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1. **IMMUNE SYSTEM** is a complex network of cells and tissues and organs that work together to defend against germs. It helps the body to recognise ***FOREIGN INVADERS.***

The main purpose of the immune system is to protect the body from virus and bacteria. Without the immune system humans would not have any control over the virus and bacteria’s and would fall sick/ill constantly. Immune system works by recognising the difference between the body’s cells and alien cells, allowing it to destroy any that could be potentially harmful. This could cause problems if your immune system wrongly classifies some of your own cells and attack them instead.

There are several components to the immune system.

***ANTIBODIES*** they help the body to fight microbes or the toxins they produce. They do this by recognising substances called antigens on the surface of the microbes or in the chemicals they produce which the microbe or toxin as being foreign.

***LYMPHATIC SYSTEM*** is a network of delicate tubes throughout the body. The main roles of the lymphatic system are to:

* Manage the fluid level in the body
* React to bacteria
* Deal with cancer cells
* Deal with cell products that otherwise would result in diseases or disorders.

Lymphatic system is made up of:

* Lymph nodes (also called lymph glands)- which trap microbes
* Lymph vessels – tubes that carry lymph, the colourless fluid bathes your body tissue and contain infection fighting white blood cells.
* White blood cells (lymphocytes).

**SPLEEN:** The spleen is a blood filtering organ that removes microbes and destroys old or damaged red blood cells. It also makes disease fighting components of the immune system (including antibodies and lymphocytes)

**BONE MARROW:** Bone marrow is the spongy tissue found inside your bones. It produces the red blood cells our bodies need to carry oxygen, the white blood cells we use to fight infection, and the platelets we need to help our blood clot.

**THYMUS:** The thymus filters and monitors your blood content. It produces the white blood cells called T-lymphocytes.

**CORONAVIRUS COVID-19 PANDEMIC** is the defining global health crisis of our time and the greatest challenge faced since world war two. It has no vaccine for now all humans rely on is their immune system.

The immune system has two types of response:

* INNATE
* ADAPTIVE

The body’s natural barriers against disease causing intruders for example, our skin, the mucus and hairs in our nose and acids in the stomach are part of our innate immune system.

Adaptive immunity develops over a lifetime of contact with pathogens and vaccines, preparations which help our immune systems to distinguish friend from foe.

Vaccination safely teaches our adaptive immune systems to repel a wide range of diseases and thus protect ourselves and others.

There is no current vaccine for coronavirus, for now our immune systems must adapt unaided to this new deadly threat.

People of all ages can be infected by the new corona virus. Older people, and people with pre-existing medical conditions (such as asthma, diabetes, heart disease) appear to be more vulnerable to becoming severely ill with the virus.

WHO advises people of all ages to take steps to protect themselves from the virus, for example by following good hand hygiene and good respiratory Hygiene.

1. **THE ADDUCTOR CANAL** is a narrow fascial tunnel in the thigh, providing an intramuscular passage through which the femoral artery and vein pass through which the femoral artery and vein pass into the popliteal fossa of the knees.

The adductor canal (hunters canal, sub sartorial canal) is a narrow conical tunnel located in the thigh. It is approximately 15cm long, extending from the apex of the femoral triangle to the adductor hiatus of the adductor magnus. The canal serves as a passageway from structures moving between the anterior thigh and posterior leg.

**BORDERS**

The adductor canal is bordered by muscular structures:

**ANTEROMEDIAL:** sartorius

**LATERAL:** vastus medialis

**POSTERIOR:** adductor longus and adductor magnus

The adductor canal runs from the apex of the femoral triangle to the adductor hiatus a gap between the adductor and hamstring attachments of the adductor magnus muscle.

**CONTENT**

The adductor canal serves as a passageway for structures moving between the anterior thigh and the posterior leg.

It transits the femoral artery, femoral vein (posterior to the artery), nerve to the vastus medialis and the saphenous nerve the largest cutaneous branch of the femoral nerve.

As the femoral artery and veins exist the canal, they are called the popliteal artery and vein respectively.

1. **EXTRAOCULAR MUSCLES:** They are located within the orbit, but are extrinsic and separate from the eyeball itself. They act to control the movements of the eyeball and the superior eyelid.

