



## Feedback

### ENE-3.A.1

**Organisms use feedback mechanisms to maintain their internal environments and respond to internal and external environmental changes.**



## Feedback

### ENE-3.B.1

**Negative feedback mechanisms maintain homeostasis for a particular condition by regulating physiological processes. If a system is perturbed, negative feedback mechanisms return the system back to its target set point. These processes operate at the molecular and cellular levels.**



## Feedback

### ENE-3.C.1

**Positive feedback mechanisms amplify responses and processes in biological organisms. The variable initiating the response is moved farther away from the initial set point. Amplification occurs when the stimulus is further activated, which, in turn, initiates an additional response that produces system change.**



**Why is negative feedback essential for cell?**

- A. Synthesizes ATP for cell**
- B. Increases cellular communication**
- C. Saves wasteful use of materials and energy**
- D. To cause response**

**Why is negative feedback essential for cell?**

**C. Saves wasteful use of materials and energy**



**Negative feedback involves the product inhibiting or slowing down the process.**

**For example, the trp operon is responsible for synthesizing trp. If trp is present, it would waste energy and resources to synthesize it. So, the trp will bind to a repressor to activate it. This activation causes the repressor to bind to the operator to inhibit transcription.**

# AP BIO INSTA-REVIEW

TOPIC

4.5



**Oxytocin is released to initiate contractions, the force of the baby on the cervix leads to release of oxytocin, which causes more contractions. What type of feedback is described?**

- A. Negative**
- B. Positive**

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Oxytocin is released to initiate contractions, the force of the baby on the cervix leads to release of oxytocin, which causes more contractions. What type of feedback is described?

**B. Positive**



**Positive feedback involves the product activating or increasing the process.**

**For example, the oxytocin is released from the pathway. The oxytocin then increases the process that leads to more oxytocin to be released.**

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**Describe positive feedback**



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**Describe positive feedback**



**The product is used to amplify the response.**

**In the previous example, the product (oxytocin) leads to an increase in contractions which pushes the babies' head harder on the cervix so more oxytocin is released.**

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**Most feedback is...**

**A. Negative**

**B. Positive**

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**Most feedback is...**

**A. Negative**



**Most of the processes in the cell involve negative feedback. This is part of homeostasis. The body is trying to regulate and maintain normal conditions for the organism.**

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**Blood glucose level is high, pancreas releases insulin. The insulin causes the cells to take up blood sugar so the sugar level decreases. Which type of feedback is described above?**

- A. Negative**
- B. Positive**

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**Blood glucose level is high, pancreas releases insulin. The insulin causes the cells to take up blood sugar so the sugar level decreases. Which type of feedback is described above?**

**A. Negative**

**The release of insulin is due to a high blood glucose level. The release of the insulin will stimulate cells to take up the glucose which will reduce the blood glucose level.**

# AP BIO INSTA-REVIEW

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**Trp operon only makes tryptophan when trp is absent from the environment. Which type of feedback is described?**

- A. Negative**
- B. Positive**

# AP BIO INSTA-REVIEW

TOPIC

4.5

**Trp operon only makes tryptophan when trp is absent from the environment. Which type of feedback is described?**

**A. Negative**



**The trp operon is responsible for synthesizing trp. If trp is present, it would waste energy and resources to synthesize it. So, the trp will bind to a repressor to activate it. This activation causes the repressor to bind to the operator to inhibit transcription.**



**Lac operon is only synthesized the materials to break down lactose in the presence of lactose. What type of feedback is described?**

- A. Negative**
- B. Positive**



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**Lac operon is only synthesized the materials to break down lactose in the presence of lactose. What type of feedback is described?**

**A. Negative**

**The lac operon is responsible for breaking down lactose. If lac is not present, it would waste energy and resources to make the enzymes to break it down. So, the lac will bind to a repressor to inactive it. This inactivation causes the repressor to no longer bind to the operator to activate transcription.**

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**When a fruit ripens it releases ethylene. Ethylene causes fruit to ripen so more ethylene is released. What type of feedback is described?**

- A. Negative**
- B. Positive**

# AP BIO INSTA-REVIEW

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**When a fruit ripens it releases ethylene. Ethylene causes fruit to ripen so more ethylene is released. What type of feedback is described?**

**B. Positive**

**Ripe fruit release ethylene. The ethylene causes the fruit to ripen more, which causes more ethylene to be released. The ethylene concentration is building up.**

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**What is the difference between positive and negative feedback?**

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**What is the difference between positive and negative feedback?**



