Sexual Reproduction

Requires two steps:

1. Production of male & female germ cells ie “Gametes”
   - Male gamete: Sperm cell
   - Female gamete: Oocyte

2. Fertilization: male gamete (sperm cell) unites with female gamete (secondary oocyte)
   - resulting cell contains one set of chromosomes from each parent

The Reproductive Organs

- **Ducts**: store and transport gametes
- **Accessory sex glands**: produce substances that protect gametes and facilitate movement.
- **Supporting structures (delivery)**:
  - Penis: delivery of gametes
  - Uterus: delivery and joining of gametes, growth of fetus during pregnancy.

Number of Chromosomes

- Every single human somatic (body) cell has 46 chromosomes, made up of 23 PAIRS (23 from each parent)
- Each pair is called a homolog with homologous chromosomes that contain similar genes
- 22 of the homologs look the same and are called autosomes
- One of the 23 pairs is a pair of sex chromosomes which may or may not look the same depending on whether they belong to a male or a female.
  - **Females** carry 2 large X chromosomes
  - **Males** carry 1 large X and 1 small Y chromosome
Somatic cells are diploid cells (IE have 46 chromosomes, or 2 sets of 23 chromosomes).

Reproductive cells or ‘gametes’ are haploid cells (IE have only 1 set of 23 chromosomes).

Genetic symbols:
- \( n \) = # of different chromosomes
- In humans, \( n = 23 \)
- Diploid cells have \( 2n = 46 \), Haploid cells have \( n=23 \)

Meiosis produces Haploid Gametes

- Occurs in gonads
- **Meiosis** is reproductive cell division
- Produces Gametes, haploid cells with 1/2 number of chromosomes or 23 chromosomes
- Fertilization restores the diploid number of chromosomes

Meiosis produces 4 haploid cells

- Normally, DNA strands in chromosomes are loose & not visible. In meiosis:
  - Nuclear wall dissolves, chromosomes become coiled, visible, and duplicate into identical ‘sister chromatids’. So… genetic material has doubled
  - Spindles from centromeres pull chromosomes apart into 2 diploid cells
  - Division happens again, leaving 4 haploid cells

Meiosis I & Meiosis II

- During prophase I, the 2 identical sister chromatids from the mother and the 2 identical sister chromatids from the father are in very close proximity and can cross over, swapping some genetic material (recombination).
- Therefore, the 4 haploid daughter cells will be genetically different from the original germ cell.
Overview Of The Male Reproductive System

1. **Spermatogenesis**: sperm production
   - **Meiosis in Seminiferous tubules**
     - Temperature control: Cremaster & Scrotal Dartos muscles
     - Hormonal control: GnRH, LH, FSH, testosterone (Leydig cells)

2. Sperm maturation & storage
   - Duct system

3. Delivery of Sperm
   - Semen production - liquid from accessory sex glands
   - Penis - Erection and passageway
   - Ejaculation

Male Reproductive System

- **Testes**: produce sperm & testosterone (male sex hormone)
- **System of ducts**: assists in maturation of, transports & stores sperm
- **Semen**: sperm + secretions from accessory sex glands
- **Accessory sex glands**: (prostate, seminal vesicles, bulbourethral glands) produce the liquid portion of semen to protect gametes and facilitate movement
- Supporting structures include: scrotum and penis

Rate of Spermatogenesis

- **Spermatogenesis**: sperm production
  - 300 million sperm/DAY are produced in the testes from puberty until death
Hormonal stimulation of Spermatogenesis

- Starting at puberty,
- the Hypothalamus begins to secrete (GnRH) Gonadotropin-Releasing Hormone,
- which stimulates the Anterior Pituitary to release LH and FSH

1. LH (Luteinizing Hormone): stimulates Leydig cells to secrete Testosterone
2. FSH (Follicle-Stimulating Hormone) + Testosterone: stimulate spermatogenesis

Spermatogenesis

- Sertoli cells (nurse cells): have FSH receptors & make many secretions that create the right environment for spermatogenesis
- Leydig cells: ‘lie’ between seminiferous tubules and produce testosterone
- Meiosis starts at wall of the seminiferous tubule, and finishes at lumen

Spermatogenic primordial germ cells undergo Meiosis I, duplicate chromosomes, recombine DNA and divide.

