

Parturition & Lactation

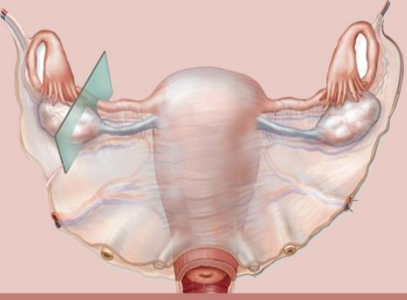
By

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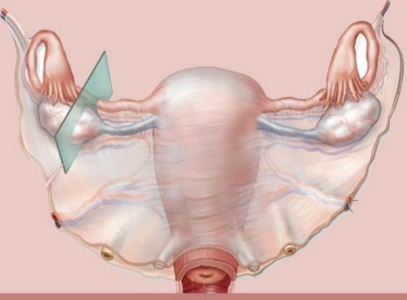
2024-2025



**Labour = parturition
= childbirth**

■ **Definition :**

- It is the process by which the fetus is delivered from the uterus after the full term of pregnancy
- 280 days after the first day of the last menstrual period (roughly 40 weeks)

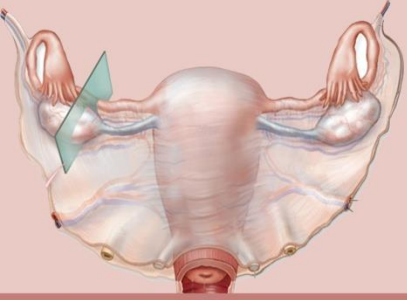


■ Causes :

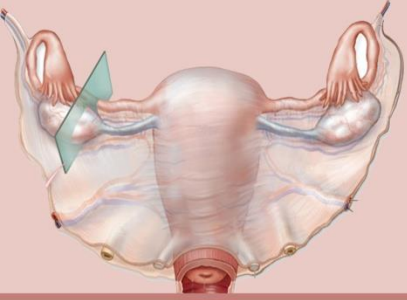
By the end of pregnancy , the uterus becomes progressively more excitable until it begins strong contraction that cause birth of the baby .

1. Hormonal factors

- Estrogen / progesterone ratio increases by the end of pregnancy
- Estrogen enhances uterine contractility while progesterone reduces it
- ↑ Estrogen / progesterone ratio will increase uterine excitability as Estrogen increase the number of oxytocin receptors in the myometrium so, increasing the uterine sensitivity to oxytocin action.



