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Course code: physiology 212

Matric number: 18/mhs02/007

Assignment

Write short note on the following

- Spermatogenesis
- Testosterone
- Spermatogenesis**

Spermatogenesis is the process by which haploid spermatozoa develop from germ cells in the seminiferous tubules of the testis. This process starts with the mitotic division of the stem cells located close to the basement membrane of the tubules.

These cells are called spermatogonial stem cells. The mitotic division of these produces two types of

cells. Type A cells replenish the stem cells, and type B cells differentiate into primary spermatocytes. The primary spermatocyte divides meiotically (Meiosis I) into two secondary spermatocytes; each secondary spermatocyte divides into two equal haploid spermatids by Meiosis II. The spermatids are transformed into spermatozoa (sperm) by the process of spermiogenesis. These develop into mature spermatozoa, also known as sperm cells.

Thus, the primary spermatocyte gives rise to two cells, the secondary spermatocytes, and the two secondary spermatocytes by their subdivision produce four spermatozoa and four haploid cells.

- **Testosterone**

Testosterone is the primary male hormone responsible for regulating sex differentiation, producing male sex characteristics, spermatogenesis and fertility.

Testosterone is responsible for the development of primary sexual development, which includes testicular descent, spermatogenesis, enlargement of the penis and testes, and increasing libido.

In addition, testosterone is involved in health and well-being, and the prevention of osteoporosis.

- Note: Insufficient levels of testosterone in men may lead to abnormalities including frailty and bone loss.

Mechanism

In puberty, the hypothalamic-pituitary-gonadal axis takes a major role in regulating testosterone levels and gonadal function. The hypothalamus secretes Gonadotropin releasing hormone GnRH, which travels down the hypothalamo-hypophyseal portal system to the anterior pituitary, which secretes luteinizing hormone (LH) and follicle stimulating hormone (FSH).

LH and FSH are two gonadotropic hormones which travel through the blood and act on receptors in the gonads. LH in particular acts on the Leydig cells to increase testosterone production. Testosterone limits its own secretion via negative feedback.

High levels of testosterone in the blood feedback to the hypothalamus to suppress the secretion of gonadotropin releasing hormone and also feedback to the anterior pituitary, making it less responsive to GnRH stimuli.