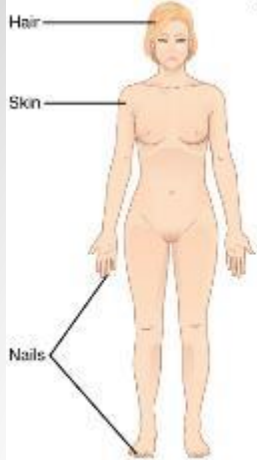


Anatomy Day 5

Natalie van Moorsel 2024

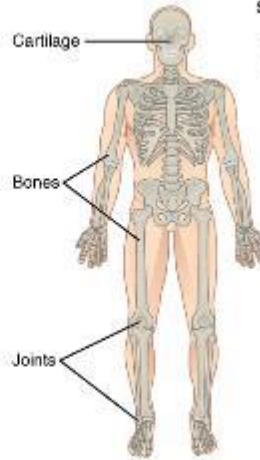
Cardiovascular system
Digestive and Excretory system
Endocrine system
Integumentary/Exocrine system
Immune system and lymphatic system
Muscular system
Nervous system
Urinary and Renal system
Reproductive system
Respiratory system
Skeletal system

MAIN SYSTEMS OF THE BODY



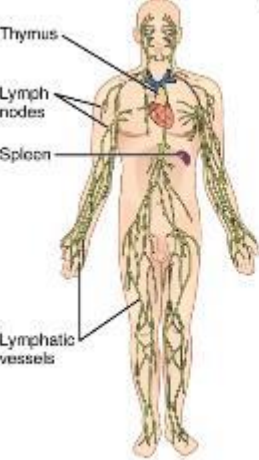
Integumentary System

- Encloses internal body structures
- Site of many sensory receptors



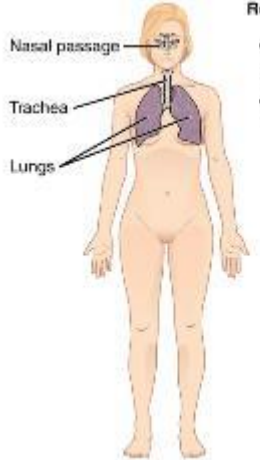
Skeletal System

- Supports the body
- Enables movement (with muscular system)



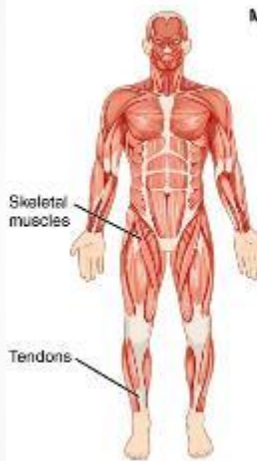
Lymphatic System

- Returns fluid to blood
- Defends against pathogens



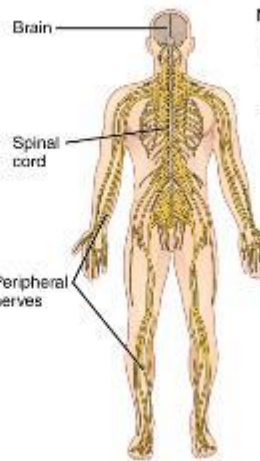
Respiratory System

- Removes carbon dioxide from the body
- Delivers oxygen to blood



Muscular System

- Enables movement (with skeletal system)
- Helps maintain body temperature



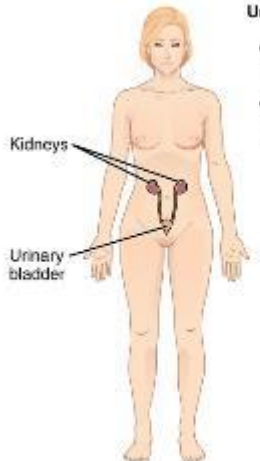
Nervous System

- Detects and processes sensory information
- Activates bodily responses



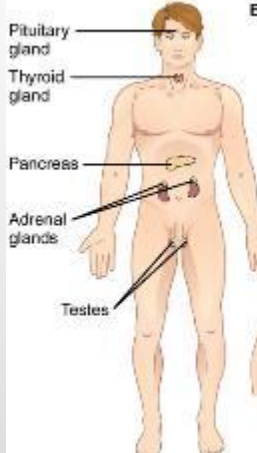
Digestive System

- Processes food for use by the body
- Removes wastes from undigested food



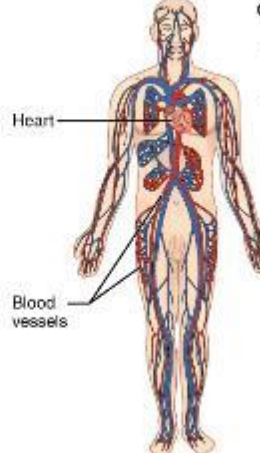
Urinary System

- Controls water balance in the body
- Removes wastes from blood and excretes them



