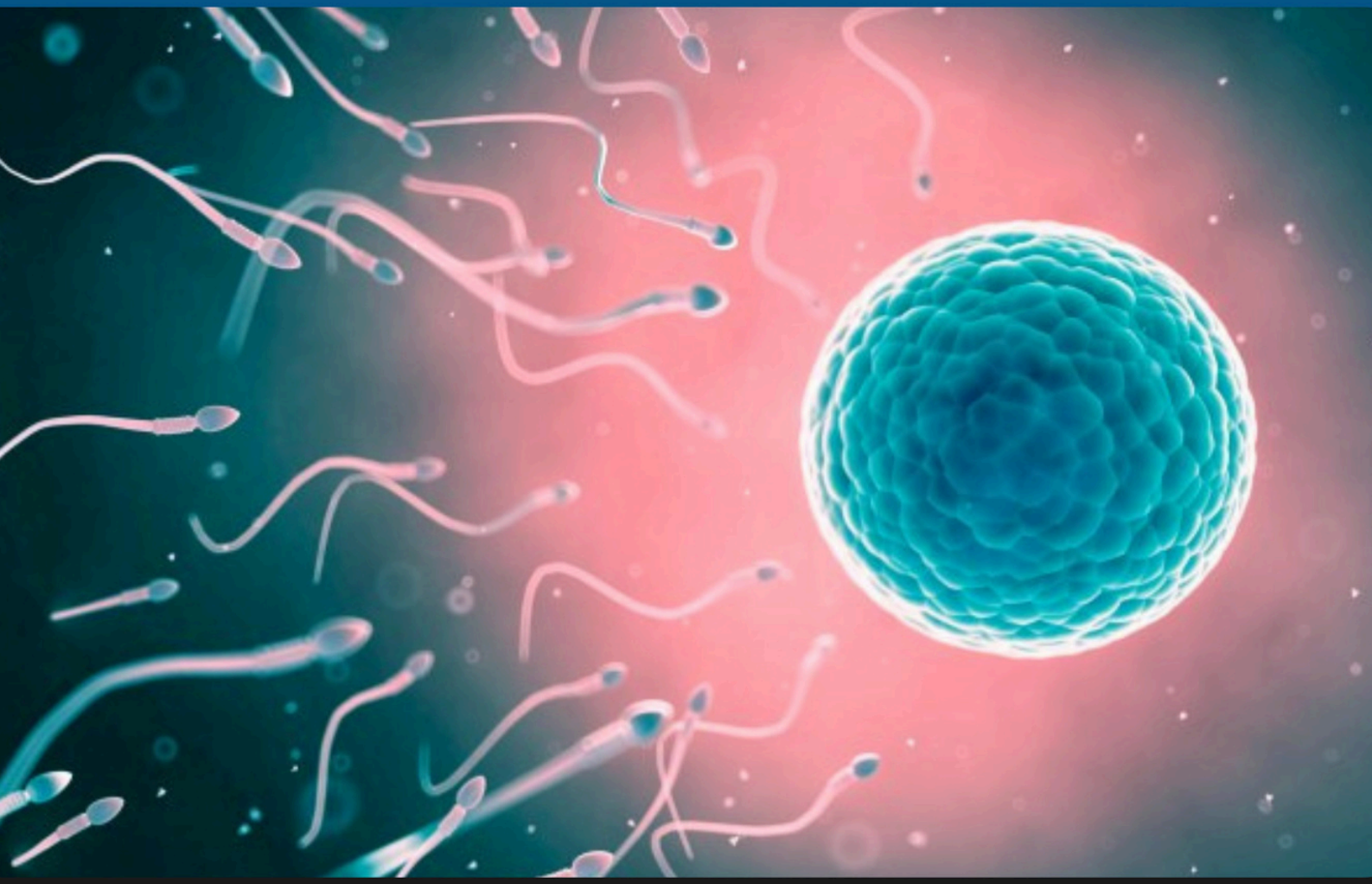
SEXUAL AND REPRODUCTIVE HEALTH

TAILORED FOR MEDICAL STUDENTS, USMLE, PLAB, PA & NURSING



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162 PAGES

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What's included: Ready-to-study anatomy, physiology and pathology notes of various sexual & reproductive health topics presented in succinct, intuitive and richly illustrated downloadable PDF documents. Once downloaded, you may choose to either print and bind them, or make annotations digitally on your iPad or tablet PC.

Clickable Hyperlinks Below:

- CONDITIONS OF THE MALE GENITALIA
  - CONGENITAL PENILE ABNORMALITIES
  - CRYPTORCHIDISM
  - BALANITIS & BALANOPOSTHITIS
  - DYSPLASIAS OF THE PENIS
  - CARCINOMA OF THE PENIS
  - PEYRONIE'S DISEASE
- CONDITIONS OF THE PROSTATE
  - PROSTATITIS
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  - BPH – (BENIGN PROSTATIC HYPERTROPHY)
- CONDITIONS OF THE TESTES
  - EPIDIDYMO-ORCHITIS
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- CONTRACEPTION
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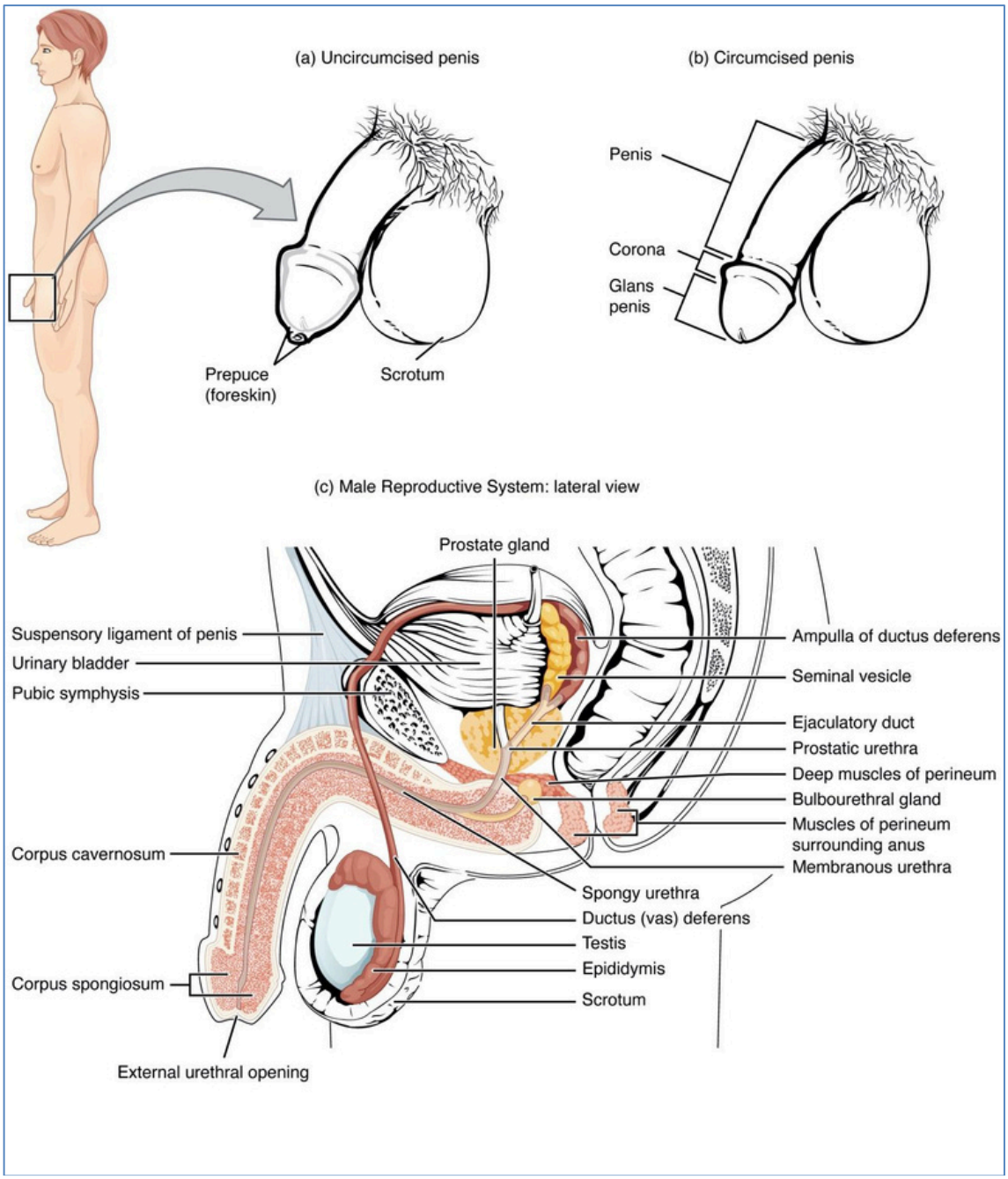
- BREASTFEEDING
- QUIZ QUESTIONS

