

## Checklist- Lab 4

### **Eyeball dissection, Extraocular muscles, Orbital walls, Foramina and Fissures, Structures passing through Foramina and Fissures of the Orbit**

#### **Eyeball dissection**

*Before dissecting the eyeball, note the external features like the periorbital fat, the Optic nerve and the attachments of extraocular muscles on sclera*

#### **Identify the three coats of the eyeball:**

##### **Outer fibrous coat**

Cornea

Sclera

##### **Middle vascular coat**

Choroid

Ciliary body

Iris

##### **Inner nervous coat**

Retina

#### **Identify the following parts:**

Corneoscleral junction (limbus)

Pupil

Lens

Anterior chamber

Posterior chamber

Aqueous humor

Vitreous humor

Suspensory ligaments

#### **Identify the Extraocular muscles on the eye model**

*(self revision)*

Levator palpebrae

superioris

Superior rectus

Inferior rectus

Medial rectus

Lateral rectus

Inferior oblique

Superior oblique

Refer to [https://www.youtube.com/watch?v=6mNs\\_TcUyHc](https://www.youtube.com/watch?v=6mNs_TcUyHc)

## **Orbital walls, foramina and fissures** (*self revision*)

### **Orbital walls**

#### Roof:

Orbital plate of frontal bone (1)

Lesser wing of sphenoid (2)

#### Floor:

Orbital plate of maxilla (3)

#### Lateral wall:

Orbital plate of zygomatic bone (4)

Greater wing of sphenoid (5)

#### Medial wall:

Frontal process of maxilla (6)

Lacrimal bone (7)

Orbital plate of ethmoid (8)

### **Foramina and fissures of the orbit**

Superior orbital fissure (9)

Inferior orbital fissure (10)

Optic canal (11)

Anterior and posterior ethmoidal foramina (12, 13)

Infraorbital groove and canal (14)

Supraorbital foramen (15)

Infraorbital foramen (16)

Note the superior orbital fissure opens anteriorly into orbit and posteriorly into middle cranial fossa

Note the inferior orbital fissure opens anteriorly into orbit and posteriorly into two fossae: one big ( infratemporal fossa) and one small (Pterygo-palatine fossa)

## Structures passing through Foramina and fissures of the orbit (*self revision*)

### Superior orbital fissure:

Lacrimal nerve  
Frontal nerve  
Nasociliary nerve  
Oculomotor nerve (upper and lower divisions)  
Trochlear nerve  
Abducent nerve  
Superior ophthalmic vein

