Name:_____Period:_____Date:_____

Biology - Those Powerful Hormones

Endocrinology is the study of the endocrine system. This field is only about 150 years old. In 1849, a man named Berthold published a report on some research he had done on chickens. He noticed that male chickens had different parts on their bodies and they also behaved differently than females. They were more aggressive. So he castrated a non adult male chicken. When it grew up the male chicken wasn't aggressive and lacked certain male traits. So he did another experiment. He put testes back on the rooster from a different male chicken. After the transplant that chicken grew a waddle and a comb and it became more aggressive. He concluded that male physical and behavioral traits were caused by something in the testes and he published that report.

Diabetes Mellitus means "sweet water". In 1889, Von Mering and Menkowski did an experiment. They opened up a dog and saw an organ they didn't know. They took it out and sewed up the dog and let the dog recover. The dog got sick and died. He urinated a lot and the ants were very attracted to this dog's urine. They would gather in his cage where he had urinated. One of them (Von Mering or Menkowski) leaned down and tasted the urine and that is how "Diabetes Mellitus" got its name. They concluded that the pancreas had something to do with carbohydrate metabolism.

In 1922, Banting and Best removed a pancreas from another dog. It got sick. They put the pancreas back in and it was saved. From the pancreas they had removed, they developed an extract and used this extract on another dog that had had a pancreaectomy. The dog was saved. They worked on this extract and discovered it was the protein portion that saved the dog.

From 1948 to 1958, a scientist named Sanger worked on isolating the single protein that would save a dog who had been pancreaectomized. He discovered that protein was insulin. This was the first protein ever sequenced and he won a Nobel Prize. There are two hormones produced in the pancreas that regulate sugar in the body. They are insulin and glucagon. Insulin directly lowers blood glucose levels by activating glucose transport from the blood stream into skeletal muscle and adipose cells. Glucagon is a hormone that mobilizes stored glucose and moves it back into the blood stream a little bit at a time.

The Curious Case of the Tiny Todd

Pretend that you are working for Dr. House.

Case: Tiny Todd comes to you and has extremely short stature for a teenager. His parents are average sized. Before going any farther we need to know more about the hormone "growth factor" because this patient has a problem with growth.

How does the hypothalamus regulate growth in the human body?

1. Hypothalamus - releases growth hormone releasing hormone (GHRH) which signals the Anterior Pituitary to release GH.
2. Anterior Pituitary - releases the growth hormone (GH) which targets the liver secrete Somatomedins.
3. Liver - secretes Somatomedins which go to receptors on bones, muscle and connective tissue and cause an increase of growth.
4. Somatomedins - inhibit the release of GHRH in the hypothalamus. This is a long negative feedback loop.
5. GH - inhibits the release of GHRH. This is a short negative feedback loop.
6. GHRH - affects hypothalamus and stops secretion of GHRH. This is an ultra short negative feedback loop.

What tests do you run and why?

Test #	Test	Why?
1		
2		
3		
4		
5		
6		

Hormones

Hormone	Gland	Location of Gland in Body	Function of Hormone
Adrenaline			
Antidiuretic Hormone (ADH)			
Corticosterone			
Dopamine			
Endorphins			
Estrogen			
Glucagon			
Growth Hormone (GH)			
Hydrocortisone			
Insulin			
Oxytocin			
Parathyroid Hormone (PTH)			
Progesterone			
Prolactin			
Testosterone			
Thyroxine (T4)			