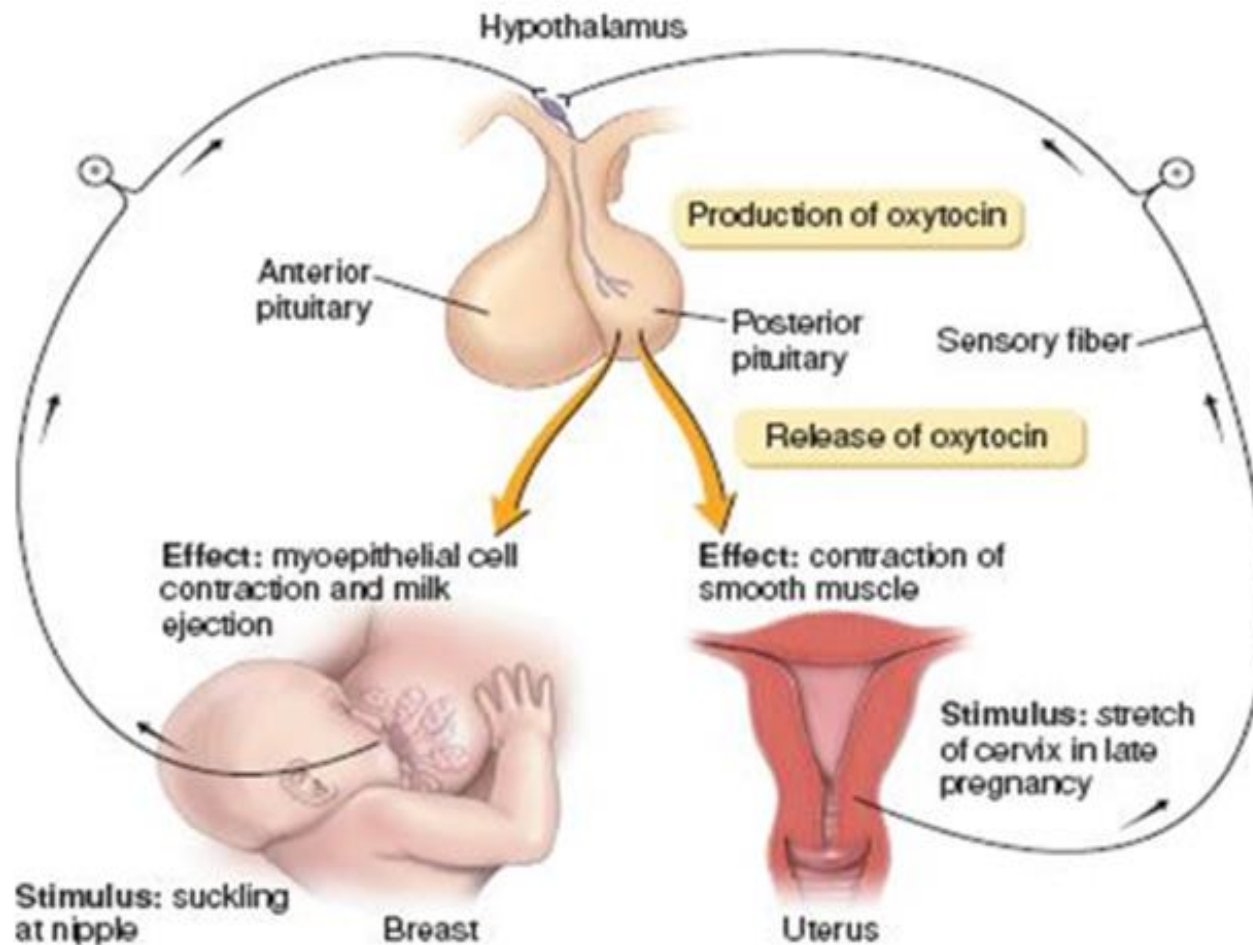
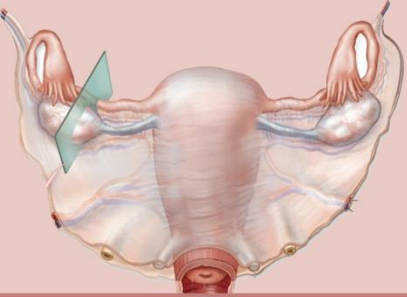
- **Prostaglandins:** Released from endometrium and increase uterine contractility .
- **Relaxin:** This hormone inhibits uterine contractions & Its secretion decreases in the last days of pregnancy (helping initiation of labor).
- **Oxytocin:** During early labor, the plasma oxytocin level is normal but it causes uterine contractions due to a marked increase in the oxytocin receptors.
- **Oxytocin causes uterine contractions by:**
 - (a) A direct effect on the uterine smooth muscle cells
 - (b) Stimulation of formation of **prostaglandins**

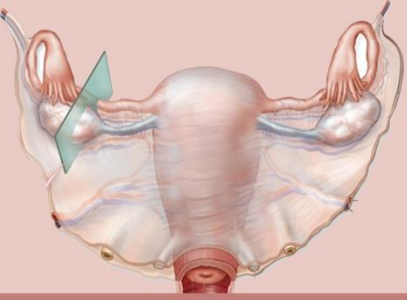


2. Mechanical factors:

- ☐ Stretch of smooth muscles in the wall of uterus increases uterine contractility.
- ☐ Stretch of cervix by **head** of fetus cause stimulation of stretch receptors in the cervix & send afferent nerve impulses travel into spinal cord and cause **two positive feedback mechanisms**

1. Uterine contraction via neural reflex cause descend of head of fetus. **2. Release of oxytocin** from maternal posterior pituitary cause strong uterine contraction lead to more descend of head & more stretch of cervix.

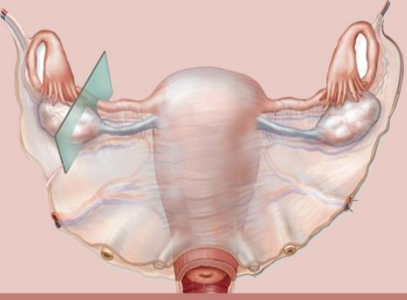




C. Contraction of abdominal muscles:

- Pain signals from uterus & birth canal \Rightarrow neurogenic reflex to spinal cord
 \Rightarrow abdominal muscle contraction \Rightarrow \Uparrow intra abdominal pressure.

Also, voluntary contraction of abdominal muscle by straining.



