# Adrenaline and Thyroxin

## Adrenaline

- **Adrenaline** is a hormone produced by the **adrenal glands**. The adrenal glands are endocrine glands that sit above the kidneys.

- Adrenaline is released in situations where the body has an increased demand for **oxygen**. For example, when an animal is being hunted, adrenaline is released.

### Physiological Effects of Adrenaline

Adrenaline causes many physiological changes to take place. These include:

1. **Increased heart rate and blood pressur**e – pumps more blood around the body for the muscles.
2. **Glucose production** – increases the breakdown of glycogen into glucose in the liver, increasing glucose supply for respiring muscles.
3. **Vasoconstriction in the gut** – causes 'butterflies in stomach', and allows blood to be redirected to the muscles and brain, for increased oxygen delivery
4. **Pupil dilation** – makes the individual more alert
5. **Bronchioles widen** – increases ventilation to get more air in for faster gas exchange

All of these effects lead to an overall **increase** in oxygen supply to the muscles that are required. This is very helpful in such situations.That is why it is known as the **'flight or fight'** reflex.

## Thyroxine

- The **thyroid gland** is an important endocrine gland that resides in the throat. It is shaped like a butterfly and has two lobes. The thyroid makes the hormone **thyroxine**.
- **Thyroxine** is a very important hormone in the he body, which works to control the **basal metabolic rate**.
- Thyroid glands are present in the neck

### Thyroxine and Negative Feedback

Thyroxine levels are controlled due to **negative feedback**. The hypothalamus, pituitary gland and thyroid glands are involved in this:

## When thyroxine levels are low:

1. Low levels of thyroxine stimulate the hypothalamus to release Thyrotropin Releasing Hormone (TRH)
2. The TRH causes the pituitary gland to release Thyroid Stimulating Hormone (TSH)
3. The TSH travels in the blood and acts on the thyroid gland to produce thyroxine
4. Thyroxine levels increase

## When thyroxine levels are normal or high:

1. The thyroxine levels inhibit the release of TRH and the production of TSH
2. Thyroxine levels decrease

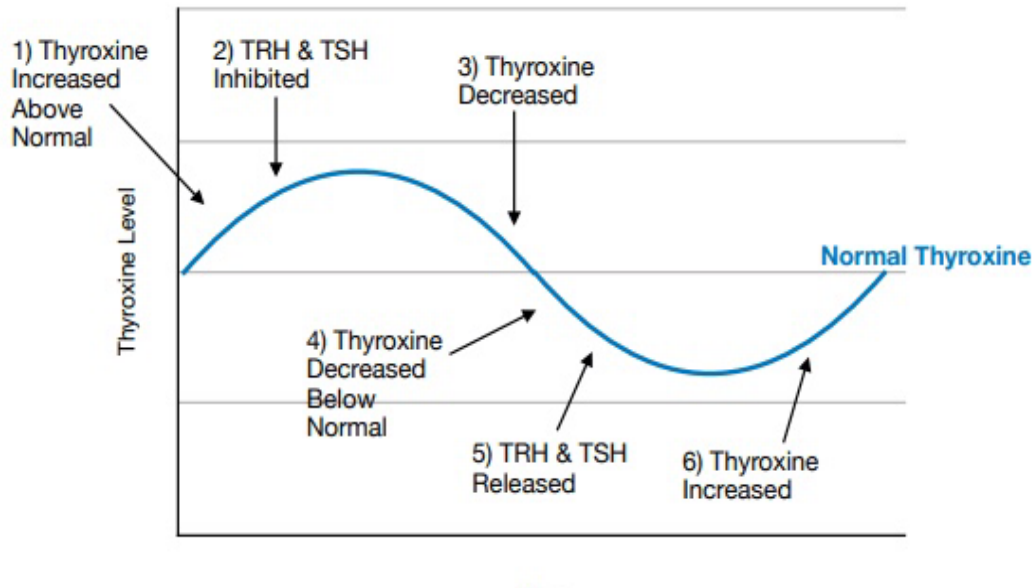


**Fig 1. Negative Feedback of Thyroxine.**