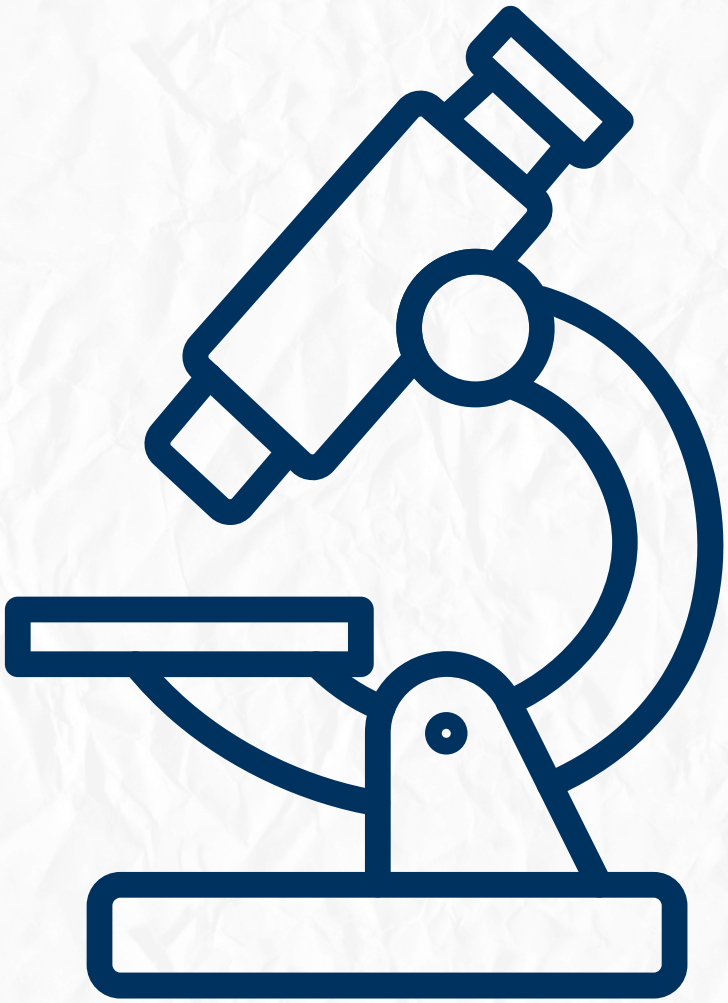
لجنة طب الأسنان

1

Oral Histology

Quiz time



Enamel

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Q1: A 22-year-old patient presents with a deep carious lesion. During examination, it is noted that the dissolution follows the chemical basis of dental caries. Which component is primarily responsible for this susceptibility?
A) Fluorapatite crystals
B) Hydroxyapatite crystals
C) Amelogenins
D) Strontium ions

Q2: During the maturation stage, ameloblasts exhibit 'modulation'. What is the primary functional difference between ruffle-ended and smooth-ended ameloblasts?
A) Ruffle-ended cells secrete matrix, while smooth-ended cells secrete the rod sheath.
B) Ruffle-ended cells allow inorganic material incorporation, while smooth-ended cells permit the exit of protein fragments and water.
C) Smooth-ended cells have tight distal junctions, while ruffle-ended cells have leaky distal junctions.
D) Ruffle-ended cells are responsible for apoptosis.

Q3: The 'Rod Sheath' contains more organic material than the rest of the enamel. How is this structure formed?
A) By the fusion of proximal and distal Tomes' processes.
B) It is secreted during the protective stage.
C) It forms when the distal Tomes' process is squeezed out, leaving a narrow space filled with organic material.
D) By the breakdown of amelogenins during maturation.

Q4: Enamel is the hardest calcified structure but is also brittle. Which histological relationship is essential to maintain its integrity under mechanical forces?
A) High concentration of fluoride in outer layers.
B) Presence of a thin layer of aprismatic enamel.
C) An underlying layer of more resilient dentin.
D) The primary enamel cuticle.

Q5: During the differentiation phase of the presecretory stage, which of the following is NOT a characteristic change?
A) The nucleus shifts proximally toward the stratum intermedium.
B) The Golgi complex migrates distally.
C) The cells continue to undergo frequent mitotic divisions.
D) The basal lamina is fragmented and removed.

Q6: A developmental defect shows a lack of enamel rods throughout the entire thickness. This implies a failure in which specific structure?
A) Stratum intermedium
B) Proximal portion of Tomes' process
C) Distal portion of Tomes' process
D) Reduced enamel epithelium

Q7: In the Maturation Proper phase, ruffle-ended ameloblasts produce bicarbonate ions. What is the physiological purpose of this?
A) To degrade organic matrix proteins.
B) To alkalize the enamel fluid and prevent reverse demineralization of growing crystallites.
C) To increase the permeability of the enamel organ.
D) To promote programmed cell death.

Q8: Regarding the chemical composition of enamel, which statement is true regarding its volume?
A) It is 96% mineral by volume.
B) Organic and inorganic components are approximately equal by volume.
C) Water content accounts for 50% of the volume.
D) Mineral content is 30% by volume.

