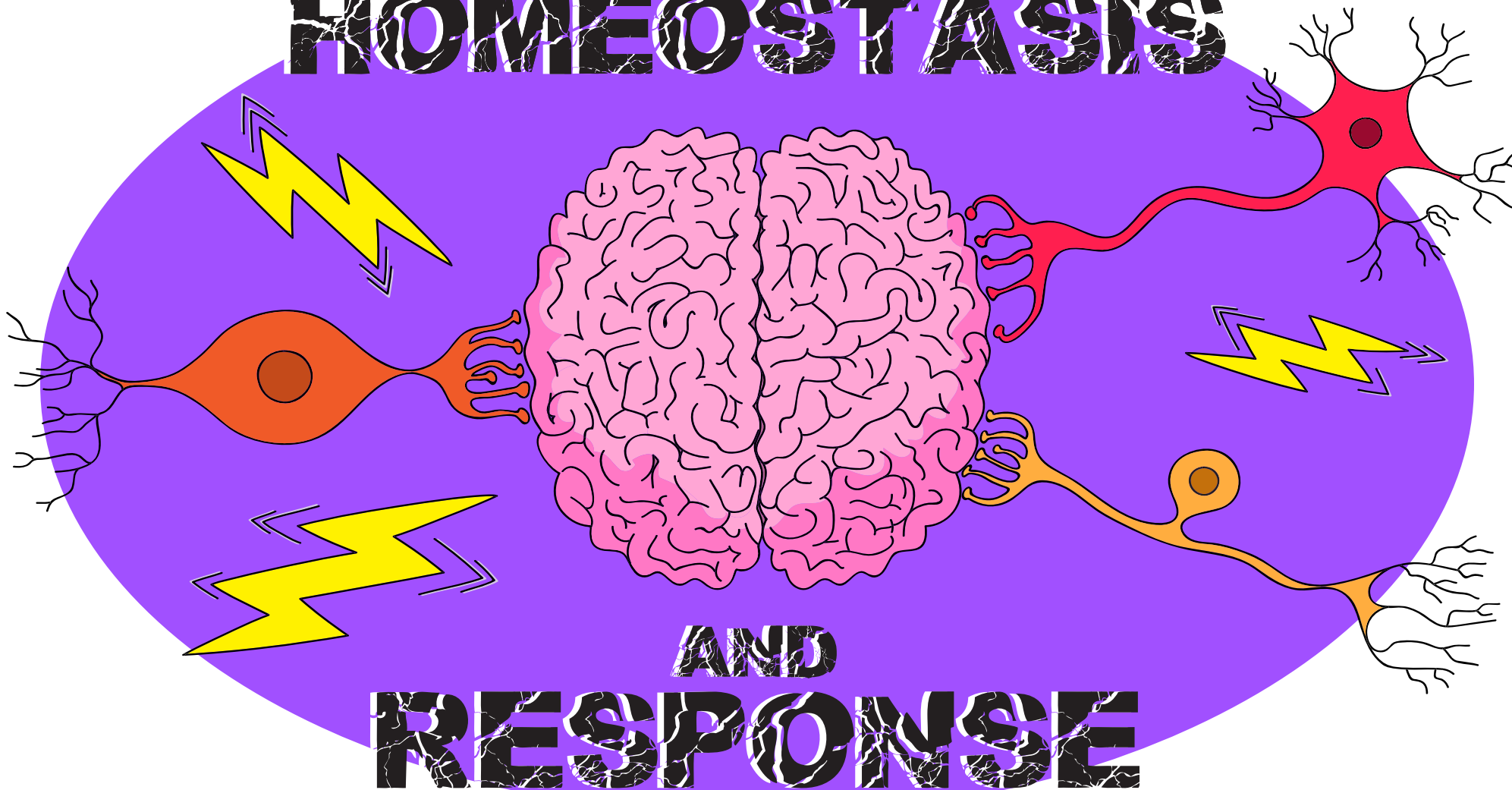


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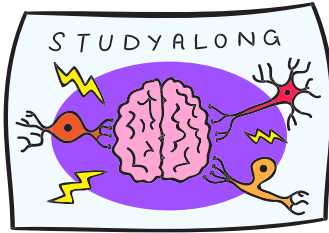
*Emmatheteachie*

# HOMEOSTASIS



# HOW TO STUDYALONG!

BIOLOGY TOPIC 5

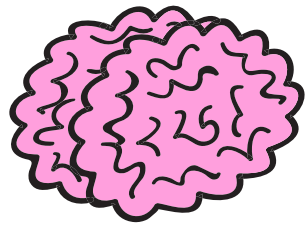
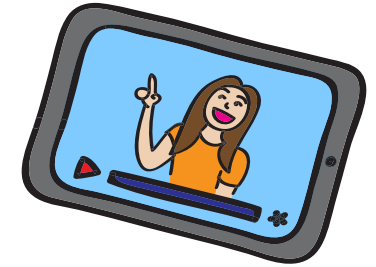


*Pick your style!*

Print the workbook in the style you want - colour or black & white! B&W is great for de-stressing colouring in & less ink!

*Studyalong with me!*

Complete the Studyalong sheets while watching my videos, pausing and replaying as much as you want!



*Test your brain!*

Quick Questions give you the chance to see which bits you've nailed and which bits need another look over!

*Save your success!*

Track your learning with your very own progress tracker - super satisfying and useful for future revision sessions!



*Examine and excel!*

20 exam-style questions to finish off the topic and let you practice your exam technique!

*Bonus break!*

Take a break and check out the bonus activity at the back for some fun or print a black & white cover page to colour in!



# YOUR PROGRESS TRACKER

## BIOLOGY TOPIC 5

**Colour** in the star that shows how you're doing for each topic!

MORE REVISION



ALMOST THERE



NAILED IT YEAH!



**Notes** - add these to help you in future revision sessions, e.g. learn the function of oestrogen

Homeostasis				
The human nervous system				
Reflex actions				
The endocrine system				
Control of blood glucose				
Treating Diabetes				
Reproductive hormones				
The menstrual cycle (HT)				
Contraception				
Infertility treatments (HT)				



# CONTENT AND VIDEOS

## BIOLOGY TOPIC 5



Scan the **QR code** using your phone or tablet camera (apple devices) or QR reader app (android devices) to load up the videos! Or visit the Emmatheteachie YouTube channel or website and select the "Homeostasis and Response" playlist.



### HOMEOSTASIS



### THE HUMAN NERVOUS SYSTEM



### REFLEX ACTIONS



### THE ENDOCRINE SYSTEM



### CONTROL OF BLOOD GLUCOSE



### TREATING DIABETES



### REPRODUCTIVE HORMONES



### THE MENSTRUAL CYCLE (HT)



### CONTRACEPTION



### INFERTILITY TREATMENTS (HT)



28-27 EXAM-STYLE QUESTIONS 38-42 ANSWERS

43 BONUS ACTIVITY (WOO!) 44 THANK YOU

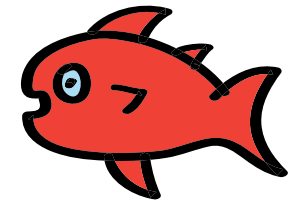
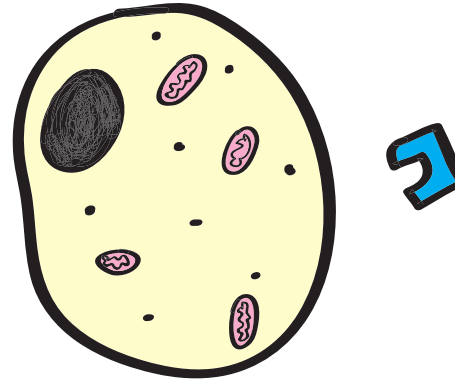




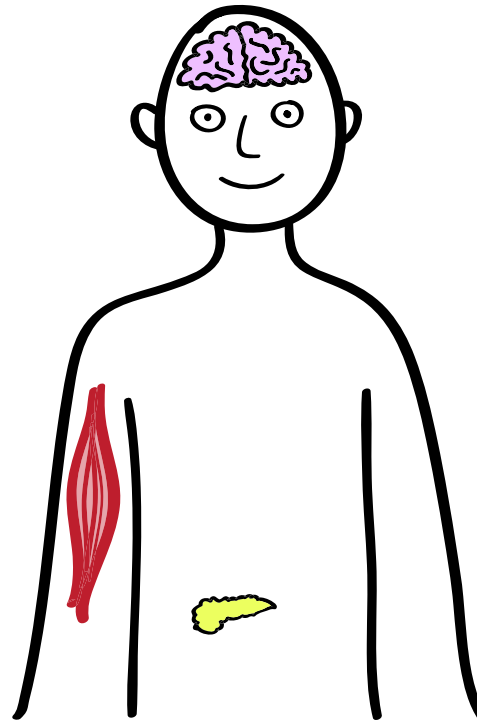
# HOMEOSTASIS



Define homeostasis and explain why it is important.



