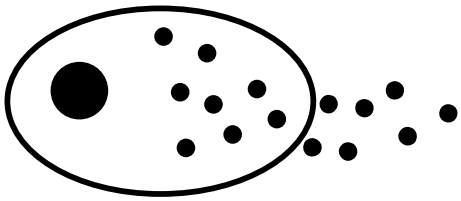
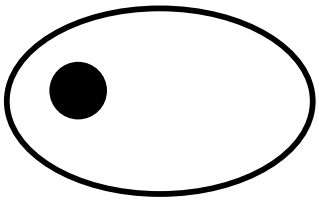
Hormonal Control of the Human Menstrual Cycle

The events of the menstrual cycle are coordinated by a complex interaction of hormones whose concentration in the blood change during the menstrual cycle. The changes are governed by coordinated hormones carried in the bloodstream from their releasing gland to their responding target cells. These hormones act through feedback mechanisms.

1. Use the data in Table 1 to plot the FSH concentration over time.
    a. Identify the day on which FSH reaches its peak concentration?
    b. Describe the effect of FSH on the follicle in the ovary during Days 1-12.
    c. The diagram below represents a cell secreting FSH. Draw the receptors you would expect to see on the target cell in the ovary.
    d. Explain how it is possible for a hormone to affect a specific type of target cell while not affecting other cells.

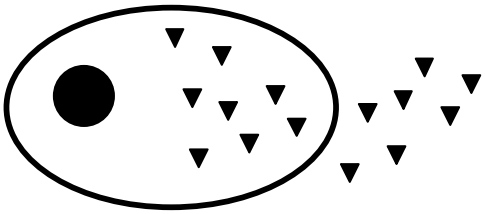


SECRETING CELL

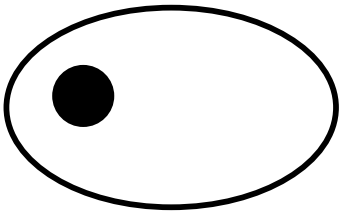


TARGET CELL

2. Add a second y axis to your graph of FSH concentration over time to plot the LH concentration over time from Table 1.
    a. Identify the day on which LH reaches its peak concentration?
    b. Describe the effect on the follicle of the spike in LH concentration?
    c. The diagram below represents a cell secreting LH. Draw the receptors you would expect to see on the target cell in the ovary.

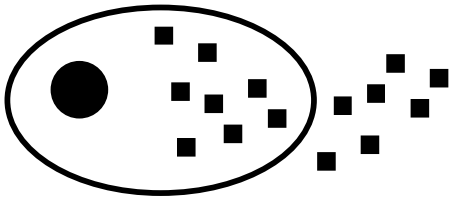


SECRETING CELL

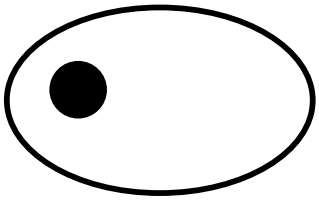


TARGET CELL

3. Use the data in Table 1 to construct another graph showing the estrogen concentration in the blood over time.
    a. Identify the day on which estrogen reaches its peak concentration?
    b. Describe the changes in the uterus in response to the increasing estrogen concentration.
    c. The diagram below represents a cell secreting estrogen. Draw the receptors you would expect to see on the target cell.



SECRETING CELL



TARGET CELL

4. Add a second y axis to your graph of estrogen concentration over time to plot the progesterone concentration over time from Table 1.
    a. Describe the events that lead to the increase in progesterone.
    b. Identify the day on which progesterone reaches its peak concentration?
    c. Describe the changes in the uterus during the time progesterone is at a high concentration.
    d. Describe the events that lead to the decrease of progesterone in a woman who does not become pregnant during a given cycle.
    e. Describe the changes in the uterus as the progesterone concentration decreases.

TABLE 1 Concentration of hormones of the human menstrual cycle

Units per Milliliter				
Day	**FSH**	**Estrogen**	**LH**	**Progesterone**
1	9	30	9	0.6
2	11	40	12	0.8
3	13	50	16	1.0
4	14	70	18	1.0
5	15	80	19	1.0
6	14	100	16	1.0
7	14	130	12	1.2
8	15	140	19	1.2
9	13	180	15	1.3
10	11	200	16	1.5
11	9	220	20	1.5
12	18	230	30	1.6
13	13	220	75	1.8
14	9	200	58	2.0
15	9	180	30	2.3
16	8	150	14	3.7
17	8	120	10	5.8
18	8	100	9	8.3
19	8	50	7	10.4
20	7	30	5	12.0
21	7	25	3	12.0
22	6	25	3	11.8
23	5	25	2	10.3
24	5	25	3	7.2
25	6	20	3	4.0
26	7	20	4	3.0
27	7	25	5	1.5
28	8	25	7	0.8