

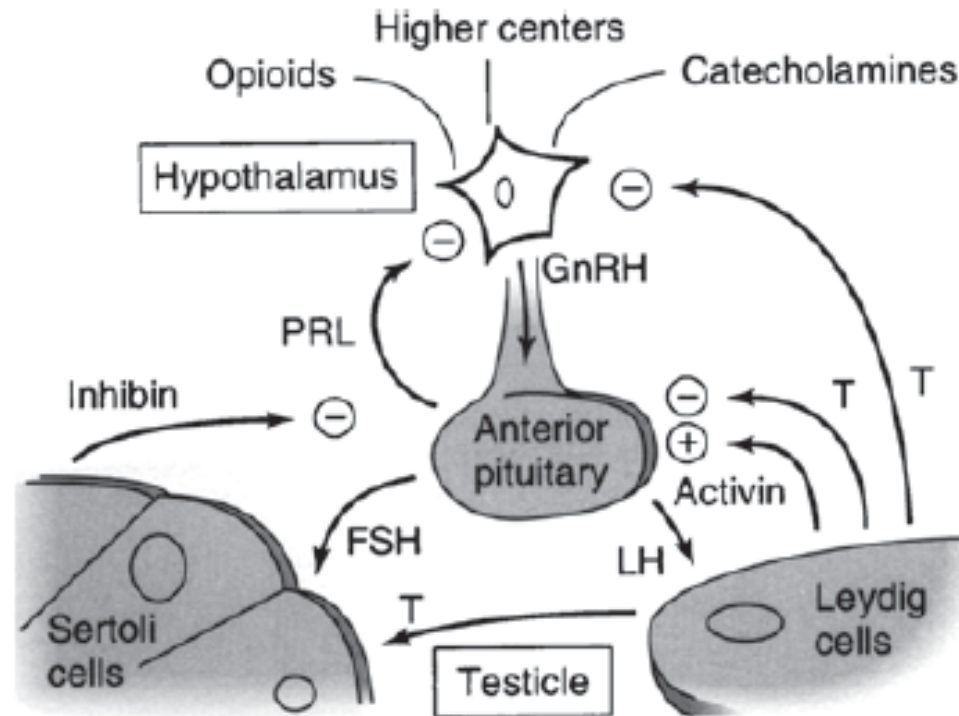
# **Male Infertility**

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Dr.Ahmed Abdul-Aziz Ahmed  
F. I.B.M.S**

# Definition

- inability to conceive after **1** year of unprotected sexual intercourse.
- **15% of couples.**
- **40%: male;**
- **40%: female;**
- **20%: both**

# Hypothalamic- Pituitary- Gonadal Axis

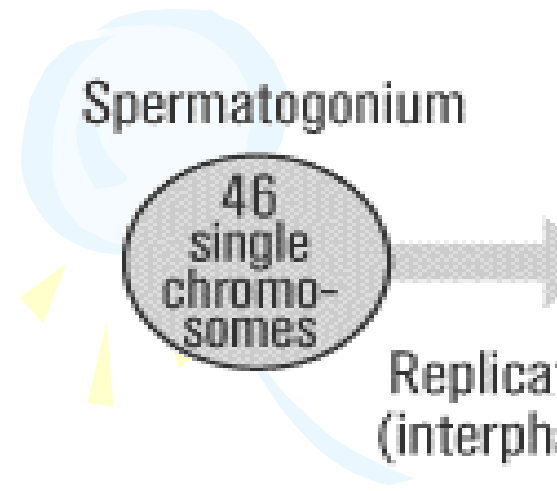


# Testis function

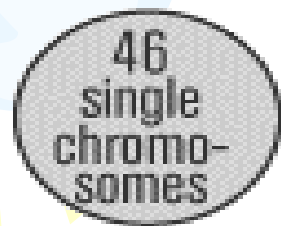
- **Endocrine: testosterone, 2% free, 98% bound to sex hormone binding globulin (SHBG).**
- **Estrogen, thyroid hormone: decrease SHBG, increase free T;**
- **Androgen, growth hormone, obesity: on the contrary**
- **Exocrine: sperm**

# Spermatogenesis

- Sertoli cell: tight junction. The strongest intercellular barriers in the body: blood-testis barrier; nurse cells
- Germ cells: spermatogonia; primary spermatocytes; secondary spermatocytes, spermatid. Mitosis and meiosis



Spermatogonium



Replication  
(interphase)



