Unit 3 Senses and the nervous system 2020/2021

§3.1 Prior knowledge
Done in class

§3.1 Basic questions

1. *TB 2.47*
2. Sense organ: organ (part of your body) which can perceive something
Stimulus: everything you can perceive with your sense organs
Impulse: an electrical message send via neurons (nerve cells)
Receptor: part of the sense organ that receives the stimuli (like the cells of the retina)
Hormone: signaling molecule or chemical message transported by the blood, made by a gland
Feed-back mechanism: a process in which something is influenced and gives back information about what happened.
3. Sense organ + eye
sense + smell
receptor + tastebud (the second word is an example of the first word).

§3.1 Applied questions
4 and 5 Will be done later
6 discussed in class

§3.2 Basic questions

1. *See TB 2.45 and 2.46 answers*
2. A: epidermis / B: dermis / C: hypodermis / *a1 and a2 not assigned* / 1a and 1b: capillaries, veins and arteries (blood vessels) / 2: nerve ending / 3: receptor for light touch / 4: fat / 5: hair / 6: opening of sweat duct / 7: hair muscle / 8: sebaceous gland (makes a fatty oil to lubricate the skin) / 9: hair follicle / 10: sweat duct / 11: sweat gland / 12: receptor for pressure
3. 1: supply with blood, oxygen, nutrients and remove waste products / 2: perceive pain / 3: perceive light touch / 4: protect, energy storage, keep warm / 5: keep warm, perceive vibrations or touch / 6: bring sweat out to the skin surface / 7: move hair (goosebumps) / 8: lubricate and waterproof the skin / 9: grow hair / 10: transport sweat / 11: produce sweat / 12: perceive pressure
4. A: epidermis / B:dermis / C: hypodermis / 1: hair / 2: muscle / 3: shaft / 4: sebaceous gland (makes a fatty oil to lubricate the skin) / 5: hair follicle / 6: nerve cell / nerve ending / 7: fat / 8: nerve cell connected to muscle / 9: opening of sweat duct / 10: sweat gland / 11: receptor for pressure / 12: veins and arteries
5. Nerve endings (pain) / Receptor for pressure / receptor for hot / receptor for cold / receptor for light touch. So for pain, for temperature (hot and cold), for light touch, for pressure, wrapped around the hairs to sense our hairs move.

§3.2 Applied questions
Discussed in class

§3.3 Basic questions

1. 1: outer ear or pinna / 2: auditory canal / 3: malleus or hammer / 4: incus or anvil / 5: stapes or stirrup / 6: eardrum or tympanic membrane / 7: cochlea / 8: amplifier
2. Sound waves entering the auditory canal → eardrum → malleus → incus → stapes → second tympanic membrane → cochlear fluid → hair cells → nerve cells → impulse to the brain.
3. Sound waves → vibration of the eardrum → movement/vibration of the three little bones → vibration of second tympanic membrane → vibration of the fluid in the cochlea → vibration of different hears connected to a nerve cell.
4. Sound waves of your own voice also travel through your head, adding an extra vibration
5. Must be recognized from a previous experience
6. **a.** Sweetness, sourness, saltiness, bitterness and umami.
   b. There are no molecules to bind to your taste buds (this is an applied question).
7. See table below

Sense	Sensory receptors	location
hearing	cells with tiny hairs	cochlea
smell	olfactory cells	nasal cavity
taste	taste buds	tongue
heat	heat sensor	close to the surface in the skin
cold	cold sensor	close to the surface in the skin
light touch	touch receptor	close to the surface in the skin
strong pressure	pressure receptor	deeper in the skin
pain	nerve endings	close to the surface in the skin

8. They contain three canals with fluid for the three dimensions. When the fluid moves (when you move or tilt your head) it triggers hairs and nerve cells, like in the cochlea.
9. For all three dimensions.

§3.3 Applied questions

10. Recognizing food, perceiving whether the food is dangerous, contains strange things or is not save to eat anymore.
11. Protecting your body against harmful food and enjoying your food.
12. No substances enter your mouth or nose which can cause an impulse.
13. No stimulus means it is big enough.
14. The tiny bones and the ear drum. They will be controlled to vibrate less, to protect your receptors.
15. **a)** less vibration, less stimuli for the receptors.
    b) The tiny bones also amplify the sound.

§3.4 Basic questions

1. *See TB answers*
2. 1. Posterior chamber / 2. Anterior chamber / 3. Cornea / 4. Pupil / 5. Uvea / 6. Iris / 7. Ciliary body / 8. Choroid / 9. Sclera / 10. Suspensory ligaments / 11. Lens / 12. Vitrous humour / 14. Retina / 16. Fovea (yellow spot) / 17. Blind spot / 18. Optic nerve / 19. Retinal blood vessels
3. *Check the textbook*
4. Cornea → aqueous humour → pupil → lens → vitrious humour → retina (yellow spot), rods and cones → optic nerve
5. Cornea, both humours and the lens (pupil is just an opening)
6. Yellow spot/fovea: main location where the light is converted into impulses, this is where you focus, everything next to the yellow spot will be blurred.
7. See table below.

Part of the eye	Function
Eyelashes	Protect the eye from dust
Eyelids	Protect the eye and wash the eye by transporting tears.
Eyebrows	Protect the eye from water running down your head.
Tears	Wash the eye
Tear ducts	Bring the tears in the corner of the eye
Lacrimal glands	(or tear glands) produce fluid (tears)

§3.4 Applied questions

Discussed in class