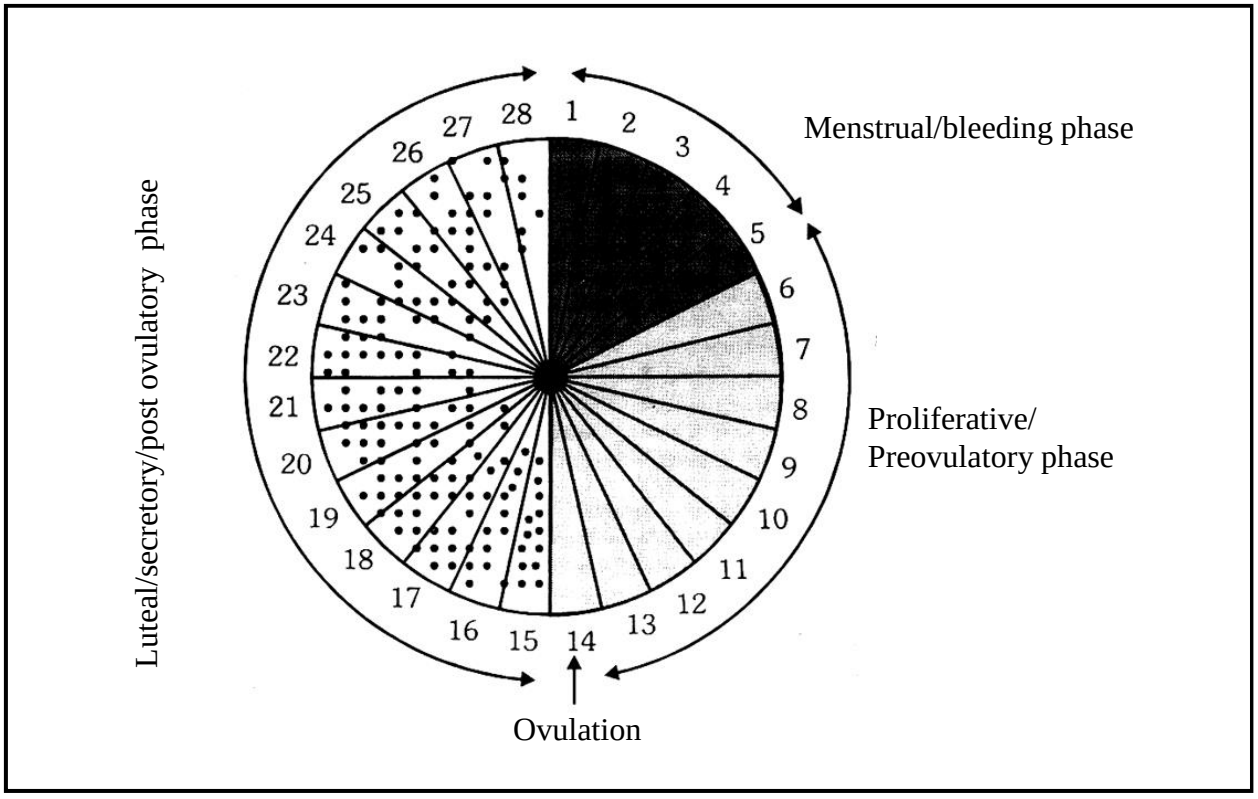
HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL CYCLE

THE MENSTRUAL CYCLE AND THEIR PHASE

Duration – 28 days Ideally (Range 24 to 32 days)



This is exhibited by primate group of animals. In this cycle the female body prepares itself for a possible pregnancy. If the pregnancy does not occur then the body aborts all preparation done and restarts the prepration for pregnancy again in a monthly cyclic manner.

MENSTRUAL CYCLE HAS THREE MAIN PHASE.

1. Bleeding phase or menstruation phase.
2. Proliferative/Preovulatory/follicular phase or oestrogenic phase.
3. Secretory/Post ovulatory/luteal phase or progesteronic phase.

(I) **Bleeding Phase :** The cycle starts with bleeding phase in its first four to five days. During this bleeding the part of the layer of endometrium called decidua gets shed off.

(II) **Preovulatory/Proliferative phase :** After first four or five days this phase begins. During this phase, Due to release of some GnRH, Pituitary secretes some FSH to stimulate the ovarian follicle. The ovarian follicle now begins to develop. Its theca interna now starts secreting an increasing amount of oestrogen.

