Q

- Lens measurements
  - Birth: 
  - mm equatorial, mm anteroposterior
A

- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
Lens measurements

- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: # mm equatorial, # mm anteroposterior
• Lens measurements
  • Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  • Adult: 9.0 mm equatorial, 5.0 mm anteroposterior
Cataract surgeons will sometimes employ an age-based rule of thumb for guessing the A-P depth of a lens--what is it?
A

- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

*Cataract surgeons will sometimes employ an age-based rule of thumb for guestimating the A-P depth of a lens--what is it?*
A-P depth = ‘Four-point-age’ (eg, the A-P depth of the lens in a 65 y.o. is ~4.65 mm)
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age...
- Lens curvature increases or decreases → refractive power
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age...
- Lens curvature increases \( \rightarrow \) ↑ refractive power
- **Lens measurements**
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior
- **With age…**
  - Lens curvature **increases** → **↑** refractive power
  - Refractive index **increases vs decreases** → **↑ or ↓** refractive power
A

- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

- With age...
  - Lens curvature increases $\rightarrow$ ↑ refractive power
  - Refractive index decreases $\rightarrow$ ↓ refractive power
- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
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- With age…
  - Lens curvature increases $\rightarrow$ ↑ refractive power
  - Refractive index decreases $\rightarrow$ ↓ refractive power

So which do people become with age—more myopic or more hyperopic?
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age…
- Lens curvature increases $\rightarrow$ $\uparrow$ refractive power
- Refractive index decreases $\rightarrow$ $\downarrow$ refractive power

So which do people become with age—more myopic or more hyperopic? That depends. The change in an individual’s refraction is a function of the interplay of these two factors.
Lens capsule thickness: Fill in the blanks

Anterior

? \( \mu m \)

? \( \mu m \)

? \( \mu m \)

Posterior

? \( \mu m \)

? \( \mu m \)

? \( \mu m \)
Lens capsule thickness: Fill in the blanks

Anterior

14 \( \mu m \)

? \( \mu m \)

Posterior

? \( \mu m \)

? \( \mu m \)

? \( \mu m \)
Q/A

Lens capsule thickness: Fill in the blanks

Anterior

14 μm

Posterior

21 μm

? μm

? μm

? μm
Lens capsule thickness: Fill in the blanks

Anterior

14 µm

Posterior

21 µm

17 µm

___ µm
Lens capsule thickness: Fill in the blanks

Anterior

14 µm

21 µm

23 µm

Posterior

17 µm
Lens capsule thickness: Fill in the blanks

**Anterior**
- 14 μm
- 21 μm
- 23 μm

**Posterior**
- 4 μm
- 17 μm
The posterior capsule is so thin it is always distended. Thus, all changes in lens shape during accommodation occur at the anterior capsule.
Zonules

- Embryologically, the *vitreous*
A

- Zonules
  - Embryologically, the *tertiary* vitreous
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the very specific tissue of the pigmented vs nonpigmented and specific portion 1 of the ciliary body

Q
A

- Zonules
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the **basal lamina** of the **nonpigmented** epithelium of the **pars plana** and **pars plicata** of the ciliary body
- **5-30 μm** in diameter
A

● Zonules
  ● Embryologically, the \textit{tertiary vitreous}
  ● Originate from the \textit{basal lamina} of the \textit{nonpigmented} epithelium of the \textit{pars plana} and \textit{pars plicata} of the ciliary body
  ● 5-30 \( \mu \text{m} \) in diameter
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 μm in diameter
- Stain with one stain and another stain
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 \( \mu \text{m} \) in diameter
- Stain with *eosin* and *PAS*
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 μm in diameter
- Stain with *eosin* and *PAS*
- Three sets of fibers:
  1) Insert at the *same location*
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the **basal lamina** of the **nonpigmented** epithelium of the **pars plana** and **pars plicata** of the ciliary body
- **5-30 μm** in diameter
- Stain with **eosin** and **PAS**
- Three sets of fibers:
  1. *Equatorial*: Insert at the **equator (duh)**
Zonules

- Embryologically, the tertiary vitreous
- Originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body
- 5-30 μm in diameter
- Stain with eosin and PAS
- Three sets of fibers:
  1. Equatorial: Insert at the equator (duh)
     - These zonules regress vs strengthen with age
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the **basal lamina** of the **nonpigmented** epithelium of the **pars plana** and **pars plicata** of the ciliary body
- 5-30 μm in diameter
- Stain with **eosin** and **PAS**
- Three sets of fibers:
  1. **Equatorial**: Insert at the equator (duh)
     - These zonules **regress** with age
Zonules

Embryologically, the *tertiary vitreous*

Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body

5-30 μm in diameter

Stain with *eosin* and *PAS*

Three sets of fibers:

1) *Equatorial*: Insert at the *equator* (duh)
   - These zonules *regress* with age

2) *Anterior*: Insert ___mm anterior to equator
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 μm in diameter
- Stain with *eosin* and *PAS*
- Three sets of fibers:
  1) *Equatorial*: Insert at the *equator* (duh)
     - These zonules *regress* with age
  2) *Anterior*: Insert 1.5 mm anterior to equator
Zonules

Embryologically, the tertiary vitreous originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body.

5-30 μm in diameter

Stain with eosin and PAS

Three sets of fibers:

1) **Equatorial**: Insert at the equator (duh)
   - These zonules regress with age

2) **Anterior**: Insert 1.5 mm anterior to equator

3) **Posterior**: Insert [ ] mm posterior to equator
A

- Zonules
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
  - 5-30 μm in diameter
  - Stain with *eosin* and *PAS*
  - Three sets of fibers:
    1) *Equatorial*: Insert at the equator (duh)
      - These zonules *regress* with age
    2) *Anterior*: Insert 1.5 mm anterior to equator
    3) *Posterior*: Insert 1.25 mm posterior to equator
List the unique properties that distinguish the lens layers from one another histologically:

- Nucleus:
- Epinucleus:
- Cortex:
List the unique properties that distinguish the lens layers from one another histologically:

- Nucleus:
- Epinucleus:
- Cortex:

**Trick question—there are none!** These terms refer to differences in *appearance* and *behavior* as encountered during cataract surgery. They are *descriptive* terms, not histological.