

ACTIVITY NO. -7- Hormones in Animals

Subject	Science
Class	X
Chapter/Unit	Control and Co-ordination
Topic	Chemical Coordination
Time	1 hour 15 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

Students will relate hormones with their target organs and functions

Skills: Applying, Analyzing

What I have to do? To develop the concept of endocrine system through collaborative approach.

What do I require? 8 Handouts each for 5 topics, Stop watch, 8 Talking Sticks, Plastic/Glass Bowl, 5 small pieces of paper / slips of paper.

What do I need to know? Hormones are our body's chemical messengers. They travel in our bloodstream to tissues or organs. They work slowly, over time, and affect many different processes, including growth, development and metabolism.

Teacher's Activity

Teacher will

- explain the concept of chemical coordination and hormones
- brief the activity.
- divide the students into 8 groups with five students in each group (Home group)
- write five topics in five slips and keep them in a bowl.
- rotate this bowl in all the groups and ask the students to pick a paper slip, and thus assign one topic to each member of each group.
- manage time during the activity
- reshuffle the groups into expert groups after one round of discussion

How will I proceed?

➤ Student's Activity

1. Students will arrange themselves into 8 groups (Home groups) of 5 students each-
Group A- A1, A2, A3, A4, A5
Group B- B1, B2, B3, B4, B5

Group C- C1, C2, C3, C4, C5

Group D- D1, D2, D3, D4, D5

Group E- E1, E2, E3, E4, E5

Group F F1, F2, F3, F4, F5

Group G- G1, G2, G3, G4, G5

Group H- H1, H2, H3, H4, H5

2. Students in each group will read about the following hormones (Silent reading)-
{Time allocated- 5 minutes}

1. Adrenaline- (for students A1, B1, C1, D1, E1, F1, G1, H1)

2. Thyroxine- - (for students A2, B2, C2, D2, E2, F2, G2, H2)

3. Growth Hormone- - (for students A3, B3, C3, D3, E3, F3, G3, H3)

4. Insulin- - (for students A4, B4, C4, D4, E4, F4, G4, H4)

5. Sex hormones--- (for students A5, B5, C5, D5, E5, F5, G5, H5)

3. These students will shuffle to form five expert groups-

Group 1- A1, B1, C1, D1, E1, F1, G1, H1

Group 2- A2, B2, C2, D2, E2, F2, G2, H2

Group 3- A3, B3, C3, D3, E3, F3, G3, H3

Group 4- A4, B4, C4, D4, E4, F4, G4, H4

Group 5- A5, B5, C5, D5, E5, F5, G5, H5

They will discuss their common topics in expert groups

{Time allocated- 10 minutes}

4. Students will reshuffle to their original home groups.-A, B,C,D,E,F, G and H.
5. Each student will explain his/her topic within the home group with a talking stick in hand. Time allocated for speech will be 2 minutes.
6. One representative from each group can then present the entire topic “ Hormones in animal” in the class. (Time allocated -5 minutes for each student representative of home group)

What have I observed?

Each student will fill in the required information in the table

S. No.	Hormone	Endocrine Gland	Function
1		Adrenal gland	
2.	Thyroxine		

3.		Pituitary gland	
4.			Regulates blood sugar level
5.	Sex hormones a) Testosterone b) Estrogen		

What have I learnt?

1. ----- is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our----- . The blood to the ----- and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our----- . The breathing rate also ----- because of the contractions of the ----- and the rib muscles.
2. ----- is necessary for the thyroid gland to make thyroxine hormone. Thyroxine regulates -----, ----- and ----- metabolism in the body so as to provide the best balance for growth
3. Deficiency of growth hormone in childhood leads to----- and its hypersecretion leads to----- in children.
4. Changes associated with puberty are because of the secretion of----- in males and ----- in females.
5. Insulin is produced by -----.

What am I curious to learn?

Let us explore the role of other hormones like norepinephrine, antidiuretic hormone and glucagon, secreted by Adrenal gland, pituitary gland and pancreas respectively.

