Reproduction and Development_Animal_Mechanisims of Sexual Reproduction_SLFAB2

MECHANISMS OF SEXUAL REPRODUCTION

During external fertilization, both eggs and sperms are shed from the body and random fertilization occurs in an aquatic medium. Further protection is made possible by the gelatinous coat in eggs. To ensure that a zygote or zygotes are formed, release of thousands of sperms and eggs are an ideal situation. Evolution tells that from fish-like ancestors, amphibians evolved by invading the land to find more food sources. Gradually, amphibians evolved into reptiles and eventually to mammals. The change in environment necessitated a modification of sexual strategies such that internal fertilization was invented. Sperms still fertilize the egg in the aquatic environment provided by the female reproductive track. The amniote egg was a necessary step as a protection and to maintain the egg and the zygote later in a moist environment.

Internal fertilization requires cooperation thus, courtship is only a stepping stone towards this process. More complicated reproductive systems including copulatory organs have to be developed to ensure that the sperm is placed near or at the vicinity of the female reproductive tract. To ensure the embryo resistant eggshells and development inside

reproductive tract have been developed. Even after
born, parental care of the egg and nourishment
became a necessary step towards the survival of the

Kangaroos and opossums are marsupials that
embryos for a short time in the uterus. Afterward
crawls out and completes their fetal development in
a mammary gland. In eutherian mammals, developmen
inside the uterus, nourished by the mother's bloo
placenta. The baby is born and further care and n
given to the offspring sometimes up to maturity. T
cases of parental care in the animal kingdom all o
selective advantage for the perpetuation of organism

GAMETOGENESIS

The organs that produce gametes in most animals are called gonads. This is the minimum reproductive system and more complicated ones involve accessory tubes and glands that protect and carry developing sex cells and embryos. Polychaete worms (Phylum Annelida) have separate sexes. The eggs and sperms develop from cells lining the coelom. As gametes mature, they are extruded from the body wall and fill the coelom. Gametes may be shed through excretory openings. In some cases the swelling mass of eggs split the body open and the parent is killed. In a certain type of wasp, the eggs are deposited in a caterpillar.

Here the embryos emerge and they consume the caterpillar as food from the inside out.

SPERMATOGENESIS

Spermatogenesis is the proce ll production in the primary sex organ of males, t ure 4.7). Inside a testis, there are many coile tubules. These tubules end up in the epididymis w ed on top of the test

is.

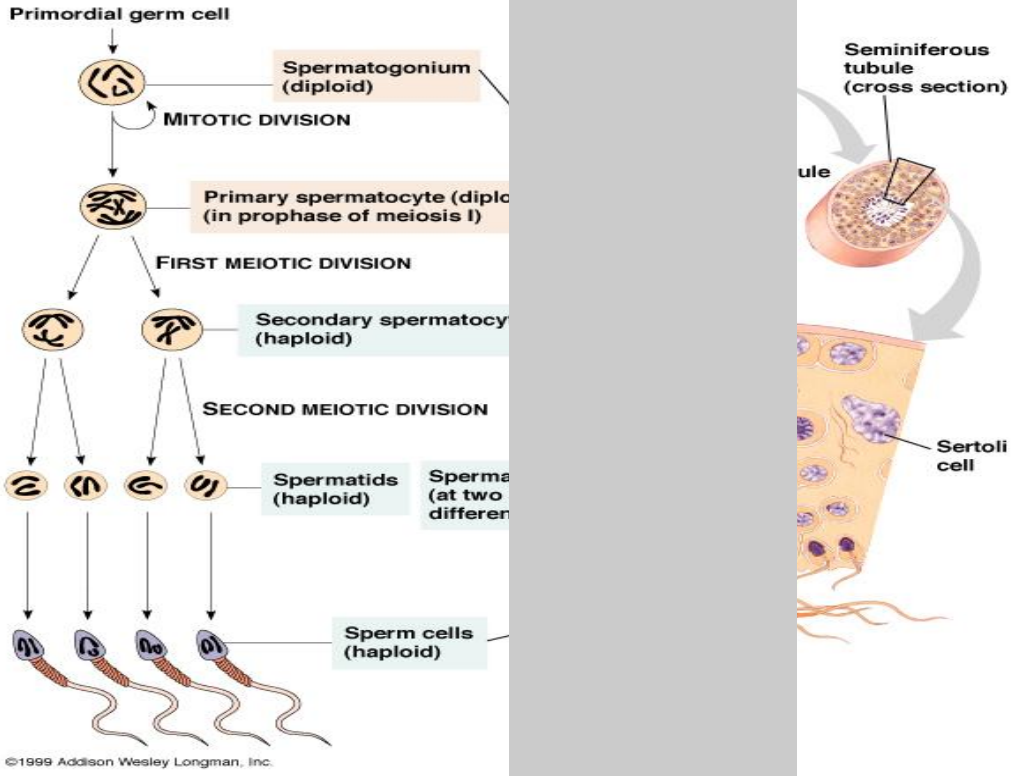


Figure 4.7 Sper

In one seminiferous tubule, primordi s in the embryo divide into numerous spermatogoni diploid cells which will later exhibit meiosis. D stimuli from the hypothalamus trigger the release dotrophin releasing hormone) which stimulates the tuary to release FSH (follicle stimulating hormone) . The FSH then travels through the bloodstream and testis to undergo spermatogenesis. GnRH also trigge se of LH (luteinizing hormone) from the anterior produce androgen and other male sex hormones osterone. Androgens are steroid hormones produced i cells of the testis. Primary and secondary sex characteristics are then developed in the male. Examples of the latter are development of stronger muscles, body and facial hair, deepening of the voice and narrowing of the hips, all associated with maleness.

