



# Pathology

## Disease of Eye & Ear

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# Learning Outcomes

By the end of the lecture, you will be able to:

- Recognize pathology of common diseases affecting eye.
  - Clarify pathological aspects of keratitis, conjunctivitis, blepharitis, chalazion.
  - Identify different tumors of the eye and eyelids with discussion of retinoblastoma
- Recognize pathology of common diseases affecting ear.
  - Understanding different types of otitis and identify different types of otitis media.
  - Identify different tumors of the ear with discussion of

Blepharitis

Conjunctivitis

Keratitis

Eye

Retinoblastoma

Rhabdomyosarcoma

Otitis media

Otitis externa

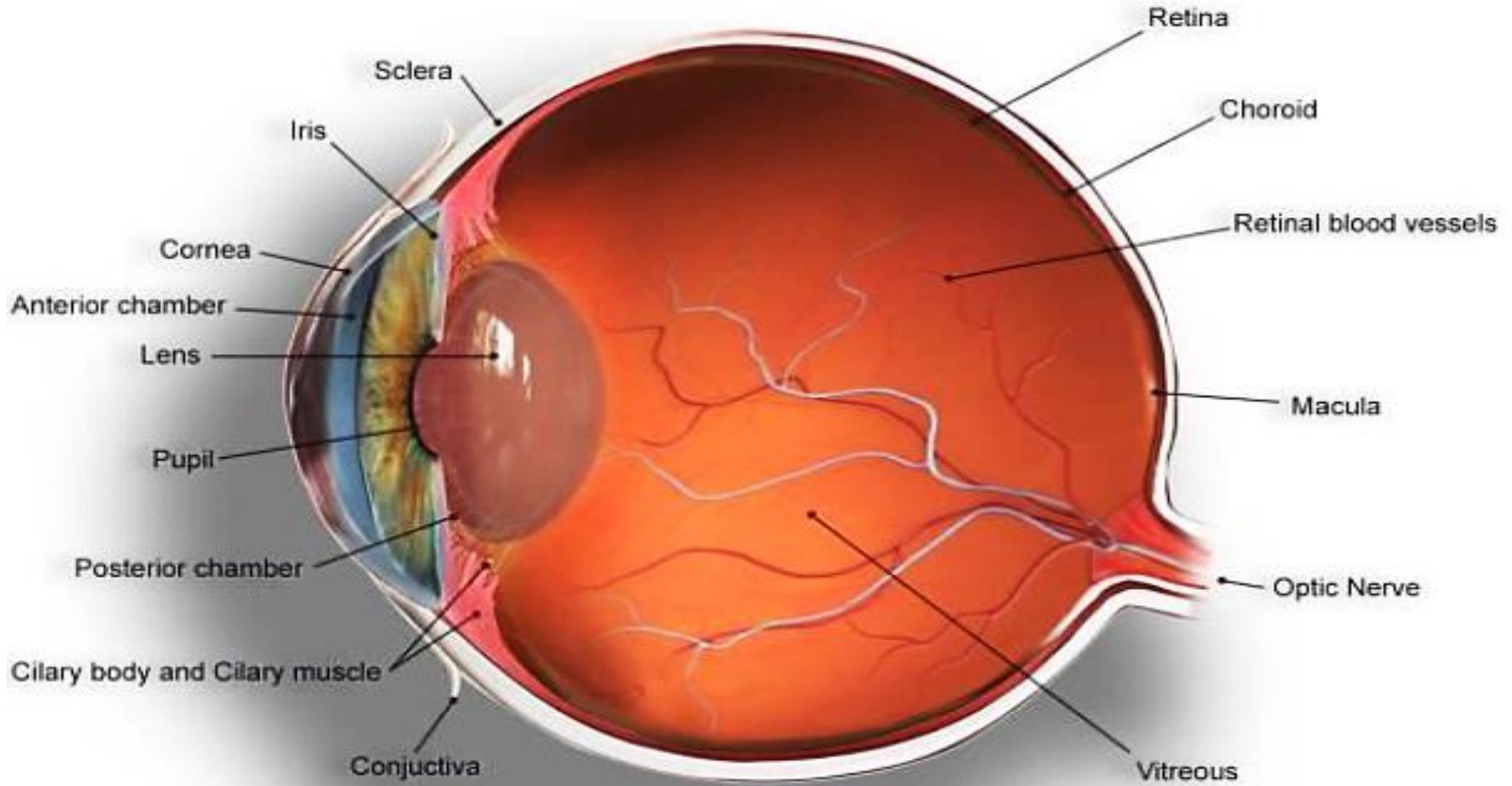
Otitis interna

Ear

Glomus tumor

Acoustic neuroma

# Eye



# Diseases of Eye

## Blepharitis

Inflammation of the eye lid.

### Causes:

- Allergies
- Dandruff (seborrheic dermatitis)
- Parasitic as lice or mites in eyelashes
- Meibomian gland dysfunction (MGD)

### Symptoms:

- Redness & swelling
- Itching.
- Pain
- Discharge that forms a crust at the lid margin during night that may prevent eyes from opening in the morning.



# Diseases of Eye

## Blepharitis

### Complications:

#### Stye:

- Acute suppurative inflammation of sebaceous glands or follicles (Boil) of eyelid
- very painful. At the eyelid's edge

#### • Chalazion:

- Granulomatous inflammation of in obstructed meibomian glands.
- Slowly growing lid nodule.
- M/E: Lipogranuloma (empty spaces surrounded by epithelioid with multinucleated giant cells, fibrosis)



# Diseases of Eye

## Conjunctivitis

Inflammation of the conjunctiva.

### Causes:

- Viral infection (Adenovirus, Herpes simplex and herpes zoster)
- Bacterial infection
- Allergic reaction.

### Symptoms:

- Redness
- Itching.
- Gritty feeling
- Discharge that may form a crust
- Lacrimation.
- Sensitivity to light, called photophobia



# Diseases of Eye

## Keratitis

Inflammation of the cornea.

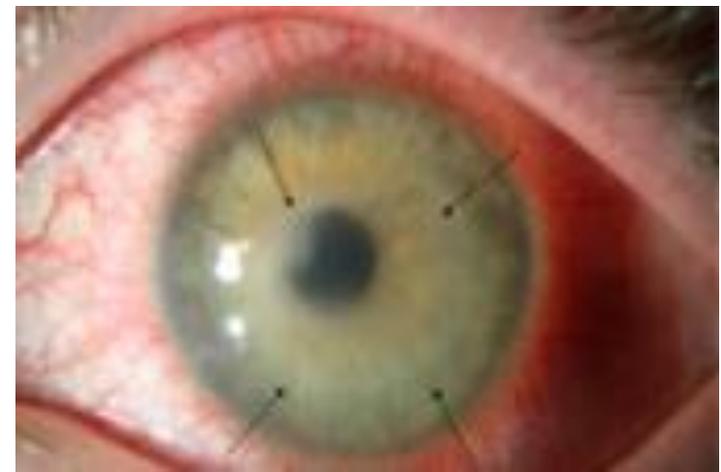
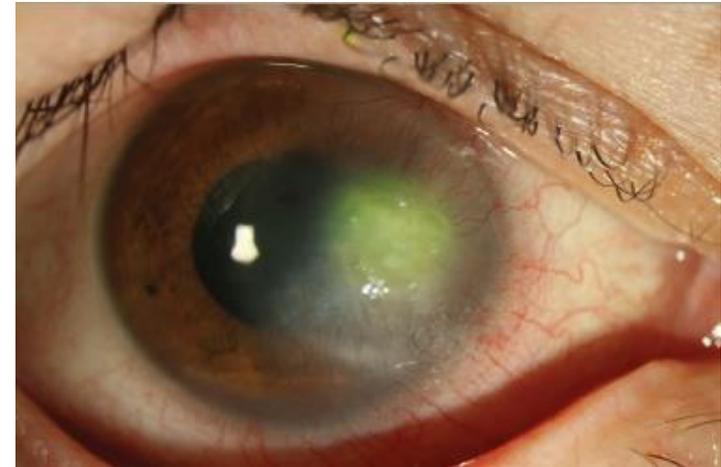
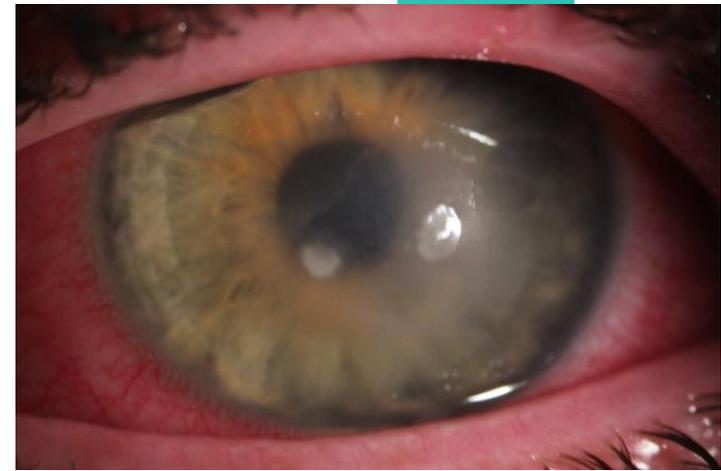
### Causes:

#### Infectious keratitis

- Bacterial
- Viral
- Fungal
- Parasitic (*Acanthamoeba*)

#### Noninfectious keratitis

- Injury
- Eyelid disorders
- Dry eye syndrome
- Exposure to intense ultraviolet (UV) light (photokeratitis)



# Diseases of Eye

## Keratitis

### Bacterial keratitis:

Common in contact lenses wearer from contaminated eye drops or contact lens solution.