Branches of ophthalmic division

### Inferior orbital fissure:

Maxillary nerve  
Zygomatic nerve  
Inferior ophthalmic vein

### Optic canal:

Optic nerve  
Ophthalmic artery

### Anterior and posterior ethmoidal foramina:

Anterior and posterior ethmoidal nerves and vessels

### Infraorbital groove and canal:

Infraorbital nerve and vessels

### Supraorbital foramen:

Supraorbital nerve and vessels

### Infraorbital foramen:

Infraorbital nerve and vessels

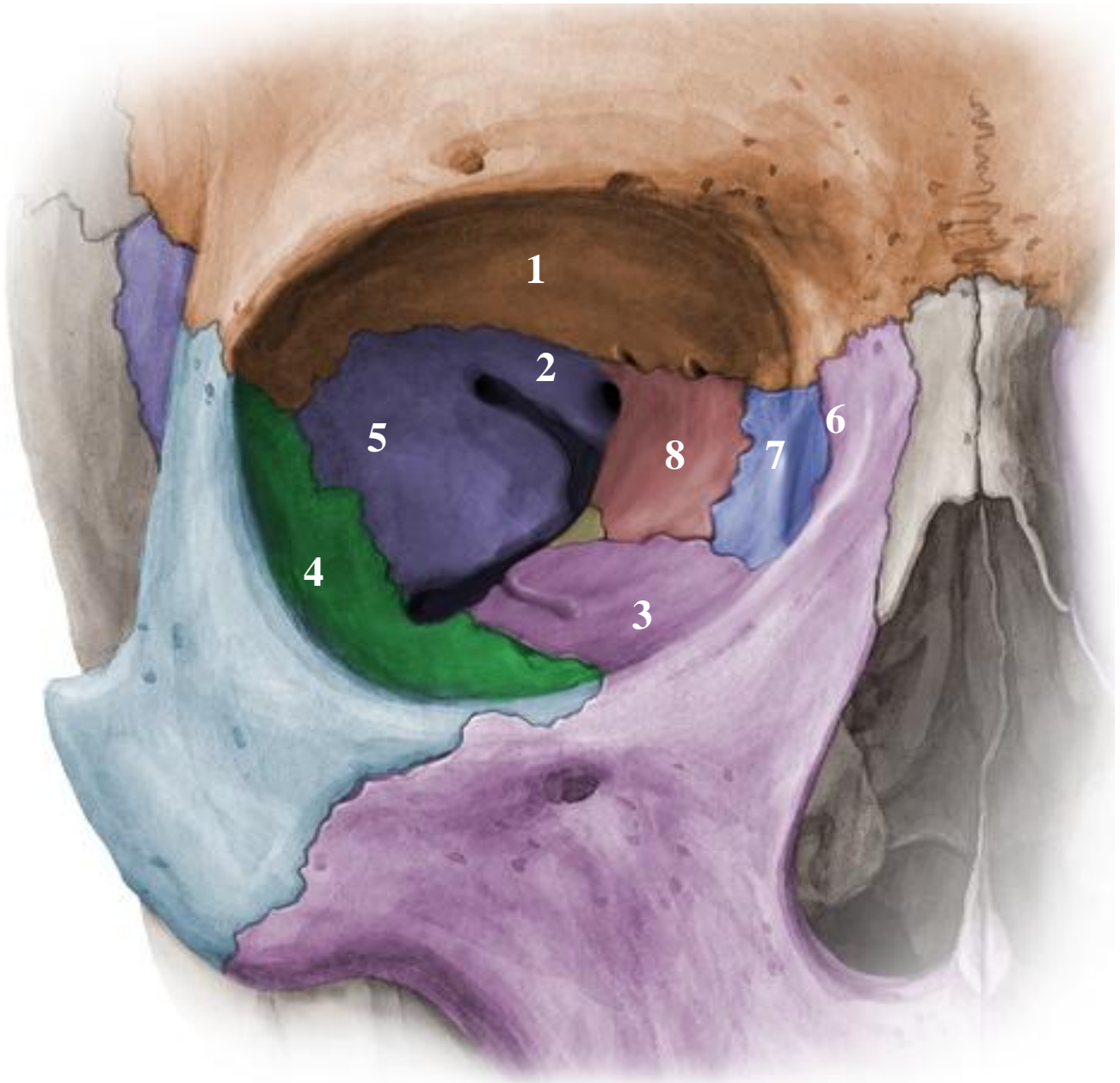
#### **Superior orbital fissure:**

between the greater and lesser wings of the sphenoid, it communicates with the middle cranial fossa

