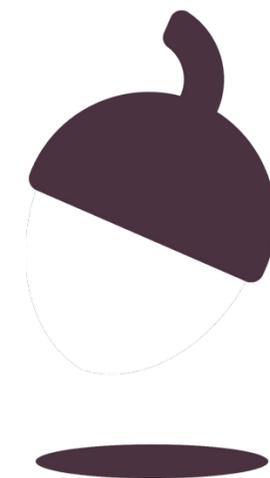


Combined Science - KS4  
Homeostasis and Response

# Review Lesson

## Homeostasis - Higher

Miss Ray



**OAK**  
NATIONAL  
ACADEMY

# Quick questions - Blood glucose control

1. Where is insulin secreted?
2. What is the target organ of glucagon?
3. What feedback mechanism controls blood glucose levels?
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 glucagon? **Liver**
3. What feedback mechanism controls blood glucose levels? **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 feedback mechanism controls the menstrual cycle?
5. What hormone inhibits LH release?



# 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 feedback mechanism controls the menstrual cycle? **Negative feedback**
5. What hormone inhibits LH release? **Progesterone**



# Exam style question

**Explain how interactions between the reproductive hormones control the menstrual cycle. [6]**



# Answer

**Explain how interactions between the reproductive hormones control the menstrual cycle. [6]**

**FSH matures** the **egg** in the ovaries. **FSH** stimulates the release of **oestrogen**.

Increased **oestrogen** concentrations cause the **uterus lining to thicken**. Oestrogen **inhibits** the release of **FSH** and **stimulates LH** release.

On day 14, **LH** levels rapidly increase and **ovulation** occurs.

From day 16, **progesterone** and **oestrogen** levels increase to **maintain the uterus lining** in case the egg is fertilised. **Progesterone inhibits** the release of **LH**.

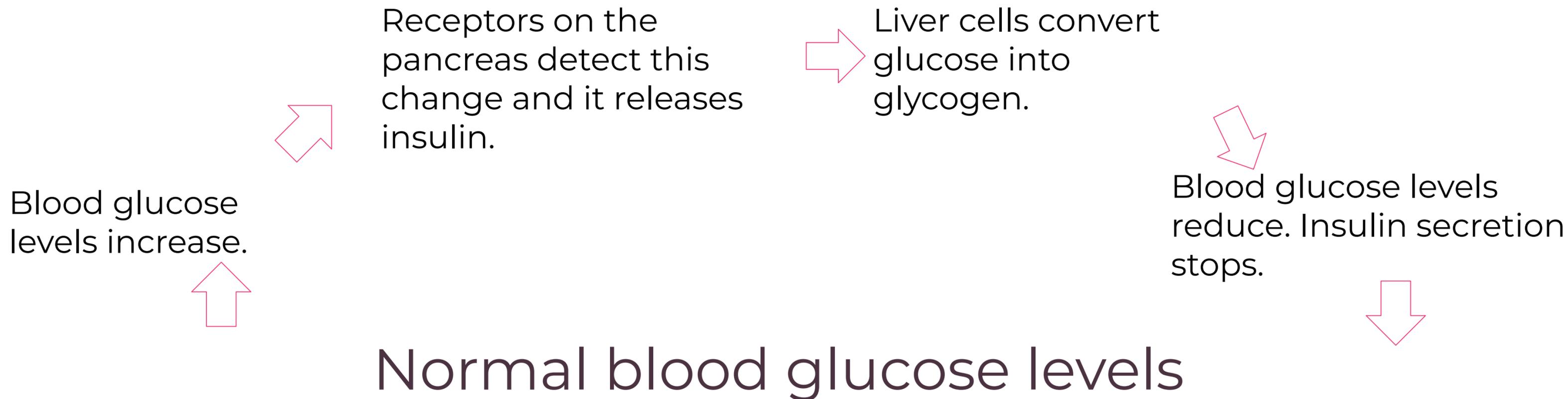
From day 21 **progesterone** and **oestrogen** levels drop and the uterus lining begins to **break down**.





## Exam style question

**Describe the negative feedback loop in place to react to a increase in the concentration of glucose within the blood. [4]**





## Answer

**Describe the negative feedback loop in place to react to a 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 the negative feedback loop in place to react to a decrease in the concentration of glucose within the blood. [4]**





## **Exam style question**

**Describe the negative feedback loop in place to react to a decrease in the concentration of glucose within the blood. [4]**