### Viral keratitis:

- Herpes simplex virus, Chicken pox virus.

The repeated infections are triggered by stress, an impaired immune system, or exposure to sunlight.

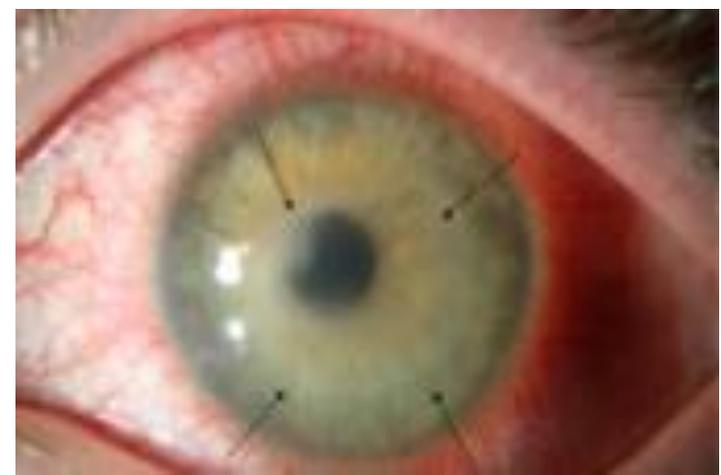
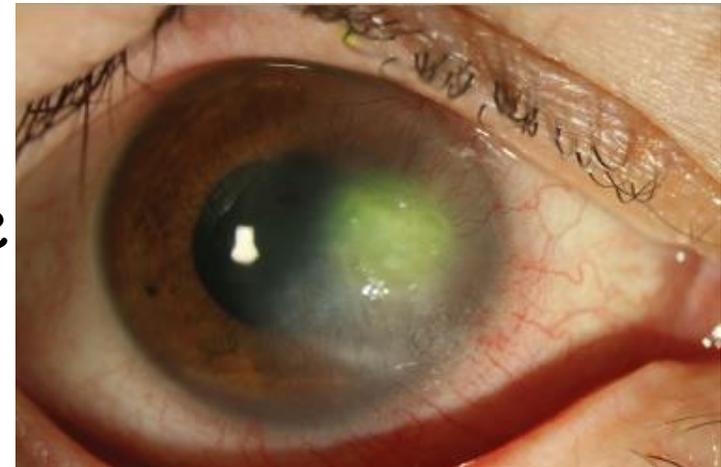
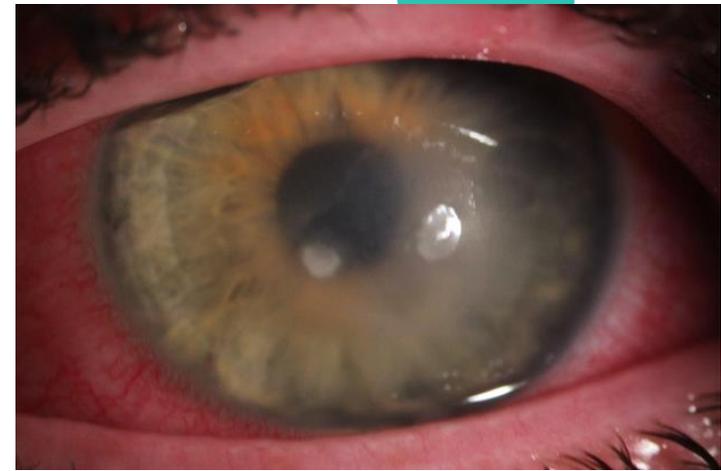
### Parasitic keratitis:

- Acanthamoeba

Poor contact lens hygiene, Exposure to water (like swimming pools) while wearing contact lenses.

### Eyelid disorders:

If the eyelid does not close properly, the cornea can dry out, and keratitis can develop



# Diseases of Eye

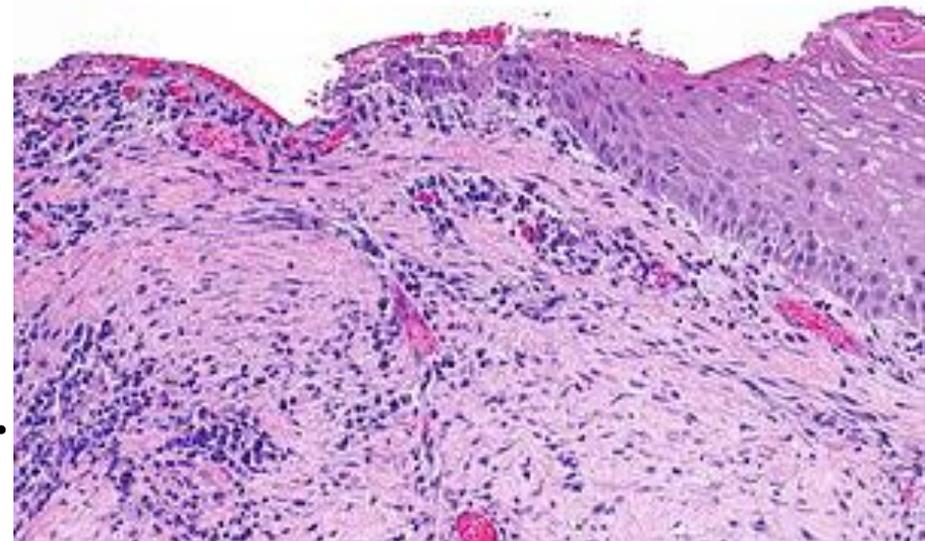
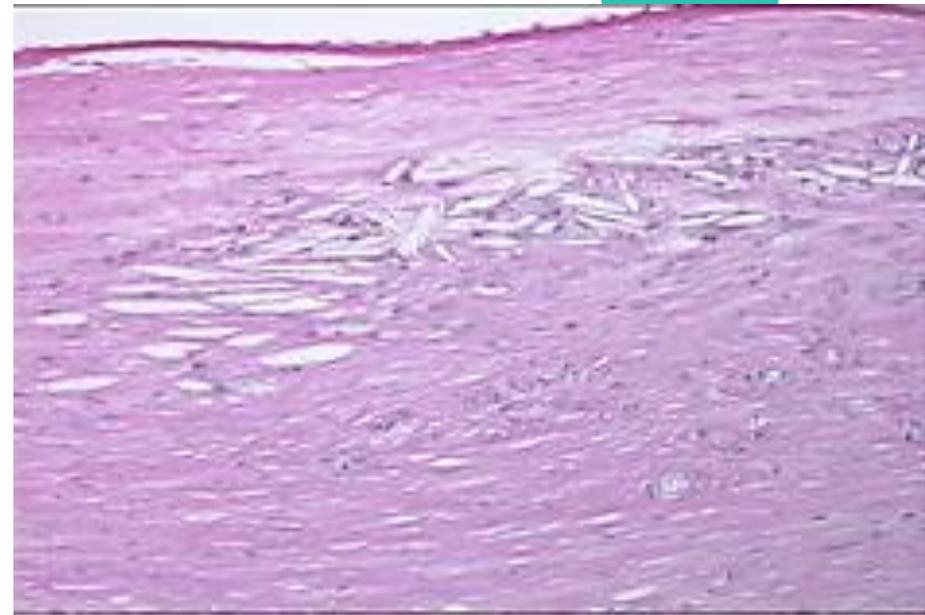
## Keratitis

### Pathologic features:

- Stromal edema. →
- Corneal ulceration may lead to fibrosis with final fibrosis and opacity.
- Rapid neovascularization.
- Stromal mixed inflammatory infiltrates could be focal, or diffuse.