Meiosis I

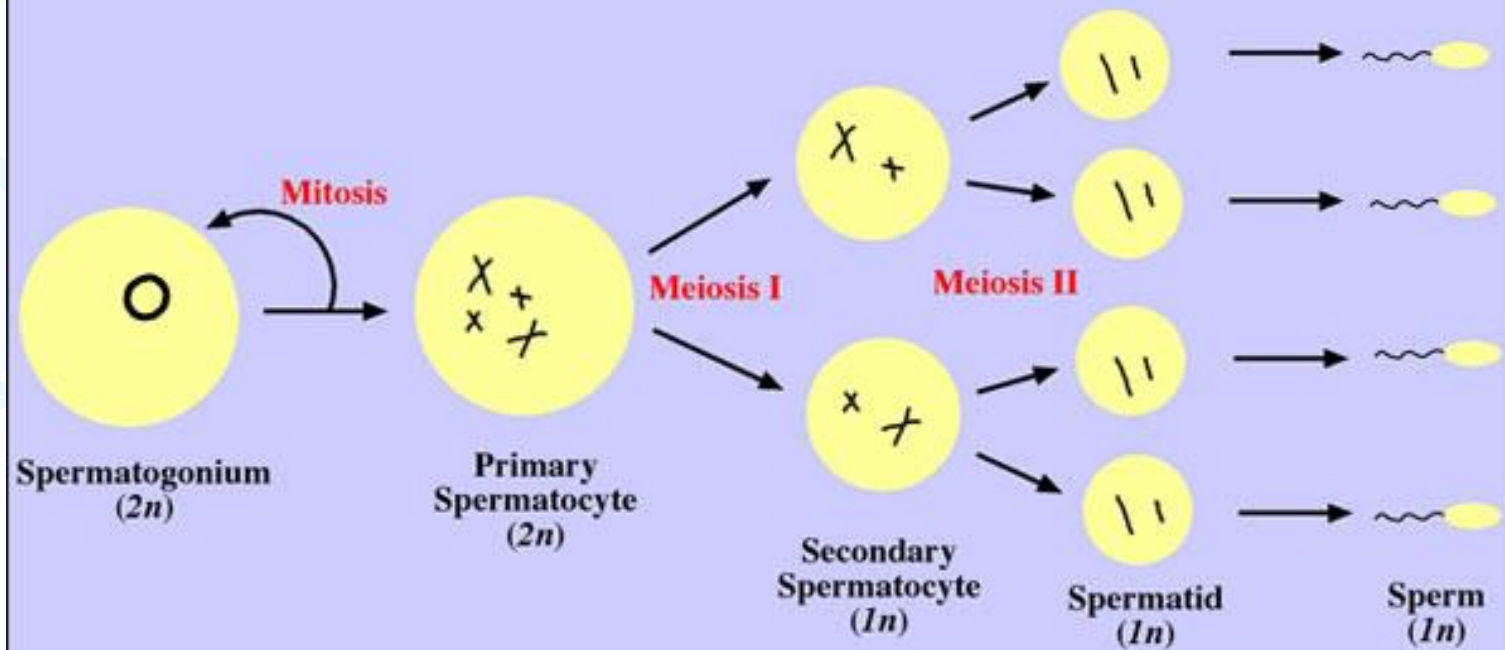


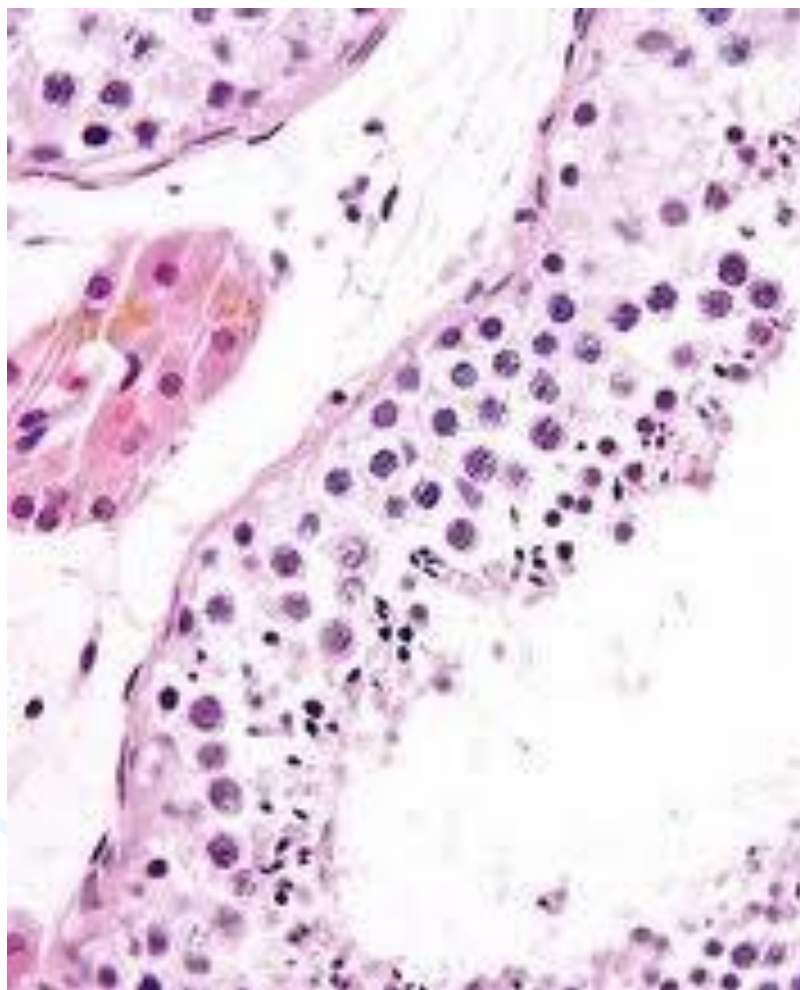
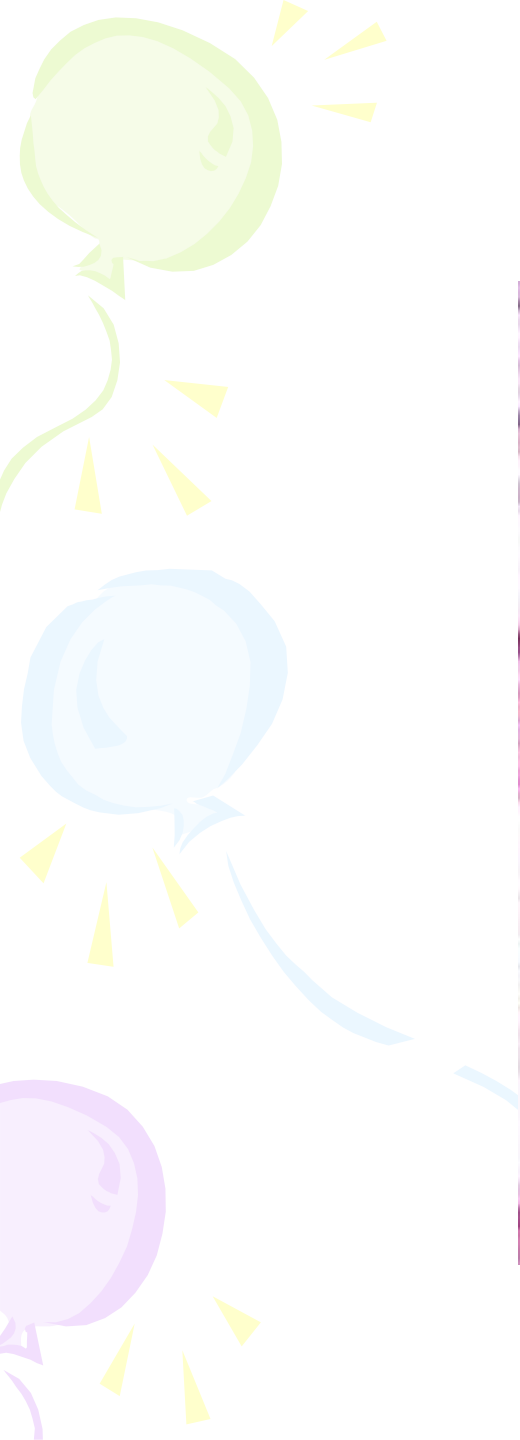
Sperm



Meiosis II

# Spermatogenesis







Three balloons (green, blue, and purple) are positioned on the left side of the slide, each with yellow triangular streamers. The green balloon is at the top, the blue one is in the middle, and the purple one is at the bottom. They are all tied with strings that trail off to the left.

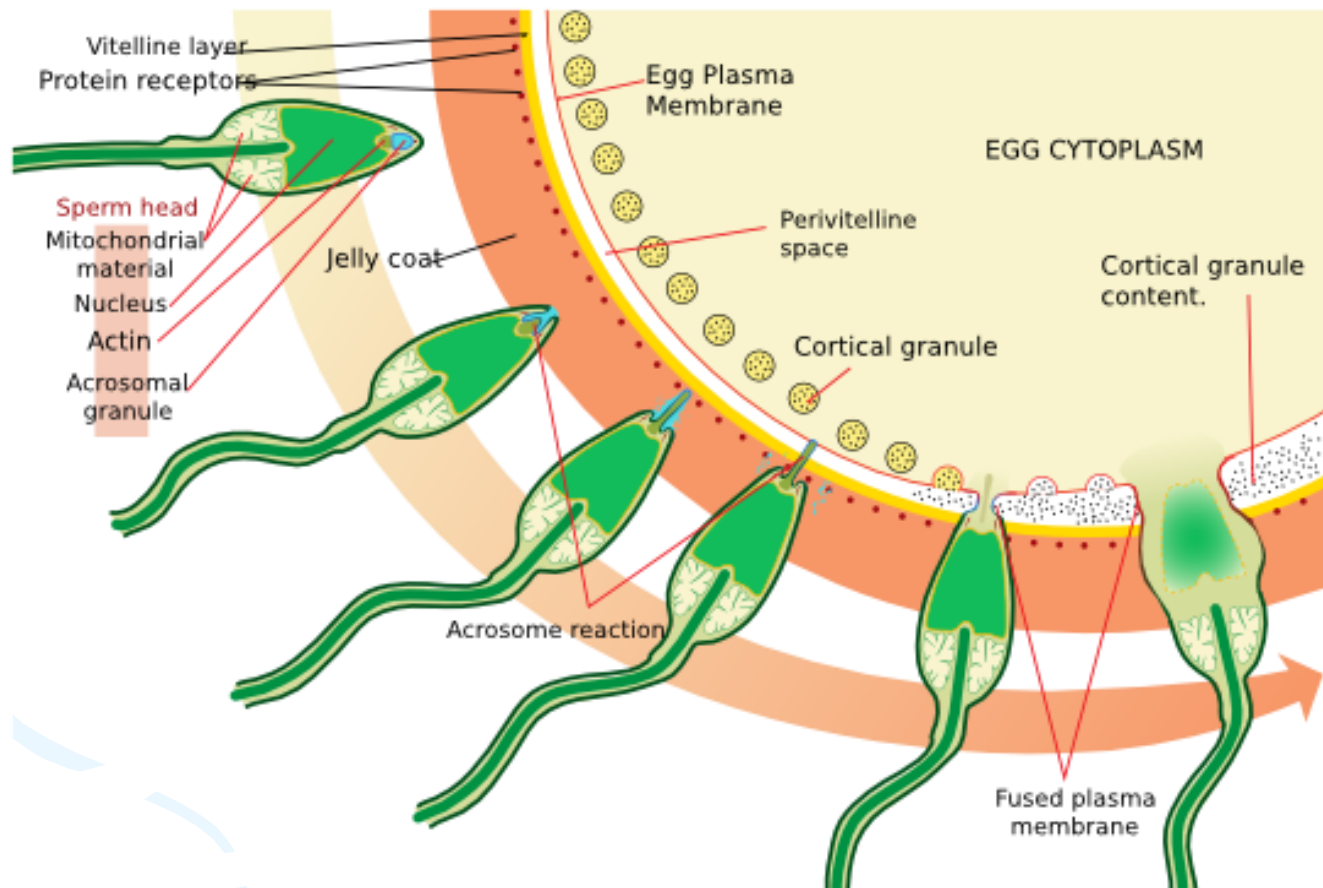
# cycles

- within the human testis, 60 days;  
sperm maturation: 10-15 days

Three balloons (green, blue, and purple) with yellow streamers are positioned on the left side of the slide.