The rising level of oestrogen causes the endometrium to proliferate and thicken. It also causes increase in the vascularity and glandularity of the endometrium.

Rising level of oestrogen also provides a positive feed back to the hypothalamus. Due to this, the hypothalamus releases more of GnRH . This GnRH induces the pituitary to release more of FSH. The rising FSH levels now cause:

(i) further growth and development ovarian follicle to form Graafian follicle

(ii) even further release of oestrogen from the theca interna of this developing follicle.

As the oestrogen level goes on rising, by the end of 10^{th} day the extreme levels of oestrogen(which have by then caused maturation of Graafian follicle and growth of endometrium)now givea negative feed back to the pituitary causing a fall in FSH secretion but also causing a rise in LH secretion. Now the LH secretion from the pituitary goes on rising. This abrupt rise (on 11^{th} to 13^{th} day) in LH concentration in blood is called as LH surge. This LH now causes the Graafian follicle to rupture after partial completion of II meiotic division in oocyte and thus the secondary oocyte is released. The release of egg (secondary oocyte) which occurs 14 day is called as **ovulation.**

(III) **Post ovulatory/secretory phase :** After ovulation the ruptured Graafian follicle transforms into corpus luteum. The granulosa and theca cells of the ruptured Graafian follicle (which is now called as corpus luteum) is found only in mammals and contain a yellow lutein or carotene pigment.

In case of absence of pregnancy this corpus luteum will get degenerated after 14 days of its formation. The degenerated corpus luteum is called **corpus albicans** (white body).

Function of corpus luteum :- Stimulated by the rising levels of LH, the corpus luteum secretes progesterone hormone. The progesterone facilitates the preparation of endometrium for receiving the embryo and its implantation. Progesterone inhibits the contractions of uterus so that the pregnancy could be maintained. Progesterone also inhibits development of next new ovarian follicle.

If pregnancy occurs then the corpus luteum persists and secretes progesterone. Progesterone is important to maintain the pregnancy and it is thus called as the **pregnancy homone.** By the fourth month of pregnancy, the placenta has developed completely. This placenta now takes over the job of further progesterone secretion. Ovary also secretes some amount of relaxin at the time of parturition.

If pregnancy does not occur after ovulation, then as the progesterone level rise, its rising levels inhibits the release of GnRH from hypothalamus. Due to this FSH, LH secretion by pituitary falls and thereby progesterone secretion by the corpus luteum (which was due to influence of LH) also now falls.

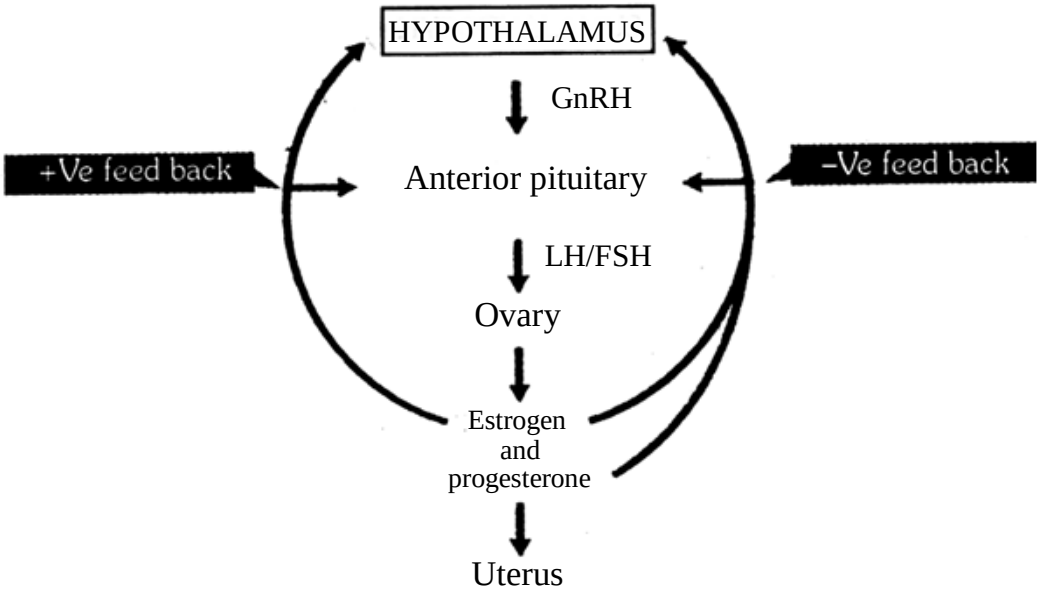
As the progesterone level drops, the corpus luteum begins to degenerate and transform in corpus albicans (which can not secrete progesterone). Due to the lack of progesterone : -