**Positive feedback results in an amplification. The product stimulates the pathway.**

**Negative feedback results in regulation back to homeostasis. The product inhibits the pathway.**

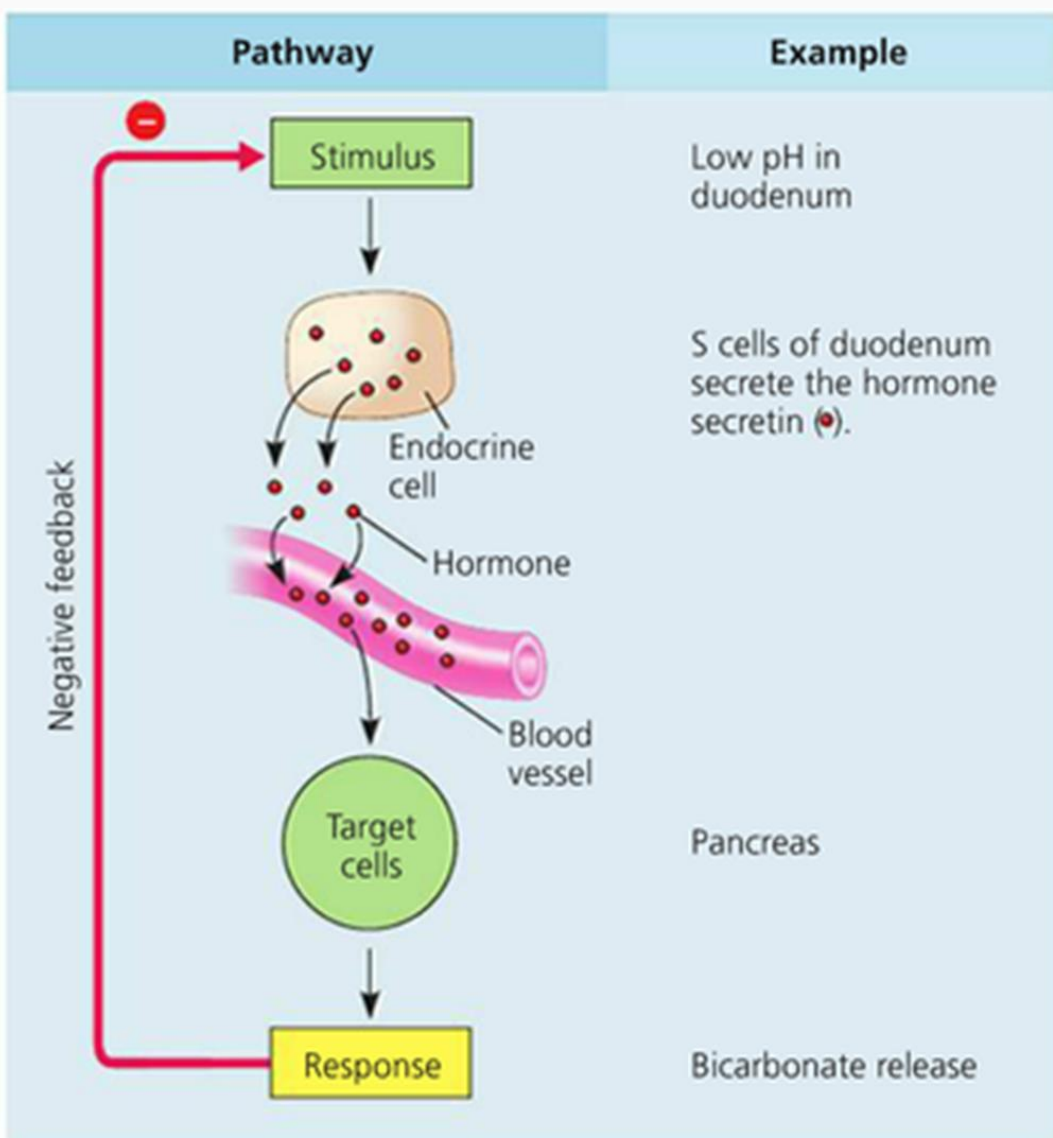
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## Example of Negative Feedback