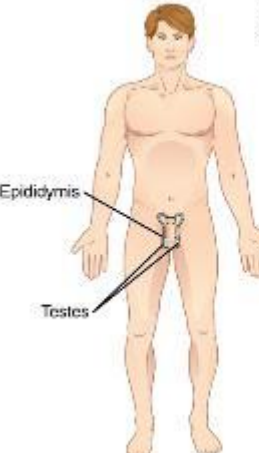
Endocrine System

- Secretes hormones
- Regulates bodily processes



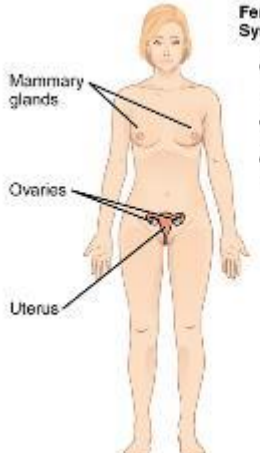
Cardiovascular System

- Delivers oxygen and nutrients to tissues
- Equalizes temperature in the body



Male Reproductive System

- Produces sex hormones and gametes
- Delivers gametes to female



Female Reproductive System

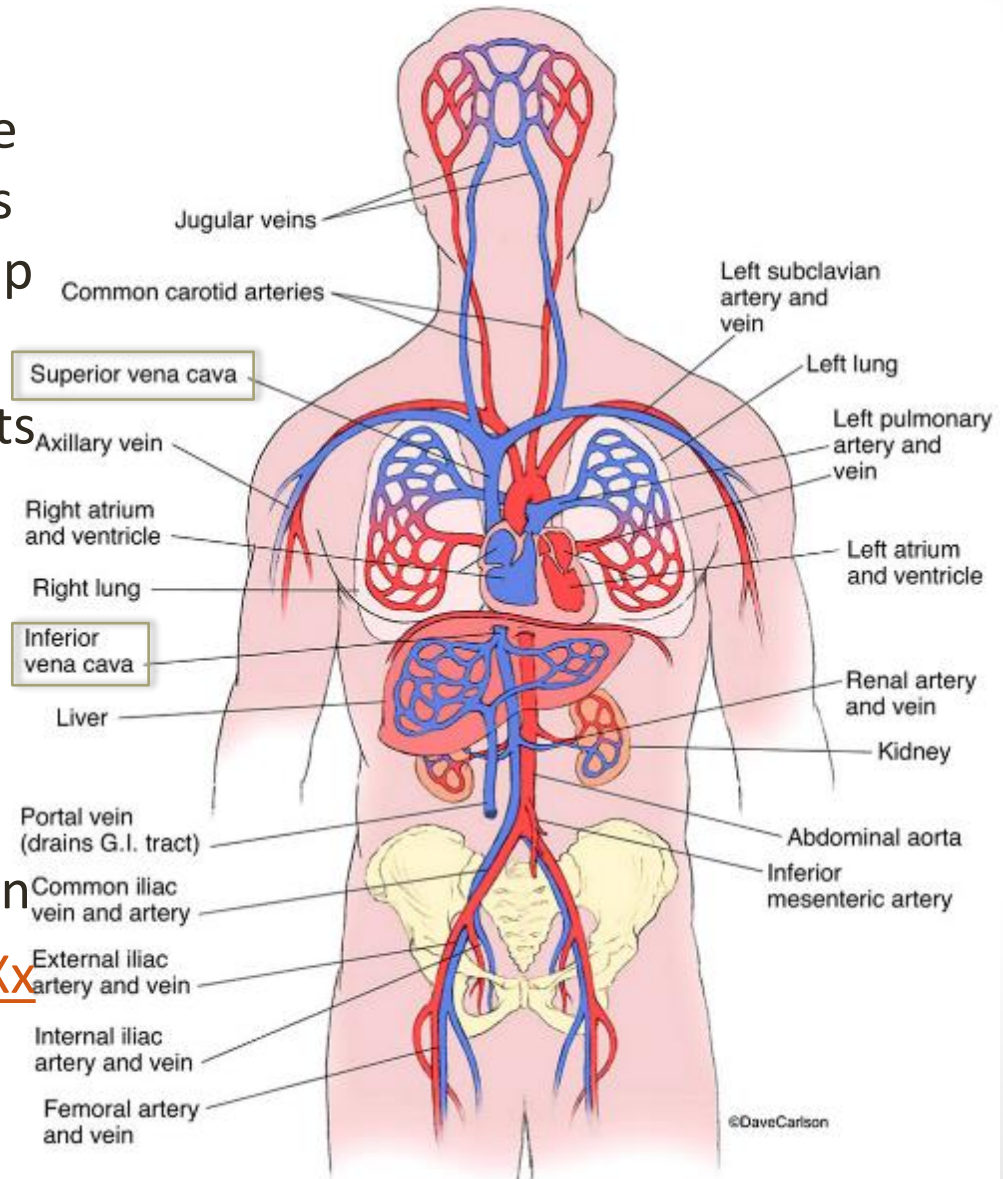
- Produces sex hormones and gametes
- Supports embryo/ fetus until birth
- Produces milk for infant