Then, they divide again in Meiosis II to produce 4 haploid sperm cells which are non-motile at this stage

Sperm has 3 parts

- **Head:**
  - 1. Contains the Acrosome, a lysosome-like vesicle with enzymes that aid penetration of sperm cell into secondary oocyte
  - 2. Nucleus w haploid # of 23 chromosomes
- **Midpiece:** contains mitochondria - make energy to power:
- **Tail:** a flagellum made of microtubules that propels the sperm cell
Ducts, Epididymis, Vas deferens

JOURNEY OF THE SPERM

**Ducts Of The Testis**
- Fluid secreted by Sertoli cells generates pressure that pushes non-motile spermatozoa + fluid along the:
  - lumen of seminiferous tubules, then into:
    - straight tubules
    - rete testis
    - efferent ducts
  - finally into ductus epididymis

**Epididymis: Sperm maturation & storage**
- Epididymis: comma-shaped organ. lies along posterior border of each testis.
- Sperm mature in the Ductus epididymis
  - Sperm is also stored here. May remain stored for a month or more.
  - Or, peristaltic contraction will propel sperm into the ductus (vas) deferens

**Ductus (Vas) Deferens: Storage**
- The Ductus Deferens or Vas Deferens also stores sperm or conveys them towards urethra by peristaltic contractions of the muscular coat
  - Sperm that are not ejaculated are eventually reabsorbed.
Normal sperm production requires 2-3°C below core body temp
- The scrotum is outside pelvic cavity, and so maintains a lower temp (95°F)
- Along with Dartos muscle of scrotum, the
- Cremaster muscle elevates & lowers testes
  - upon exposure to cold or during sexual arousal,
  - These muscles move the testes closer to pelvic cavity to absorb body heat
  - procedure is reversed in response to warmth

Scrotum
- Scrotum: supporting structure for the testes
- Externally, looks like single pouch of skin separated by a median ridge of skin called the raphe.
- Internally, there is a scrotal septum - separates scrotum into two distinct sacs, each containing a single testis.
  - Scrotal septum contains muscle tissue: dartos muscle
  - When the dator muscle contracts, skin of scrotum wrinkles and elevates the testes

Accessory Sex Glands
1. Seminal vesicles
2. Prostate
3. Bulbourethral glands: secrete most of the liquid portion of the semen
Seminal Vesicles: coagulum, alkaline & fructose

- **Seminal vesicles** secrete an alkaline, viscous fluid which:
  1. Helps semen coagulate within first 5 min after ejaculation (coagulum)
     - Coagulation helps semen to stay inside vagina
  2. Neutralizes acid secretions of female reproductive tract
  3. Provides fructose for ATP production by sperm
     - ATP powers flagella / sperm motility

Prostate & Bulbourethral gland secretions

- **Prostate**:
  - secretes milky, slightly acidic fluid with enzymes like PSA, zinc etc
  - liquefies seminal coagulum (PSA), to release sperm

- **Bulbourethral (Cowper’s) glands**:
  - secretes alkaline mucous to lubricate lining of urethra and tip of penis during intercourse & neutralize acidic environment of urethra

Semen: sperm + seminal fluid

- Seminal fluid provides:
  - transportation medium
  - nutrients for sperm - fructose
  - slightly alkaline pH of 7.2 – 7.7
  - Neutralizes hostile acidic environments of male urethra and female vagina
- liquid consists of secretions from:
  - 1) seminiferous tubules, 2) seminal vesicles, 3) prostate, 4) bulbourethral glands
- 50-150 million sperm/mL
  - <20 million sperm/mL = infertility
- Milky appearance is due to:
  - prostatic secretions
- Sticky consistency:
  - fluids from seminal vesicles and bulbourethral glands

ERECTION & EJACULATION
Erection

- Upon sexual stimulation,
  - arteries supplying penis dilate, blood flow increases
  - large quantities of blood enter sinuses of corpus cavernosum
- Expansion of sinuses **compresses veins** draining penis, so blood outflow is slowed
- Return to flaccid state when arteries constrict and **pressure on veins is relieved**
- Local release of nitric oxide and a **parasympathetic reflex** result in erection (enlargement and stiffening of penis)

Ejaculatory Duct Openings

- Are formed by union of seminal vesicle duct and ampulla of ductus deferens.
- Just before ejaculation sperm from the vas deferens & secretions from the seminal vesicles pass into and are ejected from **ejaculatory ducts into urethra**

