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**COURSE TITLE: GROSS ANATOMY**

**COURSE CODE: ANA 210**

**ASSIGNMENT QUESTIONS**

1. Describe the importance of vasculature in relation to immune system and outbreak of pandemic Convid-19 on human body

Answer:

The body’s natural barriers against disease-causing intruders – for example, our skin, the mucous and hairs in our nose, and the acid in our stomachs – are part of our innate immune systems.

Adaptive immunity develops over a lifetime of contact with pathogens and vaccines, preparations which help our immune systems to distinguish friend from foe. The immune system is the body’s multi-level defense network against potentially harmful bacteria, viruses and other organisms.

The coronavirus pandemic has turned the world’s attention to the immune system, the body’s defense force against disease-causing bacteria, viruses and other organisms that we touch, ingest and inhale every day.

The immune system is the network of cells throughout our body (in the skin, the blood, and elsewhere) that work together to prevent or limit infection from potentially harmful pathogens (like bacteria and viruses) and to prevent damage from noninfectious agents (like sunburn and [cancer](https://www.everydayhealth.com/cancer/guide/)), according to a [definition from the National Institutes of Health (NIH)](https://www.niaid.nih.gov/research/immune-system-overview).

Scientists categorize the various immune cells in two groups: innate immune cells and adaptive ones, explains [Michael N. Starnbach, PhD](https://connects.catalyst.harvard.edu/Profiles/display/Person/58775), a professor of microbiology at Harvard Medical School in Boston.

Innate immune cells are the first line of defense. They identify microbes and other potential threats, triggering a response to get rid of them. Adaptive immune cells are involved in the second part of an immune response. “These are special cells that respond to ‘mop up’ the remainder of the organisms left after the innate immune response,”

Here comes the interesting part: The adaptive immune system has what’s known as “immune memory,” meaning that when those cells see a pathogen that has previously entered the body, not only do they help get rid of the invader, they also make more copies of themselves to continue to build a stronger defense in the future so the body is better prepared to fight off the pathogen if and when it reappears.

In the case of new viruses, such as the novel [coronavirus](https://www.everydayhealth.com/infectious-diseases/coronavirus/), however, no one has a heightened response to it, because no one’s immune memory has encountered it. No one has been exposed and therefore no one has developed immunity, leaving more of us susceptible.

1. Subsartorial canal is an important area in the lower limb, Discuss

Answer:

The Subsartorial canal (also known as the Adductor, Hunter’s canal) is an aponeurotic tunnel in the middle third of the thigh, extending from the apex of the femoral triangle to the opening of the adductor Magnus, the adductor hiatus.

It is 15cm long and serves as a passageway for structures moving between the anterior thigh and posterior leg.

It is bordered by muscular structures:

* Anterior: Sartorius
* Lateral: Vastus medialis
* Posterior: Adductor longus and adductor Magnus

The apex of the adductor canal is marked by the adductor hiatus- a gap between the adductor and hamstring attachments of the adductor Magnus.

The Subsartorial canal contains the following:

* Femoral artery
* Femoral vein

Branches of the femoral nerve (specifically, the saphenous nerve and the nerve to the Vastus medialis).

1. Describe the Extraocular and Intraocular muscles with their nerve supply

Answer:

Extraocular muscles: The extraocular muscles are the six [muscles](https://en.wikipedia.org/wiki/Muscle) that control [movement of the eye](https://en.wikipedia.org/wiki/Eye_movement_(sensory)) and one muscle that controls [eyelid](https://en.wikipedia.org/wiki/Eyelid) elevation ([levator palpebrae](https://en.wikipedia.org/wiki/Levator_palpebrae_superioris_muscle)). The actions of the six muscles responsible for eye movement depend on the position of the [eye](https://en.wikipedia.org/wiki/Human_eye) at the time of muscle contraction.

Four of the extraocular muscles have their origin in the back of the orbit in a fibrous ring called the [Annulus of Zinn](https://en.wikipedia.org/wiki/Annulus_of_Zinn). The four rectus muscles attach directly to the front half of the eye (anterior to the eye's equator), and are named after their straight paths. Note that medial and lateral are relative terms. Medial indicates near the midline, and lateral describes a position away from the midline. Thus, the medial rectus is the muscle closest to the nose. The superior and inferior recti do not pull straight back on the eye, because both muscles also pull slightly medially. This posterior medial angle causes the eye to roll with contraction of either the superior rectus or inferior rectus muscles. The extent of rolling in the recti is less than the oblique, and opposite from it.

The superior oblique muscle originates at the back of the orbit (a little closer to the medial rectus, though medial to it), getting rounder as it courses forward to a rigid, cartilaginous pulley, called the [trochlea](https://en.wikipedia.org/wiki/Trochlea_of_superior_oblique), on the upper, nasal wall of the orbit. The muscle becomes tendinous about 10mm before it passes through the pulley, turning sharply across the orbit, and inserts on the lateral, posterior part of the globe. Thus, the superior oblique travels posteriorly for the last part of its path, going over the top of the eye. Due to its unique path, the superior oblique, when activated, pulls the eye downward and laterally.

The last muscle is the inferior oblique, which originates at the lower front of the nasal orbital wall, and passes under the LR to insert on the lateral, posterior part of the globe. Thus, the inferior oblique pulls the eye upward and laterally.

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| Muscles | Origin | Insertion | Innervation | Action |
| Superior rectus | Annulus of Zinn | Anterior, superior surface of the eye | Oculomotor nerve | Moves the eye up and in |
| Inferior rectus | Annulus of Zinn | Anterior, inferior surface of the eye | Oculomotor nerve | Moves the eye down and in |
| Lateral rectus | Annulus of Zinn | Anterior, lateral surface of the eye | Abducens nerve | Abducts the eye |
| Medial rectus | Annulus of Zinn | Anterior, medial surface of the eye | Oculomotor nerve | Adducts the eye |
| Superior oblique | Sphenoid bone via trochlea | Posterior, superior, lateral surface of the eye | Trochlear nerve | Moves the eye down and out |
| Inferior oblique | Maxillary bone | Posterior, inferior, lateral surface of the eye | Oculomotor nerve | Moves the eye up and out |
| Levator palpebrae superiosis | Sphenoid bone | Tarsal plate of the upper eyelid | Oculomotor nerve | Elevates the upper lid |

Intraocular muscles: There are three intraocular muscles and they change the shape of lens and size of the pupil. They are

* Ciliary muscles
* Sphincter muscles
* Dilator muscles

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| Muscles | Origin | Insertion | Innervation | Action |
| Ciliary muscle | Scleral spur | Longitudinal part: anterior one-third of the choroid  Radial part: connective tissue near the base of the ciliary process | Parasympathetic component of the oculomotor nerve(CN III) or parasympathetic postganglionic myelinated nerve fibers from the ciliary ganglion | Accommodation; regulation of trabecular meshwork pore size |
| Sphincter muscle | Pupillary margin of the iris | Pupillary margin of the iris | Parasympathetic fibers of oculomotor nerve (CN III) via short ciliary nerves | Constriction of the pupil (miosis) |
| Dilator muscle | Outer margins of the iris | Inner margins of the iris | Postganglionic sympathetic nerves via long ciliary nerves | Dilation of the pupil |