Just a note from your friendly neighbourhood anatomy teacher

- A few of these we won't be going in to today but still might refer to in this presentation
- The Muscular and Skeletal system we've spoken about in earlier presentations
- We're taking a deep dive into the nervous system next time

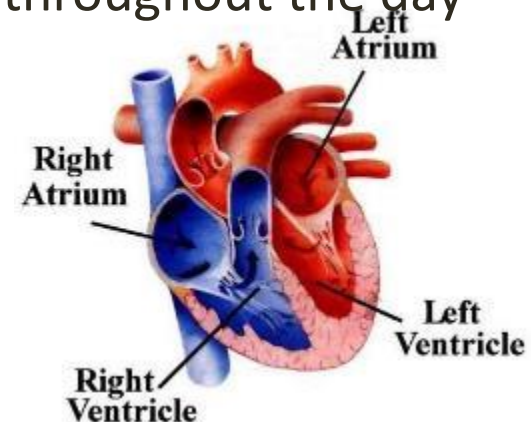
Cardiovascular system

- Organs in the system are the heart, arteries, veins and capillaries (the pump and plumbing)
- Deliver fuel and nutrients to the body
- Highway for hormones
- Maintains acid balance and regulates temperature
- Protects against infection
- <https://youtu.be/ruM4Xxhx32U>



Blood flow in the circulatory system

- Left side of the heart pumps blood to the whole body
- Right side of the heart pumps blood to the lungs for re-oxygenation
- Venous return: blood flow back to the heart, in a healthy condition this is the same as cardiac output (closed loop system)
- Blood flows into the right atrium and ventricle of the heart and then to the lungs for reoxygenation
- Heart rate variability: Heart rate changes throughout the day

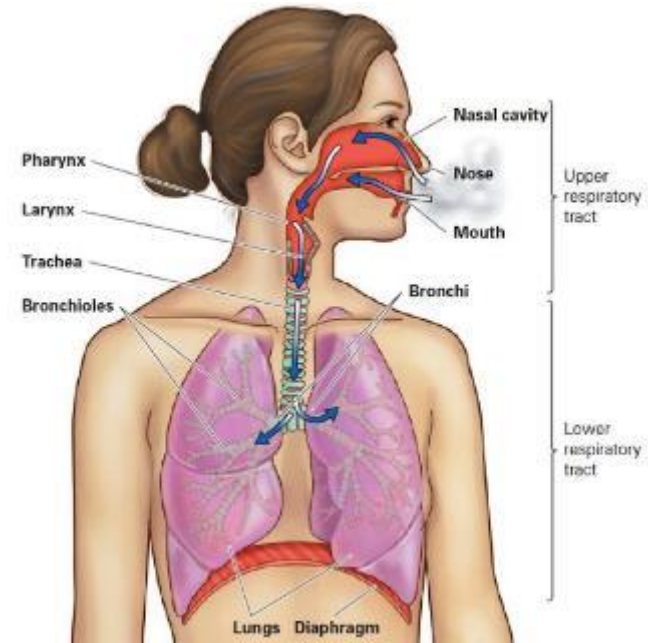


Respiratory system

The breath connects to the brain, nervous system and receptors all over the body. The rhythms of deep breathing can support the body to drop into homeostasis and guide the mind into relaxation.

Efficient (yogic) breath promotes a good exchange of oxygen (fuel) and carbon dioxide (waste) and prevents a buildup of lactic acid in the muscles

Breath moves energy (prana) through the body



Science of the breath

- **Inhalation:** chemoreceptors in the body are triggered when there is too much CO₂ in the bloodstream. They signal the brain to message the diaphragm (main respiratory muscle) which then contracts downward and the abdomen rises. The intercostal muscles expand the ribcage, lift the sternum and create space for the lungs.
- **Exhalation:** Re-oxygenated blood stops the receptors triggering the brain, the diaphragm relaxes upward and the intercostal muscles relax the chest. Air is drawn out of the body
- The moment between in and exhale is the moment of homeostasis
- https://youtu.be/8NUxvJS-_0k

Breath in yoga



- Backbending and forward bending play a role in mobility of the diaphragm
- Side bending benefits the intercostal muscles
- Health of the spine relates to the movement of the diaphragm and breath
- Belly breathing helps keep the diaphragm healthy
- Breathing deeply works on the parasympathetic nervous system
- Pranayama

