NEUR 0010 Questions
Topics: Chemical Control, Motivation, Mental Illness

NOTE before proceeding: This last third of the class varies greatly from year to year than the previous two thirds. I don't have time to rearrange all the questions to match the ever-changing order of material, so please check the heading above for the topics covered.

2007-3

49) The following statements about the posterior pituitary are all correct EXCEPT:
a) receives input from magnocellular neurosecretory neurons from the hypothalamus
b) receives input from the hypothalamus via the portal circulation
c) releases oxytocin and vasopressin
d) is involved in regulating salt concentration

50) We discussed prairie voles and meadow voles to make the important point that:
a) oxytocin release is involved in childbirth
b) vasopressin is involved in pair bonding and monogamy
c) genetics strongly influences the ratio of sympathetic and parasympathetic activation
d) a vole on the knoll is worth two in the bush

51) In the anterior pituitary's involvement in the nervous system's response to stress:
a) hypophysiotropic hormones are released from the adrenal cortex
b) cortisol causes a decrease in blood pressure
c) corticotropin releasing hormone is released into the portal circulation
d) magnocellular cells of the hypothalamus release ACTH

52) In the sympathetic division of the autonomic nervous system:
a) postganglionic neurons release ACH
b) preganglionic neurons are located in the thoracic and lumbar spinal cord
c) postganglionic neuron cell bodies are located in ganglia near or within the target organ
d) higher activity instructs the body to rest and digest

53) For the most part, diffuse modulatory systems share all the following properties EXCEPT:
a) there are only a few thousand neurons within each system
b) nuclei are located in the brainstem
c) one cell can project to thousands of other neurons
d) target neurons have ionotropic receptors

54) The diffuse modulatory system seemingly involved in reward behavior and activated by cocaine and amphetamines is:
a) 5-HT
b) ACh
c) DA
d) NE

55) The diffuse modulatory system most influenced by both Prozac and LSD is:
a) 5-HT
b) ACh
c) DA
d) NE

56) Antidiuretic hormone (ADH or vasopressin)
a) Is released when there is too much water in the body
b) Is released from the anterior pituitary
c) Causes the kidneys to conserve water (keep more water in the body)
d) Is secreted from axon terminals of OVLT neurons

57) Angiotensin II
a) Is released when blood pressure drops due to a loss of blood volume.
b) Levels increase when renin is released by the kidneys
c) Causes thirst (is a dipsogen)
d) All of the above

58) All of the following are consistent with the Lipostatic Hypothesis of weight control EXCEPT
a) Leptin is a hormone that is produced by fat cells in the body.
b) The greater the amount of fat the greater the levels of leptin in the blood.
c) Injections of leptin into experimental animals causes them to eat more.
d) Inability of fat cells to produce leptin can cause obesity.

59) Which of the following would inhibit feeding behavior?
a) Increasing levels of neuropeptide Y in the brain
b) Increasing levels of cocaine and amphetamine related transcript (CART) in the brain
c) Increasing levels of orexins in the brain
d) Increasing levels of agouti-related protein (AgRP) in the brain

60) Ghrelin
a) Is released from the stomach when it is empty.
b) Binds to receptors on neurons in the hypothalamus.
c) Causes an increase in feeding when injected into the body.
d) More than one of the above.
e) All of the above.

61) All of the following would inhibit feeding behavior EXCEPT
a) Distension (stretching) of the stomach
b) Increased levels of cholecystokinin (CCK) in the blood.
c) Decreased levels of glucose in the blood
d) Increased levels of insulin in the blood

2008-3

52. In addition to being the most ridiculously named brain structure, the pontomesencephalotegmental complex contains neurons which
a) release norepinephrine
b) are among the first to die in Huntington's disease
c) release acetylcholine
d) are the central component of the reward system

53. Activation of the _____ nervous system would cause an increase in blood pressure while activation of the _____ nervous system would cause a decrease in blood pressure.
a) sympathetic; parasympathetic
b) parasympathetic; sympathetic
c) enteric; somatic motor
d) somatic motor; enteric

