

# MCQ's (Physiology) For the Mid-term.

source: ( BRS physiology Linda )

**1- Which of the following hormones acts on its target tissues by a steroid hormone mechanism of action?**

- (A) Thyroid hormone
- (B) Parathyroid hormone (PTH)
- (C) Antidiuretic hormone (ADH) on the collecting duct
- (D)  $\beta$ 1 adrenergic agonists
- (E) Glucagon

**The answer is A**, Thyroid hormone, an amine, acts on its target tissues by a steroid hormone mechanism, inducing the synthesis of new proteins. The action of antidiuretic hormone (ADH) on the collecting duct (V2 receptors) is mediated by cyclic adenosine monophosphate (cAMP), although the other action of ADH (vascular smooth muscle, V1 receptors) is mediated by inositol 1,4,5-triphosphate (IP3). Parathyroid hormone (PTH),  $\beta$ 1 agonists, and glucagon all act through cAMP mechanisms of action.

**2- A 38-year-old man who has galactorrhea is found to have a prolactinoma. His physician treats him with bromocriptine, which eliminates the galactorrhea. The basis for the therapeutic action of bromocriptine is that it**

- (A) antagonizes the action of prolactin on the breast
- (B) enhances the action of prolactin on the breast
- (C) inhibits prolactin release from the anterior pituitary
- (D) inhibits prolactin release from the hypothalamus
- (e) enhances the action of dopamine on the anterior pituitary

**The answer is C**. Bromocriptine is a dopamine agonist. The secretion of prolactin by the anterior pituitary is tonically inhibited by the secretion of dopamine from the hypothalamus. Thus, a dopamine agonist acts just like dopamine—it inhibits prolactin secretion from the anterior pituitary.

**3- Which of the following inhibits the secretion of growth hormone by the anterior pituitary?**

- (A) Sleep
- (B) Stress
- (C) Puberty
- (D) Somatomedins
- (e) Starvation
- (f) Hypoglycemia

**The answer is D**. Growth hormone is secreted in pulsatile fashion, with a large burst occurring during deep sleep (sleep stage 3 or 4). Growth hormone secretion is increased by sleep, stress, puberty, starvation, and hypoglycemia. Somatomedins are generated when growth hormone acts on its target tissues; they inhibit growth hormone secretion by the anterior pituitary, both directly and indirectly (by stimulating somatostatin release).

**4- Which of the following hormones originates in the anterior pituitary?**

- (A) Dopamine
- (B) Growth hormone-releasing hormone (GHRH)
- (C) Somatostatin
- (D) Gonadotropin-releasing hormone (GnRH)
- (e) Thyroid-stimulating hormone (TSH)
- (f) Oxytocin
- (G) Testosterone

**The answer is e**. Thyroid-stimulating hormone (TSH) is secreted by the anterior pituitary. Dopamine, growth hormone-releasing hormone (GHRH), somatostatin, and gonadotropin-releasing hormone (GnRH) all are secreted by the hypothalamus. Oxytocin is secreted by the posterior pituitary. Testosterone is secreted by the testes.

**5- Which of the following explains the suppression of lactation during pregnancy?**

- (A) Blood prolactin levels are too low for milk production to occur
- (B) Human placental lactogen levels are too low for milk production to occur
- (C) The fetal adrenal gland does not produce sufficient estriol
- (D) Blood levels of estrogen and progesterone are high
- (e) The maternal anterior pituitary is suppressed .

**The answer is D .** Although the high circulating levels of estrogen stimulate prolactin secretion during pregnancy, the action of prolactin on the breast is inhibited by progesterone and estrogen. After parturition, progesterone and estrogen levels decrease dramatically. Prolactin can then interact with its receptors in the breast, and lactation proceeds if initiated by suckling.]

**6- A 46-year-old woman has hirsutism, hyperglycemia, obesity, muscle wasting, and increased circulating levels of adrenocorticotrophic hormone (ACTH). The most likely cause of her symptoms is**

- (A) primary adrenocortical insufficiency (Addison disease)
- (B) pheochromocytoma
- (C) primary overproduction of ACTH(Cushing disease)
- (D) treatment with exogenous glucocorticoids
- (e) hypophysectomy

**The answer is C .** This woman has the classic symptoms of a primary elevation of adrenocorticotrophic hormone (ACTH) (Cushing disease). Elevation of ACTH stimulates overproduction of glucocorticoids and androgens.

