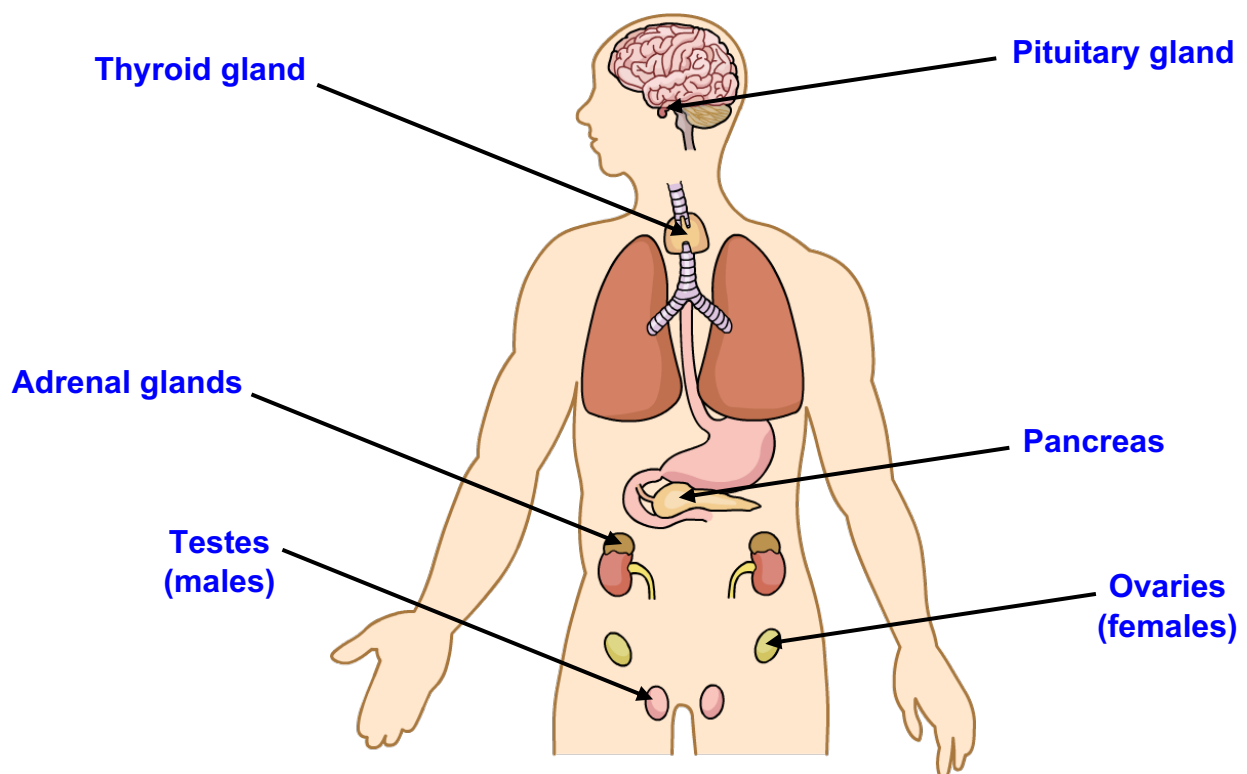


A. HORMONES

A **HORMONE** as a **chemical**, produced by a **gland**, which is carried by the **blood**.