See next page

54. You have decided to apply your knowledge of neuroscience by becoming a marriage counselor for small rodents. Mrs. Vole complains that her husband, Mr. Vole, is spending too much time visiting other female voles. In order to stimulate monogamous behavior, you recommend:
a) Injecting Mr. Vole's nucleus accumbens with oxytocin receptor blockers
b) Injecting dopamine into Mr. Vole's ventral tegmental area
c)Using a viral vector to increase the number of vasopressin receptors in Mr. Vole's nucleus accumbens
d) Securing a spot for Mr. and Mrs. Vole on an upcoming Oprah Winfrey show

55. Cells that release neurohormones in the posterior pituitary have their cell bodies in the:
a) posterior pituitary
b) anterior pituitary
c) periventricular region of the hypothalamus
d) pons
e) medulla

56. Diffuse modulatory systems
a) generally arise from brainstem nuclei
b) in most cases act through metabotropic receptors
c) are made up of neurons with widely projecting axons
d) More than one of the above
e) All of the above

57. Compared to dominant male baboons in a colony, subordinate males exhibit all of the following EXCEPT
a) higher stress levels
b) lower blood pressure
c) higher basal level of cortisol
d) higher incidence of medical problems such as depression and ulcers

58. Stimulation of neurons in the OVLT (organum vasculosum of the lamina terminalis) causes
a) decreased levels of ADH in the blood
b) increased loss of water by the kidneys
c) thirst
d) craving for salt

59. Angiotensin II is
(a) released by the hypothalamus to stimulate water retention in the kidney
(b) released by the heart in order to stimulate the hypothalamus
(c) released by the kidney in order to stimulate the subfornical organ
(d) formed when rennin is released by the kidneys.

60. Leptin plays an important role in weight regulation because:
(a) high levels of leptin stimulate feeding behavior.
(b) leptin is released by the hypothalamus to reduce metabolic rate.
(c) the hypothalamus uses leptin levels to determine how much fat is stored in the body.
(d) leptin is released by the hypothalamus to stimulate fat storage in fat cells.

61. If a mutant mouse produced twice as much leptin as normal mice, it would:
(a) accumulate more fat than normal mice.
(b) have an abnormally low metabolic rate.
(c) eat more than normal mice.
(d) weigh less than normal mice.
(e) experience neo-cortical hyperplasia and try to take over the world.

62. All of the following are part of the short-term satiety signal EXCEPT:
(a) Release of Cholecystokinin (CCK)
(b) high levels of leptin
(c) rise in insulin
(d) rise in blood glucose
(e) reversal of hedonistic properties of food

63. The eating of food causes all of the following EXCEPT;
(a) increased levels of insulin and cholecystokinin
(b) increased activity in sensory neurons of the vagus nerve
(c) activation of the reward center
(d) increased levels of ghrelin

2009-3

54. All of the following are correct about the diffuse modulatory systems of the brain EXCEPT
a) Neurotransmitters in these systems tend to activate metabotropic (G-protein coupled) receptors.
b) Acetylcholine and Norepinephrine are two of the neurotransmitters used in these systems.
c) Each of the modulatory systems targets a distinctly different area of the brain.
d) Most of the neurons in these systems originate from the brainstem.

55. You are on vacation in Neuroland and you have just ridden the Action Potential Coaster and slid down the Crazy Cochlea Coil into the Blob Pool. These exciting experiences activate your _____ nervous system thereby causing _____.
a) sympathetic; an increase in heart rate
b) parasympathetic; an increase in heart rate
c) sympathetic; an increase in digestive system function
d) parasympathetic; an increase in digestive system function

56. The diffuse modulatory system involved in the reward system of the brain uses the neurotransmitter
a) dopamine
b) serotonin
c) acetylcholine
d) norepinephrine

57. The diffuse modulatory system that plays the most significant role in facilitating learning and memory uses the neurotransmitter
a) dopamine
b) serotonin
c) acetylcholine
d) norepinephrine

58. Increasing levels of vasopressin can lead to an increase in the
a) density of spines in prefrontal cortex neurons
b) reabsorbtion of water by the kidneys
c) level of ACTH in the blood
d) More than one of the above