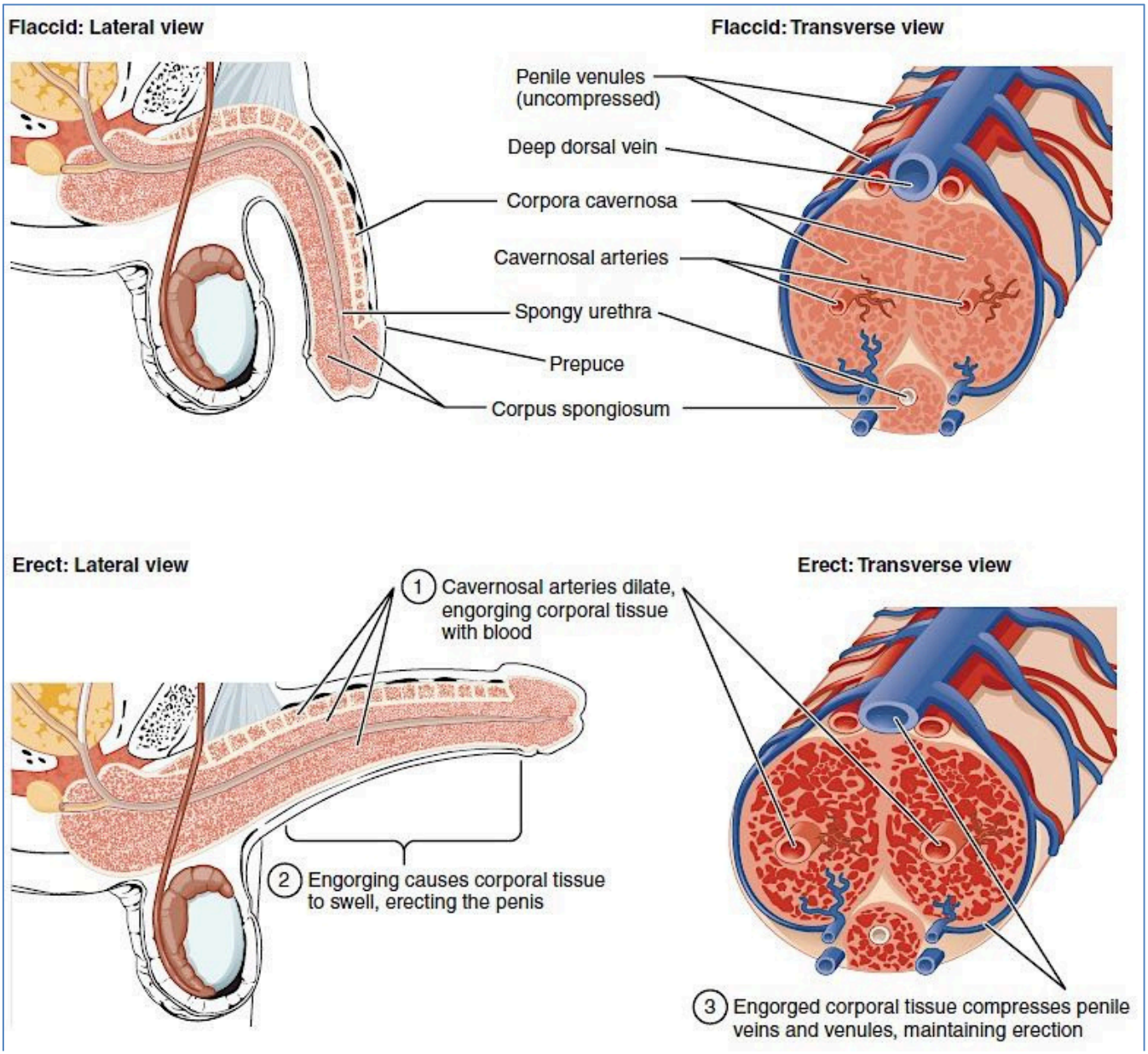
REVIEW OF MALE UROGENITAL ANATOMY

REVIEW OF MALE UROGENITAL ANATOMY

Normal Male Reproductive Anatomy:

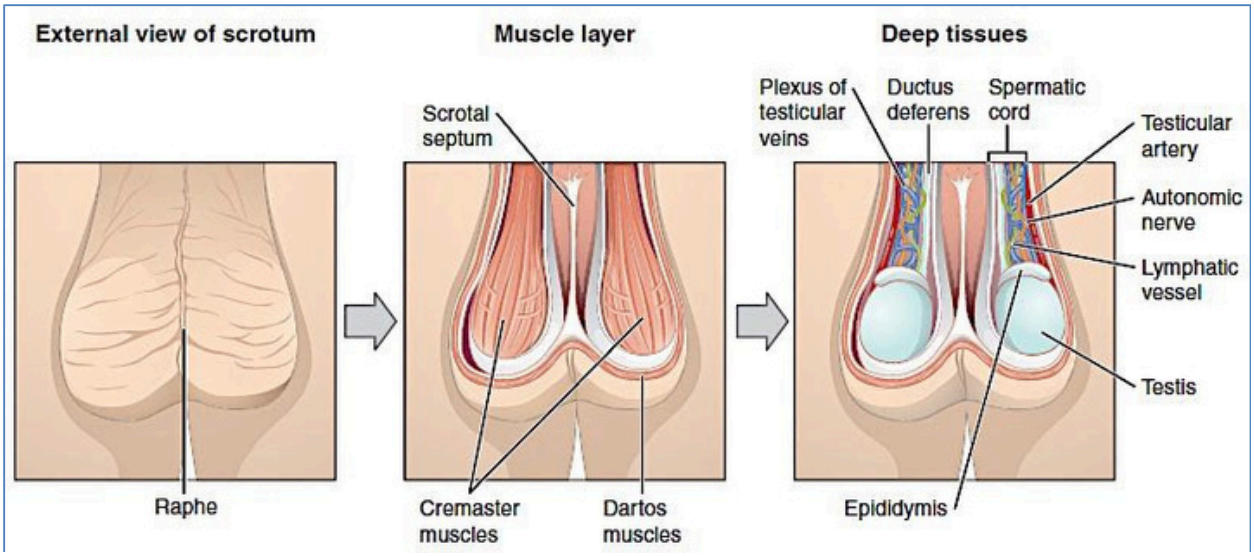
- **Ducts** – (receive/transport gametes):
  - o **1: Epididymis –** (5% of ejaculate)
  - o **2: Ductus (vas) Deferens**
  - o **3: Urethra -** (Prostatic → Membranous → Spongy (penile) → External Orifice)
- **Penis:**
  - o **3 Sections – Root, Body & Glans Penis.**
  - o **Corona –** Neck sulcus
  - o **Erectile Tissues:**
    - § **2x Corpus Cavernosum** – Central Arteries
    - § **1x Corpus Spongiosum** – Central Urethra
  - o **Tunica Albuginia –** Fibrous capsule encasing the Testis & Penis (Note: Does NOT encase the Epididymis)
  - o **Urethra –** Transitional Epithelium
  - o **Prepuce** (foreskin)





- **Testicles & Scrotum:**
  - o **Testes - Gonads (produce gametes)**
    - § **Testis (Albuginea of testes)**
      - **Seminiferous tubules** – sperm production
      - **Leydig Cells** – testosterone production
    - § **Epididymis -** Highly coiled tubules.
  - o **Spermatic Cord –** Spermatic Artery, Vein & Vas-Deferens (+ Lymphatics).
  - o **Tunica Vaginalis –** Remnants of the foetal peritoneum dragged into the scrotum by descending testes.
    - § **Obliterated Processus Vaginalis –** The obliterated peritoneal remnants from descending of the testes. Note: If not fully obliterated, can → Indirect Inguinal Hernias.
  - o **Tunica Albuginia –** Fibrous capsule encasing the Testis & Penis (Note: Does NOT encase the Epididymis)

  - o **Thermoregulation:**
    - § **Why descended?** – Spermatogenesis requires a lower temperature than core temperature.
    - § **Cremaster Muscle:** Lifts testicles closer to body when cold. (thermoregulation)
    - § **Dartos Muscle:** Increases/decreases surface area of the scrotum (thermoregulation)
    - **Pampiniform Plexus:** Network of blood vessels



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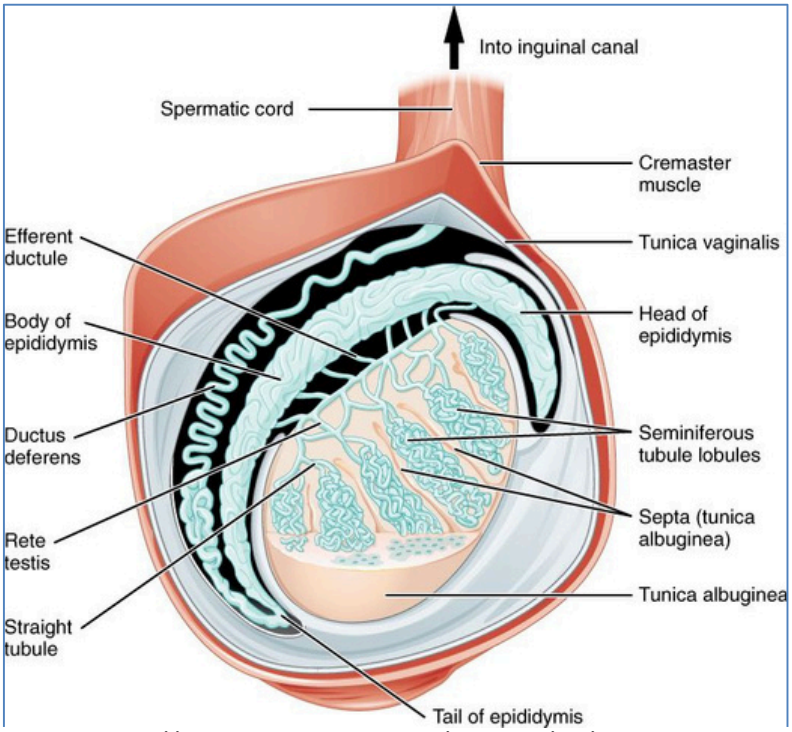

