

Activity 2.3.2: Hormones Gone Wild

Introduction

The endocrine system releases hormones to maintain homeostasis and uses feedback to regulate the levels of these chemical signals. Hormones help balance the amount of water in our body, the amount of calcium in our blood and bones, and the amount of growth in cells and tissues. In your study of diabetes, you learned that when there is a problem with the hormone insulin, the body has trouble controlling blood sugar and maintaining homeostasis. Too much or too little of a hormone can really throw off the body’s balance. And sometimes, this imbalance not only affects what goes on inside, but affects what we see on the outside.

In this activity, you will work in teams to solve a medical mystery. A troubled patient is coming to you for advice. While doctors have been able to classify each of the strange symptoms he has been experiencing for the past year, they can not pinpoint how they all fit together. The endocrine system is clearly malfunctioning, but doctors can not find the source of the problem. Work with your team to investigate the hormones and glands of the endocrine system and use information you find to piece together the clues provided by your patient and make a diagnosis. You will work through this case in two parts. You must successfully complete Part I before you can move on to Part II.

Equipment

* Computer with Internet access and Inspiration® software
* Endocrine system graphic organizer
* Student dry erase board
* Dry erase markers
* Markers or colored pencils
* Anatomy in Clay® Maniken®
* Yellow clay
* Paper towels
* Laboratory journal

Procedure

Part I: Making the Diagnosis

1. Read the patient file of Lincoln Grant found on the next page.

Lincoln is a 27 year-old man who has been experiencing strange medical symptoms over the past year. He knows something is wrong, but doctors are having a hard time piecing together the clues. Previous doctors’ notes report:

* Lincoln has noted a gradual enlargement of his body tissue. He is long past puberty, but the bones of his face and jaw seem to be growing thicker and changing shape. Even his hands and feet look larger.
* Lincoln has put on a considerable amount of weight in the past year. His diet has not changed and he still plays basketball two times a week with his friends. He’s getting plenty of rest, but he still feels sluggish.
* Lincoln and his wife have been trying to get pregnant for over a year. Worried about their chances, they decide to visit the doctor. Routine lab tests reveal that Lincoln has an extremely low sperm count.

Most recently, Lincoln has reported some problems with his vision. He has noticed that images are blurry and that he sometimes sees double. Doctors are baffled by what Lincoln is reporting. His varied symptoms make the overall cause of his problems hard to pinpoint, but doctors are sure the answer lies in the endocrine system.

1. Work with a team of four to investigate the clues provided in the case report.
2. Obtain a dry erase board and assorted colors of dry erase markers from your teacher. With your group, begin an evidence board. Use this board to brainstorm ideas and visualize connections.
3. List Lincoln’s symptoms on the board and work together to generate ideas about their cause. As you complete additional research and have new ideas, share them with the group and add them to the board. Use paper towels to erase items from the board. Only the group as a whole can decide to remove ideas. The format of this organizer is up to you. You may create lists. You may create a concept map. Use this visual aid to help you piece together the clues.
4. Use the websites listed below (as well as others you may find) to begin your investigation. Research how a problem with hormones of the endocrine system could lead to Lincoln’s symptoms. Could he have too much of a hormone? Too little? Is there a problem with a specific gland? His disorder may involve multiple hormones and glands. See if you can find a pattern in Lincoln’s symptoms.

* Nemours Foundation- A Body Basics Article: Endocrine System <http://kidshealth.org/teen/your_body/body_basics/endocrine.html>
* The Hormone Foundation – Endo 101: Endocrine Glands <http://www.hormone.org/Endo101/page2.cfm>
* Medline Plus – Medical Dictionary: Hormones <http://www.nlm.nih.gov/medlineplus/hormones.html>
* Tour of the Endocrine System <http://www.innerbody.com/image/endoov.html>
* Biology at University of Cincinnati Clermont College: Endocrine System <http://www.biology.clc.uc.edu/courses/bio105/endocrin.htm>

1. List the hormone or glands that might be involved next to each symptom on your evidence board. List the target organ(s) of these hormones.
2. Brainstorm connections between these hormones.
3. Discuss reasons why Lincoln may be having vision problems. Add theories to your evidence board. Use this information to help you decide on the overall cause of Lincoln’s symptoms.
4. When you think you have a diagnosis, walk your teacher through the evidence on your board and make your case. If your diagnosis is correct, write a summary of your findings in your laboratory journal and move on to Part II. If your diagnosis is not quite there, use clues provided by your teacher to expand your research.