Emission

- **Emission**: discharge of small volume of semen before ejaculation
  - peristaltic contractions propel semen into penile urethra
  - may also occur during sleep (nocturnal emission)
- **Alkaline seminal fluid** neutralizes acidity of urethra, protecting sperm
- In males, the urethra is the terminal duct of both reproductive and urinary systems

Ejaculation

- **Ejaculation** is a sympathetic reflex at S2-S4.
- Urinary bladder smooth muscle sphincter closes - urine is not expelled and semen does not enter urinary bladder
- Semen is ejected from urethra by rhythmic involuntary contractions of **bulbospongiosus muscle**
- Once ejaculated, most sperm do not survive more than 48 hours in female reproductive tract
**FEMALE REPRODUCTIVE SYSTEM**

**Oogenesis & Folliculogenesis**

- **Ovaries:**
  - In a female fetus, by ~20 wks, in the ovaries, most of its 1st oocytes have developed from oogonia (stem cells). These have 46 chromosomes & are stuck in prophase I.
  - After birth, each 1st oocyte can remain dormant in prophase I for up to 50 yrs.
  - After menarche, each month, before ovulation, follicular secretions, influence a 1st oocyte to become a 2nd oocyte w/ 23 chromosomes.
  - During ovulation, one 2nd oocyte is expelled.

- **Follicules:**
  - By birth, all 1st oocytes (2n) are covered by a single layer of flat follicular cells, called the primordial follicle.
  - Local growth factors etc recruit some primordial follicles to awaken:
    - Primordial follicles → 1st follicles → 2nd follicles → Graffian follicle
  - It takes ~375 days from primordial follicle to preovulatory follicle.

**Functions of the Female Reproductive System**

- **Ovaries:** produce secondary oocytes & hormones (progesterone, estrogens, inhibin, relaxin)
- **Uterine tubes:** transport 1 secondary oocyte to uterus. Normally, site where fertilization occurs.
- **Uterus:** implantation of fertilized ovum, fetal development, labor.
- **Vagina:** receives penis during sexual intercourse, childbirth passageway.
- **Mammary glands:** synthesize, secrete, eject milk to nourish newborn.
Theca & Granulosa

- Follicles have 2 main cell types:
  1. **Theca**: expresses LH receptors. LH binding causes theca to make androgens from cholesterol.
  2. **Granulosa**: FSH & LH receptors.
     - Mainly secretes estradiol (E₂)
     - Converts thecal androgens to estrogen.
     - Secretes inhibin which along with estrogen inhibits LH & FSH
     - FSH causes proliferation of granulosa cells, and thus estrogen, to rise.

- At any given moment, the ovary has follicles in all stages of development
- The follicle becomes sensitive to, or dependent on, FSH & LH only at the Graafian/Antral stage

LH – Androgens

FSH – Estrogens

- When LH stimulates theca cells they secrete Androgens:
  - Mainly Androstenedione
  - Also Testosterone
- When FSH stimulates the granulosa cells they secrete Estradiol (E₂)
  - Granulosa Converts androgens to estrogen

THE MENSTRUAL CYCLE

- Around age 8-13, the female brain (hypothalamus) starts producing GnRH which causes release of FSH (follicle stimulating hormone) from the anterior pituitary, initiating the first menstruation, or menarche.
- Menstruation will occur approximately every 28 days until age 45-50.
The Menstrual cycle is divided into 2 phases of ovarian events, which affect the uterus:

1. **The follicular phase**
   - **Ovary**: the follicle is growing around the oocyte and increasing estrogen secretion.
   - **Uterus**: menstruation, then proliferation of endometrium

2. **The luteal phase**
   - **Ovary**: after ovulation, what is left of the follicle becomes the corpus luteum, which secretes progesterone & estrogen.
   - **Uterus**: secretory phase until Progesterone & E drops, then lining degrades

**FOLLICULAR PHASE**

Day 1-14 Follicles are growing.