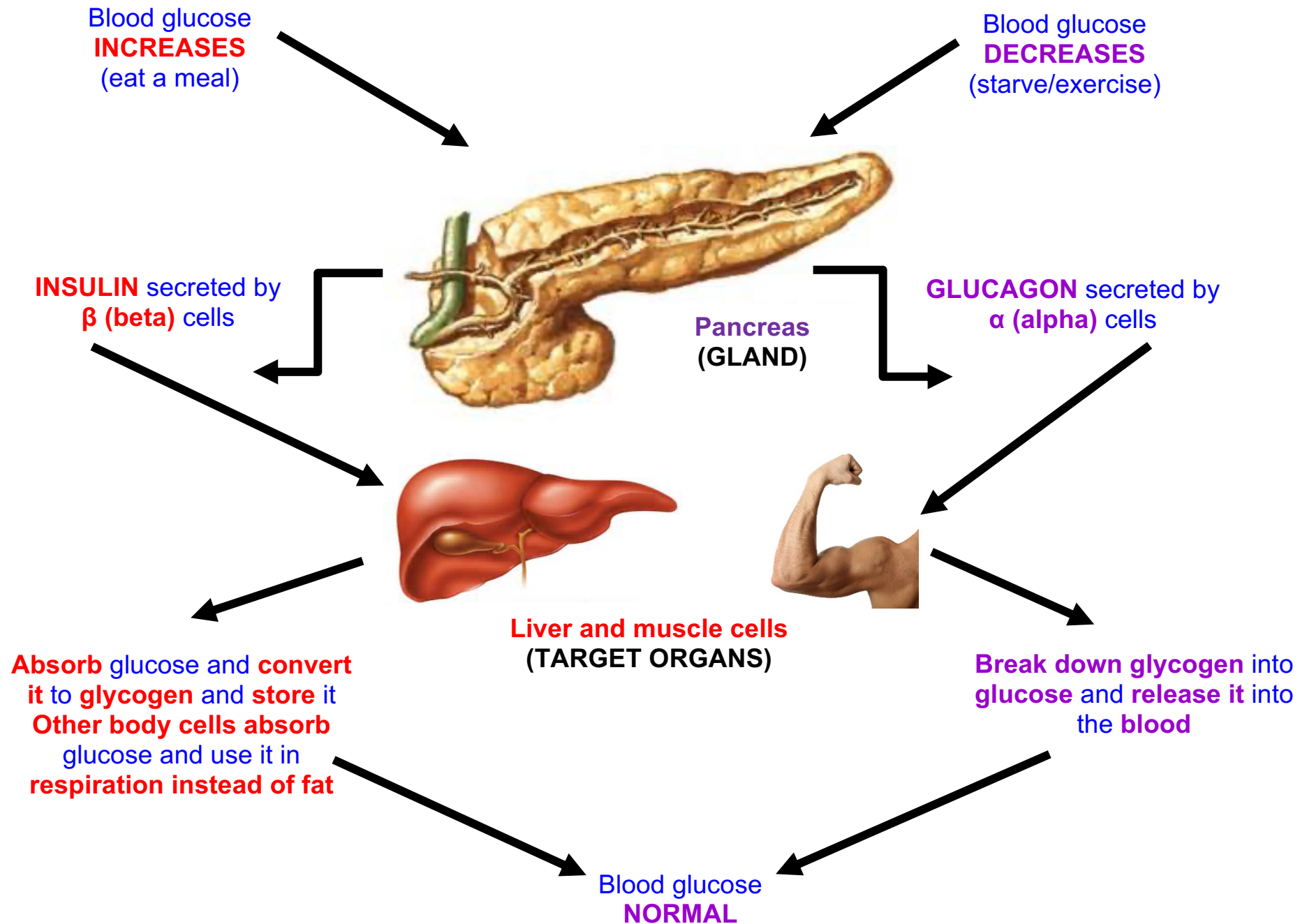
It then **alters the activity** of one or more **specific target organs**.

- The hormonal system is also known as the **endocrine system**.
- Here are the main **endocrine glands** of the body:



- **Homeostasis** is simply **maintaining** a **constant internal environment**.

B. CONTROLLING BLOOD GLUCOSE CONCENTRATION



C. POSITIVE AND NEGATIVE FEEDBACK

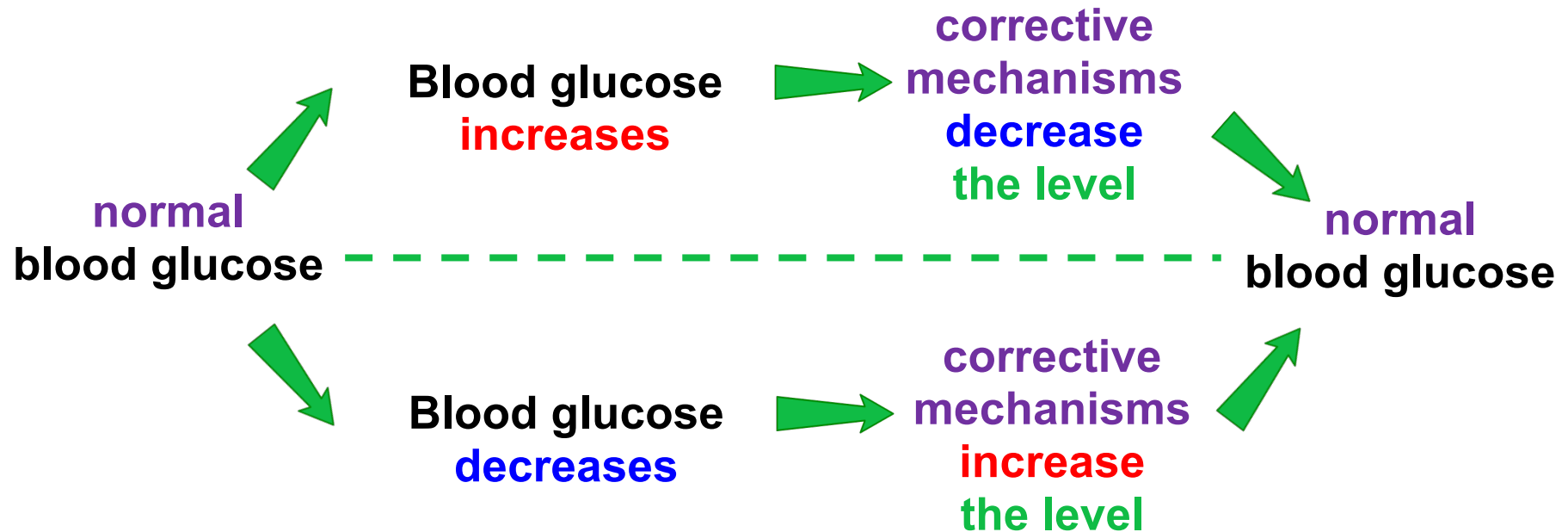
POSITIVE FEEDBACK is when a **RISE** in the level of something causes **FURTHER RISES** and a **FALL** in the level causes **FURTHER FALLS**