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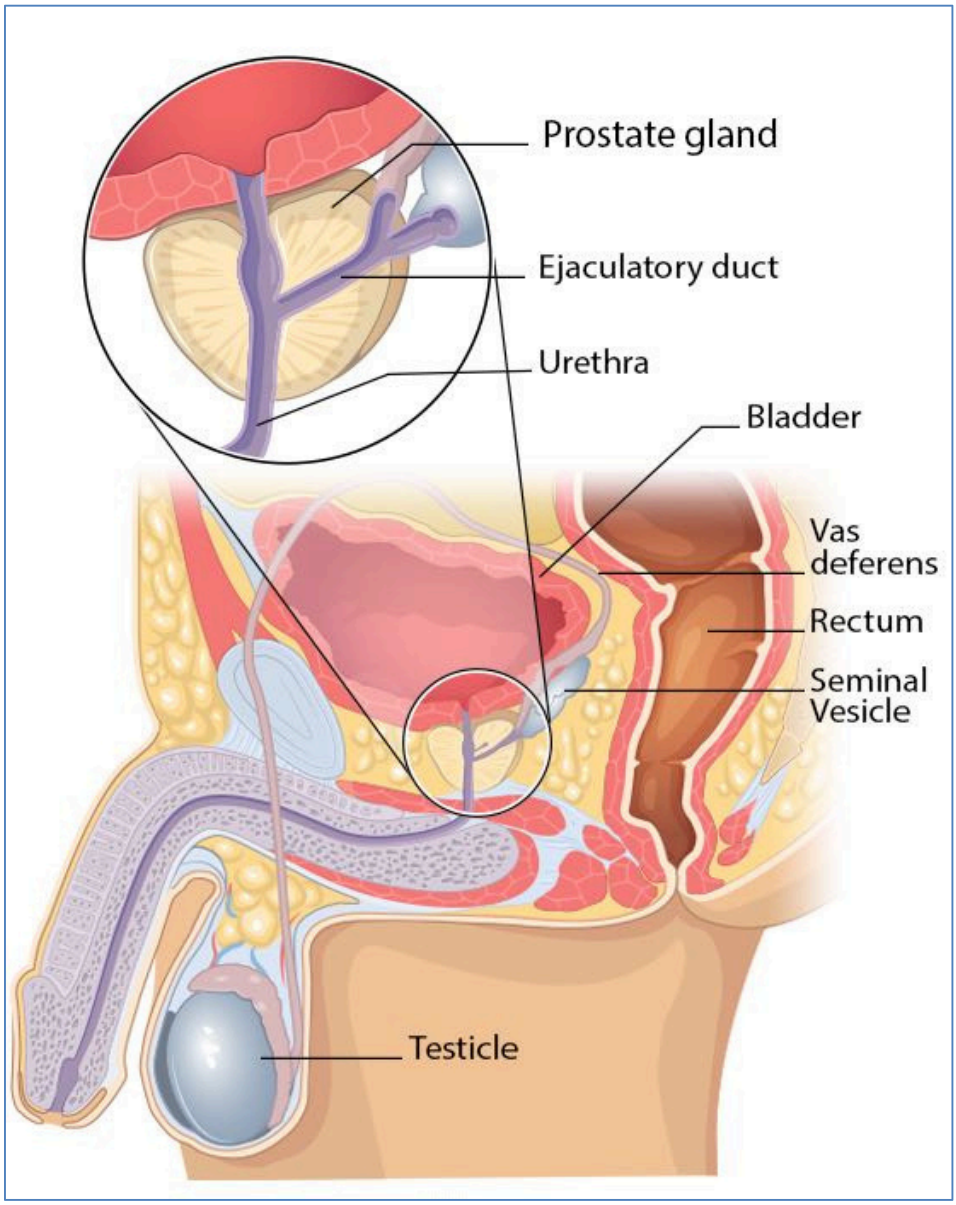
- **Accessory Glands:**
  - o **Seminal vesicles -** (60% of ejaculate) – Reduces Acidity of Semen
  - o **Prostate gland -** (30% of ejaculate) - Helps activate sperm & keep it viable
  - o **Bulbourethral glands –** (5% of ejaculate) - Neutralises traces of urine in urethra.

- **The Prostate Gland:**
  - o **Anatomy:**
    - § 5 lobes (2 Laterals, Anterior, Median & Posterior)
    - § Inferior to Bladder, Posterior to Penis
    - § Periurethral (Encases Urethra)
    - § Also encases Ejaculatory Ducts from Seminal Vesicles
  - o **Function:**
    - § Adds bulk to Semen
    - § Acid phosphatase - Proteolytic Enzyme - Maintains liquidity of prostate
    - § Prostate Specific Antigen (PSA) – Proteolytic Enzyme - Maintains liquidity of prostate.
    - § Hormone responsive - Androgens
  - o **Normal Histology:**
    - § Fibro-Muscular Organ – Plenty of Smooth Muscle Fibres
    - § Glands *Normally* have a *Double Layer* Epithelium (Note: Prost.Ca. is a *Single Layer* Epithelium)



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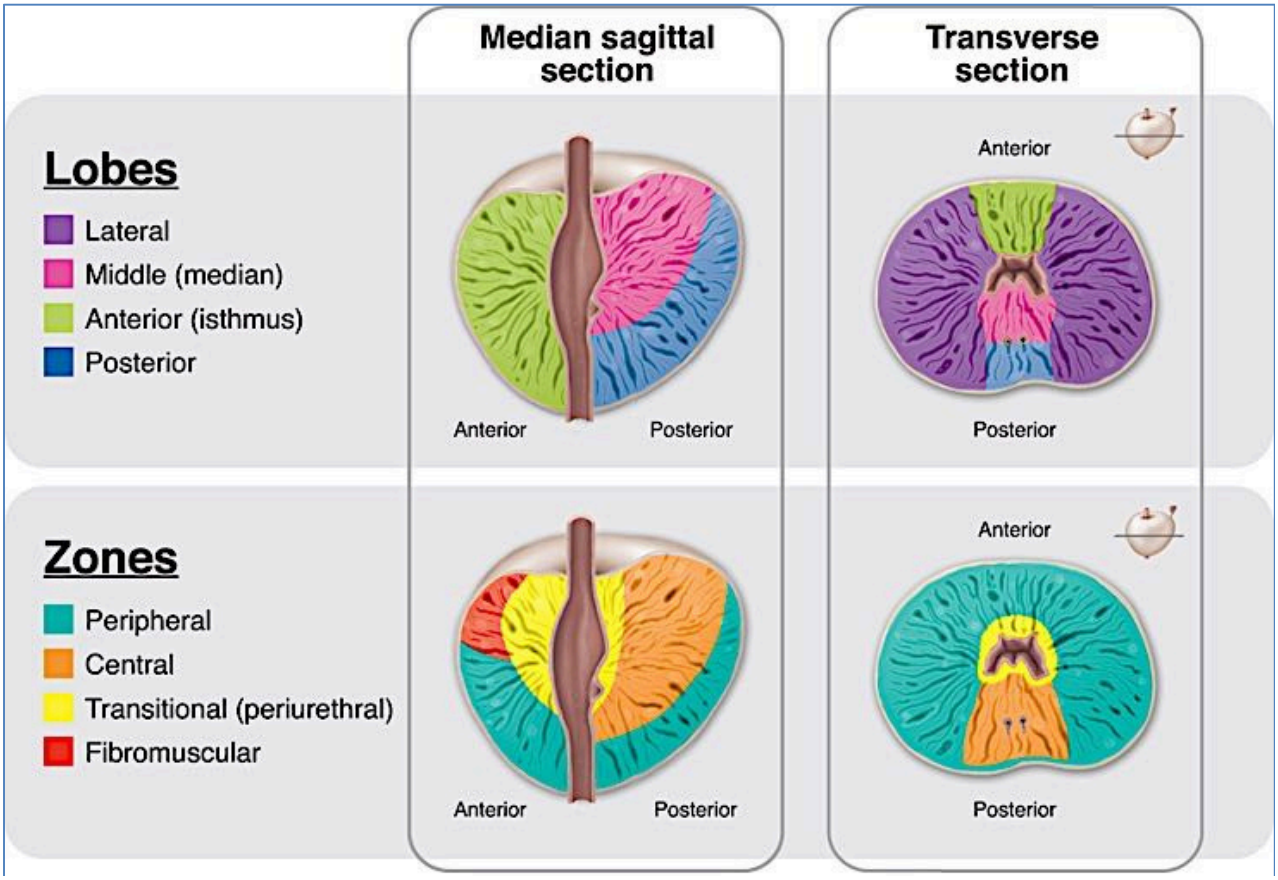
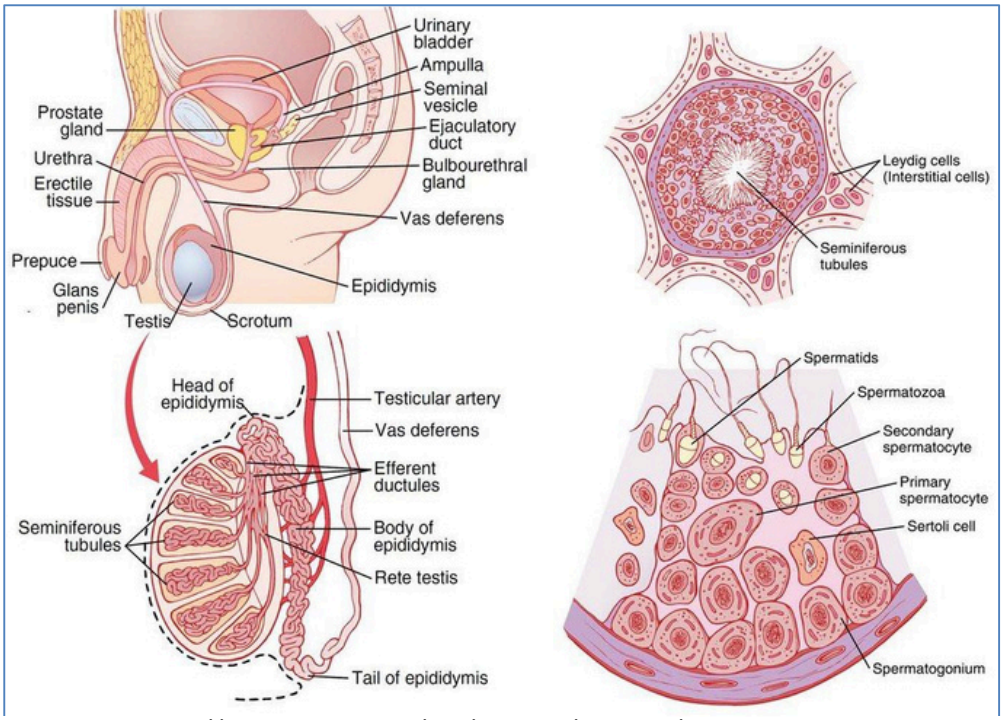


https://shri.public-health.uiowa.edu/wp-content/uploads/2019/10/Prostate-1-Intro_Anatomy.pdf