**Ovary: Follicles day 1-14**

- Day 1-7: Multiple Antral follicles are competing for FSH
- On Day 7: One Graffian follicle, the most sensitive to FSH, becomes the huge (2.5cm), Preovulatory follicle
- The preovulatory follicle secretes inhibin which lowers FSH so the others follicles die – atresia
- Day 12: Preov. follicle secretes enough estrogen to stimulate LH surge

**Ovulation**

- Day 14 – the estrogen peak from the follicle causes the anterior pituitary to release an LH surge. This surge causes ovulation.
- A 2’ oocyte (metaphase II) and its corona radiata are released from within the preovulatory follicle
Uterine Tubes, Fimbriae

- Fimbriae, fingerlike projections at the end of uterine tubes, have cilia on its surface that move the oocyte towards the uterus.
- Fimbriae "sweep" the expelled oocyte from the pelvic cavity into the fallopian tubes.
- The Oocyte will survive 12-24 hrs after ovulation.

Day 15-28. The Corpus Luteum

LUTEAL PHASE

Uterus
d. 1-14

- Day 1-4: menstruation. very low levels of estrogen and progesterone cause the uterine lining, the endometrium to shed
- Day 5-13: proliferation: as the follicles secrete estrogen, the endometrium grows thicker

Corpus luteum

- Day 15-28, in the ovary, the leftover ruptured follicle becomes the yellow corpus luteum (~2-6cm).
  - It secretes high levels of progesterone, & low levels of estrogen & inhibin.
  - Progesterone:
    - stops the effects of estrogen on cell division. It prevents the uterine lining from becoming too thick or crowded due to estrogenic cell division.
    - prevents the uterus from contracting (premature labor) due to effects of prostaglandins.
    - Raises the woman’s body temp
  - Without fertilization, CL degrades within 14 days, progesterone and estrogen secretion drops and menses commence.
• If no fertilization occurs, the corpus luteum in the ovary degrades.

• The drop in Progesterone (& estrogen) levels triggers the uterus to secrete prostaglandins.

• Prostaglandins cause:
  1. Uterine smooth muscle to contract & expel lining = menstrual cramps
  2. Uterine spiral arterioles to constrict which cuts off blood/oxygen supply to endometrium. It then dies & sloughs off = menses

• Normal blood flow 50-150mL from 3-7 days

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**FERTILIZATION**

• During sexual arousal, vagina can stretch & lengthen, cervix retracts to accept penis

• Tens of millions of sperm are deposited into vagina during ejaculation

• Sperm must cross vagina, cervix, uterus, into uterine tube to fertilize the oocyte

• Only a few dozen sperm reach an oocyte

• Most sperm arrive in 45 min, fastest in 15 min, slowest can arrive up to 3 days later. Speed depends on:
  - sperm motility - straight path vs
  - Vaginal secretion quality - pH, viscosity, ion concentration Ca…
Cervical Mucus

• Vagina is normally acidic (pH 3-4)
• Normally mucus forms a mucus plug that impedes passage of sperm (and bacteria) into cervix
• Just before / during ovulation, under influence of estrogen, cervical mucus changes quality to aid sperm motility. Lasts ~2 days
• Becomes stretchy, like egg white, called Spinnbarkeit mucus.
  – becomes alkaline (pH8.5)
  – More abundant
  – Higher water content
  – Aids capacitation of sperm - makes flagella beat more vigorously
• After ovulation, under progesterone becomes scanty, thick, tacky

Diploid Zygote, Mitosis & Implantation

• After fertilization, nuclear materials of haploid ovum and haploid sperm unite.
• diploid fertilized ovum = “zygote”. Begins cell divisions (mitosis) while moving toward the uterus.
• Arrives at uterus 6-7 days after ovulation and implants in uterine endometrium.

Fertilization

• Fertilization can occur anytime w/in 24 hrs after ovulation
• Sperm live up to 3 days in female reproductive tract
• Sperm usually fertilizes a 2° oocyte in ampulla of uterine (fallopian) tube
• If sperm penetrates oocyte, meiosis II completes, creating a mature ovum (& 3 polar bodies ie like leftovers)

Summary of Hormones

FSH: stimulates growth of follicle which secretes mostly estrogen - mainly grows things: uterine lining, breasts, secondary sex characteristics
LH: stimulates ovulation>corpus luteum which secretes mostly progesterone - mainly maintains things: especially uterine lining & thus pregnancy!
Summary of hormones II

APPENDIX

Testes

- Testes, or Testicles: paired oval glands
- Tunica Vaginalis: serous membrane, partially covers the testes
- Tunica Albuginea: divides testes into lobules
- Lobules: contain 200-300 seminiferous tubules where sperm are produced
  - 2 types of cells:
    - Spermatogenic cells – sperm-forming cells
    - Sertoli cells – supporting cells
- Leydig cells: lie between seminiferous tubules and produce testosterone