This tends to lead to **SUDDEN RISES OR FALLS**

NEGATIVE FEEDBACK is when a **CHANGE** in the level of something causes the **OPPOSITE CHANGE**

This **RETURNS** it to the **NORMAL LEVEL**

- Controlling **blood glucose concentration** is a good example of **NEGATIVE FEEDBACK**:



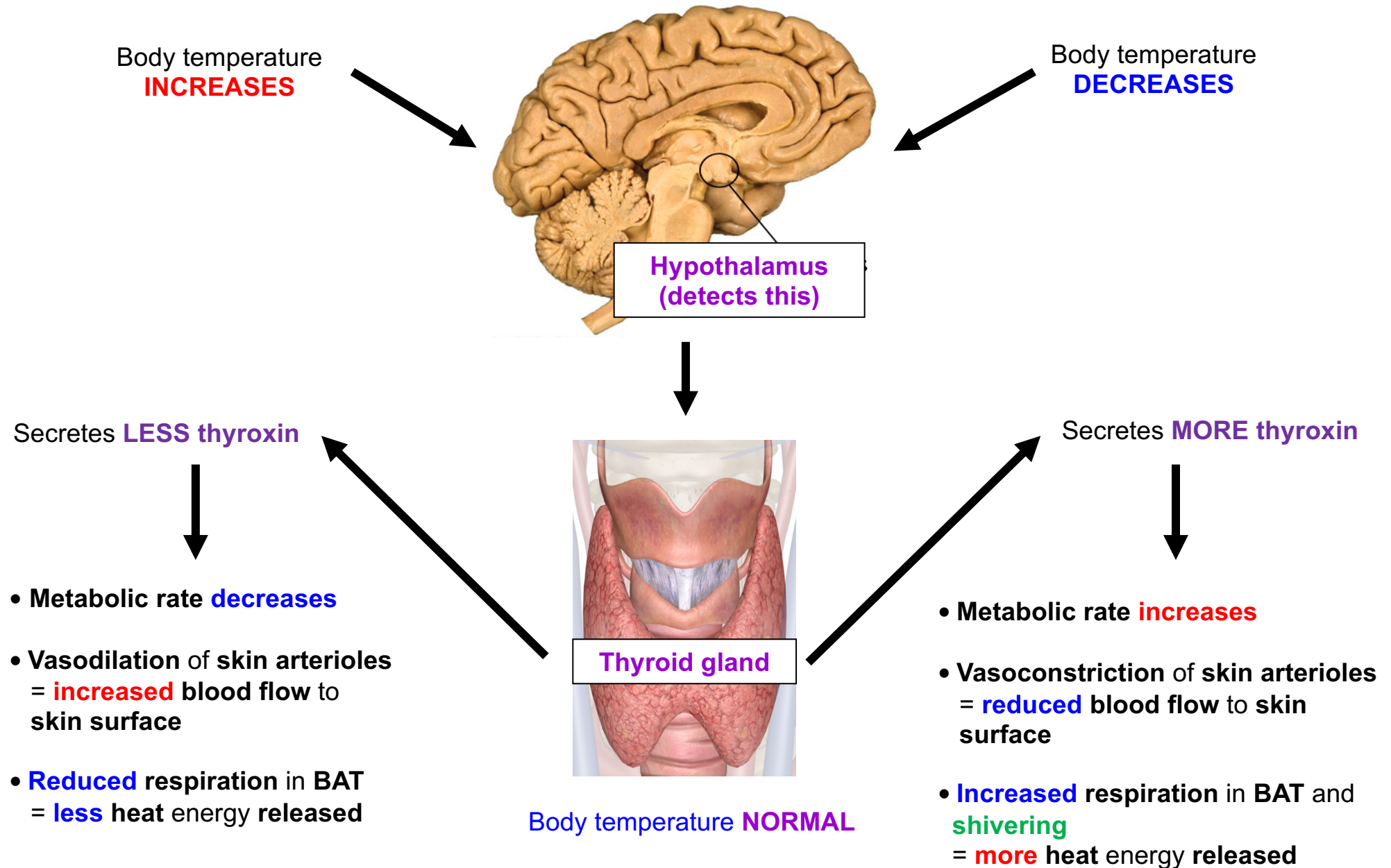
D. TYPE I & TYPE II DIABETES

- Both types of **diabetes** cause a **high blood glucose concentration**.

TYPE I DIABETES		TYPE II DIABETES
STARTS	<ul style="list-style-type: none">• During childhood	After childhood
CAUSE	<ul style="list-style-type: none">• Immune system destroys β cells of pancreas• (So) less insulin is secreted	<ul style="list-style-type: none">• Target cells on liver do not respond to insulin• (are insulin-insensitive)
CONTROLLED BY	<ul style="list-style-type: none">• Insulin injections• Measuring blood glucose levels regularly	<ul style="list-style-type: none">• Low carbohydrate diets.• Exercise.
NOTES	Diet and exercise alone cannot control it	Risk factors: <ul style="list-style-type: none">• high-fat, low-fibre diets• obesity• genetics

