

Biology of the Salivary Glands 513 (KEY)
MID-TERM Examination
May 24, 2000

Multiple Choice

1. Nerves have a number of actions on salivary gland cells. Which of the following refers to maintaining normal function?
 - a. Hydrokinetic
 - b. Protokinetic
 - c. Synthetic
 - d. Trophic (**correct**)
 - e. Autonomic

2. Which of the following does not result from stimulation of myoepithelial cells?
 - a. Speeds up initial flow of saliva.
 - b. Reduces luminal volume.
 - c. Increases reabsorption of sodium ions. (**correct**)
 - d. Contributes to secretory pressure.
 - e. Helps the flow overcome increased peripheral pressure.

3. Saliva was collected from human parotid glands and then analyzed. Which of the following results of this analysis is correct?
 - a. In resting saliva sodium ion concentration is about 3 mEq/l and after flow is stimulated is about 63 mEq/l. (**correct**)
 - b. In resting saliva sodium ion concentration is about 63 mEq/l and after flow is stimulated is about 3 mEq/l.
 - c. In resting saliva potassium ion concentration is about 3 mEq/l and after flow is stimulated is about 63 mEq/l.
 - d. In resting saliva potassium ion concentration is about 4 mEq/l and after flow is stimulated is about 47 mEq/l.
 - e. none of the above.

4. The pH of saliva
 - a. becomes the same as plasma at high flow rates.
 - b. is 7.4 at high flow rates.
 - c. is 5.8 at rest and 7.7 at high flow rates. (**correct**)
 - d. is 7.7 at rest and 5.8 at high flow rates.
 - e. is dependent on the concentration of potassium ions.

5. In an experiment the parasympathetic or sympathetic branches of the nervous system supplying the rat parotid gland were stimulated at increasing frequencies and saliva flow rate measured.
- At 10Hz saliva flow was maximum with sympathetic secretion and at a minimum with parasympathetic stimulation. **(correct)**
 - At 100Hz saliva flow was 90 $\mu\text{l}/\text{min}$ with sympathetic secretion and 12 $\mu\text{l}/\text{min}$ with parasympathetic stimulation.
 - The saliva resulting from sympathetic secretion is watery while the parasympathetic saliva is high in protein.
 - After injecting a α -adrenergic receptor blocker parasympathetic secretion is markedly reduced while sympathetic secretion remains unchanged.
 - none of the above
6. Rats were starved for 24hrs and then given either an injection of saline (control) or a dose of 30 mg/kg isoproterenol. After 1 hr the parotid glands were removed and prepared for histological sectioning. Using a microscope, the area of the secretory granules was measured in both control and experimental conditions. The results indicate that
- isoproterenol has no effect on granule area.
 - isoproterenol does not promote protein secretion in the rat parotid gland.
 - isoproterenol at this dose significantly reduces the area of secretory granules. **(correct)**
 - isoproterenol is a very potent muscarinic receptor agonist.
 - isoproterenol at this dose does not significantly reduce the area of secretory granules.
7. The nerve supply to salivary glands travels from the CNS in
- afferent sensory fibers.
 - the solitary tract.
 - the solitary nucleus.
 - efferent secretomotor fibers. **(correct)**
 - hypolemmal synapses.
8. Activation of α -adrenoreceptors on the basolateral membrane of salivary acinar cells leads to
- an increase in intracellular IP_3 .
 - mobilization of intracellular calcium.
 - formation of cyclic AMP. **(correct)**
 - fluid secretion.
 - Secretion of substance P.
9. The investigator who first described conditioned salivary reflexes was
- Thaysen
 - Lopatin
 - Pavlov **(correct)**
 - All of the above
 - None of the above.