# Fertilization

- Middle of the female menstrual cycle, the cervical mucus changes
- Acrosome reaction, zona reaction







# Diagnosis of male infertility

## History

- Duration of infertility; earlier pregnancies
- Sexual history, timing and frequency, lubricants
- Medical and surgical history
  - fever, acute infection, surgical procedure of bladder, retroperitoneum, pelvis, hernia
- Childhood diseases: mumps, cryptorchidism
- Medication, pesticides, radiation, tobacco, cocaine, marijuana, androgenic steroids, hot tubs or saunas
- Family history



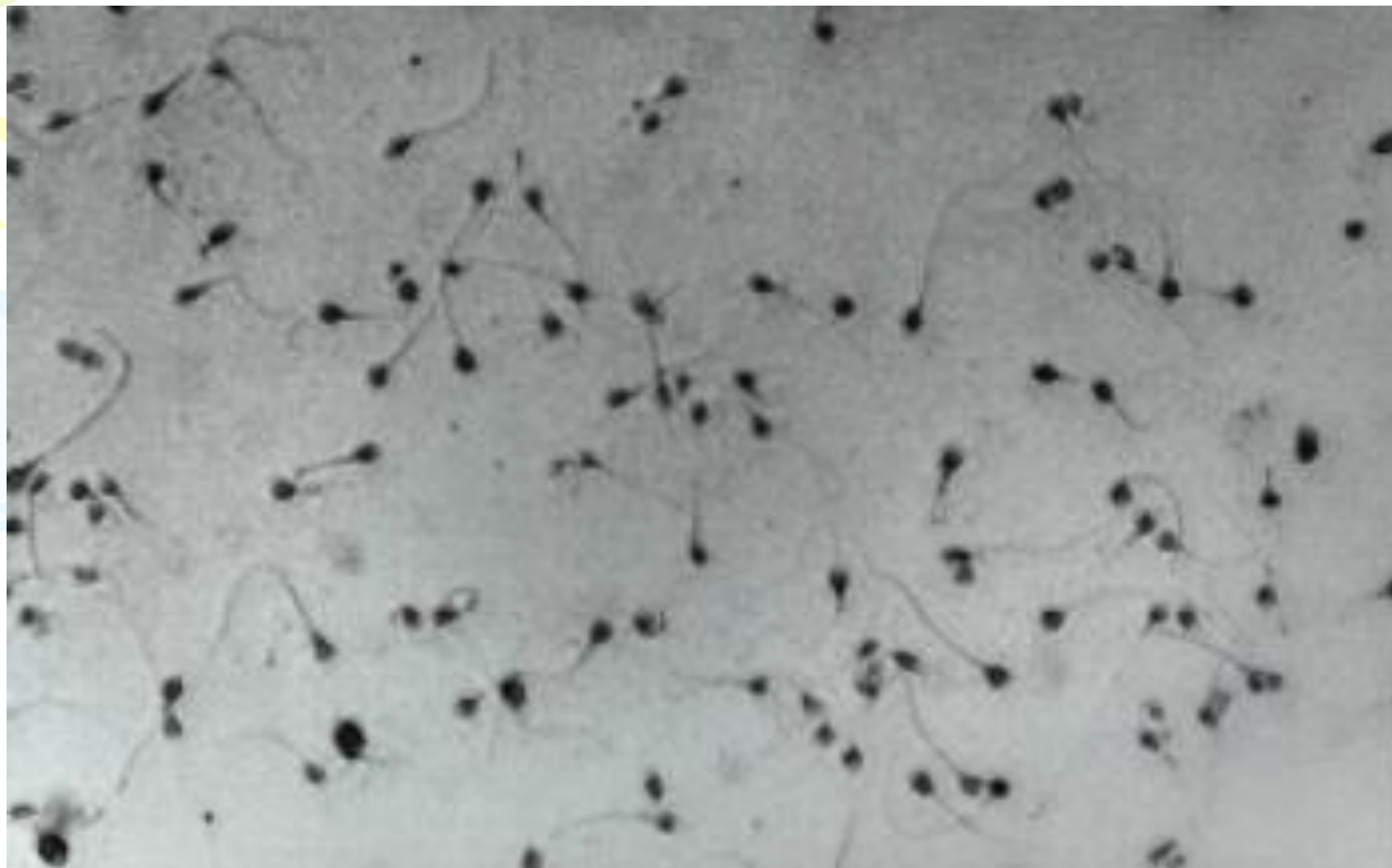
# Physical examination

- Virilize: body hair, gynecomastia
- Scrotal contents
- Testis: size and consistency
- Epididymis; vas deferens; varicocele
- Other abnormalities

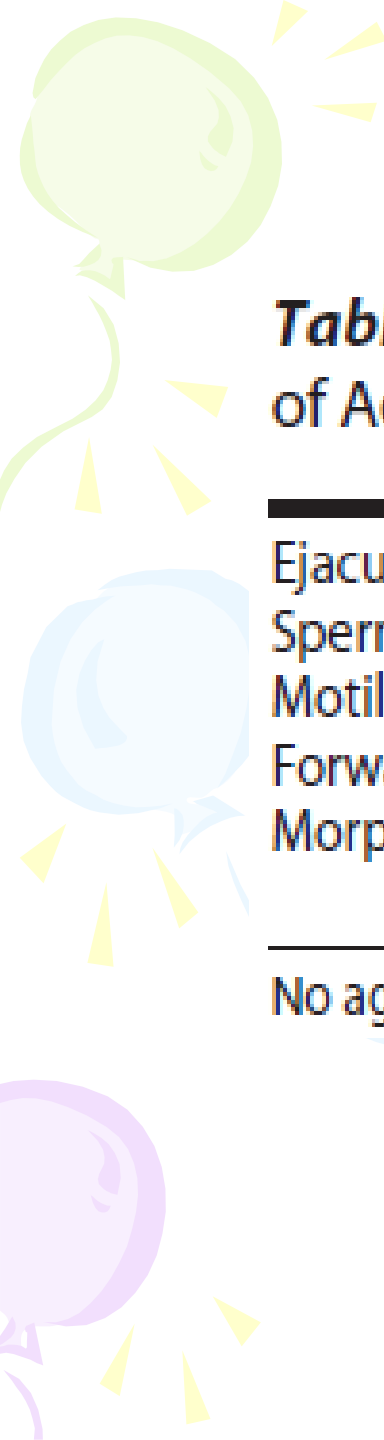


# Laboratory tests

- Urinalysis
- Semen analysis
- Semen collection: 48-72 hours of sexual abstinence.
- Seminal fructose and postejaculate urinalysis
- Fructose: derived from the seminal vesicle
- Hormone assessment
- FSH and testosterone







**Table 44–6.** Semen Analysis—Minimal Standards of Adequacy.

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Ejaculate volume	1.5–5.5 mL
Sperm concentration	$>20 \times 10^6$ sperm/mL
Motility	$>50\%$
Forward progression	2 (scale 1–4)
Morphology	$>30\%$ WHO normal forms ( $>4\%$ Kruger normal forms)

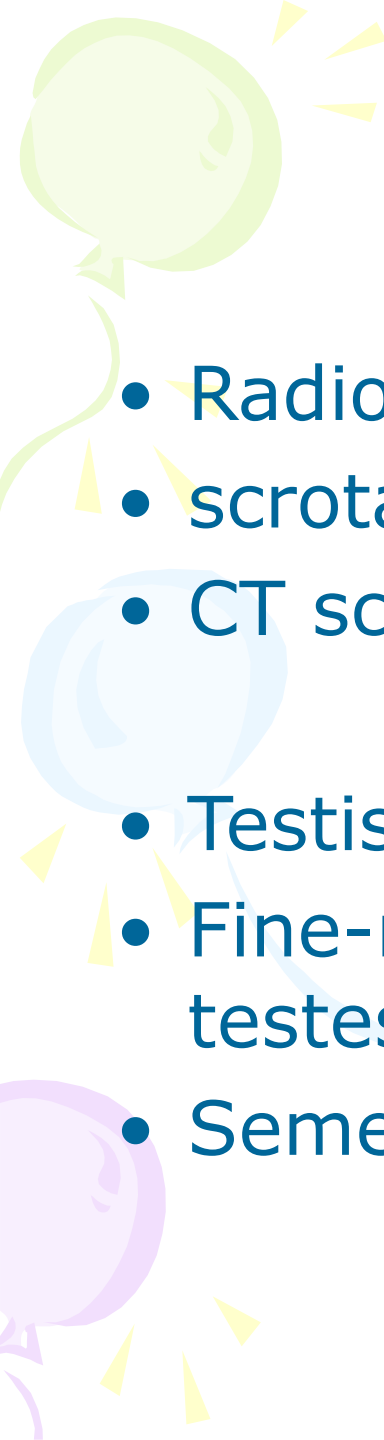
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No agglutination (clumping), white cells, or increased viscosity.