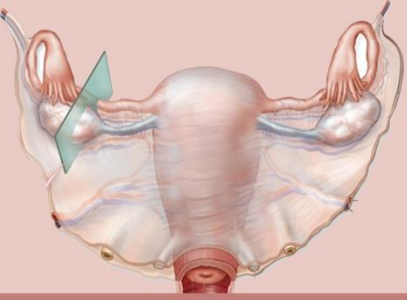
D. Role of fetus:

- Strong uterine contraction \Rightarrow **Pressure** on the fetus.
- **Pressure** on the fetus head is a stress \Rightarrow stimulate the fetus hypothalamus

\Rightarrow \uparrow CRF \Rightarrow \uparrow ACTH from the fetus anterior **Pituitary** gland

\Rightarrow  **cortisol level** from fetus adrenal cortex causes:

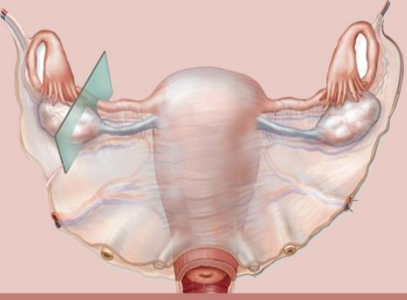
1. \downarrow **Placental Progesterone** concentration \Rightarrow \uparrow uterine contractility.
2. \uparrow **Prostaglandins** secretion \Rightarrow **Powerful** uterine contraction.



local prostaglandin production

plays several roles in labor and delivery.

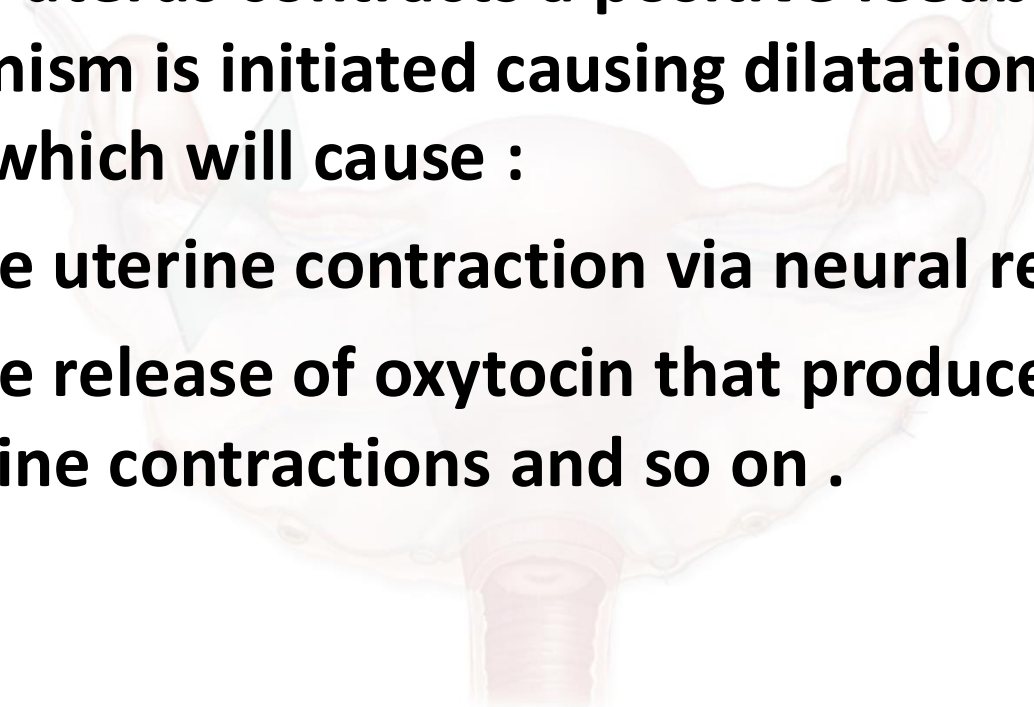
- (1) **Prostaglandins** increase the intracellular calcium concentration of uterine smooth muscle, thereby increasing its contractility.
- (2) **Prostaglandins** also promote gap junction formation between uterine smooth muscle cells to permit synchronous contraction of the uterus.
- (3) **Prostaglandins** cause softening, thinning (effacement), and dilation of the cervix early in labour.