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

**The pancreas releases glucagon into the blood.**

**The glucagon stimulates the liver cells to convert glycogen into glucose.**

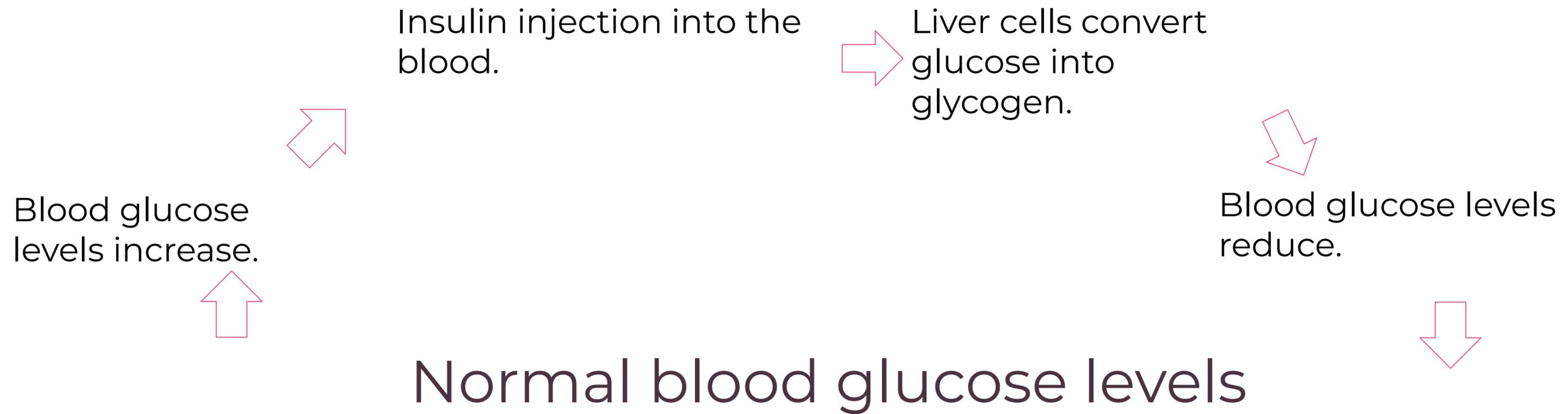
**When blood glucose levels return to normal the pancreas stops releasing glucagon.**





# 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 negative feedback loop in place to react to a increase in the concentration of glucose within the blood in a Type 1 diabetic. [3]**





## **Exam style question**

**Describe the negative feedback loop in place to react 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.**



**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



**Explain how oestrogen levels control the concentration of FSH in the blood.**



**Explain how oestrogen levels control the concentration of FSH in the blood.**

Oestrogen inhibits the release of FSH from the pituitary gland, decreasing the concentration of FSH in the blood.





## **Describe the sequence of hormonal interactions in the menstrual cycle. [6]**

- Name each hormone
- State the roles that they play
- Link the hormones together with the key words 'stimulate' and 'inhibit'





## Describe the sequence of hormonal interactions in the menstrual cycle. [6]

**FSH matures** the **egg** in the ovaries. **FSH** stimulates the release of **oestrogen**.

Increased **oestrogen** concentrations cause the **uterus lining to thicken**. Oestrogen **inhibits** the release of **FSH** and **stimulates LH** release.

On day 14, **LH** levels rapidly increase and **ovulation** occurs.

From day 16, **progesterone** and **oestrogen** levels increase to **maintain the uterus lining** in case the egg is fertilised. **Progesterone inhibits** the release of **LH**.

From day 21 **progesterone** and **oestrogen** levels drop and the uterus lining begins to **break down**.





# Exam style question

The contraceptive pill contains high levels of oestrogen and progesterone. Explain how taking the combined pill can prevent pregnancy. [4]

**Keywords: FSH, LH, ovulation, mature.**

Oestrogen inhibits the release of \_\_\_\_\_. If there is no \_\_\_\_\_ released, then the eggs will not \_\_\_\_\_ within the ovaries. Progesterone inhibits the release of \_\_\_\_\_. If \_\_\_\_\_ is not released then \_\_\_\_\_ will not occur. This means that the person cannot get pregnant.





## Exam style question

The contraceptive pill contains high levels of oestrogen and progesterone. Explain how taking the combined pill can prevent pregnancy. [4]

**Keywords: FSH, LH, ovulation, mature.**

Oestrogen inhibits the release of FSH. If there is no FSH released, then the eggs will not mature within the ovaries. Progesterone inhibits the release of LH. If LH is not released then ovulation will not occur. This means that the person cannot get pregnant.





## Exam style question

**Explain how a progesterone releasing contraceptive method can prevent pregnancy. [4]**

- What is LH's role in the menstrual cycle?
- What effect does increased progesterone levels have on LH?
- What does this prevent happening?





## Answer

**Explain how a progesterone releasing contraceptive method can prevent pregnancy. [4]**

- What is LH's role in the menstrual cycle?
- What effect does increased progesterone levels have on LH?
- What does this prevent happening?

**LH stimulates ovulation. Increased progesterone levels inhibits LH release from the pituitary gland. Without LH in the blood, ovulation will not occur and therefore the egg cannot be fertilised.**

