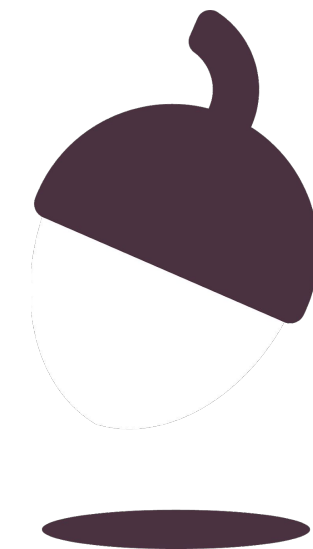


Combined Science - KS4
Homeostasis and Response

Review Lesson

Homeostasis - Foundation

Miss Ray



OAK
NATIONAL
ACADEMY

Quick questions - Blood glucose control

1. Where is insulin secreted?
2. What is the target organ of insulin?
3. What organ secretes insulin?
4. Which type of diabetes is caused by an autoimmune disease?
5. What chemical reaction uses glucose as a reactant?



Answers - Blood glucose control

1. Where is insulin secreted? **Pancreas**
2. What is the target organ of insulin? **Liver**
3. What organ secretes insulin? **Negative feedback**
4. Which type of diabetes is caused by an autoimmune disease? **Type 1**
5. What chemical reaction uses glucose as a reactant? **Respiration**



Exam style question

Discuss similarities and the differences in the response to an increase in blood glucose concentrations between a healthy person and a Type 1 diabetic. [6]



Answers

Discuss similarities and the differences in the response to an increase in blood glucose concentrations between a healthy person and a Type 1 diabetic. [6]

Similarities:

- Receptors detect an increase in blood glucose concentrations
- Target organ is the liver
- Liver converts excess glucose into glycogen
- This reduces the blood glucose concentrations to normal

Differences:

- Healthy person's pancreas releases insulin into the blood.
- Diabetic must inject insulin into the blood.



Quick questions - The menstrual cycle

1. Where is FSH secreted?
2. What role does LH play in the menstrual cycle?
3. What hormones do the ovaries secrete?
4. What hormone matures the eggs?
5. What hormone maintains the uterus lining?



Answers - The menstrual cycle

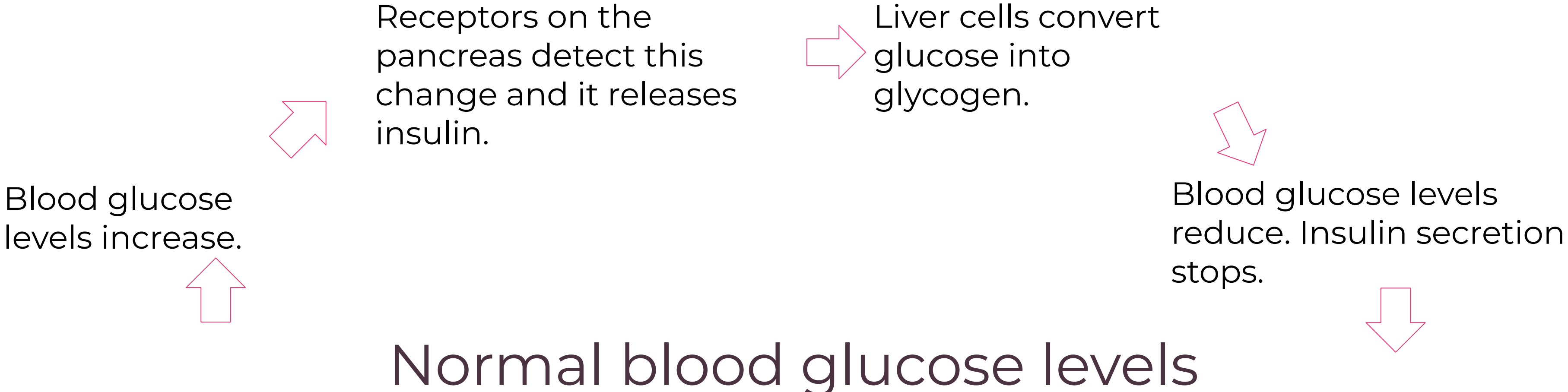
1. Where is FSH secreted? **Pituitary gland**
2. What role does LH play in the menstrual cycle? **Stimulates ovulation**
3. What hormones do the ovaries secrete? **Oestrogen and progesterone**
4. What hormone matures the eggs? **FSH**
5. What hormone maintains the uterus lining? **Progesterone**





Exam style question

Describe how the body reacts to an increase in the concentration of glucose within the blood. [4]



Answer

Describe how the body reacts to an increase in the concentration of glucose within the blood. [4]

When blood glucose levels increase, this is detected by glucose receptors in the pancreas.

The pancreas releases insulin into the blood.

The insulin stimulates the liver cells to convert glucose into glycogen.

When blood glucose levels return to normal the pancreas stops releasing insulin.