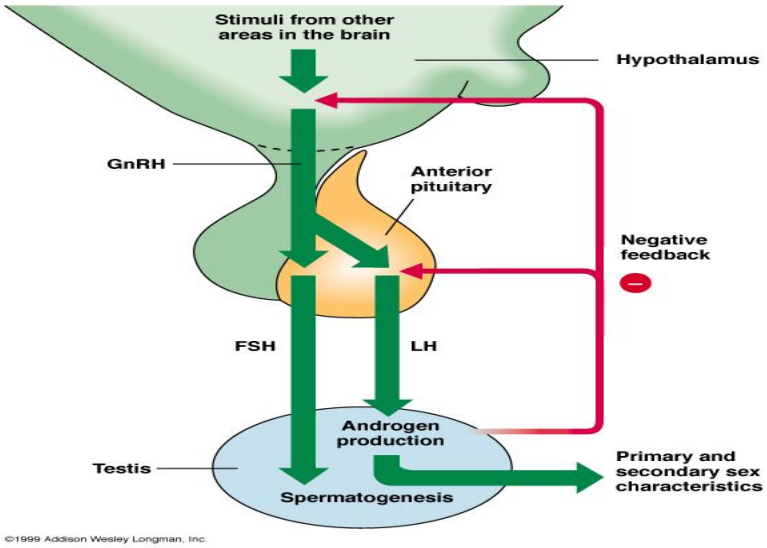


Figure 4.8 Hormonal events that trigger gametogenesis

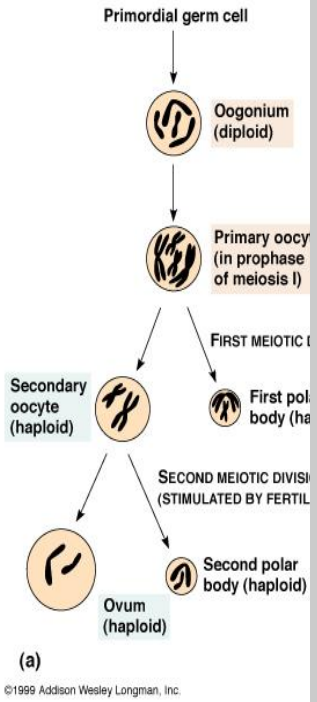
The primary sex characteristics with the maturation of the testis. The spermat to become primary spermatocytes. Approximately 3 ogenia per day develop into primary sperm primary spermatocyte undergoes Meiosis I o haploid secondary spermatocytes. Each secondar divides by Meiosis II to produce two spermatid ment from nearby Sertoli cells, a spermatid wi into one functional sperm cell. Thus for every cyte, four sperm cells are produced. The sperm ce he central space in every seminiferous tubule, cal

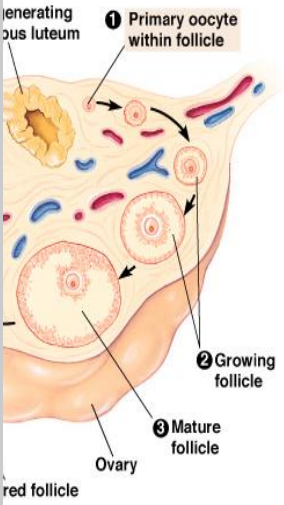
The sperm cell contains the ha a spiral shaped mitochondrion in the middle pi gated tail similar to a flagellum. At the tip of there is acrosome which helps the sperm penetr e acrosome contains hydrolytic enzymes concentrat granules. Sperm cells of animals take a variety ecially on the tip.

OOGENESIS

Oogenesis is the process where ova are developed in the primary sex organ of females, the ovary (Figure 4.9). When a human baby girl is born, all the potential egg cells that will later mature are already contained in the miniature ovary.

Unlike spermatogenesis, oogenesis is characterized by gap periods and sex cells are triggered by puberty and subsequent release of female hormones similar to the one described for spermatogenesis.





In the ovary, primordial germ cells dev ia. Each oogonium grows into a primary oocyte wit FSH triggers the growth of several follicles but res every month at the onset of puberty. The p undergoes Meiosis I to produce a haploid seconda very small polar body. Most of the cytoplasm is e developing egg. During ovulation, the follicle secondary oocyte breaks away from the ovary. If a available, fertilization may occur and the second develops by Meiosis II

into an ootid and finally to a mature ovum, with the subsequent release of a second polar body. For every primary oocyte which undergoes Meiosis, there is only one functional product, the ovum. The polar bodies are not fertilized.

Estrogen is the most common female hormone. It is responsible for triggering secondary female sex characteristics such as development of the breasts, change in voice quality and widening of the pelvic girdle, all in preparation for pregnancy and motherhood. During the first time that the human female ovulates but there is no fertilization, the follicular tissue (which contained the secondary oocyte) develops into a corpus luteum which disintegrates. If the female is fertilized, the corpus luteum helps sustain pregnancy by secreting progesterone.