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QUESTION 1

Until a vaccine is available, our immune system will need to adapt unaided to COVID-19. The immune system is the body's multi-level defence network against potentially harmful bacteria, viruses and other organisms. A healthy life style helps one's immune system to be in the best shape possible to tackle pathogens, but it's better to stop them from entering the body in the first place.

The corona virus pandemic has turned the world's attention to the immune system, the body defense force against diseases causing bacteria, viruses and other organisms that we touch, ingest and inhale every day. But what is the immune system exactly and how does it help repel intruders? Think of its body's personal army working from the cellular to macro level. Each cell, molecule, tissue and organ in this army plays a vital role in warding off invading pathogens, and also helps guard against internal threats like cancer. The system has two types of responses: the innate and the adaptive.

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 stomach are part of our innate immune systems. Adaptive immune develops over a lifetime of contact with pathogens and vaccines, preparation which helps our immune systems to distinguish friend from foe. Vaccinations 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 corona virus, and we may not see one in 18 months or longer. So our systems must adapt unaided to this potentially deadly threat.

QUESTION 2

The adductor canal (hunter's canal, subsartorial 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.

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.

The adductor canal serves as a passageway for structures moving between the anterior thigh and posterior leg. It transmits the femoral artery, femoral veins (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 exit the canal, they are called the popliteal artery and vein respectively.

QUESTION 3

The extraocular muscles are located within the orbit, but are extrinsic and separate from the eyeball itself. They act to control the movements of the eyeballs 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 movements-recti and oblique muscles
- Responsible for superior eyelid movements.

LEVATOR PALPEBRAE SUPERIORIS

The levator palpebrae superioris (LPS) is the only muscle involved in raising the superior eyelid. A small portion of this muscle contains a collection of smooth muscle fibers- known as the superior tarsal muscle. In contrast to the LPS, 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.

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

The intraocular muscles include the ciliary muscle, the sphincter pupillae, and the dilator pupillae. The ciliary muscle is a smooth muscle ring that controls accommodations by altering the shape of the lens, as well as controlling the flow of aqueous humor into schlemm's canal.