

NEUR0010: Chemical Control of Behavior

<p>Describe what is meant by a “diffuse modulatory system.”</p> <p>Where are the cell bodies for these modulatory systems?</p> <ul style="list-style-type: none"> - Norepinephrine - Serotonin - Dopamine - Acetylcholine 	<p>A small set of neurons in a nucleus (usually in the brainstem) project divergently throughout the brain and release neurotransmitter diffusely.</p> <p>NE: locus coeruleus (blue spot) in the pons 5-HT: Raphe nuclei in the brainstem</p> <ul style="list-style-type: none"> - Raphe nuclei + locus coeruleus = reticular activating system, important for sleep/wake cycles. <p>DA: substantia nigra in the tegmentum (degenerates during Parkinson’s) ACh: basal forebrain complex (degenerates during Alzheimer’s), but the pontomesencephalotegmental system does not.</p>
<p>LSD resembles which neurotransmitter?</p>	<p>Serotonin</p>
<p>Which two areas play a role in reward and addictive behaviors? What neurotransmitter is responsible for this?</p>	<p>Ventral tegmental area → nucleus accumbens Dopamine release by the VTA to the NAc is a major reward pathway.</p>
<p>Drugs like cocaine and amphetamines enhance the effect of which two neurotransmitters?</p>	<p>Norepinephrine and dopamine</p>
<p>Which type of cells are the first to degenerate in Alzheimer’s?</p>	<p>Cholinergic cells The basal forebrain complex degenerates, but the PMT area does not.</p>
<p>Describe the process of hypothalamic control of the posterior pituitary.</p>	<p>Magnocellular neurons of periventricular zone (PVZ) in the hypothalamus project down to the posterior pituitary and release hormones directly into the bloodstream.</p>
<p>Two major hormones of posterior pituitary</p>	<p>Oxytocin and vasopressin—associated with mate selection, attachment, and homeostasis</p>
<p>Prairie voles/montane voles are monogamous or non-pair-bonding?</p>	<p>Prairie voles = monogamous Montane voles = non-pair-bonding</p>

<p>Which type of voles have more oxytocin and vasopressin receptors in their brains' reward areas?</p>	<p>Prairie voles because they are more monogamous</p>
<p>What is the effect of injecting oxytocin receptor <i>antagonists</i> into the brains of monogamous voles?</p>	<p>Prevents partner preference (destroys their monogamy)</p>
<p>What is the effect of increasing vasopressin receptor expression in the brains of montane voles?</p>	<p>Makes them more "monogamous" compared to controls.</p>
<p>Describe the process of hypothalamic control of the anterior pituitary.</p>	<p>Parvocellular neurons of the hypothalamic PVZ release hypophysiotropic hormones into a capillary bed. These hormones diffuse and stimulate/inhibit cells of the anterior pituitary to release hormones.</p>
<p>Hormones released by the anterior pituitary</p>	<p>FSH (follicle-stimulating hormone) LH (luteinizing hormone) TSH (thyroid stimulating hormone) ACTH (adrenocorticotrophic hormone) GH (growth hormone) Prolactin</p>
<p>What does the HPA axis stand for? What are the steps in releasing cortisol? When is cortisol released?</p>	<p>Hypothalamic-Pituitary-Adrenal Axis. 1) Hypothalamus releases CRH 2) CRH tells anterior pituitary to release ACTH 3) ACTH travels in the bloodstream to the adrenal cortex 4) Adrenal cortex releases cortisol into the bloodstream 5) Cortisol sends a negative feedback signal to hypothalamus.</p>

<p>The amygdala excites/inhibits the HPA axis.</p> <p>Describe the effects of chronic stress or excess cortisol on the hippocampus. What evidence is there for this in animals?</p> <p>Compare and contrast the sympathetic and parasympathetic systems in terms of:</p> <ul style="list-style-type: none">- preganglionic neurotransmitter- postganglionic neurotransmitter- dermatomes in spinal cord- location of ganglia in relation to target organ	<p>Excites</p> <p>Degeneration of hippocampal dendrites, cell death and reduced hippocampal size, anxiety disorders.</p> <p>Baboons that are lower ranked in their social hierarchy are more stressed and show higher basal cortisol levels. They suffer from high blood pressure, ulcers, and depression.</p> <p>SYMPATHETIC Preganglionic NT: ACh Postganglionic NT: NE Thoracic and Lumbar nerves Ganglion located far from target organs</p> <p>PARASYMPATHETIC Preganglionic NT: ACh Postganglionic NT: ACh Cranial and Sacral nerves Ganglion located close to target organs</p>
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