MEGA LECTURE

AQA (GCSE Notes)

Chapter 5: Homeostasis and Response

Q1. What is homeostasis and why is it important for cells in the human body?

Q2. Explain how homeostasis maintains optimal conditions for enzyme function.

Q3. What internal conditions must be controlled in the human body to maintain homeostasis?

Q4. Describe the role of receptors in a control system.

Q5. What is the function of coordination centres in the human body?

Q6. How do effectors help maintain homeostasis?

Q7. Give an example of a chemical response involved in homeostasis.

Q8. Describe how the nervous system helps maintain body temperature.

Q9. Explain what is meant by a stimulus and give an example.

Q10. Describe how information travels from a receptor to an effector in the nervous system.

Q11. What is the role of the brain and spinal cord in the nervous system?

Q12. How do neurones carry electrical impulses in the nervous system?

Q13. What is the central nervous system and what are its main parts?

Q14. Explain how the structure of the nervous system is adapted to allow fast responses.

Q15. What is a reflex action and how is it different from a normal response?

Q16. Describe the pathway of a reflex arc using all the correct components.

Q17. What is the function of the sensory neurone in a reflex arc?

Q18. What is the role of the relay neurone in the spinal cord?

Q19. How do synapses work to pass impulses between neurones?

Q20. What is the role of a motor neurone in a reflex action?

Q21. Why are reflex actions important for survival?

Q22. Give an example of a reflex action and explain its benefit.

Q23. Describe the difference between voluntary and involuntary responses.

Q24. What happens at a synapse when an electrical impulse reaches it?

Q25. How does the body respond when blood glucose concentration becomes too high?

Q26. What happens to the body if internal conditions are not kept within narrow limits?

Q27. How does the nervous system coordinate the contraction of a muscle?

Q28. What is meant by coordination in terms of the nervous system?

Q29. How can a gland act as an effector in a nervous response?

Q30. Explain how the nervous system detects and responds to changes in the environment.

Q31. What is the difference in speed between nervous and hormonal responses, and why?

Q32. What is meant by an automatic control system?

Q33. Why is it necessary for control systems to respond to both internal and external changes?

Q34. What role does the spinal cord play in reflex actions?

Q35. Describe how the structure of a sensory neurone helps it carry impulses.

Q36. What is the role of the myelin sheath in neurones?

Q37. Explain why impulses in reflex arcs do not involve the conscious brain.

Q38. What happens when a receptor detects a change in the environment?

Q39. How can data about reaction times help us understand how the nervous system works?

Q40. How can reaction time be measured practically in a lab?

Q41. Why is it useful to repeat measurements when investigating reaction times?

Q42. Describe one factor that might affect a person's reaction time.

Q43. What is the difference between the central nervous system and the peripheral nervous system?

Q44. How can a graph be used to show changes in reaction times?

Q45. What can charts and tables tell us about the nervous system's function?

Q46. Why is it important that signals in the nervous system travel quickly?

Q47. How does the structure of a motor neurone relate to its function?

Q48. Explain how a stimulus leads to a response in a reflex arc.

Q49. What would happen if the relay neurone was damaged in a reflex pathway?

Q50. Why are reflex actions considered protective mechanisms?

Q51. What is the main role of the brain in the human body?

Q52. Describe the function of the cerebral cortex in the brain.

Q53. What is the role of the cerebellum in the brain?

Q54. Explain the function of the medulla in controlling body processes.

Q55. Why is the brain described as a complex organ?

Q56. What is the benefit of having billions of interconnected neurones in the brain?

Q57. Identify three main regions of the brain and state their functions.

Q58. How does the structure of the cerebral cortex help in its function?

Q59. What types of activities are controlled by the cerebellum?

Q60. Explain how the medulla controls unconscious activities.

Q61. What are the challenges of studying brain function?

Q62. Why is it difficult to treat brain damage or brain diseases?

Q63. What is one method used by neuroscientists to map brain function?

Q64. How does electrical stimulation help scientists understand the brain?

Q65. Describe how MRI scanning can be used to study the brain.

