Menstrual cycle

- The menstrual cycle average 28 days.
- Variation between 21 and 35 days are normal.
- Irregular and infrequent cycles may occur for a few months after puberty and in the few years proceeding the menopause.
- Menstrual cycle (Endometrial cycle) is under the control of the ovaries.
- Both estrogen and progesterone control and maintain the menstrual cycle.

* The endometrium is made of two layers:-

(1) Stratum basalis: Adjacent to the myometrium
- Unresponsive to hormonal stimulation.
- Remains intact throughout the menstrual cycle.

(2) Functional layer

made of <
- (A) Stratum spongiosum
- (B) stratum compactum

* Menstrual cycle consists of three phases:-

(1) Follicular or proliferative phase (The 14th day)
- Begins at the end of the menstrual phase. - Parallels growth of the ovarian follicles.
- Is under the influence of estrogen ⇒ mitotic activity in the glands & stroma.

endometrial thickness from 2 to 8 mm (from basalis to opposed basalis layer).

(2) Secretory progestational phase (The 21st day)
- Begins approximately 2 to 3 days after ovulation in response to progesterone produced by the corpus luteum.

Mitotic activity is severely restricted ←
- Endometrial glands produce then secretes glycogen rich vacules
- Stroma edema.
- Stromal cells enlargment.
- Spiral arterioles develop, lengthen & coil.

(3) Menstrual phase (The 28th day)

* Menstruation:-
- Priodic desquamation of the endometrium.
- The external hallmark of the menstual cycle.
- Just before menses the endometrium is infiltrated with leucocytes.
- Prostaglandins are maximal in the endometrium just before menses.

↳ constriction of the spiral arterioles ⇒ ischemia & desquamation.

Followed by arteriolar relaxation, bleeding & tissue breakdown.

* The zygote need zona pellucida to prevent early implantation.

* The zygote's jorney to the uterus:-
- Takes approximately 3 to 4 day.
- The zygote undergoes a series of mitotic divisions called cleavage, that results in an increase in cells number.
* The two cellular stage (two cells) → Four-cell stage → Eight-cell stage
↳ These cells are called (Blastomers)
- Approximately 3 days after fertilization, the Blastomers divide again to form a 16-cell morula (mulberry)
↳ Inner cells constitute the inner cell mass → gives rise to tissues of the embryo proper
↳ The surrounding cells compose the outer cell mass → forms the trophoblast, which later contributes to the placenta.
* At the time that morula reaches the uterus, the mucosa of the uterus is in the Secretory phase during which: Uterine glands and Arteries become coiled and the tissue become succulent.
* The morula enters the uterine cavity (Day 4 after fertilization)
- Uterine fluid begins to penetrate through the zona pellucida into the intracellular space of the inner cell mass, gradually, the intracellular spaces become confluent, and a single cavity, the blastocele, forms.
- At this time, the embryo is a blastocyst. - Inner cell mass → embryoblast
- The outer cell mass (trophoblast) flatten and form the epithelial wall of the blastocyst.
* The Zona pellucida disappears to allow implantation.

ovulation: Day's 14	Fertilization: Day's 15	Implantation: Day's 21

* Day 6 after fertilization: Trophoblastic cells over the embryoblast pole begin to penetrate between the epithelial cells of the uterine mucosa (Early implantation).
- Pregnancy starts at Day 6 when Blastocyst loosely attached to endometrium.
* where did human's embryo spend their first week of development? inside the fallopian tube.
* If fertilization does not occur, the corpus luteum reaches maximum development approximately 9 days after ovulation, Subsequently, the corpus luteum shrinks because of degeneration of lutean cells and forms a mass of fibrotic scar tissue, the corpus albicans.
* If the oocyte is fertilized, degeneration of the corpus luteum is prevented by human chorionic gonadotropin (hCG), a hormone secreted by the (syncytiotrophoblast of the developing embryo). The corpus luteum continues to grow and form's the corpus luteum of pregnancy (corpus luteum graviditatis).
- By the end of third month, this structure (corpus luteum graviditatis) may be one third to one half of the total size of the ovary.
- Yellowish luteal cells continue to secrete progesterone until the end of the fourth month thereafter they regress slowly as secretion of progesterone by the trophoblastic component of the placenta becomes adequate for maintenance of pregnancy.