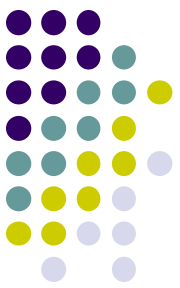


Q

For each statement, identify the **lens-related secondary OAG** with which it is associated (some have more than one answer)

Phacolytic glaucoma Phacoantigenic glaucoma Lens-particle glaucoma

- The only one described in the *Glaucoma* book as 'rare':



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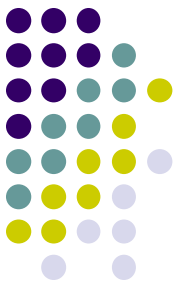


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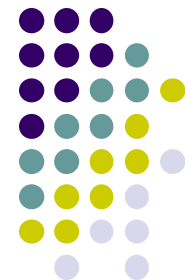


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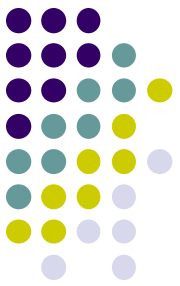


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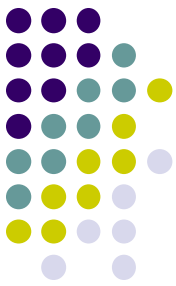


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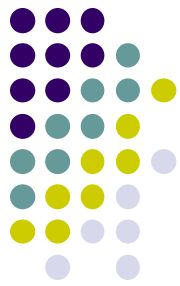
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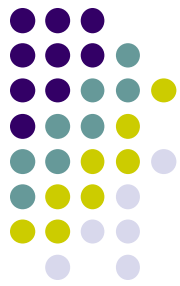
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‘TM clogged with macrophages’ applies also to another form of secondary OAG—which one?



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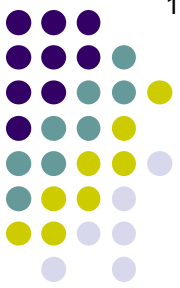
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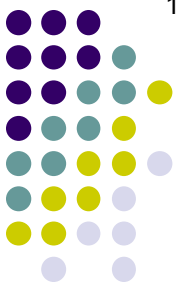
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In phacolytic glaucoma, the macrophages are full of

two words



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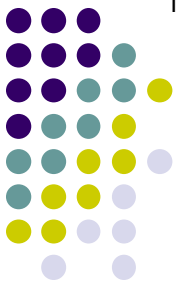
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In phacolytic glaucoma, the macrophages are full of lens proteins .



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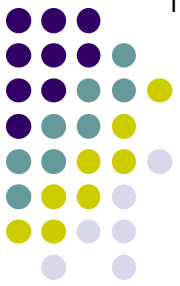
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*In phacolytic glaucoma, the macrophages are full of lens proteins .
What are they full of in hemolytic glaucoma?*



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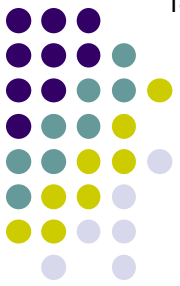
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Hemoglobin

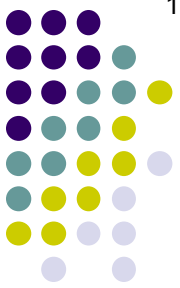


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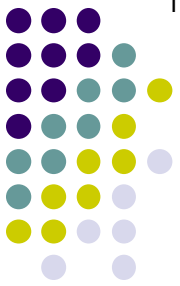


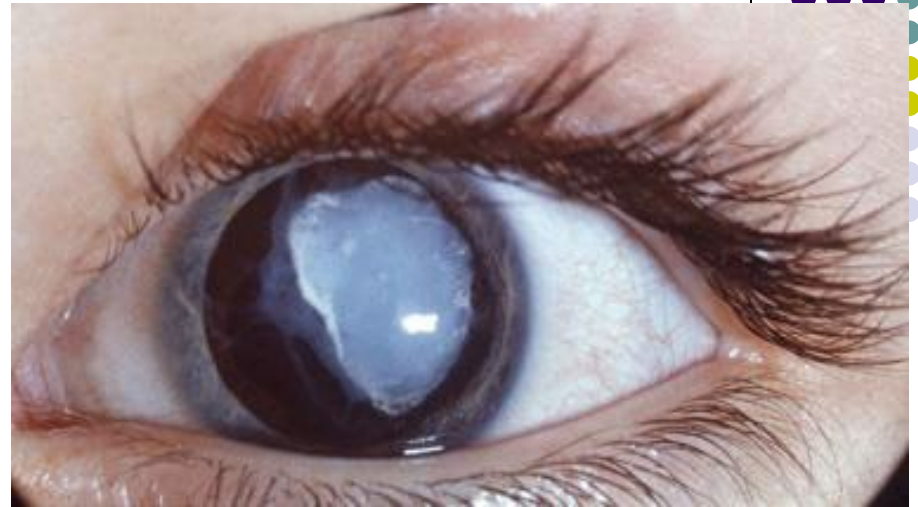
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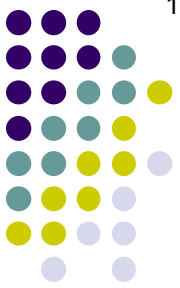
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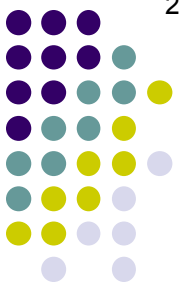
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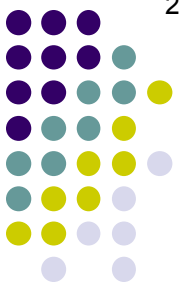
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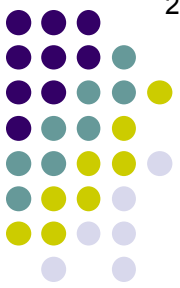
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What does this imply about the status of the capsule in phacoantigenic and lens-particle glaucoma?



