

MOTOR NEURONS & REFLEXES

Lower Motor Neuron: what is it, where is it, what does it do
Segmental Reflexes: sensory ending, effector, pathway, synaptic organization, initiating stimulus, motor response, significance of the following reflexes: muscle stretch (myotatic) reflex, withdrawal (flexion) reflex, inverse myotatic (clasp-knife) reflex
Gamma (small) motor nerve system: what is it, what does it do
Upper Motor Neuron: what is it, where is it, what does it do (spinal nerves vs. cranial nerves)
Effect of lower and upper motor neuron lesions
Neuron regeneration

VOLUNTARY MOTOR SYSTEM

Primary Motor Cortex: where is it, what is its role and how do we know, topographical organization, cellular organization, descending pathways – pyramidal & extrapyramidal, effect of lesions

Premotor Cortex: where is it, what is its role

Supplementary Motor Cortex: where is it, what is its role

Basal Ganglia: recognize the names of the nuclei which make up the basal ganglia, where the nuclei are located, general role, input and output, general interconnections, neurotransmitters

Hyperkinesia & Hypokinesia: define, examples

Huntington's Disease, Ballismus, Parkinson's Disease: signs & symptoms, neuropathology, treatment

Cerebellum: location, divisions, general input and output

Vestibulo-cerebellum: structures, input, output, role

Spino-cerebellum: structures, input, output, role

Cerebro-cerebellum: structures, input, output, role

Motor learning

Pathophysiology

HYPOTHALAMUS

Hypothalamus: location, external inputs, receptors, general role; nuclei discussed in the lecture

Outputs: autonomic, anterior pituitary, posterior pituitary

Feedback: general scheme, long loop, short loop

Temperature regulation: sensory input, motor output, integrative mechanism; pathophysiology

Circadian rhythm: define, examples, structures involved, input, output

RETICULAR ACTIVATING SYSTEM, EEG, SLEEP

RAS: location, organization, input, output & cortical projection, role

EEG: definition, source, classification, origin of rhythms

Sleep: REM vs. non-REM sleep, stages, sequence throughout the night, pathophysiology, neural basis

Epilepsy & seizures: characterization of types, management

MASTICATION

Muscles involved, forces

Inputs: characteristics of periodontal receptors, TMJ afferents, muscle and tendon afferents

Reflexes

Mastication general characteristics, phases, food reduction cycle

CNS basis: reflex vs. pattern generator, evidence

LIMBIC SYSTEM & EMOTIONS

Components of emotion: evaluation/recognition; somatic, conscious, autonomic/endocrine

Limbic system: location, recognize main structures, connections, role, relation to emotions

Fear & anxiety: relation to amygdala, behaviors, conditioning, anxiety disorders

LANGUAGE

Hemispheric specialization: define, evidence, categorical vs. representational hemispheres (dominant/non-dominant), relation to handedness, function after injury

Cortical representation: Broca's and Wernicke's area location, function, aphasias, other language disorders

LEARNING & MEMORY

Cellular basis of learning and memory

Definitions, declarative vs. procedural memory

Memory stages, role of context, consolidation, forgetting, amnesia, emotions

Brain structures: prefrontal cortex, hippocampus, mamillary bodies, long-term memory storage

Learning strategies

EYE MOVEMENT

Muscles involved, motor nerves, effect of lesions

Saccades: characteristics, function

Smooth pursuit movements: characteristics, function

Vestibulo-ocular movements: characteristics, function

Vergence movements: characteristics, function, pathophysiology, diplopia & amblyopia

Nystagmus: describe, optokinetic nystagmus, rotary/physiological nystagmus, pathological nystagmus

Gaze centers: location, function, medial longitudinal fasciculus

Superior colliculus: location, inputs, outputs, function

Frontal eye fields: location, outputs, function

ASSOCIATION CORTEX

Cortical association areas: location

Parietal association cortex: inputs, functions, pathophysiology, agnosia, neglect, tests

Temporal association cortex: roles, pathophysiology

Prefrontal association cortex: functions, pathophysiology -- orbitofrontal, dorsolateral