

Structure of the Human Gametes

Reproductive Sex cells are also known as gametes. These includes the sperm in male and egg/ovum in female.

The formation of the gametes takes place in the gonads.

Structure and functions of the male gamete(sperm)

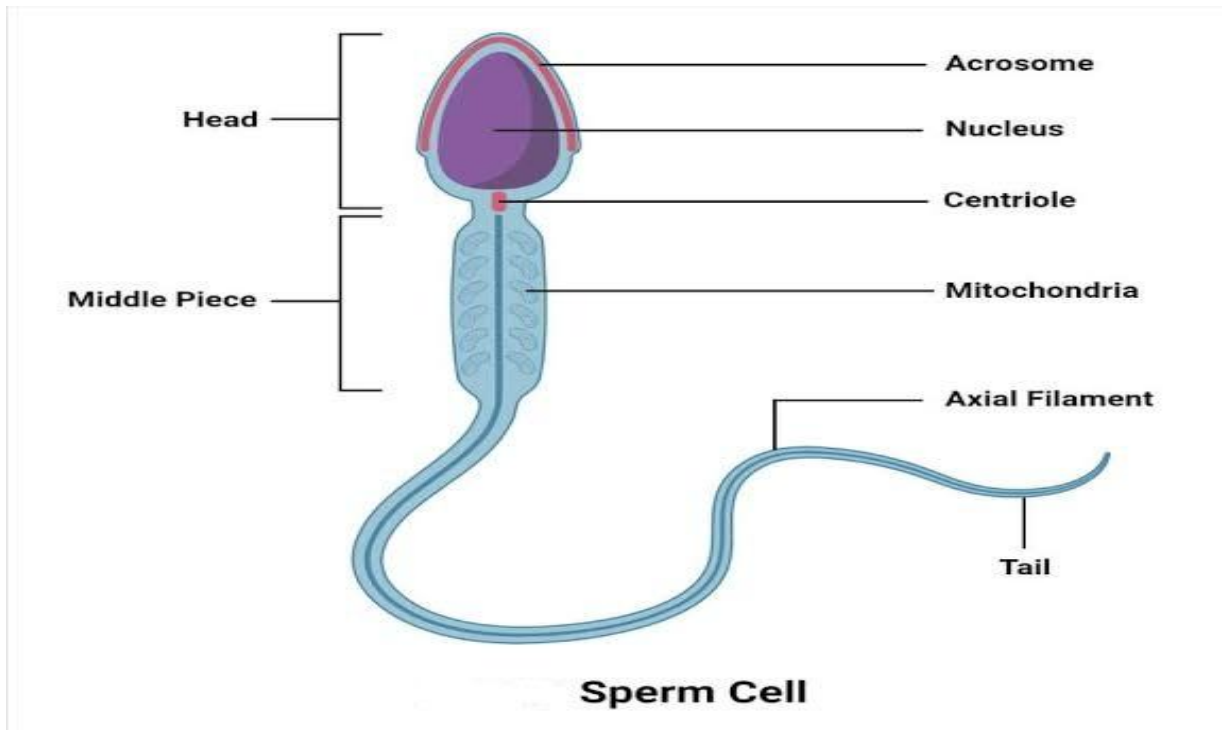
The male sex cells or gametes are produced in the testes by a process called ***spermatogenesis***.

Numerous sperms are produced throughout the life of a mammal.

Structure of the Human Gametes

A human sperm is about 0.05mm long and microscopic.

The Mammalian sperm has three main parts; The head which contains the nucleus, a middle piece and a tail/flagellum.



Structure of the Human Gametes

Function of the organelles in the male gamete(sex cell)

The Acrosome : is a sac containing enzymes, these enzymes break down part of the egg membranes so that the sperm can penetrate the egg during fertilisation.

The acrosome is located at the anterior end of the head.

The Middle Piece: The middle contains many mitochondria which provide energy for the sperm to swim toward the sperm.

Structure of the Human Gametes

Function of the organelles in the male gamete(sex cell)

The Tail or Flagellum: This helps propels the sperm cell. It is found at the posterior end of the sperm.

Nucleus: This is found in the head of the sperm cell. It carries the genetic materials(chromosomes) which fuses with the nucleus of the ovum.

Structure of the Human Gametes

Structure of the Female gamete(Egg)

The female sex cells or gametes called the eggs or ova are produced in the ovaries by a process called **oogenesis**. The egg is spherical and has a large nucleus containing haploid set of chromosomes.