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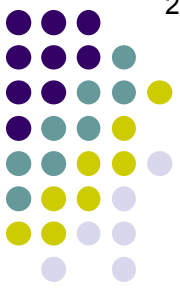
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It implies (correctly) that the capsule is **open** in these conditions



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Phacoantigenic glaucoma

Lens-particle glaucoma

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- Mediated by IgG antibodies
- TM is clogged with macrophages
- Chunks of cortex material
- Is also known as [cortical] degeneration
- **Capsule is intact: Phacolytic**

Phacolytic
through
intact
capsule

This is how I remember that the capsule is intact in phacolytic glaucoma, but **not** in phacoantigenic glaucoma

Phacoantigenic
not
intact
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What does this imply about the status of the capsule in phacoantigenic and lens-particle glaucoma?

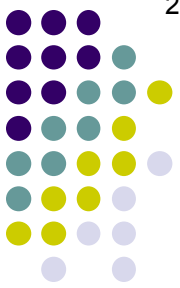
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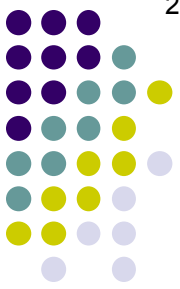
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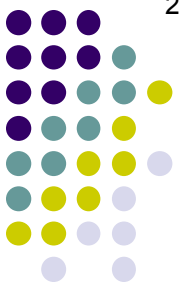


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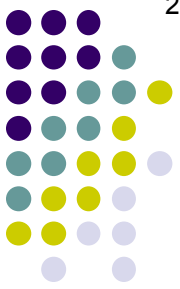
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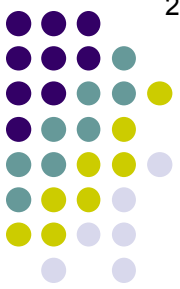


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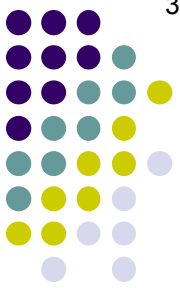
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In phakic eyes, minute amounts of lens proteins make their way through the capsule and into the AC. Because of this, normal lens proteins enjoy a certain level of immunologic privilege and are well tolerated by the eye. However, violation of the capsule results in massive amounts of lens proteins spilling into the AC. If this influx disrupts the privilege, severe inflammation, ie, phacoantigenic uveitis—and glaucoma—may result.

- Chunks of cortex may be visible in AC. Lens particle
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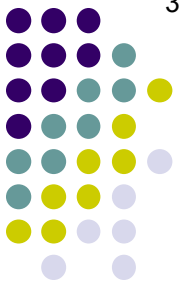
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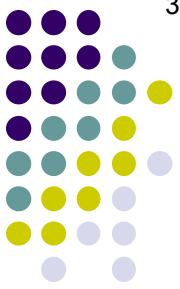
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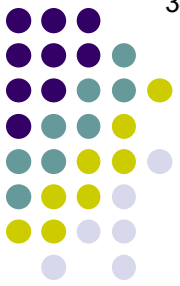
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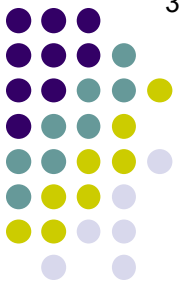
What does it mean to say a protein has been 'denatured'?

- Is a reaction to *denatured* lens proteins: **Phacolytic**

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Phacoantigenic

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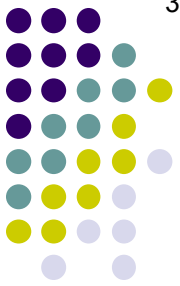
It means the protein has been forced out of its native conformation. Because a protein's function is inextricably tied to its shape, denatured proteins do not behave as they do in their native form.

- Is a reaction to *denatured* lens proteins: **Phacolytic**

Q

For each statement, identify the **lens-related secondary OAG** with which it is associated (some have more than one answer)

Phacolytic glaucoma Phacoantigenic glaucoma Lens-particle glaucoma



- The only one described in the *Glaucoma* book as 'rare':
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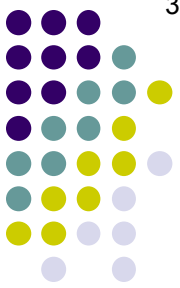
Can you give an example of protein denaturation?

- Is a reaction to *denatured* lens proteins: **Phacolytic**

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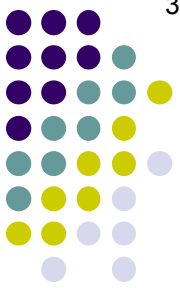
Consider egg albumin. In its native state, it's a clear liquid. But if sufficient heat is applied, it becomes a white solid. (And if sufficient salsa is applied to the white solid, it becomes delish.)

