



FLASH CARDS

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Kalat's Book
Chapter 8
Alphabetical

aerobic

aerobic

Requiring air (oxygen). Prolonged moderate exercise. Slow-twitch muscle fibers use oxygen, produce less vigorous contractions and don't fatigue easily.

anaerobic

anaerobic

Living without air. Fast-twitch muscles fibers don't use oxygen (except in recovery), produce vigorous contractions and fatigue easily. Produce lactate and phosphate.

antagonistic muscles

antagonistic muscles

Muscles are one directional. Need muscles pulling the other way (antagonistic) to lift and lower a limb. Work in pairs.

antisaccade task

antisaccade task

A test of prefrontal cortex development. Told to not look at a moving object, small children nearly always look. Ability to ignore moving objects increases with maturity but is always a challenge.

Babinski reflex

Babinski reflex

Toes fan out and the big toe is extended. Normal in infants because connection between brain and spine are not yet myelinated. Disappears in 12-24 months; toes then curl in. If present in adults, sign of CNS damage.

ballistic movement

ballistic movement

Movement that once started can't be stopped or adjusted. Rare in humans.

basal ganglia

basal ganglia

Collection of nuclei lying under the brain. Uses GABA as neurotransmitter; inhibits movement. Aids learning skills by what it doesn't inhibit.

caudate nucleus

caudate nucleus

Part of the basal ganglia. Provide feedback for learning and memory. Greatly impacted by Huntington's disease.

cardiac muscles

cardiac muscles

Heart muscles; combination of striate and smooth muscle fibers. Looks striated but act like smooth muscles. Contracts if acetylcholine released, relaxes when it's not released.

central pattern generators

central pattern generators

Neural networks that generate rhythmic patterns; no sensory feedback required. Fin movements in fish, wing flapping in birds. In humans, swallowing and breathing.

cerebellar cortex

cerebellar cortex

Cerebellum. Contains more neurons than the rest of the brain combined but they are very tiny. Vital for coordination of movement, including eye movements, walking straight, hand movements and speech.

corticospinal tracts

corticospinal tracts

Paths between cerebral cortex and spine.
Lateral tract controls hands, fingers, toes &
distal limbs. Medial tract controls neck,
shoulder and trunk.

extensor

extensor

Muscles and tendons used to extend (straighten) fingers, hands, arms, etc.
Opposite of flexor.

fast-twitch fibers

fast-twitch fibers

Anaerobic muscle fibers; don't use oxygen (except in recovery). They produce vigorous contractions & fatigue easily.

flexor

flexor

Muscles and tendons used to flex (shorten the angle) fingers, hands, arms, etc.
Opposite of extensor.

Golgi tendon organ

Golgi tendon organ

Proprioceptor sensors in tendons measure changes in muscle contraction. Muscle force compresses sensors; prevents muscles from over-contraction.

grasp reflex

grasp reflex

Infantile reflex; lasts for 5-6 months. Object in hand is tightly grasped; how long the grasp is held is unpredictable.

huntingtin

huntingtin

Located in the neocortex, cerebellum and hippocampus, huntingtin provides protein to protein connections needed for molecule transportation, inhibition of apoptosis, and neural development. A large cytoplasmic protein composed of 3000+ amino acids. Portions of the chain get abnormally repeated in Huntingon's Disease.

Huntington's disease

Huntington's disease

Huntington's chorea. Caused by dominant autosomal gene (affects men & women equally). Symptoms worse the earlier the onset. Controllable and jerky muscle movements. Gradual brain damage that causes hallucinations, delusions, rigidity and abnormal facial expressions.

L-dopa

L-dopa

L-3,4-dihydroxyphenylalanine; synthesized by l-tyrosine. Precursor to dopamine. Uses to treat Parkinson's because it can cross BBB.

lateral corticospinal tract

lateral corticospinal tract

Paths between cerebral cortex and spine.
Controls hands, fingers, toes and distal limbs. Matures later than lateral tract.

medial corticospinal tract

medial corticospinal tract

Paths between cerebral cortex and spine.
Controls neck, shoulder and trunk. Matures
before lateral tract.

mirror neurons

mirror neurons

Motor neurons (or networks) that help associate objects and goals. Active during movement and watching others move; facilitate goal attainment (reaching, speech, etc.). Perhaps related to empathy.

motor program

motor program

Fixed patterns of movements. Can be learned or innate neuron sequences.

MPP+

MPP+

Synthetic opioid; similar to morphine but not as strong. Causes symptoms like Parkinson's disease; destroys dopamine neurons.