Q66. What are the risks of carrying out procedures on the brain?

Q67. What are the benefits of brain surgery for treating certain conditions?

Q68. Why is the brain difficult to study safely?

Q69. How can studying patients with brain damage help understand brain function?

Q70. Why must doctors be careful when performing surgery on the brain?

Q71. What ethical considerations are involved in brain research?

Q72. How might research into the brain help people with mental health conditions?

Q73. What is the role of the eye in the nervous system?

Q74. What is the function of the retina?

Q75. Describe the role of the optic nerve in vision.

Q76. What is the sclera and what does it do?

Q77. How does the cornea help focus light?

Q78. What does the iris do to control the amount of light entering the eye?

Q79. Describe how the ciliary muscles and suspensory ligaments work together.

Q80. What is meant by accommodation in the eye?

Q81. How does the eye focus on a near object?

Q82. How does the eye adjust to focus on a distant object?

Q83. What changes take place in the lens when focusing on near objects?

Q84. What changes take place in the lens when focusing on distant objects?

Q85. What happens to the eye in dim light conditions?

Q86. Why is it important for the eye to adapt to dim light?

Q87. What causes myopia in the eye?

Q88. What causes hyperopia in the eye?

Q89. How can spectacle lenses help correct myopia?

Q90. How do spectacle lenses correct hyperopia?

Q91. What is the difference between hard and soft contact lenses?

Q92. How does laser eye surgery correct vision problems?

Q93. What are the risks of using contact lenses?

Q94. How can replacement lenses help treat eye defects?

Q95. Why must eye treatments be done with great care?

Q96. How can a ray diagram show the defect of myopia?

Q97. How can a ray diagram show the defect of hyperopia?

Q98. How do convex lenses help in correcting hyperopia?

Q99. How do concave lenses help in correcting myopia?

Q100. What is the advantage of using laser surgery over glasses or contact lenses?

Q101. What is the function of the thermoregulatory centre in the brain?

Q102. How does the thermoregulatory centre detect changes in body temperature?

Q103. What role do skin receptors play in temperature control?

Q104. How is information about skin temperature sent to the brain?

Q105. What is vasodilation and when does it occur?

Q106. How does vasodilation help to reduce body temperature?

Q107. What is vasoconstriction and when does it happen?

Q108. How does vasoconstriction help to increase body temperature?

Q109. What is the function of sweat glands in temperature control?

Q110. How does sweating reduce body temperature?

Q111. What causes the body to stop sweating?

Q112. What is the role of shivering in temperature regulation?

Q113. Why is it important to keep the body temperature within a narrow range?

Q114. What could happen if body temperature gets too high?

Q115. What could happen if body temperature gets too low?

Q116. Explain how blood vessels in the skin respond to cold conditions.

Q117. Describe how energy is transferred from the body to the environment.

Q118. Why is the brain well suited to act as a coordination centre?

Q119. Describe how the body restores normal temperature after being in a hot environment.

Q120. Describe how the body restores normal temperature after being in a cold environment.

Q121. How does the endocrine system differ from the nervous system in terms of speed and duration?

Q122. What is the main function of the endocrine system?

Q123. What are hormones and how do they travel through the body?

Q124. What is a target organ in relation to hormones?

Q125. Why are the effects of hormones generally slower than those of the nervous system?

Q126. What is meant by hormonal coordination?

Q127. Name the glands involved in the endocrine system.

Q128. Where is the pituitary gland located in the body?

Q129. Why is the pituitary gland called the “master gland”?

Q130. How does the pituitary gland control other glands?

Q131. Name two hormones secreted by the pituitary gland and their functions.

Q132. Where is the pancreas located and what is its function in the endocrine system?

Q133. What hormone is produced by the pancreas and what is its effect?

Q134. Where is the thyroid gland located and what hormone does it release?

Q135. What is the role of thyroxine in the body?

Q136. Where are the adrenal glands located and what is their function?

Q137. What hormone is produced by the adrenal glands and when is it released?

Q138. Where are the ovaries located in the female body?

Q139. What hormones are produced by the ovaries?