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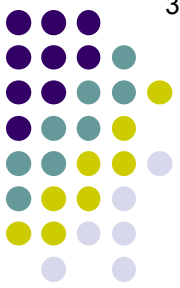
What role does denaturation play in the inflammatory process?

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- *What does it mean to say a protein has been 'denatured'?*
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- *Can you give an example of protein denaturation?*
Consider egg albumin. In its native state, it's a clear liquid. But if sufficient heat is applied, it becomes a white solid. (And if sufficient salsa is applied to the white solid, it becomes delish.)
- *What role does denaturation play in the inflammatory process?*
Recall that normal lens proteins enjoy a degree of immunologic privilege. In contrast, *denatured* proteins enjoy no such privilege, and thus tend to attract macrophages in large numbers.
- **Is a reaction to *denatured* lens proteins: **Phacolytic****

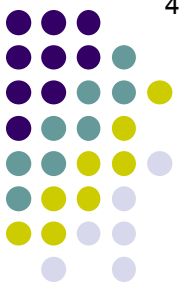
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- Is also known as [condition name] *uveitis*: Phacoantigenic
- Capsule is intact: Phacolytic
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- The presence of KP is a key clinical finding:

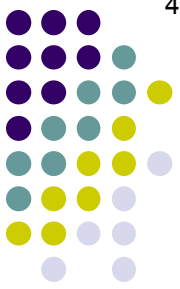
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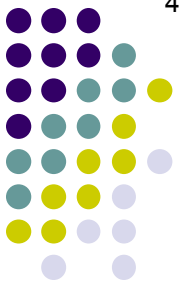


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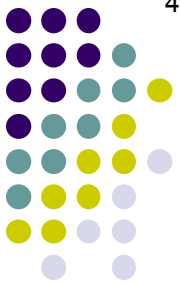
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- **The presence of KP is a key clinical finding: Phacoantigenic**

Are the KP granulomatous, or nongranulomatous?

A

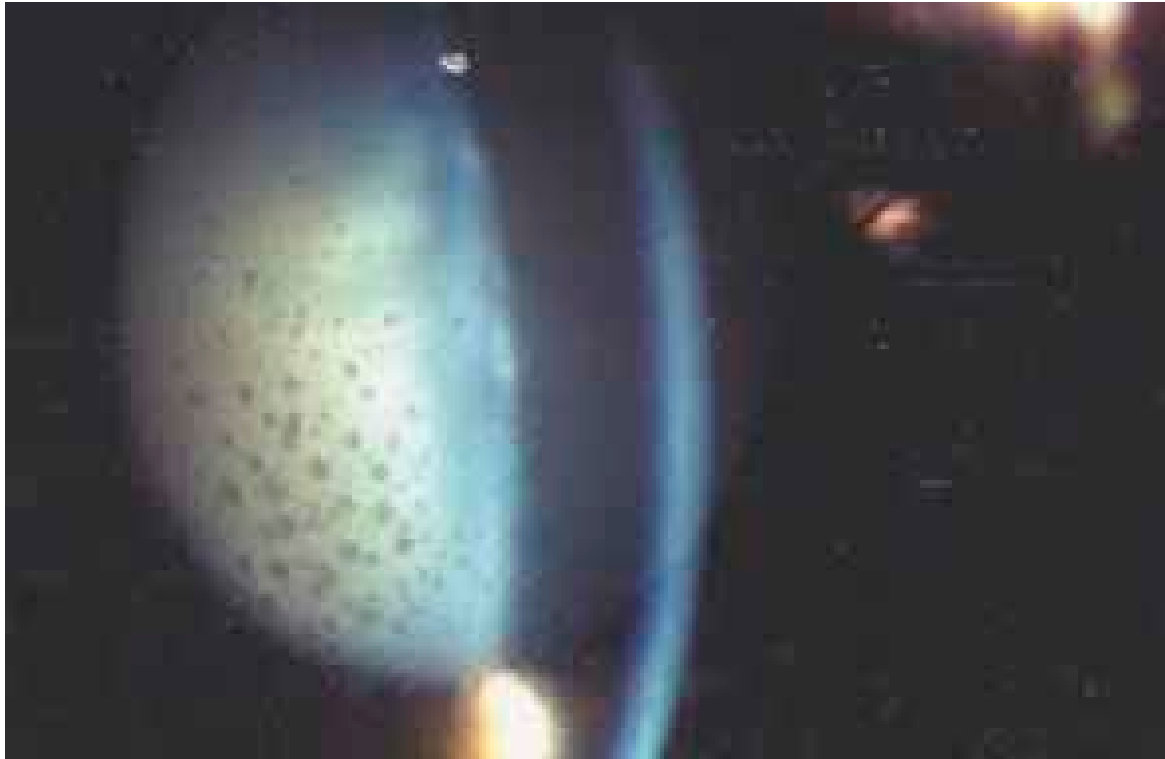
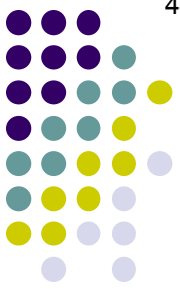
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Granulomatous