Structures Involved in Spermatogenesis & Transport:

- **Seminiferous Tubules –** Consist of:
  - o **Sertoli Cells –** Make up the walls of the Seminiferous Tubules (+ Form the Blood-Sperm Barrier) (+ Produce Androgen-Binding Protein in response to **FSH** → Sperm Receptive to Testosterone)
  - o **Germ Cells (Spermatogonia) –** Immature sperm at different stages of development and different levels within the Seminiferous Tubules. (Note: Only luminal spermatogonia have tails)
- **Interstitial Leydig Cells –** (Outside the tubules) – Produce Testosterone in response to **LH**
- **Epididymis –** Series of tubules where sperm undergo final maturation. (Pseudostratified columnar
- epithelium)

  Vas Deferens – (Pseudostratified columnar epithelium + Surrounding smooth muscle)



Credit: https://www.toppr.com/ask/content/concept/gonadal-hormones-201182/

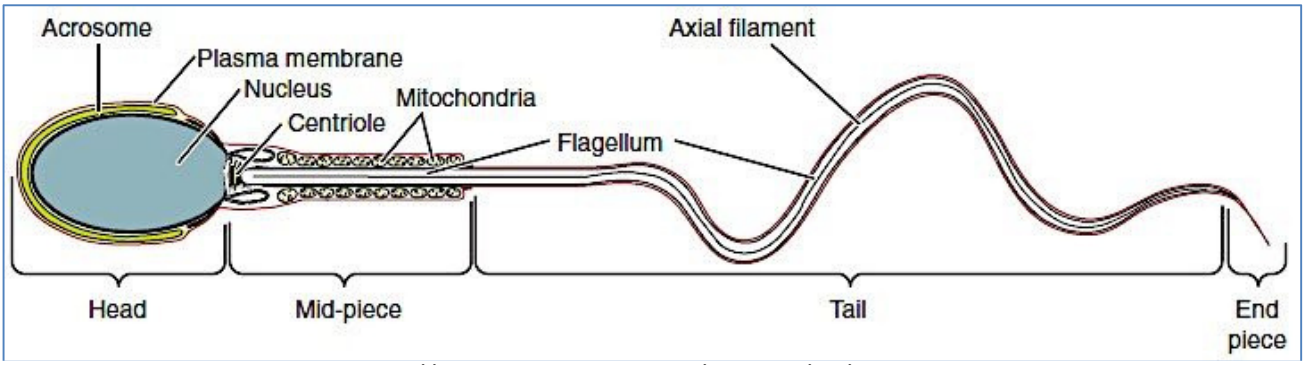
PHYSIOLOGY OF THE TESTES:

Spermatogenesis:

- The overall process of sperm formation – from **spermatagonium** (stem cells) **to spermatozoa** (sperm).
- Takes place inside the walls of the Seminiferous tubules
    - Walls of S.Ts are made of various sperm-forming cell types, all at different stages of development.
- **Mitosis:**
    - **#1 Spermatogonia (2n):**
        - The outermost tubule cells, in direct contact with the basal lamina.
        - Divide by mitosis into 2 spermatagonium.
            - Type A & Type B
                - Type A remains on the basement membrane – for future mitotic divisions.
                - Type B is pushed toward the lumen, where it becomes a **primary spermatocyte.**
- **Meiosis:**
    - **#2(a) Primary Spermatocyte (2n):**
    - Undergoes meiosis I, forming two smaller haploid cells called s**econdary spermatocytes.**
    - **#2(b) Secondary Spermatocytes (n):**
        - Continue into meiosis II producing 4 daughter cells called **spermatids**

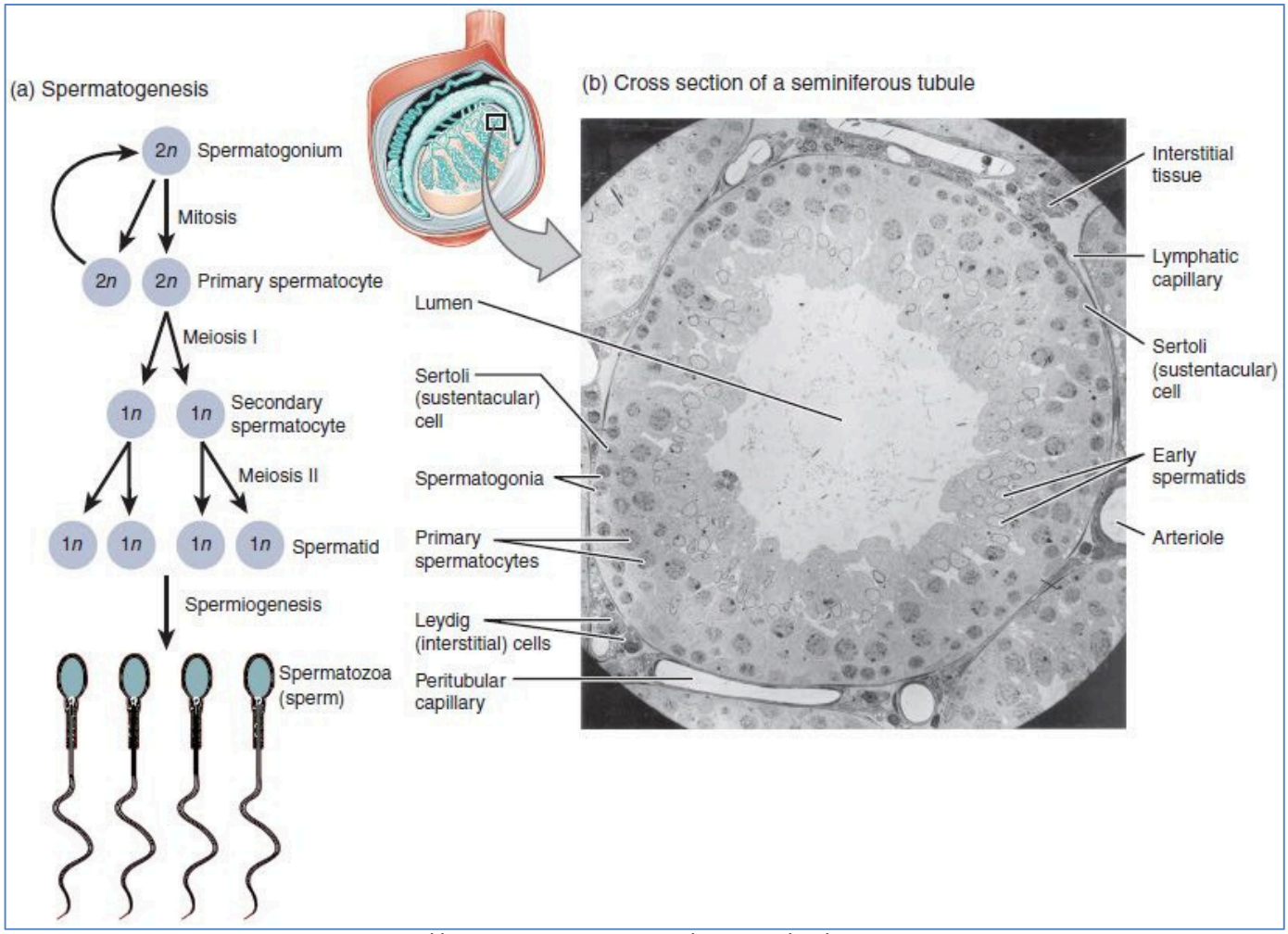
      #3 Spermatids (n):
        - Small, round cells with large nuclei.
        - Closer to the lumen of the Seminiferous tubule.
- **Spermiogenesis:**
        - Spermatids elongate
        - Shed excess Cytoplasmic baggage
        - Forms a tail (flagellum)
        - Result in potentially motile **spermatozoa (sperm)**
    - **# 4 Spermatozoa:**
        - **Head**:
            - Flattened nucleus → compacted DNA
            - Helmet-like **acrosome** on top of nucleus.
                - Contains hydrolytic enzymes for egg penetration.
        - **Mid-piece:**
        - Spiralled Mitochondria around contractile filaments of tail.