Spermatic Cord

- A supporting structure of the male reproductive system that ascends out of the scrotum
- The spermatic cord passes through the inguinal canal into the abdomen.
Inguinal Canal

- canal originates at deep (abdominal) inguinal ring
- slitlike opening in aponeurosis of transversus abdominis muscle
- canal ends at superficial (subcutaneous) inguinal ring.
- opening in aponeurosis of external oblique muscle

Inguinal Hernias

- The inguinal region is a weak area in the abdominal wall.
- Consequently, it is often the site of an inguinal hernia – a rupture or separation of a portion of the inguinal area of the abdominal wall.

Inguinal Hernias

- Indirect inguinal hernia – part of the small intestine protrudes through the deep inguinal ring and enters the scrotum.
- Direct inguinal hernia – a portion of the small intestine pushes into the posterior wall of the inguinal canal causing a localized bulging in the wall of the canal.

Penis

- Contains urethra - passageway for ejaculation of semen and secretion of urine
- Consists of root, body, and glans penis
- Root of penis is the attached (proximal) portion. It consists of:
  - Bulb of penis (expanded portion of the base).
  - Crura of penis (the 2 separated and tapered portions).
Penis

- **Body** of penis
- **Glands** of penis – slightly enlarged, acorn-shaped region (distal region)
  - **prepuce (foreskin)** covers the glans in an uncircumcised penis
  - **fundiform ligament** and **suspensory ligament** of penis arise from the pubic symphisis and support the weight of the penis.

Organs Of The Female Reproductive System

- **Ovaries**
- **Uterine (Fallopian) tubes** (oviducts)
- **Uterus**
- **Vagina**
- **External organs**

Related Medical Specialties

- **Gynecology**: medical specialty concerned with diagnosis and treatment of diseases of the female reproductive system.
- **Urology**: The study of the urinary system. Urologists also diagnose and treat diseases of the male reproductive system.

Ovaries

- The female gonads are the 2 ovaries
- lie on either side of uterus
- produce the gametes that develop into mature ova (eggs) after fertilization
- produce the hormones progesterone, estrogens (female sex hormones), inhibin, and relaxin
Supporting Ligaments of the Ovaries

- **Broad ligament** of uterus attaches to ovaries and holds them in position
- **Ovarian ligament** anchors ovaries to uterus.
- **Suspensory ligament** attaches ovaries to pelvic wall

Uterine (Fallopian) Tubes

- Females have 2 uterine (fallopian) tubes, or oviducts
- extend laterally from uterus
- route for sperm to reach an ovum
- transport secondary oocytes / fertilized ova from ovaries to uterus
- movements of **fimbriae** (fingerlike projections) create local currents that sweep ovulated secondary oocyte from pelvic cavity into uterine tube

Anatomy Of Uterus

- Anatomical divisions of uterus include:
  - **Fundus** – dome shaped portion superior to uterine tubes
  - **Body** – tapering central portion. uterine cavity lies in here.
  - **Isthmus** – portion between body and cervix
  - **Cervix** – an inferior narrowing portion that opens into the vagina.
  - The interior is called the **cervical canal**.
  - opens into uterine cavity at internal os
  - Opens into vagina at external os

Uterus

- part of pathway for sperm deposited in vagina to reach uterine tubes
- site of implantation of a fertilized ovum
- development of fetus during pregnancy
- Contracts to expel fetus during labor in response to oxytocin
- When implantation does not occur, uterus is source of menstrual flow.
Anatomy Of The Uterus

- **Anteflexion**: normal. Body of uterus projects anteriorly and superiorly over the urinary bladder.
- **Retroflexion**: posterior tilting of uterus
- Uterosacral ligaments, cardinal (lateral cervical) ligaments, and round ligaments normally hold the uterus in anteflexion, but can permit enough movement for the uterus to become malpositioned.

Vagina

- Tubular, 3-5 inch long fibromuscular canal lined with mucous membrane.
- Extends from the exterior of the body to uterine cervix.
- Receptacle for penis during sexual intercourse.
- Outlet for menstrual flow.
- Passageway for childbirth.
- Acidic environment retards microbial growth, but also harmful to sperm.