Phacoantigenic glaucoma: Granulomatous KP

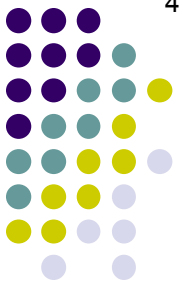
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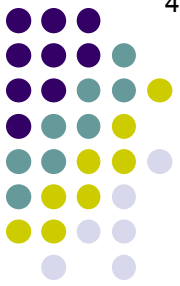


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- The one most likely to have a very high IOP:

A

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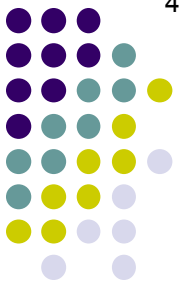
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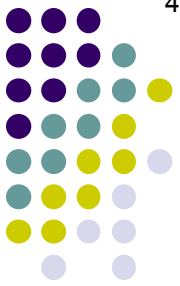


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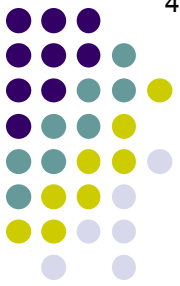
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Why is phacoanaphylactic glaucoma actually a misnomer?



A

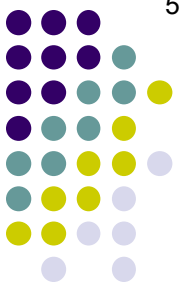
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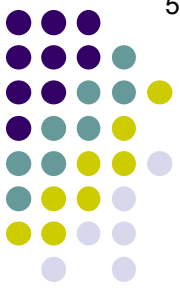
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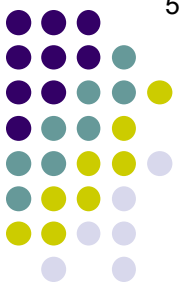
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The involvement of IgE, mast cells and basophils

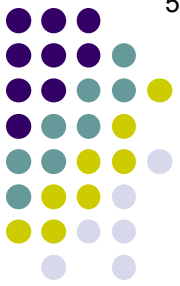


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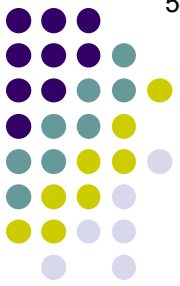


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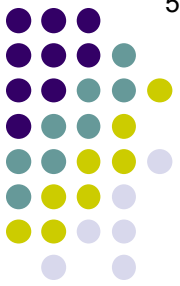


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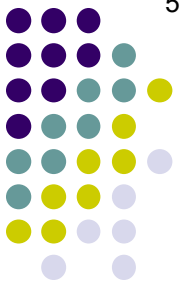
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(We'll unpack the term adaptive immune response later in the slide-set)

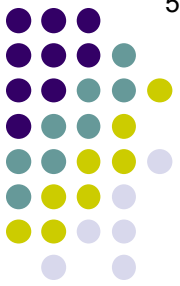


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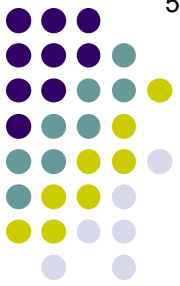


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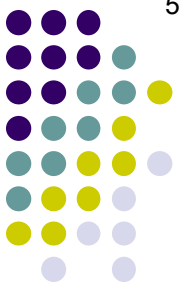
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What is a mature cataract?



Q/A

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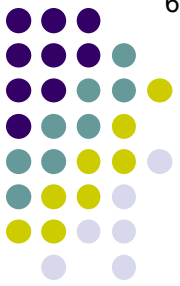
What is a mature cataract?

A

nuclear vs
cortical vs
PSC

cataract that has progressed to involve the entire lens

nucleus vs
cortex vs
PC



A

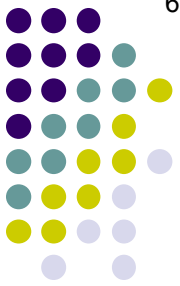
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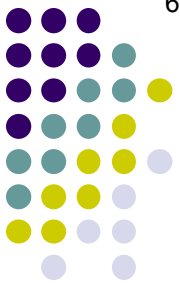
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What is a mature cataract?

A cortical cataract that has progressed to involve the entire lens cortex





Mature cataract

Q

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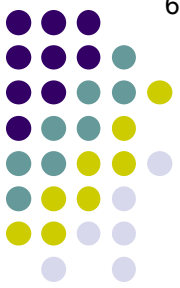
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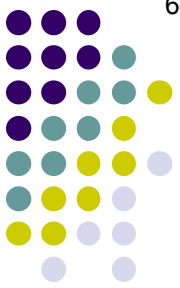
A cortical cataract that has progressed to involve the entire lens cortex

What is a hypermature cataract?

Mature cataracts may absorb water, transforming them into an

swollen

cortical cataract.



A

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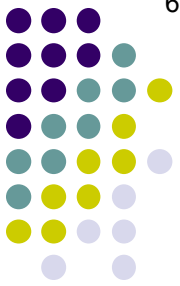
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Mature cataracts may absorb water, transforming them into an *intumescent cortical cataract*.



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Q

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Take note of the stages:

Mature cataract



?

A/Q

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Mature cataract → intumescent cataract → ?