There are seven extraocular muscles- the levator palpebrae superioris, superior rectus, inferior rectus, medial rectus, lateral rectus, inferior oblique and superior oblique.

Functionally, they can be divided into two groups:

* Responsible for eye movement- recti and oblique muscles.
* Responsible for superior eyelid movement- Levator palpebrae superiors.

**LEVATOR PALPEBRAE SUPERIORIS**

The Levator Palpabrae superioris is the only muscle involved in raising the superior eyelid. A small portion of this muscle contains a collection of smooth muscles fibres known as the superior tarsal muscle. The superior tarsal muscle is innervated by the sympathetic nervous system.

**ATTACHMENTS:** originates from the lesser wing of the sphenoid bone, immediately above the optic foramen. It attaches to the superior tarsal plate of the upper eyelid (a thick plate of connective tissue).

**ACTIONS:** elevates the upper eyelid.

**INNERVATION:** The Levator palpebrae superior is innervated by the oculomotor nerve (CN III). The superior tarsal muscle (located within the LPS) is innervated by the sympathetic nervous system.

**MUSCLES OF THE EYE MOVEMENT**

There ae six muscles involved in the control of the eyeball itself. They can be divided into two groups; the four recti muscles, and the two oblique muscles.

**RECTI MUSCLES**

There are four recti muscles, superior rectus inferior rectus, medial rectus and lateral rectus.

These muscles characteristically originate from the ***COMMON TENDINOUS RING.*** This is a ring of fibrous tissue, which surrounds the optic canal at the back of the orbit. From the origin, the muscles pass anteriorly to attach to the sclera of the eyeball. The name recti Is derived from the Latin for straight this represents the fact that the recti muscles have a direct path from origin to attachment. This is in contrast with the oblique eye muscle, which have an angular approach to the eyeball.

**SUPERIOR RECTUS**

**ATTACHMENTS:** originates from the superior part of the common tendinous ring and attaches to the superior and anterior aspect of the sclera.

**ACTIONS:** Adducts the eyeball.

**INNERVATION:** oculomotor nerve (CN III)

**LATERAL RECTUS**

**ATTACHMENTS:** Originates from the lateral part of the common tendinous ring, and attaches to the anterolateral aspect of the sclera.

**ACTIONS:** Abducts the eyeball

**INNERVATION:** Abducens nerve (CN VI)

**OBLIQUE MUSCLES**

There are two oblique muscles the superior and the inferior oblique. Unlike the recti group of muscles, they do not originate from the common tendinous ring. From their origin, the oblique muscles take an angular approach to the eyeball (in contrast to the straight approach of the recti muscles). They attach to the posterior surface of the sclera.

**SUPERIOR OBLIQUE**

**ATTACHMENTS:** Originates from the body of the sphenoid bone. Its tendon passes through a trochlear, and then attaches to the sclera of the eye posterior to the superior rectus.

**ACTIONS:** Depresses, abducts and medially rotates the eyeball.

**INNERVATION:** Trochlear nerve (CN IV).

**INFERIOR OBLIQUE**

**ATTACHMENTS:** Originates from the anterior aspect of the orbital floor. Attaches to the sclera of the eye posterior to the lateral rectus.

**ACTIONS:** Elevates abducts and laterally rotates the eyeball.

**INNERVATION:** Oculomotor nerve (CN III).

**INTRAOCULAR MUSCLE:** Include the ciliary muscle, the sphincter pupillae, and the dilator pupillae. The ciliary muscle is a smooth muscle ring that controls accommodation by altering the shape of the lens, as well as controlling the flow of aqueous humour into Schlemm’s canal. The ciliary muscle is attached to the zonular fibres which suspends the lens. Upon contraction of the ciliary muscle, the tension on the lens is lessened which causes it to adopt a more spherical shape to focus on nearby objects. Relaxation of the ciliary muscle has the opposite effect, optimizing distant focus. The sphincter pupillae and dilator pupillae are also composed of smooth muscle. The sphincter pupillae encircles the pupil and is responsible

for the constriction of its diameter, while the dilator muscle is arranged radially and increases the pupillary diameter.