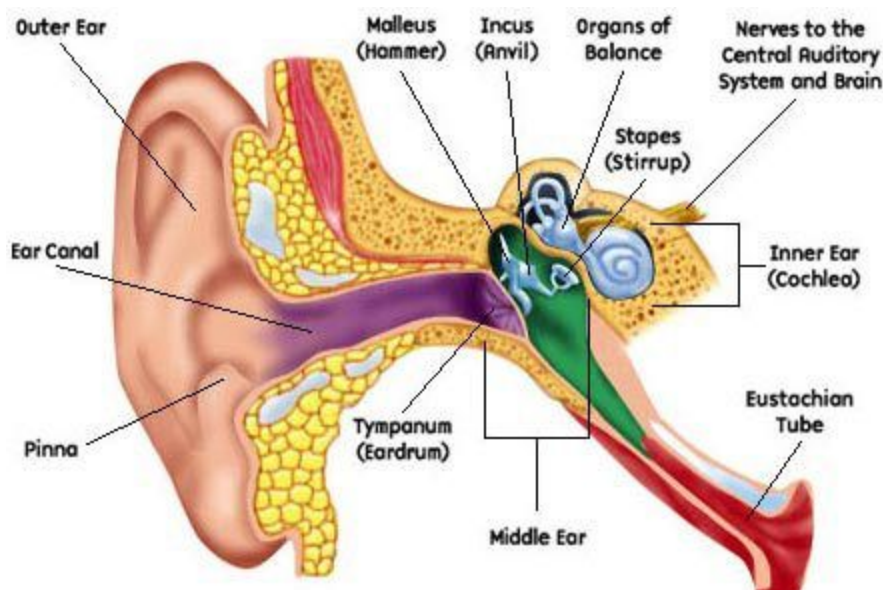


- Orientation tuning of neurons measures how a cell's firing rate depends on the position (orientation) of a stimulus
- This depends on the receptive field properties from the presynaptic neuron
- Simple cells = circular, center-surround organization, fixed inhibitory or excitatory zones
- Complex cells = orientation dependent, larger receptive field, bar or edge shaped, no fixed inhibitory or excitatory zones, respond strongly to moving stimuli
- Hypercomplex cells = orientation dependent, have threshold-like boundaries in their receptive fields that determine if it will respond
- Receptive fields become larger and more specialized from simple → complex
- In visual cortex, cells are grouped together in columns perpendicular to the surface
- Tuning properties are constant within a column of cortex
- Across columns, there is a smooth transition between properties
- Damaging either stream could produce different deficits (agnosia)
- Prosopagnosia- inability to recognize faces, occurs due to damage to the fusiform gyrus

Audition

- Sound waves are a propagating, periodic disturbance of air molecules
- Alternating patterns of compression and expansion (rarefaction)
- Amplitude = intensity / volume (loudness is a property of perception)
- Frequency = pitch; number of compressions per second
- Spectral Analysis = representation of the sum of single-frequency tones



- Pain pathway decussates right away
- Sensory pain- direct pathway to VPN
- Emotional pain- same, but it synapses onto the hypothalamus instead of the thalamus
- Somatosensory cortex responds to painful stimuli, memories of pain, and signals a warning for impending pain
- Central nuclei of thalamus, amygdala, hippocampus, prefrontal cortex and cingulate cortex are associated with emotional associations
- Activating opiate receptors blocks the release of substance P in spinal cord and the periaqueductal gray area of the midbrain
- Endorphins attach to the same brain receptors as morphine

Movement

- Purpose of having a nervous system
- Motor system executes motor programs - fixed sequence of movements either learned or built into the nervous system
- All motor neurons are in the ventral part of the spinal cord
- Motor unit = a motor neuron + the muscle it innervates
- Smooth muscle- controls digestive system
- Cardiac muscle- controls heart
- Skeletal/ striated muscle- controls movement of body in relation to environment
- Each muscle fiber receives info from only one axon, but one axon can innervate many muscle fibers
- Neuromuscular junction- synapse between motor neuron axon and a muscle fiber, where Ach is released that causes a muscle to contract
- Movement requires alternating contraction of opposing sets of antagonistic skeletal muscles (flexor vs. extensor)
- Fast-twitch: fast contractions (ex. sprinters) anaerobic, fatigue rapidly