A

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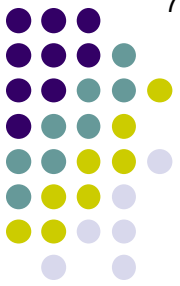
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For each statement, identify the **lens-related secondary OAG** with which it is associated (some have more than one answer)

Phacolytic glaucoma Phacoantigenic glaucoma Lens-particle glaucoma

- aka *phacoanaphylactic glaucoma*: Phacoantigenic
- Usually unilateral: All of them
- Is mediated by an *adaptive* immune response: Phacoantigenic
- Associated with mature/**hypermature cataract**: Phacolytic

What is a **mature cataract**?

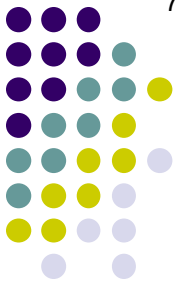
A cortical cataract that has progressed to involve the entire lens cortex

What is a hypermature cataract?

Mature cataracts may **absorb water**, transforming them into an ***intumescent cortical cataract***. A ***hypermature cataract*** results when an intumescent cataract begins leaking water and denatured proteins through its intact anterior capsule.

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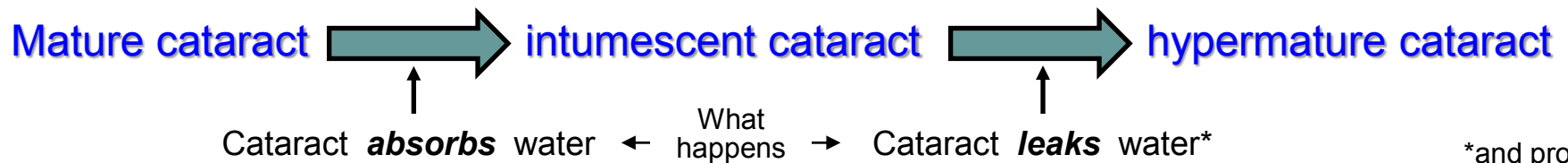
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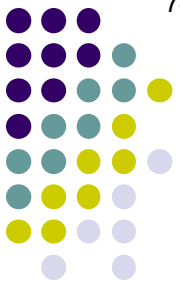
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All three of these pose a particular challenge during an early, crucial step in cataract surgery.
What step, and what challenge?

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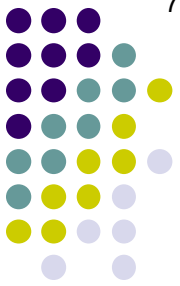
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For all three stages, the red reflex is completely obscured. As most cataract surgeons rely on the red reflex to visualize the anterior capsule during capsulorrhexis, this step cannot be performed in a conventional manner.

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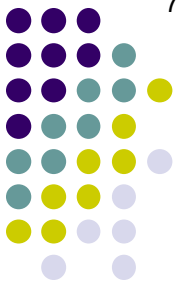
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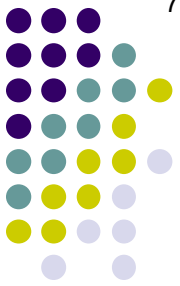
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They stain the anterior capsule with

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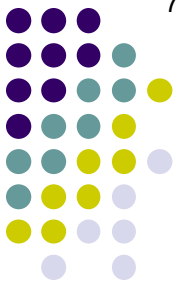
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Mature cataract

→ **intumescent cataract** →

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What effect does swelling have on the internal dynamics of the lens?

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Mature cataract

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It increases the pressure within the lens

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*When the surgeon makes the initial rent in the capsule, the increased pressure within an intumescent cataract may cause **the rent to suddenly and uncontrollably extend to the periphery***

If/when the rent runs peripherally, what is the resulting appearance of the lens?

What happens to the lens when the rent runs peripherally?

They stain the anterior capsule with trypan blue

Take note of the stages:

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What do you do?

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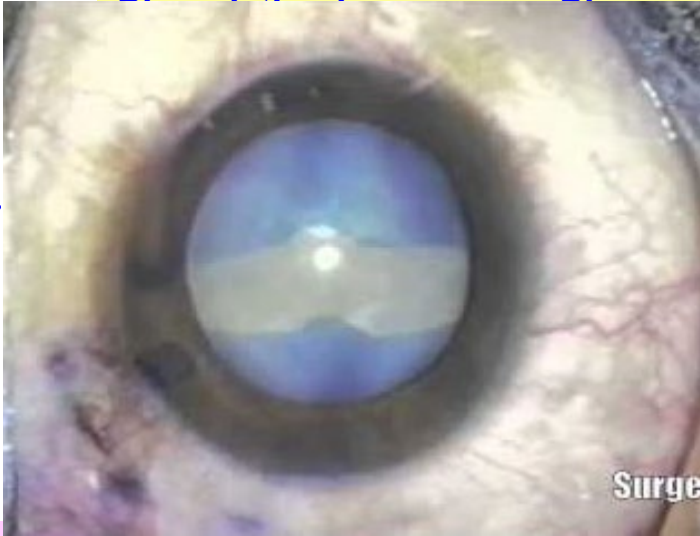
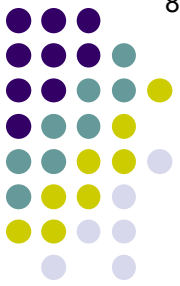
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Phacolytic glaucoma Lens-particle glaucoma



Phacoma: Phacoantigenic

em

immune response: Phacoantigenic

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acts for a moment. In this context, what does

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Recall that, because of red-reflex obscuration, **trypan blue** is used in all these cases.