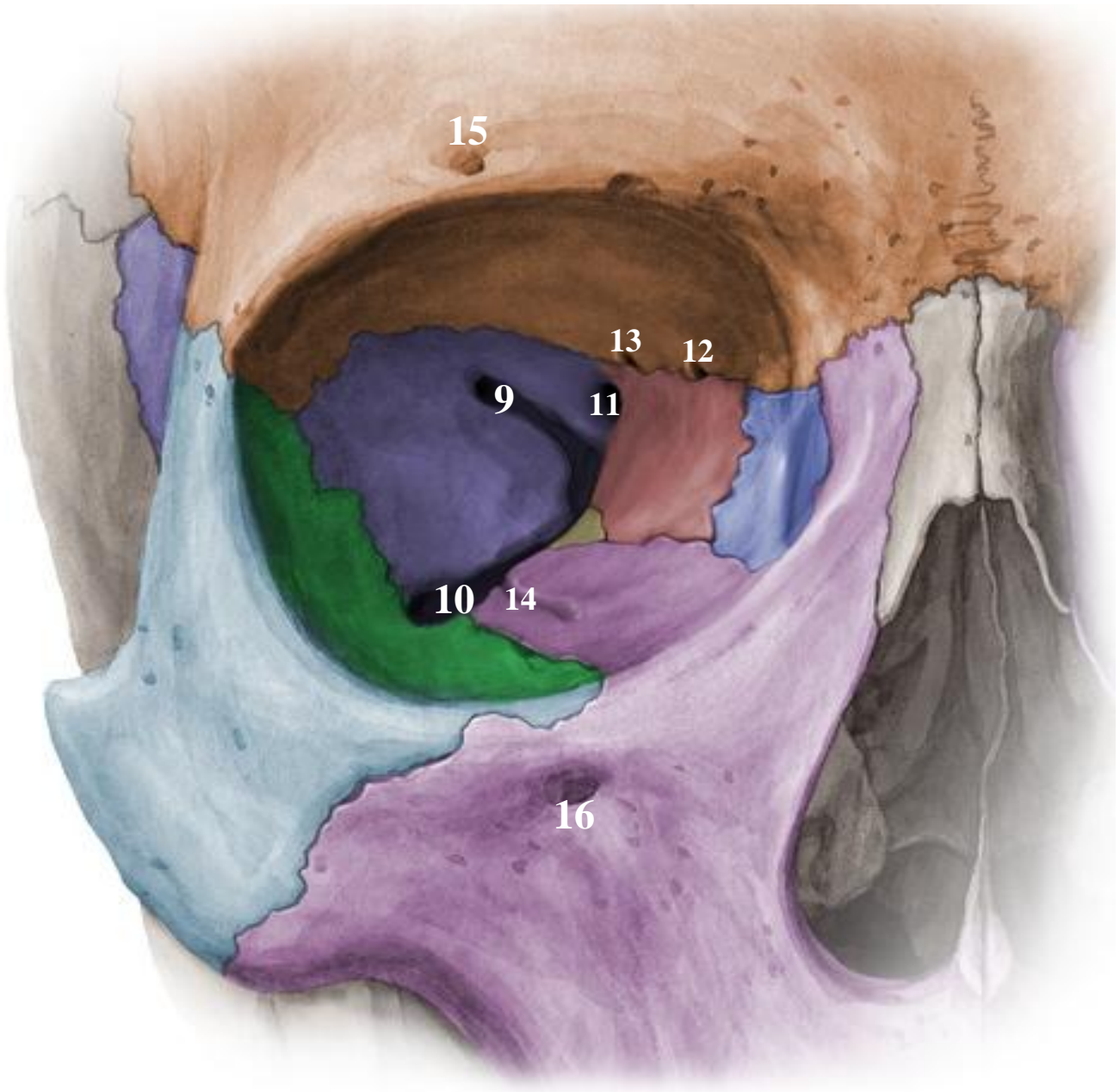
#### **Inferior orbital fissure:**

between the maxilla and the greater wing of the sphenoid, it communicates with the pterygopalatine fossa and infratemporal fossa

# Orbital walls



# Foramina and fissures of the orbit



## Sheep eyeball dissection procedure

*Use the scalpel carefully. Don't use excessive force or a sawing motion when using a scalpel*

- 1- Dry the eye with paper toweling. Examine the front of the eye and locate the cornea, sclera and fatty tissue. Examine the back of the eye and find extrinsic muscle bundles, fatty tissue and the optic nerve. If the optic nerve is not visible use the probe to move the fatty tissue around until the nerve is exposed.
- 2- Place your eye specimen in the dissection pan. Turn the specimen so the cornea is on the left and the optic nerve is on your right. Select a place to make an incision of the sclera midway between the cornea and optic nerve. Use the scalpel to make a small cut through the sclera. Fluid should ooze out of the eyeball when you have cut deeply enough. You will be reminded of how tough the sclera is when you make this cut.
- 3- Insert the point of the scissors into the slit made by the scalpel and cut the sclera with a shallow snipping motion. Cut the sclera all the way around the eyeball (cut into anterior and posterior hemispheres).
- 4- Observe the gelatinous vitreous humor that fills the central cavity of the eye.
- 5- Use forceps (probe or tip of scissor) to peel the retina away from the underlying choroid coat. The retina should remain attached at the blind spot. The choroid coat is dark and relatively thin. Use forceps (probe or tip of scissor) to gently separate the choroid from the outer sclera. Verify that the eye has three distinct layers, the retina, choroid and sclera.
- 6- Use forceps (probe or tip of scissor) to remove the vitreous humor from the anterior hemisphere of the eye. Try not to disturb the lens that is just below the vitreous humor.
- 7- Removal of the vitreous humor reveals the lens, ciliary body and suspensory ligaments. Remove the lens by pulling it free from its attachments. Note the shape of the lens, its stiffness and opaqueness.
- 8- When the lens is removed, an opening, allowing light to enter the eye is seen. This opening, the pupil is located in the center of the iris.
- 9- Remove the cornea from the anterior eye hemisphere. Use a scalpel to puncture a small slit at the boundary between the cornea and sclera. Then insert the scissors into the slip and cut all the way around the cornea to remove it. Notice the thickness of the cornea. How does it compare to the thickness of the sclera? Carefully observe the anterior side of the iris and pupil. Which structure of the eye would be just behind the pupil opening?
- 10- Observe the eye model. Examine the external muscles.

Notes:

- ✓ Sheep have four extrinsic muscles (humans have six)
- ✓ The fatty tissue cushions the eye
- ✓ The cloudy nature of the cornea is caused by the non-living tissue. It is transparent in the living state
- ✓ The vitreous humor along with the aqueous humor (found behind the cornea) helps to maintain the shape of the eye.
- ✓ Notice that the retina is only firmly attached to the choroid at one place. This region is the optic disc or blind spot. Here the nerve fibers leave the retina and form the optic nerve which is directly behind the blind spot.
- ✓ The choroid contains an extensive network of blood vessels that bring nourishment and oxygen to itself and the other two layers. The dark color, caused by pigments, absorbs light so that it is not reflected around inside of the eye.
- ✓ The tapetum lucidum, which is not found in the human eye, functions to reflect light onto the retina. It especially helps animals with night vision since it can reflect light even at very low intensities. It is shiny, glittering with a bluish color.
- ✓ In the normal condition the lens is transparent except, when as a condition of aging, the lens turns cloudy. The cloudy condition, called cataract, prevents or reduces the amount of light reaching the retina. The normal lens is convex shaped and somewhat elastic. It is held in place by the suspensory ligaments that in turn join with the smooth muscle containing ciliary body (**ciliary muscle**).
- ✓ Two muscle layers of the iris regulate the size of the pupil. One layer increases the pupil size with decreasing light intensity and the other layer reduces pupil size with increasing light intensity (**sphincter and dilator pupillary muscles**).
- ✓ Note the oblong shape of the sheep pupil; in humans the pupil is circular.

