Special Senses

The Eye
The eye is formed by three layers, or tunics. From the outside to the inside of the eyeball the three tunics are the

**fibrous tunic**, which forms a capsule enclosing and protecting the other components of the eye. It is subdivided into the sclera, with primarily structural functions, and the cornea, which is part of the optic apparatus.

**vascular tunic**, which forms the choroid, ciliary body and iris. This tunic is also called the uveal tract. The choroid has primarily nutritive functions. The ciliary body generates the aqueous humor of the eye, but the ciliary muscle also functions in the optic apparatus. The iris is part of the optic apparatus in which it functions as a contractile diaphragm, i.e. the aperture of the eye. The neural tunic consists of the retina.

The retina proper forms the photoreceptive layer of the eye. As a double-layered epithelium, the retina also covers the ciliary process and the posterior surface of the iris, where it has both nutritive and structural functions. The ciliary and iridial parts of the retina are described together with the ciliary process and iris.
some pictures...
Eye ball consists of three layers:

1. External layer - Sclera;
2. Middle layer - Choroid;
3. Innermost layer - Retina;
Movement of eye

Eye movement simulator
(http://cim.ucdavis.edu/eyes/version1/eyesim.htm)
Innervation
### Extrinsic eye muscles

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Movement</th>
<th>Nerve</th>
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<tbody>
<tr>
<td>Superior oblique</td>
<td>Depresses eye, turns laterally</td>
<td>IV (Trochlear)</td>
</tr>
<tr>
<td>Lateral rectus</td>
<td>Turns laterally</td>
<td>VI (Abducens)</td>
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<tr>
<td>Medial rectus</td>
<td>Turns medially</td>
<td>III (Oculomotor)</td>
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<tr>
<td>Superior rectus</td>
<td>Elevates</td>
<td>III (Oculomotor)</td>
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<tr>
<td>Inferior rectus</td>
<td>Depresses eye</td>
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</tr>
</tbody>
</table>
Large Models - Anterior Structures

- Sclera
- Lacrimal gland
- Iris
- Pupil
Large Models - Muscles (Anterior)

Superior rectus muscle

Medial rectus muscle

Lateral rectus muscle

Tendon of superior oblique muscle

Medial rectus muscle
Small Models - Muscles (Anterior)

Superior rectus muscle

Medial rectus muscle

Tendon of superior oblique muscle

Lateral rectus muscle

Inferior oblique muscle

Inferior rectus muscle

Medial rectus muscle

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Large Models – Medial View

- Lacrimal gland
- Superior rectus muscle
- Tendon of Superior oblique muscle
- Optic nerve
- Sclera
- Medial rectus muscle
- Choroid
- Optic nerve
Large Models – Posterior Structures

- Choroid
- Sclera
- Optic nerve
- Lacrimal gland
Large Models – Muscles (Posterior)

Superior rectus muscle

Tendon of superior oblique muscle

Lateral rectus

Medial rectus

Inferior rectus muscle

Lateral rectus
Small Models – Muscles (Posterior)

- Superior rectus muscle
- Tendon of superior oblique muscle
- Medial rectus muscle
- Inferior rectus muscle
- Medial rectus muscle
- Lateral rectus muscle
- Inferior oblique muscle

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Large Models - Lateral

- Superior rectus muscle
- Lacrimal gland
- Sclera
- Optic nerve
- Lateral rectus muscle
- Optic nerve
- Lateral rectus muscle
- Inferior oblique muscle
Eye Wall Layers and Chambers

- Posterior cavity
- Vitreous humor
- Sclera
- Choroid
- Retina
- Anterior cavity
- Cornea
- Anterior cavity
- Posterior cavity
Internal Structures

- Ciliary body
- Suspensory ligaments
- Fovea centralis
- Optic disk
- Iris
- Lens

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Cow Eye

- Choroid is darkly pigmented layer
- Pupil is opening in iris
- Retina is partially detached
Sheep Eye

- Choroid is darkly pigmented layer
- Pupil is opening in iris
- Retina is partially detached
Vision Tests

Snellen-Visual Acuity Chart

Ishihara Color Plates

Astigmatism Chart

Blind Spot Test Figure
Large Eye Model with Lid

http://daphne.palomar.edu/ccarpenter/Models/eye_3b.htm

http://www.highlands.edu/academics/divisions/scipe/biology/labs/cartersville/2121/senses.htm
1. (outer layer) Fibrous: dense connective tissue
   - **Sclera** – white of the eye
   - **Cornea**
2. (middle) Vascular: uvea
   - **Choroid** – posterior, pigmented
   - **Ciliary body**
     - Muscles – control lens shape
     - Processes – secrete aqueous humor
     - Zonule (attaches lens)
   - **Iris**
3. (inner layer) Sensory
   - **Retina and optic nerve**
(a) **Diagrammatic view.** The vitreous humor is illustrated only in the bottom part of the eyeball.
Posterior View of the Anterior Half of the Eye

Figure 16.9a