Thus, after the rent runs out, the surgeon sees a **white stripe** (the cataract) between **two areas of blue** (the undisturbed, trypan blue-stained capsule).

They stain the anterior capsule with **trypan blue**

Take note of the stages:

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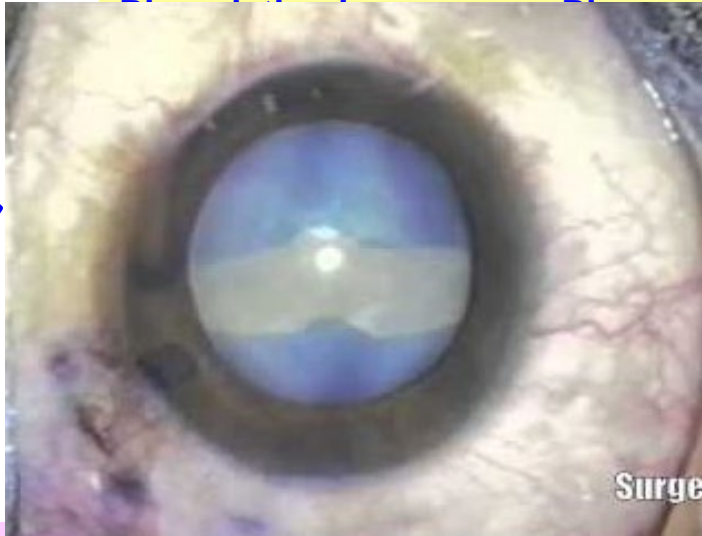
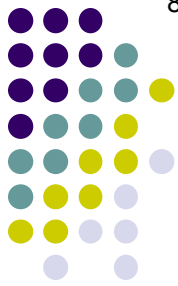
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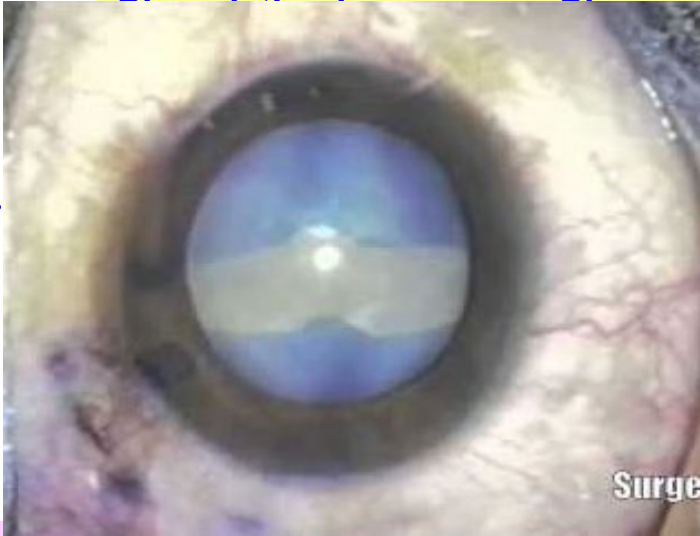
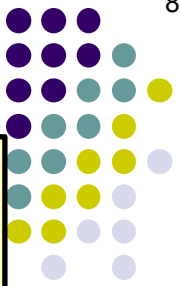
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As if obscuration of the red reflex wasn't enough, the increased intralenticular pressure of an

intumescent cataract has led to a memorable name for this finding. What is it?
It is known as '**Argentinian flag sign**'

When the intumescent cataract extends the white stripe centrally and unilaterally extends to the periphery

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When faced with an intumescent cataract, what can the surgeon do to minimize the likelihood of seeing an Argentinian flag?

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When the surgeon makes the incision in the capsule, the increased pressure within an intumescent cataract may cause **the rent to suddenly and uncontrollably extend to the periphery**

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What is the name of this appearance?

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When faced with an intumescent cataract, what can the surgeon do to minimize the likelihood of seeing an Argentinian flag?

- Counteract the positive pressure within the lens by filling the AC with a high-viscosity OVD
- Reduce intralenticular pressure by aspirating cortical material immediately upon creating the initial rent

When the surgeon makes the initial rent in the capsule, the increased pressure within an intumescent cataract may cause **the rent to suddenly and uncontrollably extend to the periphery**

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A cortical cataract that has progressed to involve the entire lens cortex

What is a hypermature cataract?

Mature cataracts may absorb water, transforming them into an **intumescent cortical cataract**. A **hypermature cataract** results when an intumescent cataract begins leaking water and denatured proteins through its intact anterior capsule.

Next

Finally: What stage occurs after the hypermature stage?

Take note of the stages:

Mature cataract → intumescent cataract → hypermature cataract → ?

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Morgagnian cataract

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What change occurs as a cortical cataract progresses from the hyper mature to the Morgagnian stage?

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Take note of the stages

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Further and extensive liquefaction of the cortical material

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What is the slit-lamp appearance of a Morgagnian cataract?

