

HMED 4100 2023H – Sensorveiledning

Sensorveiledning på langsvar-spørsmålene:

Question 4

What is the pulmonary circulation? (2 points)

Answer:

- Description of the anatomy (Right atrium → right ventricle → pulmonary artery → lungs (with capillaries/alveolae) → pulmonary veins → left atrium)
- Physiology: Gas exchanges (O₂, CO₂)

What is the systemic circulation? (2 points)

Answer:

- Description of the anatomy (left atrium → left ventricle → aorta → arteriolas/capillaries → veins → inferior/superior cava → right atrium)
- Physiology: Oxygen used in energy consumption, CO₂ leftover from energy consumption

What are the coronary arteries? (2 points)

Answer:

- Distribution of arterial blood to the heart
- 3 main branches (LAD, Cx, RCA)
- 10% of total blood consumption

Question 5

Please describe in 2-3 sentences the main aspects of diabetes type 1. (3 points)

Answer:

- Autoimmune disease
- Affects mainly young individuals
- Loss of insulin production for beta cells in pancreas, gives high blood sugar.
- No permanent cure, but need of treatment with insulin injection several times daily, for the rest of the life, as well as sugar-reduced diet
- Severe long terms effects on blood

Question 6

Please provide the names of these structures related to the endocrine system (the illustration contains both male and female gonads) (8 points)

Answer:

1. Thymus
2. Pineal gland (konglekjertel). (Hypothalamus have also been considered correct (1 point), as pineal gland have not been mentioned in class)
3. Pituitary (Hypofyse)
4. Thyroid gland (skjoldbruskkjertel)
5. Adrenal gland (binyrer)
6. Pankreas (bukspyttkjertel)
7. Ovaries (eggstokker)
8. Testes (testikler)

Question 8

What is the purpose of homeostasis? Maximum 4 sentences. (4 points)

Answer:

Homeostasis, is a (any) self-regulating process by which biological systems maintain stability while adjusting to changing external conditions. If homeostasis is successful, life continues; if unsuccessful, disaster or death ensues. The stability attained is actually a dynamic equilibrium, in which continuous change occurs yet relatively uniform conditions prevail.

Any system in dynamic equilibrium tends to reach a steady state, a balance that resists outside forces of change. When such a system is disturbed, built-in regulatory devices respond to the departures to establish a new balance; such a process is one of feedback control. All processes of integration and coordination of function, whether mediated by electrical circuits or by nervous and hormonal systems, are examples of homeostatic regulation.

Question 9

What are the vital signs? (5 points)

Answer:

- The vital signs are: Pulse rate, blood pressure, saturation of oxygen in blood, temperature and respiration rate.

Question 11

Kidney failure is a serious condition. Describe in 2-3 sentences the two main types of treatment for kidney failure. (3 points)

Answer:

1. Transplantation of a kidney, from a living or dead donor.
2. Dialysis, either 2-3 times/week at hospital, or peritoneal dialysis (in the abdomen), organized by the patient.

In 2-3 sentences, name at least four of the main functions of the kidneys (3 points).

Answer:

- remove waste products from the body.
- remove drugs from the body.
- balance the body's fluids.
- Control the acid-base (pH) balance in the body
- release hormones that regulate blood pressure.
- produce an active form of vitamin D that promotes strong, healthy bones.
- control the production of red blood cells.

Question 15

What is the name of the bacteria that can cause gastric/duodenal ulcer? (Max 2 sentences). (1 point)

Answer: Helicobacter pylori

What are dangerous complications of an ulcer? (maximum 3 points)

Answer:

- Internal bleeding. Bleeding can occur as slow blood loss that leads to anemia or as severe blood loss that may require hospitalization or a blood transfusion.
- A hole (perforation) in your stomach wall.
- Obstruction.
- Gastric cancer.

What is the most important cause of hepatitis in developed countries? (maximum 2 sentences). (1 point)

Answer:

- The correct answer is different hepatitis viruses, like hepatitis virus A, hepatitis virus B, hepatitis virus C, hepatitis virus E, and more.
- Some students seems to have translated "hepatitis" in the question as "liver failure", and these have earned 1 point for correct answer to that (usually "alcohol" or "hepatitis").

What are typical symptoms of gastroenteritis? (maximum 3 sentences). (1 point)

Answer:

- Diarrhea, vomiting, stomach pain, abdominal cramps

List 2 types of inflammatory bowel disease. (maximum 2-3 sentences). (1 point)

Answer:

- Crohns disease (Morbus Crohn)
- Ulcerative colitis

Question 16 (2 points each)

Explain how cell division is crucial to understand cancer development

Answer:

- During cell division (mitosis), mutations occur frequently
- Mutations are alteration of the DNA, that sometimes are without consequences, but sometimes can be the start of a cancer
- Several mutations are needed to start a cancer
- To control and regulate these mutations are crucial to stay free from cancer

List at least two processes that continuously takes place in the body and that prevent cancer development

Answer:

- Apoptosis – controlled/programmed cell death
- Immune system that regulates unwanted growth
- Tumor suppressor genes, like p53

What is the primary tumor?

Answer:

- Primary tumors are those located at the site where the tumor began to grow (i.e., where cancer originated).

What cells are typically damaged by chemotherapy?

Answer:

- The fast-growing cells are typically damaged by chemotherapy – as the cancer cells (main target).
- The normal cells most likely to be affected by chemotherapy are blood cells forming in the bone marrow, and cells in the digestive tract, reproductive system, and hair follicles.

What is the rationale for developing anticancer medication that targets angiogenesis?

Answer:

- Angiogenesis means “production of new blood vessels”
- Hence, targeting the angiogenesis inhibits the growth of blood vessels around the cancer tumor/cells and are responsible for death of the tumour due to starvation and accumulation of toxic waste. The therapy, thus, indirectly cytotoxic to the tumour cells by targeting newly developing blood vessels.

Question 20 – 3 points each, total of 6 points.

What is a stroke?

Answer:

A stroke is a serious life-threatening medical condition that happens when the blood supply to a part of the brain is cut or broken. This can have one of two causes:

- Ischemic stroke, caused by a blood clot that completely or partially stops blood flow
- Hemorrhagic stroke is a broken wall of a blood vessel that causes a bleeding in the brain, so the blood not arriving to its target.

Can you describe some common symptoms or signs of stroke?

Answer:

The main symptoms of stroke can be remembered with the word FAS(T):

Face – the face may have dropped on one side, the person may not be able to smile, or their mouth or eye may have dropped.

Arms – the person with suspected stroke may not be able to lift both arms and keep them there because of weakness or numbness in one arm.

Speech – their speech may be slurred or garbled, or the person may not be able to talk at all despite appearing to be awake; they may also have problems understanding what you are saying to them.

(Time – it's time to call emergency immediately if you see any of these signs or symptoms.)

Why is rapid treatment of stroke important?

Answer:

If someone is having a stroke, it means there is a lack of blood flow to the brain, which deprives brain cells of oxygen. For every minute that passes while someone is having a stroke, 1-2 million brain cells are lost. The longer that someone is suffering from a stroke, the greater their chance of disability or death. Every minute counts.