INTRAUTERINE DEVICES- A HIGHLY EFFECTIVE METHOD OF CONTRACEPTION

By Megan Klein
According to the Centers for Disease Control and Prevention-
In 2006, 49% of pregnancies were unintended
Neurons in the hypothalamus produce hormone GnRH

GnRH travels to the pituitary gland and stimulates production of gonadotropins luteinizing hormone (LH) and follicle stimulating hormone (FSH)

LH stimulates follicular theca cells to produce androgens (estrogen), while FSH stimulates growth and maturation of the follicle.

Estrogen has a negative feedback effect on GnRH, LH, and FSH

Estrogen has a mitogenic effect on the lining of the uterus causing proliferation
The female egg spends its life in the ovary in a structure known as a follicle.

FSH stimulates the growth of follicles.

Around a week into the cycle, one dominant follicle continues maturing, the rest degrade.

At this point the dominant follicle is producing low levels of estrogen which keep GnRH, LH and FSH low through negative feedback.
As the dominant follicle continues to grow, it begins secreting significant amounts of estrogen.

The now high concentrations of estrogen stop exhibiting negative feedback, and instead start to exert a positive feedback on gonadotropins, causing the LH surge.
The LH surge causes the follicle surrounding the egg to rupture and the egg to be released in a process called ovulation.

The remaining cells of the follicle become the corpus luteum, a gland that begins secreting progesterone and estrogen right after its formation.

Estrogen now exerts a negative feedback on LH and FSH again, keeping levels low and inhibiting the development of new follicles.

The corpus luteum’s life, though, is finite in the absence of LH and eventually begins to degrade, allowing a new cycle to begin.
In the event of pregnancy...

- The fertilized egg becomes a trophoblast that produces hCG.

- hCG is structurally similar to LH, so it prevents the corpus luteum from degenerating.

- Continual secretion of gonadal steroids from the corpus luteum keeps FSH low, preventing additional menstrual cycles that would result in the loss of the embryo.

- Eventually, the placenta takes over producing estrogen and progesterone and the corpus luteum regresses.
The uterine lining is a highly variable environment that also goes through phase during the menstrual cycle.

Early rising estrogen levels stimulate the endometrium to grow.

Following the formation of the corpus luteum, progesterone causes the endometrium to become an actively secreting tissue—making the environment of the uterus hospitable in the case of implantation.

Progesterone and estrogen effect the uterus by influencing secretion of cervical mucus to assist in sperm navigation.

Degradation of lining occurs after the fall of estrogen and progesterone.
Two Main IUDs in the US

Copper IUD (Paragard)  
- Lasts for 10 years

Levonorgestrel IUD (Mirena)  
- Lasts for 5 years
Upon semen’s introduction into the reproductive tract, the spermatozoa’s first objective is to pass through the cervical mucus.

This process entails migration through what is described as a highly invaginated series of moist opposed surfaces which only tens of sperm every succeed.
HOXA10 is essential for embryo implantation in humans, and the maternal disruption of the gene results in uterine factor infertility.
Remodeling of the uterine tissues is an important process involved in both the sequential destruction and reconstruction of the functional layer of the endometrium, and for the implantation process.
A daily intrauterine release of 50µg or more of LNG per day is needed for the complete inhibition of ovulation. Only 20µg of LNG are released per day from the LNG IUD.
Determining Key Mechanisms

- It is important to distinguish the mechanisms that account for the majority of prevented pregnancies from those that are occasional or exceptional.

- Researchers designed a study that would assess whether or not embryos are formed and reach the endometrial cavity in IUD users at the same rate as in nonusers.

1. The recovery of spermatozoa from the site of fertilization
2. The detection of substances presumed to be specifically produced by an embryo
3. Recovery of developing zygotes from the genital tract
4. The biological condition of the zygotes recovered from the genital tract

“Embryos are NOT formed in IUD users at a rate comparable to nonusers.”
31% of women would NOT consider a method that worked by post-fertilization effects.
Other Myths

- Previous model Dalkon Shield
- Pelvic Inflammatory Disease
- Chance of perforation
Complicated Patients

- Unintended pregnancy has numerous consequences
- Testing before insertion is highly recommended for patients
- IUDs are safe to use in patients with STIs, HIV, and diabetes
Conclusion

- IUDs work in a predominantly pre-fertilization fashion
- Chance of perforation or migration is a very rare occurrence
- IUDs are compatible for all types of patients
- As this information becomes more well-known, IUDs will become a far more popular option