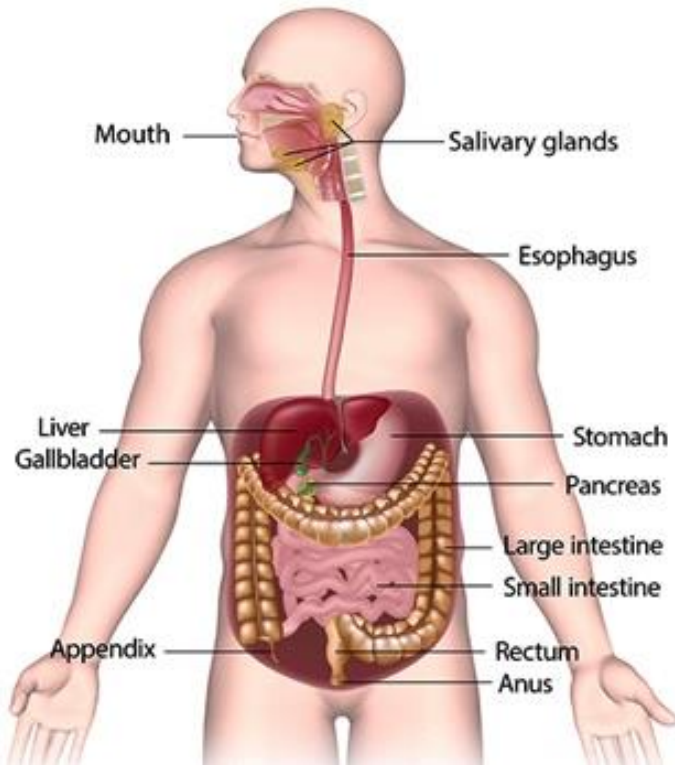
Breathing difficulties

- Overactive abdomen: if the muscles are too tight the belly won't be able to expand enough
- Gasping for air: Insufficient breath
- Chest pains with deep breathing: Costochondritis or inflammation of the cartilage around the sternum
- Trauma can cause difficulty with deep breath
- Lung conditions or heart conditions
- Injuries of the ribs, shoulders, etc



Digestive and Excretory system

The Digestive System



1. Ingestion: begins in the mouth
2. Secretion: cells secrete water, acid, buffers and enzymes
3. Mixing and propulsion: contraction and relaxation of smooth muscle in the walls of the GI tract to move food and secretions towards the anus
4. Mechanical digestion: teeth cut and grind the food, smooth muscle churns the food in the stomach and small intestine
5. Chemical digestion: digestive enzymes are produced by salivary glands, tongue, stomach, pancreas and small intestine
6. Absorption: Amino acids, cholesterol, sugar, vitamins, minerals and water don't need chemical digestion and circulate to cells
7. Defecation: Waste, bacteria and cells are eliminated

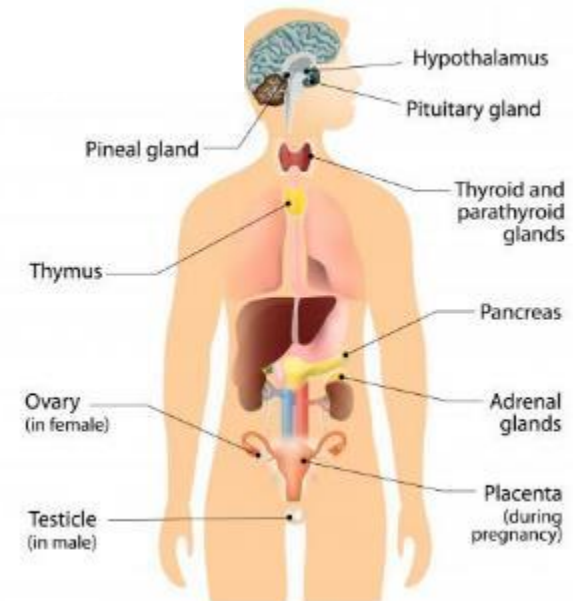
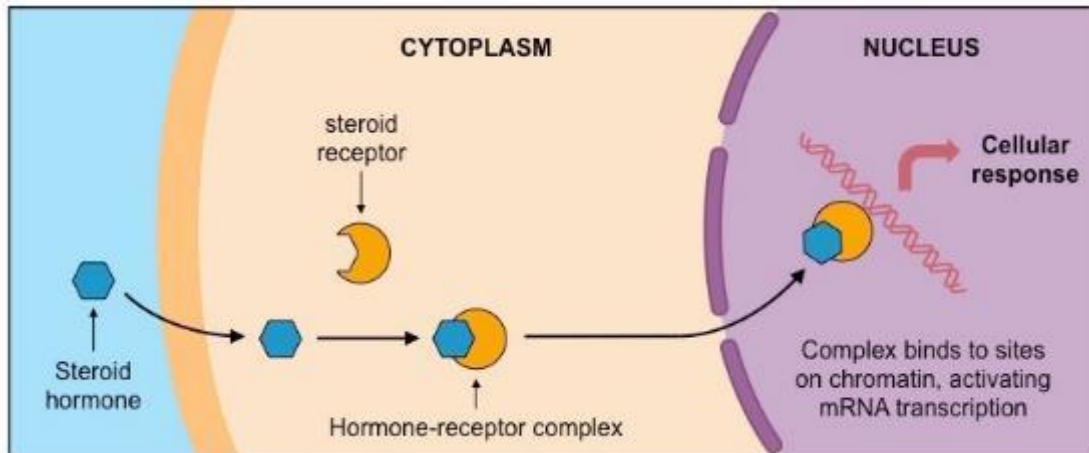
Yoga and digestion

