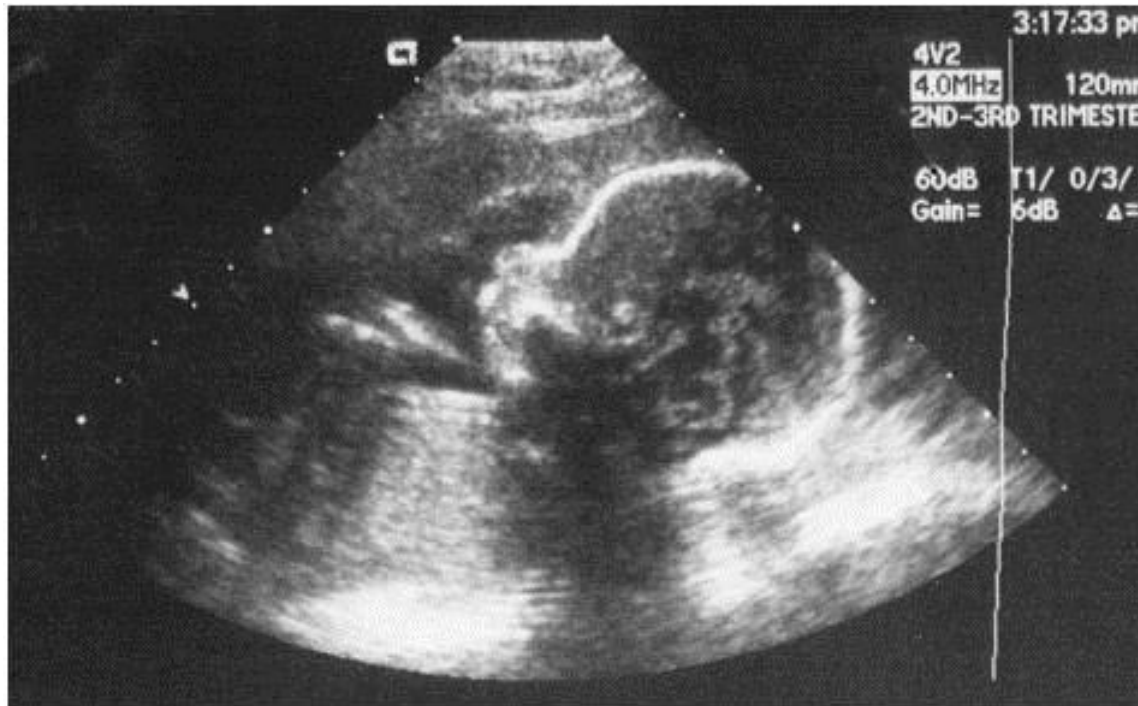


Reproductive System



Male Reproduction Anatomy

- Testes
 - Seminiferous tubules
- Epididymis
- Vas deferens
- Ejaculatory duct
- Urethra
- Prostate gland
- Seminal vesicles
- Bulbourethral gland
- Penis
 - Corpus cavernosum and Corpus spongiosum
 - Glans penis
 - Prepuce

Female Reproduction Anatomy

- Ovary
 - Follicular cells and corpus luteum
- Fallopian / Uterine tubes
 - Fimbrae
- Uterus
 - Cervix
 - Endometrium, Myometrium, and Perimetrium
- Vagina
 - Hymen
- Vulva
 - Clitoris
 - Labia majora and minora
 - Vestibule

Gamete Formation

- **Spermatogenesis** – occurs within the seminiferous tubules of the testes
 - Before puberty, mitosis occurs to make more stem cells
 - After puberty, **Follicle Stimulating Hormone (FSH)** stimulates meiosis to make spermatids which will develop into mature sperm

- Another hormone involved in puberty is **Luteinizing Hormone (LH)** which stimulates the gonads to release testosterone (starts secondary sex characteristics)
 - Deepening of voice, hair development, enlarged skeleton and muscles

Meiosis Review

- Purpose: To get cells that have half the amount of DNA as the parent cell – diploid to haploid cells
 - Prophase, Metaphase, Anaphase, Telophase twice
- Prophase I is extremely important for the diversity of life
 - Homologous chromosomes find their match
 - The DNA is so close together that crossing over occurs (mixing of DNA)
 - This creates a unique mixture of DNA in each sperm and egg cell

Spermatogenesis

- Primary spermatocyte starts meiosis
- Secondary spermatocyte forms from first division
- After 2nd division, early spermatids form
- These cells get flagella added and a decrease in cytoplasm - sperm

Male Erection, Orgasm, and Ejaculation

- Sexual stimulation causes parasympathetic nerve impulses to release nitric oxide to dilate arteries in penis
- Erection
 - Blood accumulates in the erectile tissue and penis swells and elongates
- Orgasm
 - Culmination of sexual stimulation and includes emission and ejaculation