### Clinical features:

- Eye redness.
- Eye pain.
- Excess tears or other discharge.
- Blurred vision due to edema or opacities.
- Photophobia.
- Foreign body sensation



# Eye Tumors

## **Eyelid:**

1. Squamous cell papilloma.
2. Basal cell papilloma.
3. Sebaceous adenoma.
4. Nevi.

## **Conjunctiva & cornea:**

1. Squamous cell papilloma.
2. Nevi

## **Intraocular:**

1. Nevus.

## **Eyelid:**

1. Squamous cell carcinoma.
2. Basal cell carcinoma.
3. Sebaceous adenocarcinoma.
4. Malignant melanoma.

## **Conjunctiva & cornea:**

1. Squamous cell carcinoma.
2. Malignant melanoma.

## **Intraocular:**

1. Melanoma.
2. Lymphoma
3. Retinoblastoma.

## **Intraorbital:**

- lymphoma.  
Rhabdomyosarcoma.

# Eye Tumors

- \* The most common malignant tumor of the eye lid is **Basal cell carcinoma** followed by **Sebaceous adenocarcinoma**.
- \* The most common primary ocular malignancy in the adults is **Uveal Melanoma**.
- \* The most common malignant ocular tumor in Children is **Retinoblastoma**.
- \* The most common malignant orbital tumor in Children is **rhabdomyosarcoma**

# Eye Tumors

## Retinoblastoma

- The most common malignant ocular tumor in children. →
- Present at birth or in early childhood (<4 years old).
- 40% of cases are familial; carrying mutation in Rb1 gene; with tendency of bilateral tumors
- Tumor occurs when both alleles of the retinoblastoma 1 gene (RB1) are inactive

### NE:

- Greyish white mass within the retina with areas of calcification and yellow necrosis.



# Eye Tumors

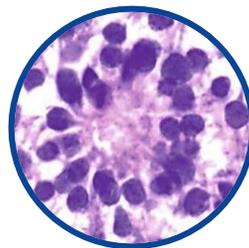
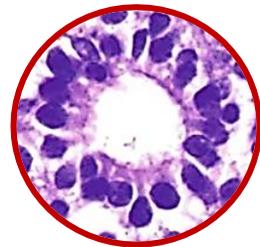
## Retinoblastoma

### M/E:

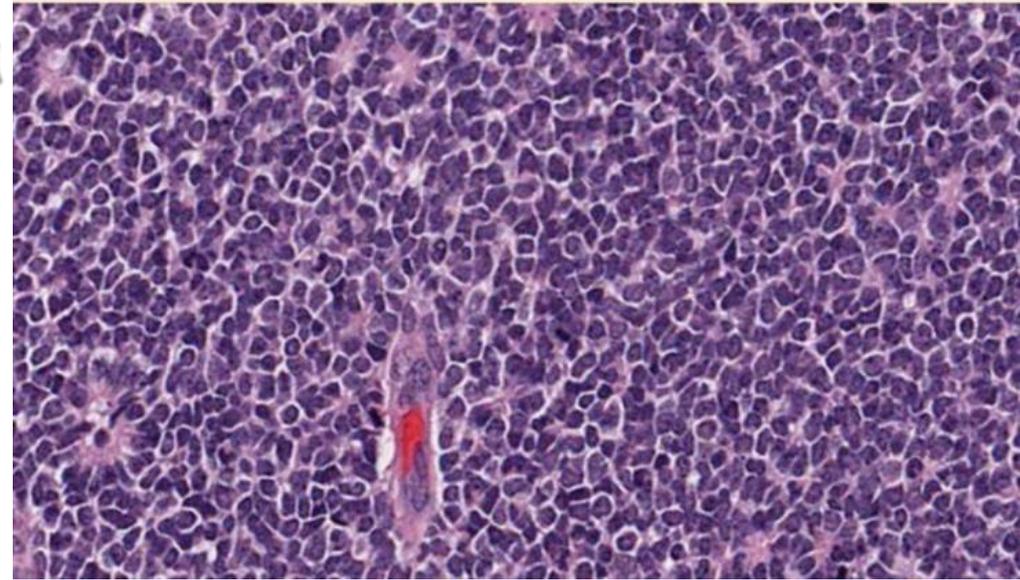
- Embryonal tumor consists of small round blue cells with hyperchromatic nuclei and scant cytoplasm arranged in sheets.

- The tumor cells show characteristic rosettes (tends form photo-receptor elements)

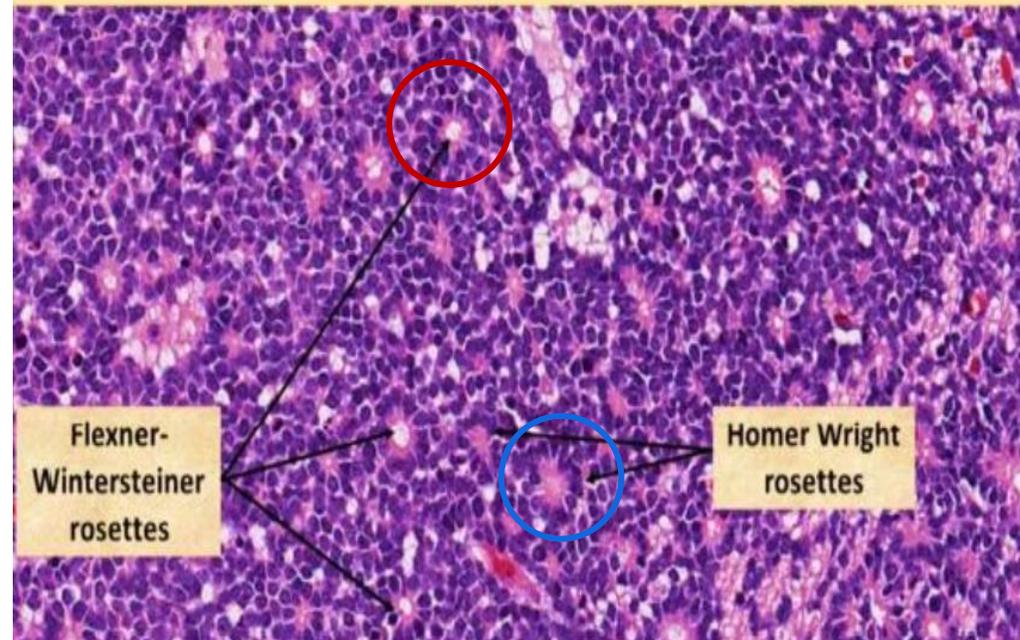
where the tumor cells are arranged around a lumen or around neurofibrillary structure.