- Reduces physiological stress for enzyme function
- Helps move the digesting materials and wastes through the system
- Increases blood flow to the digestive organs for efficient functioning
- Yoga soothes the sympathetic nervous system, decreases stress levels and stimulates the rest and digest response.



Endocrine system

- System of communication between cells and systems for slower, longer action
- Communication through chemical messengers which travel through the blood to target cells
- Hormones bind to specific receptors in the cells that change how the cell behaves
- <https://youtu.be/-SPRPkLoKp8>

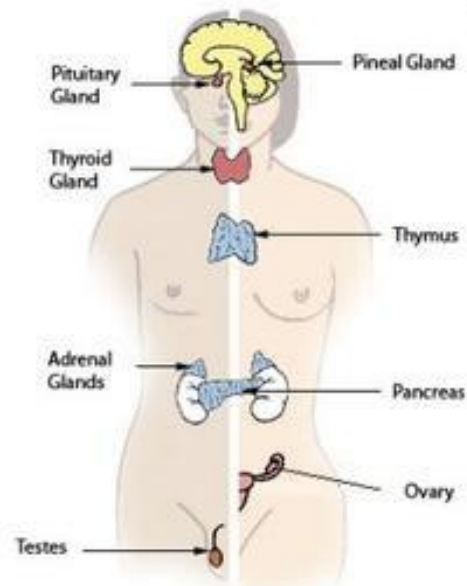
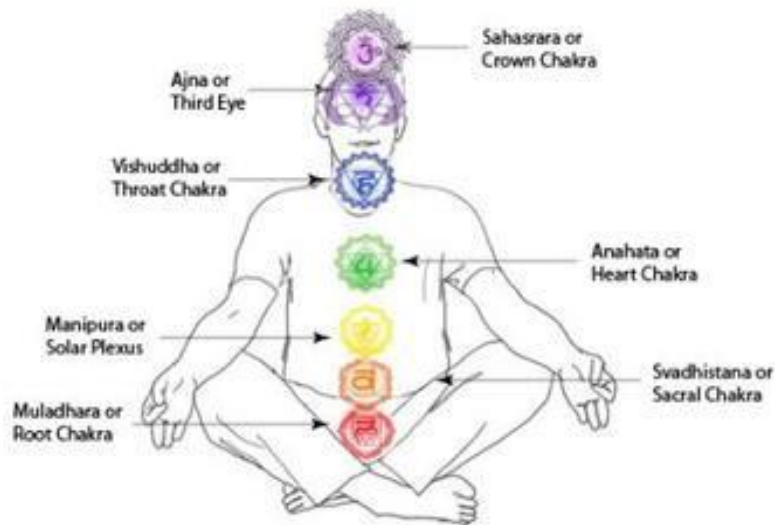


Overview of the endocrine system

Gland	Function	Location	Subtle anatomy
Pituitary	Master gland: controls actions of other endocrine glands and some organs including the kidneys, thyroid and adrenals	Centre of the brain – size of a pea	Sahasrara chakra
Pineal	Regulates sleep/wake cycle (melatonin) and mood (serotonin)	Centre of the brain	Ajna chakra
Thyroid	Regulates metabolism (growth, body weight and energy)	Throat (anterior neck)	Vishudda chakra
Parathyroid	Regulates calcium levels in blood (bone density)	Throat (posterior neck)	Vishudda chakra
Thymus	Produces hormones involved with immunity	Near heart	Anahatha chakra
Pancreas	Regulates blood sugar/energy levels	Navel	Manipura chakra

Gland	Function	Location	Subtle anatomy
Adrenals	Regulates water balance and stress response	On top of the kidneys	Manipura chakra
Ovaries / Testes	<ul style="list-style-type: none"> Regulates reproductive functions Ovaries produce estrogen and progesterone Testes produce sperm and testosterone 	Pelvis	Swadhistana chakra