Name and briefly describe the key components of any control system.



Name three conditions that are kept constant in the human body.



# HOMEOSTASIS

<< QUICK QUESTIONS >>

1. Complete: Homeostasis is the r\_\_\_\_\_ of the \_\_\_\_\_ conditions of a cell or \_\_\_\_\_ to maintain optimum conditions for cell and \_\_\_\_\_ function.
2. Give 2 examples of homeostatic control in the human body.
3. What is a stimulus?
4. Name the type of cells that detect stimuli.
5. Name the two types of effectors.
6. Describe what a coordination centre is.



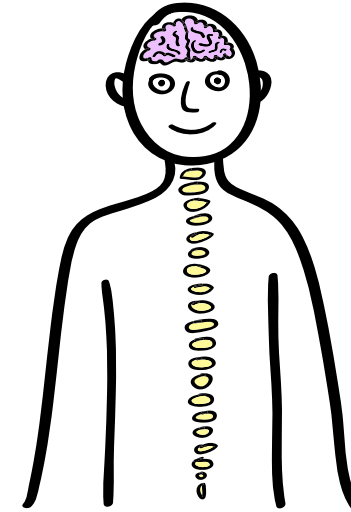
# THE HUMAN NERVOUS SYSTEM

## BIOLOGY TOPIC 5

★ Name the five main sense organs and what they detect.



★ Label the two components of the central nervous system on the diagram below:

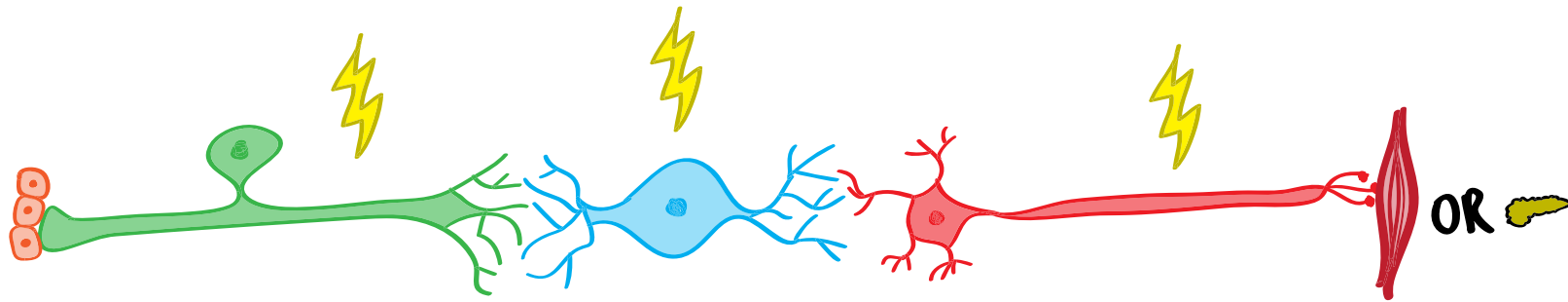


★ Describe the difference between a neurone and a nerve.

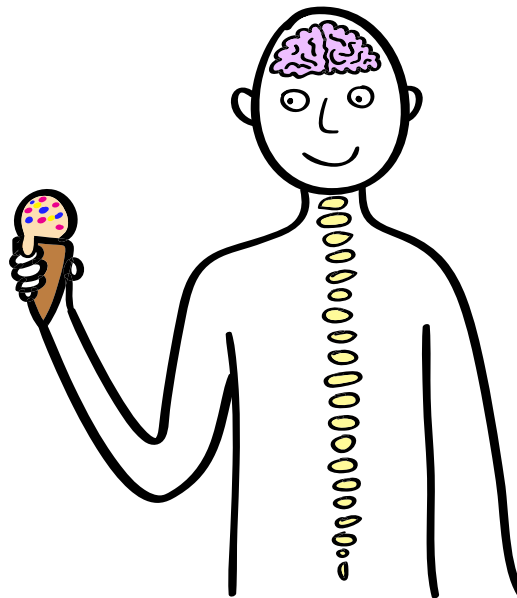
# THE HUMAN NERVOUS SYSTEM

## BIOLOGY TOPIC 5

★ Describe the steps involved in a nervous system response to a stimulus.



★ Describe what would happen when the ice-cream drips onto this person's finger.



# THE HUMAN NERVOUS SYSTEM

## BIOLOGY TOPIC 5

### << QUICK QUESTIONS >>

1. What is the central nervous system?

2. Explain the difference between a nerve and a neuron.

3. Which two sense receptors can detect chemicals?

4. Complete the sequence for how the nervous system works:

\_\_\_\_\_ -> receptor -> \_\_\_\_\_ -> relay neuron -> \_\_\_\_\_ -> effector -> \_\_\_\_\_

5. How is information transmitted through the human nervous system?

6. Muscles are one type of effector. Name the other.

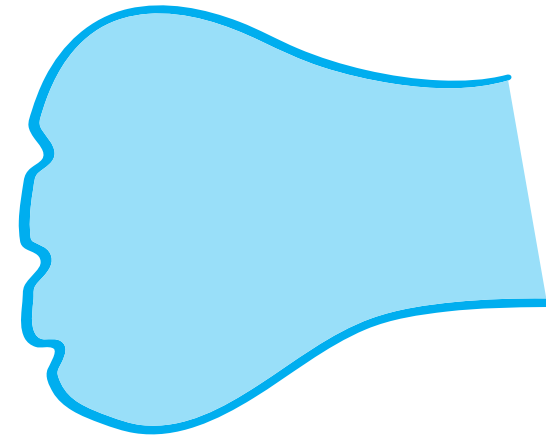
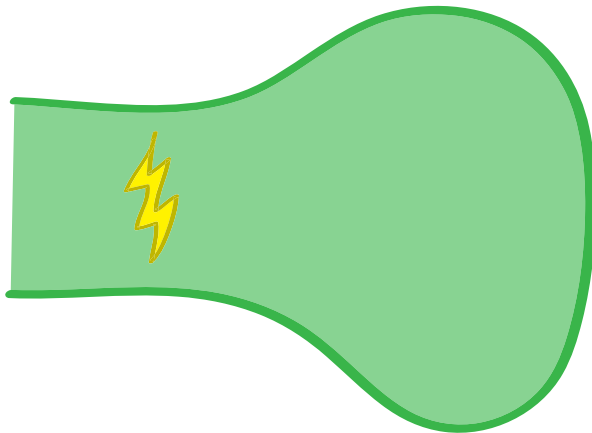


# REFLEX ACTIONS

★ Describe what a synapse is and label it on this diagram:

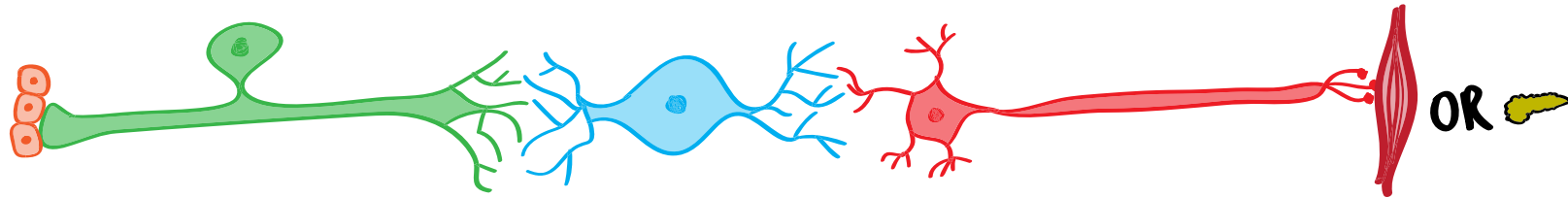


★ Complete the diagram below to show what happens when an electrical impulse reaches the end of one neurone.