**7- Which of the following would be expected in a patient with Graves disease?**

- (A) Cold sensitivity
- (B) Weight gain
- (C) Decreased O2 consumption
- (D) Decreased cardiac output
- (e) Drooping eyelids
- (f) Atrophy of the thyroid gland
- (G) Increased thyroid-stimulating hormone (TSH) levels
- (H) Increased triiodothyronine (T3) levels

**The answer is H .** Graves disease (hyperthyroidism) is caused by overstimulation of the thyroid gland by circulating antibodies to the thyroid-stimulating hormone (TSH) receptor (which then increases the production and secretion of triiodothyronine (T3) and thyroxine (T4), just as TSH would). Therefore, the signs and symptoms of Graves disease are the same as those of hyperthyroidism, reflecting the actions of increased circulating levels of thyroid hormones: increased heat production, weight loss, increased O2 consumption and cardiac output, exophthalmos (bulging eyes, not drooping eyelids), and hypertrophy of the thyroid gland (goiter). TSH levels will be decreased (not increased) as a result of the negative feedback effect of increased T3 levels on the anterior pituitary.

**8- Blood levels of which of the following substances is decreased in Graves disease?**

- (A) Triiodothyronine (T3)
- (B) Thyroxine (T4)
- (C) Diiodotyrosine (DIT)
- (D) Thyroid-stimulating hormone (TSH)
- (e) Iodide (I<sup>-</sup>)

**The answer is D .** In Graves disease (hyperthyroidism), the thyroid is stimulated to produce and secrete vast quantities of thyroid hormones as a result of stimulation by thyroid-stimulating immunoglobulins (antibodies to the thyroid- stimulating hormone [TSH] receptors on the thyroid gland). Because of the high circulating levels of thyroid hormones, anterior pituitary secretion of TSH will be turned off (negative feedback).

**9- Which of the following hormones acts by an inositol 1,4,5-triphosphate (IP3)-Ca<sup>2+</sup> mechanism of action?**

- (A) 1,25-Dihydroxycholecalciferol
- (B) Progesterone
- (C) Insulin
- (D) Parathyroid hormone (PTH)
- (e) Gonadotropin-releasing hormone (GnRH)

**The answer is e.** Gonadotropin-releasing hormone (GnRH) is a peptide hormone that acts on the cells of the anterior pituitary by an inositol 1,4,5-triphosphate (IP3)-Ca<sup>2+</sup> mechanism to cause the secretion of follicle-stimulating hormone (FSH) and luteinizing hormone (LH). 1,25-Dihydroxycholecalciferol and progesterone are steroid hormone derivatives of cholesterol that act by inducing the synthesis of new proteins. Insulin acts on its target cells by a tyrosine kinase mechanism. Parathyroid hormone (PTH) acts on its target cells by an adenylate cyclase–cyclic adenosine monophosphate (cAMP) mechanism.

**10- Secretion of oxytocin is increased by**

- (A) milk ejection
- (B) dilation of the cervix
- (C) increased prolactin levels
- (D) increased extracellular fluid (ECF) volume
- (e) increased serum osmolarity

**The answer is B.** Suckling and dilation of the cervix are the physiologic stimuli for oxytocin secretion. Milk ejection is the result of oxytocin action, not the cause of its secretion. Prolactin secretion is also stimulated by suckling, but prolactin does not directly cause oxytocin secretion. Increased extracellular fluid (ECF) volume and hyperosmolarity are the stimuli for the secretion of the other posterior pituitary hormone, antidiuretic hormone (ADH).

**11- A61-year-old woman with hyperthyroidism is treated with propylthiouracil. The drug reduces the synthesis of thyroid hormones because it inhibits oxidation of**

- (A) Triiodothyronine (T3)
- (B) Thyroxine (T4)
- (C) Diiodotyrosine (DIT)
- (D) Thyroid-stimulating hormone (TSH)
- (e) Iodide (I<sup>-</sup>)

**The answer is e.** For iodide (I<sup>-</sup>) to be “organified” (incorporated into thyroid hormone), it must be oxidized to I<sub>2</sub>, which is accomplished by a peroxidase enzyme in the thyroid follicular cell membrane. Propylthiouracil inhibits peroxidase and, therefore, halts the synthesis of thyroid hormones.

# Good Luck..

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