Homeostasis: Exercise and Negative Feedback Mechanisms

Edwin Moses of the USA clears a hurdle en route to his victory in the men's 400m hurdles final at the 1984 Summer Olympic Games in Los Angeles, California. (David Cannon/Allsport)

- **Exercise** can cause huge changes in the body's _____ _____
- The _____ in the muscles that are working hard
- Need _____
- Need _____
- Produce more _____
- The body adjusts to meet these demands and returns to normal through _____

The Effect of Exercise on the Respiratory System

STIMULUS

- When exercising, the working muscles are producing more CO_2 than usual

SENSOR

- _____on cells that are found in the _____ detect the increase in concentration of CO_2 in the bloodstream

CONTROL

- A rise in CO_2 during exercise causes these chemoreceptor sensory cells to send nerve impulses to the _____ in the **brain**

EFFECTOR

- The **respiratory centre** in the **brain** sends a message to the_____ to increase activity so that **breathing rate** increases
- This results in an increased breathing rate, _____ from the blood

STIMULUS

- When exercise slows down or stops, there is a decrease in the CO_2 produced

SENSOR

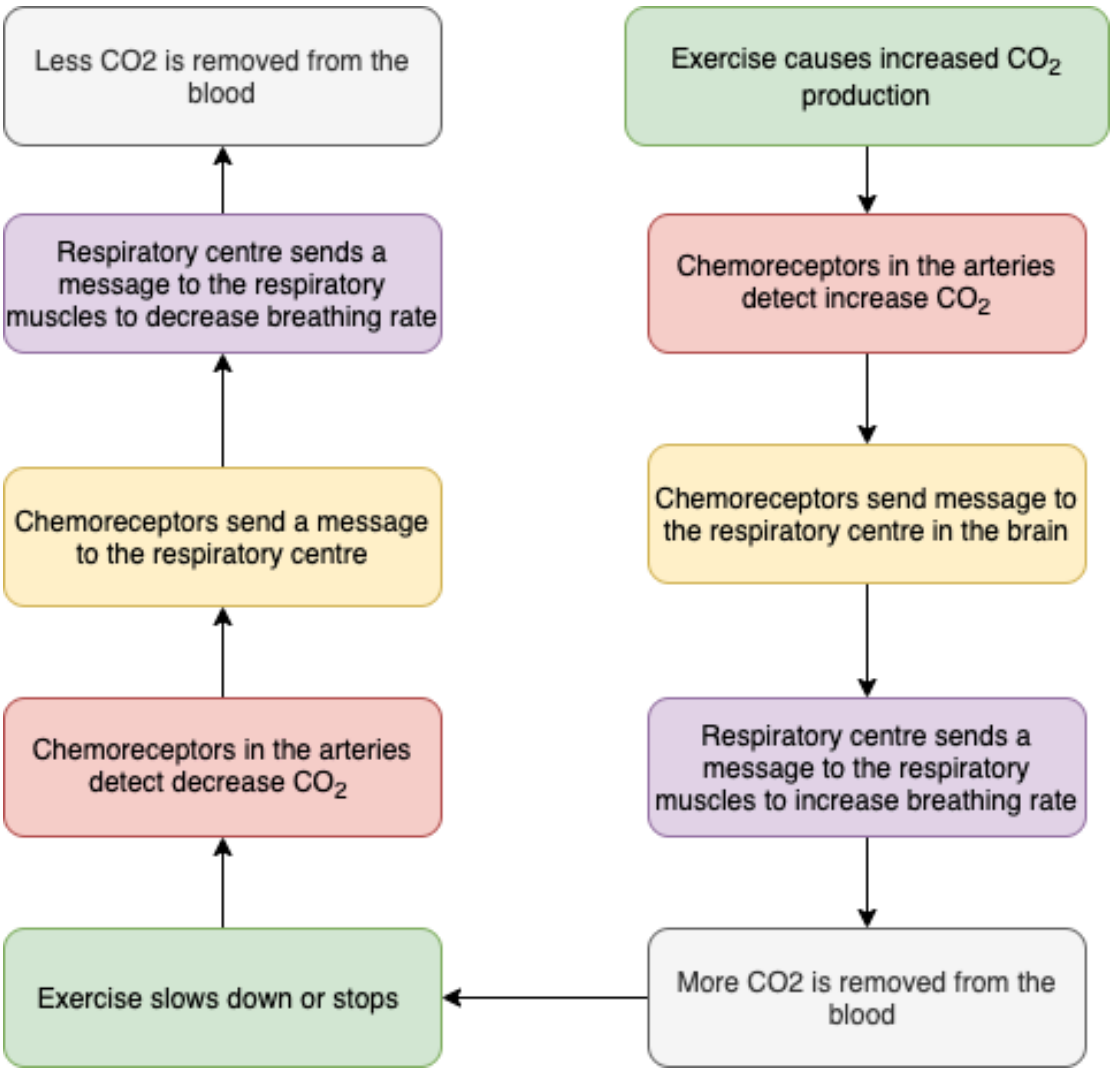
- This is detected by the **chemoreceptors** in the **arteries**