59. Taking a male baboon from a colony where he is the sole male and placing him in a colony with many males where he is forced to be a subordinate male would cause all of the following EXCEPT
a) an increase in cortisol levels
b) an increase in glucocorticoid receptors in neurons of the hippocampus
c) an increase in stress levels and ulcers
d) an increase in blood pressure

60. When the concentration of the blood plasma increases
a) levels of ADH in the blood increase
b) thirst centers of the brain are stimulated
c) the kidneys conserve water
d) More than one of the above
e) All of the above

61. While donating blood, Camillio strikes up a conversation with the cute nurse who is taking care of him. Thoroughly distracted by his engrossing conversation about Reticular Theory, the nurse mistakenly drains 2 liters of blood from Camillio's body (4 times the normal amount). As a result of this dramatic loss of blood volume
a) renin release from the kidney would increase.
b) the parasympathetic nervous system would be activated to slow Camillio's heart rate.
c) vasopressin levels in the blood would decrease.
d) the kidneys would increase the removal of water from the blood.

62. Lesions of the ventromedial hypothalamus in rats can lead to
(a) a decrease in the rat's body weight over time
(b) an increase in the rat's body weight over time.
(c) hypophagia
(d) a decrease in blood leptin levels in the rat

63. Humans lacking the gene for leptin will
a) be overweight.
b) have more leptin receptors on fat cells.
c) have high blood leptin levels.
d) demonstrate an overall increased level of activity of hypothalamic alphaMSH and CART neurons.

64. Which of the following would most likely stimulate feeding behavior?
a) release of orexins in the brain
b) release of Cholecystokinin (CCK) into the blood
c) decrease in ghrelin levels in the blood
d) stretch of the stomach (gastric distension)
e) reversal of hedonistic properties of food

65. Satiety signals
a) are highest right after a meal
b) are carried to the brain through the vagus nerve
c) activate the reward center in the brain
d) More than one of the above
e) All of the above

66. Which of the following most clearly states the distinction between a mental illness and a neurological disorder?
a) Neurological disorders only affect a single brain area.
b) There is no evidence that mental illnesses have a biological basis.
c) Neurological disorders can be treated with medication and psychotherapy.
d) Mental illnesses cannot be traced back to a single cause (e.g. infection or brain damage)

67. Of the following treatments, which are commonly used in anxiety disorders?

A. electroconvulsive therapy	D. benzodiazepines
B. serotonin-specific reuptake inhibitors	E. dopamine 2 receptor blockers
C. psychotherapy	F. glutamate channel blockers

a) A; B; C; D; E
b) A; B; C
c) B; C; D
d) B; C; D; E
e) A; C; E
f) C; D; E

68. Which of the above treatments are used for treating major depression?
a) A; B; C; D; E
b) A; B; C
c) B; C; D
d) B; C; D; E
e) A; C; E
f) C; D; E

69. Schizophrenia
a) results in selective loss of neurons in the hippocampus.
b) produces some symptoms similar to those induced by blocking GABA receptors in a normal person.
c) is the mental illness that has the strongest link to genes (identical twin much more likely to suffer from schizophrenia if sibling has this disorder)
d) once present when a person reaches 20 years of age, gets worse as the person progresses through middle age years.

70. A person suffering from _____ would have the most difficulty with the Wisconsin Card Sorting task.
a) schizophrenia
b) anxiety disorder
c) depression
d) bipolar disorder

71. The ***negative*** symptoms of schizophrenia can lead to a false diagnosis of
a) anxiety disorder
b) bipolar disorder
c) depression
d) a PCP (phencyclidine; “angel dust”) overdose

2010-3

51. The diffuse modulatory system that uses norepinephrine originates in cell bodies of the:
a) substantia nigra
b) raphe nuclei
c) basal forebrain complex
d) locus coeruleus

52. Many hallucinogenic drugs are similar in structure to which neurotransmitter:
a) acetylcholine
b) dopamine
c) norepinephrine
d) serotonin

53. A rat will repeatedly press a button, to the point of going hungry, if the button leads to electrical stimulation of the:
a) nucleus of Meynert
b) suprachiasmatic nucleus
c) ventral tegmental area
d) reticular activating system