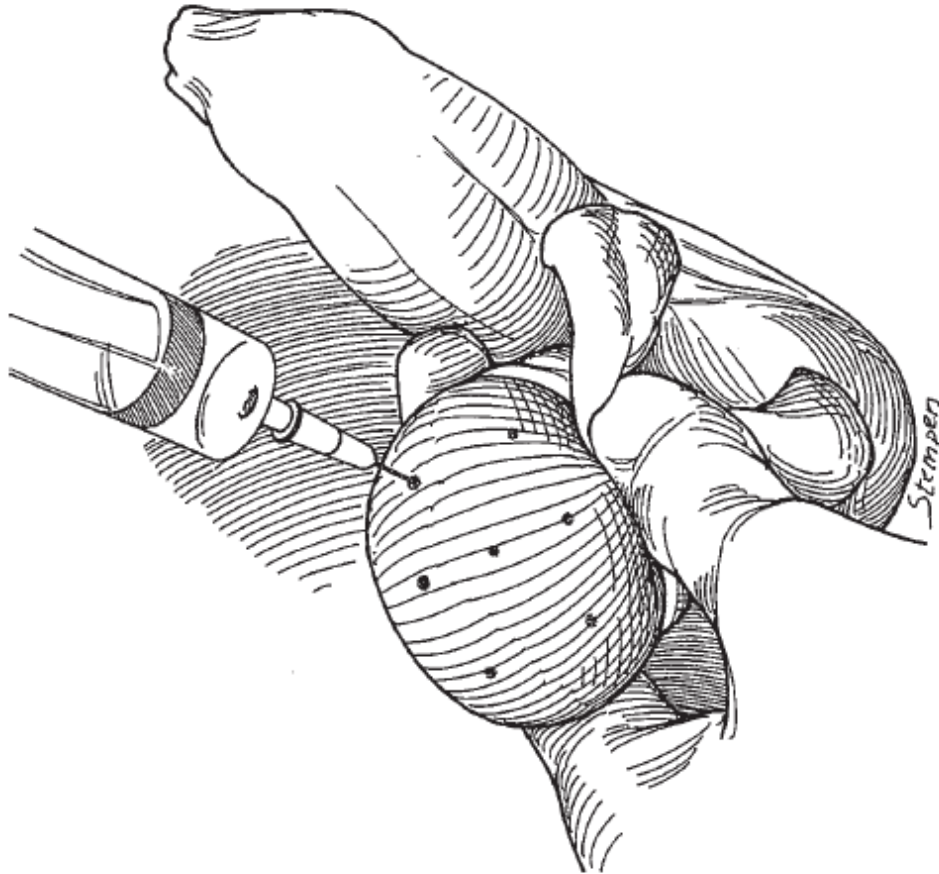


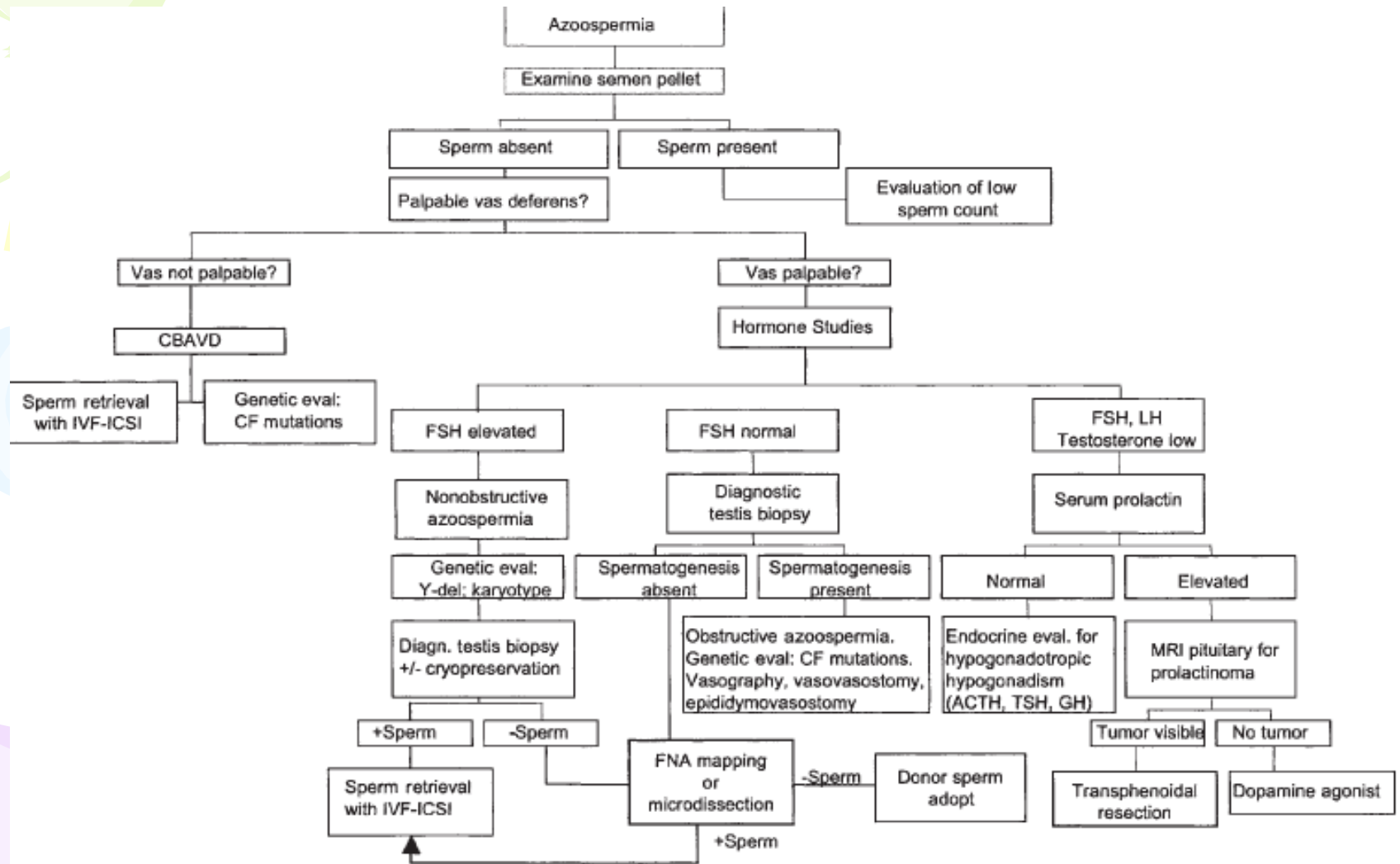
# Adjunctive tests

- semen leukocyte analysis;
- antisperm antibody test;
- hypoosmotic swelling test;
- sperm penetration assay;
- sperm chromatin structure;
- chromosomal studies;
- genetic analysis

- 
- Radiologic testing
    - scrotal ultrasound, transrectal ultrasound
    - CT scan or MRI of the pelvis
  - Testis biopsy & vasography
  - Fine-needle aspiration 'mapping' of the testes
  - Semen culture

# Mapping of testes





# Causes of male infertility

- **Pretesticular**
- **Testicular**
- **posttesticular**



# Pretesticular causes of infertility

## **Hypothalamic disease**

- Gonadotropin deficiency (Kallmann syndrome)
- Isolated LH deficiency ("fertile eunuch")
- Isolated FSH deficiency
- Congenital hypogonadotropic syndromes

## **Pituitary disease**

- Pituitary insufficiency (tumors, infiltrative processes, operation, radiation, deposits)
  - Hyperprolactinemia
  - Exogenous hormones (estrogen-androgen excess, glucocorticoid excess, hyper- and hypothyroidism)
  - Growth hormone deficiency
-



# Testicular causes of infertility

Chromosomal (Klinefelter syndrome [XXY], XX sex reversal, XYY syndrome)

Noonan syndrome (male Turner syndrome)

Myotonic dystrophy

Vanishing testis syndrome (bilateral anorchia)

Sertoli-cell-only syndrome (germ cell aplasia)

Y chromosome microdeletions (DAZ)

Gonadotoxins (radiation, drugs)

Systemic disease (renal failure, liver failure, sickle cell anemia)

Defective androgen activity

Testis injury (orchitis, torsion, trauma)

