TEST BANK

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Reviewed by:

1. Olfactory cells

A. Are epithelial cells which synapse with olfactory nerves.
B. Generate impulses when stimulated which are relayed in the thalamus.
C. Are chemoreceptors.
D. Show little adaptation.
E. Are more important than taste in appreciating the flavour of food.

answer:

A. False They are modified nerve cells in the nasal epithelium.

B. False Unlike other sensory inputs, olfactory impulses are not relayed in the thalamus.

C. True They recognize certain molecular structures.

D. False It is the newcomer who recognizes the smell in the room.

E. True In their absence, food loses much of its flavour.

2. Increasing the salt concentration applied to a 'salt' taste bud increases

A. Its sensitivity to salt.
B. The amplitude of its generator potentials.
C. The amplitude of the action potentials generated.
D. Impulse traffic to the thalamus.
E. Impulse traffic up the ascending reticular formation.

answer:

A. False It decreases; taste receptors adapt to stimuli applied to them.

B. True Stronger stimuli lead to generator potentials of greater amplitude.

C. False There is an increase in impulse frequency, not amplitude.

D. True All but olfactory impulses are relayed in the thalamus.

E. True All sensory inputs send impulses via collaterals to this system.

3. The olfactory system can detect

A. 20–40 distinct odours.
B. Differences in odour between isomers of the same substance.
C. The direction from which an odour comes.
D. Small differences in the concentration of the substance responsible for the odour.
E. Odours better in old than in young people.

Answer:

A. False It is thought that humans can differentiate between 2000 and 4000 different odours.

B. True The receptors can detect small differences in molecular configuration.

C. True Probably due to the different time of arrival of the odour at the two nostrils.

D. False Though very low concentrations of odorous substances can be detected, differences in concentration of more than 30 per cent are needed to detect a difference in intensity.

E. False Olfaction ability falls with age.

4. The hair cells in the semicircular canals are stimulated by

A. Movement of perilymph.
B. Linear acceleration.
C. Rotation at constant velocity.
D. Gravity.
E. Movement of endolymph relative to hair cells.

Answer:

A. False Perilymph is the fluid outside the membranous labyrinth.

B. False Their adequate stimulus is angular not linear acceleration or deceleration.

C. False A blindfold person is unaware of any sensation when rotated at constant velocity, e.g. as on the earth!

D. False Gravity produces linear acceleration.

E. True During angular acceleration or deceleration, the inertia of the endolymph causes it to move relative to the hair cells on the walls of the semicircular canals. The resulting movement of the hair cells generates afferent impulses that travel in the vestibular nerves.

5. Utricles

A. Are gravity receptors.
B. Contain calcified granules.
C. Contain hair cells.
D. Contain endolymph which communicates with that in semicircular canals and cochlea.
E. Can initiate reflex changes in muscle tone.

Answer:

A. True They respond to linear acceleration.

B. True The inertia of these otoliths enables utricles to respond to linear acceleration.

C. True These are stimulated by forces acting on the otoliths.

D. True They are all parts of the membranous labyrinth, filled with endolymph.

E. True Muscle tone is reflexly redistributed so that the body can withstand gravitational stresses.

6. The receptor cells serving taste

A. Are confined to the tongue.
B. Are stimulated when chemicals diffuse through the overlying epithelium to reach them.
C. Are primary sensory neurones.
D. Are histologically different for the four primary taste modalities.
E. For sweetness are more common at the tip than at the back of the tongue.

Answer:

A. False They are found also in the soft palate, pharynx and larynx.

B. False The microvilli on top of receptors protrude through taste pores into the buccal cavity.

C. False They are receptor cells which synapse with primary sensory neurones.

D. False They look alike.

E. True Sweet sensation is experienced at the front of the tongue; bitterness at the back.

7. The frequency of impulses generated by receptors in a utricle is

A. Related to the orientation of the head.
B. Higher during travel at 100 than at 20 miles per hour.
C. Reduced in the weightless conditions in outer space.
D. Inversely related to the frequency being generated by the opposite utricle.
E. Related to the impulse frequency being generated by semicircular canal receptors.

Answer:

A. True This determines the plane of the gravitational pull on the otoliths.

B. False The utricle is affected by acceleration, not velocity.

C. True This can give rise to a form of travel sickness.

D. False Often both respond in parallel.

E. False The utricles and semicircular canals function independently; utricles respond to linear acceleration, semicircular canals to angular acceleration.

8. Taste receptors

A. For sour taste predominate at the sides of the tongue.
B. May respond to more than one modality of stimulus.
C. Give rise to a sour taste when stimulated by hydrogen ions.
D. Cannot detect small (10 per cent) differences in the concentration of taste-evoking chemicals.
E. Respond more to substances in warm solutions than in cold ones even though the substance concentration is the same in both.