54. Cocaine and amphetamine enhance the effect of which two neurotransmitters:
a) acetylcholine and norepinephrine
b) dopamine and norepinephrine
c) serotonin and dopamine
d) serotonin and norepinephrine

55. Which of the following manipulations produces montane voles that are more monogamous than usual:
a) increased expression of vasopressin receptors
b) increased circulating levels of vasopressin
c) decreased expression of vasopressin receptors
d) decreased circulating levels of vasopressin

56. We saw evidence that stress causes all the following EXCEPT:
a) hippocampal cell death
b) degeneration of hippocampal dendrites
c) high basal cortisol levels
d) dementia

57. One effect of activation of the parasympathetic division of the autonomic nervous system is:
a) faster heartbeat
b) decreased digestion
c) constriction of the eye's pupil
d) orgasm

58. The part of the body that is the center for thermoregulation, where desired body temperature is compared to current body temperature and the "decision" on whether to activate cooling or heating systems is made, is the
a) carotid artery
b) preoptic nucleus of the hypothalamus
c) pituitary gland
d) adrenal gland
e) nucleus accumbens

59. Activation of neurons in the Organum Vasculosum of the Lamina Terminalis (OVLT) leads to
a) release of vasopressin (antidiuretic hormone or ADH) from the posterior pituitary
b) thirst
c) loss of water from the body
d) More than one of the above
e) All of the above

60. A drop in blood volume will cause all of the following EXCEPT
a) increase in renin release
b) increased activity in the sympathetic nervous system
c) increased heart rate
d) peripheral arterioles would dilate (relax).

61. Lesions of the lateral hypothalamus in rats can lead to
a) a decrease in the rat's body weight over time
b) an increase in the rat's body weight over time.
c) hyperphagia

62. If a human has not eaten food for weeks (in a state of starvation) he/she will have
a) decreased levels of orexins
b) decreased levels of hypothalamic alpha melanocyte stimulating hormone (alpha MSH)
c) high blood leptin levels.
d) increased levels of hypothalamic neuropeptide Y (NPY).

63. The brain area that is crucial for responding to leptin and ghrelin levels in the body in a way that regulates feeding behavior is the
a) arcuate nucleus
b) lateral hypothalamus
c) nucleus tractus solitaries (NTS)
d) hippocampus

64. As you eat an extra large bag of Fritos the smell and taste of the food does not change but your enjoyment decreases as you eat more and more. The signals responsible for decreasing the enjoyment of the Fritos as you eat more and more include
a) release of cholecystokinin (CCK)
b) distension of the stomach
c) release of Ghrelin
d) More than one of the above

72. The most effective treatment for most forms of mental illness is
a) psychotherapy
b) drugs
c) psychotherapy combined with drugs
d) alternating periods of psychotherapy and drugs

73. Overactivation of the Hypothalamic-Pituitary-Adrenal Axis (HPA axis) is strongly implicated in
a) depression
b) schizophrenia
c) anxiety disorders
d) More than one of the above
e) All of the above

74. Which of the following immediately treats the symptoms of someone suffering from anxiety disorder?
a) serotonin specific reuptake inhibitors (SSRIs)
b) benzodiazepine
c) monoamine oxidase inhibitors
d) psychotherapy

75. Monoamine oxidase inhibitors
a) decrease levels of monoamines
b) increase levels of serotonin
c) decrease levels of norepinephrine
d) increase levels of GABA

76. Schizophrenia is characterized by
a) accelerated loss of gray matter.
b) hallucinations and delusions.
c) a positive response to treatment of symptoms with drugs that block dopamine 2 receptors.
d) All of the above

77. Which of the following indicate the presence of the ***positive*** symptoms of schizophrenia?
a) lack of engagement
b) overeating
c) depression
d) poor testing on the Wisconsin Card Sort Test

78. The presence of the sex hormone estrogen has been linked to
a) an increase in the rate of depression in women compared to men.
b) a decrease in the rate of schizophrenia in women compared to men.
c) postpartum depression
d) More than one of the above.
e) All of the above

2011-3

51. There are diffuse modulatory systems in the brain that use all the following neurotransmitters EXCEPT:
a) acetylcholine
b) glutamate
c) norepinephrine
d) serotonin

