Lecture notes for Monday December 2, 2002

Outline

• Meiosis
• Male reproductive system: testes - structure & functions

Terminology

• Gametes = male or female reproductive cell = sperm or secondary oocyte
• Gonad = organ that produces gametes & secretes sex hormones

Meiosis

• Somatic cells have 23 pairs of chromosomes. All except one pair are homologous. In the male one pair has an X chromosome & a Y chromosome
• Somatic cells are DIPLOID (2n) one set from each parent

• Gametes are HAPLOID (n)
• Two stages in Meiosis: stage I & stage II
• Both stages are similar to mitosis (PMAT I & PMAT II)
• Stage I: formation of homologous pairs to form set of 4 chromatids = TETRAD

• Crossing-over => formation of a new combination of genes => genetic variation
• Result: 2 haploid cells BUT each chromosome has 2 chromatids
• Stage II: no replication
• End result: One diploid cell produces 4 haploid gametes

Male Reproductive System

• Scrotum = support structure for testes
• Dartos & cremaster muscles help regulate temp. of testes
• Sperm production occurs at 2-3 degrees C below normal core body temp.

Testes

• Surrounded by fibrous capsule = tunica albuginea
• 200-300 lobules/testis
• 2-3 seminiferous tubules/testis where spermatogenesis occurs

• Cryptorchidism
• Testicular cancer
• Structure of the seminiferous tubule:
  spermatogonia (2n; stem cell)
  primary spermatocytes (2n)
  secondary spermatocytes (n)
  spermatids (n)
  sperm cells (n)

• Sertoli cells = sustentacular cells: protect & nourish sperm; secrete hormone INHIBIN
• Leydig cells = interstitial cells: secrete testosterone

**Sperm cell**
• 65-75 days to mature
• 300 million/day
• Head: nucleus + acrosome
• Midpiece: mitochondria
• Tail = propeller

**Hormonal control of spermatogenesis**
• Hypothalamus secretes Gonadotropin Releasing Hormone (GnRH)
• Anterior pituitary secretes:

  Gonadotrophic hormones:
  1. Luteinizing hormone (LH) stimulates Leydig cells to secrete TESTOSTERONE
  2. Follicle stimulating hormone (FSH) stimulates spermatogenesis

**Testosterone**
• Prenatal development
• Development of male sexual characteristics
• Development of sexual function
• Stimulates protein synthesis