Q140. Where are the testes located and what hormone do they release?

Q141. What is the function of testosterone in males?

Q142. How does the endocrine system maintain homeostasis?

Q143. Why does each hormone affect only specific target organs?

Q144. Explain how hormones can regulate body processes over long periods.

Q145. What is the role of feedback mechanisms in hormone control?

Q146. How do hormones affect growth and development?

Q147. What could happen if the endocrine system fails to regulate hormone levels properly?

Q148. Compare the communication methods used by the nervous and endocrine systems.

Q149. How does the pituitary gland respond to signals from the brain?

Q150. Why is it important for the endocrine system to respond to changing conditions in the body?

Q151. What is the role of the pancreas in controlling blood glucose levels?

Q152. How does insulin help reduce high blood glucose levels?

Q153. What happens to excess glucose in the liver and muscle cells?

Q154. What causes blood glucose concentration to rise after a meal?

Q155. How does glucose move from the blood into the cells?

Q156. What is Type 1 diabetes and what is its main cause?

Q157. Why do people with Type 1 diabetes need insulin injections?

Q158. What is Type 2 diabetes and how does it affect the body?

Q159. Why don't the body cells respond to insulin in Type 2 diabetes?

Q160. How can Type 2 diabetes be controlled through lifestyle changes?

Q161. Why is obesity a major risk factor for developing Type 2 diabetes?

Q162. What are the main differences between Type 1 and Type 2 diabetes?

Q163. What are common symptoms of untreated diabetes?

Q164. What is the role of glucagon in blood glucose control?

Q165. How does glucagon raise low blood glucose levels?

Q166. What is glycogen and where is it stored?

Q167. How does the body switch between storing and releasing glucose?

Q168. What is a negative feedback cycle in the context of blood sugar regulation?

Q169. How do insulin and glucagon work together in a feedback loop?

Q170. How does the body respond to a drop in blood sugar concentration?

Q171. What might a graph of blood glucose levels after eating show?

Q172. How do blood glucose graphs differ for diabetic and non-diabetic people?

Q173. What are the dangers of high blood sugar levels over time?

Q174. Why is it important to maintain constant blood glucose concentration?

Q175. How does the body lose water through the lungs?

Q176. What substances are lost through sweating?

Q177. Why can't water loss from lungs and skin be controlled?

Q178. What happens if body cells lose too much water?

Q179. What happens if body cells gain too much water?

Q180. How do the kidneys help regulate the water balance in the body?

Q181. What is the role of the kidneys in removing urea?

Q182. What is filtration in the kidney?

Q183. What substances are reabsorbed into the blood by the kidney?

Q184. Why is glucose reabsorbed and not lost in urine?

Q185. What happens to excess ions in the kidney?

Q186. What is urea and how is it made in the liver?

Q187. What is deamination and why is it necessary?

Q188. Why is ammonia quickly converted to urea?

Q189. How is urea safely removed from the body?

Q190. What does ADH stand for and what is its function?

Q191. When is ADH released from the pituitary gland?

Q192. What effect does ADH have on kidney tubules?

Q193. How does ADH help conserve water when blood is too concentrated?

Q194. What happens to ADH levels when blood becomes too dilute?

Q195. How is ADH controlled by negative feedback?

Q196. What happens when the kidneys stop working properly?

Q197. What is kidney dialysis and when is it needed?

Q198. How does dialysis remove waste products from the blood?

Q199. What are the key differences between dialysis and kidney transplant?

Q200. What are the benefits and risks of kidney transplantation?

Q201. What is the role of reproductive hormones during puberty?

Q202. What secondary sex characteristics are caused by reproductive hormones in females?

Q203. What changes occur in males during puberty due to testosterone?

Q204. Where is oestrogen produced and what is its main function?

Q205. What is ovulation and how often does it occur?

Q206. What is the role of testosterone in the male body?

Q207. What does follicle stimulating hormone (FSH) do in the menstrual cycle?

Q208. What effect does luteinising hormone (LH) have in the female reproductive system?

Q209. How does oestrogen help in the menstrual cycle?