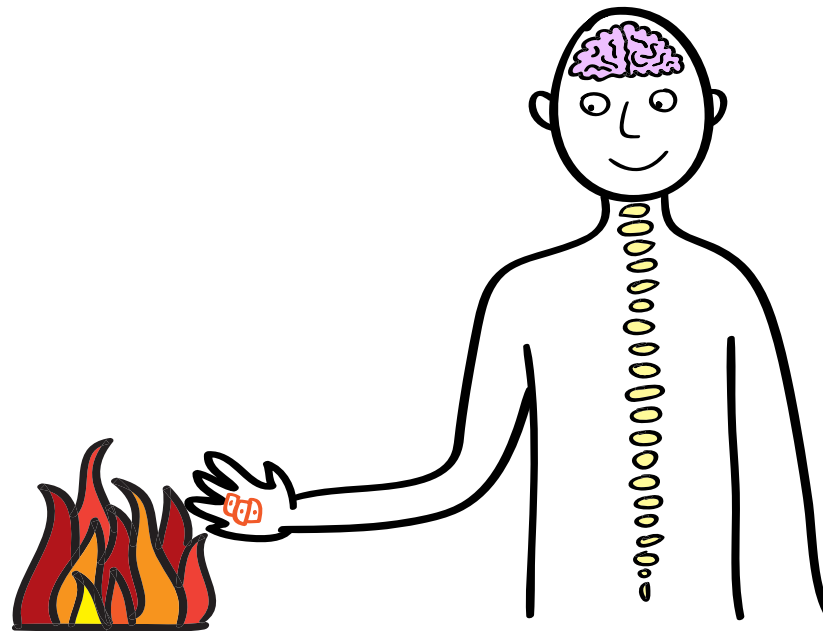
# REFLEX ACTIONS

★ Reflex arcs travel along the same pathway as a normal nervous system response, except they don't pass through conscious parts of the brain. Recap the steps of this pathway by labelling the diagram below:



★ Describe what will happen in the situation shown below.

★ Describe what a reflex action is.



★ Explain the importance of reflex actions.





# REFLEX ACTIONS

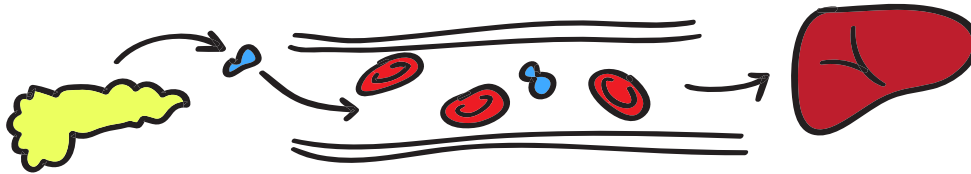
## << QUICK QUESTIONS >>

1. Describe how a synapse works.
2. What is a reflex action?
3. Write down, in the correct order, which neurons information will pass through in a reflex action.
4. Explain the main benefit of reflex actions.



# THE ENDOCRINE SYSTEM

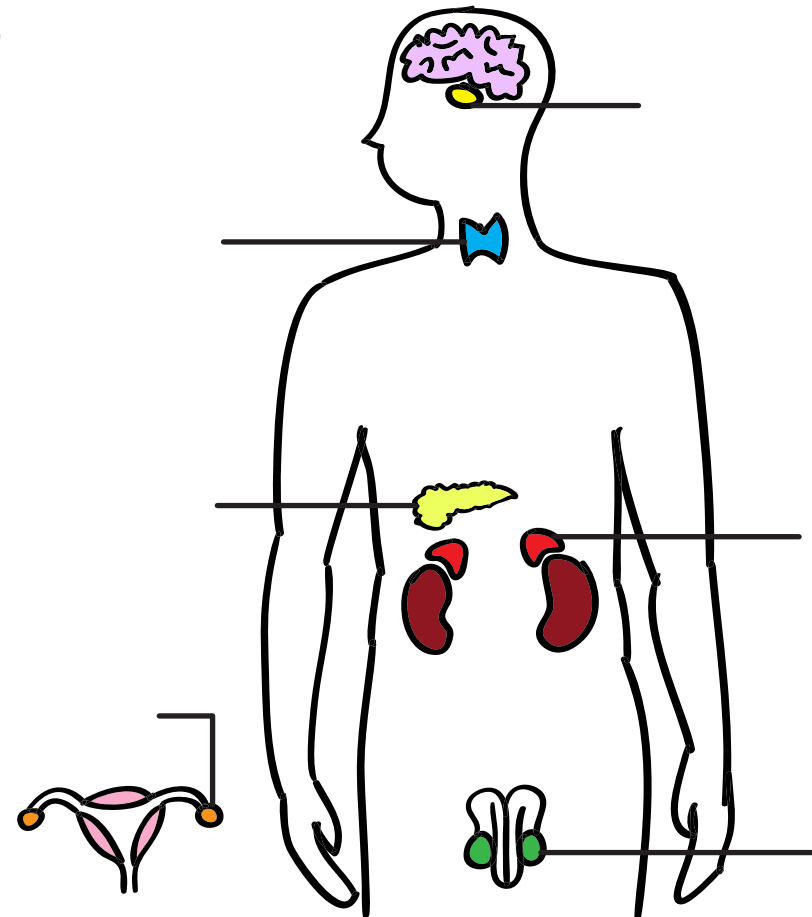
★ Describe how the endocrine system works, by labelling the diagram below.



★ Describe two differences between the endocrine system and the nervous system.

★ Why is the pituitary gland referred to as the “master gland”?

★ Name the six glands shown in this diagram:

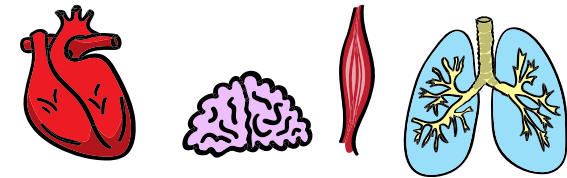
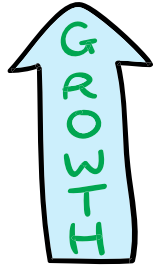


# THE ENDOCRINE SYSTEM

★ State where thyroxine is produced and describe its function in the body.

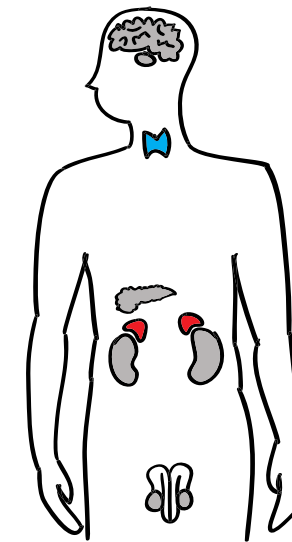
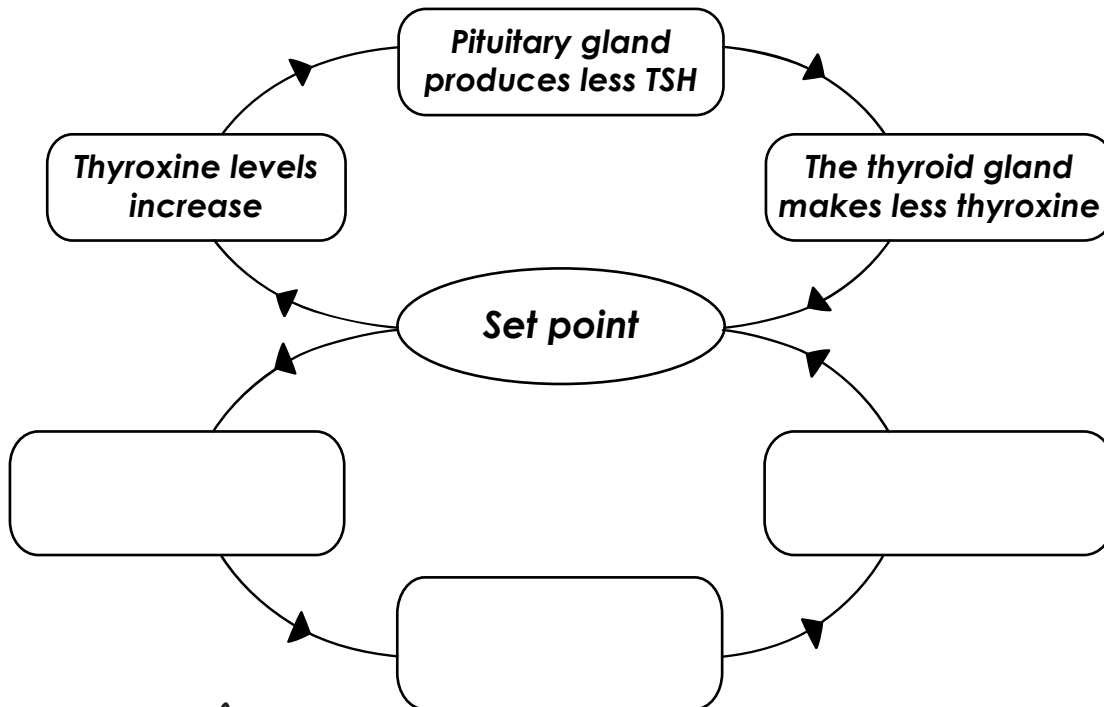
★ State where adrenaline is produced and describe its function in the body.

HIGHER TIER



★ Describe what negative feedback is by using the example of thyroxine to complete this diagram:

★ Label the two glands where thyroxine and adrenaline are each produced.