High Power: Intensely basophilic nuclei and scanty cytoplasm



ROSETTES

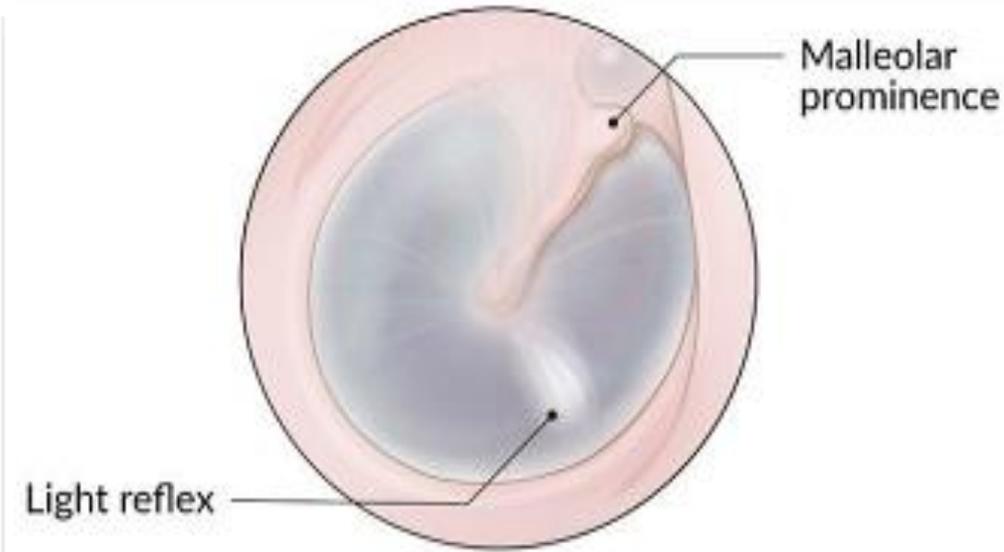
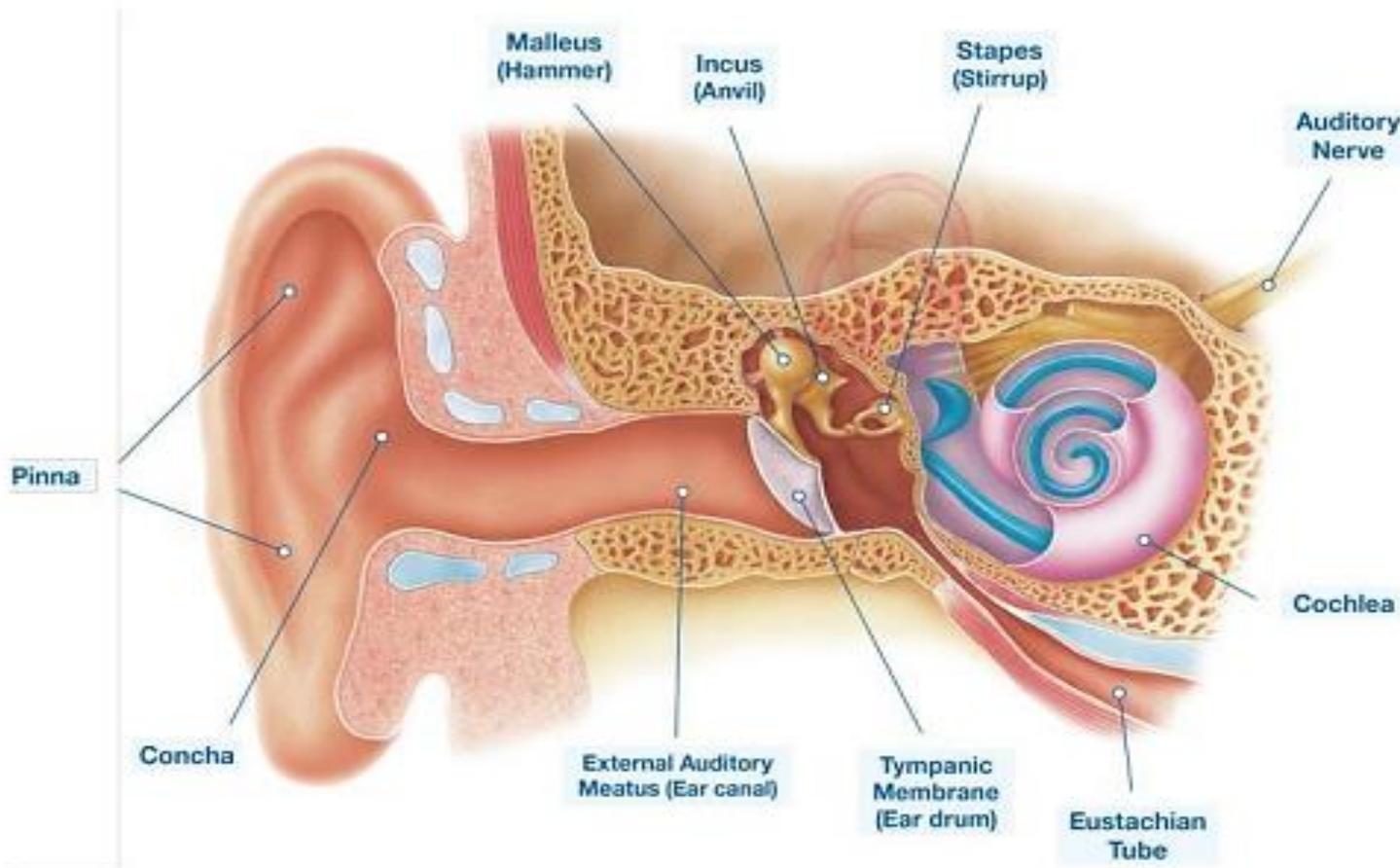


## Now....Answer this

Which of the following is a microscopic feature of retinoblastoma:

- a. perivascular rosettes.
- b. Hypercellularity & pleomorphism.
- c. Pleomorphism & mitosis.
- d. Small round cells.
- e. Psammoma bodies.

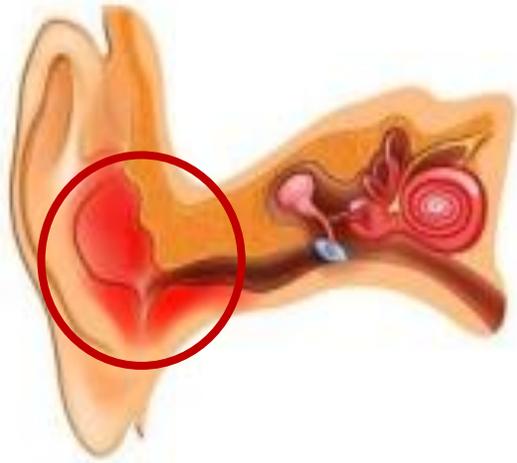
# Ear



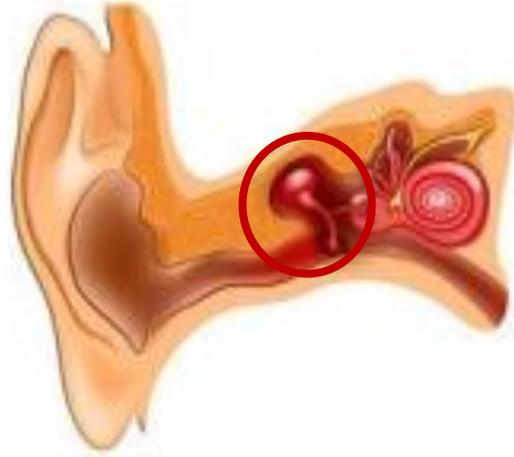
- Glistening, transparent
- Light reflex
- Pearly gray to pale pink.
- Mobile (to the air pulses).
- Handle and short process of malleus well identified

# Diseases of Ear

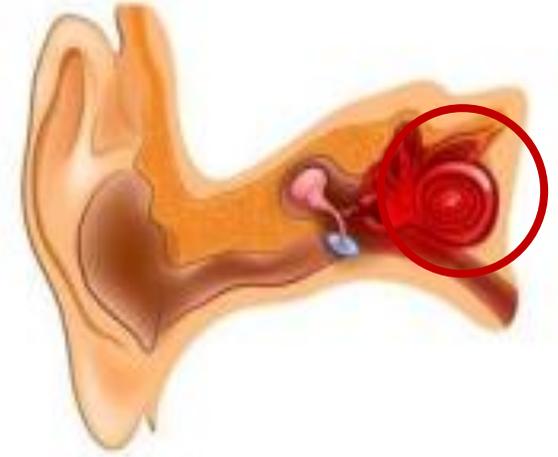
## Otitis



otitis externa



otitis media



otitis interna

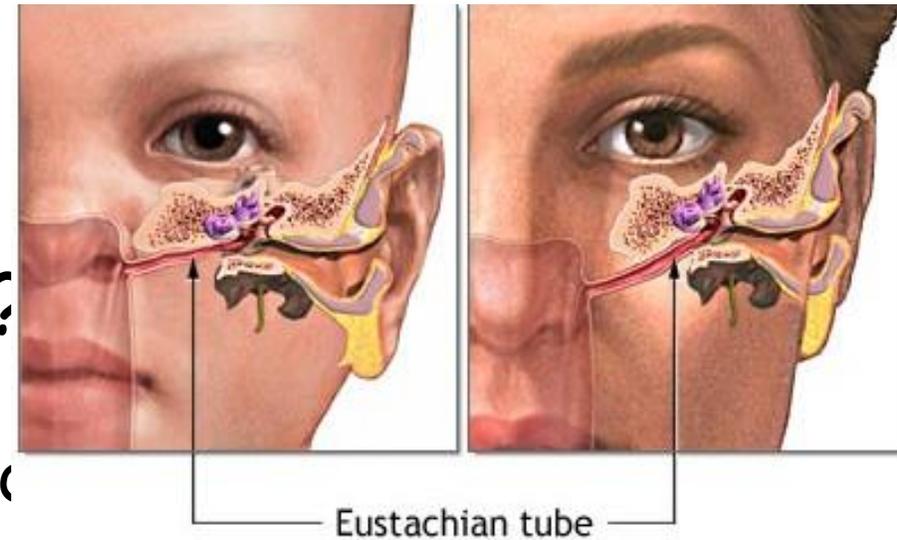
# Diseases of Ear

## Otitis Media

Inflammation of the middle ear.