Answer:

A. True Receptors for bitter taste predominate on the posterior dorsum of the tongue.

B. True Recording from single taste receptors demonstrates that a single receptor can respond to more than one modality.

C. True All acids taste sour.

D. True Taste receptors are poor at discriminating between intensities; a concentration difference of more than 30 per cent is needed for discrimination.

E. True Food flavour is accentuated when hot; unpleasant medicine less offensive when cold.

10. An audiogram

A. Is a plot of hearing loss (or hearing ability) against sound frequency.
B. Showing equal impairment of air and bone conduction suggests conductive deafness.
C. Showing hearing loss at low frequencies for air conduction suggests ear drum damage.
D. Showing loss at 8000 Hz for air and bone conduction suggests basal cochlear damage.
E. Showing hearing loss at the lower frequencies is common in elderly people.

Answer:

A. True It is obtained using an audiometer.

B. False In conductive deafness air conduction, but not bone conduction, is impaired.

C. True This is an example of conductive deafness.

D. True This can be caused by acoustic trauma, e.g. in heavy industry.

E. False Hearing loss in the elderly (presbycusis) particularly affects higher frequencies.

11. Poor balance is more likely when there is

A. Semicircular canal rather than cochlear damage.
B. Impairment of basilar rather than carotid artery blood flow.
C. Spinothalamic tract rather than posterior column damage.
D. Dim rather than bright light.
E. Recent rather than long-standing destruction of one labyrinth.

Answer:

A. True The cochlea does not contribute sensory information needed for balance.
B. True The basilar artery supplies brain stem areas particularly concerned with balance.
C. False The posterior columns transmit proprioceptive information needed for balance.
D. True Vision can compensate for loss of proprioception.
E. True Abrupt loss of input causes severe disturbance followed by gradual adaptation.

12. Colour blindness

A. Results from inability to detect one of the three primary light colours, red yellow and blue.
B. Where red and green are indistinguishable is due to failure of red and green cone systems.
C. In which no colours can be detected is due to failure of all the cones systems.
D. Is more common in women than men.
E. Is a disability linked to the Y-chromosome.

Anwer:

A. True One or more of the three types of cone fails to function.
B. False It is due to failure of one of the two systems.
C. False It is due to the presence of only one functioning cone system.
D. False It is 20 times more common in men.
E. False Its linkage to the X-chromosome explains its greater frequency in men.

13. Impairment of the sense of smell

A. May be confined to certain odours only.
B. May occur in hydrocephalus.
C. Is likely after thalamic damage.
D. Can be caused by inflammation of the nasal mucosa.
E. Is a recognized effect of temporal lobe tumour.

Answer:

A. True If only some of the many receptor types involved in olfaction are lost.
B. True Due to damage to the olfactory nerves by distortion of the cranium.
C. False Smell pathways do not pass through the thalamus.
D. True This can prevent odours reaching the receptor cells.
E. False It may indicate a frontal lobe tumour.

14. Involuntary oscillatory eye movements (nystagmus)

A. Do not occur in healthy people.
B. May result from cochlear disease.
C. Occur in cerebellar disease.
D. Occur when cold fluid is run into one external ear canal.
E. Do not affect acuity of vision.

Answer:
A. False They occur when a normal person stops rotating.
B. False Disease of the semicircular canals may cause nystagmus.
C. True Nystagmus is an ataxia of eye fixation.
D. True Due to cooling of fluid in the adjacent semicircular canal.
E. False The rapid eye movements tend to make vision blurred.

15. Typical effects of ageing on the special senses include gradual loss of

A. Near vision.
B. Olfactory sensitivity (hyposmia).
C. 90 per cent of the accommodative power of the lens during the lifespan.
D. Hearing affecting bone and air conduction similarly.
E. Hearing affecting high and low frequencies similarly.

Answer:
380.
A. True Recession of the near point is typical of the ageing eye (presbyopia); vision at 20–30 cm deteriorates.
B. True It affects over 70 per cent of elderly people.
C. True It falls from 10–15 dioptres in childhood to 5–10 at 30 and to about 1 dioptre at 70.
D. True It is a sensorineural deafness (presbycusis).
E. False High-pitched sounds are more affected.

16. In unilateral vestibular disease, typical features include

A. The sensation that the external world is revolving.
B. Prolonged nystagmus when cold water is placed in the external auditory meatus on the affected side.
C. A tendency to stagger when walking.
D. A tendency to fall in the dark.

E. Nausea and vomiting.

Answer:

A. True Unbalanced vestibular input causes this sensation (vertigo).

B. False In this ‘caloric’ test, reduction in nystagmus duration indicates vestibular abnormality.

C. True Due to inappropriate information affecting brain areas controlling balance.

D. True Compensating visual stimuli are then eliminated.

E. True Unbalanced, excessive or reduced vestibular inputs cause nausea and vomiting as seen in sea-sickness and space-travel sickness.