THE LOCATION OF THE ENDOCRINE GLANDS AND CHAKRAS



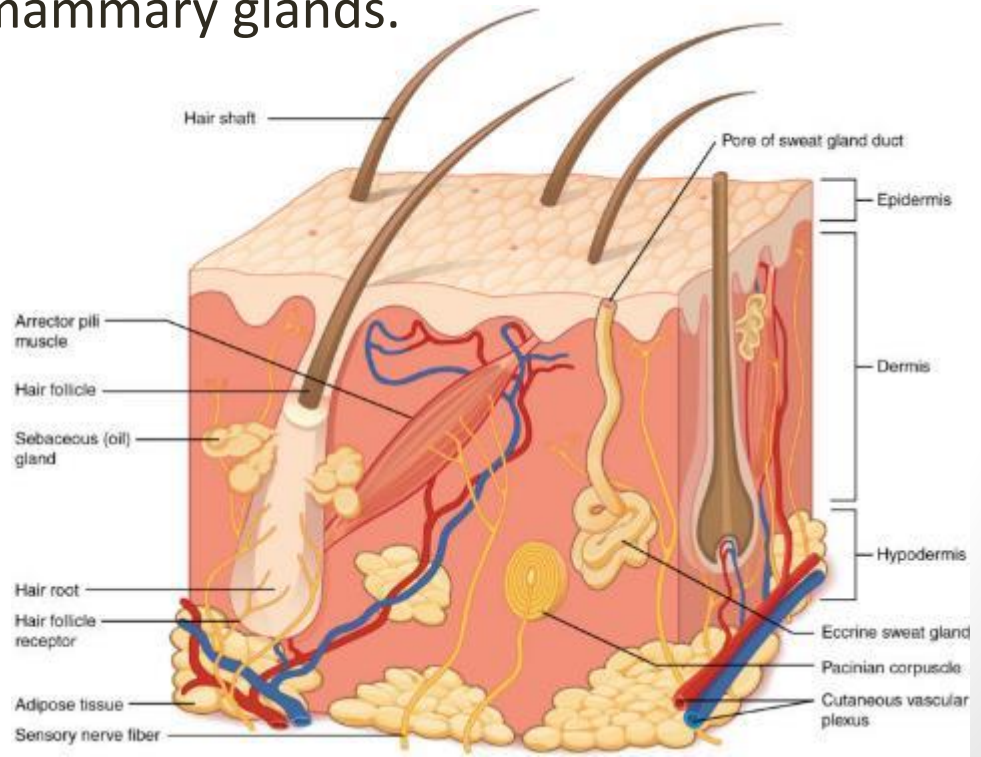
Endocrine system and yoga

- Yoga has a balancing effect on the hormonal secretions in the glands
- There is a direct relationship between the glands and the chakras just like there's a relationship between the nervous system and the nadis
- When we balance the glands we also balance the chakras and vice versa

Integumentary and Exocrine system

- Skin, hair, nails, the tissue below the skin and assorted glands
- Protects the underlying tissues; keeps harmful substances out and prevents the loss of fluids
- Exocrine glands: Sudoriferous glands, sebaceous glands, ceruminous glands and mammary glands.

Skin is composed of the epidermis and the dermis, below those layers lies the hypodermis (actually not a layer of the skin)