### Risk factors:

- Children in first 2-4 years of life ???
  - Immune system not fully developed
  - Eustachian tube is easier to get blocked as it is shorter, more horizontal with narrower opening
  - Adenoids show infection or hyperplasia
- Bottle feeding (in supine position)
- Day care (kid-to-kid)
- Craniofacial anomalies as cleft palate
- Ciliary dysfunction as in exposure to cigarette



# Diseases of Ear

## Otitis Media

### Etiology:

\**S. pneumoniae* - 40-45%

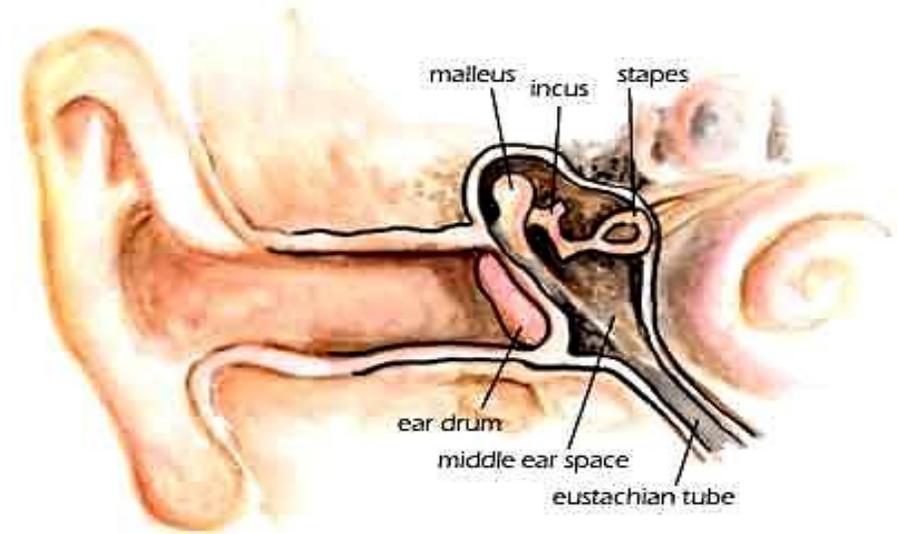
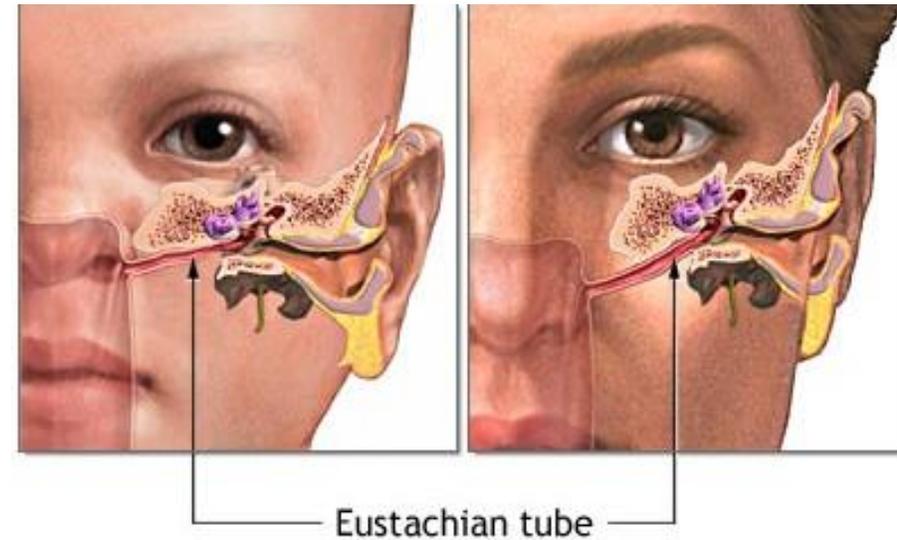
\**H. influenzae* - 30-35%

Others:

*Moraxella catarrhalis*,  
Group A strep, staph,  
Viral

### Routes:

- Via eustachian tube: the most common.
- Via external ear: tympanic membrane perforation.
- Direct spread from mastoiditis.
- Blood-born: very rare.



# Diseases of Ear

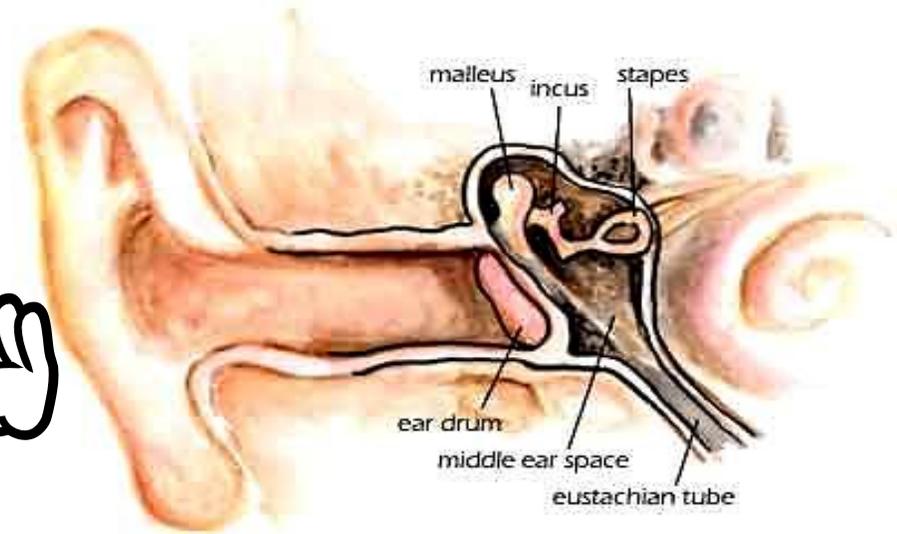
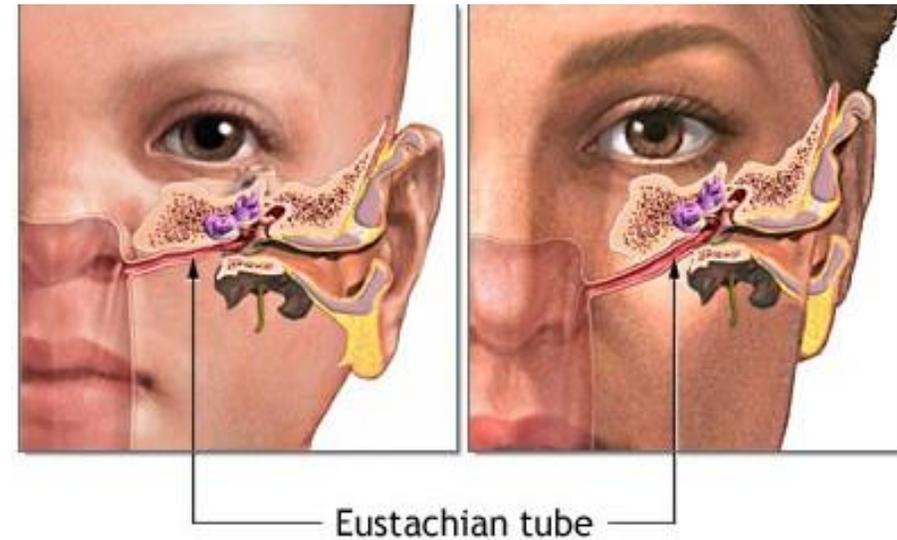
## Otitis Media

### Classification:

- Acute Otitis media:
- Otitis Media with effusion (OME):
- Chronic otitis media:
  - OM lasting 6 weeks or more
  - Chronic suppurative
  - Cholesteatoma

### Complications:

- Hearing loss; conductive, temporary
- Facial nerve Paralysis
- Spread of infection:
  - Labyrinthitis, Mastoiditis
  - Intracranial as meningitis & brain abscess