Let me evaluate myself-

1. What are hormones?
2. How does our body respond when adrenaline is secreted into the blood?
3. People living in hilly regions usually suffer from goiter. Why?
4. Why are some patients of diabetes treated by giving injections of insulin?

5. Draw a diagram to show the position of endocrine glands and name the hormones secreted by them.

HAND OUT

1. Adrenaline

When a stressful situation occurs and your heart begins to race, your hands begin to sweat, and you start looking for an escape, this hormone also called epinephrine is secreted, which is a crucial part of the body's fight-or-flight response. Adrenaline is produced in the medulla in the adrenal glands as well as some of the central nervous system's neurons. Within a couple of minutes during a stressful situation, adrenaline is quickly released into the blood, sending impulses to organs to create a specific response.

What is the function of adrenaline?

Adrenaline triggers the body's fight-or-flight response. This reaction causes air passages to dilate to provide the muscles with the oxygen they need to either fight danger or flee. Adrenaline also triggers the blood vessels to contract to re-direct blood toward major muscle groups, including the heart and lungs. The body's ability to feel pain also decreases as a result of adrenaline, which is why you can continue running from or fighting danger even when injured. Adrenaline causes a noticeable increase in strength and performance, as well as heightened awareness, in stressful times. After the stress has subsided, adrenaline's effect can last for up to an hour.

All these responses together enable the animal body to be ready to deal with the situation.

2. Thyroxine

Thyroxine is the main hormone secreted into the bloodstream by the thyroid gland. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and maintenance of bones. Iodine is necessary for the thyroid gland to make thyroxin hormone. Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth. Iodine is essential for the synthesis of thyroxin. In case iodine is deficient in our diet, there is a possibility that we might suffer from goitre. One of the symptoms in this disease is a swollen neck

3. Growth Hormone

Growth hormone is released into the bloodstream from the anterior pituitary gland. The pituitary gland also produces other hormones that have different functions from growth hormone.

Growth hormone regulates growth and development of the body.

Very rarely, increased growth hormone levels can occur in children before they reach their final height, which can lead to excessive growth of long bones, resulting in the child being abnormally tall. This is commonly known as gigantism (a very large increase in height). If there is a deficiency of this hormone in childhood, it leads to dwarfism.

4. Sex Hormones- Testosterone and Estrogen

You must have noticed many dramatic changes in your appearance as well as that of your friends as you approached 10–12 years of age. These changes associated with puberty are because of the secretion of testosterone in males and oestrogen in females.

The sex hormones play a key role in reproduction and sexual development. These are mainly produced by the gonads . The sex hormones are generally involved in:

- Reproduction and sexual development
- Puberty
- Promoting hair growth
- Regulating cholesterol levels

The levels of sex hormones keep fluctuating the entire life. These fluctuations can lead to health issues such as hair loss, bone loss, infertility, etc.

5. Insulin

Insulin is a hormone made by the pancreas that allows your body to use sugar (glucose) from carbohydrates in the food that you eat for energy or to store glucose for future use. Insulin helps keeps your blood sugar level from getting too high (hyperglycemia) or too low (hypoglycemia). The cells in your body need sugar for energy. However, sugar cannot go into most of your cells directly. After you eat food and your blood sugar level rises, cells in your pancreas (known as beta cells) are signaled to release insulin into your bloodstream. Insulin then attaches to and signals cells to absorb sugar from the bloodstream. Insulin is often described as a “key,” which unlocks the cell to allow sugar to enter the cell and be used for energy.

If you have more sugar in your body than it needs, insulin helps store the sugar in your liver and releases it when your blood sugar level is low or if you need more sugar, such as in between meals or during physical activity. Therefore, insulin helps balance out blood sugar levels and keeps them in a normal range. As blood sugar levels rise, the pancreas secretes more insulin.

People with type 1 diabetes cannot make insulin because the beta cells in their pancreas are damaged or destroyed. Therefore, these people will need insulin injections to allow their body to process glucose and avoid complications from hyperglycaemia