Male Erection, Orgasm, and Ejaculation

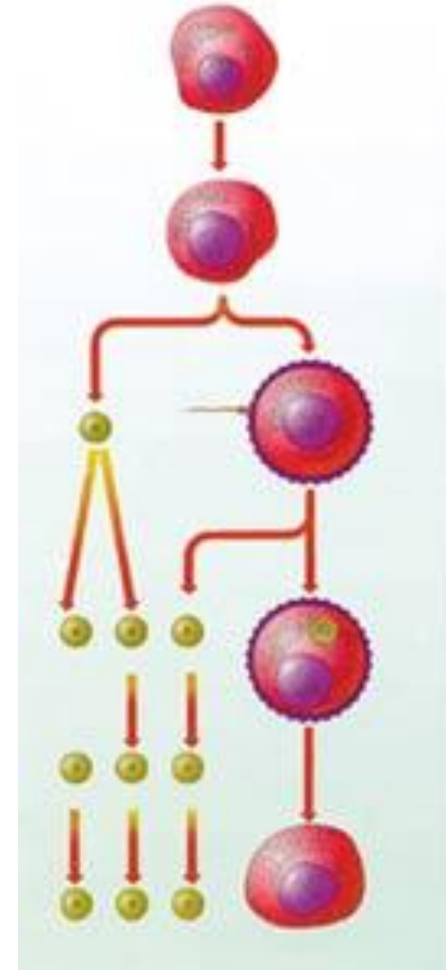
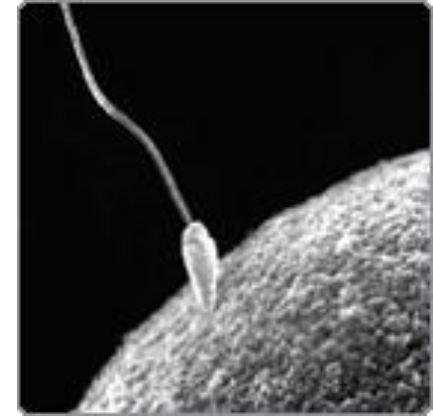
- Emission
 - Movement of sperm from testes to glands
 - Triggered by sympathetic impulses
- Ejaculation
 - Increased pressure in erectile tissue helps force semen through the urethra in rhythmic contractions
- After ejaculation, blood vessel constrict and penis returns to its flaccid state
- Semen contains citric acid, free amino acids, fructose, enzymes, phosphorylcholine, prostaglandin, potassium, and zinc

Ovarian and Menstrual Cycle

- Monthly release of an egg = ovarian cycle
- Cyclic changes in the endometrium = menstrual cycle
 - Each women is fertile for about 45 years of her life
- **Estrogen** and **Progesterone** work together to regulate the menstrual cycle and estrogen coordinates the appearance of the secondary sex characteristics
 - LH and FSH also contribute to changes
- At **menopause**, estrogen levels decline and menstruation stops
 - Can lead to osteoporosis and other complications

Gamete Formation

- Oogenesis – occurs in the ovaries
 - Egg cells develop within a follicle in the ovary
 - Before birth, mitosis grows the numbers of immature primary oocytes
 - At puberty, meiosis occurs and one egg cell is produced with 3 polar bodies (unequal division of the cytoplasm)
 - Second division occurs only if egg is fertilized



Oogenesis

- Primary oocyte starts meiosis
- Result is 1 polar body and secondary oocyte
- No fertilization = no 2nd meiosis
- Fertilization = another polar body and an ovum (egg)
- Polar bodies eventually breakdown

Ovarian cycle

- Primary follicle forms
- Follicular cells forms – contains primary oocyte
 - Filled with follicular fluid
- Ovulation occurs (ruptures ovary)
 - Secondary oocyte forms and 1 polar body forms
- Corpus luteum breaks down only if fertilization did not occur
 - If pregnant, corpus luteum will release hormones to start the development process

Menstrual Cycle

- Coincides with ovulation
 - Increase blood and nutrients to endometrium
- If egg is fertilized, it will implant 7 days after ovulation
 - Uterine lining is continuing to thicken
- If egg is not fertilized, then endometrial lining is shed = period or menses

Cycle takes about 28 days from menses to menses

Female Erection, Lubrication, and Orgasm

- Erection
 - When sexually stimulated, the parasympathetic nerve impulses triggers the release of nitric oxide to dilate blood vessels in the clitoris
- Lubrication
 - Impulses will also stimulate the vestibular glands to release a lubrication to facilitate insertion of the penis into the vagina
- Orgasm
 - Just prior to an orgasm, the vagina swells and fills with blood to increase the friction on the penis
 - The rhythmic contractions are helping to aid the transport of sperm into upper end of the fallopian tubes