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The dense brown nuclear cataract is observed to be freely mobile within the liquified remnants of the cortical cataract

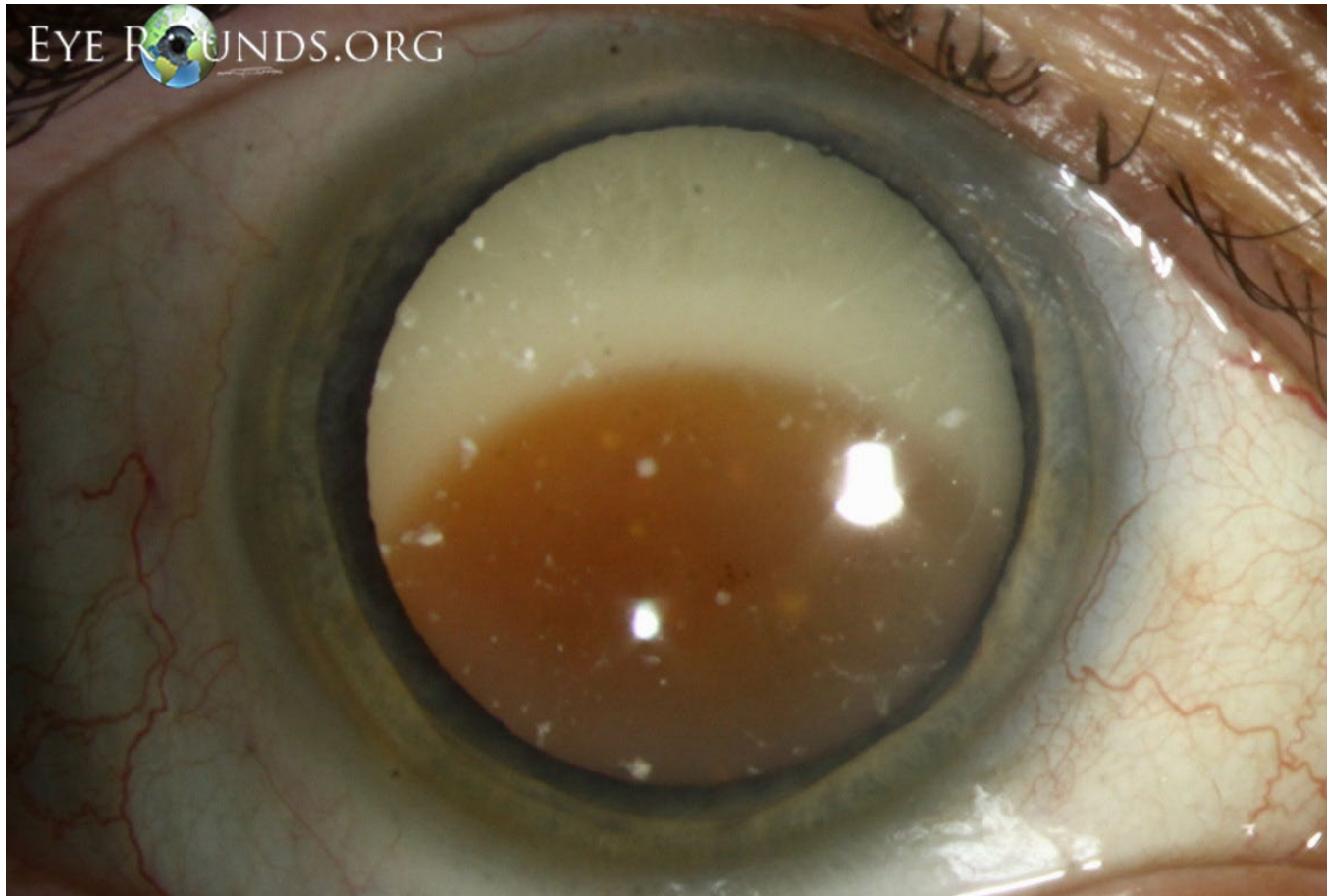
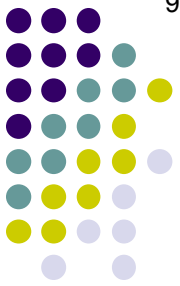
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Morgagnian cataract

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Morgagnian cataract

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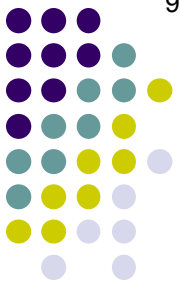
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What effect does the leaking of water and proteins have on the volume of the cataract?

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A

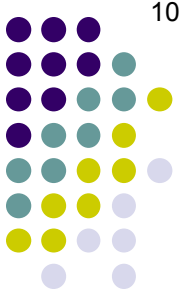
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What effect does the leaking of water and proteins have on the volume of the cataract?
It reduces it significantly

*intumescent cortical cataract. A hypermature cataract results when an intumescent cataract begins **leaking water and denatured proteins through its intact anterior capsule.***



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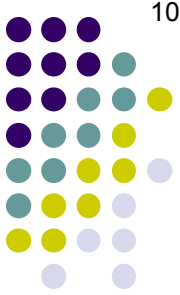
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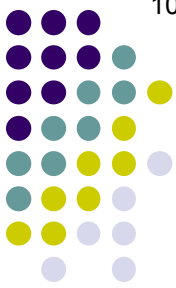
This reduction in cataract volume is responsible for a classic finding in hypermature cataracts.