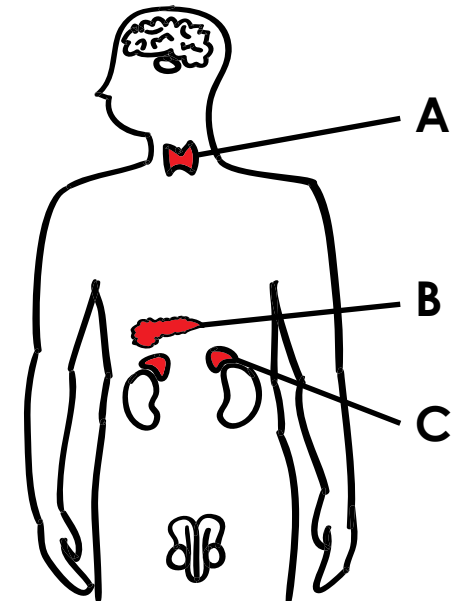


# THE ENDOCRINE SYSTEM

## BIOLOGY TOPIC 5

### << QUICK QUESTIONS >>

1. Describe the function of glands.
2. Why is the pituitary gland called the master gland?
3. Suggest a disadvantage of the endocrine system.
4. Name glands A, B and C.

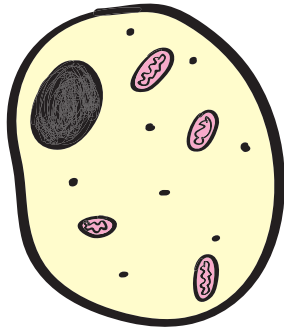


**HIGHER:** Also name the hormones produced by A and C

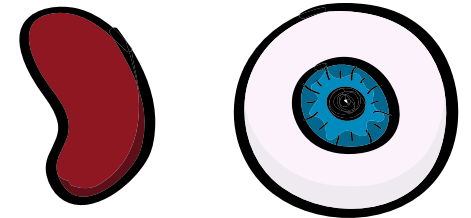


# CONTROL OF BLOOD GLUCOSE

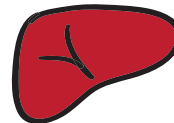
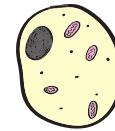
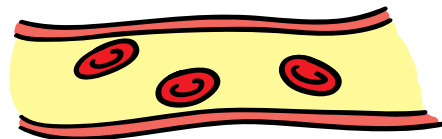
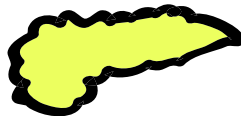
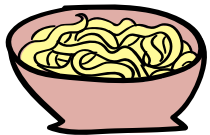
★ Glucose is used to release energy in the process of respiration. State three ways in which this energy is used.



★ Describe the issues when blood glucose levels concentration changes too far from the normal concentration.



★ Annotate the diagrams below to describe what happens when foods containing carbohydrates are eaten.



# CONTROL OF BLOOD GLUCOSE

BIOLOGY TOPIC 5

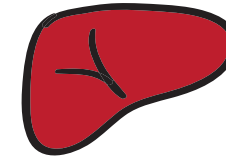
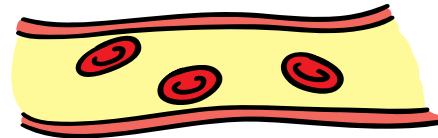
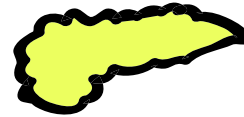


Explain how blood glucose concentration can decrease.



Annotate the diagram to show what happens in the body when the blood glucose concentration decreases.

HIGHER TIER



Describe the difference between: glucose, glycogen and glucagon. You can also practise your spellings here if you like!

# CONTROL OF BLOOD GLUCOSE

## BIOLOGY TOPIC 5

### << QUICK QUESTIONS >>



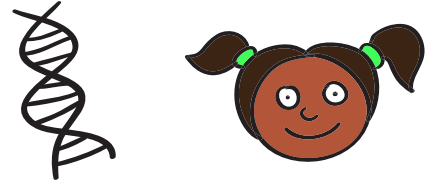
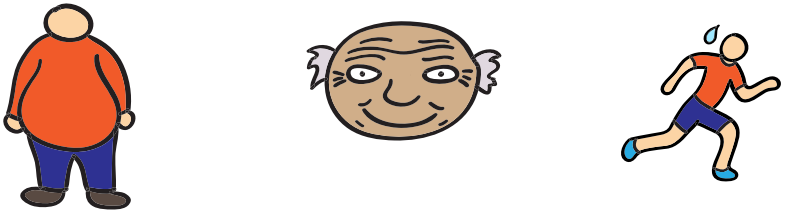

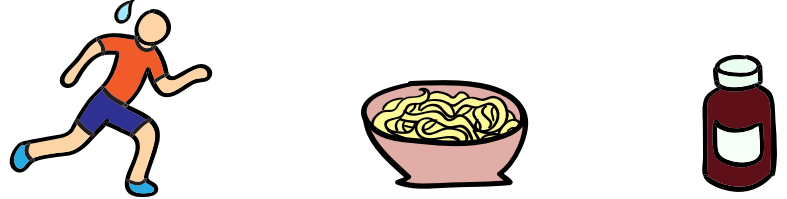
1. Which organ monitors blood glucose levels?
2. Describe how blood glucose levels may increase.
3. Explain how the body responds when blood glucose levels increase.
4. **HIGHER:** Explain the function of the hormone *glucagon* in the body.





# TREATING DIABETES

★ Complete the table below by annotating the diagrams.

	TYPE 1 DIABETES	TYPE 2 DIABETES
Disorder		
Cause		
Treatment		

# TREATING DIABETES

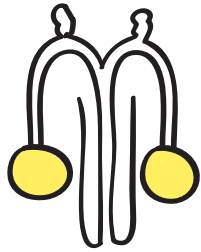
## << QUICK QUESTIONS >>

1. Name the disorder caused when the pancreas fails to produce enough insulin.
2. What is the main risk factor for Type 2 diabetes?
3. How does Type 2 diabetes affect the body, i.e. what is happening if you have this disorder?
4. How can Type 2 diabetes be treated?
5. Suggest why insulin is given by injections rather than in tablets.

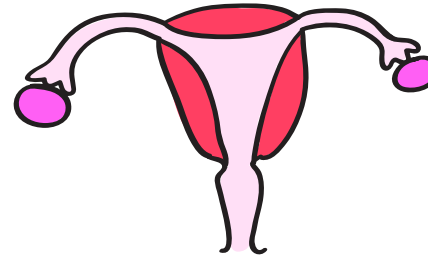
# REPRODUCTIVE HORMONES

★ Name the male and female reproductive hormones and identify where they are produced on the diagrams below.

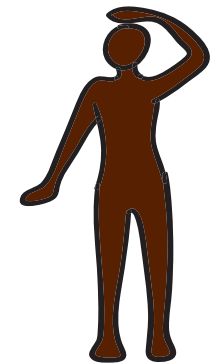
## Males



## Females



★ Describe some of the secondary sex characteristics that develop during puberty.



# REPRODUCTIVE HORMONES

★ Name the four hormones that are involved in controlling the menstrual cycle and describe the role of each one.

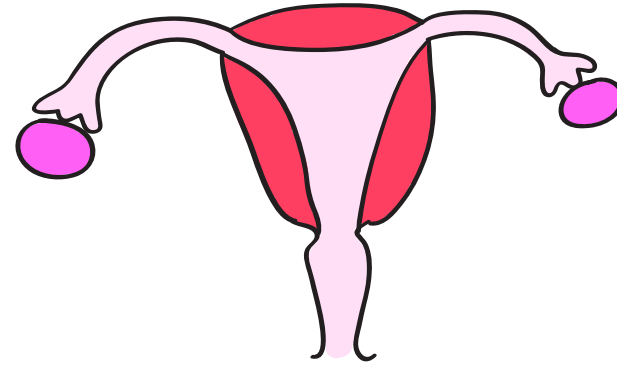
1

2

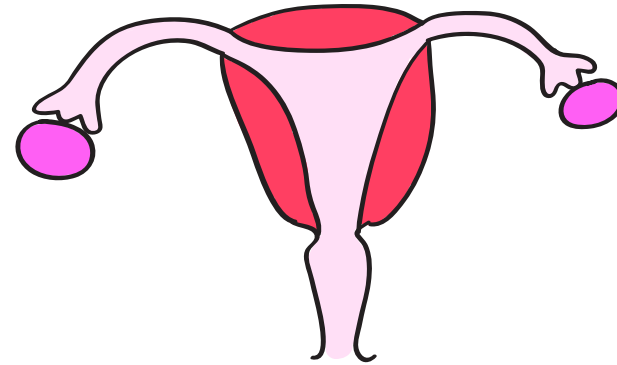
3

4

★ Label the female reproductive system:



★ Show where the egg is released from each month and where it goes next:



