



جامعة الأزهر - غزة
AL-AZHAR UNIVERSITY-GAZA



Physiology female reproductive system IV





Estrogens

- Actions of estrogen on target organs:

- 1-Primary sex organs:

- ✓ Growth of ovarian follicles
 - ✓ LH surge → ovulation

- 2-Secondary sex organs:

- Fallopian tube
 - ✓ ++ motility
 - ✓ ++ activity & NO of cilia
 - Uterus: max number of estrogen receptors during proliferative phase
 - Endometrium: Proliferative phase & via ++ growth factors (Somatomedins & epithelial growth factors)
 - Myometrium:
 - ✓ ++ Actin & Myocin
 - ✓ ++ Oxytocin Receptors & sensitivity
 - ✓ ++ excitability





Estrogens

- Cervix: thin alkaline mucous (thinnest at ovulation)
Stretched into long threads (Spinnbarkeit-test)
- Vagina: Stratification & keratinization & ↑ thick mucous
Glycogen → lactic acid (kill bacteria)
- Breast: Enlargement & fat deposition & ++ Blood flow
Duct & nipple
Areola: pigmentation





Estrogens

- Secondary sex characters:
 - ✓ Hair: -- body, ++ scalp, triangle shape pubic hair with base upwards
 - ✓ Skin: Soft & smooth
 - sebaceous glands → -- acne
 - N.B. excess → dry skin – Greasy skin
 - ✓ Voice: no effect on larynx
i.e. High pitched child voice
 - ✓ Body:
 - Narrow shoulders
 - Broad pelvis
 - Fat rounded contour
 - ✓ Behavior:
 - Libido
 - Make-up of female
- ✓ Note: pubic & axillary hair growth by adrenal androgens



Progesterone

- C21 Steroid
- Sources: Corpus luteum and placenta small amount from ovarian follicles & adrenal cortex
Important intermediate in ALL tissues secreting steroid hormones. In C luteum, granulosa cells secrete progesterone by themselves or theca cells provide pregnenolone
- Plasma level in follicular phase 0.9 ng/ml  20 time to peak Midluteal 18 ng/ml
- Transport:
 - Free 2%
 - Bound 98%:
 - Albumin 80%
 - Globulins 18%
- Metabolism: Liver → converted to → pregnanediol & excreted in
- Mechanism of action: Genomic
Progesterone releases its receptor from heat shock protein
→ exposure of DNA binding domain of receptors (A & B)





Functions of Progesterone

- Progesterone Promotes Secretory Changes in the Uterine Endometrium During the Latter Half of the Monthly Sexual Cycle.
- Secretory changes prepare the uterus for implantation of the zygote.
- Progesterone has a similar effect on the lining of the fallopian tubes, causing secretion of the fluid that provides nutrition for the fertilized ovum during its passage to the uterus.
- The hormone also reduces the excitability and motility of the uterine smooth muscle.





Functions of Progesterone

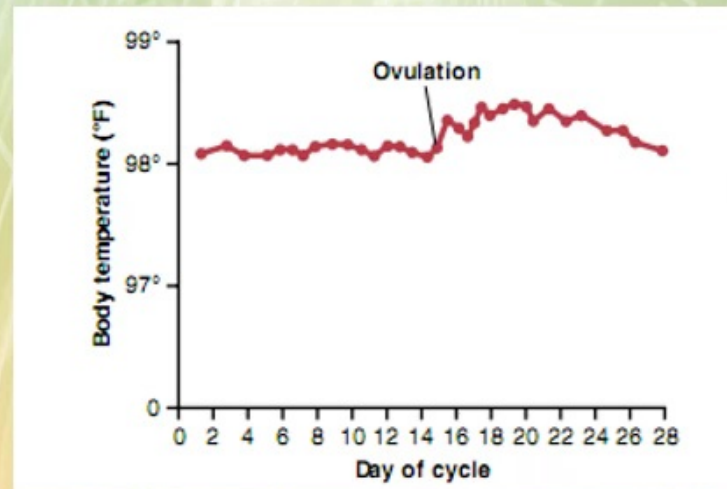
- Progesterone Stimulates Development of Lobules and Alveoli of the Breasts.
- Stimulation by progesterone causes alveolar cells to enlarge, proliferate, and become secretory, although the cells do not produce milk in response to progesterone.





Functions of Progesterone

- Progesterone Causes an Upward Resetting of the Body Temperature Control System by About 0.5°F.
- This effect can be used to determine the time of ovulation because progesterone is not produced until the preovulatory LH surge, which takes place a few hours before ovulation.





