Multiple Choice

1. Pilocarpine inhibits secretion more than propranolol because:
   a. It is a cholinergic agonist and therefore inhibits fluid release.
   b. It stimulates the muscarinic receptor.
   c. Propranolol is administered only intravenously and therefore does not inhibit the salivary glands efficiently.
   d. None of the above (correct)
   e. All of the above

2. If you isolate the anterior hard palate and stimulate it with a lemon drop, which of the following will occur?
   a. Profuse secretion because the mucous salivary glands located here, have numerous parasympathetic connections.
   b. No secretion because lemon drops inhibit the beta-adrenergic receptor thereby inhibiting secretion.
   c. No secretion because the serous salivary glands located here, do not secrete saliva.
   d. No secretion because this is an unusual location for salivary glands. (correct)
   e. None of the above

3. If you administer a drug that stimulates phospholipase C, in a patient taking atropine, theoretically which of the following could happen:
   a. Fluid secretion is induced. (correct)
   b. No change in fluid secretion.
   c. Fluid secretion is further inhibited.
   d. Protein secretion ceases.
   e. None of the above

4. A patient presents to your office with bilateral tumors in the parotid gland, complaining of a dry mouth. This lack of secretion is:
   a. Unrelated to the salivary gland mass.
   b. Related to disruption and loss of acinar structure and therefore disruption of normal signaling mechanisms in the gland. (correct)
   c. Psychological. The patient has minor salivary glands that produce saliva and therefore disruption of parotid function should have no effect.
   d. Indicative of inaccurate reporting because all salivary gland tumor tissue continues its normal secretion activities.
   e. None of the above
5. Signaling molecules within a cell allow:
   a. Amplification of the stimulus since several identical molecules can be stimulated by the same agonist.
   b. Rapid communication between the extracellular and intracellular environments.
   c. Resistant to irradiation.
   d. Both a) and b). (correct)
   e. None of the above.

6. Which statement is not correct?
   a. Secondary saliva is isotonic in relation to plasma. (correct)
   b. Primary saliva is isotonic in relation to plasma.
   c. Secondary saliva is hypotonic in relation to plasma.
   d. Secondary saliva has a lower concentration of ions in relation to plasma.
   e. None of the above.

7. Which statement is not correct regarding the myoepithelial cells?
   a. Speeding up the initial flow of saliva.
   b. Reducing luminal volume
   c. Part of the structural components of the salivary glands
   d. Modified epithelial cells with contractile ability
   e. Smooth muscle cells with secretory ability. (correct)

8. What event does not occur with stimulated saliva?
   a. Na\(^+\) increases
   b. K\(^+\) increases (correct)
   c. HCO\(_3\)\(^-\) increases
   d. Flow rate increases
   e. None of the above

9. Which one is not a parasympathetic ganglion?
   a. Ciliary ganglion
   b. Trigeminal ganglion (correct)
   c. Pterygopalatine ganglion
   d. Otic gangion
   e. Submandibular ganglion

10. In order to stimulate the flow of the saliva in a patient, what would be the best approach:
    a. Stimulating the specific nerves by electrodes
    b. Give the patient a parasympathetic agonist drug (carbachol) (correct)
    c. Give patient a sympathetic agonist drug (isoproterenol)
    d. All of the above
    e. None of the above
11. The concept of “multi-functionality” describes the fact that:
   a. every salivary protein has the same multiple functions.
   b. salivary proteins tend to have more than one biological activity. (correct)
   c. each salivary protein possesses one unique biological activity which in concert with the other proteins results in multi-functions.
   d. all of the above
   e. none of the above

12. The significance of salivary proteins complexing with salivary mucins is that:
   a. complexing with mucins keeps the mucins from complexing with themselves, thus maintaining their lubricating activity.
   b. the mucins can be rapidly eliminated from the oral cavity.
   c. the biological activities of the salivary proteins are inhibited until needed.
   d. complexing with mucins tends to concentrate the proteins resulting in high levels of biological activity associated with the mucins. (correct)
   e. None of the above

13. The water retention properties of mucins are important in the airways because they:
   a. help prevent the airways from drying out. (correct)
   b. foster the growth of commensal organisms.
   c. help anchor dental appliances.
   d. all of the above
   e. none of the above

14. Pellicle-formation is important to the integrity of the teeth because:
   a. the pellicle concentrates the inhibitors of calcium-phosphate precipitation at the enamel surface.
   b. the pellicle reduces the loss of calcium-phosphate from the tooth.
   c. the pellicle concentrates anti-microbial substance at the tooth surface.
   d. all of the above (correct)
   e. none of the above