Q9: The Reduced Enamel Epithelium (REE) protects enamel from connective tissue to prevent resorption. This layer is formed by the fusion of:
A) Ameloblasts and Dental Papilla.
B) Ameloblasts and the other layers of the enamel organ.
C) Mantle Dentin and Pulp.
D) Oral Epithelium and Dental follicle.

Q10: During the secretory stage, which proteins are dominant, and what is their fate?
A) Enamelins; they remain as the primary scaffold.
B) Amelogenins; they are removed as crystals grow wider and thicker during maturation.
C) Collagen; it is calcified to form the rod core.
D) Tuftelin; it is replaced by water.

Q11: Amelogenesis begins during which stage of tooth development? A) Bud stage
B) Cap stage
C) Bell stage
D) Eruption stage

Q12: In the 'Morphogenetic Phase', what is the shape of the cells of the inner enamel epithelium? A) Tall columnar with distal nuclei
B) Cuboidal or low columnar with central nuclei
C) Flattened epithelial cells
D) Hexagonal prisms

Q13: During the 'Secretory Stage', where is the messenger RNA (mRNA) for enamel proteins translated? A) Golgi complex
B) Nucleus
C) Ribosomes on the membrane of the rough endoplasmic reticulum
D) Mitochondria in the infranuclear compartment

Q14: What characterizes 'Initial Enamel' and 'Final Enamel' compared to the rest of the enamel layer? A) They are more mineralized
B) They do not contain enamel rods (Aprismatic)
C) They are formed by smooth-ended ameloblasts
D) They contain a higher concentration of Collagen

Q15: According to the 'Life Cycle of Ameloblast', in which phase do the cells lose their ability to divide? A) Morphogenetic phase
B) Differentiation phase
C) Protective stage
D) Desmolytic stage

Q16: During the 'Maturation Stage', what is the percentage of ameloblasts that undergo programmed cell death (Apoptosis)? A) 10%
B) 25% during the transitional phase and another 25% later (Total 50%)
C) 75%
D) 100% before the tooth erupts

Q17: Which structures are responsible for tightly holding ameloblasts together and determining what can pass between them? A) Hemidesmosomes
B) Junctional complexes (Proximal and Distal)
C) Enamel tufts
D) Tomes' processes

Q18: In the 'Desmolytic Stage', the Reduced Enamel Epithelium (REE) produces enzymes to: A) Form the dental cuticle
B) Destroy the connective tissue separating the tooth from the oral epithelium
C) Mineralize the enamel matrix
D) Induce cementum deposition

Q19: What is the main protein found in 'Mature Enamel' organic matrix? A) Amelogenin
B) Non-amelogenins (Enamelin, Tuftelin)
C) Collagen type I
D) Keratin

Q20: The 'Modulation Cycle' during maturation is a rapid process. In some species, how often does it occur? A) Once every 5 years
B) Once every week
C) As often as once every 8 hours (3 times a day)
D) Only during the night

الإجابات (للتحقق):
1- B| 2- B| 3- C| 4- C | 5- C| 6- C |7- B |8- B| 9- B |10- B| 11-C | 12-B | 13-C | 14-B | 15-B | 16-B | 17-B | 18-B | 19-B | 20-C

Q1: In cross-section, the enamel prism is best described as having a "keyhole" or "fish-scale" shape. Which orientation is correct for its components?
A) The head is oriented cervically, and the tail toward the crown.
B) The head is oriented toward the crown, and the tail toward the cervical margin.
C) Both head and tail are oriented perpendicular to the crown surface.
D) The head is oriented toward the pulp, and the tail toward the ADJ.

Q2: Regarding the crystal arrangement within a single enamel prism, how do crystals diverge from the central axis?
A) All crystals remain perfectly parallel to the long axis.
B) Crystals are oriented perpendicular to the long axis at the prism core.
C) The further the crystals are from the central axis, the more their orientation diverges.
D) Crystals in the tail are more tightly packed than in the head.

Q3: 'Gnarled Enamel' is a structural variation found at the cusps or incisal edges. What is its primary clinical significance?
A) It increases the aesthetic translucency of the tooth.
B) It makes the enamel more susceptible to acid etching.
C) It allows teeth to resist strong masticatory forces (up to 20-30 pounds) without fracturing.
D) It provides a pathway for odontoblast processes to enter enamel.

Q4: Hunter-Schreger bands are an optical phenomenon seen in the inner two-thirds of enamel. What produces this effect?
A) Alternating zones of organic and inorganic material.
B) Changes in the direction between adjacent groups of enamel rods.
C) Periodic rests in enamel production every 24 hours.
D) Entrapment of odontoblast processes at the DEJ.