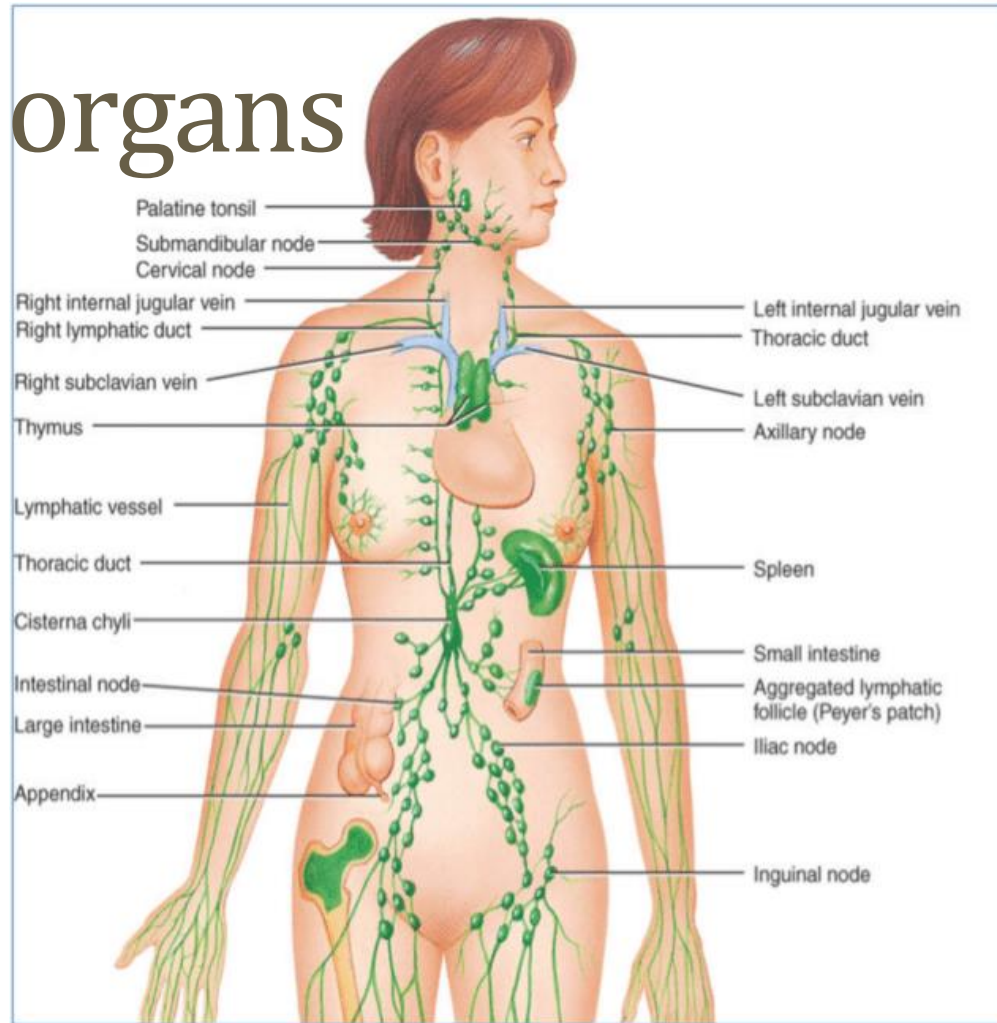


Immune and lymphatic system

- Tissues and organs that work to remove cellular wastes, destroy bacteria and maintain the volume of blood in the blood stream lymphatic flow relies on skeletal muscle contractions and breathing to push the lymph through the vessels
- Lymph is a fluid containing white blood cells which fight infection (lymphocytes)
- The lymphatic system consists of vessels which are similar to those in the circulatory system and are connected to lymph nodes where the lymph is filtered. Unlike the circulatory system it is not a closed system but takes care of waste and disposes it.
- <https://youtu.be/PSRJfaAYkW4>

Lymphoid organs

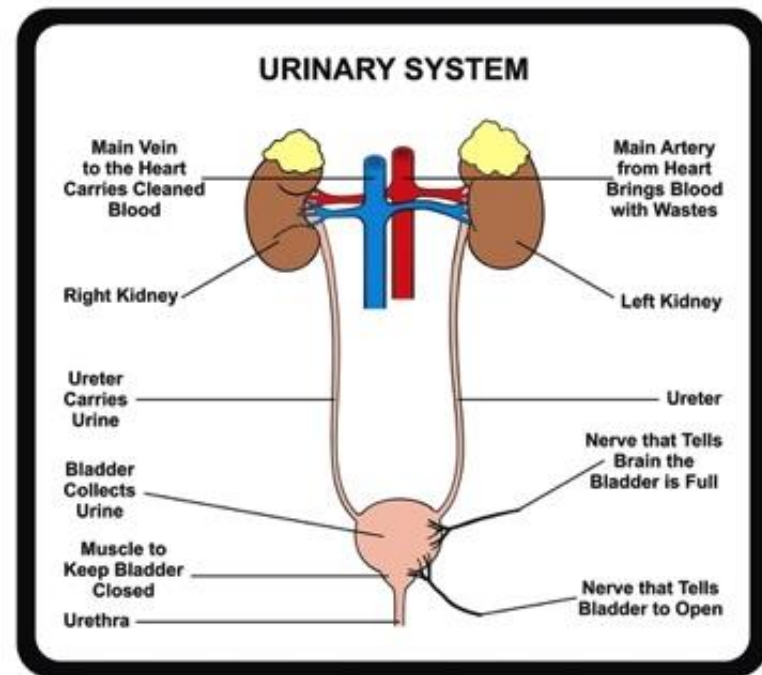
- Primary:
 - Bone marrow
 - Thymus gland
- Secondary:
 - Spleen
 - Lymph nodes



Major parts of the lymph tissue are located in the lymph nodes and tonsils, but most of the body contains lymphatic tissue