# REPRODUCTIVE HORMONES

## BIOLOGY TOPIC 5

### << QUICK QUESTIONS >>

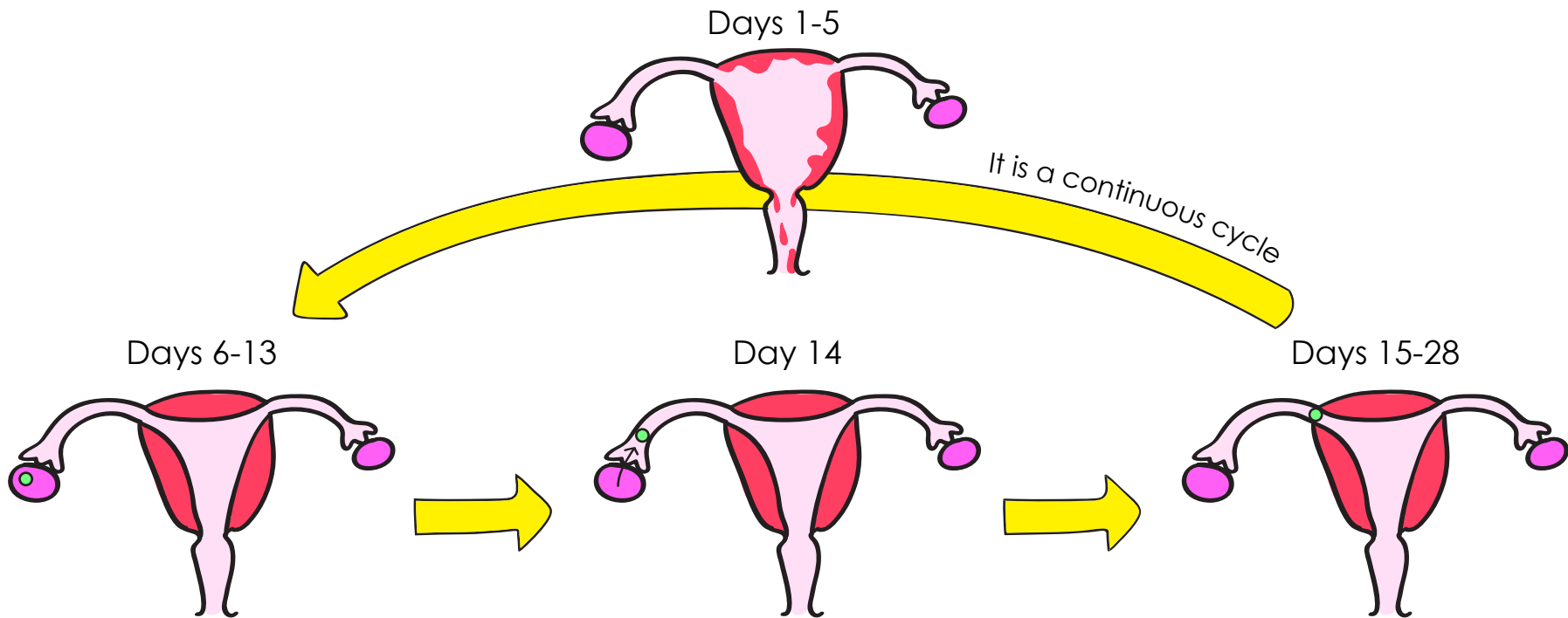
1. What is the name of the main male reproductive hormone?
2. Where is sperm produced?
3. Describe the process of ovulation.
4. Which hormone stimulates the release of a mature egg?
5. Describe the function of progesterone.



# THE MENSTRUAL CYCLE

★ Describe what happens during the menstrual cycle.

HIGHER TIER



# THE MENSTRUAL CYCLE

BIOLOGY TOPIC 5

HIGHER  
TIER



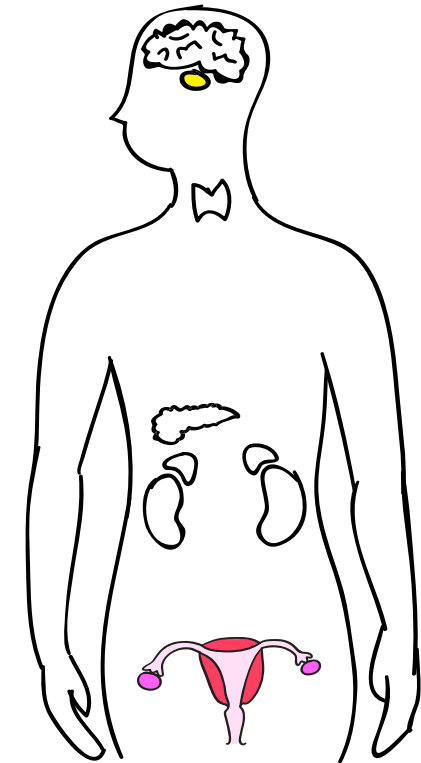
Describe the function of each reproductive hormone in the menstrual cycle. Include any interactions between different hormones.

1 FSH

2 OESTROGEN

3 LH

4 PROGESTERONE



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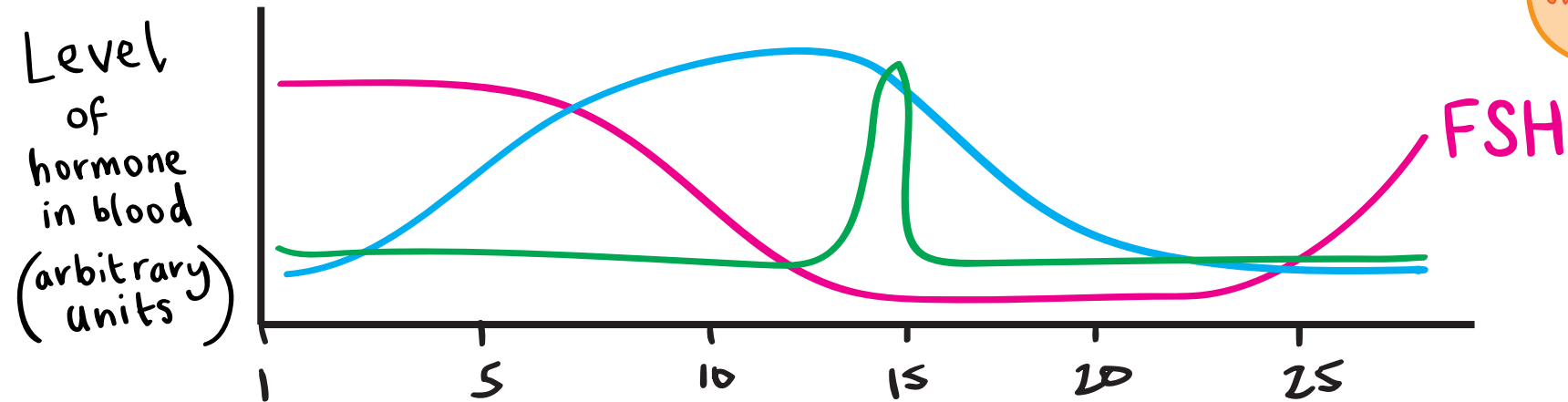


# THE MENSTRUAL CYCLE

BIOLOGY TOPIC 5

<< QUICK QUESTIONS >>

HIGHER TIER



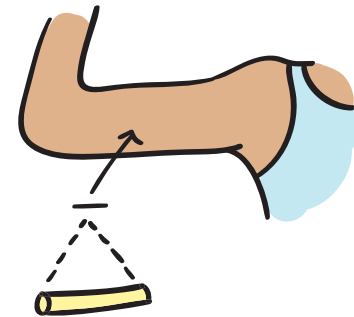
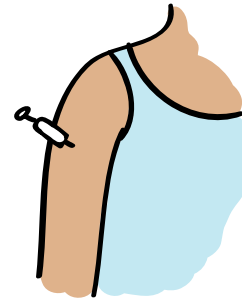
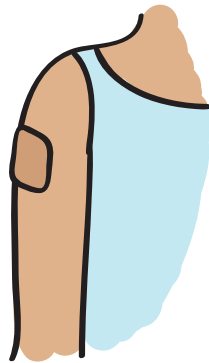
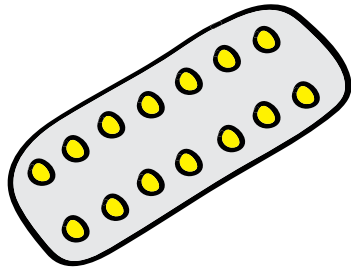
1. Name the hormone represented by the green line and explain your choice.
2. Explain the changes in the levels of FSH. You must refer to the hormone represented by the blue line in your answer.



