--only scattered case reports exist

Two specific forms of severe reaction been reported--what are they?  
Panuveitis and **APMPPE**

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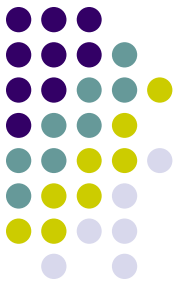
What does APMPE stand for in this context?  
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In three words (including 'syndrome'), what sort of condition is it?  
A white dot syndrome

Adverse reactions to the flu vaccine common?  
Extremely rare--only scattered case reports exist

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Panuveitis and **APMPPE**

# Drug-Induced Uveitis



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*In this context, what does BCG stand for?*

*ccines*

*TB skin test*

*BCG*

# Drug-Induced Uveitis



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- Sulfonamides

## Topical

- Metipranolol
- PGAs
- Cholinesterase inhibitors

## Intravitreal

- Cidofovir
- Anti-VEGF agents
- Antibiotics

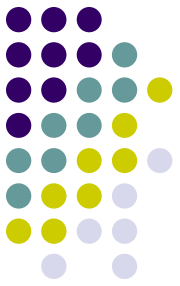
*In this context, what does BCG stand for?  
bacille Calmette-Guérin*

*ccines*

*TB skin test*

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# Drug-Induced Uveitis



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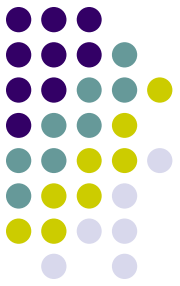
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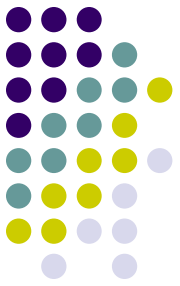
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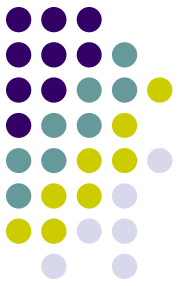
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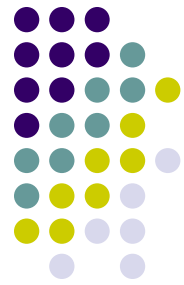
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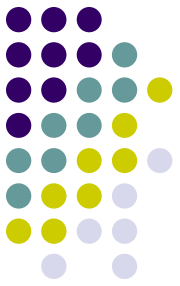
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A bilateral granulomatous or nongranulomatous anterior uveitis

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