What is it?

The anterior capsule is shrunken and wrinkled

*intumescent cortical cataract. A hypermature cataract results when an intumescent cataract begins **leaking water and denatured proteins through its intact anterior capsule.***





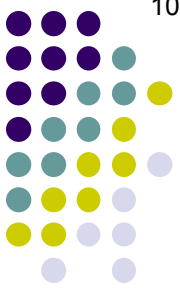
Hypermature cataract. Note the capsular wrinkling

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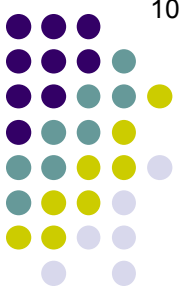


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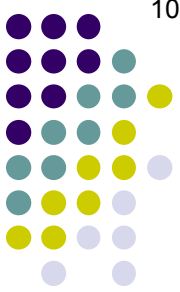


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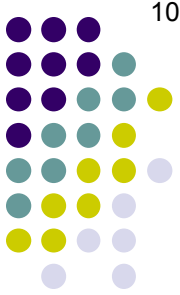
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How should lens-particle glaucoma be managed?



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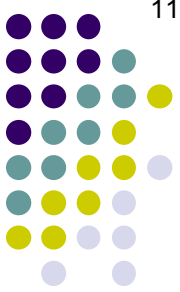
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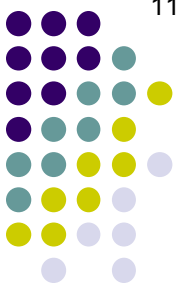
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If medical management proves inadequate, what is the next step?

Surgical removal of the offending material

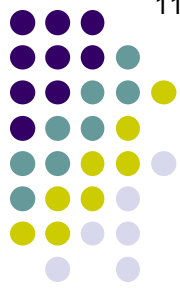


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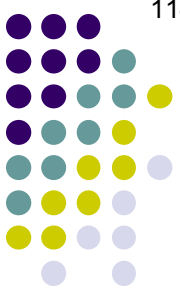


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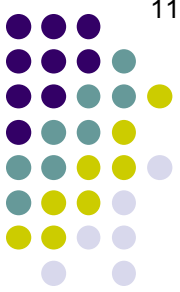


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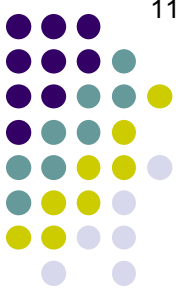


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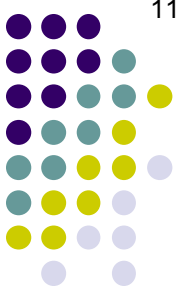
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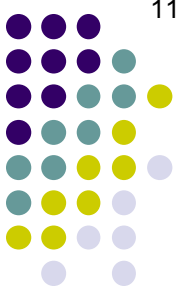
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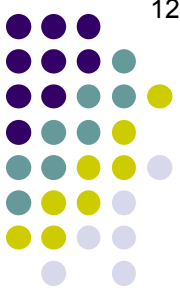
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With what type of organism are LPSs associated?

- Is mediated by an

What are the two main effector cells?
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What general class of molecules are LPSs?
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What is the name of the receptors that recognize LPSs, as a few other immune-related molecules?
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Gram(+), Gram(-), or both?

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Bacterial LPSs are AKA a sort of toxin—what sort?

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There are two broad categories of immune response—what are they?

Innate and **adaptive** (FYI, we're about to unpack *adaptive immune response*, as promised earlier)

In general, what is the nature of each, and how do they differ?

The adaptive immune response involves 'education,' with surveillance cells learning to recognize and remember. The innate immune response does not require education—it relies on **'preprogrammed' immune cells** to recognize foreign material encountered in tissue or blood.

- Is mediated by an

With what type of organism are LPSs associated?

Bacteria

Gram(+), Gram(-), or both?

Gram(-)

Bacterial LPSs are AKA a sort of toxin—what sort?

'Endotoxin'

What are the two main effector cells?
Neutrophils and macrophages

What general class of molecule?

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What is the name of the receptors?
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And now, an overly-long sidebar regarding immunology and the lens-related OAGs:

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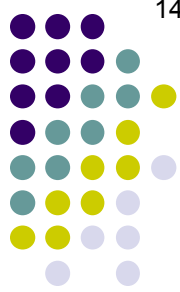
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TLDR When studying the lens-related secondary OAGs, you really should read about them in all four of the *BCSC* books that address them—*Glaucoma*, *Uveitis*, *Lens* and *Path*. But be prepared to grapple with inconsistencies in terminology when doing so.

Q

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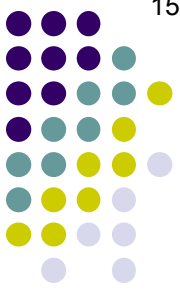
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Phacolytic glaucoma: Corneal edema

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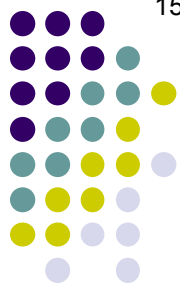
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