Biology of the Salivary Glands 513 (KEY)
Final Examination
June 25, 2002

Multiple Choice

1. Pilocarpine increases secretion more than propranolol because: .

   a) It is a cholinergic antagonist and therefore inhibits fluid release.
   a) It stimulates the β-adrenergic receptor.
   a) Propranolol is administered only intravenously and therefore does not inhibit the salivary glands efficiently.
   a) None of the above correct

1. 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.
   a) No secretion because lemon drops inhibit the beta-adrenergic receptor thereby inhibiting secretion.
   a) No secretion because the serous salivary glands located here, do not secrete saliva.
   a) None of the above. correct

1. If you administer a drug that stimulates phospholipase C, in a patient taking pilocarpine, theoretically which of the following could happen:

   a) No change or slight increase in fluid secretion. correct
   a) Fluid secretion is further inhibited.
   a) Protein secretion ceases.
   a) All of the above.

1. A patient presents to your office with bilateral tumors in the parotid gland. Her chief complain deals with esthetics. You may find the following on exam and further questioning.

   a) Several decayed teeth.
   a) Difficulty in swallowing.
   a) Dissatisfaction with retention of her partial denture
   a) All of the above. correct

1. Signaling molecules within a cell allow:

   a) Amplification of the stimulus since several identical molecules can be stimulated by the same agonist.
   a) Rapid communication between the extracellular and intracellular environments.
   a) Translation of a stimulus to a specific physiologic event.
   a) All of the above correct
   a) (a) and (b).

1. Gene therapy procedures allow investigators to

   a) add new metabolic functions to cells that previously did not have those functions.
   a) avoid the use of restriction endonucleases.
   a) introduce anti-metabolic activities to disrupts tumor cell growth.
   a) a and c. **Correct**
   a) none of the above.

1. Mucosal immunity provides most of its protection by blocking

   a) microbial receptors specific for colonization.
   a) the complement cascade.
   a) blocking penetration of undigested food products into the mucosal tissues.
   a) a and c **Correct**
   a) none of the above

1. A major problem with viral-based gene therapy methods is that:

   a) the viruses are usually not tissue or host specific.
   a) the viruses stimulate immune responses because they are antigens.
   a) the viruses are potential biohazards.
   a) b and c **Correct**
   a) none of the above

1. Sensitization to foods is minimized by secretory IgA antibodies by:

   a) The inflammatory response that occurs in the presence of food, these antibodies and complement.
   a) Destroying the antigen presenting cells that would normally present the food antigens to T cells in the gut.
   a) Blocking the penetration of intact food products into the gut. **correct**
   a) All of the above
   a) None of the above

1. Immune defects in the Secretory IgA system are generally more detectable after breast feeding ceases because:

   a) Breasts milk contains maternal sIgA antibodies which mask a lack of sIgA antibodies in the neonate.
   a) Protective levels of sIgA do not appear until the child is several years old.
   a) Breast feeding stimulates the production of IgE in the newborn, resulting in protective antibodies to most pathogens
   a) a and b **correct**
   a) None of the above.

TRUE OR FALSE (mark "a" for true, "b" for false)

1. Stimulation of muscarinic receptors results in slow saliva flow because of increased protein release. **False**
1. If a patient had amplified cAMP production in the salivary gland, fluid secretion would not occur. **False**
1. A patient with badly damaged muscarinic and adrenergic receptors would have no xerostomia problems because of constitutive secretion of proteins. **False**
1. 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. **True**
1. In the same patient mentioned in the previous question, there would also be effects on salivary fluid release because of cross-talk between the signaling pathways. **True**
1. Protection of the oral cavity is rarely derived from the mucosal immune system. **False**
1. Inflammatory reactions are often associated with mucosal immunity. **False**
1. Secretory component is synthesized by the epithelial cells to enable transport onto the mucosal surface. **True**
1. Langerhans cells are not antigen presenting cells. **False**
1. Whole saliva would not be expected to contain IgG. **False**

Multiple Choice (Choose the BEST answer)

1. The strands of mucous in Bill Cosby's sketch on the dentist's office were caused by:

    a) A lack of saliva in his mouth due to the stress of being in the dentist's office
    a) Mucins in the saliva. **correct**
    a) High water content of saliva.
    a) Anesthetics used in the procedure
    a) None of the above

1. Gene therapy may provide new options for patients who have had head and neck irradiation and no longer make saliva because:

    a) It may be possible to introduce secretory functions in ductal cells. **correct**
    a) It may be possible to eliminate the need for saliva in these patients.
    a) It may be possible to convert the damaged acinar cells to insulin-producing cells.
    a) It may be possible to make the remaining ductal cells more radioresistant.
    a) None of the above

