**Physiology of pregnancy**

*Pregnancy* is the condition of female in which unborn fetus is contained within her body. Pregnancy begins with fertilization, and ends with parturition and includes implantation and placentation .

There are many events precede the pregnancy which includes:

• Ovulation,

• Ovum transport to the fertilization site,

• Sperm deposition and sperm transport.

• Sperm capacitation

• Fertilization

* **Ovulation**:

The ovulation occurs under the influence of LH released from the anterior pituitary gland and occurs in different time according to species .In cow ovulation occurs 12 hr after ending of estrus ,in mare before 48 hr from ending of estrus ,in ewe occurs after 24-36 hr after starting estrus and some animals the ovulation occurs after mating (induced ovulation) like rabbit ,cat and camel.

* **Ovum transport**:

At ovulation the ovum or egg is collected by the infundibullar end of the oviduct, then it is transported down inside the oviduct towards the uterus possibly by a combination of cilial (hair-like) action and muscular contractions of oviduct.

Transport through the oviduct appears to be under the control of ovarian steroid hormones since estrogens reduce and progesterone increases the speed of passage of ova through the oviducts. Fertilization normally occurs in the ampulla of the oviduct close to the junction with the isthmus.

In the cow, the ovum enters the uterus 4–5 days after ovulation in morula stage.

* **Spermatozoa transport** :

In the case of natural service, semen is deposited in the anterior vagina whereas with artificial insemination it is usual to place inside the uterus or in the anterior cervix.

Spermatozoa ascend the female tract by both active and passive processes. Active transport involves activity of the spermatozoa tail but clearly its interaction with surface epithelial secretions and cilia is also important. Propulsion of spermatozoa through the uterus appears to be quite rapid and the isthmus of the oviduct acts as a spermatozoa reservoir in many species.

* **Capacitation**:

Before spermatozoa are able to fertilize the ovum, they have to undergo a further series of maturational changes in the female tract. These processes are known as **capacitation** and the **acrosome reaction** and are thought to require about six hours in the cow.

The process of capacitation is stimulated when sperm enter the female reproductive tract. The acrosome reaction follows capacitation and involves the fusion of the sperm cell membrane and the acrosome and the formation of gaps through which the acrosome contents can diffuse. The acrosome reaction is necessary to allow penetration of the oocyte by the sperm.

* **Fertilization**:

When the sperm reaching the ovum, the sperm penetrates any remaining cumulus oophorus by the action of the enzyme hyaluronidase from the acrosome and comes into contact with the zona-pellucida., and the mobility of the spermatozoa is also important in the process of sperm penetration.

The fusion of the sperm and ovum cell membranes begins at the middle of the sperm head region. The sperm head becomes engulfed by the ova with the loss of the tail.

Fertilization is completed with the fusion of the haploid male and female pronuclei , by a process known as syngamy.