QUESTION 1

A 35-year-old female patient presents to her primary care physician with a complaint of weight gain, particularly in the face (round "moon" face), upper back (buffalo hump), and abdomen. She also reports easy bruising, muscle weakness, and irregular menstrual periods. On physical examination, her blood pressure is elevated (160/95 mm Hg). Laboratory tests reveal high blood glucose levels and low potassium levels.

What is the most likely cause of the patient's symptoms and findings?

A. Hypothyroidism
B. Polycystic Ovarian Syndrome (PCOS)
C. Cushing's syndrome
D. Type 2 Diabetes mellitus
E. Hypopituitarism

QUESTION 2

A 9-year-old girl is brought to the emergency department (ED) by her father, who reports that she has been complaining of intermittent heart palpitations and a constant feeling of nervousness for the past few weeks and woke up this morning complaining of headache. On review of systems, she also reports abdominal pain and frequent diarrhea. At her annual physical examination one year ago, she was healthy and had normal vital signs. Her blood pressure is 150/95 mm Hg, and her heart rate is 113 beats per minute. Her physical examination is notable for slight diaphoresis and tachycardia but is otherwise unremarkable. Her thyroid-stimulating hormone level is 2.2 µU/mL (reference range, 0.5–4.0).
What diagnostic test is most likely to reveal the cause of the patient's symptoms?

A. Abdominal ultrasound
B. CT of the abdomen and pelvis
C. Positron emission tomography of the chest
D. Measurement of fractionated metanephrines
E. Measurement of serum cortisol

QUESTION 3

The β-Adrenergic Receptor Is Desensitized by Phosphorylation and by Association with

A. ATP

B. PKA

C. Arrestin

D. Inhibin

QUESTION 4

Which of the following statements about endocytosis is TRUE

A. Renders a cell responsive to hormone

B. Increases the number of cell surface receptors

C. Renders a cell less responsive to hormone

D. None of the above

QUESTION 5

Epinephrine is synthesized from …… in the adrenal medulla

A. tyrosine

B. phenylalanine/tyrosine

C. phenylalanine

D. None of the above

QUESTION 6

Binding of epinephrine with β-adrenergic receptors on liver cells activates

A. Glucagon receptor

B. PKC

C. PKA

D. adenylate cyclase A

QUESTION 7

Steroid hormones including aldosterone, cortisol, and dehydroepiandrosterone are synthesized and secreted by cells in the

A. Hypothalamus

B. Pituitary Gland

C. Adrenal cortex

D. Adrenal medulla

QUESTION 8

Catecholamines last only a short time and are quickly broken down by the body into molecules called

A. metanephrines

B. glucocorticoids

C. mineralocorticoids

D. steroids

QUESTION 9

They originate from steroid precursors and are synthesized primarily in the zona fasciculata of the adrenal cortex.

A. metanephrines

B. glucocorticoids

C. mineralocorticoids

D. steroids

QUESTION 10

A major driving force for aldosterone biosynthesis is …… which is generated by the renin-angiotensin system

A. angiotensinogen

B. angiotensin III

C. angiotensin I

D. angiotensin II

QUESTION 11

Steroid hormones including aldosterone, cortisol, and dehydroepiandrosterone are synthesized and secreted by cells in the

A. Hypothalamus

B. Pituitary Gland

C. Adrenal cortex

D. Adrenal medulla

QUESTION 12

All of the following are normal events leading to secretion of aldosterone from the adrenal gland except

A. renin is released by the kidney in hypovolemia.

B. angiotensinogen binds co-membrane receptors.

C. $Ca2^{+}$ levels in the cell rise.

D. aldosterone is secreted into the blood.

QUESTION 13

Which part of the adrenal glands is responsible for producing adrenaline (epinephrine)?

A. Adrenal Cortex

B. Adrenal Medulla

C. Adrenal Nephron

D. Adrenal Papilla

QUESTION 14

Which of the following hormones are synthesized by zona glomerulosa (outermost layer)?

A. Progesterone
B. Cortisol
C. Aldosterone
D. dehydroepiandrosterone

QUESTION 15

Aldosterone is a hormone that increases the renal reabsorption of Na^+ and increases extracellular fluid and blood volume. Identify the correct statement associated with aldosterone

A. Renin-Angiotensin feedback loop increases the synthesis of CRH

B. Hyperkalemia reduces the aldosterone secretion

C. ACTH increases the production of aldosterone

D. None of the above

QUESTION 16

Classic triad of pheochromocytoma consists of all except?