Exam style question

Describe how the body uses insulin to control blood sugar levels. [4]

Keywords: insulin, glucose, liver, pancreas, glycogen





Exam style question

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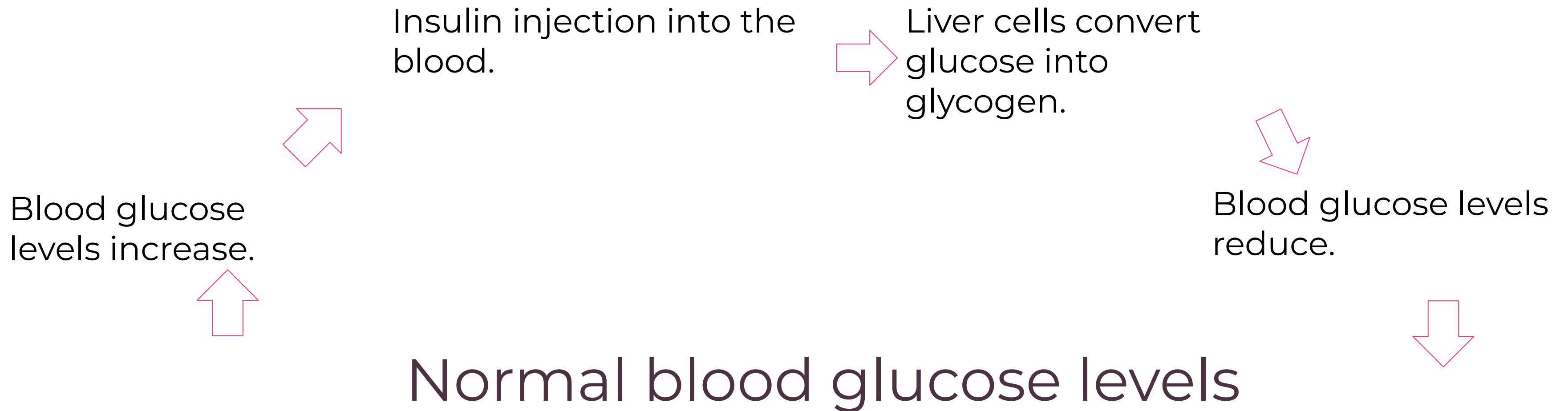
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Exam style question

Explain how a Type 1 diabetic's blood glucose levels are returned to normal after a meal. [4]





Answer

Explain how a Type 1 diabetic's blood glucose levels are returned to normal after a meal. [4]

After eating a meal the blood glucose levels will increase. The diabetic person will inject insulin into the blood. This stimulates the liver to convert the excess blood glucose into glycogen for storage. The blood glucose levels decrease and return to normal.





Exam style question

Describe the body's response to a increase in the concentration of glucose within the blood in a Type 1 diabetic. [3]





Exam style question

Describe the body's response to a increase in the concentration of glucose within the blood in a Type 1 diabetic. [3]

When blood glucose levels increase, the diabetic person injects insulin into the blood.

The insulin stimulates the liver cells to convert glucose into glycogen.

Blood glucose levels return to normal.



Question

List the four hormones involved in the menstrual cycle and describe their roles.

Hint - fish only like happy people!



Hormones of the menstrual cycle

FSH - matures the egg

Oestrogen - thickens uterus lining

LH - causes ovulation (release of egg)

Progesterone - maintains uterus lining



Calculating the mean

	Blood glucose concentrations (mg/100dm ³)			
	Day 1	Day 2	Day 3	Mean
Person A	70	73	72	71.7
Person B	81	79	80	
Person C	65	67	69	
Person D	123	75	78	

$$70 + 73 + 72 = 215$$

$$215 \div 3 = 71.6667 = 71.7$$



Calculating the mean

	Blood glucose concentrations (mg/100dm ³)			
	Day 1	Day 2	Day 3	Mean
Person A	70	73	72	71.7
Person B	81	79	80	80
Person C	65	67	69	67
Person D	123	75	78	76.5

$$70 + 73 + 72 = 215$$

$$215 \div 3 = 71.6667 = 71.7$$





	FSH concentrations in the blood (mg/100dm ³)		
	Person A	Person B	Person C
Day 1	20	31	20
Day 3	22	30	18
Day 5	20	30	19
Mean			

1. Calculate the means.
2. What is the independent variable?
3. What is the dependent variable?





	FSH concentrations in the blood (mg/100dm ³)		
	Person A	Person B	Person C
Day 1	20	31	20
Day 3	22	30	18
Day 5	20	30	19
Mean	21	30.3	19

1. Calculate the means.
2. What is the independent variable?
3. What is the dependent variable?

Day
FSH concentrations in the blood (mg/100dm³)



Percentage change

$$\text{Percentage change} = \frac{\text{Final value} - \text{Starting value}}{\text{Starting value}} \times 100$$

Time after meal (hours)	Concentration in the blood (mg/dm ³)		
	Glucose	Sodium ions	Insulin
1	96	25	44
3	72	11	15
Percentage change (%)	-25		

$$72 - 96 = -24$$

$$-24 \div 96 = -0.25$$

$$-0.25 \times 100 = -25\%$$

25% decrease



Percentage change

$$\text{Percentage change} = \frac{(\text{Final value} - \text{Starting value}) \times 100}{\text{Starting value}}$$

Time after meal (hours)	Concentration in the blood (mg/dm ³)		
	Glucose	Sodium ions	Insulin
1	96	25	44
3	72	11	15
Percentage change (%)	-25	-56	

$$11 - 25 = -14$$

$$-14 \div 25 = -0.56$$

$$-0.56 \times 100 = -56\%$$

56% decrease



Percentage change

$$\text{Percentage change} = \frac{\text{Final value} - \text{Starting value}}{\text{Starting value}} \times 100$$

Time after meal (hours)	Concentration in the blood (mg/dm ³)		
	Glucose	Sodium ions	Insulin
1	96	25	44
3	72	11	15
Percentage change (%)	-25	-56	-66

$$15 - 44 = -29$$

$$-29 \div 44 = -0.66$$

$$-0.66 \times 100 = -66\%$$

66% decrease