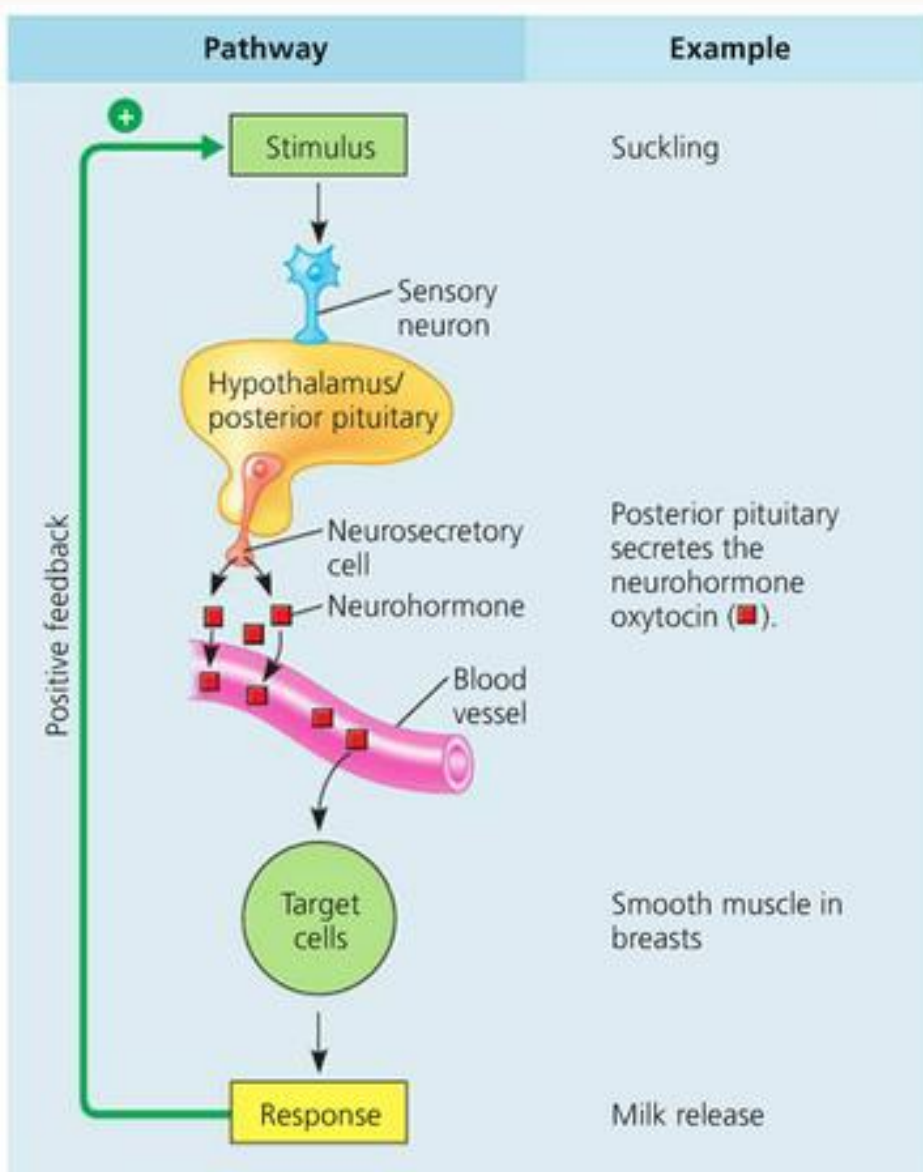
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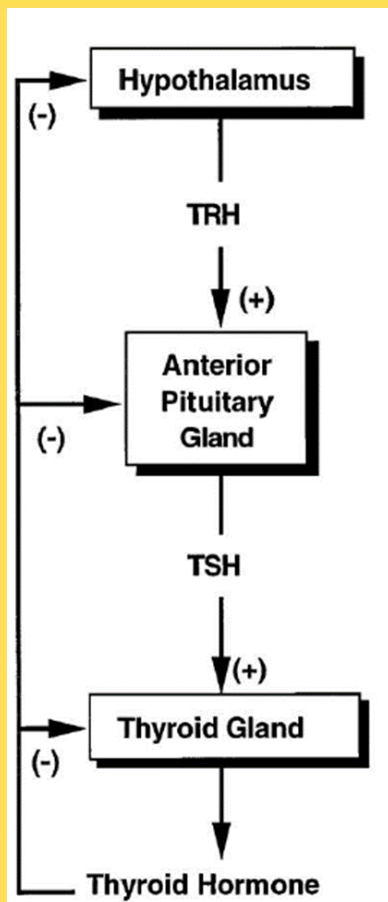
## Example of Positive Feedback



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**Predict what would happen with overactive pituitary in diagram.**

- A. Thyroid hormone levels decrease**
- B. Thyroid hormone levels increase**
- C. Thyroid hormone levels stay the same**