10. The cell bodies of sympathetic secretomotor fibers are located in
- intermediolateral nucleus. **(correct)**
 - the superior salivatory nucleus.
 - the inferior salivatory nucleus.
 - the medulla
 - the nucleus of the solitary tract.
11. The concept of “multi-functionality” describes the fact that
- every salivary protein has the same multiple functions.
 - salivary proteins tend to have more than one biological activity. **(correct)**
 - each salivary protein possesses one unique biological activity which in concert with the other proteins results in multi-functions.
 - all of the above
 - none of the above
12. The significance of salivary proteins complexing with salivary mucins is that
- complexing with mucins keeps the mucins from complexing with themselves, thus maintaining their lubricating activity.
 - the mucins can be rapidly eliminated from the oral cavity.
 - the biological activities of the salivary proteins are inhibited until needed.
 - complexing with mucins tends to concentrate the proteins resulting in high levels of biological activity associated with the mucins. **(correct)**
 - None of the above
13. The water retention properties of mucins are important in the airways because they
- help prevent the airways from drying out. **(correct)**
 - foster the growth of commensal organisms.
 - help anchor dental appliances.
 - all of the above
 - none of the above
14. Pellicle-formation is important to the integrity of the teeth because
- the pellicle concentrates the inhibitors of calcium-phosphate precipitation at the enamel surface.
 - the pellicle reduces the loss of calcium-phosphate from the tooth.
 - the pellicle concentrates anti-microbial substance at the tooth surface.
 - all of the above **(correct)**
 - none of the above
15. The ability of certain salivary proteins to bind to and aggregate bacteria is a two-edged sword because
- when salivary proteins are in solution, bacteria are aggregated and can be eliminated before they adhere to the tooth.
 - when salivary proteins are part of the pellicle, bacteria adhere to the tooth surface and can cause damage.
 - aggregation of bacteria enhances their pathogenicity and makes it more difficult for the body to eliminate them.
 - a and b **(correct)**
 - none of the above

16. It is important to prevent supersaturated calcium-phosphate in saliva from precipitating because
- the calcium-phosphate must be kept in solution to maintain an equilibrium with calcium-phosphate in the tooth.
 - if calcium-phosphate precipitates in the tooth pores, the pores will become blocked.
 - calcium-phosphate may contribute to calculus formation.
 - all of the above **(correct)**
 - none of the above
17. The production of lactoferrin is considered one type of “nutritional immunity” because
- lactoferrin feeds iron to the oral microorganisms and, thereby, poisons them.
 - lactoferrin withholds iron from microorganisms and, thereby starves them. **(correct)**
 - lactoferrin is a nutritional source for many oral microorganisms.
 - lactoferrin inhibits the ability of many bacteria to utilize glucose.
 - none of the above.
18. The sialoperoxidase system is self-regulating due to the fact that
- it is activated whenever thiocyanate is present.
 - it is activated whenever there is a low pH in the mouth.
 - it is activated when oral bacteria are nutritionally stimulated. **(correct)**
 - all of the above
 - none of the above
19. What is the evidence that amylases serve more than a nutritional function?
- They have antibacterial activity.
 - They are found in body secretions having nothing to do with nutrition.
 - They are broken down by bacterial proteases.
 - a and b **(correct)**
 - none of the above
20. Difficulty in rapidly performing more than two swallows in a row is due to
- salivary reflux phenomenon.
 - pyosalpingitis.
 - the throat muscles becoming fatigued.
 - lack of oral lubrication. **(correct)**
 - none of the above

True/False

21. Basal levels of unstimulated saliva provide most of the protection to the oral cavity during sleep **(T)**
22. The teeth are at great risk for decay late a 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. A patient’s perception of a “dry mouth” is always consistent with clinical measurements of his/her salivary output. **(F)**
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 is considered functional normal and subnormal levels of saliva. **(F)**
28. Loss of the ability to produce a specific salivary protein will generally compromise an individual's oral cavity. **(F)**
29. All of the components found in saliva are produced by the acinar cells. **(F)**
30. The primary protection of the oral cavity is derived from the mucosal immune system. **(F)**