1. Saliva is an excellent window into the body for diagnostic and therapy because:

   a) Saliva is easy to collect
   a) Many drugs equilibrate between the saliva and serum, making drug level monitoring easier.
   a) Saliva is free of bacteria and other contaminants that complicate laboratory analysis.
   a) a and b **correct**
   a) non of the above

1. Organized mucosa-associated lymphoid tissue is

   a) found in the lymph nodes.
   b) associated with initial immune response to antigen . **Correct**
   c) filled with plasma cells that are producing antibodies.
   d) composed primarily of M-cells and L-cells.
   e) none of the above

25. Transepithelial transport of antigen is important because without it

   a) antigen would only be detected by the lymphoid cells in O-MALT.
   b) antigen would not be detected by the lymphoid cells in the alternate complement pathway.
   c) polymeric antibody would be pumped through the epithelial cells
   d) vascular addressins would target the wrong cell types.
   e) none of the above **Correct**

TRUE OR FALSE (mark "a" for true, "b" for false)

26. M-cells often enable pathogens to penetrate the epithelial cell layer of the mucosa. **True**

27. One would not expect to find SC associated with monomeric IgA in the serum. **True**

28. Homing is a process by which cells leave the D-MALT and randomly migrate until they encounter vascular addressins that bind to their cell surface receptors in O-MALT. **False**

29. Secretory IgA is a very efficient activator of complement. **False**

30. Secretory IgA is very protective to the neonate because at birth the newborn is already producing adult levels of sIgA. **False**

Multiple Choice

31. Which of the following are the most likely to lead to xerostomia?

   a) Medications
   b) Healthy Aging
   c) Sialolithiasis
   d) a, b and c
   e) a and c **Correct**

32. A 65-year old female presents to you with complaints of a burning tongue. She has been on a known xerostomic medication for over 8 years for hypertension. Her stimulated salivary flow rate is 0.4 ml/min. What will you do?

a) Consult with the prescribing physician about changing the medication dose.
b) Nothing. Her flow rate is not in the xerostomic range. Reassure her that nothing is wrong
c) Consult with the prescribing physician about changing the administration time of the medication.
d) A and b **Correct**

33. A 75-year old female presents to your office with complaints of dysphagia, dysguesia, difficulty keeping her denture in place, and cracked, dry lips. She has been taking 3 medications over the last 10 years for hypertension and depression. What is the most likely diagnosis causing her symptoms and what is the most likely cause?

a) A broken denture; a crack is irritating the soft tissue and breaking the seal preventing a good fit
b) Xerostomia; her age, older people have dry mouths
c) Xerostomia; her medications **Correct**
d) a and b

34. Chemotherapy-induced xerostomia is

a) Permanent, the tissues will never be the same as pre-chemotherapy
b) May be permanent, depends on the drug used
c) Temporary, just give the tissues time to recover from the drug **Correct**
d) There is no such thing

35. Complaints of xerostomia increase with

a) Use of prescription drugs only
b) Polypharmacy
c) Use of OTC (over the counter) drugs only
d) Prolonged Use of drugs
e) b and d **Correct**

36. Local obstruction of saliva, leading to xerostomia, may be caused by:

a) Anatomical strictures
b) Food Impaction
c) Salivary stone
d) All of the above
e) a and c **Correct**

37. Signs/Symptoms of xerostomia include, but are not limited to:

a) Thick, ropey saliva
b) Dysphagia
c) Amputation Caries
d) All of the above **Correct**
e) a and c

38. Chronic, recurrent sialadenitis may be caused by:

    a) A resistant bacterial organism
    b) Mucus plug
    c) A stone
    d) Xerostomia
    e) a, b and c **Correct**

39. A 24-year old healthy male presents to you with pain and swelling in his left cheek at meal times. On clinical exam, you express pus out of the left parotid gland orifice. What is the most-likely diagnosis and how will you treat it?

    a) Viral sialadenitis; nothing, antibiotics don't work on viruses
    b) Mucus plug; dilate the orifice to remove the plug
    c) Bacterial sialadenitis; give antibiotics and see him again in ten days **Correct**
    d) Mumps; nothing, refer him to his physician
    e) Salivary stone; try to squeeze the stone out

40. A 63-year old female presents to you with complaints of a dry mouth and multiple cavities. Her medical history reveals a cumulative dose of 6000 cGy of fractionated radiation for a malignant tongue lesion over 7 years ago. She is currently taking no medications. Her clinical exam reveals a scrotal tongue, rampant cervical caries, sticky mucous membranes, and a white, creamy coating on her tongue. What are her most likely diagnoses and what most likely contributed to them?

    a) Xerostomia, amputation caries, fungal infection on her tongue. These are common in older women.
    b) Xerostomia, amputation caries, coated tongue. All these come naturally with aging.
    c) Xerostomia, amputation caries, fungal infection on her tongue. Her history of radiation therapy lead to these problems. **Correct**
    d) None of the above.