CONTROL

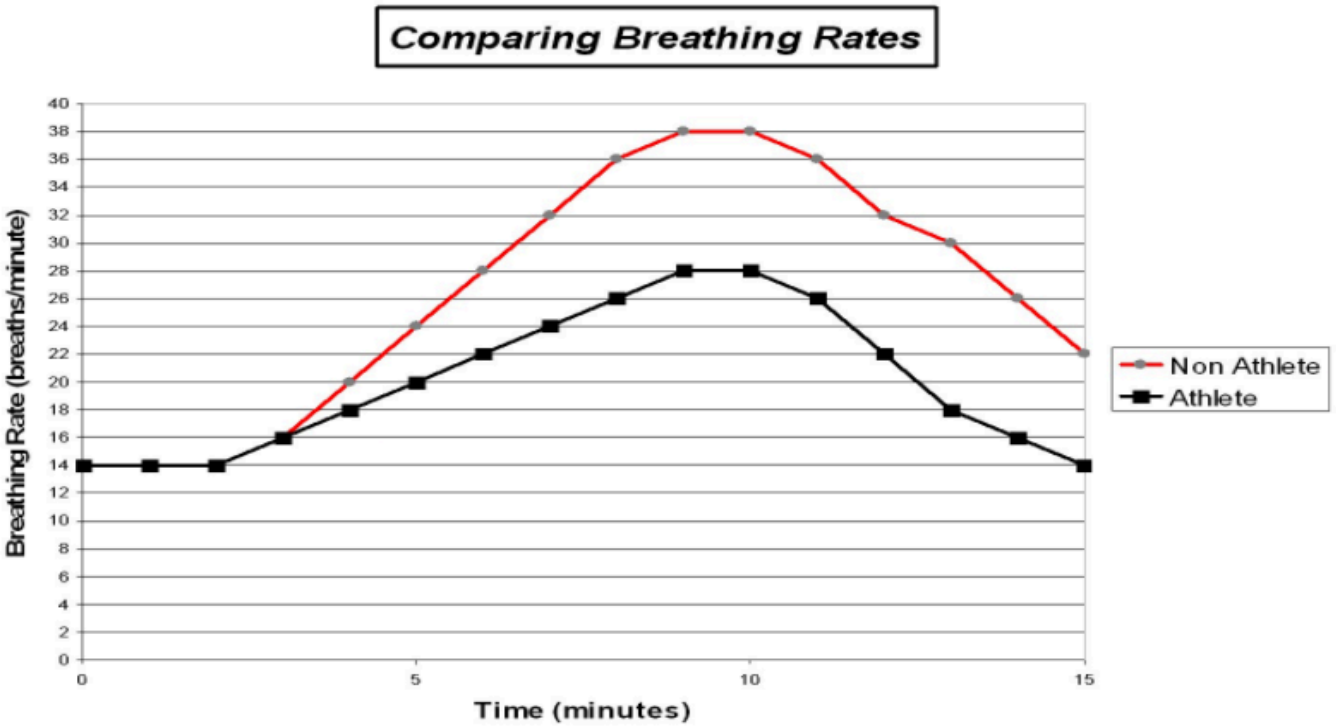
- A message is sent to the **respiratory centre** of the brain

EFFECTOR

- The **respiratory centre** sends a message to the **respiratory muscles** to _____



Exercise and Breathing Rate



A comparison between athletes and non-athletes breathing rates when undergoing exercise was conducted.