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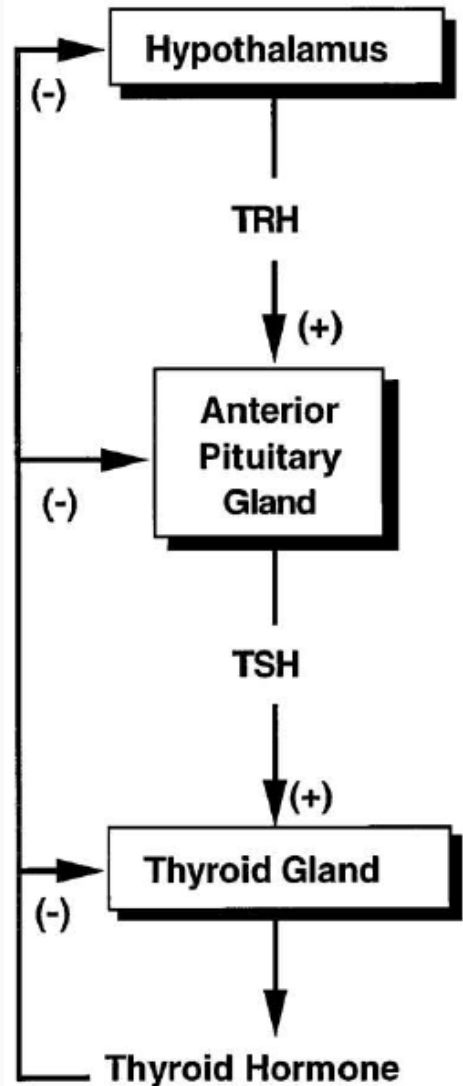


**Predict what would happen with overactive pituitary in diagram.**

**B. Thyroid hormone levels increase**

**The pituitary will release TSH which will cause the Thyroid Gland to release the thyroid hormone.**

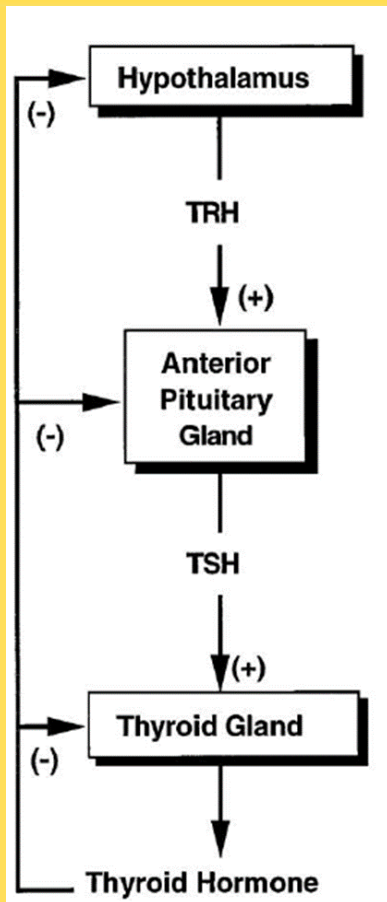
**This means that an overactive pituitary will lead to an increase in thyroid hormone levels.**



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**Predict what would happen if overactive pituitary with TSH release.**

- A. TRH levels decrease**
- B. TRH levels increase**
- C. TRH levels stay the same**

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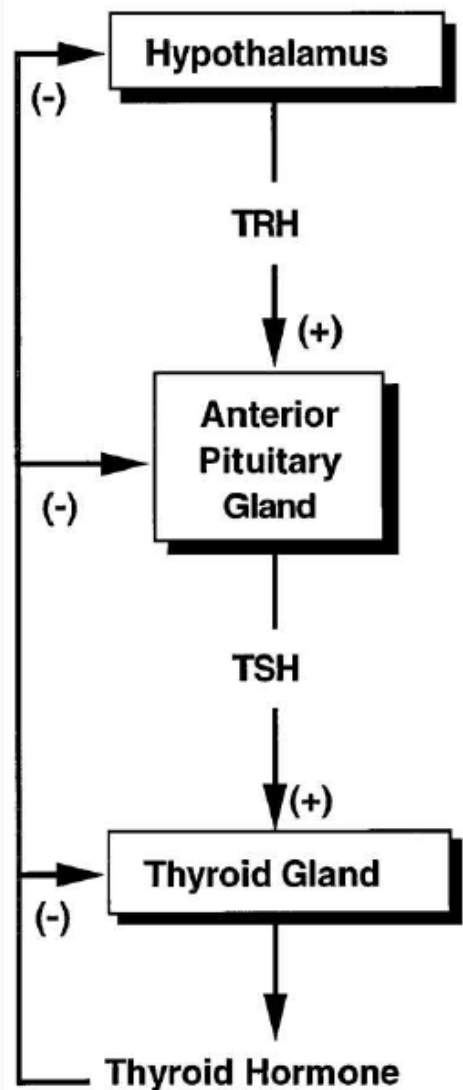
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**Predict what would happen if overactive pituitary with TSH release.**

