PhysioQuiz 3 - Concept Review and Applications

1. Synaptic Transmission and Ion Channels
Chloride & potassium channels hyperpolarization (inhibitory)
Sodium & calcium channels depolarization (excitatory)
Applications: GABA drugs (anxiety, seizures)

2. Carbonic Anhydrase Function
Specific enzyme, lowers activation energy, does not change equilibrium
Application: Used in treating glaucoma, altitude sickness

3. Auditory Frequency Mapping
High frequency base of cochlea; Low apex
Application: Cochlear implants

4. ANS Control
Sympathetic HR, RR, contractility; Parasympathetic digestion, HR

5. Enzyme Inhibition (PFK example)
Product inhibition, often allosteric

6. Cochlear Anatomy
Scala media (endolymph), scala tympani, scala vestibuli, tectorial membrane

7. Enzyme Kinetics
Competitive Km, same Vmax; Non-competitive Vmax

8. Hair Cells
Inner send signal; Outer amplify

9. Sound Pressure
Increased via ossicles, out-of-phase windows

10. ATP Use in Muscle
Required for cross-bridge cycle, calcium pump, Na+/K+ ATPase

11. Michaelis-Menten
Km ~14 mM (from curve), defines substrate affinity

12. Visual Signal Transduction
Light stops glutamate, activates bipolar ganglion CNS

13. Brain Glucose Use
Cannot do gluconeogenesis; uses glucose/ketones

14. Sound Amplification
Ossicles increase, not decrease amplitude

15. Brain Functions
Frontal (motor), Temporal (hearing/memory), Occipital (vision)

16. Vitamin Cofactors
Biotin/B12 = allosteric enzyme activators

17. Limbic System
Emotions, memory, urges (not muscle memory)

18. Diffusion
Gradient, thickness, permeability, size affect rate (not ATP)

19. Inhibition Graphs
Competitive Km, same Vmax; Allosteric Vmax

20. Positive Cooperativity
Each binding increases the next; sigmoid curve

21. Synaptic Sequence
AP Ca2+ influx NT release receptor activation AP in post-synaptic

22. Language Areas
Brocas = speech; Wernickes = comprehension