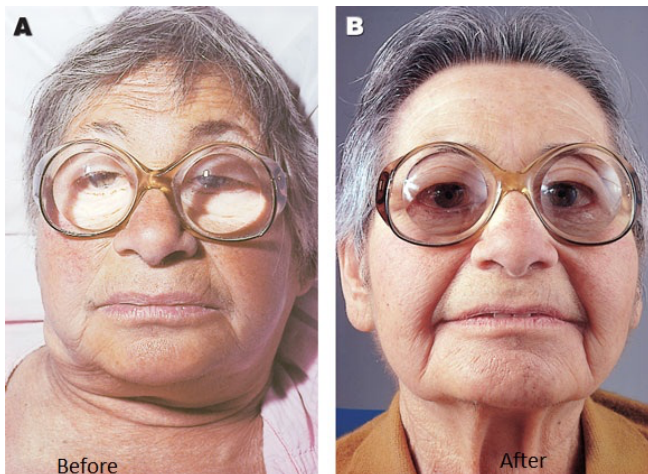
E. EFFECTS OF THYROXIN

- **BAT** = **B**rown **A**dipose (**F**at) **T**issue



Hypothyroidism

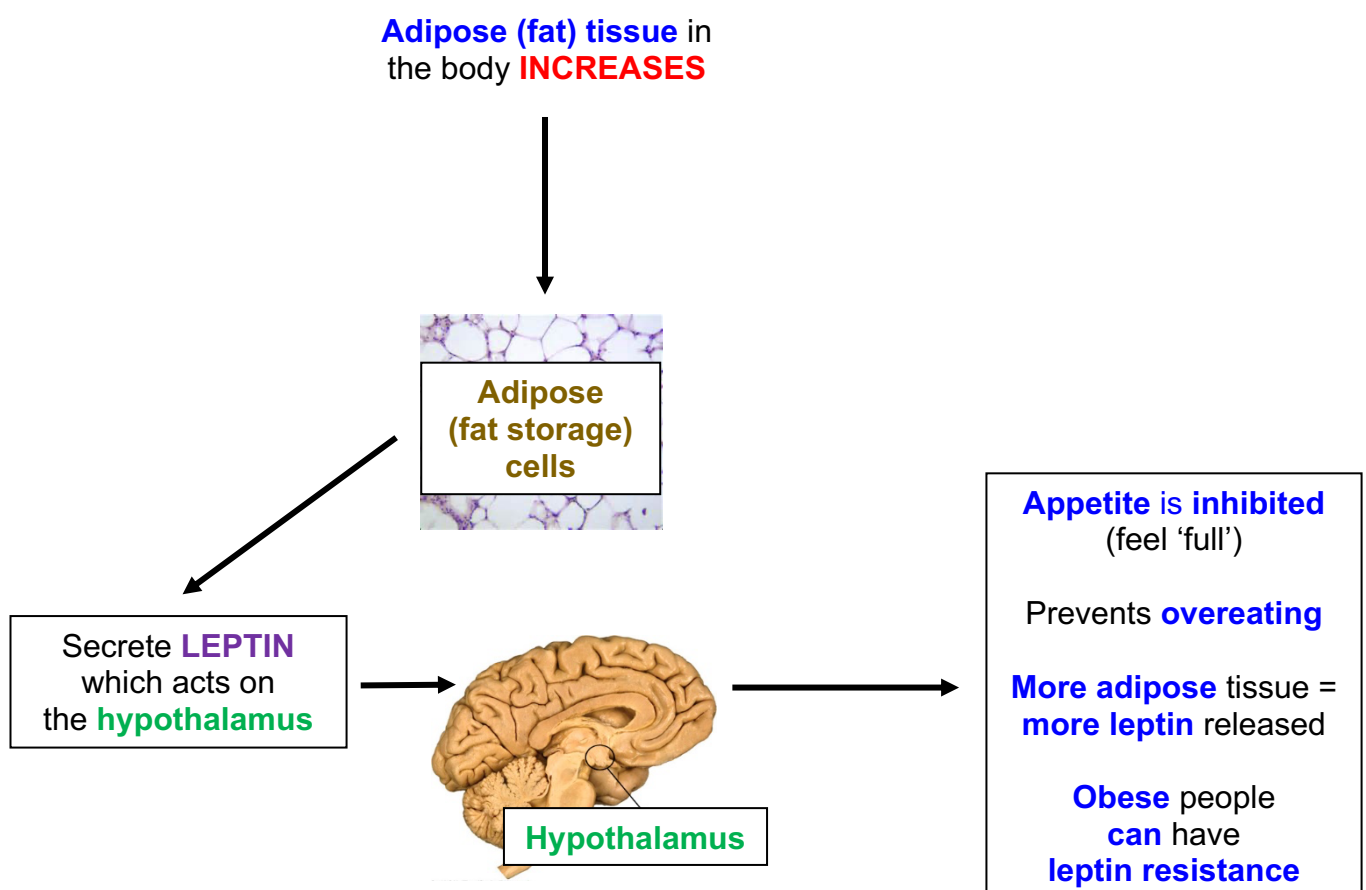
- Happens when the **thyroid gland** **does not secrete enough** thyroxin



- Metabolic rate** **decreases**
- Reduced** respiration of BAT
- Unexpected **weight gain**
- More calories** are **stored** as fat

F. EFFECTS OF LEPTIN

- Leptin **inhibits** appetite to **prevent** us from **overeating**.



G. EFFECTS OF MELATONIN

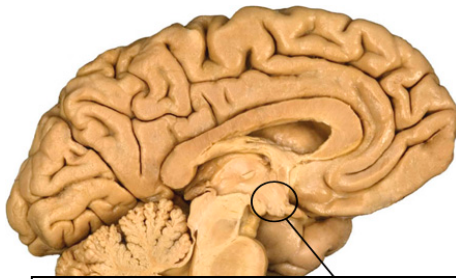
- Melatonin is secreted by the **pineal gland** to control **circadian rhythms** and **sleep patterns**.



Cells in **retina**
detect if it is:

- light (day)
- dark (night)

electrical
impulses



Hypothalamus
Supra-chiasmatic nuclei
(SCN)

electrical
impulses

PINEAL GLAND (BRAIN)

secretes

**MORE MELATONIN
AT NIGHT**

MELATONIN & JET LAG

- We are adapted to live in a **24-hour cycle** and have **circadian rhythms** in behaviour that fits with this cycle
- We produce **more melatonin** at **night** and **less melatonin** as we get **older**
- So, **older** people have **more irregular sleep patterns**
- **Jet lag** is when the **SCN** and **pineal gland** keep **setting** a **circadian rhythm** to **suit** the **day** and **night** from the **old time zone** rather than the new one
- Symptoms: **cannot sleep**; **irritable**; **headache**; **tiredness**
- We can **take melatonin** by **mouth** at a **time** when we **should be going to sleep** to help **prevent** jet lag.

H. COMPARING THE NERVOUS & HORMONAL (ENDOCRINE) SYSTEMS

SIMILARITIES	
Both used to communicate between cells/tissues/organs	
Both cause a response in specific/target cells	
Both can stimulate or inhibit	
Both can work over long distances	
Both (usually) under control of the brain/CNS	
Both used in homeostasis /use negative feedback	
DIFFERENCES	
NERVES	HORMONES
Electrical impulses	Chemical messenger
Transported in neurons	Transported in blood
Faster acting	Slower acting
Shorter-lived	Long term / longer-lasting
Carried to single/specific cell	Carried throughout the body
Only muscles/glands receive impulses	Wider range of tissues affected