

4-H Animal Science Lesson Plan

Reproduction

Level 3

Hormones Control Everything! (Level 3)

Goal (Learning Objective):

Youth will learn what the primary hormones are that are responsible for reproductively in the female and male, where each hormone comes from, and what each hormone does. There will also be an explanation of the brain for its role in reproduction.

Supplies Needed:

A poster board, chalk board, flip chart paper or white erase board to write on as the instructor, plus several different colors of writing utensils. Also as the instructor have note cards and different colored writing utensils. Provide a piece of paper and different colored markers to the youth for them to use.

Copies of the "Hormones" table for the youth to complete (Table 1).

Pre-Lesson Preparation:

On each note card with a different color write down the hormone, its source, and primary action first for females then males.

Lesson Directions/Outline:

- Background information

Hormones control everything when it comes to reproduction, so it should be deemed necessary to understand them and their importance in the continuation of life.

Role of the Brain: Senses external and internal environment of the female and regulates behavior as it is the control center for reproduction. Within the brain is the hypothalamus and pituitary glands. The Hypothalamus responds to external stimulus and reacts by activating the release of hormones within the body. It itself secretes hormones that regulate other hormones as well as other hormones that are influential in growth and metabolism. The pituitary glands secrete reproductively important hormones as well.

Female Hormones:

E2 (Estradiol, predominant Estrogen hormone)-Ovary-causes development of sex organs and secondary sex characteristics in the female. Also causes female to exhibit heat (estrus)

FSH & LH (follicle stimulating hormone & luteinizing hormone)-Pituitary (attach to the brain)-stimulates development of the follicle (fluid filled gland on ovary)

GnRH (gonadotrophin releasing hormone)-Hypothalamus (in the brain)-triggers release of FSH & LH

P4 (Progesterone)-Corpus Luteum (follicle that as has matured after egg was ovulated) & placenta-maintains pregnancy

PGF2-alpha (Prostaglandin F-2 Alpha)-Uterus-causes regression of the CL, uterine contractions during birth and allows female to come into heat again.

Male Hormones:

FSH (follicle stimulating hormone)-Pituitary-stimulates production and maturation of sperm.

GnRH (gonadotrophin releasing hormone)-Hypothalamus-triggers the release of FSH & LH

LH (luteinizing hormone)-Pituitary-causes secretion of male sex hormone, Testosterone

Testosterone-Testis-causes development of sex organs and secondary sex characteristics

Conducting the activity

As the instructor explains each hormone, where it is produced in the body and the function of the hormone have the youth complete the blank table. Have the youth use a different colored marker for each hormone (if possible). The result will be a color-coded table of hormones that they built themselves. Have youth volunteers' recap each of the primary hormones are for both males and females.

What did we learn?

What would be the result if an animal's body was not producing some of these hormones?

What may be some of the factors causing low hormonal levels?

Why is this important?

Hormones lead to cascading events in the body, and influence to a great extent reproduction. What would be the result of a break in the hormonal chain for a person's body or in livestock reproduction?

References/Resources:

Ohio State University Extension. (2000). Sheep Resource Handbook for Market and Breeding Projects. (page 123).

Ohio State University Extension. (2008). Reproduction. Goat Resource Handbook (page 35-36).

Pathways to Pregnancy and Parturition, Second revised edition. P.L. Senger, 2003 Chapter 5

*****Bonus Activity*****

Encourage the youth to on their own research the Biochemical Classification of each of these hormones. Each hormone will either be a peptide, glycoprotein, steroid, or prostaglandin. Have them add that to their hormone table and offer a prize to those who complete it by the next meeting

E2 = steroid

LH = glycoprotein

FSH = glycoprotein

GnRH = peptide

P4 = steroid

PGF2-alpha = prostaglandin

Testosterone = steroid

Table 1.

Female Hormones

Hormone	Site of production	Function

Male Hormones

Hormone	Site of production	Function