# CONTRACEPTION



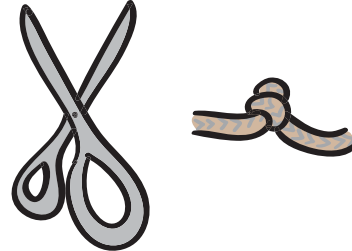
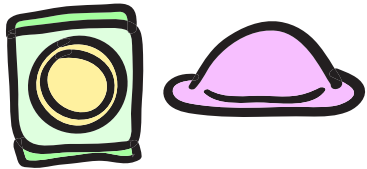
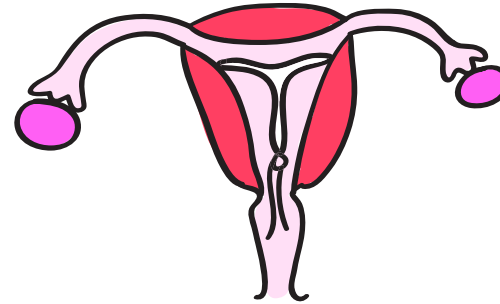
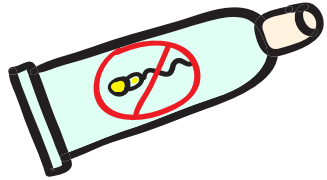
Describe how each of these hormonal methods of contraception works. Include an evaluation of each method.



# CONTRACEPTION



Describe how each of these non-hormonal methods\* of contraception works. Include an evaluation of each method.



\*Some IUDs can use hormones to prevent pregnancy - it depends on the type

# CONTRACEPTION

## << QUICK QUESTIONS >>

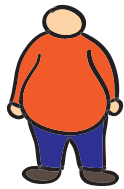
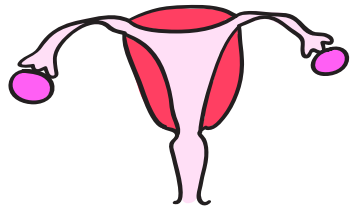
### BIOLOGY TOPIC 5

1. Define "contraception".
2. The contraceptive pill uses hormones to inhibit the maturation of eggs. Which hormone causes the maturation of eggs in the ovary?
3. Name two types of barrier contraception.
4. Compare the IUD to spermicides.



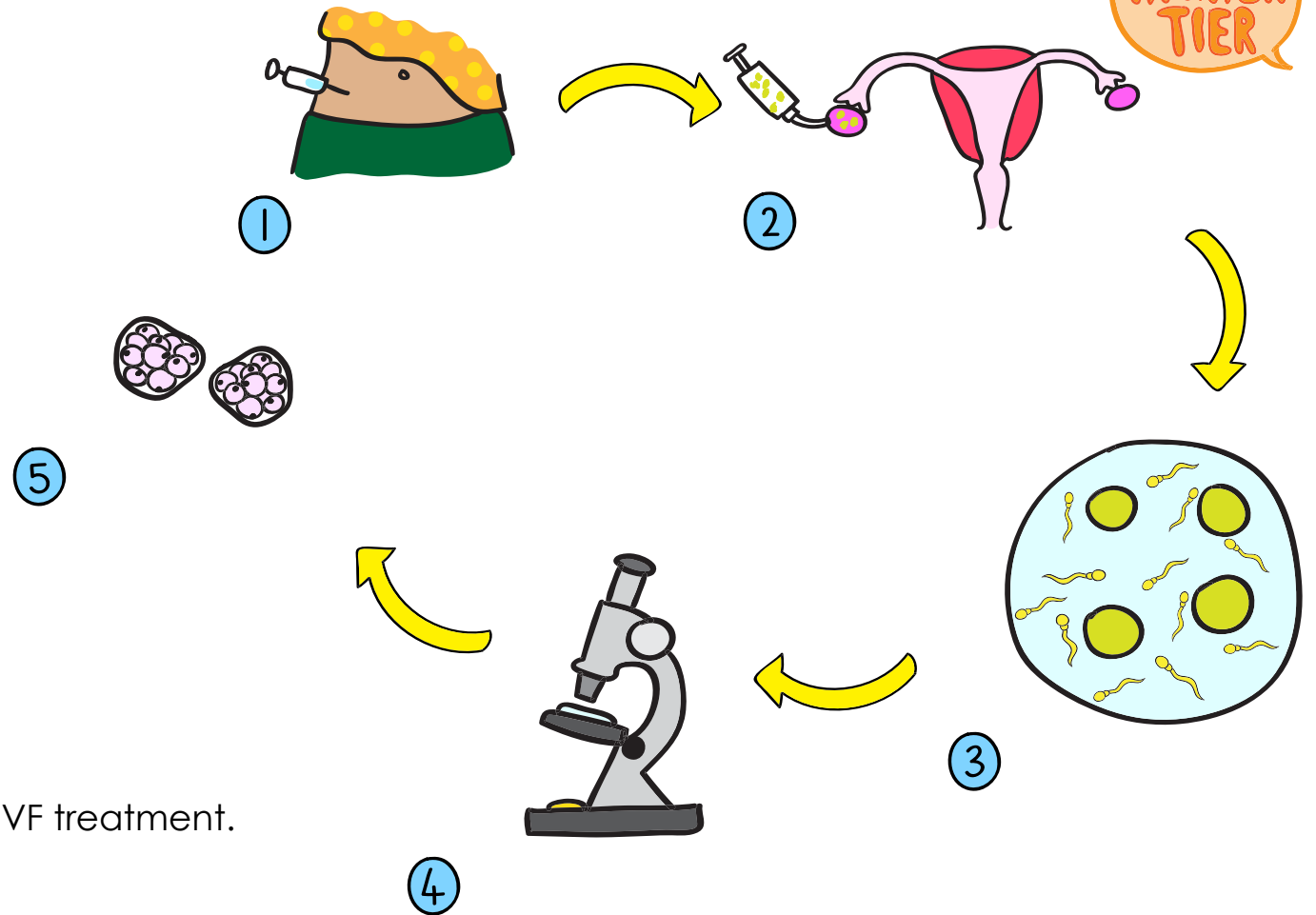
# INFERTILITY TREATMENTS

★ Describe some causes of infertility.



★ Describe some issues with IVF treatment.

★ Describe the stages of IVF treatment.



# INFERTILITY TREATMENTS

## BIOLOGY TOPIC 5

### << QUICK QUESTIONS >>

1. Some women struggling to conceive are given fertility drugs. Which reproductive hormones do these drugs contain?
2. What is the function of FSH?
3. During IVF, a woman is given fertility drugs and mature eggs are then collected from her ovaries. Describe the remaining stages of IVF.
4. Suggest why a woman may choose not to have IVF despite being eligible for it.



# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

1. A person is sitting on the beach when the sun comes out from behind a cloud. Their eyes squint and they decide to put on their hat to provide some shade from the sun.

A) What is the stimulus in this situation? (1)

B) Which type of cells can detect stimuli? (1)

C) State the reflex action that is occurring in the situation described above and suggest its importance. (2)

D) Which type of effector was involved in the person placing the hat on their head? (1)

2. In a reflex arc, a signal is passed through different neurones.

A) How is the signal transmitted through a neurone? (1)



Photo by StockSnap via Pixabay



# EXAM-STYLE QUESTIONS

B) Name the three types of neurones that the signal will pass through in the correct order: (3)

Direction of signal

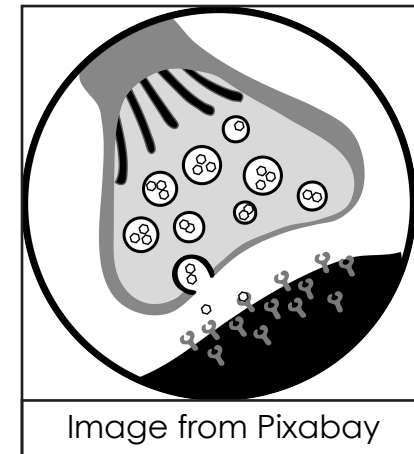


\_\_\_\_\_ neurone

\_\_\_\_\_ neurone

\_\_\_\_\_ neurone

3. The diagram shows what can happen in the gap between two neurones. State the term for the gap between two neurones and describe what occurs there to allow the signal to continue. (4)



4. The central nervous system, or CNS, is made of two components. Name each component. (2)

5. The internal conditions of a cell or organism are controlled to ensure they are at an optimal level.

A) Circle the word below that describes the control of internal conditions. (1)

Transpiration

Regulation

Homeostasis

Contraception

B) Blood glucose concentration is controlled in the human body. State two other conditions that are regulated in humans. (2)

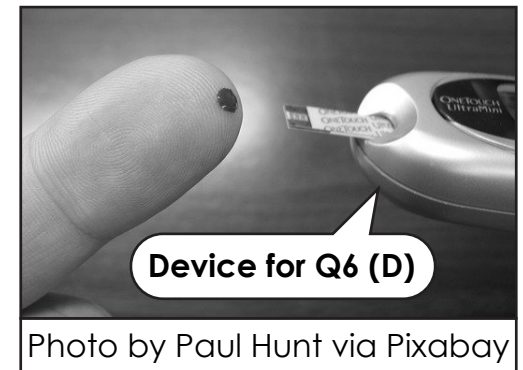
6. Some people have a disorder in which their bodies do not produce sufficient insulin to regulate blood glucose concentration.