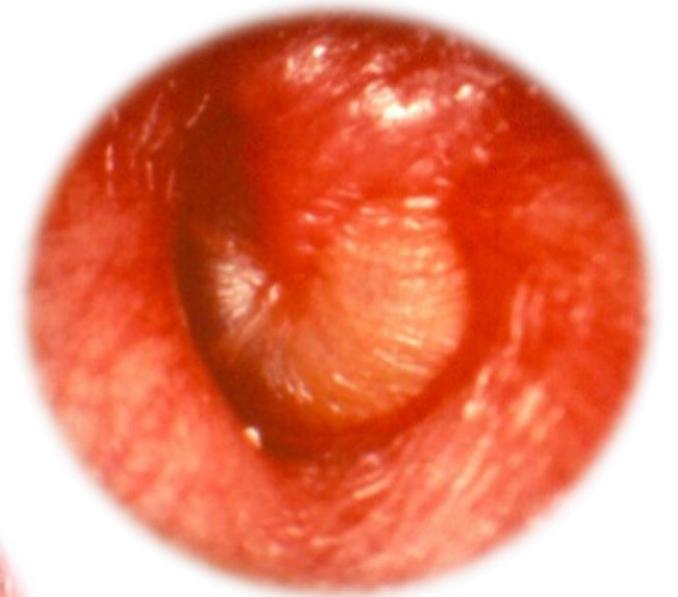
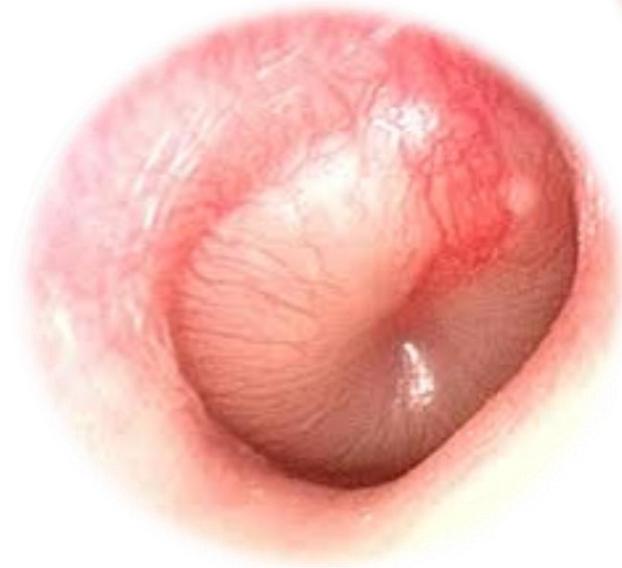
# Diseases of Ear

## Otitis Media

### Acute otitis media:

#### Tympanic membrane:

- Opaque, thick
- Bulging/injected (erythematous)
- Loss of anatomic landmarks
- Reduced mobility
- Purulent effusion



# Diseases of Ear

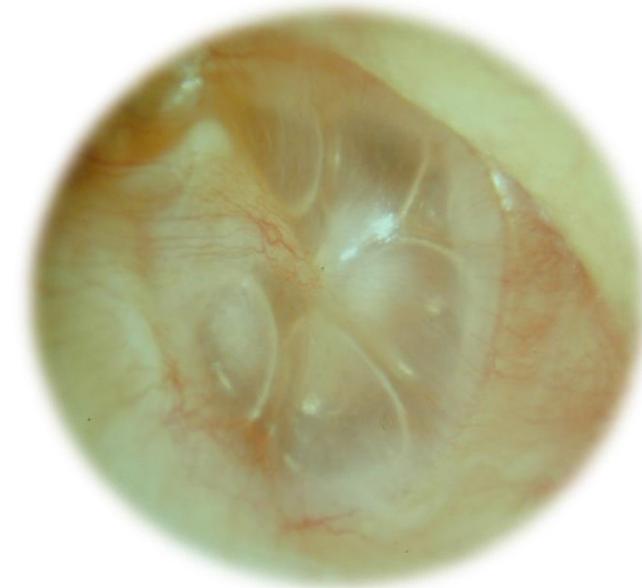
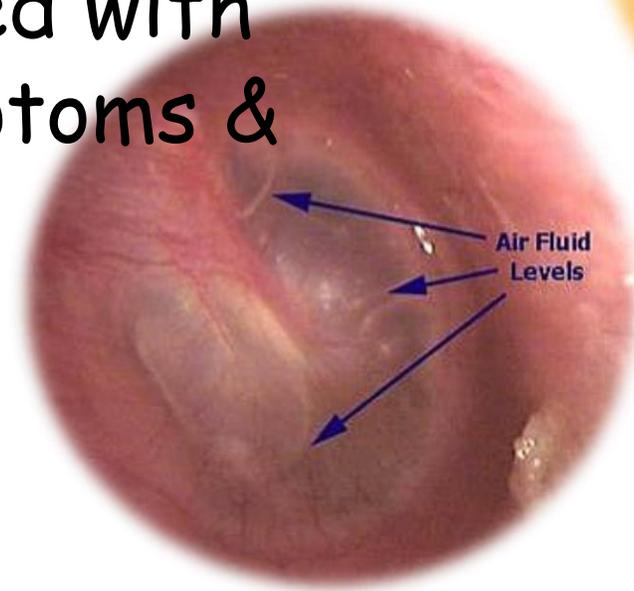
## Otitis Media

### Otitis media with effusion:

Effusion with intact tympanic membrane, **not** associated with acute inflammatory symptoms & signs.

Tympanic membrane:

- Translucent or opaque
- Gray/pink
- Reduced mobility
- Effusion (thick mucoid) +/- air.

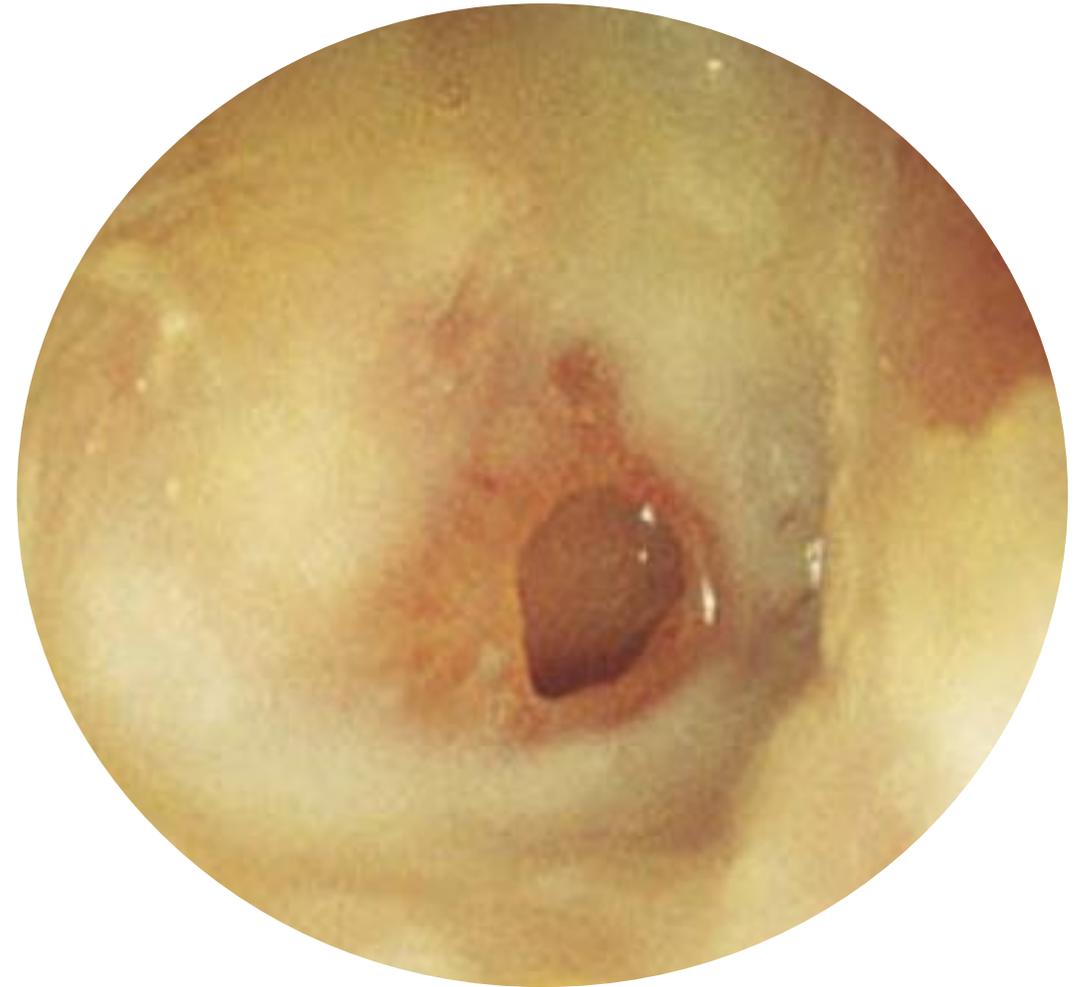


# Diseases of Ear

## Otitis Media

### Chronic suppurative otitis media:

- Chronic tympanic membrane perforation, fibrosis, calcification
- Purulent discharge (mucopurulent otorrhea)
- Conductive hearing loss

