

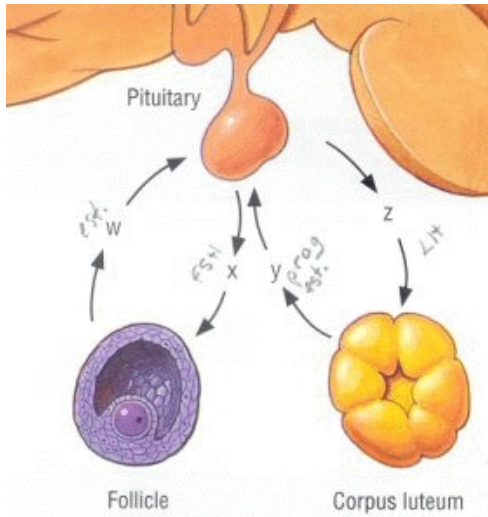
## Hormone Levels During the Menstrual Cycle

### Objective

To investigate how hormone levels regulate the female menstrual cycle.

### Procedure

1. Ovarian hormones are regulated by gonadotropic hormones. Study the feedback loop shown in Figure 1 below.



- a) Identify as w, x, y, or z, the two gonadotropic hormones represented in the diagram.
- b) Identify the ovarian hormones shown in the diagram.
- c) Which two hormones exert negative feedback effects?

2. Body temperatures of two women were monitored during their menstrual cycles. One woman ovulated while the other did not. The data are recorded in Table 1

d) Graph the data provided. Plot changes in temperature along the y-axis and the days of the menstrual cycle along the x-axis.

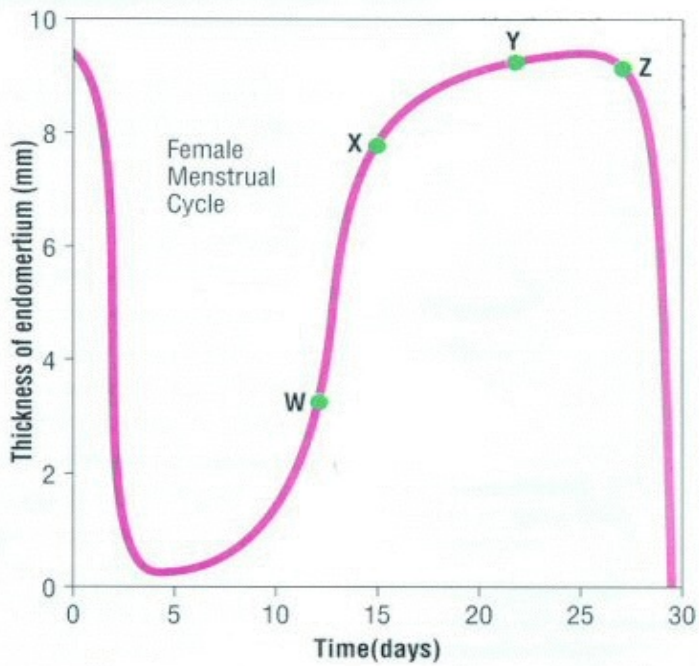
- e) Assuming this menstrual cycle represents the average 28-day cycle, label the ovulation day on the graph.
- f) Describe changes in temperature prior to and during ovulation.

**Fig. 1**

**Table 1**

Days	5	10	12	14	16	18	20	22	24	28
Ovulation	36.4	36.2	36.0	38.4	37.1	36.6	36.8	37.0	37.1	36.6
No Ovulation	36.3	35.7	35.8	36.2	36.1	36.0	36.3	36.3	36.4	36.5

- g) Compare body temperatures with and without a functioning corpus luteum.



**Fig. 2**

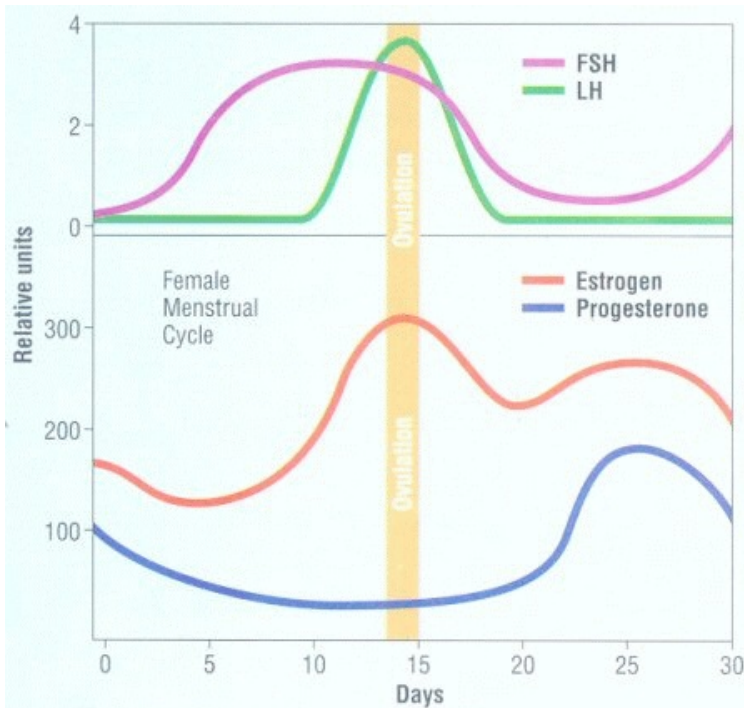
3. Figure 2 shows changes in the thickness of the endometrium throughout the female menstrual cycle.  
 h) Identify the events that occur at times X and Z.

i) Identify by letter the time when follicle cells produce estrogen.

j) Identify by letter the time when the corpus luteum produces estrogen and progesterone.

4. Levels of gonadotropic hormones are monitored throughout the female reproductive cycle. Levels are recorded in relative units in Figure 3

k) How does LH affect estrogen and progesterone?



**Application Questions**

1. Explain why birth control pills often contain high concentrations of progesterone and estrogen.
2. Why would a woman not take birth control pills for the entire 28 days of the menstrual cycle? On which days of the menstrual cycle would the pill not be taken?

**Fig. 3**