A) Name this condition. (1)

B) Name the organ which normally produces insulin. (1)

C) Describe the advised treatment for sufferers of this disorder. (1)

D) Suggest the purpose of the device pictured right. (1)



7. Insulin can cause excess glucose to move into certain body parts where it is converted into glycogen.

Where can this occur? Tick two boxes: (2)

- Brain
- Liver
- Pancreas
- Bone marrow
- Muscles

8. **HIGHER TIER:** During exercise, the body uses glucose in respiration to transfer energy for movement. This results in a decrease in blood glucose concentration.

Describe what happens in the body to return the blood glucose concentration to normal. (4)

# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

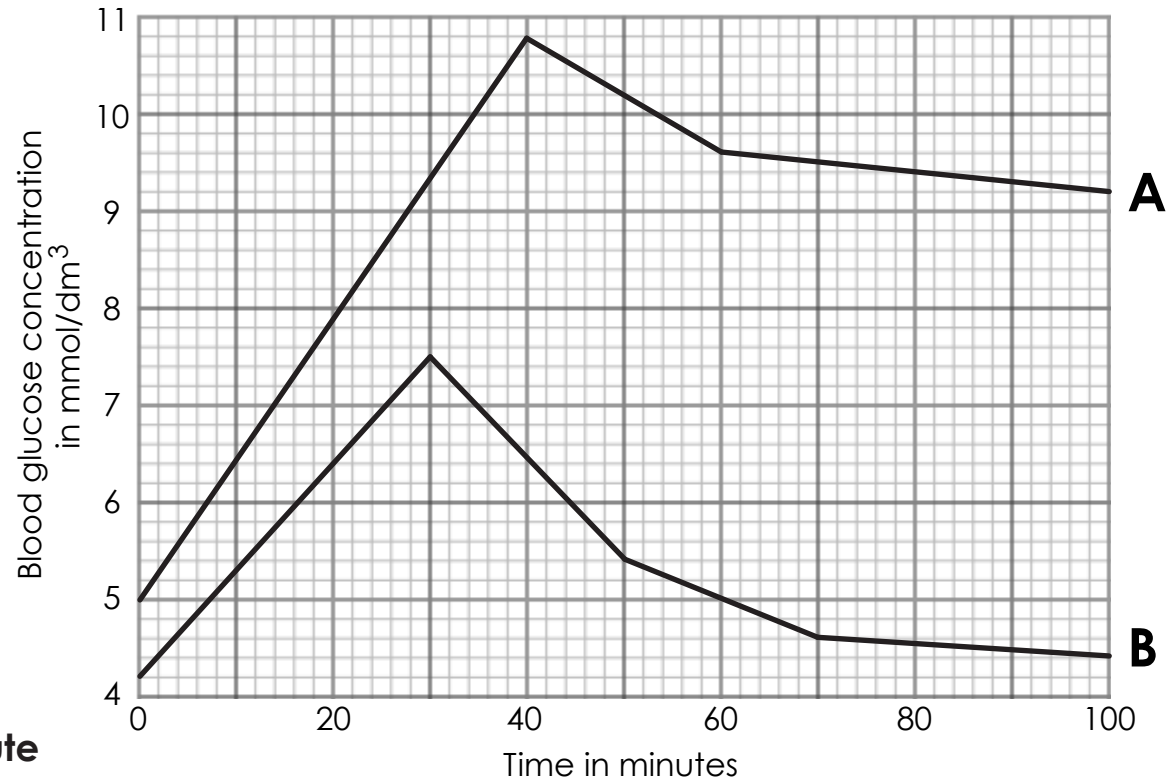
9. Two people ate a carbohydrate-rich meal at Time 0. Their blood glucose concentrations were monitored.

A) Calculate how much person B's blood glucose concentration increased between 0 - 30 minutes. (1)

Answer: \_\_\_\_\_ mmol/dm<sup>3</sup>

B) Calculate the rate of increase in person A's blood glucose concentration between 0 - 40 minutes. (2)

Answer: \_\_\_\_\_ mmoldm<sup>-3</sup>/minute



C) Person A's blood glucose concentration rose at a faster rate than person B's blood glucose. Describe two other ways that person A's results differed from person B's results and suggest why they differ. (3)

10. Type 2 Diabetes is a disorder in which the body cells no longer respond to the insulin produced by the pancreas.

A) What is the main risk-factor for Type 2 Diabetes? (1)

B) How can Type 2 Diabetes be treated? (2)

11. Compare the similarities and differences of the endocrine system and nervous system. (6)

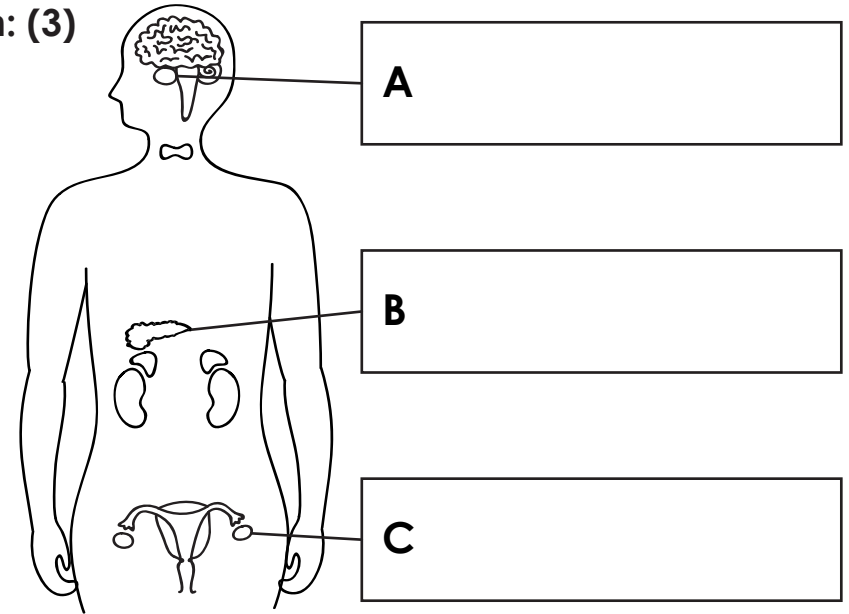
# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

12. Name the gland in which adrenaline is produced. (1)

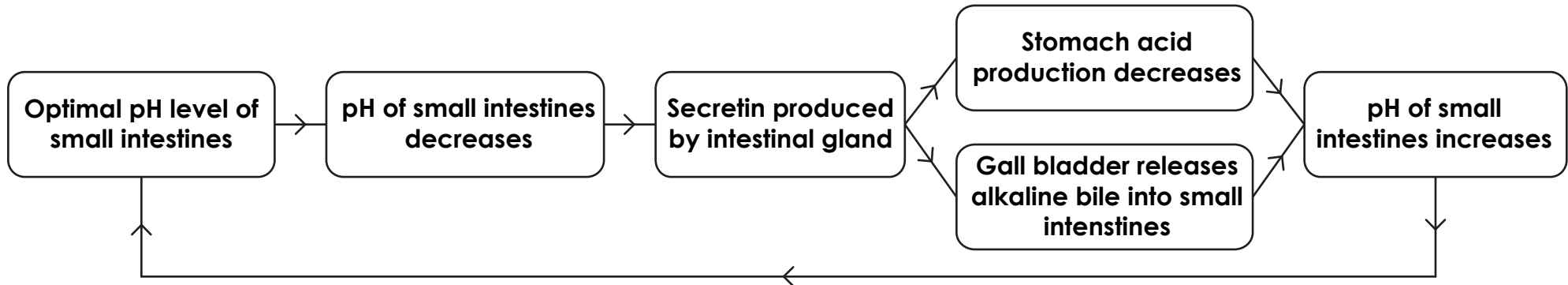
13. Complete the labels for glands A, B and C on this diagram: (3)

14. Some people suffer from an under-active thyroid gland. Suggest what would happen in the body of a person who suffers from this. (3)



15. The testes produce a male reproductive hormone that is responsible for the development of secondary sex characteristics during puberty. Name this hormone and describe its main function. (2)

16. HIGHER TIER: Secretin is a hormone produced in an intestinal gland. The diagram below shows its action in the body.



A) State the target organ(s) of secretin. (1)

B) Suggest the function of secretin. (1)

C) Name the process that regulates the production of secretin. (1)

D) Suggest how secretin production would be affected by an increase in the pH level of the small intestines above the optimal level. (1)

# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

17. Several hormones are involved in the menstrual cycle of a woman. Describe the function of: (2)

LH:

FSH:

18. Name the contraceptive shown in the image and describe how it works. (2)



Photo by Anqa via Pixabay

19. The table below shows the effectiveness of different methods of contraception.

A) Which is the most effective method? (1)

B) Which method(s) prevents transmission of STDs? (1)

C) Which method(s) shown use hormones? (1)

Method of contraception	Pregnancies prevented (%)
Diaphragm	95
Copper IUD	>99
Condoms	98
The implant	99



20. HIGHER TIER ONLY. A couple are struggling to get pregnant normally. They undergo some tests and find out that that the man's sperm are an abnormal shape. Their doctor explains that IVF is an option.