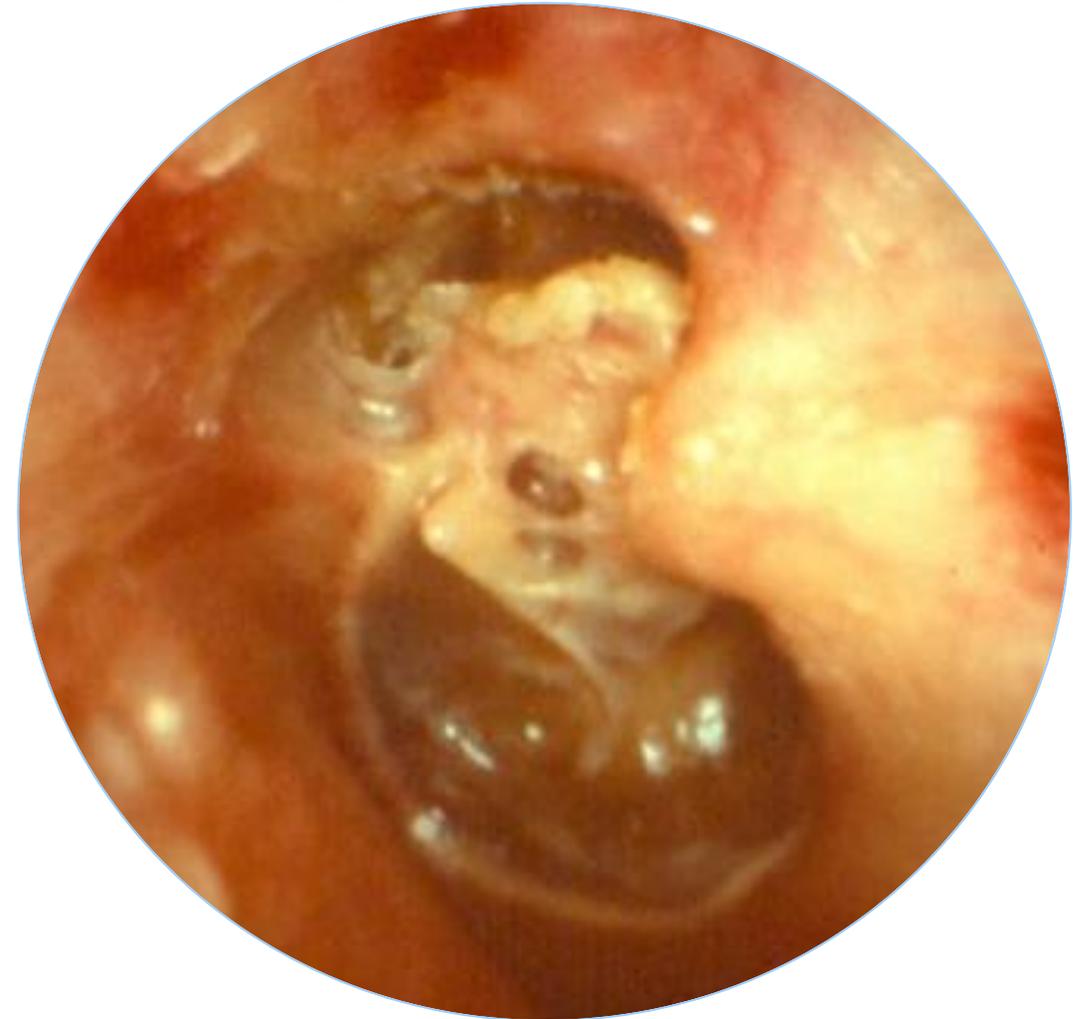


# Diseases of Ear

## Otitis Media

### Chronic otitis media with cholesteatoma:

- Accumulation of squamous epithelium with keratin + cholesterol clefts + large number of histiocytes. in middle ear & mastoid
- Osteolytic (osteoclastic inflammation)
- Often accompanied by chronic otorrhea



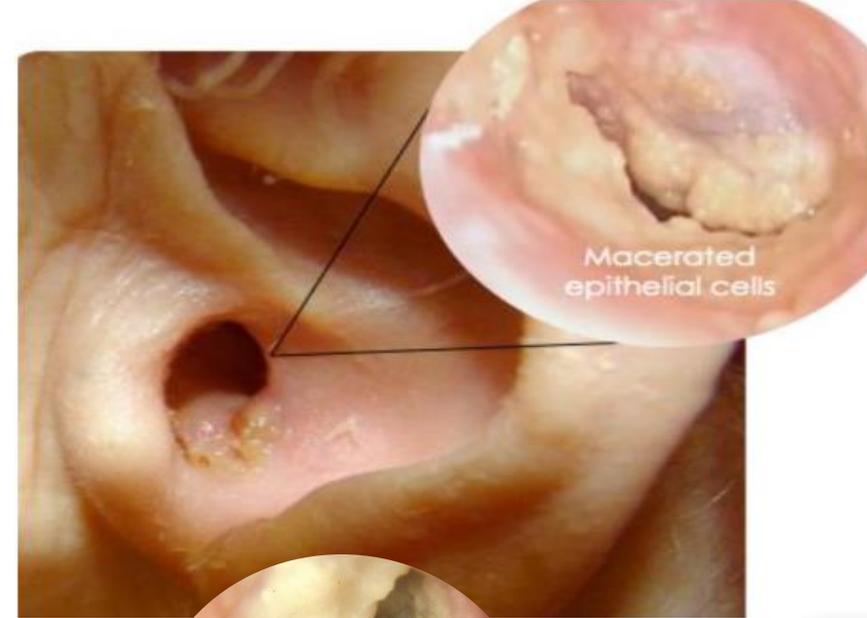
# Diseases of Ear

## Otitis Externa

Infection of the skin and subcutis of the external auditory canal

### Types:

- 1- Acute diffuse otitis externa
- 2- Circumscribed otitis externa.
- 3- Chronic otitis externa.
- 4- Malignant (Necrotizing) otitis externa



## Otitis Interna

- Commonly known as labyrinthitis or vestibular neuritis.
- Caused mainly by viral infection.
- Symptoms include vertigo, dizziness, a ringing sound in your ears

# Ear Tumors

- Tumors of external ear:  
Cerumen-gland tumors
- Tumors of middle ear:  
Jugular paraganglioma  
(glomus tumor).
- Tumors of inner ear:  
Acoustic neuroma.

# Ear Tumors

## Schwannoma

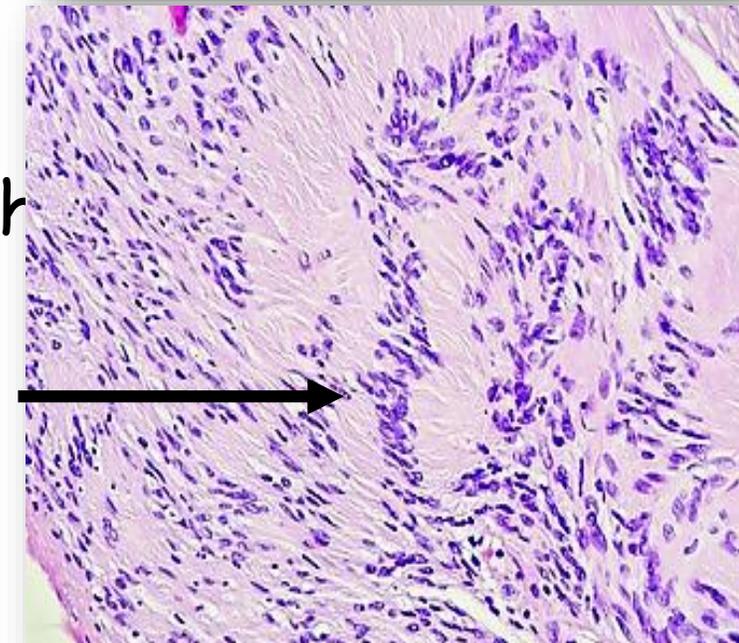
- It is a benign tumor called Acoustic neuroma of 8th cranial nerve
- Age: 50-60 years.

### N/E:

Solitary mass, capsulated, firm round or fusiform with the related nerve at one side  
Cut surface is grey white and may show cysts

### M/E:

Spindles shaped cells arranged in bundles, with rod-shaped nuclei side by side in palisade manner with reticular and collagen fibers in between.



