Date – 03/02/2022 B-Sc-Part-II
(Zoology Hons.) Paper-IV. A.
Fertilization

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Q.1.— Write an essay on fertilization.

Ans.— The fusion of the sperm with the ovum to form diploid zygote is known as fertilization. The sequence of changes during fertilization includes Karyogamy (fusion of the nuclei of the two gametes) followed by plasmogamy (mixing of the cytoplasm of the two gametes). Completion of fertilization involves following three phases:

(1) Movement of the sperm towards the ovum:

As the ovum is non-motile, the movement of sperm becomes essential to reach ovum. This is done by the sperm with the help of its tail by whip like lashing movement.

The movement is initiated by the attraction caused by a glucoprotein substance known as fertilizin. The fertilizin is secreted by the plasma membrane of the ovum. Another acidic proteinous substance known as antifertilizin is also secreted by the surface of the sperm. Both these secretions fertilizin and antifertilizin are species specific just like only its own key can fit into the lock.

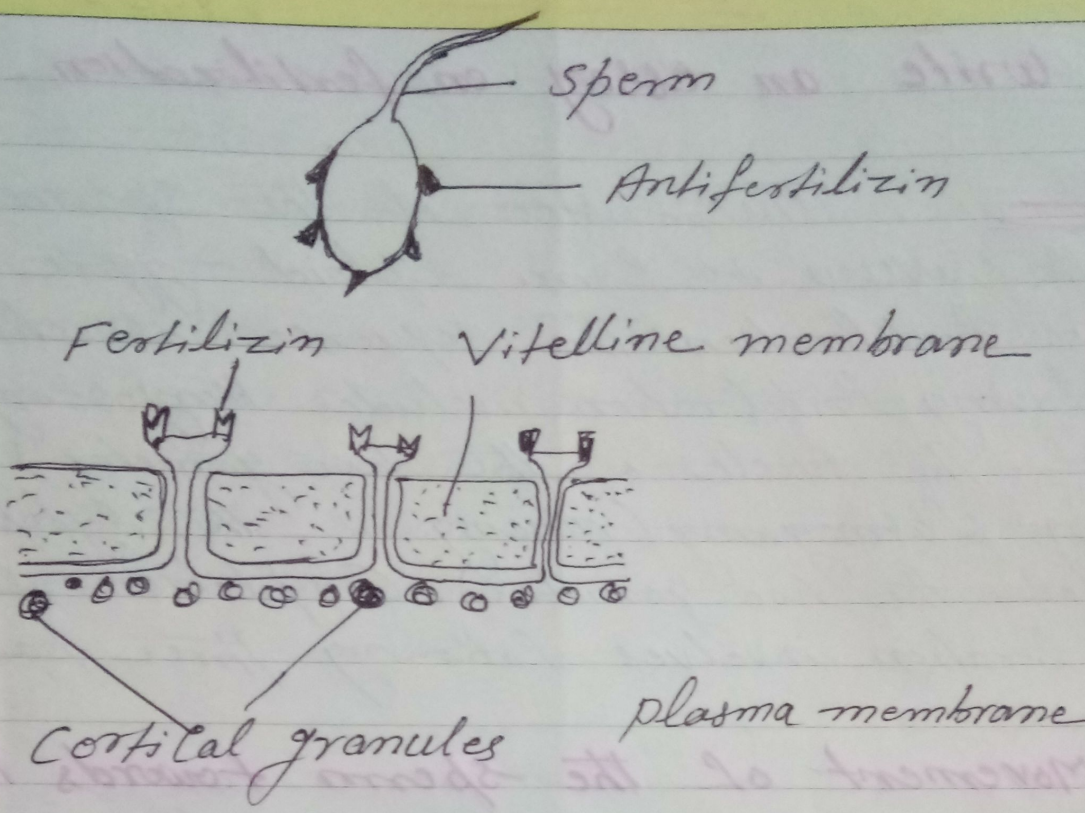

Fig:- Fertilization of egg & Antifertilizin of Sperm

on the reaching the surface of the ovum, the sperm becomes attached to the surface of the latter with the help of fertilizin and antifertilizin. Some people also call fertilizin and anti-fertilizin as gynogamones and androgam-ones respectively.

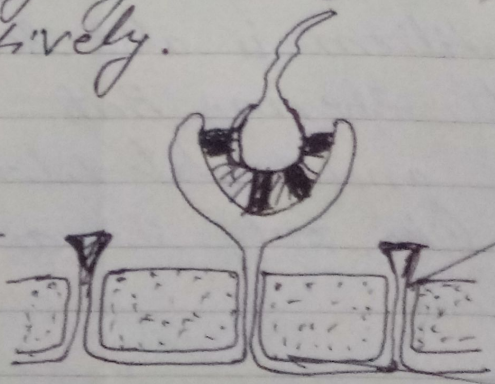

Fig:- Attachment of Sperm with ovum by fertilizin & Antifertilizin.

(ii) Penetration of the Sperm into the ovum:

The attachment of the Sperm with the Surface of the ovum initiates several biochemical changes.

