

Physiology of behavior chapter 13



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perceptual learning Learning to recognize a particular stimulus-stimulus-response learning Learning to automatically make a particular response in the presence of a particular stimulus; includes classical and instrumental conditioning

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classical conditioning A learning procedure; when a stimulus that initially produces no particular response is followed several times by an unconditional stimulus (US) that produces a defensive or appetitive response (the unconditional response-UR), the first stimulus (now called a conditional stimulus-CS) itself evokes the response (now called the conditional response-CR)

Hebb rule The hypothesis proposed by Donald Hebb that the cellular basis of learning involves strengthening of a synapse that is repeatedly active when the postsynaptic neuron fires

instrumental conditioning A learning procedure whereby the effects of a particular situation increase (reinforce) or decrease (punish) the probability of the behavior; also called operant conditioning

reinforcing stimulus An appetitive stimulus that follows a particular behavior and thus makes the behavior become more frequent

punishing stimulus An aversive stimulus that follows a particular behavior and thus makes the behavior become less frequent

motor learning Learning to make a new response

long-term potentiation (LTP) A long-term increase in the excitability of the neuron to a particular part of the limbic system; includes the hippocampus proper (Ammon's horn), dentate gyrus, and subiculum

population EPSP An evoked potential that represents the EPSPs of a population of neurons

associative long-term potentiation A long-term potentiation in which concurrent stimulation of weak and strong synapses to a given neuron strengthens the weak ones

NMDA receptor A specialized ionotropic glutamate receptor that

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controls a calcium channel that is normally blocked by Mg^{2+} ions; involved in long term potentiation
AP52-Amino-5-phosphonopentanoate, a drug that blocks NMDA receptors
dendritic spike An action potential that occurs in the dendrite of some types of pyramidal cells
AMPA receptor An ionotropic-glutamate receptor that controls a sodium channel; when open, it produces EPSPs
CaM-KII Type II calcium-calmodulin kinase, an enzyme that must be activated by calcium; may play a role in the establishment of long-term potentiation
nitric oxide synthase An enzyme responsible for the production of nitric oxide
long-term depression (LTD) A long-term decrease in the excitability of a neuron to a particular synaptic input caused by stimulation of the terminal button while the postsynaptic membrane is hyperpolarized or only slightly depolarized
short-term memory Memory for a stimulus or an event that lasts for a short while
delayed matching-to-sample task A task that requires the subject to indicate which of several stimuli has just been perceived
ventral tegmental area (VTA) A group of dopaminergic neurons in the ventral midbrain whose axons form the mesolimbic and mesocortical systems; plays a critical role in reinforcement
nucleus accumbens (NAC) A nucleus of the basal forebrain near the septum; receives dopamine-secreting terminal buttons from neurons of the ventral tegmental area and is thought to be involved in reinforcement and attention
medial forebrain bundle (MFB) A fiber bundle that runs in a rostral-caudal direction through the basal forebrain and lateral hypothalamus; electrical stimulation of these axons is reinforcing
anterograde amnesia Amnesia for events that occur after some disturbance to the brain, such as head injury or certain degenerative brain disease
retrograde amnesia Amnesia for events that preceded some disturbance to the brain; such as a head injury or electroconvulsive

shock
Korsakoff's syndrome
Permanent anterograde amnesia caused by brain damage resulting from chronic alcoholism or malnutrition
consolidation
The process by which short-term memories are converted into long-term memories
declarative memory
Memory that can be verbally expressed, such as memory for events in a person's past
nondeclarative memory
Memory whose formation does not depend on the hippocampus
formation; a collective term for perceptual, stimulus-response, and motor memory
perirhinal cortex
A region of limbic cortex adjacent to the hippocampal formation that, along with the parahippocampal cortex, relays information between the entorhinal cortex and other regions of the brain
parahippocampal cortex
A region of limbic cortex adjacent to the hippocampal formation that, along with the perirhinal cortex, relays information between the entorhinal cortex and other regions of the brain
episodic memory
Memory of a collection of perception of events organized in time and identified by a particular context
semantic memory
A memory of facts and general information
semantic dementia
Loss of semantic memories caused by progressive degeneration of the neocortex of the lateral temporal lobes
place cell
A neuron that becomes active when the animal is in a particular location in the environment; most typically found in the hippocampal formation
sharp-wave-ripple complex (SWRs)
A period of intense, high-frequency oscillations that originate in hippocampal fields (CA1 and CA3) and propagate to the cerebral cortex; involved in replay of information from periods of waking during slow-wave sleep
preconsolidation
A process of consolidation of a memory that occurs subsequent to the original consolidation that can be triggered by a reminder of the original stimulus; thought to provide the means for modifying existing memories