

**B.Sc Part 1**

**ZOOLOGY (subsidiary)**

**PAPER 1**

**FERTILIZATION**

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# Fertilization

Living organisms ensure their continuance on the earth by reproduction. Reproduction may occur either asexually or sexually. There is an evident difference between sexual reproduction and asexual reproduction. The sexual mode is a more complex process than the asexual mode. One crucial difference is the fertilization. It is the main stage of sexual reproduction, which is absent in asexual mode. Let's learn more about types of fertilization.

## **Fertilization in Animals**

The process of fusion of sperm with egg (ovum) to produce zygote is called fertilization. It is the crucial and primary stage of sexual reproduction. During sexual intercourse, the penis ejaculates millions of sperms into the vagina of the woman. Sperms will travel through the uterus to oviducts. At oviduct, one out of million sperms fertilizes the released ovum. The fertilized egg develops into a zygote. Without the fusion of gametes, sexual reproduction is futile. It doesn't occur in asexual reproduction.



Fertilization in most of the animals is similar to that in humans. Animals also produce gametes for fusion. But the fusion of gametes may take place inside or outside the body. Based on this, fertilization is of two types – internal and external fertilization.

### **External Fertilization**

When the fusion of sperm and egg takes place outside the female parent, it is called external fertilization. Only a minority of organisms exhibit this type of gamete fusion. For example, fish, frogs, etc. Here the female parent deposits her eggs in a place and later, the male parent ejects his sperms over them, then fusion takes place.

Gametes that fuse externally have to face many challenges. Since eggs and sperms are deposited in the external environment, the chances of fusion are very less. Predators may eat eggs and the zygote that is formed. To compensate for this loss, organisms like fish and frogs lay hundreds of eggs at a time.

### **Internal Fertilization**

Fertilization is the process of fusion of male and female gametes. The nuclei of the sperm fuse with the nuclei of the egg and form a single nucleus which results in the formation of zygote. Fertilization can be external or internal.

In sexual reproduction, the male inserts the sperms into the female reproductive tract to fuse with the egg. If the fusion takes place within the female parent, it is called internal fertilization. In humans, most of the animals like cats, lions, pigs, dogs, hens,

etc., the fusion of gametes takes place internally. In this type, a zygote is formed within the mother and gets its nourishment from her.

Internal fertilization is the process of fertilization that occurs inside the body of an individual. It occurs mostly in land animals. For internal fertilization to occur there needs to be a method for the introduction of male sperms into the female reproductive tract. Different animals have different methods of transferring the sperms. For e.g., in mammals, reptiles, and some fish, this is done by copulation. In birds, this is done by the cloacal kiss.

There are three ways in which internal fertilization produces offsprings:

- Oviparity
- Ovoviviparity
- Viviparity

### **Oviparity**

The fertilized eggs are laid outside the body of the mother. The egg receives nourishment from the yolk. For e.g., fish, amphibians, reptiles and all birds are all oviparous.

### **Ovoviviparity**

The fertilized eggs are retained in the female, and the embryo receives nourishment from the yolk. When they hatch, the young ones are fully developed. This is seen in some bony fish, sharks, lizards, snakes, etc.

### **Viviparity**

In this, the young one develops inside the mother and receives nourishment through the placenta. Most of the mammals, a few reptiles, and cartilaginous fish are viviparous.

## **Advantages of Internal Fertilization**

The advantages of internal fertilization are:

- Chances of fusion of gametes are more.
- The probability of successful fertilization is increased.
- The mates are selective.
- The chances of dehydration of gametes decrease.
- The young one is protected against the predators and the outside environment and hence chances of survival are increased.

## **Internal Fertilization in Humans**

The fertilization in humans is internal. The male introduces the sperms into the female reproductive tract. The sperm fuses with the egg in the ampulla of the fallopian tube. This results in the formation of a zygote which undergoes mitosis to form an embryo. The embryo is then implanted into the uterus. The entire process of development of the child takes place inside the uterus. Once the child is completely developed, it is delivered.

Internal fertilization, however, increases the risk of sexually transmitted diseases in individuals. But, it is considered to be one of the most favourable methods of fertilization.

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