Renal (urinary) system

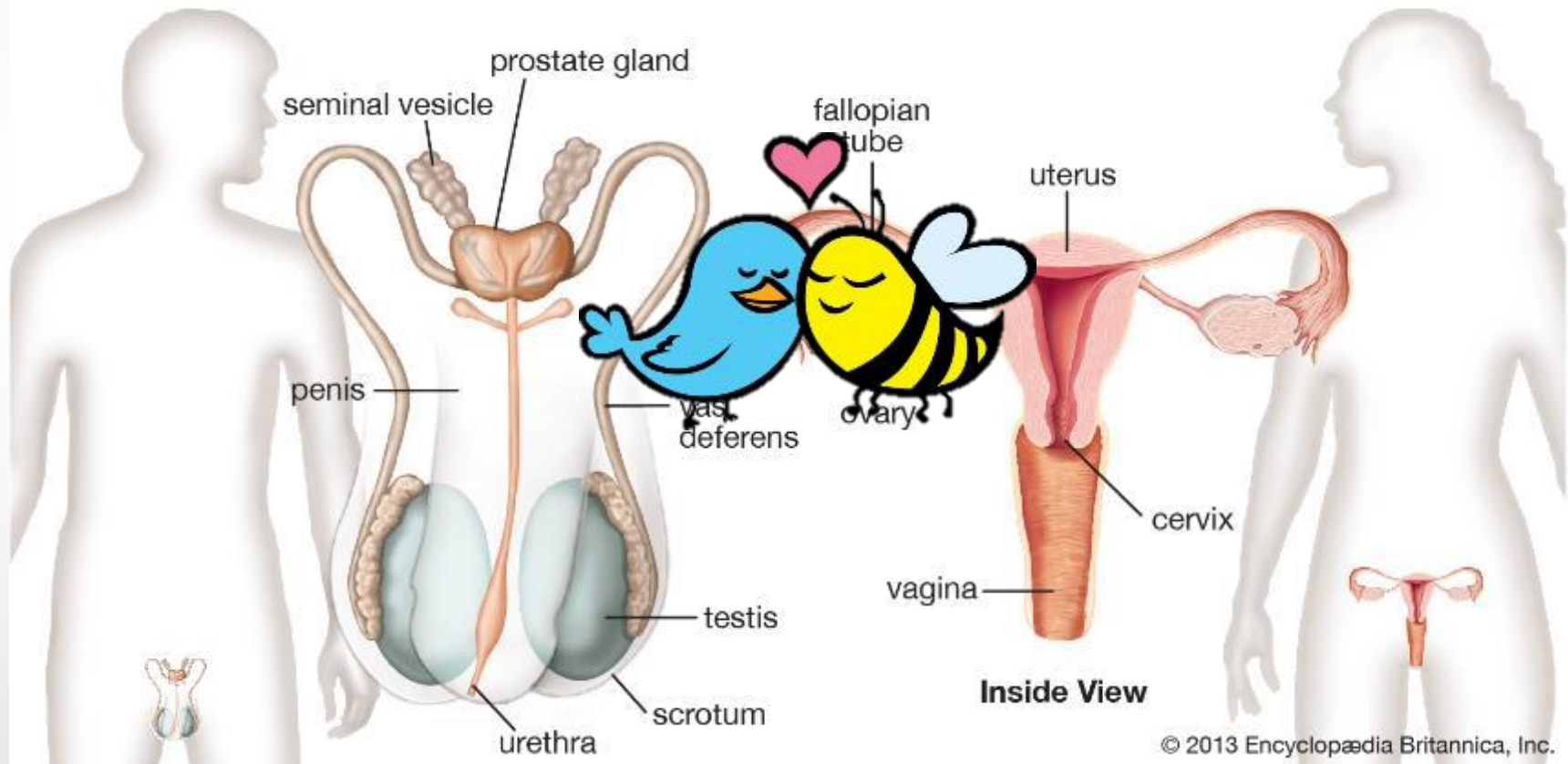
- Produces, stores and eliminates urine (fluid waste excreted by the kidneys)
- Kidneys make urine by filtering wastes and extra water from blood
- Urine travels through two tubes called ureters and fills the bladder
- When the bladder is full we eliminate through the urethra
- Helps balance chemicals and water in the body
- Muscles close around the opening of the bladder into the urethra to prevent leakage



Reproductive system

Male Reproductive System

Female Reproductive System



Reproductive system

- Also known as the genital system is a biological system made of the organs for sexual reproduction
- Is there a direct effect of yoga on the reproductive system?
Not really to be honest :)

Although there is no causal effect there can be a positive effect on chances to conceive. This does go into the ethics of yoga as we can't promise a good outcome.



Guest appearance

Tim Bavinck

Questions you sent in

- What do we need to pay extra attention to after somebody's had a hip surgery?
- What are good things to do for people with a neck hernia?
- What are good ways to release upper back and shoulder pain?
- What advice do you have for issues with the SI joint? Where do we pay attention in yoga?
- What should we tell people with back issues? What can you not do?
- What happens with a shin splint? Can we work on this through yoga?
- For people who have issues with joints or bones, is it suggested that yoga can help with healing?

Homework

Pick an asana. How does your asana work on the systems we worked on today?

½ - 1 a4

Utkatasana	Uttitha Trikonasana
Paschimottanasana	Ardha Chandrasana
Adho Mukhasvanasana	Tadasana
Parsva Sukhasana	Parivrrta Sukhasana
Balakasana	Navasana
Chakrasana	Ustrasana
Savasana	Sarvaungasana
Urdva Mukhasvanasana	Bhujangasana