1. What is the initial breathing rate for athletes and non-athletes?

2. What is the highest breathing rate for both athletes and non-athletes?

3. Around what time did the breathing rate plateau for athletes?

4. After 10 min. what do you think is happening?

The Effect of Exercise on the Circulatory System

STIMULUS

- The working muscles have an increased demand for _____

  and _____

- The _____ narrow, **increasing blood pressure** so that the rate of blood flow increases to the muscles

SENSOR

- _____ on cells that are found in the **heart** detect the increase in blood pressure

CONTROL

- A rise in blood pressure during exercise causes these **baroreceptor** sensory cells to send nerve impulses to the

  _____ in the **brain**

EFFECTOR

- The **cardiovascular centre** in the **brain** sends a message to the **heart** to increase activity so that blood flow increases

- This results in an increased heart rate, **carrying more oxygen and glucose** to the working muscles

STIMULUS

- When exercise slows down or stops, less oxygen and glucose are needed and blood pressure decreases

SENSOR

- This is detected by the **baroreceptors** in the heart

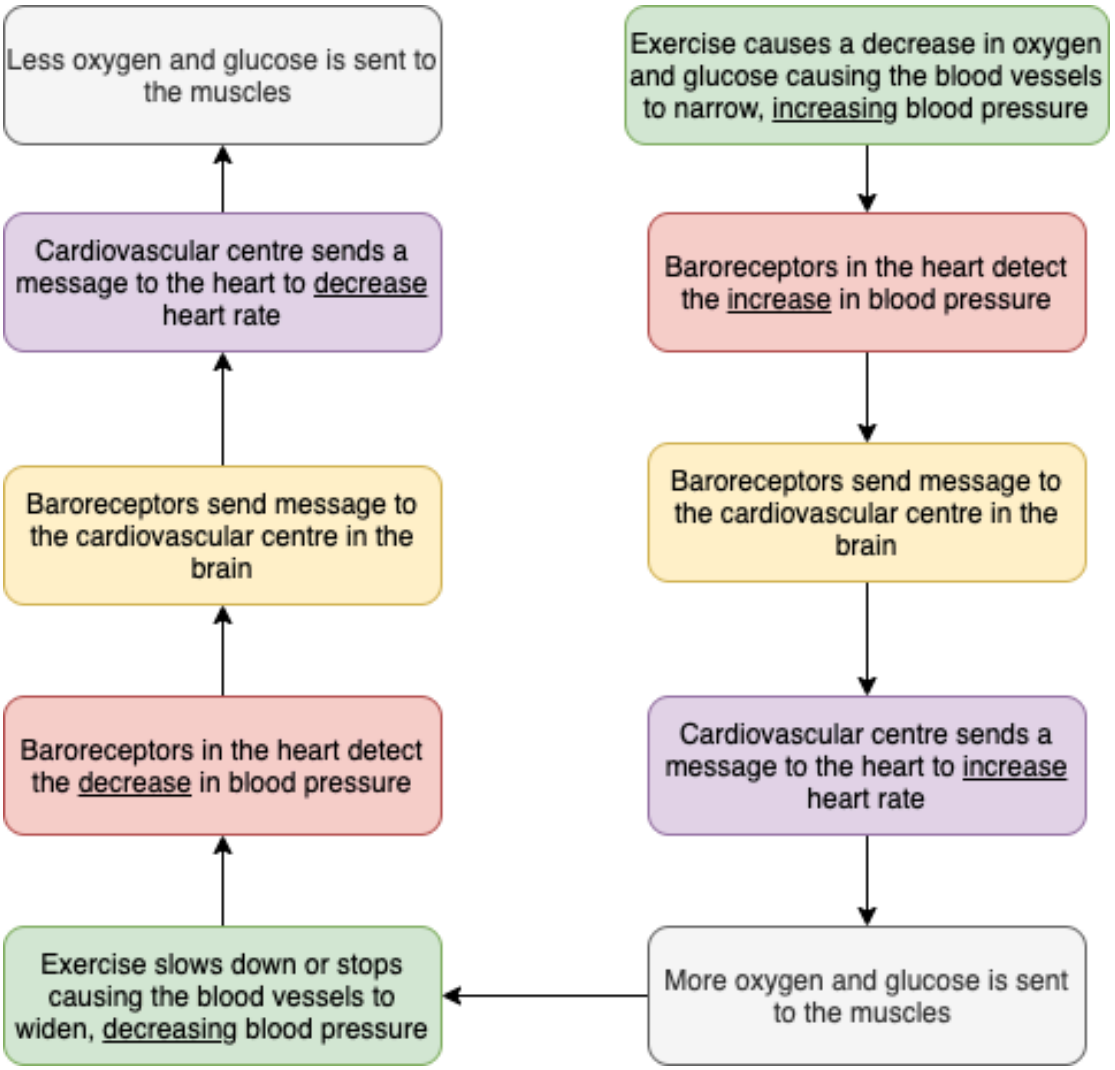
CONTROL

- A message is sent to the **cardiovascular centre** of the **brain**

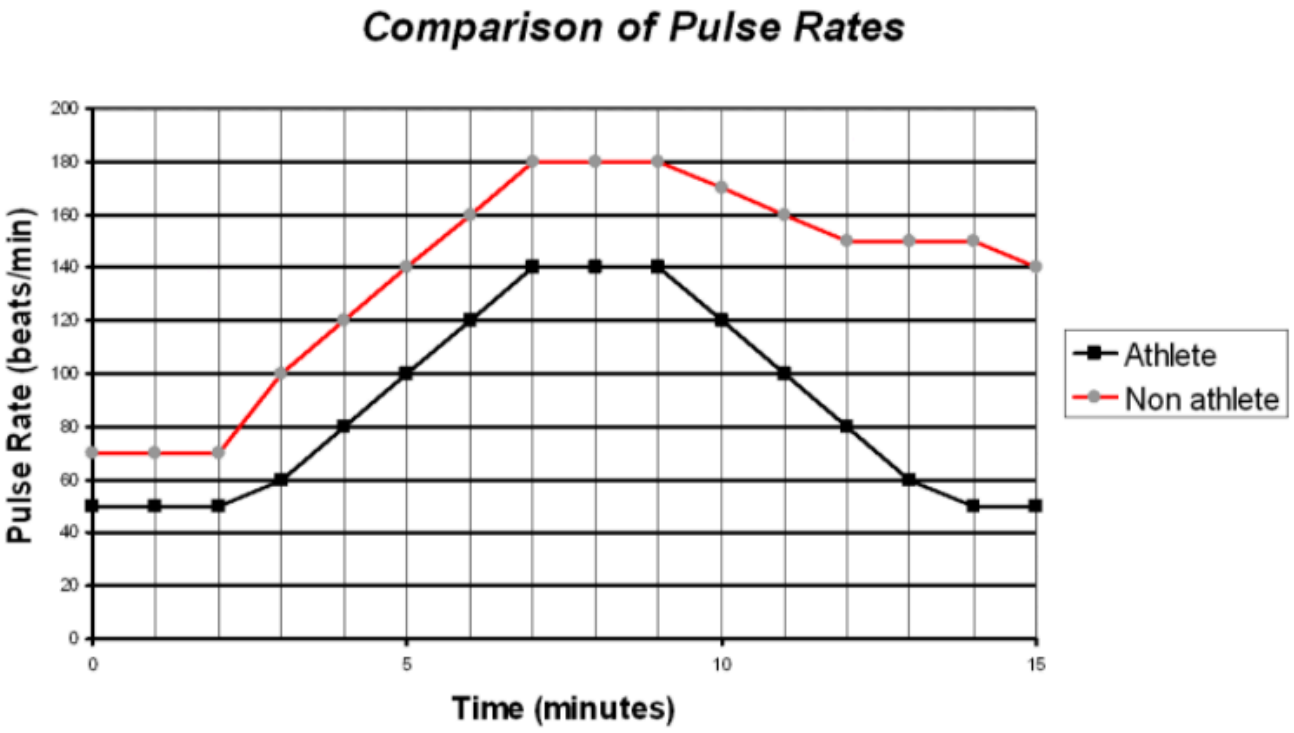
EFFECTOR

- The **cardiovascular centre** sends a message to the **heart** to

  _____



Exercise and Heart Rate



A comparison between athletes and non-athletes pules rates when undergoing exercise was conducted.

1. What is the initial pulse rate for athletes and non-athletes?

2. What is the highest pulse rate for both athletes and non athletes?

3. Around what time do you think they began exercising? Explain.

4. After 9 min. What do you think is happening?

5. Why do you think there is a difference between pulse rates of athletes and non-athletes?

The Endocrine System and Fight or Flight?

- Sometimes we are in situations where we have to react to a threat or a perceived threat
- The _____ in this case is something that can harm us
- The **endocrine system** produces specific _____ that cause **physiological changes** in response to a threat

- One of the main hormones that is produces is called **adrenaline**
- **Adrenaline** can cause many physiological changes that prepare an individual to confront (fight) or avoid (flight) the threat

Fight or Flight Response

What is the **Stimulus, Sensor, Control** and **Effector** in the fight or flight response?

Physiological changes during 'fight or flight' response to a threat

PHYSIOLOGICAL CHANGE	**REASON**
Increased heart rate	
Increased breathing rate	
Pupil dilation	
Sweat production	
Reduction of non-essential functions (eg. digestive system, urinary system)	