52. An important locus of dopaminergic neurons that project to numerous brain areas is:
a) pontomesencephalic tegmental complex
b) raphe nuclei
c) locus coeruleus
d) substantia nigra

53. An example of how magnocellular neurosecretory cells in the hypothalamus operate is:
a) corticotropin-releasing hormone released into the hypothalamic-pituitary portal circulation
b) oxytocin released into the bloodstream during childbirth
c) cortisol released into the bloodstream during stress
d) vasopressin released into the hypothalamic-pituitary portal circulation

54. Vasopressin antagonists given to a male prairie vole before mating will:
a) prevent him from forming a pair-bond relationship
b) make him more monogamous
c) make the brain distribution of vasopressin receptors more similar to the normal montane (meadow) vole
d) activate the nucleus accumbens

55. All the following are associated with high levels of stress in baboons EXCEPT:
a) high levels of cortisol in the blood
b) a dominant position in the social hierarchy
c) reduced hippocampus size
d) degeneration of hippocampus dendrites

56. In the sympathetic division of the autonomic nervous system, the ganglia are located near _____ and the postganglionic neurotransmitter is_____.
a) the spinal cord / NE
b) the spinal cord / ACh
c) the target tissue / NE
d) the target tissue / ACh

57. The enteric division of the autonomic nervous system is concerned with:
a) involuntary movement
b) motivation to drink
c) regulation of sleep state
d) digestion

58. All the following occur in response to high osmolarity of the blood EXCEPT:
a) OVLT neurons detect the high osmolarity
b) magnocellular neuroscretory cells in the hypothalamus become more active
c) anti-diuretic hormone is released by the posterior pituitary
d) ADH causes the kidneys to remove water from the blood

59. When the kidney detects decreased blood flow/volume:
a) renin release from the kidneys is decreased
b) angiotensin II is released into the bloodstream
c) we become thirsty
d) more than one of the above

60. Which of the following is anorectic:
a) Neuropeptide Y
b) CART
c) AgRP
d) orexins

61. Lesions to which brain area cause hyperphagia:
a) ventromedial thalamus
b) ventromedial hypothalamus
c) lateral thalamus
d) lateral hypothalamus

62. All the following statements about leptin are correct EXCEPT:
a) pathological obesity in humans is associated with low levels of blood leptin
b) blood levels of leptin are proportional to body fat mass
c) injection of leptin into the CSF of genetically obese mice increases feeding behavior
d) leptin is produced by fat cells

63.All the following play a role as a satiety signal EXCEPT:
a) gut distension
b) release of cholecystokinin (CCK)
c) decrease in blood insulin levels
d) increase in blood glucose level

64. Ghrelin:
a) causes hypophagia when injected
b) is released when the stomach is empty
c) is found in abnormally low levels while adults with Prader-Willi syndrome fast
d) levels are lower than normal in girls with anorexia nervosa

86. The stress response consists of all the following EXCEPT:
a) activation of the parasympathetic nervous system
b) avoidance behavior
c) release of cortisol from the adrenal glands
d) increased arousal

87. All the following are effects of cortisol on the brain EXCEPT:
a) changes in growth factors
b) decrease in adrenal gland size
c) changes in glucocorticoid receptors in the hippocampus
d) hippocampal cell death

88. Genetic predispositions are seen in many forms of mental illness but the disorder with the greatest genetic component is:
a) major depression
b) schizophrenia
c) panic disorder
d) obsessive-compulsive disorder

89. Prozac is an effective treatment for
a) depression
b) anxiety disorders
c) schizophrenia
d) more than one of the above

90. Monoamine oxidase inhibitors:
a) reduce anxiety
b) increase anxiety
c) elevate mood
d) prevent the positive symptoms of schizophrenia

91. Which demonstrates a role of dopamine in schizophrenia:
a) neuroleptic drugs
b) atypical neurleptics
c) PCP
d) lithium

92. The following statements about benzodiazepines are all true EXCEPT:
a) they bind to GABA receptors
b) anxiety is associated with reduced numbers of benzodiazepine receptors in frontal cortex
c) benzodiazepine is an anxiolytic drug
d) benzodiazepine is a serotonin-selective reuptake inhibitor