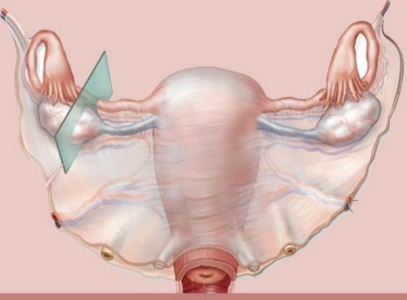


■ Suggested mechanism of labour :

Once uterus contracts a positive feedback mechanism is initiated causing dilatation of the cervix which will cause :

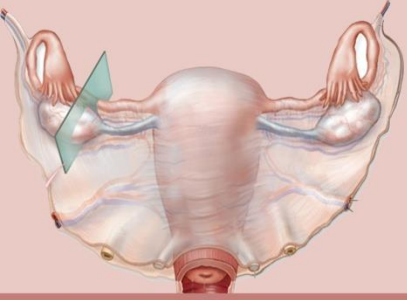
- More uterine contraction via neural reflex .
- More release of oxytocin that produces more uterine contractions and so on .





There are three stages of **normal labor**.

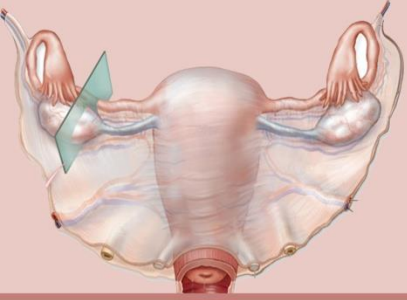
- In the **first stage**, uterine contractions originating at the fundus and sweeping downward move the head of the fetus toward the cervix and progressively widen and thin the cervix.
- In the **second stage**, the fetus is forced through the cervix and delivered through the vagina.



In the **third stage**, the placenta separates from the uterine decidual tissue and is delivered.

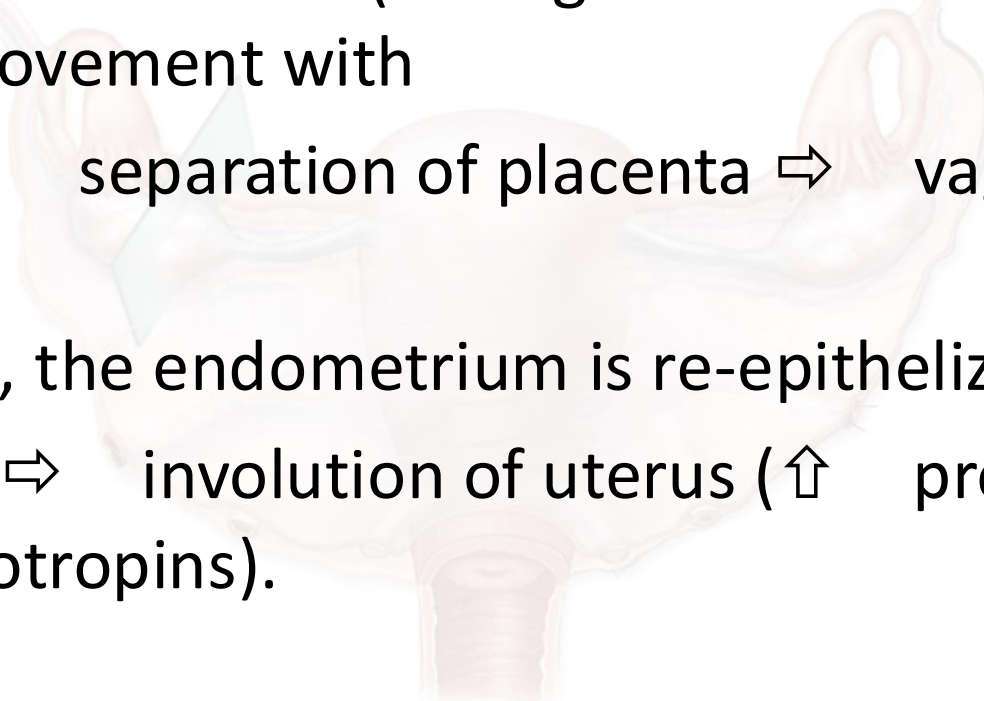
During this **last stage**, powerful contractions of the uterus also serve to **constrict uterine blood** vessels and limit postpartum bleeding.