Q210. What is the function of progesterone in the menstrual cycle?

Q211. What triggers the start of the menstrual cycle?

Q212. How do FSH and oestrogen interact during the menstrual cycle?

Q213. What causes a rise in LH levels during the cycle?

Q214. How do oestrogen and progesterone prepare the uterus for pregnancy?

Q215. What causes the uterus lining to break down if pregnancy does not occur?

Q216. What happens to hormone levels after ovulation?

Q217. How can hormone graphs help track the menstrual cycle?

Q218. When in the cycle is a woman most likely to become pregnant?

Q219. What happens to hormone levels if fertilisation occurs?

Q220. How does the interaction of four hormones regulate the menstrual cycle?

Q221. What is the purpose of oral contraceptives?

Q222. How do oral contraceptives prevent pregnancy?

Q223. What are the benefits and risks of taking oral contraceptive pills?

Q224. What is the role of progesterone in hormonal contraception?

Q225. How do implants, patches or injections work to prevent pregnancy?

Q226. What are barrier methods of contraception?

Q227. How do condoms and diaphragms prevent fertilisation?

Q228. What are intrauterine devices (IUDs) and how do they work?

Q229. How do hormonal IUDs differ from copper IUDs?

Q230. What is the function of spermicidal agents?

Q231. Why is abstaining from intercourse considered a method of contraception?

Q232. What is surgical sterilisation and how does it prevent pregnancy?

Q233. What are the advantages of non-hormonal methods of contraception?

Q234. What are the disadvantages of hormonal contraceptive methods?

Q235. Why is it important to evaluate different contraception methods?

Q236. How can personal beliefs influence contraception choices?

Q237. Why can't science alone answer questions about contraception?

Q238. What social factors affect access to contraception?

Q239. How can the use of contraception impact population growth?

Q240. What ethical concerns exist around long-term contraception use?

Q241. What economic issues are linked to access to contraceptive methods?

Q242. How do contraceptives empower individuals in family planning?

Q243. How can contraception reduce the spread of sexually transmitted infections?

Q244. Why might someone choose natural family planning over other methods?

Q245. How does contraception benefit public health systems?

Q246. What are the consequences of not using effective contraception?

Q247. How is the effectiveness of a contraceptive method measured?

Q248. Why might contraceptive failure occur even when methods are used?

Q249. How do hormonal methods of contraception affect menstrual cycles?

Q250. What role do healthcare providers play in educating about contraception?

Q251. What hormones are included in fertility drugs and what are their roles?

Q252. How does FSH help women who are infertile?

Q253. What is the role of LH in treating infertility?

Q254. Why might a woman take fertility drugs before trying to conceive?

Q255. How does IVF treatment help couples with fertility problems?

Q256. What are the first steps in the IVF process?

Q257. How are eggs collected from the mother during IVF?

Q258. What happens to the eggs after they are collected in IVF?

Q259. How is fertilisation carried out in IVF?

Q260. At what stage are embryos transferred back into the uterus?

Q261. Why are only one or two embryos inserted into the uterus during IVF?

Q262. What are the possible outcomes of transferring more than one embryo?

Q263. Why are FSH and LH used together in IVF treatment?

Q264. How have improved microscopy techniques supported IVF procedures?

Q265. What are the chances of success with IVF treatment?

Q266. Why can IVF be emotionally and physically stressful for patients?

Q267. What are the health risks of multiple births for the mother?

Q268. Why are multiple births risky for babies?

Q269. How do patients usually feel after unsuccessful IVF cycles?

Q270. What ethical issues are linked to the selection of embryos in IVF?

Q271. Why might some people be against IVF on religious or moral grounds?

Q272. How do doctors decide which embryos to transfer during IVF?

Q273. What social challenges might couples face when undergoing IVF?

Q274. How does the cost of IVF affect access to treatment?

Q275. Why is it important for doctors to explain IVF success rates clearly?

Q276. What role does thyroxine play in the human body?

Q277. Where is thyroxine produced and what gland is involved?

Q278. What effect does thyroxine have on the body's metabolism?