Vagina: Hymen

- **Hymen**: thin fold of vascularized mucous membrane closes the inferior end of the vaginal opening to the exterior (vaginal orifice).
- **Imperforate hymen**: sometimes hymen completely covers orifice. Surgery may need to be performed to permit the discharge of menstrual flow.

Vulva

- Vulva/pudendum refer to external genitals of female.
- Mons pubis: elevation of adipose tissue covered by skin and coarse pubic hair. Cushions pubic symphysis.
- Labia majora.
- Labia minora.
- Clitoris – a cylindrical mass of erectile tissue and nerves.
- Prepuce of the clitoris.
- Vestibule.
- Vaginal orifice.
- External urethral orifice.
- Pararethral (Skene’s) glands – mucous secreting glands.
- Greater vestibular (Bartholin’s) glands – mucous secreting glands.
Perineum

- **diamond-shaped area** medial to thighs and buttocks of both males and females
- contains the external genitals and anus
- bounded on anterior by pubic symphisis, laterally by ischial tuberosities, and posteriorly by coccyx.
- **anterior urogenital triangle** contains external genitals and **posterior anal triangle** contains anus.

Mammary Glands

- modified sudoriferous (sweat) glands that produce milk.
- nipple w lactiferous ducts where milk emerges
- Areola: area surrounding nipple. contains sebacous (oil) glands
- suspensory ligaments of breast (cooper’s ligaments) support breast tissue
- functions of mammary glands are: synthesis, secretion, and ejection of milk (lactation)

Fibrocystic Disease Of The Breasts

- The breasts of females are highly susceptible to cysts and tumors.
- Fibrocystic disease is the most common cause of breast lumps in females.

Fibrocystic Disease Of The Breasts

- Cysts (fluid filled sacs) develop.
- Mainly in females between ages 30 and 50 due to excess of estrogens or deficiency of progesterone.
- This occurs about a week or so before menstruation begins.
Episiotomy

- During childbirth, the emerging fetus stretches the perineal region.
- A physician sometimes performs an episiotomy, a perineal cut made with surgical scissors.

Episiotomy

- The cut enlarges the vaginal opening to make more room for the fetus to pass.
- The straight cut is easier to suture than the jagged tear that may form naturally.
- The incisions is closed in layers with a suture that is absorbed. Stitches do not need to be removed.

Hysterectomy

- Hysterectomy is the surgical removal of the uterus.
- It is the most common gynecological operation.
- It may be indicated in conditions such as endometriosis, pelvic inflammatory diseases, recurrent ovarian cysts, excessive uterine bleeding, and cancer of the cervix, uterus, or ovaries.

Uterine Prolapse

- Uterine prolapse is a falling down or downward displacement of the uterus.
- This condition may result from weakening of supporting ligaments and pelvic musculature.
Uterine Prolapse

• This is associated with disease, traumatic vaginal delivery, chronic straining from coughing or difficult bowel movements, or pelvic tumors.

Uterine Prolapse

• Degrees of prolapse:
  – 1st degree (mild) – the cervix remains within the vagina,
  – 2nd degree (marked) – the cervix protrudes to the exterior through the vagina.
  – 3rd degree (complete) – the entire uterus is outside the vagina.

Uterine Prolapse

• Treatment varies depending upon the degree of prolapse:
  – Pelvic exercise.
  – Dieting if the patient is overweight.
  – A stool softener to minimize straining during defecation.
  – Pessary therapy – placement of a rubber device around the uterine cervix to prop up the uterus.
  – Surgery.

Circumcision

• Circumcision is a surgical procedure in which part or the entire prepuce is removed.
• It is usually performed just after delivery, 3 to 4 days after birth, or on the 8th day as part of a Jewish religious rite.
• The following benefits may result from circumcision: lower risk of urinary tract infections, protection against penile cancer, and possibly a lower risk of STDs.
Cryptorchidism

• A condition in which the testes do not descend into the scrotum.
• It occurs in about 3% of full-term infants and 30% of premature infants.

Cryptorchidism

• Untreated b/l cryptorchidism often results in sterility due to high temperatures.
• The testes of about 80% of boys with cryptorchidism descend spontaneously within the 1st year of life.
• Untreated, it results in a greater chance of testicular cancer.

Sperm morphology

• Determined by sperm analysis
• Poor morphology is one cause of male infertility