      Tail:
            - **Flagellum** produced by the **centriole** near the nucleus
            - Whip-like movements of tail **propel** the sperm once **activated by prostate.**



Sustentacular Cells (Sertoli Cells):

- Extend from basal lamina to the lumen of S.T.
- Bound by **tight-junctions:**
  - Defines the **basal & adluminal** compartments.
  - Forms the **blood-testes barrier** →stops sperm's membrane antigens from escaping into bloodstream & activating immune system

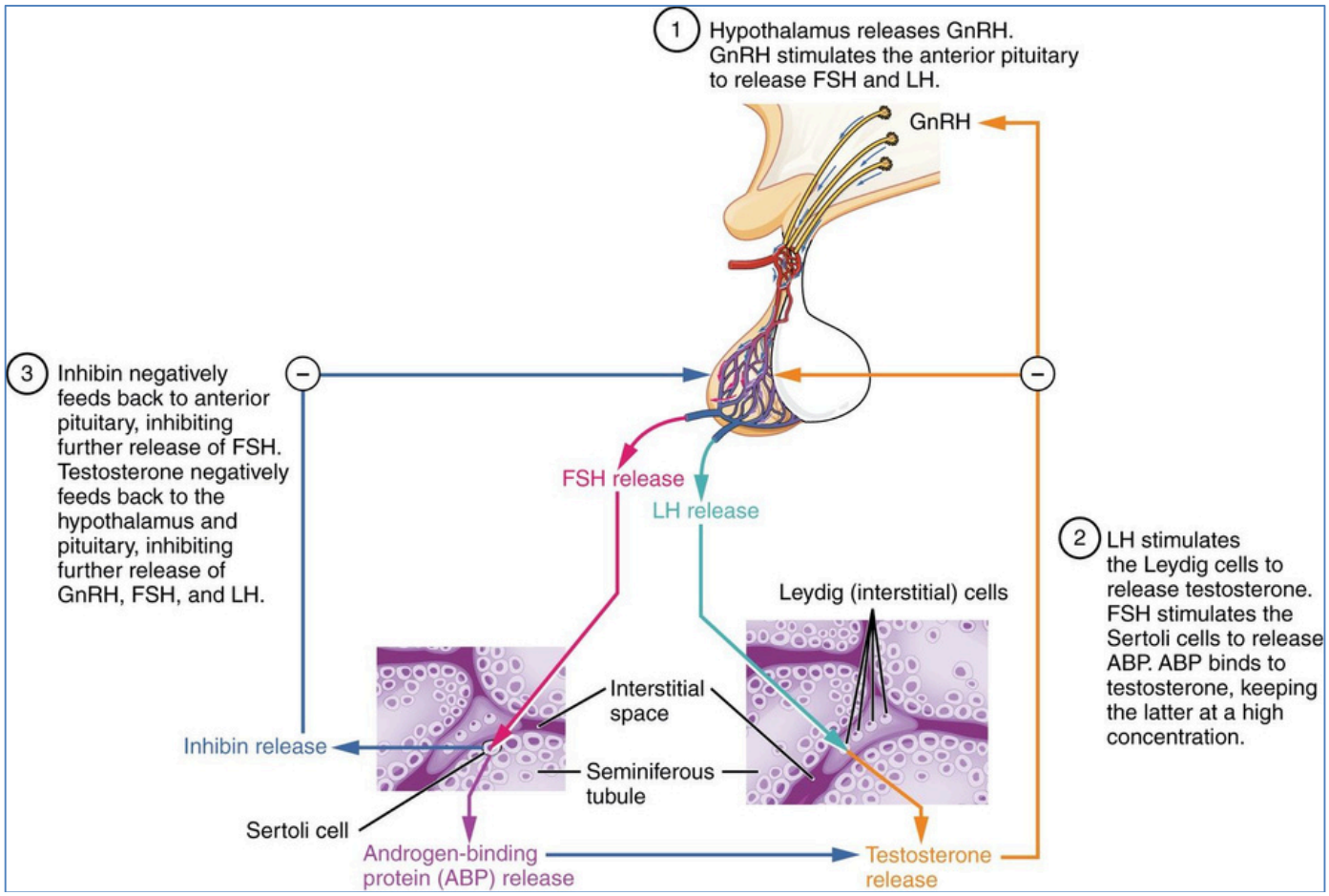


Neuroendocrine Control; "Brain-Testicular Axis":

1) **Hypothalamus** releases **GnRH (gonadotropin-releasing hormone)** which →
2) **Anterior Pituitary →** release gonadotropins: **FSH** (Follicle stimulating hormone) **& LH** (Luteinizing hormone).
3) **FSH:** stimulates **Sertoli** (Sustentacular) cells to release **Androgen-binding protein (ABP)** → Makes spermatagonium, spermatocytes, and spermatozoa **receptive to** the androgen: **Testosterone.**
4) **LH:** stimulates the **Leydig cells** [Basally external to Seminiferous tubules] to **produce testosterone** which **triggers & maintains spermatogenesis.**
5) **Testosterone** produced by Leydig (interstitial) cells **inhibits GnRH** production; as does **Inhibin**, produced by the sustentacular (sertoli) cells. **→ Neg. Feedback to Hypothalamus → ↓GnRH**

- When testosterone is at its peak → **sperm count is high (20Mil+)** → inhibin levels rise →GnRH decreases →FSH & LH levels decrease → Testosterone & ABP levels decrease → **spermatogenesis slows.**

-When **sperm count is low (20Mil -) →** inhibin & testosterone levels are low → no negative feedback to hypothalamus → hypothalamus Releases GnRH → Ant. Pituitary releases LH & FSH → FSH stimulates sustentacular (sertoli) cells to produce ABP; LH stimulates the interstitial (Leydig) cells to produce testosterone →Testosterone + ABP stimulates spermatogenic cells → **Spermatogenesis increases.**

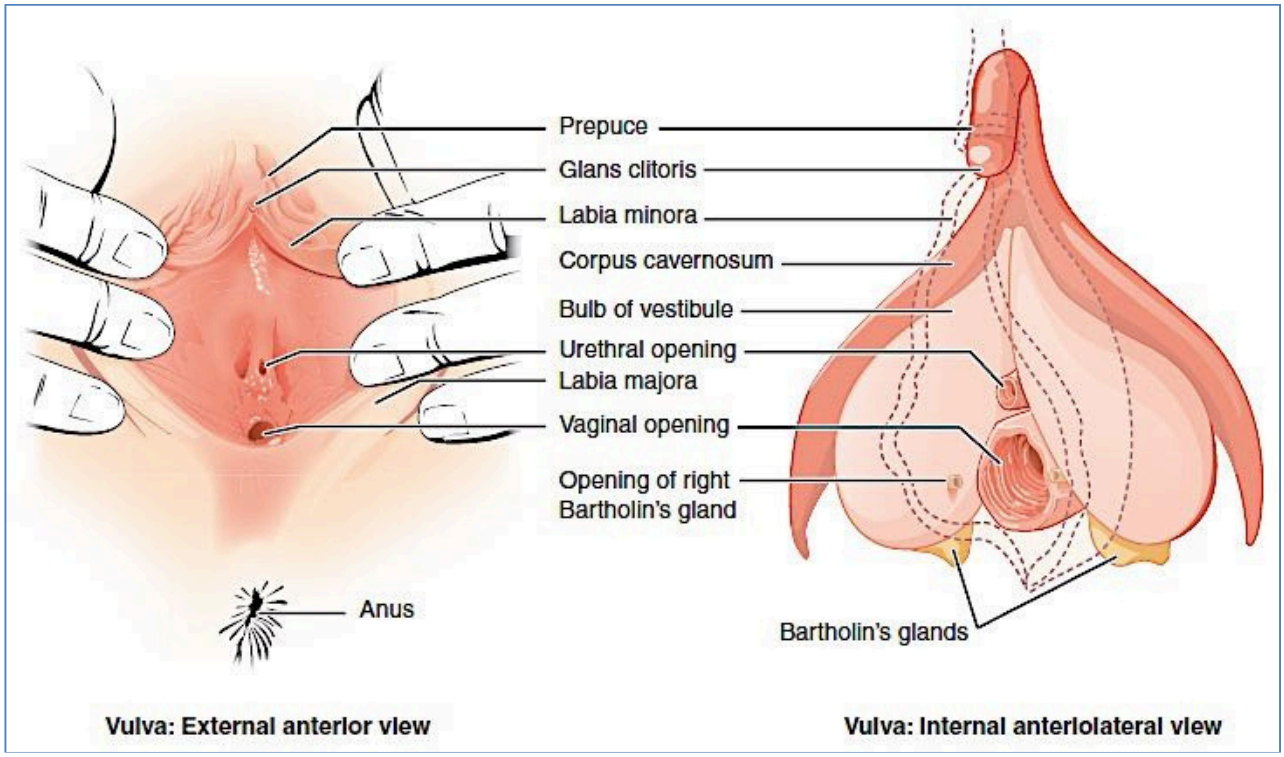


REVIEW OF BASIC FEMALE REPRODUCTIVE ANATOMY

REVIEW OF BASIC FEMALE REPRODUCTIVE ANATOMY

Review of Female Reproductive Structures:

- **Anatomy:**
  - **Vagina/Vulva:**
    - Labia Majora & Minora
    - Clitoris & prepuce of clitoris
    - Urethral orifice