Q5: A clinician observes 'concentric rings' in a cross-section of a tooth under a microscope. These structures represent a weekly rhythm of enamel production and are known as:
A) Cross Striations
B) Enamel Lamellae
C) Enamel Spindles
D) Striae of Retzius

Q6: The 'Neonatal Line' is an accentuated stria of Retzius. In which teeth is this line typically found?
A) Only in permanent second molars.
B) In all permanent teeth except incisors.
C) In deciduous teeth and first permanent molars.
D) Only in teeth that erupt after the age of two.

Q7: How do 'Enamel Spindles' differ from 'Enamel Tufts' histologically?
A) Spindles are trapped odontoblast processes, while tufts are branched defects with high protein content.
B) Spindles extend to the surface, while tufts are only at the DEJ.
C) Tufts are caused by birth trauma, while spindles are daily growth lines.
D) There is no difference; they are two names for the same structure.

Q8: 'Type C' Enamel Lamellae are the most common type and are characterized by:
A) Occurring before calcification during enamel formation.
B) Being filled with organic material from saliva after tooth eruption.
C) Reaching only halfway through the enamel thickness.
D) Containing only enamel matrix and interrod substance.

Q9: Amelogenesis Imperfecta (AI) can be classified based on the stage of formation. A defect in the 'Maturation Stage' leads to which clinical type?

A) Hypoplastic enamel (thin enamel sheets).

B) Gnarled enamel.

C) Hypocalcified enamel (low mineral content/poor quality).

D) Neonatal line formation.

Q10: During the 'Acid Etching' process in restorative dentistry, what are the two main effects achieved on the enamel surface?

A) It increases enamel thickness and adds fluoride ions.

B) it removes plaque/debris and increases porosity for better bonding.

C) It seals enamel lamellae and regenerates damaged prisms.

D) It converts hydroxyapatite into fluorapatite instantly.

إجابات سريعة للمراجعة:

1-B | 2-C | 3-C | 4-B | 5-D | 6-C | 7-A | 8-B | 9-C | 10-B

Q21: Regarding the 'Direction of Enamel Prisms', how do they differ between permanent and primary (deciduous) teeth near the Cemento-enamel Junction (CEJ)? A) In both, they tilt apically toward the root.
B) In permanent teeth they tilt apically, while in primary teeth they become horizontal.
C) In permanent teeth they are horizontal, while in primary teeth they tilt incisally.
D) There is no difference; they are always perpendicular to the surface.

Q22: 'Cross Striations' in human enamel are periodic bands seen across rods. What is the distance between these striations, and what do they reflect? A) 2.5 mm; reflect weekly growth.
B) 4 µm; reflect a daily rhythm of enamel formation.
C) 60 nm; reflect the size of a single crystal.
D) 10 µm; reflect the travel of one ameloblast.

Q23: The 'Dentino-enamel Junction (DEJ)' has a scalloped profile. What is the orientation of this scalloping? A) Convex toward enamel, concave toward dentin.
B) Straight line with no curvatures.
C) Convex toward dentin, concave toward enamel.
D) Jagged spikes extending to the tooth surface.

Q24: Which of the following best describes 'Enamel Tufts'? A) Trapped odontoblast processes that cross the DEJ.
B) Linear defects filled with organic material from saliva.
C) Branched structures projecting from the DEJ containing "tuft protein".
D) Optical bands found only in the outer third of enamel.

Q25: In 'Age Changes', why does the color of the tooth darken as a person gets older? A) Because enamel becomes thicker and more opaque.
B) Due to the progressive loss of hydroxyapatite crystals.
C) Due to deepening dentin color seen through a progressively thinning enamel layer.
D) Because ameloblasts regenerate and secrete darker matrix.

Q26: 'Amelogenesis Imperfecta - Hypoplastic Type' is a defect that specifically occurs during which stage? A) Maturation stage.
B) Secretory stage, resulting in thin enamel sheets.
C) Protective stage, resulting in tooth resorption.
D) Morphogenetic stage, resulting in no tooth formation.

Q27: Why is it clinically important for a dentist to ensure that enamel is supported by underlying dentin during restoration? A) To increase the fluoride content of the filling.
B) Because unsupported enamel is prone to fracture under force.
C) To allow the enamel to regenerate after the procedure.
D) To prevent the formation of Hunter-Schreger bands.

Q28: 'Perikymata' are surface manifestations of which histological structure? A) Enamel spindles.
B) Striae of Retzius ending at the outer surface.
C) Cross striations on the rod surface.
D) Rod ends in the cervical region.

Q29: As enamel ages, what happens to its fluoride content and permeability? A) Fluoride decreases and permeability increases.
B) Both fluoride and permeability increase.
C) Fluoride increases (especially at the surface) and permeability reduces.
D) They both remain constant throughout life.

Q30: During 'Acid Etching', which acid is commonly used at a 37% concentration to increase porosity? A) Polyacrylic acid.
B) Phosphoric acid.
C) Hydrochloric acid.
D) Acetic acid.

الأجوبة النموذجية:
21-B | 22-B | 23-C | 24-C | 25-C | 26-B | 27-B | 28-B | 29-C | 30-B