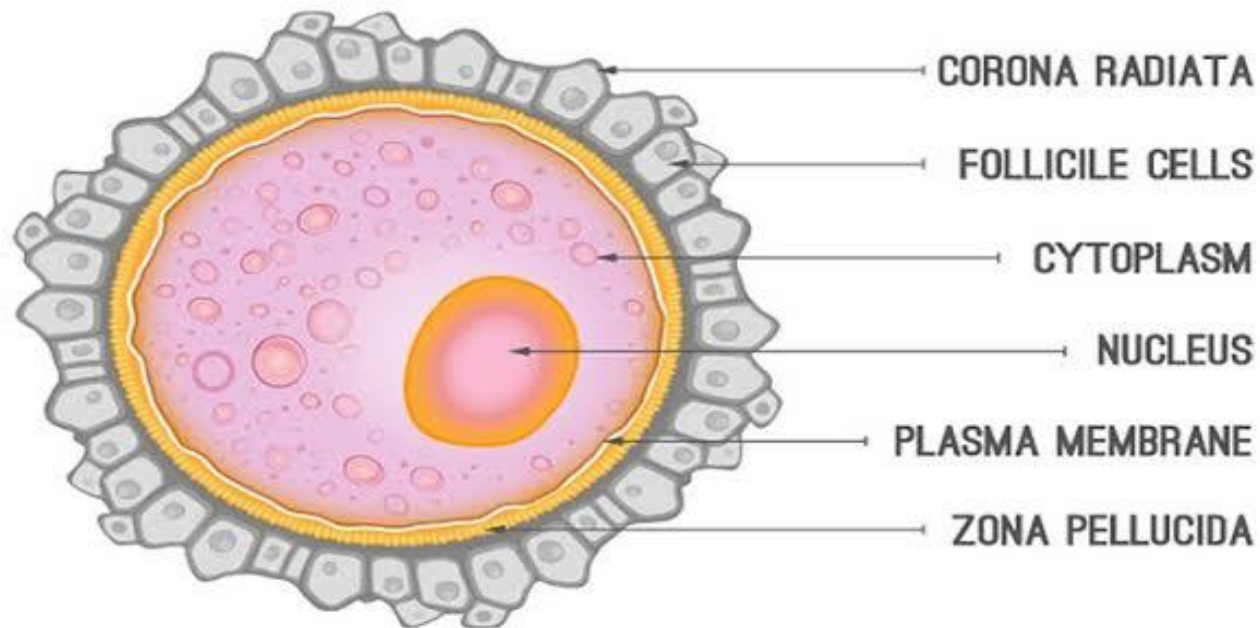
Each ovum is about 0.1mm in diameter. Abundant cytoplasm is present and may contain a small Amount of yolk which provides a source of nourishment for the embryo.

The egg has a plasma membrane in which in turn is surrounded by an outer membrane.

Structure of the Human Gametes

Structure of the Female gamete(Egg)

FEMALE EGG STRUCTURE



Fertilization

Definition of Fertilization

Fertilization in humans refers to the fusion of male and female gametes that facilitates the development of a new organism.

Fertilization is the natural life process, which is carried out by the fusion of both male and female gametes, which results in the formation of a zygote. In humans, the process of fertilization takes place in the fallopian tube.

During this process, semen comprising thousands of sperms are inseminated into the female vagina during coitus/copulation/sexual intercourse.

Fertilization

The sperms move towards the uterus and reach the opening of the fallopian tube. only a few sperms will succeed in reaching the opening of the fallopian tube.

The sperm swim partly by the lashing their tails and partly by the peristaltic contraction of the vagina, uterus and fallopian walls.

Millions of sperm surround the egg in the fallopian tube, but the only the head of one sperm penetrates the ovum.

The head of sperm has a sac called the acrosome, this secretes enzymes that help dissolve the egg membrane.

Fertilization

When the head of the sperm touches the jelly layer of the egg, the acrosome secretes enzymes which digest the egg membranes.

As the sperm penetrates the egg/ovum, it instantly triggers off the formation of an extra membrane around this cell so that no other sperm can enter. This prevents what is called polyspermy. A situation where an ovum is fertilized by more than one sperm.

Sperm can survive in the female reproductive system for about 48 – 72hrs. Hence, fertilization can still occur if ovulation occurs two or three days after ejaculation.

Fertilization

Steps in fertilization

Ovulation: The release of a mature egg (ovum) from the ovary.

Sperm Journey: The path of sperm from the male reproductive system to the fallopian tube.

Fusion: The meeting of the sperm and egg in the fallopian tube.

Formation of Zygote: The fertilized egg (zygote) that results from the fusion

Implantation

What is Implantation ?

Once fertilization happens, the cell starts to divide and multiply within 24 hours in the fallopian tube. This detached multi-celled structure is called a zygote. The zygote further divides into ball of cells called blastocyst. Later, after 3-4 days, the blastocyst travels to the uterus and now we call it an embryo. The embryo develops and undergoes various stages and gets attached to the endometrial layer of the uterus. This process of attachment is known as implantation.

Implantation

When the embryo is implanted, a number of embryonic membrane develops around it.

The innermost membrane is the amnion which contains a fluid called amniotic fluid.

This fluid acts as buffer or shock absorber for the growing embryo.

The embryo first feeds on the yolk of the ovum but when the yolk is exhausted, it feeds on the food substances in the fluid of the uterus. As the embryo grows, it develops a placenta and membranes.

Implantation

Placenta is an organ formed partly by embryonic tissue and partly by the uterine lining (chorion and allantois). Placenta contains numerous blood vessels and villi and is connected to fetus by a cord known as the umbilical cord.

This contains artery and vein for transportation of blood.

The placenta ensures selective exchange of materials between the embryo and maternal blood.

The transports of substances such as nutrients and waste products occurs through the capillaries within the villi at the end of the umbilical cord through diffusion.

Gestation

Definition of Gestation

The period between fertilization and when the foetus is fully developed is known as gestation period.

This period in human is nine months.

When the foetus is fully developed, birth or parturition occurs.

Parturition is the expulsion of the foetus, placenta and foetal membranes from the uterus.