A. Palpitation

B. Obesity

C. Headache

D. Profuse sweating

QUESTION 17

Which of the following statements accurately describes the role of epinephrine in response to stress?

A. Epinephrine inhibits adenylate cyclase, leading to decreased cAMP levels
B. Epinephrine activates glycogenesis and glycolysis to conserve glucose
C. Epinephrine binds with α-adrenergic receptors on liver cells
D. Epinephrine activates adenylate cyclase, leading to increased cAMP levels and promotion of glycogenolysis

QUESTION 18

Which statement accurately describes the clinical manifestations of pheochromocytomas?

A. The tumors primarily cause hypotension due to the release of continuous norepinephrine

B. Pheochromocytomas release catecholamines in various patterns ranging from paroxysmal, continuous and mixed patterns

C. Norepinephrine is released in a paroxysmal pattern, resulting in persistent hypertension

D. Epinephrine is released continuously, leading to persistent tachyarrhythmias

QUESTION 19

Which of the following statements regarding blood tests for pheochromocytoma is accurate?

A. Catecholamines are more stable and accurate to measure than metanephrines
B. Plasma tests are preferred over urine tests for accurate measurement
C. Levels of catecholamines at least twice the upper limit of normal indicate a pheochromocytoma
D. Metanephrines are not recommended due to their short half-life in blood

QUESTION 20

Which statement describes the regulation of ACTH (adrenocorticotropic hormone) secretion?

A. ACTH secretion remains constant throughout the day, independent of diurnal rhythmicity
B. Negative feedback of cortisol only occurs at the hypothalamic level
C. CRH (corticotropin-releasing hormone) does not play a role in the pulsatile secretion of ACTH
D. ACTH secretion increases in response to various stresses and is mediated by vasopressin and CRH

QUESTION 21

Which adrenal cortex zone is primarily responsible for the synthesis of steroid hormones, including glucocorticoids?

A. Zona reticularis
B. Zona glomerulosa
C. Zona fasciculata
D. Zona medulla

QUESTION 22

What is the diurnal circadian pattern of cortisol release, with the highest levels typically occurring?

A. Midnight to 4 AM
B. 4 AM to 8 AM
C. 8 AM
D. 4 PM to 8 PM

QUESTION 23

Which of the following metabolic disturbances is associated with excess glucocorticoid levels?

A. Increased insulin sensitivity
B. Enhanced energy expenditure
C. Decreased abdominal obesity
D. Insulin resistance, dyslipidemia, and abdominal obesity

QUESTION 24

Which type of adrenal insufficiency is characterized by a defect at the hypothalamic level and is often caused by exogenous steroid treatment?

A. Primary adrenal insufficiency (PAI)
B. Secondary adrenal insufficiency (SAI)
C. Tertiary adrenal insufficiency (TAI)
D. Addison's Disease

QUESTION 25

What is the primary driving force for aldosterone biosynthesis in response to conditions such as hypovolemia, hypervolemia, and stress?

A. Renal vasodilation
B. Increase in blood volume
C. Rise in serum potassium concentration
D. Angiotensin II generated by the renin-angiotensin system

QUESTION 26

Which physiological aspects does the renin-angiotensin-aldosterone pathway primarily regulate in the human body?

A. Temperature homeostasis
B. Blood pressure, fluid balance, and electrolyte homeostasis
C. Respiratory rate control
D. Digestive enzyme secretion

QUESTION 27

Which adrenal gland zone is primarily responsible for excess aldosterone production in cases of primary hyperaldosteronism?

A. Zona fasciculata
B. Zona reticularis
C. Zona glomerulosa
D. Zona medulla

QUESTION 28

What is a key factor leading to the functional distinction between the zona glomerulosa and the inner two zones (zona fasciculata and zona reticularis) in the adrenal cortex?

A. Diurnal circadian rhythm
B. Hormonal feedback mechanisms
C. Enzymatic differences
D. Neural control mechanisms

QUESTION 29

Which adrenal androgen is considered qualitatively more important due to its greater peripheral conversion to testosterone?

A DHEA

B. DHEA sulfate

C. Androstenedione

D. Testosterone

QUESTION 30

When acetylcholine (Ach) binds to nicotinic receptors on chromaffin cells in the adrenal medulla, what is the immediate consequence?

A. Promotion of exocytosis of catecholamine-filled vesicles
B. Inhibition of catecholamine release
C. Activation of the sympathetic division of the autonomic nervous system
D. Inhibition of the pituitary-adrenal axis