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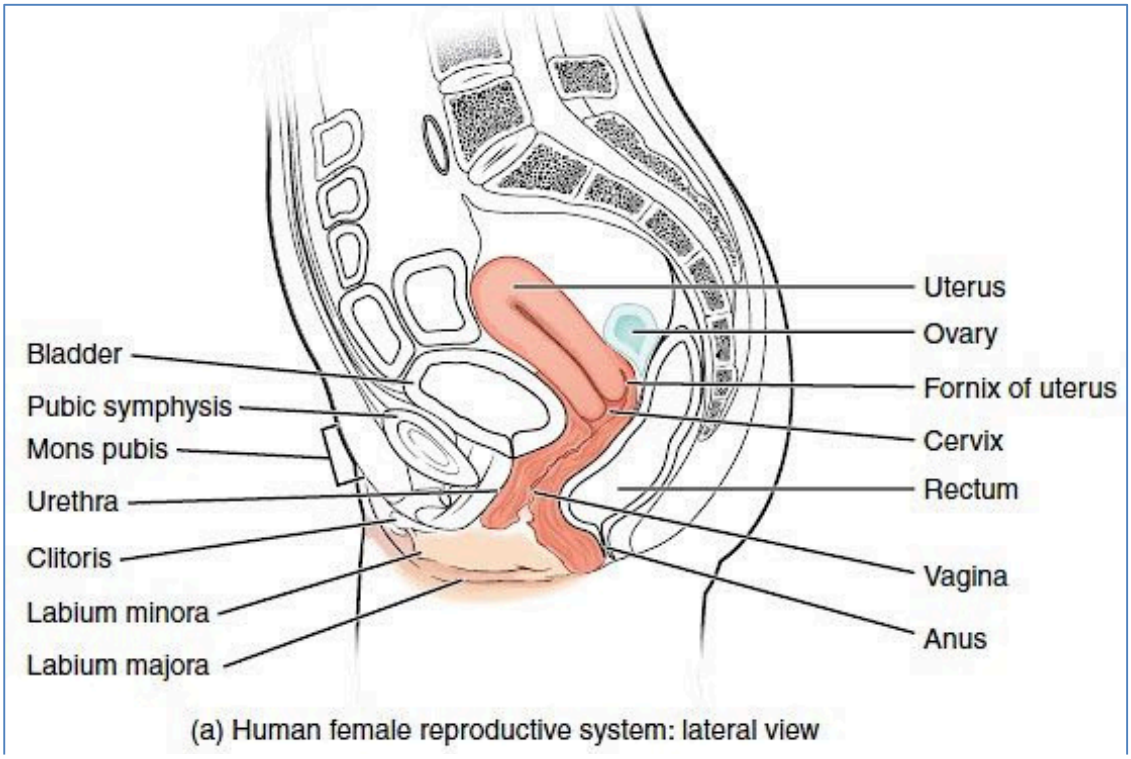
  - **Uterus -** Fundus (top / head), Body, Cervix (external os, canal, internal os), Lumen (internal cavity)
    - **Perimetrium** – Outer wall
    - **Myometrium** – Middle of wall
    - **Endometrium** – Inner wall



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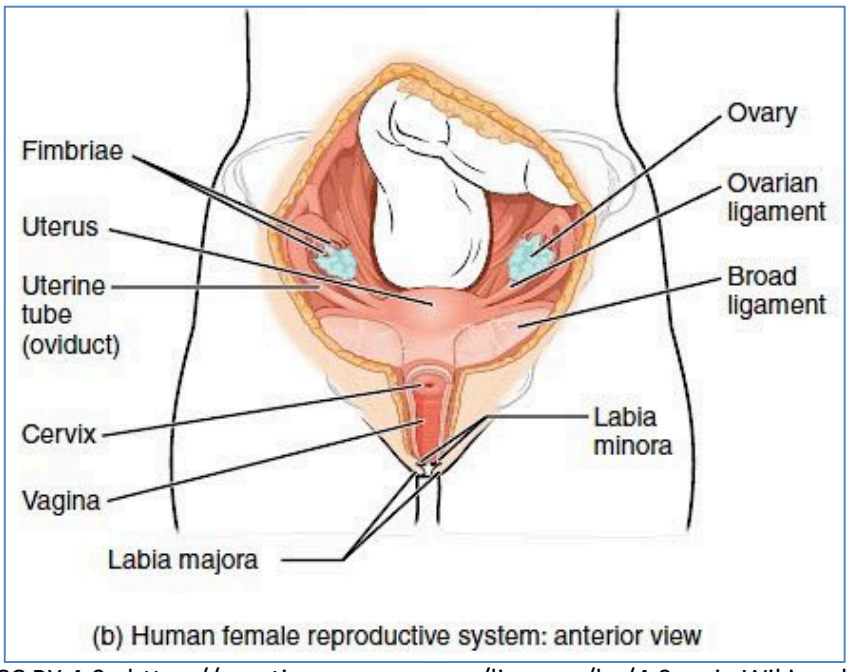

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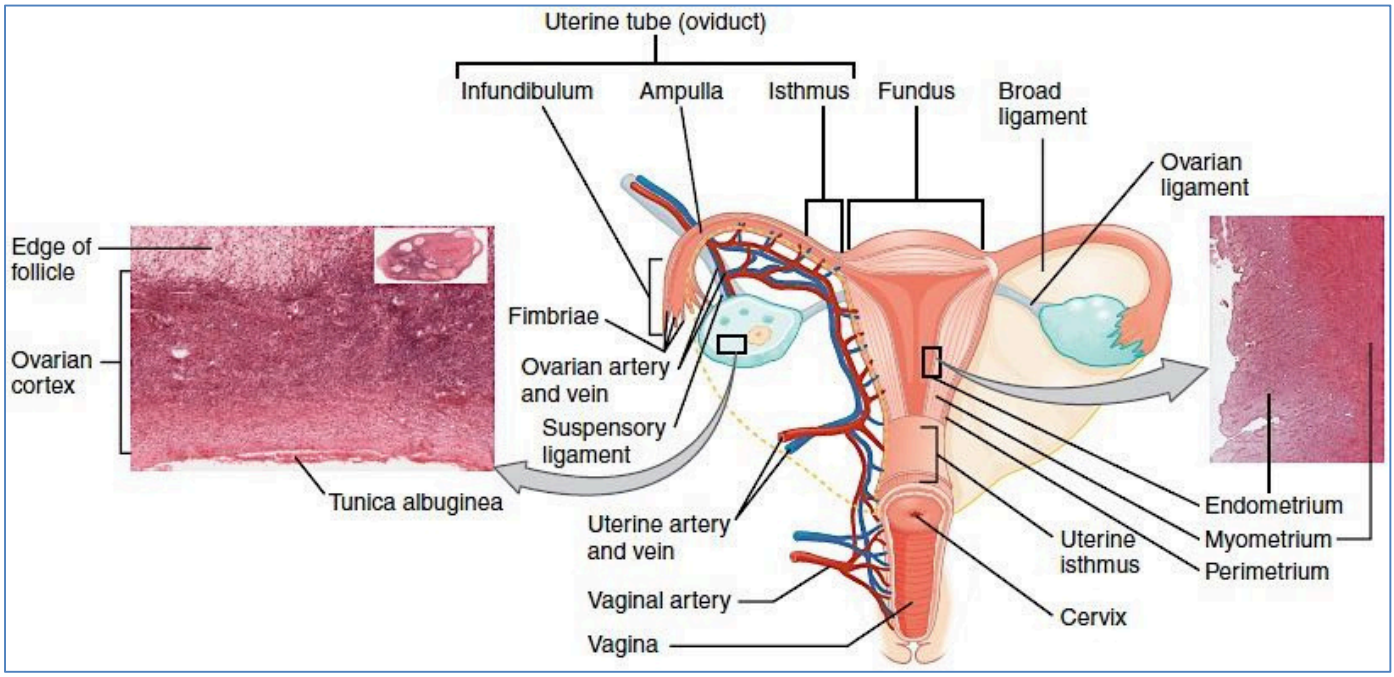
- **Uterine (fallopian) Tubes**
  - Common site of fertilisation
  - Infundibulum – projections = fimbriae (closest to ovary) → Receives oocyte
- **Ovaries (gonads)**
  - Produce female gametes (oocytes)
  - Secrete female sex hormones – (Oestrogen & Progesterone)
  - Held in place by ligaments & muscles