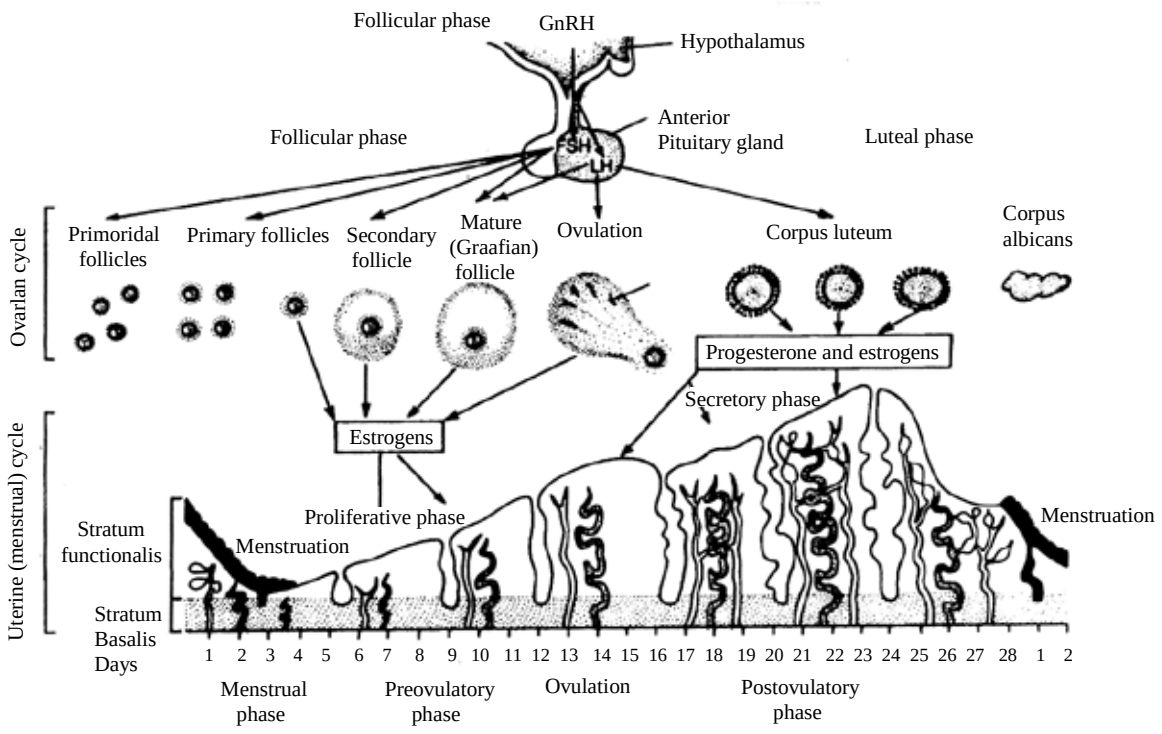
(i) The overgrown endometrium now begin to break and separate from the inner uterine wall causing bleeding.

(ii) The uterine contraction (which was till now inhibited due to presence of progesterone) now start. Thus the separated endometrium along with blood is now being passed out via vaginal route. This is again the beginning of next menstrual or bleeding phase.

Total loss of blood per day is about 20 ml, so an average 40 to 80 ml blood/cycle is lost. This blood can not clot. The period between ovulation and next menstrual bleeding (post ovulatory period) is always constant (i.e. is 14 days). However the ovulation date may vary (causing a change in pre ovulatory period). After ovulation the ovum is viable only for two days, while sperms introduced into the vagina can survive for a maximum of four days.

On basis of the above data, safe period method for family planning is calculated. Normally it is considered to be day 1 to day 8 and then from day 20 to day 28.





Schematic representation of menstrual cycle