# Ear Tumors

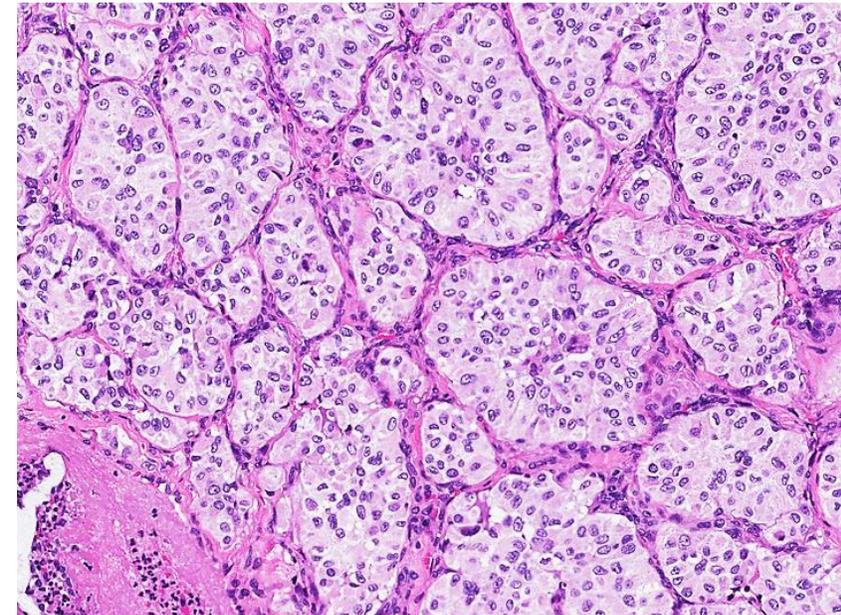
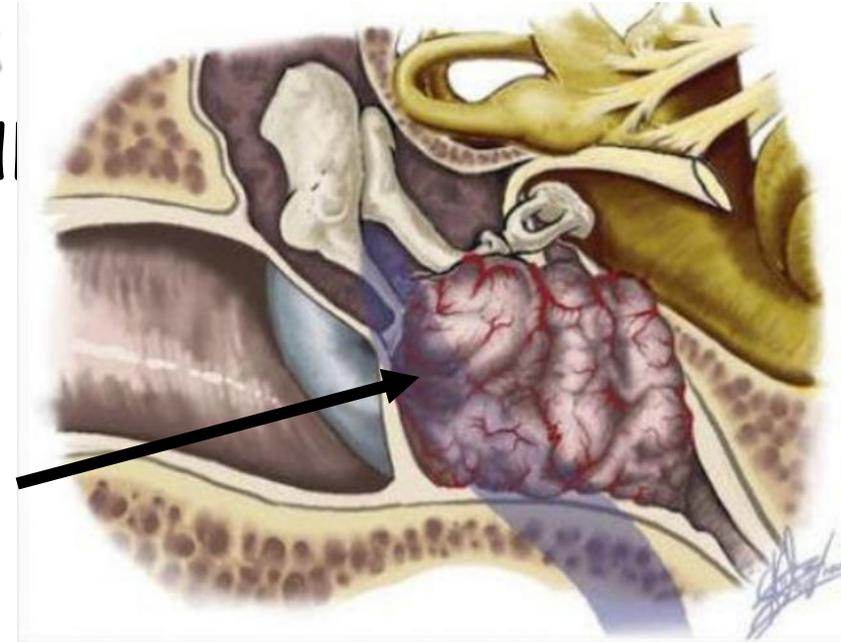
## Jugular para-ganglioma

The most common benign tumor of the middle ear. Called *Glomus jugular*- Arise from parasympathetic ganglia.

**M/E:**

Classic organoid/nested pattern called "zellballen"; with fibrovascular stroma separates the nests

1. the central cells are rounded/ovoid chief cells with abundant eosinophilic granular cytoplasm.
2. Spindle cells present at the periphery of nests.



## Now....Answer this

Cholesteatoma is characterized by which of the following?

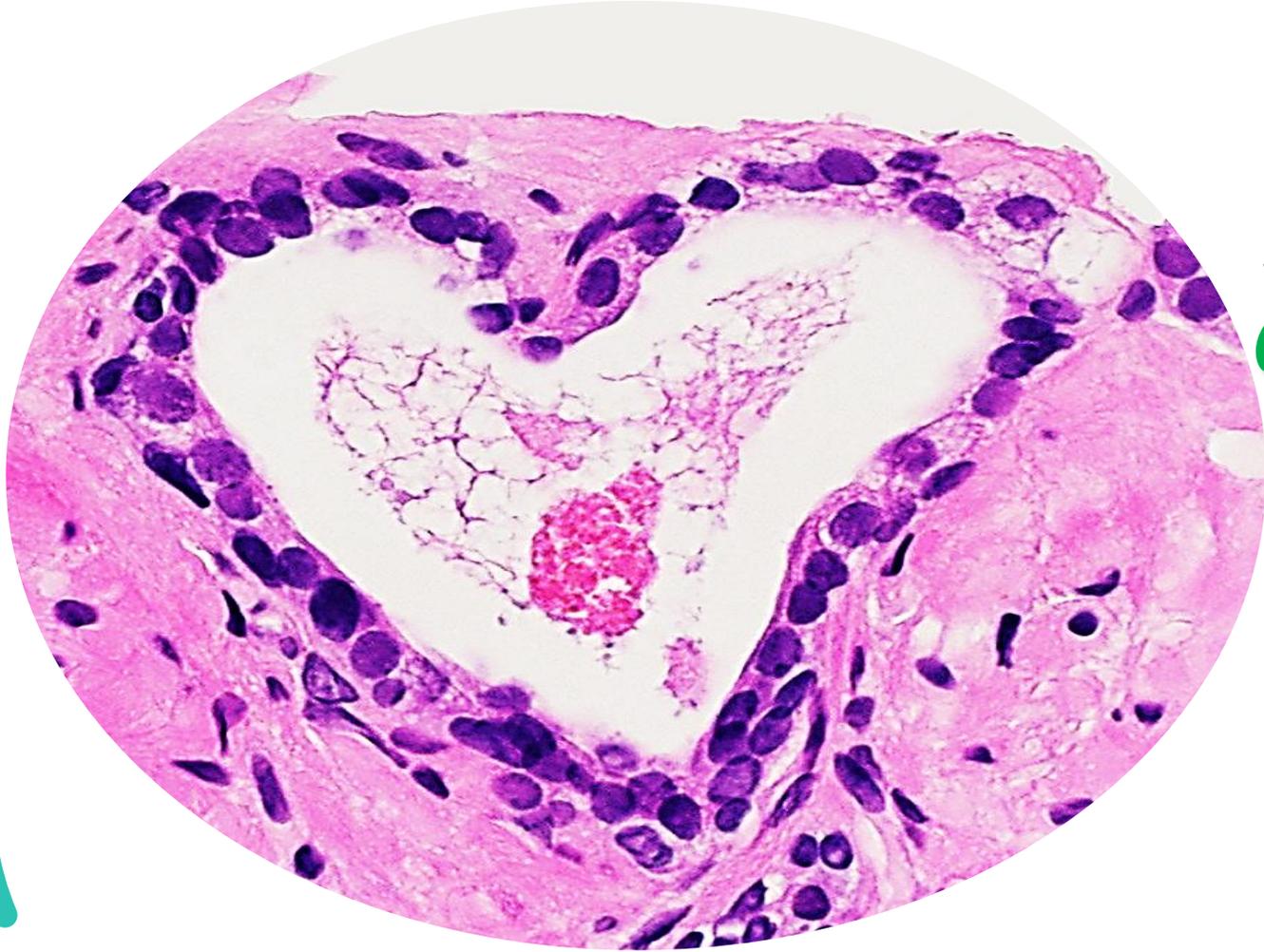
- a) Accumulation of fluid in the middle ear
- b) Commonly affect children
- c) Excess suppuration
- d) Bone inflammation with erosion
- e) Accumulation of secretions in the middle ear



Discussion & Feedback

# References & recommended readings

1. Robbins & Cotran Pathologic Basis of Disease, (Robbins Pathology), 2018 ISBN: 978-0-323-35317-5, Edition: 10th
2. Webpath: <https://webpath.med.utah.edu/webpath.html>  
<https://www.pathologyatlas.ro/index.php>



*Thank you*