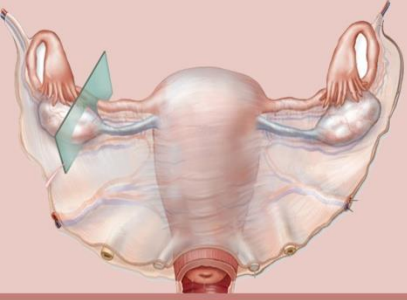
After delivery of the placenta, the hormones concentrations return to their pre-pregnant levels, except for **prolactin**, whose levels **remain high** if the mother **breast-feeds** the infant



After delivery of fetus:

- Contraction of uterus (during 10 - 45 minutes) \Rightarrow shearing movement with placenta \Rightarrow separation of placenta \Rightarrow vaginal discharge .
- After that, the endometrium is re-epithelized again
- Lactation \Rightarrow involution of uterus (\uparrow prolactin \Rightarrow \downarrow gonadotropins).





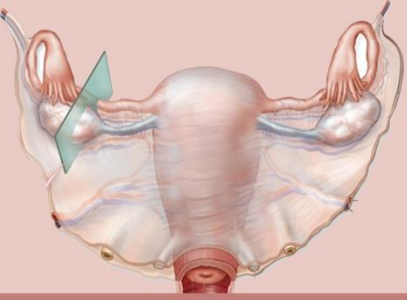
Mammary glands

■ Development :

1. During childhood : mammary glands are rudimentary .
2. At puberty : mammary glands enlarge and develop under the effect of estrogen and progesterone secreted from ovaries .
3. During pregnancy : more enlargement and development occur by high levels of estrogen and progesterone and prolactin and human chorionic somatomammotropin

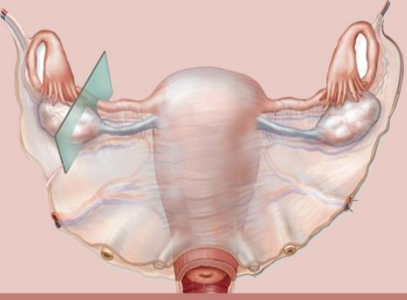
(HCS)

1. During lactation
 - Milk formation : by prolactin .
 - Milk ejection : by oxytocin .



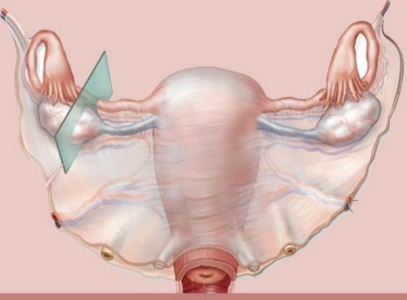
Throughout pregnancy, **estrogen and progesterone** stimulate the growth and development of the breasts, preparing them for lactation.

Estrogen also stimulate prolactin secretion by the anterior pituitary, and prolactin levels steadily increase over the course of pregnancy, However, although prolactin levels are high during pregnancy, ***lactation does not*** occur because estrogen and progesterone block the lactogenic action of prolactin



- **After parturition**, when estrogen and progesterone levels fall so, their inhibitory effects on prolactin action are removed and lactation can proceed.
- **lactation** is maintained by suckling, which stimulates the secretion of both oxytocin and prolactin.

If lactation continues, there is suppression of ovulation because prolactin inhibits GnRH secretion by the hypothalamus and FSH and LH secretion by the anterior pituitary.



Lactation

The initiation of milk production (lactogenesis) is under hormonal control of:

prolactin hormone from anterior pituitary gland.

- True milk production starts **two days** after delivery.