Cryptorchidism

Varicocele

Idiopathic



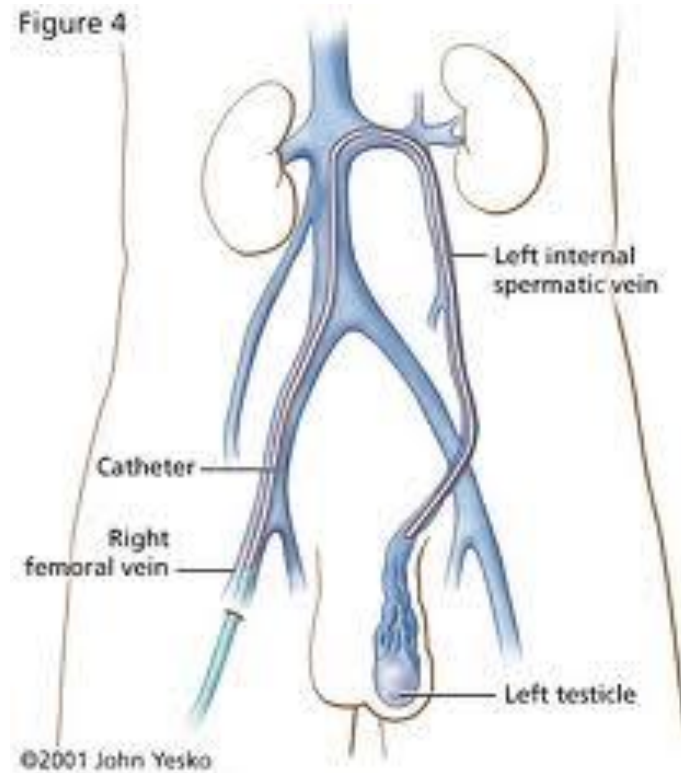


# Medications associated with infertility

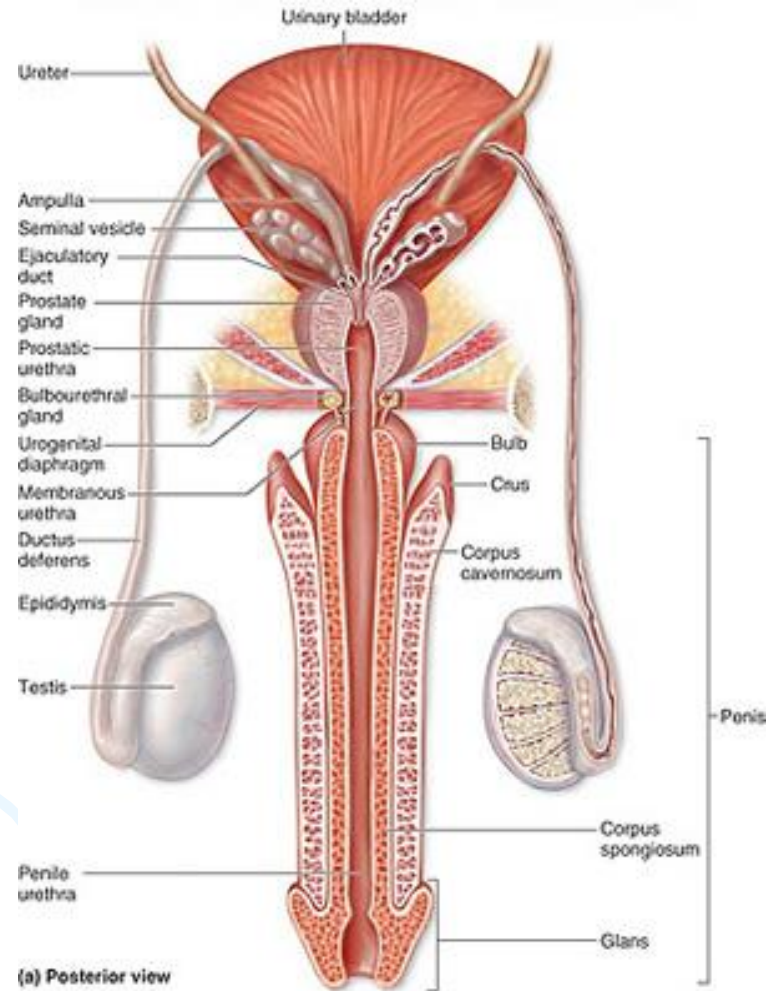
- Ketoconazole, spironolactone, alcohol inhibit T synthesis
- Cimetidine: androgen antagonist
- Marijuana, heroin, methadone: lower T levels
- Pesticides, estrogen like activity
- Chemotherapy
- Calcium channel blockers; sulfasalazine; colchicine; allopurinol; alpha-blockers; nitrofurantoin; antipsychotics; antidepressants

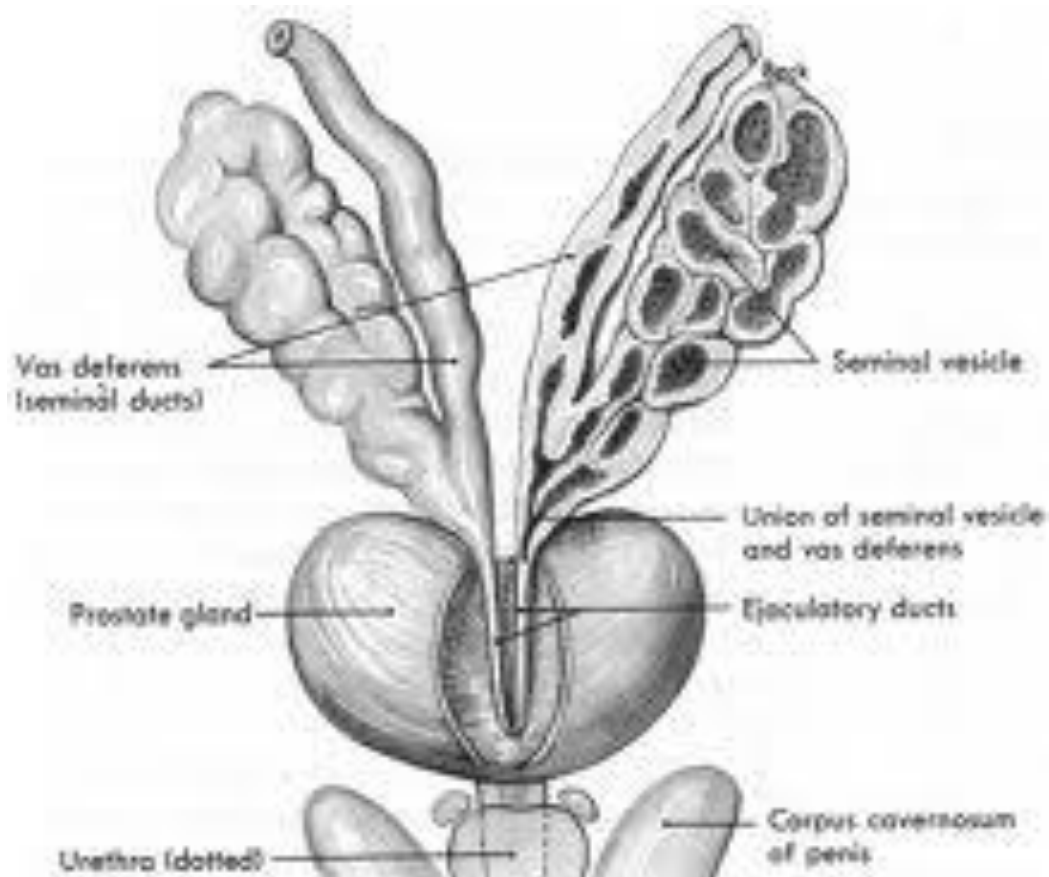
# varicocele

Normal: 15%;  
infertility: 40%

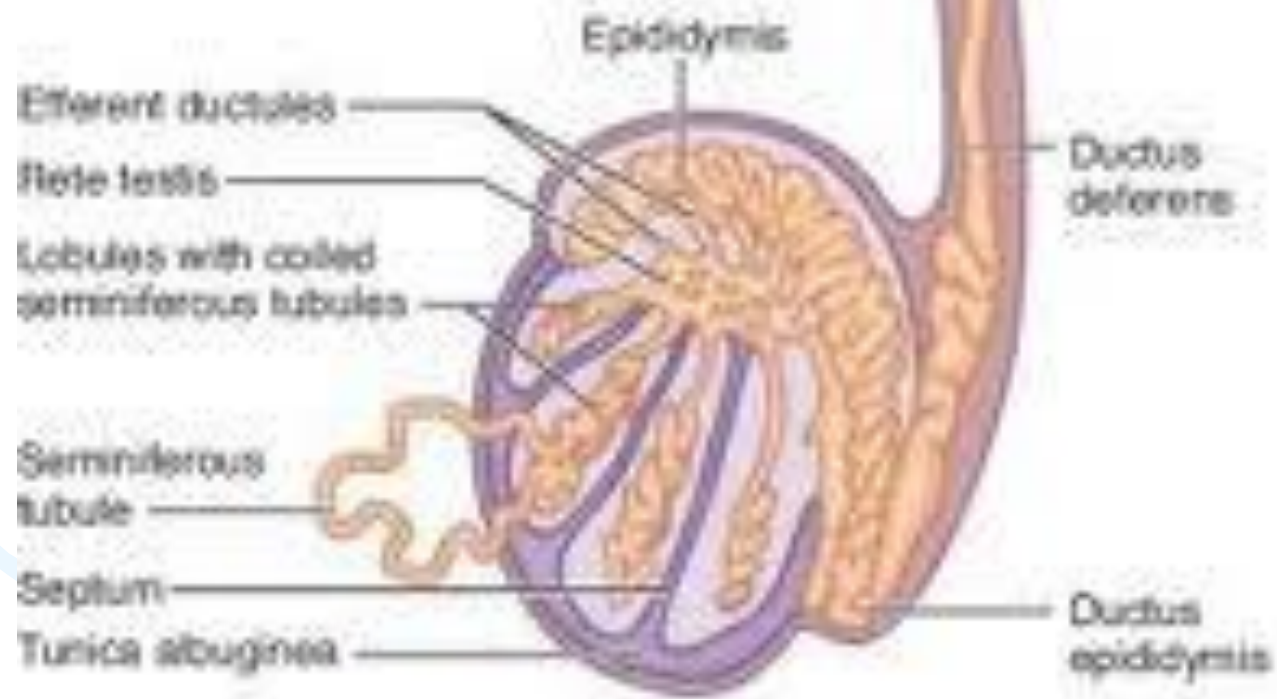


# Posttesticular causes of infertility





Formation of the ejaculatory ducts by union of the seminal vesicles with the vas deferens just before entrance into the prostate gland. The ejaculatory ducts open into the prostatic portion of the urethra.