A) Suggest how abnormally shaped sperm may prevent pregnancy. (1)

B) Explain the process of IVF and how it may overcome the couple's issue. (6)

C) In the early years of IVF treatment, as many as six embryos were implanted. Explain why this number now been reduced. (1)

1. A) The sun (1)  
B) Receptor cells (1)  
C) The reflex action is squinting (1) and it protects the eye from damage from the light (1)  
D) Muscle (1)
2. A) As an electrical impulse (1)  
B) Sensory neurone (1) Relay neurone (1) Motor neurone (1)  
*They must be in the correct order from left to right.*
3. The gap between two neurones is called a synapse (1)  
*And then any three from:*  
Chemical messengers are released from one neurone (1)  
*Neurotransmitters, or any examples of these, are accepted in place of chemical messengers.*  
They diffuse across the synapse (1)  
And attach to receptors on the next neurone (1)  
Causing a new electrical impulse to begin (1)
4. Brain (1) and spinal cord (1)
5. A) Homeostasis should be circled (1)

# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

### << ANSWERS >>

5. B) Temperature (1) Water levels (1)

6. A) Type 1 Diabetes (1)

B) The pancreas (1)

C) Insulin injections (1)

*Do not accept insulin on its own.*

D) To monitor blood glucose concentration (1)

7. *If any additional boxes are ticked, deduct one mark for each box (until 0).*

Liver (1)

Muscles (1)

8. *Any four from:*

The pancreas detects the low blood glucose concentration (1)

The pancreas releases glucagon (1)

Glucagon travels in the bloodstream to the liver (1)

In the liver, glycogen is converted into glucose (1)

Blood glucose concentration rises (1)

9. A)  $7.5 - 4.2 = 3.3 \text{ mmol/dm}^3$  (1)

B) Change in concentration:  $10.8 - 5.0 = 5.8$  (1) Rate =  $5.8 \div 40 = 0.145 \text{ mmoldm}^{-3}/\text{minute}$  (1)

*Rate is calculated by dividing  
the change in concentration  
by the time (40 minutes)*



### << ANSWERS >>

9. C) Any two from:

Person A's highest blood glucose concentration was higher than person B's (1)

Person A's blood glucose concentration increased for a longer time or peaks later (1)

Person A's blood glucose concentration took longer to decrease or took longer to return to normal (1)

*Plus 1 mark for the suggestion of why:*

Person A has Diabetes (1)

*Accept Type 1 or Type 2 Diabetes.*

10. A) Obesity (1)

B) A carbohydrate-controlled diet (1)

More exercise or having an exercise regime (1)

*Accept losing weight.*

*Make sure the comparison is clear - if you only mention one system and not the other, then it is not a clear comparison and you will lose the mark!*

11. Any six from:

Differences:

The endocrine system uses hormones to transmit information whereas the nervous system uses electrical impulses (1)

The endocrine system is slower than the nervous system (1)

The endocrine system produces a longer-lasting effect than the nervous system (1)

Similarities:

Both receive information from receptor cells (1)

Both use coordination centres (1)

Both use effectors to carry out a response (1)

Both use chemical messengers (the nervous system uses these at the synapse) (1)



# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

### << ANSWERS >>

12. Adrenal gland(s) (1)

13. A - pituitary gland (1)

B - pancreas (1)

C - ovary (1)

14. Less thyroxine produced (1)

Resulting in a lower basal metabolic rate (BMR) (1)

Which causes: an increase in rate of respiration OR an increase in breakdown of excess proteins

OR causing increase in formation of glycogen / lipids / proteins (1)

15. Testosterone (1)

Stimulate sperm production (1)

16. A) Stomach AND gall bladder (1)

*Both are needed for the mark.*

B) To regulate / control the pH of the small intestines (1)

C) Negative feedback (1)

D) It would decrease OR it would stop being produced (1)

*Secretin is not on the specification -  
but being able to interpret and explain  
simple diagrams of negative feedback is!  
So be prepared for unknown hormones &  
just apply what you have learnt.*



# EXAM-STYLE QUESTIONS

## BIOLOGY TOPIC 5

### << ANSWERS >>

17. LH: causes ovulation or stimulates the release of a mature egg from the ovary (1)  
FSH: causes eggs to mature and stimulates ovaries to produce oestrogen (1)  
*Both functions of FSH are required for the mark.*

18. Oral contraceptive pill (1)  
*Accept "the pill" and "contraceptive pill".*  
Contains hormones to inhibit FSH so that no eggs mature (1)  
*Accept names of hormones: oestrogen and/or progesterone.*

19. A) Copper IUD (1)  
B) Condoms and diaphragm (1)  
C) The implant (1)

*The > sign means "greater than"  
so the copper IUD was greater than  
99% effective at preventing pregnancy.*

20. A) The sperm cannot swim to the egg OR cannot penetrate the egg (1)

B) *Any six from:*

The woman is given fertility drugs containing LH and FSH (1)  
Mature eggs are extracted from the ovaries (1)  
The egg is fertilised by the sperm in the laboratory (1)  
This is done by injecting/inserting the sperm into the egg (1)  
*Accept a description of the sperm not needing to swim to the egg to fertilise it.*  
The fertilised eggs develop into embryos (1)  
And are monitored using microscopy techniques (1)  
One or two embryos are inserted into the woman's uterus (1)

C) Multiple births are risky for both the mother and babies (1)




# BONUS ACTIVITY


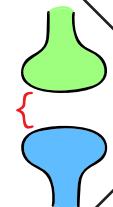










## BIOLOGY TOPIC 5

PRINT ON A4 PAPER

### HOMEOSTASIS QUESTION GAME



1. Cut out the square and then fold it into a "fortune teller" (the name for this origami game). If you haven't folded one of these before, watch this video to help you 
2. In pairs, ask the person to pick a word from the outside. Open and close the fortune teller for every letter of the word, e.g. for LH, open it once and close it once (2 letters).
3. Ask your partner to pick a number.
4. Open and close the fortune teller that many times.
5. Ask them to pick a number and then ask them the question for that number.
6. Once they have answered, open the flap to reveal the answer.

<p><b>Effector</b></p>	<p>6 WHERE IS OESTROGEN MADE? IN THE OVARIES</p> 	<p>7 WHAT IS A SYNAPSE? A SYNAPSE IS THE GAP BETWEEN TWO NEURONES</p> 	<p><b>Insulin</b></p>
<p>5 WHAT IS DIABETES? A DISORDER IN WHICH THE BODY CANNOT REGULATE BLOOD GLUCOSE CONCENTRATION.</p> 	<p>8 WHAT DOES FSH DO? FSH CAUSES EGGS TO MATURE &amp; STIMULATES THE OVARIES TO PRODUCE OESTROGEN</p> 	<p>1 NAME THE MASTER GLAND. THE PITUITARY GLAND (FOUND BELOW THE BRAIN)</p> 	<p>2 WHAT DOES A GLAND DO? GLANDS RELEASE HORMONES - THEY ARE PART OF THE ENDOCRINE SYSTEM</p> 
<p>4 WHERE IS GLYCOGEN STORED? IN THE LIVER AND MUSCLES</p> 	<p>3 HOW DOES THE PILL WORK? IT RELEASES HORMONES TO PREVENT MATURE EGGS FROM BEING RELEASED</p> 	<p>1 NAME THE MASTER GLAND. THE PITUITARY GLAND (FOUND BELOW THE BRAIN)</p> 	<p>2 WHAT DOES A GLAND DO? GLANDS RELEASE HORMONES - THEY ARE PART OF THE ENDOCRINE SYSTEM</p> 
<p><b>LH</b></p>	<p>3 HOW DOES THE PILL WORK? IT RELEASES HORMONES TO PREVENT MATURE EGGS FROM BEING RELEASED</p> 	<p>2 WHAT DOES A GLAND DO? GLANDS RELEASE HORMONES - THEY ARE PART OF THE ENDOCRINE SYSTEM</p> 	<p><b>Neurone</b></p>

☆☆★ **THANK YOU** ★☆☆

**THANKS & BYE!**



FROM  
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