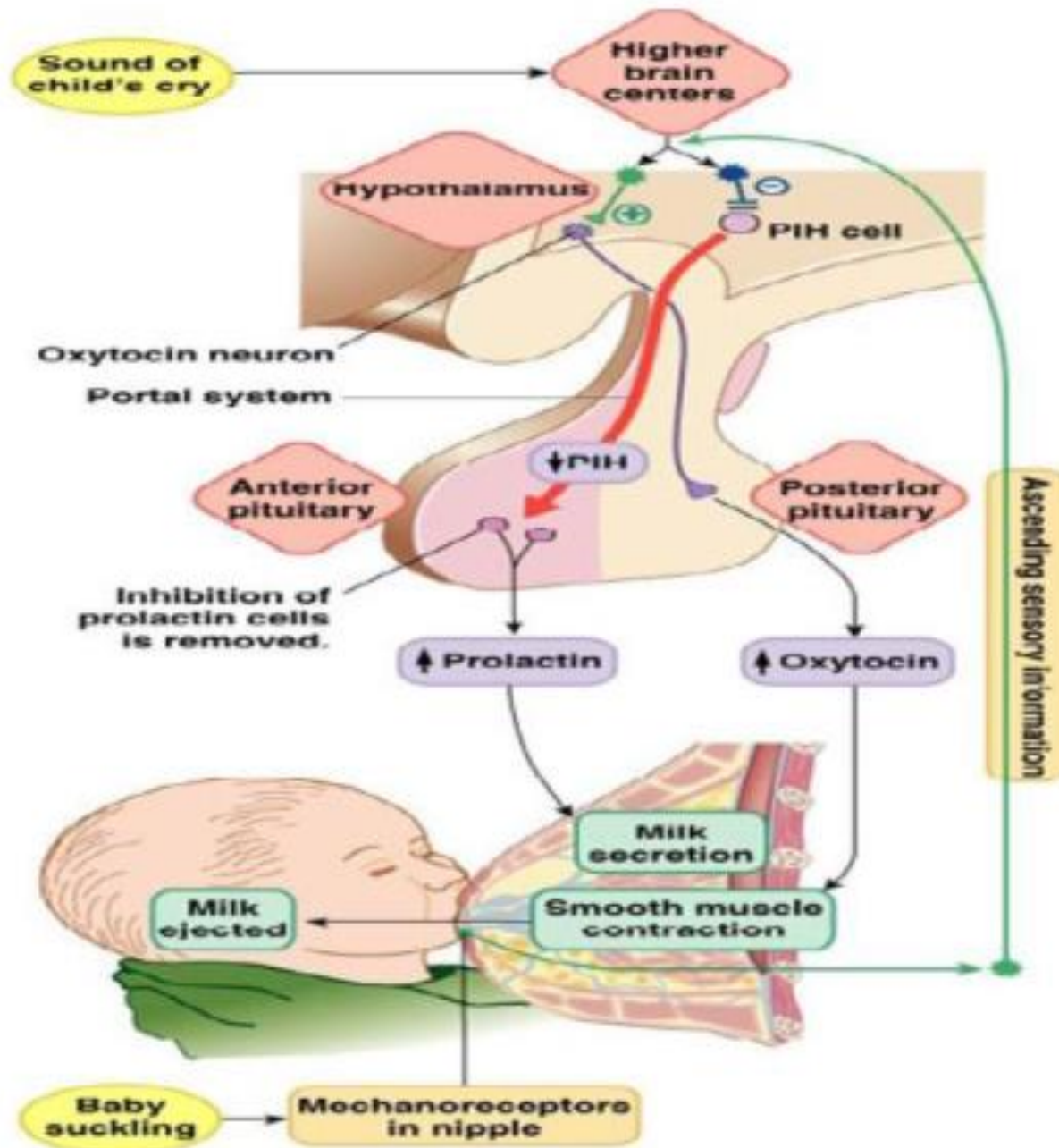
- **Suckling** helps lactation by two mechanisms:

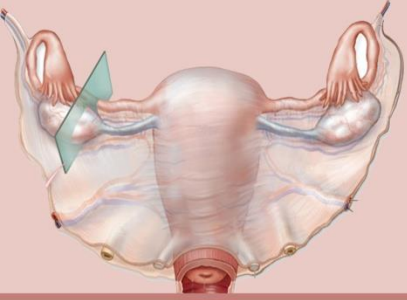
- a) Maintenance of prolactin secretion \Rightarrow maintenance of milk formation.

- b) Ejection of milk by oxytocin (suckling reflex).

- With continued suckling, lactation can continue for years.

- \uparrow Prolactin \Rightarrow depress ovulation & fertility (**lactation amenorrhea**).





Hormonal control of mammary glands

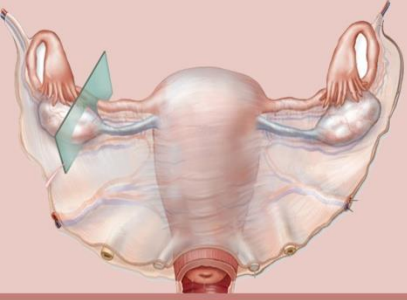
1- Estrogen:

- Stimulates **Proliferation** of **duct** system and nipples.
- It increases **Blood** flow to breast.
- It is responsible for **Pigmentation** of areolas.

2- Progesterone: Stimulates formation of mammary gland **acini**.

3- Prolactin: Secreted by anterior pituitary

It stimulates formation and secretion of milk by acini.



4- Placental Lactogen (human chorionic somatomammotropin (HCS) stimulates breast development.

5- Oxytocin: It squeezes milk from acini.

6- Adrenal corticoids & Thyroxin & insulin:

- needed for **metabolic** activities of the gland, no specific role in milk production.

7- Growth hormone:

- necessary for mammary gland development



THank you