15. The ability of certain salivary proteins to bind to and aggregate bacteria is a two-edged sword because:
   a. when salivary proteins are in solution, bacteria are aggregated and can be eliminated before they adhere to the tooth.
   b. when salivary proteins are part of the pellicle, bacteria adhere to the tooth surface and can cause damage.
   c. aggregation of bacteria enhances their pathogenicity and makes it more difficult for the body to eliminate them.
   d. a and b (correct)
   e. none of the above

16. It is important to prevent supersaturated calcium-phosphate in saliva from precipitating because:
   a. the calcium-phosphate must be kept in solution to maintain an equilibrium with calcium-phosphate in the tooth.
   b. if calcium-phosphate precipitates in the tooth pores, the pores will become blocked.
   c. calcium-phosphate may contribute to calculus formation.
   d. all of the above (correct)
   e. none of the above
17. Difficulty in rapidly performing more than two swallows in a row is due to:
   a. salivary reflux phenomenon.  
   b. pyosalpingitis.  
   c. the throat muscles becoming fatigued.  
   d. lack of oral lubrication. (correct)  
   e. none of the above

18. What ion is mainly responsible for the increase in the stimulated saliva?
   a. Na\(^+\)  
   b. Negatively charged amylase  
   c. Cl\(^-\)  
   d. HCO\(_3\)\(^-\) (correct)  
   e. None of the above

19. Select the incorrect statement:
   a. Saliva contains growth factors such as epithelial growth factor (EGF) and nerve growth factor (NGF)  
   b. Saliva is generally saturated with respect to calcium and phosphate which help in remineralizing enamel  
   c. Salivary reflexes are under voluntary control (correct)  
   d. Saliva functions as temperature regulator  
   e. Digestive enzymes are present in the saliva

20. Select the incorrect statement:
   a. Acetylcholine is the neurotransmitter between the second order neuron and the target organ in the parasympathetic nervous system.  
   b. Parasympathetic ganglia are located close to their targets.  
   c. sympathetic ganglia are located in the sympathetic trunk.  
   d. Norepinephrin (noradrenalin) is the neurotransmitter between the second order neurons and the target organ in the parasympathetic nervous system. (correct)  
   e. None of the above

True/False
21. Different concentrations of a taste quality stimulates salivary flow rate at different rates. (T)  
22. The teeth are at great risk for decay late at night because the salivary flow rates are low at that time. (T)  
23. In otherwise healthy individuals (between 30 and 60 years old), there is a normal progressive reduction in salivary flow rates with advancing age (F).  
24. Stimulation of muscarinic receptors results in rapid saliva flow because of increased fluid release. (T)  
25. The primary cause of salivary gland output reduction in the elderly can usually be traced to the medications that they are taking for other medical problems. (T).  
26. Erosion of tooth surfaces in patients who have had head and neck irradiation is attributable to increased mucin levels and concentrations of supersaturated calcium phosphate. (F)
27. There is a clear distinction between what are considered functional normal and subnormal levels of saliva. (F)

28. In a patient taking no drugs, salivary protein secretion may be impaired if the patient has an inactivating mutation in Gs, the GTP-binding protein. (T)

29. If a patient had a defect in cAMP production only in the salivary gland, fluid secretion would not occur. (F)

30. A patient with badly damaged muscarinic and adrenergic receptors would have no xerostomia problems because of constitutive secretion of proteins. (F)

**Multiple Choice**

31. What neurotrophic factors are important for the development of the autonomic nervous system?
   a. NGF
   b. GDNF
   c. NrTN
   d. All of the above (correct)
   e. None of the above

32. In addition to survival effect, neurotrophic factors are important for many other aspects of the nervous system such as:
   a. Growth
   b. Differentiation
   c. Extension of cellular processes
   d. Synthesis of proteins
   e. All of the above (correct)

33. What statement is not correct:
   a. The neurotrophic theory explains the basic controlling mechanisms for controlling the number of nerve cells in the developing nervous system.
   b. Neurotrophic factors are endogenous proteins and neurons require them for survival.
   c. Neurotrophic factors are produced by the target tissue.
   d. All of the above
   e. None of the above (correct)
True/False

34. Saliva secretion ceases during night. (F)
35. Saliva secretion follows a circadian rhythm. (T)
36. Total protein composition of the saliva decreases as salivary glands are stimulated. (T)
37. Hypolemmal innervation hypothesis explains the mode of contact between the parasympathetic nerve fibers and salivary gland cells. (T)
38. Activation of different G-protein coupled receptors is coupled to activation of different intracellular events leading to either protein exocytosis and/or fluid secretion. (T)
39. Neurotransmitters exert their biological function as they enter the nuclei of the salivary gland cells. (F)
40. Cyclic AMP and IP3 are examples of second messengers. (T)