41. A 68-year old male presents on a referral from his physician. The patient has been diagnosed with a malignant tumor in the head and neck area and is scheduled to undergo radiation therapy. He will get 7500 cGy in divided doses to the right side of his face. He currently has no dental complaints. What will you do first?

    a) Nothing. Tell him to return after his radiation therapy since no permanent damage is expected.
    b) A complete and thorough exam and treatment plan, keeping in mind the permanent change in saliva flow and healing properties. **Correct**
    c) Send him to a hospital dental clinic. A general dentist shouldn't be treating him.
    d) Immediately extract all of his teeth and make him dentures.

42. For the patient above, when considering the radiation dose and field, what are you concerned about?

    a) Permanent damage to the right parotid gland
    b) Mucositis/dermatitis
    c) Xerostomia and amputation caries
    d) All of the above **Correct**

43. An 18-year old female presents with complaints of sore, bleeding gums. Her medical history reveals that she has a seizure disorder and has been on dilantin for the past 6 years. On clinical exam what oral manifestation of the drug dilantin do you expect?

    a) Dysgeusia
    b) Coated tongue
    c) Gingival enlargement **Correct**
    d) Lichenoid lesions
    e) None of the above

44. For the patient above, what condition(s) most exacerbate(s) the oral manifestation of dilantin use?

    a) Poor oral hygiene
    b) Sialolithiasis
    c) Mouth breathing
    d) Crowded teeth
    e) a, c and d **Correct**

45. Erythema multiforme is an oral manifestation of a systemic agent and is characterized by:

    a) Symmetrical mucocutaneous lesions with a predilection for oral mucosa, hands, and feet
    b) Oral lesions which heal without scars
    c) Erythema with vesicles and erosions developing within hours
    d) All of the above **Correct**
    e) None of the above

46. A 65-year old female with a history of 6500 cGy of radiation to the left side of her face 10 years ago presents to your office. She hasn't seen a dentist since her radiation therapy. She presents to you with complaints of dry mouth and sensitive teeth. You diagnose her with xerostomia and radiation caries. For her xerostomia you:

    a) Recommend oral rinses for the dryness.
    b) Recommend over-the-counter (OTC) saliva substitutes.
    c) Do nothing since the glandular changes are reversible.
    d) Recommend coating agents to lubricate.
    e) a, b and d **Correct**

47. For the patient above, for her radiation caries you will:

    a) Automatically extract all her teeth since she will always have xerostomia and her teeth have a hopeless future.
    b) Restore what is clinically possible and minimize invasive oral surgery
    c) Instruct her on proper oral care
    d) Fabricate fluoride trays and prescribe fluoride
    e) b, c and d **Correct**

48. The generally accepted salivary flow rate in healthy, non-medicated adults is ____ for resting flow and _____for stimulated flow.

    a) 0.1-0.2 ml/min; 0.3-0.4 ml/min
    b) 0.1-0.2 ml/min; 0.5-0.6 ml/min
    c) 0.3-0.4 ml/min; 1.0-2.0 ml/min **Correct**
    d) 0.5-0.6 ml/min; 0.1-0.2 ml/min

49. Patient compliance of saliva substitutes is poor because

    a) Saliva substitutes aren't available in the USA
    b) The substitutes feel too much like someone else's saliva **Correct**
    c) The substitutes are sterilized saliva samples from volunteers
    d) Not much selection

50. A patient complains of a dry mouth and a painful swelling under his chin. There is also pain that increases at meal times. On clinical exam of the submandibular ducts you are unable to express any saliva from the left orifice and there is a 1/2 cm hard, round object near the orifice. What do you suspect is the most likely diagnosis and how will you confirm it?

    a) Bacterial sialadenitis; administer antibiotics and see him in 10 days
    b) Sialolithiasis; take an occlusal radiograph **Correct**
    c) Viral sialadenitis; treat the symptoms and see him in 10 days
    d) Anatomical stricture; refer him to an oral surgeon
    e) Mucus plug; dilate the orifice to try to squeeze the plug out