The cytoplasm of the ovum bulges out at the Surface of attachment to form a Conical projection. This conical Projection is known as the cone of reception of fertilization cone.

The sperm is activated to initiate acrosomic action by the fertilizin. Once the acrosome is stimulated, it secrets an enzyme known as sperm lysin. The sperm lysin secreted by the mamalian sperm is called hyaluronidase which dissolve the hyaluronic acid connecting the follicular cells around the ovum.

The lytic enzyme dissolve the membrane of the ovum at the site of reception cone, makes a way through which the sperm enters the ovum. only the head and the middle piece enter the ovum whereas the tail is shed outside. But in case of mammal the entire sperm enter the ovum.

(iii) Fusion of gametic nuclei:

As soon as the sperm enters the ovum, the nucleus of the former is separated from the rest part i.e. the middle Piece and the tail. This separated nucleus is now known as male Pronucleaus. The later moves towards

the female pronucleus. The path of its movement can be marked due to arrival of an enormus amount of migratory Pigment granules on the Path. its Path in the ectoplasm is known as Penetration Path whereas its path is the endoplasm is ~~called~~ known as peneration Path whereas its path in the ~~path~~ formation of diploid zygote. The rest ~~p~~ parts of the sperm are absorbed in the cytoplasm of the ovum.

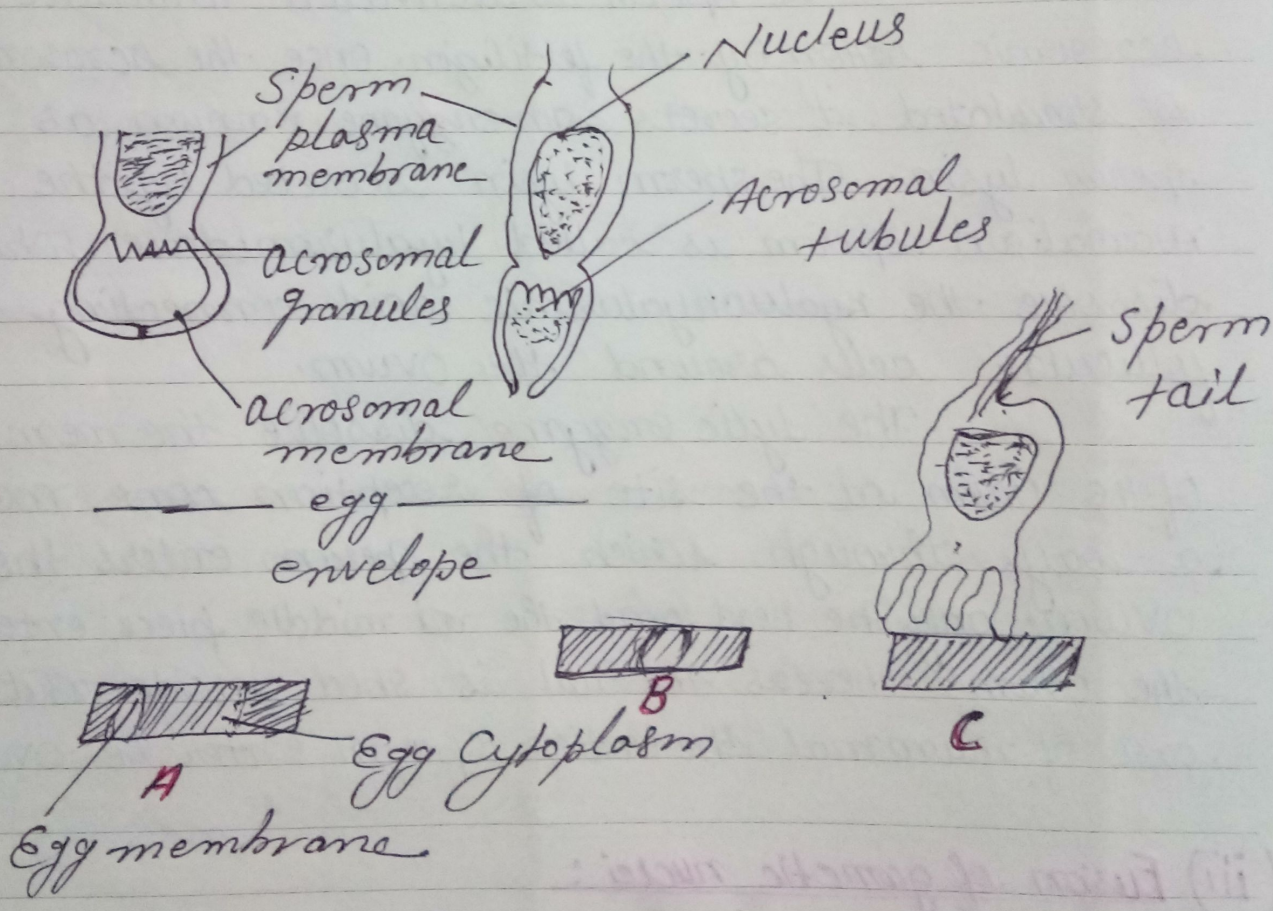

Fig:- Events in the union of male & female gametes.