

Integration

1. Overview
2. Sensory integration
 1. sensation- awareness of changes in internal & external environment
 2. perception- conscious interpretation of stimuli
3. Somatosensory organization
 1. overview
 2. receptor level (entero-, extero-, & proprioceptors)
 1. transduction- translation of information into nerve impulses
 1. stronger stimuli result in more frequent impulses
 2. adaptation
 1. decrease in membrane responsiveness
 2. variation in rate of adaptation
 1. rapid
 1. pressure, touch, smell
 2. non-adaptive
 1. pain
 2. proprioception
 3. slow
 1. interoceptors- blood chemicals
 2. Merkel's discs- touch
 3. Ruffini's corpuscles- deep pressure
 3. circuit level (ascending pathways)
 1. neuronal composition
 1. first order neurons-
 1. where? cell bodies in dorsal root or cranial ganglia
 2. connect? skin & proprioceptors to spinal cord or brain stem
 2. 2nd order
 1. where? dorsal horn or medulla
 2. connect? to thalamus or cerebellum
 3. third order-
 1. where? in thalamus
 2. connect? to somatosensory cortex
 2. ascending pathways
 1. nonspecific- awareness, but difficulty in localizing
 1. emotional aspects of perception
 1. pain, pleasure, aversion, arousal
 2. specific- precise localization
 1. tactile discrimination
 2. pressure
 3. vibration
 4. conscious proprioception (limb & joint position)
 3. parallel
 1. adds richness to experience (same information in different ways)
 2. redundancy
 4. spinocerebellar tracts
 1. connect proprioceptors to cerebellum
 5. figure
 4. perceptual level
 1. information to thalamus
 1. rough localization
 2. modality perception
 2. then projected to somatosensory cortex & association areas
 3. processing
 1. perceptual detection- yes/no?
 2. magnitude estimation- how much? frequency coding
 3. spatial discrimination- where stimulated? (2 pt. discrimination test)
 4. feature abstraction-
 1. get "texture" from touch, pressure, pain, & temperature receptors
 5. quality discrimination
 1. analytic- separate qualities
 1. e.g., sugar & salt in water
 2. synthetic- vision & olfaction
 1. e.g., chocolate taste is complex
 2. photoreceptors detect red, green, & blue yet we "see" other colors
 6. pattern recognition- e.g., faces, melodies
 4. Motor Integration
 1. simple stimulus-motor response
 1. mediated by reflex arcs
 1. automatic
 2. stereotyped
 2. complex motor behavior

1. e.g., walking & swimming
2. mediated by fixed action patterns
 1. stereotyped
 2. sequential
 3. triggered
 1. internal stimuli
 2. external stimuli
 4. all-or-none
3. three levels
 1. segmental
 1. spinal cord
 2. central pattern generators
 2. projection
 1. motor cortex & brain stem nuclei
 3. programs/instruction level
 1. cerebellum & basal nuclei
 2. precommand areas
5. Memory
 1. processing overview
 2. STM to LTM
 1. emotional state (NE release)
 2. rehearsal
 3. association- link new with old information
 4. automatic- unconscious
 5. consolidation- fit new facts into pre-existing categories
 3. facts & skills memory
 1. fact
 1. explicit information
 2. context
 3. symbol manipulation & language
 2. skill (procedural) memory
 1. practice
 2. remember by doing
 3. hard to unlearn
 4. role of sleep in retention
 1. analysis?
 2. editing?
 5. role of stress (glucocorticoids) in memory retention
 1. variable- easier to make, harder to retrieve
 2. depends whether visual, auditory, or spatial memories.
6. Links to endocrine systems