# Posttesticular causes of infertility

## **Reproductive tract obstruction**

- Congenital blockages
  - Congenital absence of the vas deferens (CAVD)
  - Young syndrome
  - Idiopathic epididymal obstruction
  - Polycystic kidney disease
  - Ejaculatory duct obstruction
- Acquired blockages
  - Vasectomy
  - Groin surgery
  - Infection
- Functional blockages
  - Sympathetic nerve injury
  - Pharmacologic

## **Disorders of sperm function or motility**

- Immotile cilia syndromes
- Maturation defects
- Immunologic infertility
- Infection

## **Disorders of coitus**

- Impotence
- Hypospadias
- Timing and frequency

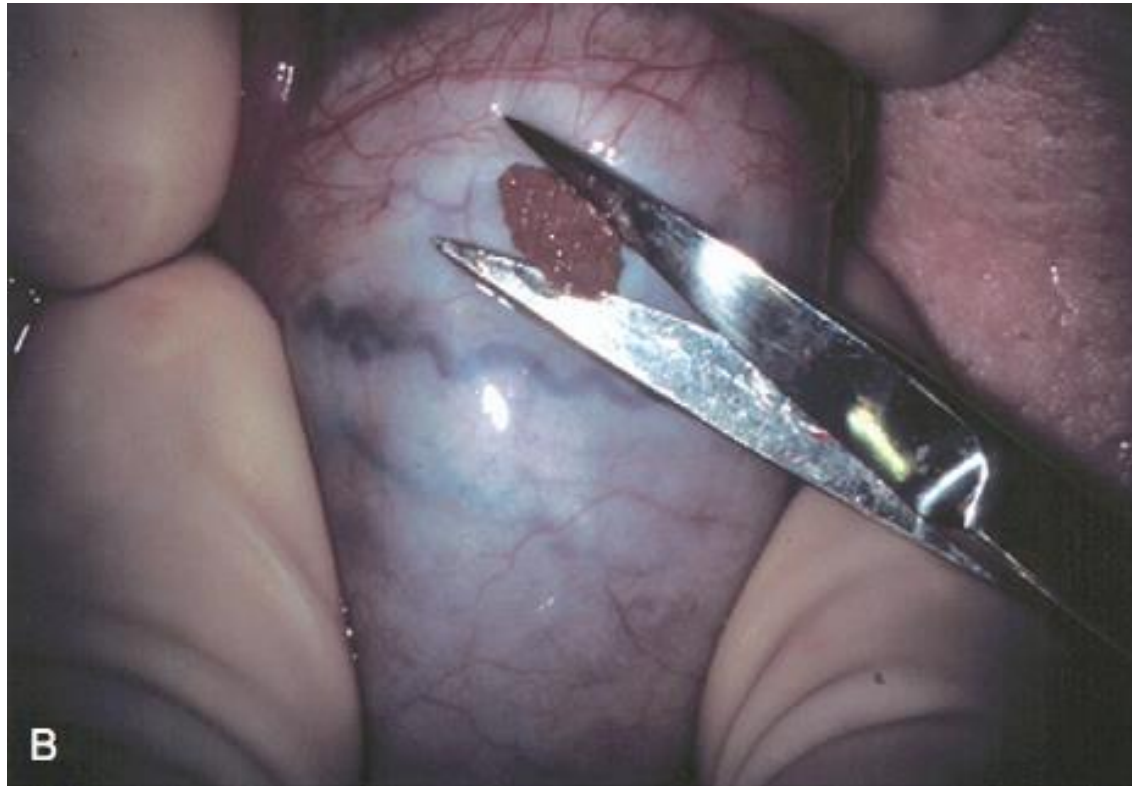


# Treatment of male infertility (Surgical treatments)

- Varicocele:
- Vasovasostomy or epididymovasostomy
- Ejaculatory duct obstruction: TURED
- Electroejaculation spinal cord injury; pelvic or retroperitoneal surgery injured the pelvic sympathetic nerves.
- Sperm aspiration: vas deferens, epididymis, or testicle.
- Orchidopexy: within two years of age
- Testicular torsion; the unaffected, contralateral testis can become infertile after torsion of its mate. Sympathetic orchidopathia, immunologic in nature.
- Pituitary ablation
- Elevated serum prolactin levels stemming from a pituitary adenoma can be treated medically and surgically.