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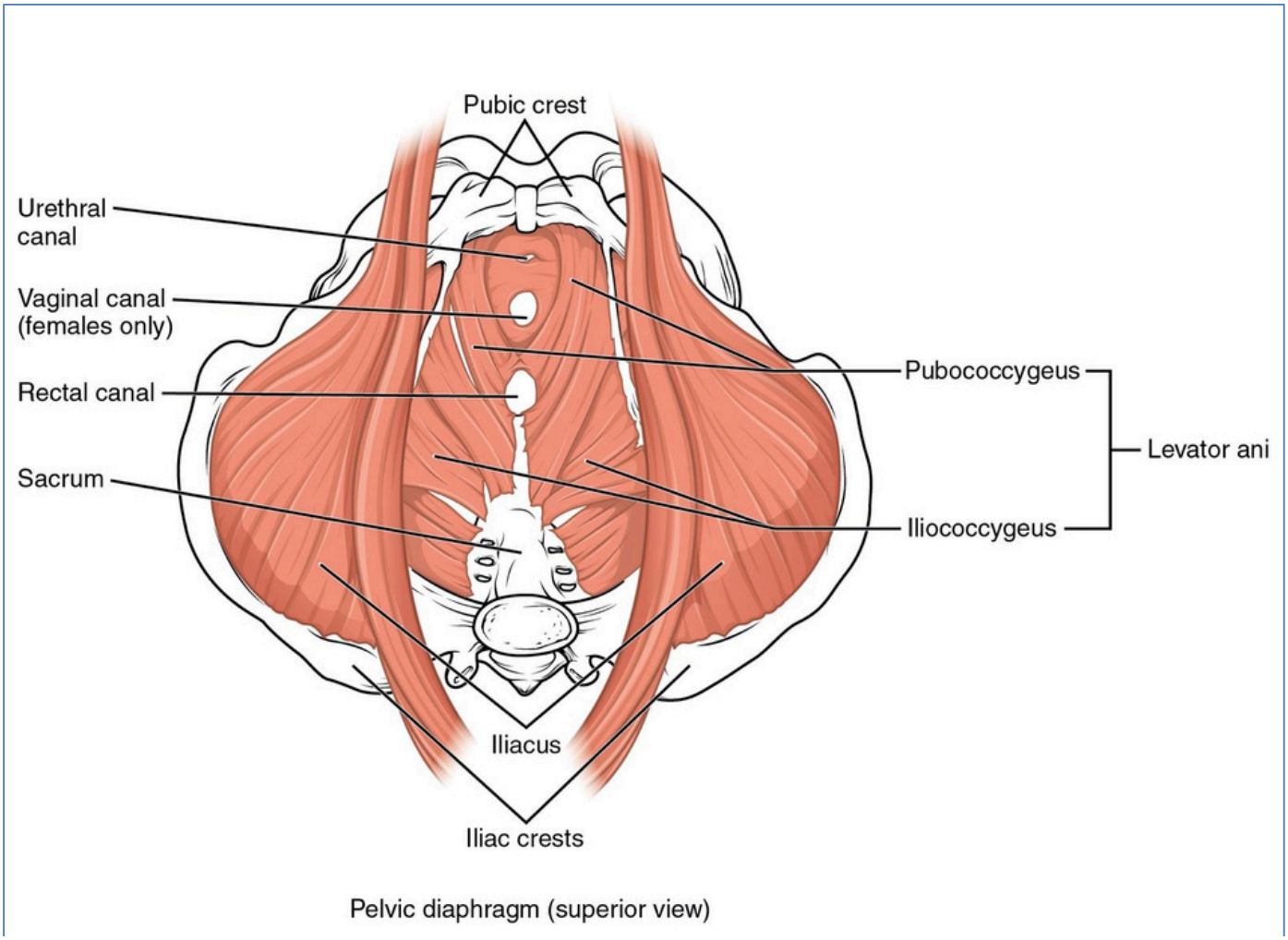
- **Blood Supply:**
  - **Internal iliac artery:**
    - Branches from common iliac artery.
    - Uterine Artery
    - Vaginal Artery
    - To external genitalia
  - **Ovarian Artery:**
    - To ovaries, uterine tubes and uterus

- **Pelvic Diaphragm:**
  - **Levator Ani (anterior half)**
    - Iliococcygeus
    - Pubococcygeus
  - **(posterior) Coccygeus** (ischiococcygeus)
  - **(posterior) Piriformis**



Pelvic diaphragm (superior view)

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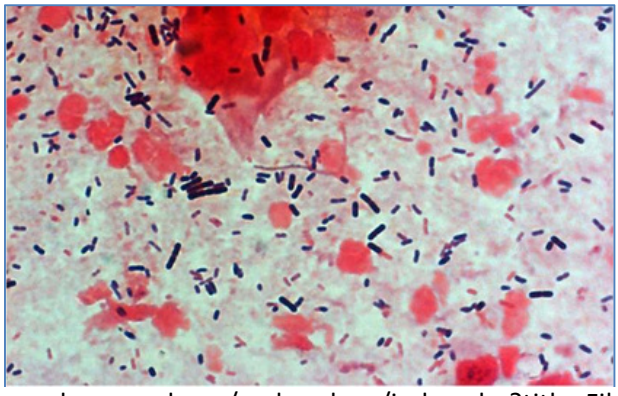
Normal Flora of the Genital Tract

- **Male:**
- o **Urethra** – Few Organisms - (*Staph. epidermidis*, Streptococci, *Uroplasma urealyticum*)

Female:

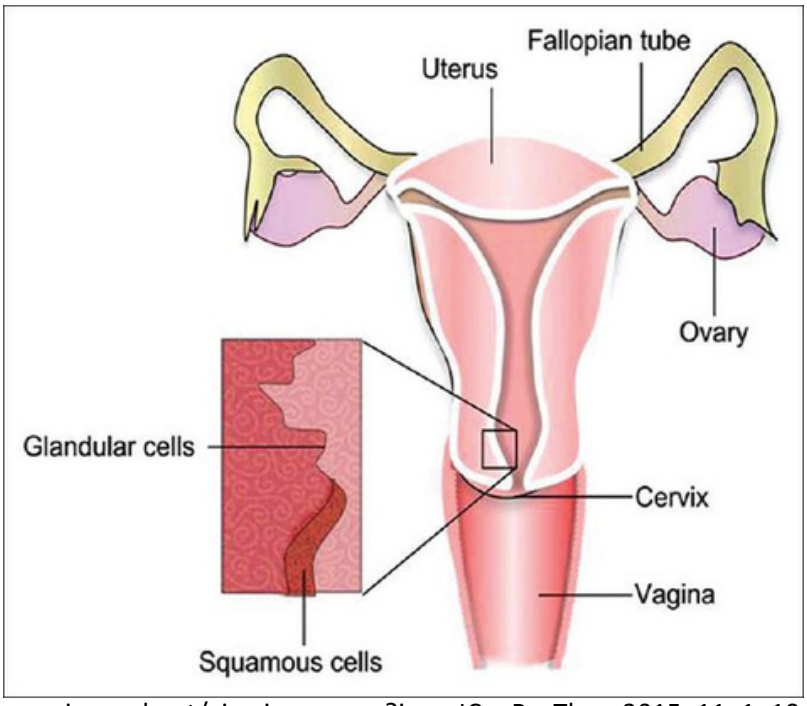
- o **Vagina** – High Numbers of Bacteria – (***Lactobacillus*** - Blue Gram Positive Rods, + Some Anaerobes)
  - → Produce lactic acid
  - → Protects against Bacterial Vaginosis & Yeast Infections.



https://embryology.med.unsw.edu.au/embryology/index.php?title=File:Bacteria_-_gram-stained_vaginal_smear_05.jpg

Background Information on the Cervix:

- **Note: The Transformation Zone – Commonest location of Cervical Cancer.**
  - o **TZ =** The location of Transition from Squamous to Columnar Epithelium.
  - o The most common location from where pre-cancerous cells arise.
  - o **Note:** During puberty, Columnar Epithelium Migrates out of the os → Exposed to Vaginal Acidity → Metaplasia to Squamous Epithelium
  - o This is the area Predisposed to Cancer.