Q279. How is growth and development influenced by thyroxine?

Q280. What is a feedback system?

Q281. How does negative feedback control thyroxine levels?

Q282. What hormone is involved in regulating thyroxine production?

Q283. What happens if thyroxine levels are too low?

Q284. What happens if thyroxine levels are too high?

Q285. What is the role of adrenaline in the body?

Q286. What triggers the release of adrenaline?

Q287. How does adrenaline prepare the body for action?

Q288. What changes occur in the body due to adrenaline?

Q289. Why does adrenaline increase heart rate?

Q290. How does adrenaline help muscles during stress?

Q291. Where is adrenaline produced?

Q292. Why is adrenaline not controlled by negative feedback?

Q293. How are oxygen and glucose delivered more quickly during the fight or flight response?

Q294. What is meant by the fight or flight response?

Q295. How do thyroxine and adrenaline differ in their effects?

Q296. How do stress and fear affect hormone levels?

Q297. Why is the control of thyroxine levels important for health?

Q298. What might a diagram of thyroxine feedback show?

Q299. Why is homeostasis important in the hormonal system?

Q300. How does the body keep internal conditions stable using hormones?

Q301. What are plant hormones and why are they important for plant growth?

Q302. What is phototropism and how does it help plants survive?

Q303. What is gravitropism and why is it also called geotropism?

Q304. What role does auxin play in plant responses to light?

Q305. How does an uneven distribution of auxin affect shoot growth?

Q306. How does auxin influence root growth differently from shoot growth?

Q307. What happens to a plant shoot placed in one-sided light?

Q308. What is the response of plant roots to gravity?

Q309. How can we observe phototropism in a practical experiment?

Q310. How should measurements be recorded in the plant growth practical?

Q311. Why are labelled diagrams important when recording plant responses?

Q312. What factors must be controlled during a tropism experiment?

Q313. Why are both length and direction of growth measured in the seedling practical?

Q314. What is the benefit of using seedlings in plant hormone investigations?

Q315. How do plants sense the direction of light?

Q316. How does gravity affect where auxin collects in plant tissues?

Q317. What changes can be seen in seedlings grown in the dark?

Q318. What is the difference between positive and negative tropisms?

Q319. Why is auxin important for plant coordination?

Q320. What are gibberellins and what do they help with in plants?

Q321. What role do gibberellins play in seed germination?

Q322. How can gibberellins promote flowering in plants?

Q323. Why are gibberellins used to increase fruit size?

Q324. What is ethene and what is its role in fruit ripening?

Q325. How does ethene help during transport of fruits?

Q326. Why is the control of fruit ripening important in the food industry?

Q327. What is tissue culture and how is auxin used in this process?

Q328. How do auxins help in producing new plants from cuttings?

Q329. What is the role of rooting powder and why is auxin added to it?

Q330. Why are auxins used as weed killers?

Q331. How do auxin-based weedkillers target only certain plants?

Q332. What is the benefit of using selective weedkillers in farming?

Q333. How can overuse of plant hormones affect biodiversity?

Q334. What is the environmental risk of hormone-based weed control?

Q335. Why is it important to use plant hormones carefully in agriculture?

Q336. How can gibberellins be used to improve crop production?

Q337. What are the commercial benefits of using plant hormones in farming?

Q338. Why might farmers delay or speed up fruit ripening?

Q339. How does controlling plant hormones help in food supply chains?

Q340. What are some examples of crops treated with gibberellins?

Q341. Why is it useful to control seed dormancy with plant hormones?

Q342. How does ethene influence cell division?

Q343. What advantages do hormones offer over mechanical methods in agriculture?

Q344. How might hormone use affect non-target plant species?

Q345. How are plant hormones transported in the plant body?

Q346. What precautions are taken when using plant hormones in greenhouses?

Q347. How could hormone misuse affect pollinators?

Q348. Why should plant hormone levels be monitored in food production?

Q349. What is a practical way to test the effect of auxin on root growth?

Q350. How do plant hormone technologies demonstrate applied biology in agriculture?