Signals Behind the Scenes

Trace how endocrine pathways can affect behavior.

P.2.6 "Analyze the structure and function of the endocrine system and its effect on human behavior."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each structure the passage explicitly says releases a named hormone, and circle the hormone it releases. Box two changes in behavior or feeling linked to these pathways.

Before the Curtain Rises

1. Minutes before a student steps onstage for a school play, a missed line suddenly seems possible. The hypothalamus, a brain region that helps control endocrine activity, detects a possible challenge. It signals the pituitary gland, which releases adrenocorticotropic hormone, or ACTH, into the bloodstream. ACTH reaches the adrenal cortex, the outer part of each adrenal gland, and stimulates the release of cortisol. This chain takes several minutes. Cortisol helps keep fuel available during the challenge. It may help the student stay attentive, although prolonged high cortisol levels can make remembering lines harder.

2. A second route can act faster. The sympathetic nervous system prompts the adrenal medulla, the inner part of each adrenal gland, to release epinephrine into the blood. Epinephrine increases heart rate and helps send more blood to muscles. The student might feel a pounding heart and speak quickly. These changes can help with an urgent response, but they do not guarantee a strong performance. Unlike the slower cortisol chain, this route does not begin with the pituitary releasing ACTH. The two routes can operate at the same time, so the student may feel both alert and shaky.

3. That night after the show, the student eats a snack before doing homework. A snack raises blood glucose. The pancreas releases insulin, which helps many body cells take up glucose and helps regulate blood sugar. This supply of fuel can support concentration, but insulin alone cannot explain how well the student finishes an assignment. As lights dim, the pineal gland releases more melatonin, a hormone that signals nighttime and supports sleepiness. Bright phone light can delay this rise. Endocrine signals affect readiness to work, but sleep habits, experience, and the student's choices also shape behavior.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace the slower pathway from the hypothalamus to a possible change in the student's attention or memory onstage.

2. How do the adrenal medulla and adrenal cortex differ in what prompts them, what they release, and how quickly their pathways act?

3. After the show, how might the pancreas and pineal gland affect the student's readiness to do homework in different ways?

4. Why would knowing the student's hormone activity not be enough to predict how the student performs or finishes homework?

3 YOUR TURN

Your own words

Imagine a student ate breakfast after staying up late on a bright phone and must speak in a morning debate. In four or five sentences, trace two hormone pathways from the passage to possible effects on the student's focus or alertness, and explain why hormones cannot fully predict the student's performance.

Signals Behind the Scenes

PART 1 · READ AND MARK

Underline each structure the passage explicitly says releases a named hormone, and circle the hormone it releases. Box two changes in behavior or feeling linked to these pathways. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace the slower pathway from the hypothalamus to a possible change in the student's attention or memory onstage.	**The hypothalamus signals the pituitary to release ACTH. ACTH stimulates the adrenal cortex to release cortisol, which may support attention, though prolonged high levels can make remembering lines harder.**
2	How do the adrenal medulla and adrenal cortex differ in what prompts them, what they release, and how quickly their pathways act?	**The sympathetic nervous system prompts the adrenal medulla to release epinephrine through the faster route. ACTH from the pituitary stimulates the adrenal cortex to release cortisol through a route that takes several minutes.**
3	After the show, how might the pancreas and pineal gland affect the student's readiness to do homework in different ways?	**After the snack, pancreatic insulin helps cells take up glucose, which can support concentration. As lights dim, pineal melatonin increases and supports sleepiness.**
4	Why would knowing the student's hormone activity not be enough to predict how the student performs or finishes homework?	**Hormones affect readiness but do not guarantee an outcome. Sleep habits, experience, and the student's choices also shape behavior.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

After breakfast, the student's pancreas may release insulin. Insulin helps cells take up glucose, which may support focus during the debate. Bright phone light the night before may have delayed the pineal gland's rise in melatonin, a hormone that supports sleepiness. If that delay contributed to staying awake late, the student might feel less alert in the morning. Hormones cannot fully predict the debate because preparation and the student's choices also matter.

Accept other passage-supported behavior effects and appropriately qualified connections. The hypothalamus need not be underlined in Part 1 because the passage does not say it releases a named hormone.