MPTP

MPTP

1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine. Precursor to MPP⁺.
Body converts it to MPP⁺.

muscle spindle

muscle spindle

Stretch receptor inside muscle. Detects length of fibers, sends info to spinal cord to activate stretch reflex (sends signal for muscle to contract). Also informs brain of body position.

neuromuscular junction

neuromuscular junction

Where motor neuron and muscle synapse.
Acetylcholine released here, activated
ionotropic calcium channels to open,
cascade causes muscle to contract.

nuclei of the cerebellum

nuclei of the cerebellum

Lots of tiny neurons that help fine tune motor movements. Facilitate precision skills and timing of movements. Cells deeper in cerebellum receive inhibitory input from Purkinje cells (which use GABA) and from excitatory cells that use glutamate.

parallel fibers

parallel fibers

Neurons in cerebellum are organized in repeated geometric patterns. Parallel fibers are parallel to each other but are perpendicular to Purkinje cells.

Parkinson's disease

Parkinson's disease

Early onset is probably genetic; late onset is more common and affects about 2% over 65. Specific cause not known but neurons in the substantia nigra gradually die. Symptoms include resting tremor, slow movements, difficult initiating activity.
More common in men.

posterior parietal cortex

posterior parietal cortex

Back of parietal lobe. Involved in planning movements, tracking body position, intentionality of action and goal-directed movements.

prefrontal cortex

prefrontal cortex

In front of the motor & pre-motor cortices. Contains the orbitofrontal, dorsolateral and ventromedial regions. Involved in decision making, planning, executive processes and social behaviors.

premotor cortex

premotor cortex

Part of frontal lobe, just before the motor cortex.
Receives info about where both the body and the target of the behavior are located. Spatial guidance.
Actively prepares for movement to happen;
somewhat less active during actual movement.

primary motor cortex

primary motor cortex

Back part of frontal lobe, between premotor cortex & parietal lobe. Actually triggers behaviors by stimulating brainstem and spinal cord.

proprioceptor

proprioceptor

Any receptor that reports changes in body position. Includes stretch, tension, muscle spindle, joint and inner ear receptors.

Purkinje cells

Purkinje cells

Large, flat neurons in cerebellum that are organized in repeated sequential planes, like dominos in a row. Purkinje cells have intricate tree-like clusters of dendrites; parallel cells go orthogonally through them.

putamen

putamen

Part of the basal ganglia; receive info from cerebral cortex. Interacts with many areas of the brain to regulate movements & learn skills. Highly impacted by Parkinson's disease.

readiness potential

readiness potential

Lateralized readiness potential. A spike in neural activity on the surface of the brain occurs when you are ready to move but before the movement is initiated. Decisions may have a pre-conscious component.

red nucleus

red nucleus

Part of the midbrain; situated between the substantia nigra and the oculomotor nuclei.

Controls motor coordination, crawling in babies, and your arm swing when you walk.

reflexes

reflexes

Automatic responses that don't require thinking. Includes infantile reflexes that last a few months, and lifelong reflexes like coughing, eye blink and knee jerk.

rooting reflex

rooting reflex

Lasts about 4 months. Aid in breastfeeding. When cheek touched, turns toward it & begins sucking. Intensity increases when hungry.

slow-twitch fibers

slow-twitch fibers

Aerobic muscle fibers; use oxygen to contract. They produce less vigorous contractions & don't fatigue easily.

smooth muscles

smooth muscles

Organ muscles; stomach, bladder, intestines and blood vessels. Makes involuntary contractions like a continuous sheet. More elastic than skeletal muscles.

stem cells

stem cells

Undifferentiated cells, immature; as grow become like neighboring cells. They theoretically have self-renewal (makes exact copies).

striated muscles

striated muscles

Skeletal muscles; most common type.
Composed of thousands of fibers or bands.
Attached to skin and bones; makes
voluntary contractions.

stretch reflex

stretch reflex

Protects muscle from over-stretching.
Monosynaptic reflex arc: stimulate stretch receptor in muscle (hit with tiny hammer), neuron to spine, spine to muscle causes contraction (leg jerks up).

supplementary motor cortex

supplementary motor cortex

Helps plan and control movements. Particularly useful for organizing behavioral sequences & rapid movements. May stabilize walking

vestibular nucleus

vestibular nucleus

Collects input from vestibular system (inner ear, etc). Located in pons and medulla, they aids in controlling body position and balance.

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