Applied Biomedical Sciences

National Dental Examining Board of Canada (NDEB) Virtual OSCE and Assessment of Fundamental Knowledge (AFK)

About 20% of the AFK · 5 topics · 2026 blueprint

Applied Biomedical Sciences covers head and neck anatomy, oral histology and embryology, physiology, biochemistry, microbiology, immunology and general pathology as they apply to dental care. It is the largest AFK area, about 20% in NDEB's 2026 blueprint. Its questions test whether you can link a basic science fact to a clinical sign, a complication or a treatment choice.

You should be able to: Why does an infection from a mandibular third molar that perforates the lingual cortex usually reach the submandibular space rather than the sublingual space?

Every topic: the key point and the trap

BS-1 Head and neck anatomy for the dentist

The inferior alveolar nerve is a branch of the posterior division of the mandibular nerve (V3); it enters the mandibular foramen on the medial ramus, and its mental branch exits at the mental foramen, usually near the apices of the mandibular premolars.

Trap: Assuming the facial nerve supplies the parotid gland or the muscles of mastication; it passes through the gland and supplies facial expression only.

BS-2 Tooth development and oral histology

Tooth development passes through the bud, cap and bell stages; the inner enamel epithelium induces odontoblast differentiation, and dentin forms before enamel at each site.

Trap: Linking the radicular cyst to rests of Serres instead of rests of Malassez.

BS-3 Physiology and biochemistry of saliva, caries and hemostasis

Bicarbonate is the main salivary buffer, especially at high flow; stimulated saliva has more bicarbonate and a higher pH than resting saliva.

Trap: Ordering a platelet count or bleeding time to monitor warfarin; warfarin is monitored with the INR.

BS-4 Oral microbiology and immunology

Mutans streptococci are linked to the start of enamel caries because they are acidogenic, aciduric and make sticky glucans from sucrose; lactobacilli thrive in established cavities and drive progression.

Trap: Calling every glove reaction a latex allergy; most delayed hand dermatitis is type IV from accelerators, or irritant dermatitis.

BS-5 General pathology and systemic disease

Acute inflammation is dominated by neutrophils and chronic inflammation by lymphocytes, plasma cells and macrophages; a granuloma is a collection of epithelioid macrophages, often with giant cells.

Trap: Treating metaplasia and dysplasia as the same; metaplasia is an adaptive change of cell type, dysplasia is atypia with malignant potential.

Key terms

Chorda tympani: Branch of the facial nerve that joins the lingual nerve, carrying taste from the anterior two thirds of the tongue and parasympathetic fibres to the submandibular and sublingual glands.

Mylohyoid line: Ridge on the inner mandible where the mylohyoid muscle attaches; it decides whether lingual spread of infection enters the sublingual or submandibular space.

Rests of Malassez: Epithelial remnants of Hertwig root sheath in the periodontal ligament; the source of radicular cysts.

Critical pH: The pH below which saliva and plaque fluid become undersaturated with tooth mineral, about 5.5 for enamel.

Stephan curve: Graph of plaque pH falling after sugar intake and recovering over time.

INR: International normalized ratio, a standardized prothrombin time used to monitor warfarin.

Red complex: Three bacteria (Porphyromonas gingivalis, Tannerella forsythia, Treponema denticola) associated with advanced periodontitis.

Type IV hypersensitivity: Delayed, T cell mediated reaction appearing 48 to 72 hours after contact.

Dysplasia: Disordered epithelial growth with cellular atypia, a potentially malignant change.

HbA1c: Glycated hemoglobin, reflecting average blood glucose over about the previous 3 months.

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