# Surgical management of male infertility

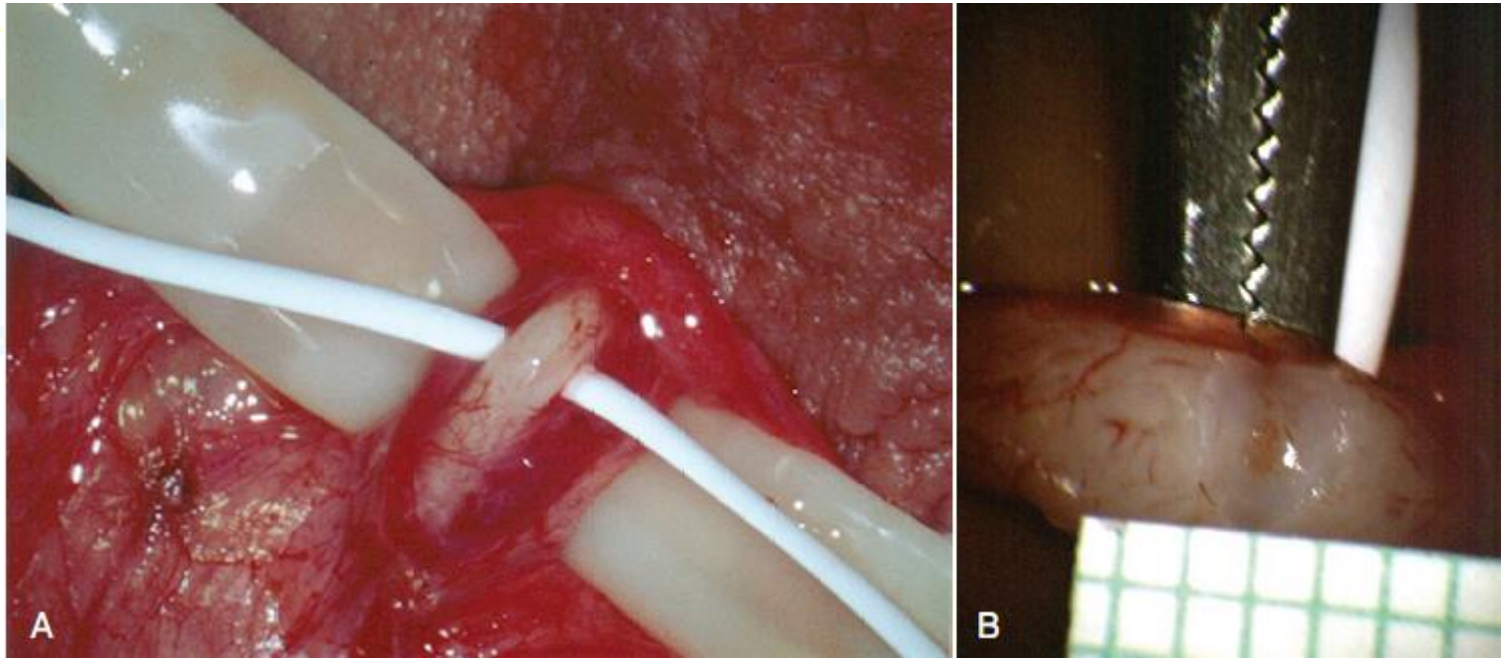
- Testis biopsy





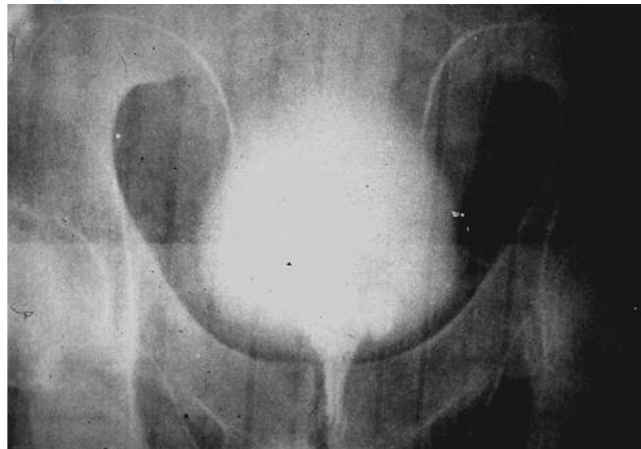
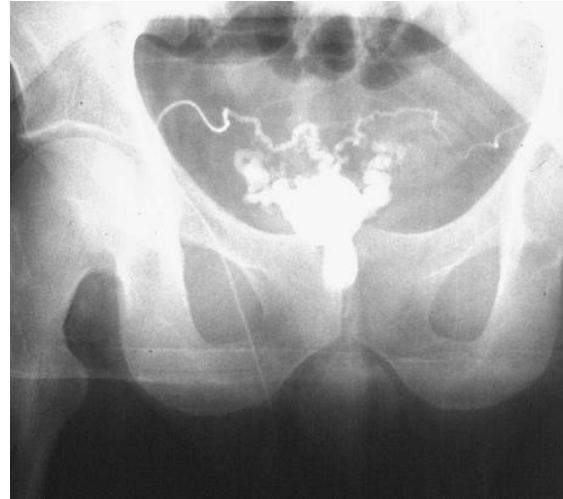
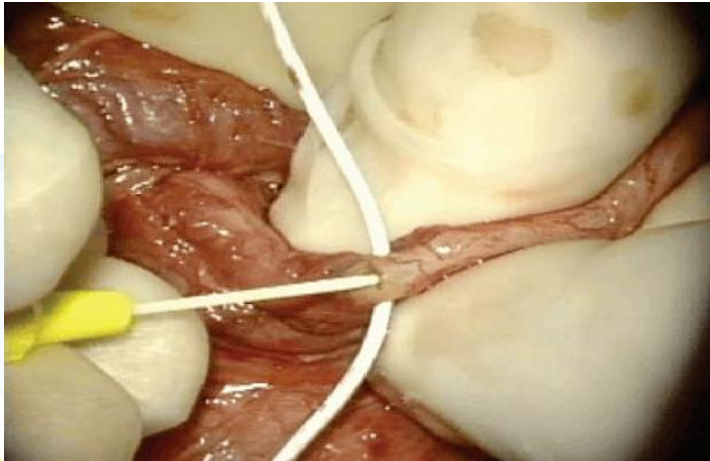
# Surgical management of male infertility

- Vasography:



# Surgical management of male infertility

- Vasography



# Surgical management of male infertility

- Vasovasostomy

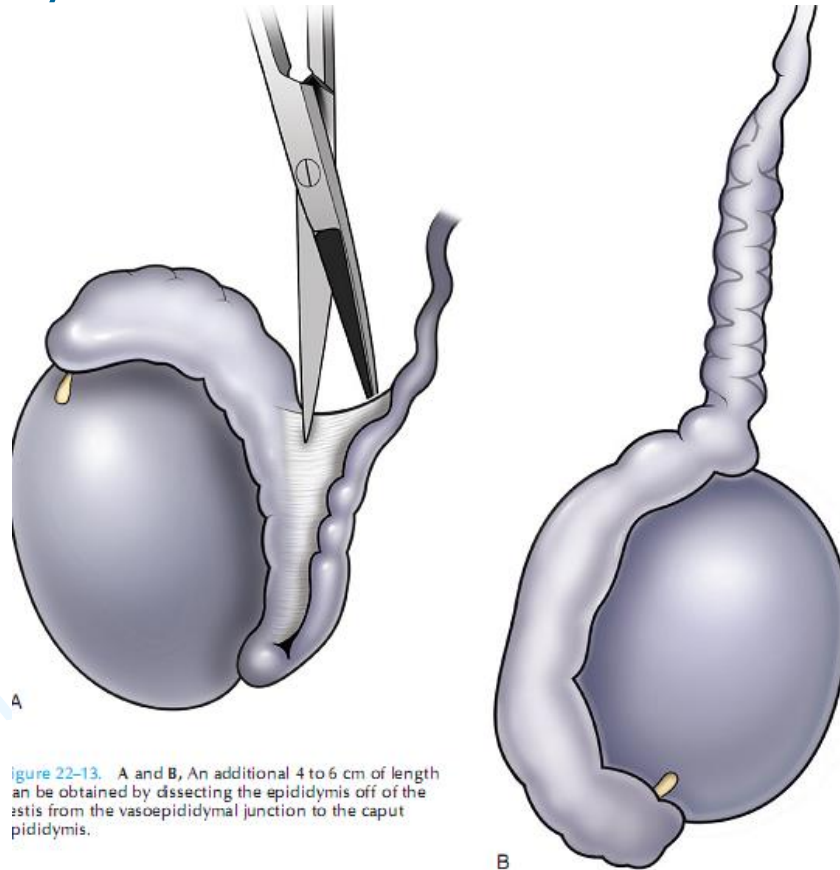
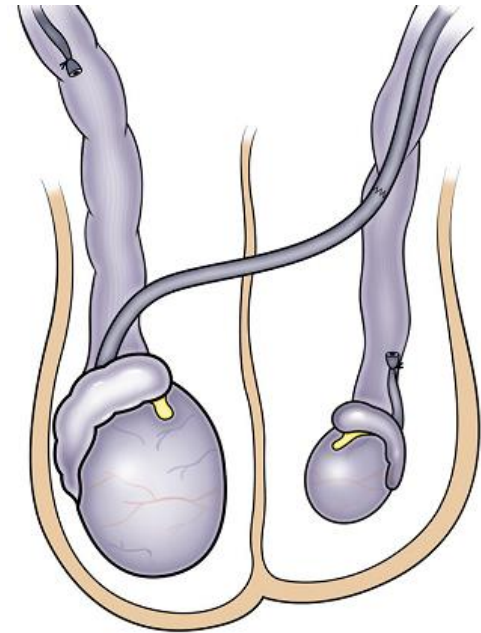
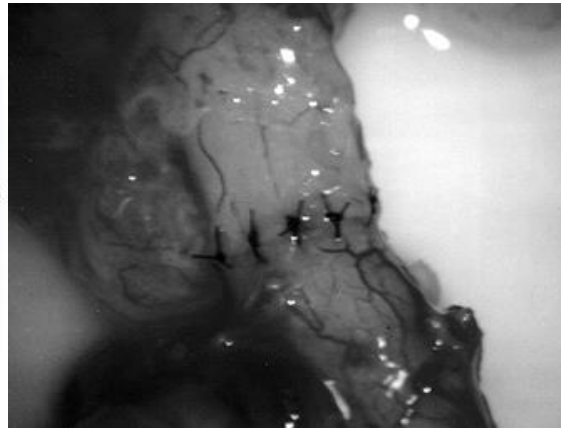
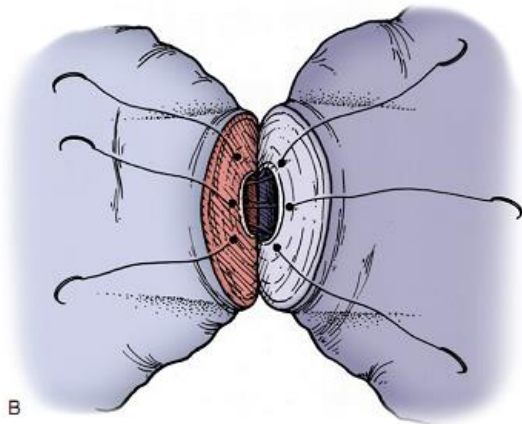


Figure 22-13. A and B, An additional 4 to 6 cm of length can be obtained by dissecting the epididymis off of the testis from the vasoepididymal junction to the caput epididymis.

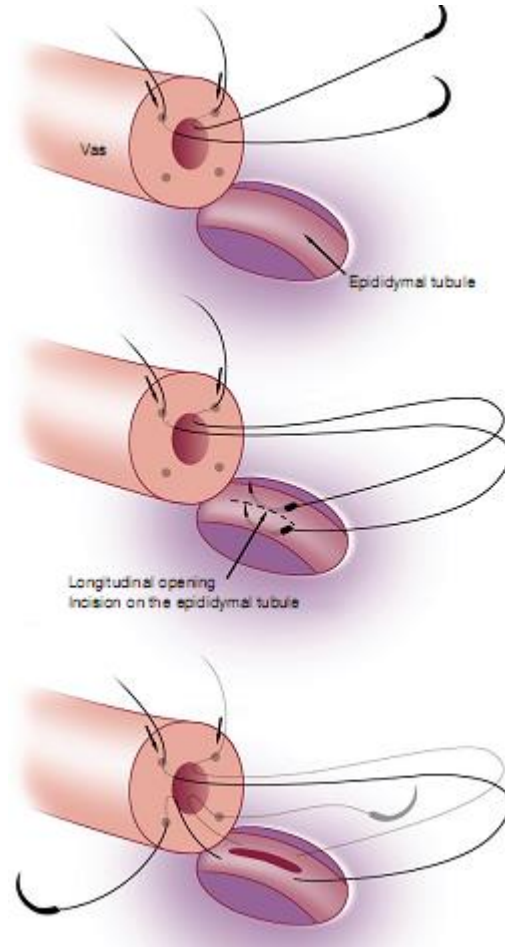
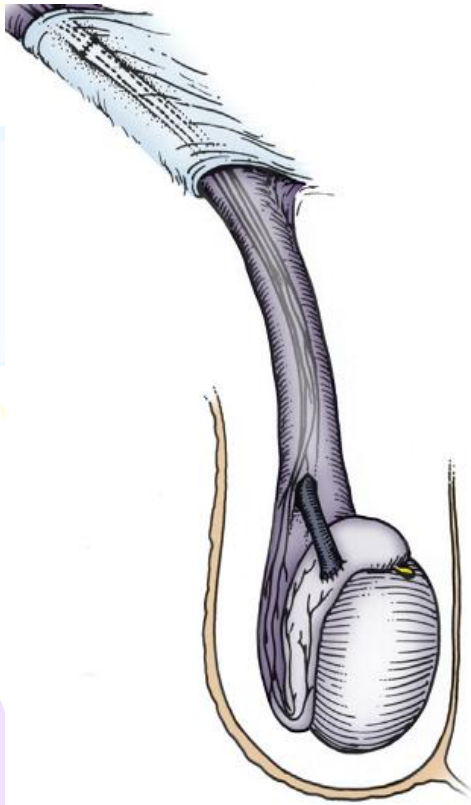
# Surgical management of male infertility