Functions of Progesterone

- On respiration: Stimulates respiration → -- PCO₂
- Electrolyte balance:
 - Prog. Like glucocorticoid & mineralocorticoid. On DCT → Na & water retention
 - Prog. On large dose competes with aldosterone → Na & water excretion

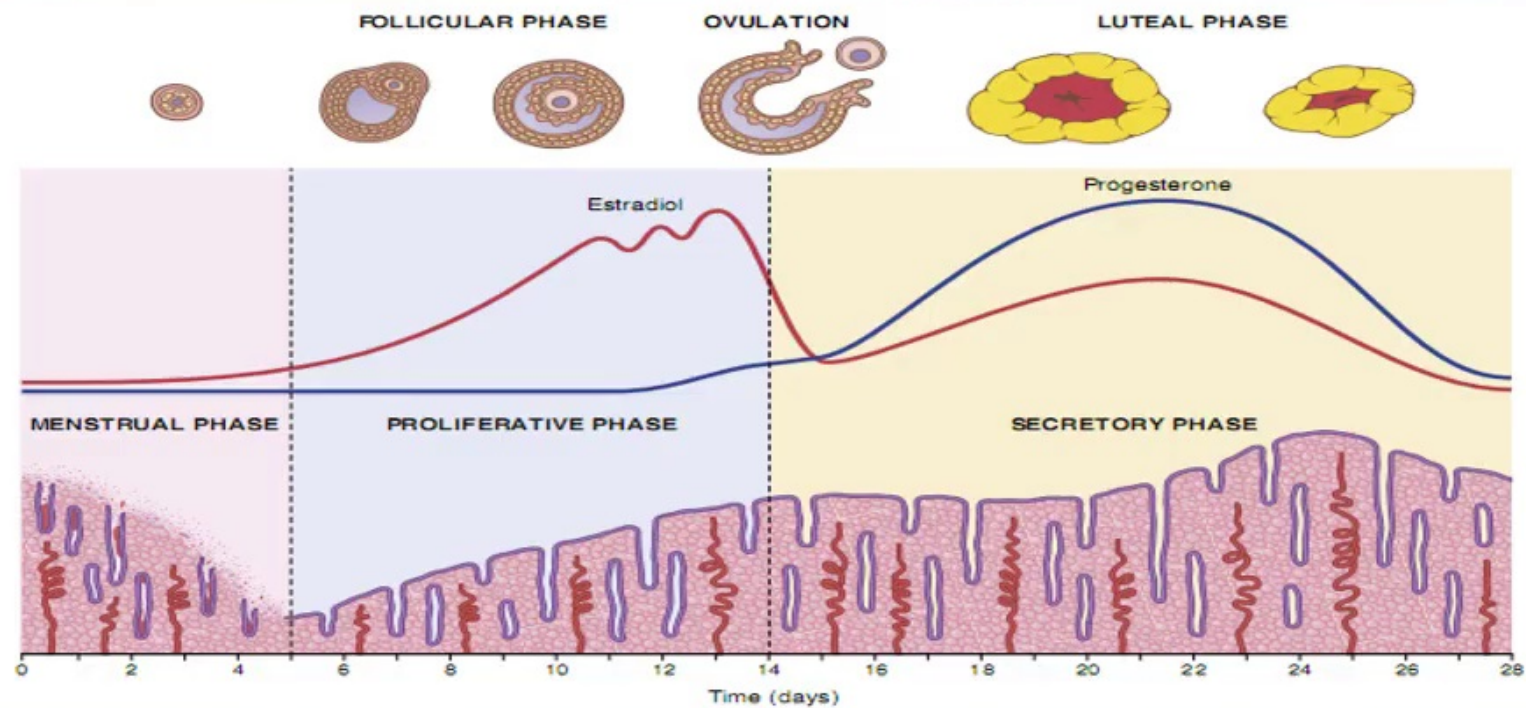




Monthly Endometrial Cycle and Menstruation

- Driven by the cyclic production of ovarian hormones, the endometrium goes through a monthly cycle characterized by three phases:
 - (1) proliferation.
 - (2) development of secretory changes.
 - (3) menstruation.





Pre-ovulatory phase		Post-ovulatory phase
Degenerative	Proliferative	Secretory (luteal)
Menstruation	Estrogen phase	Progestational phase
Duration: 3-5 5	14 th day	
Control: 0	1	2
Sudden withdrawal of estrogen and progesterone	Estrogen	Estrogen & Progesterone