**A. TRH levels decrease**

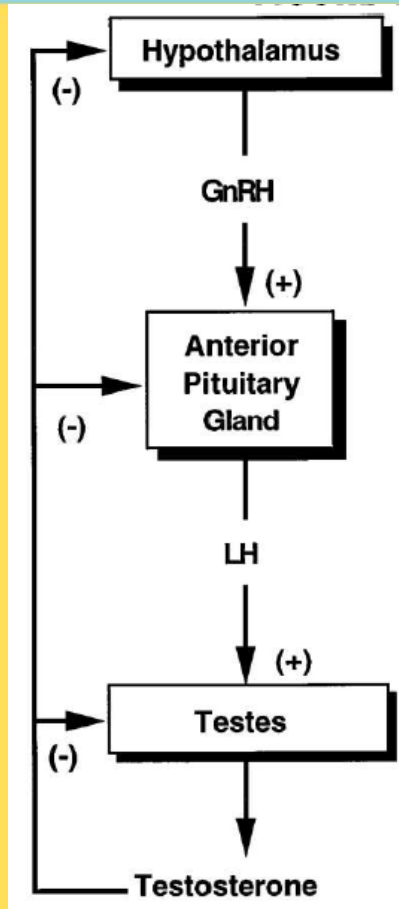
The pituitary will release TSH which will cause the Thyroid Gland to release the thyroid hormone. The thyroid hormone has a negative feedback with the hypothalamus. The hypothalamus releases the TRH. If there is an increase in TSH and thyroid hormone, there is a decrease in TRH levels.



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**If you injected testosterone, what organ would decrease in mass?**

- A. Hypothalamus**
- B. Pituitary**
- C. Testes**
- D. All of the above**

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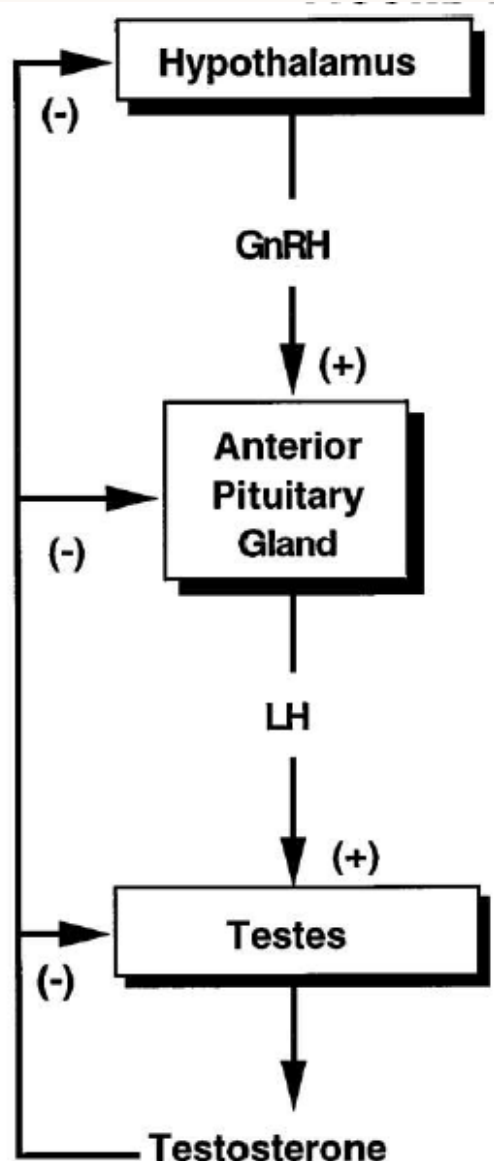
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If you injected testosterone, what organ would decrease in mass?

**D. All of the above  
(Hypothalamus, Pituitary,  
& Testes)**



The testosterone has a negative feedback loop with the hypothalamus, anterior pituitary, and testes. If there is an increase in testosterone, it will decrease the testes, anterior pituitary, and hypothalamus



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**Thinking about feedback loops,  
how does the body regulate  
temperature?**

# AP BIO INSTA-REVIEW

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**Thinking about feedback loops, how does the body regulate temperature?**



**Thermoreceptors determine the temperature is less than normal body temperature activating vasoconstriction and shivering/goosebumps.**

**Thermoreceptors determine the temperature is higher than normal body temperature activating vasodilation and sweating (evaporative cooling).**