- Vasovasostomy



# Surgical management of male infertility

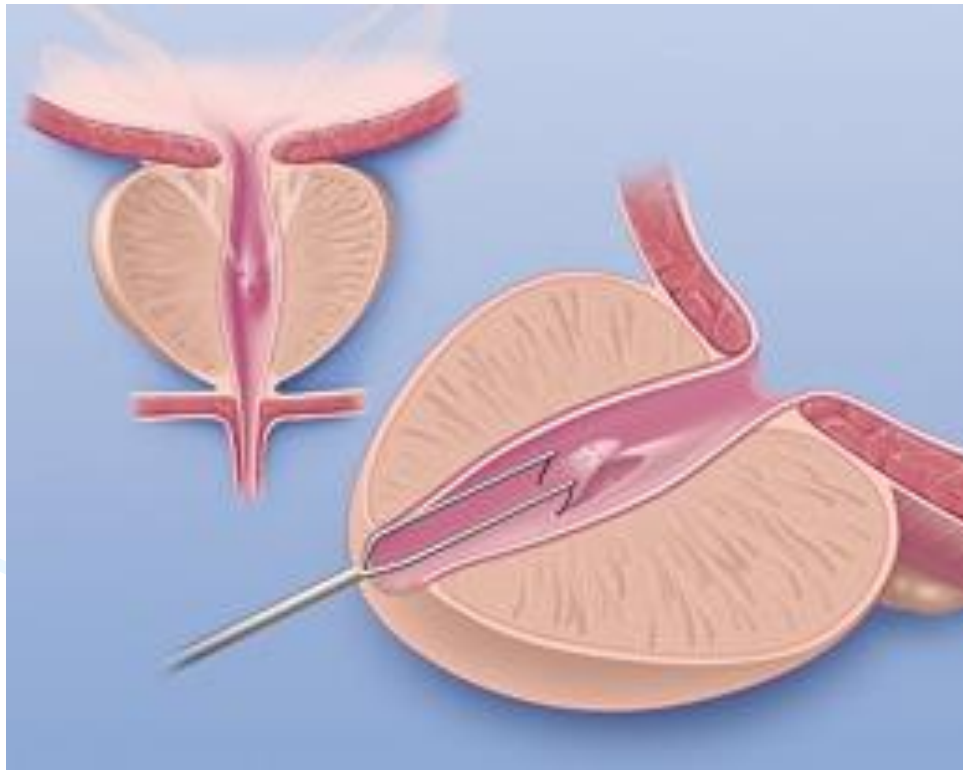
- Vasoepididymostomy





# Surgical management of male infertility

- Transurethral resection of the ejaculatory ducts





# Treatment of male infertility (Nonsurgical treatments)

- Pyospermia: evaluate the patient for sexually transmitted diseases, penile discharge, prostatitis, or epididymitis
- Coital therapy
- Immunologic infertility
- Corticosteroid suppression, sperm washing, IUI, IVF, and ICSI.



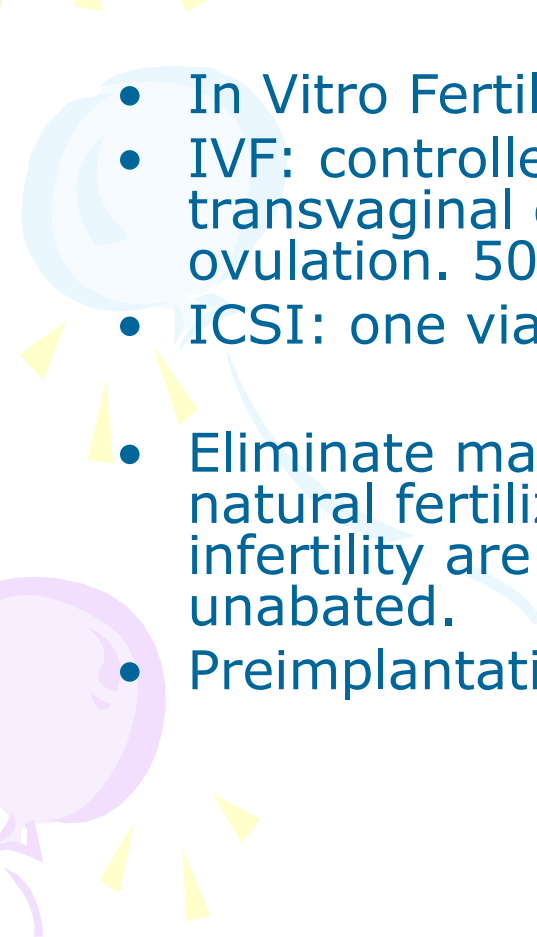
# Medical therapy

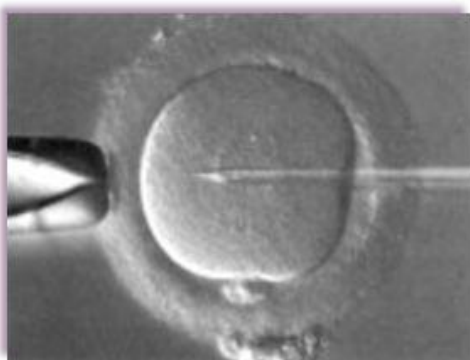
- Hyperprolactinemia; hypothyroidism; congenital adrenal hyperplasia; testosterone excess/deficiency: Kallmann syndrome, HCG, FSH
- Empiric medical therapy
- clomiphene citrate: antiestrogen, increase secretion of GNRH, FSH, and LH. Low sperm count
- antioxidant therapy: vit E
- growth hormone



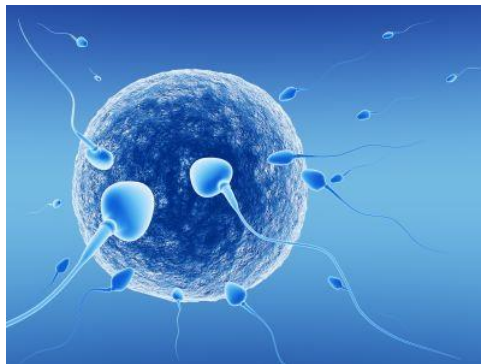


# Assisted reproductive technologies

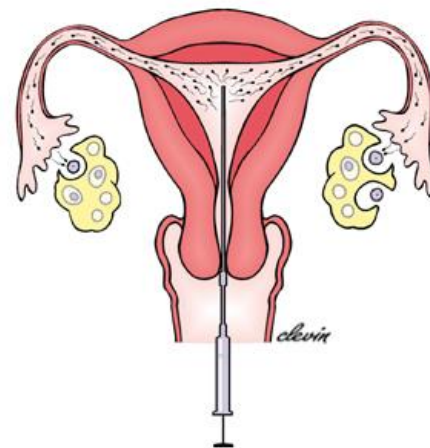
- Intrauterine insemination (IUI): Cervical factors; low sperm quality, immunologic infertility, poor sperm delivery. At least 5-40 million motile sperm in the ejaculate
  - In Vitro Fertilization and Intracytoplasmic sperm injection
  - IVF: controlled ovarian stimulation and ultrasound-guided transvaginal egg retrieval from the ovaries before normal ovulation. 500,000 to 5 million sperms are required
  - ICSI: one viable sperm
  - Eliminate many natural selection barriers that exist during natural fertilization, genetic defects that caused the infertility are expected to be passed on to offspring unabated.
  - Preimplantation genetic diagnosis
- 



ICSI



IVF



IUI

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**THANK YOU!!!**