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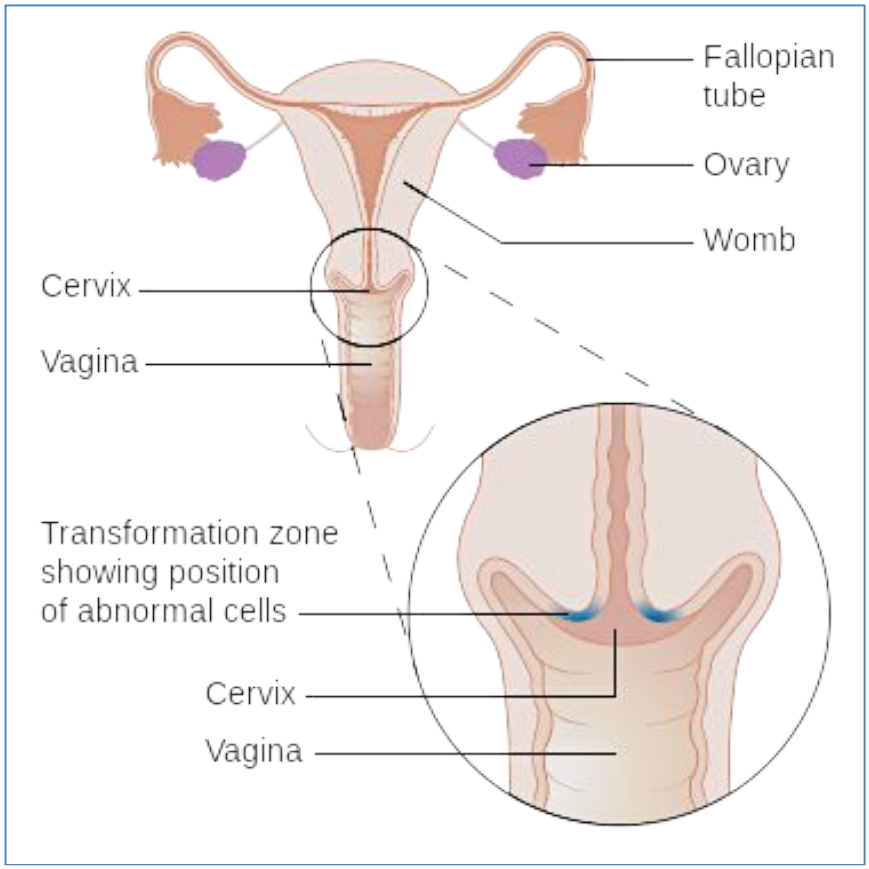
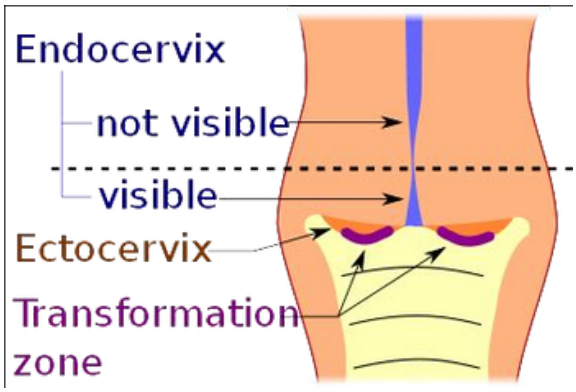
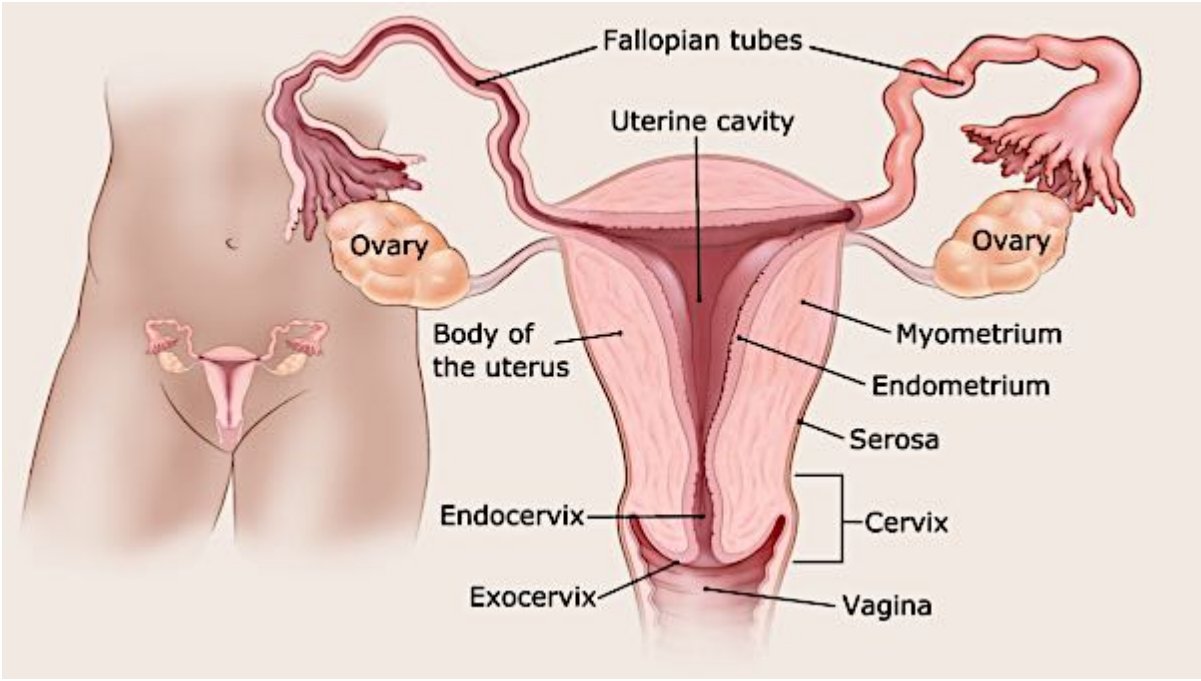


- **Note: The Normal Cervix – Anatomy & Histology:**
  - o **Endocervix =** *Simple Columnar Epithelium*
  - o **Ectocervix =** *Stratified Squamous Epithelium*



Mikael Häggström, M.D. - Author info - Reusing images- Conflicts of interest: NoneMikael Häggström, CC0, via Wikimedia Commons



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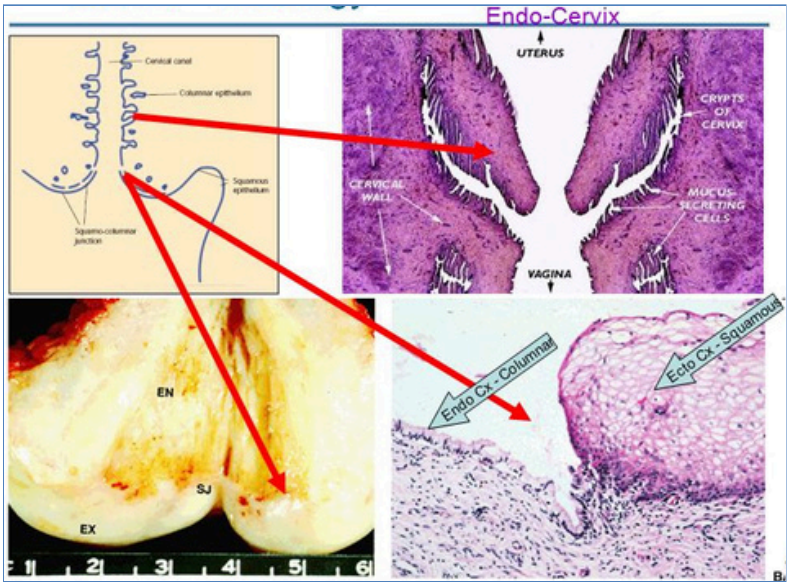
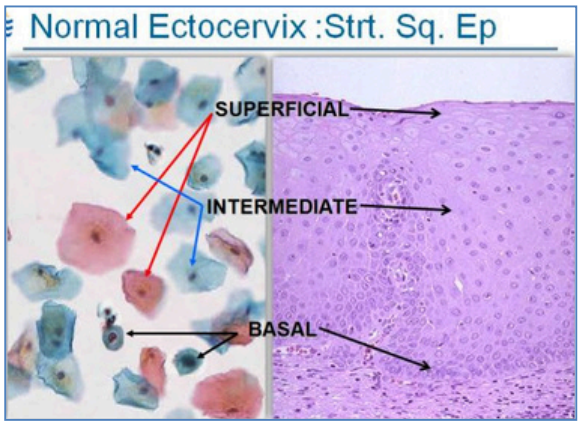
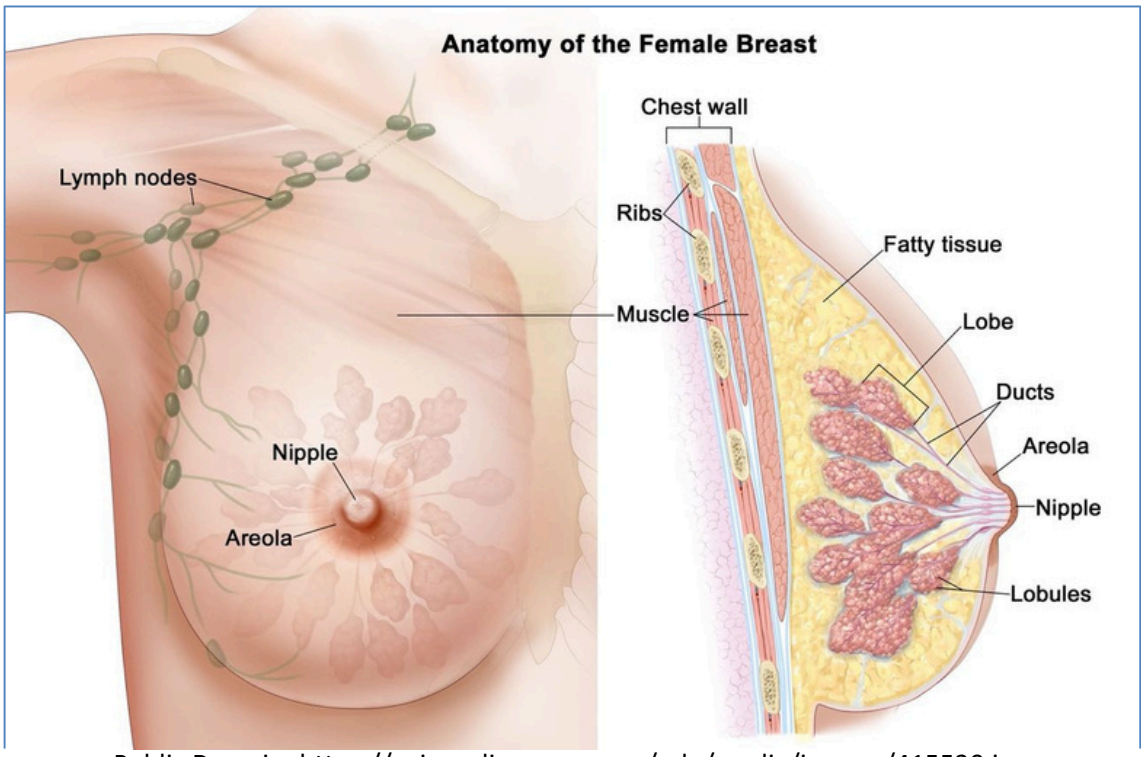




Overview of The Breast:

- **Mammary glands:**
  - o Exist in both sexes – only functional in females
  - o Contained within the breast – within the hypodermis (superficial fascia), anterior to pectoral muscles of the thorax.
- **Areola** – ring of pigmented skin surrounding nipple – contains large sebaceous glands (stop chapping)
- **Nipple** – protrudes from centre of areola
- Attached to Pec-Major by Suspensory Ligaments
- **Glandular Breast Tissue:**
  - o Approx 20 lobes/lobules → Converge to Lactiferous Ducts → Lactiferous Sinuses → Nipple
  - o Padded and separated from each other by connective tissue (suspensory ligaments) and fat
  - o Within the lobes are smaller lobules – containing glandular alveoli – produce milk during lactation.
  - o Compound alveolar glands pass milk into the lactiferous ducts →accumulates in a lactiferous sinus.
- **Lymphatic Drainage:**
  - o Supraclavicular, Infraclavicular, Parasternal, Pectoral, Axillary, Central, Subscapular



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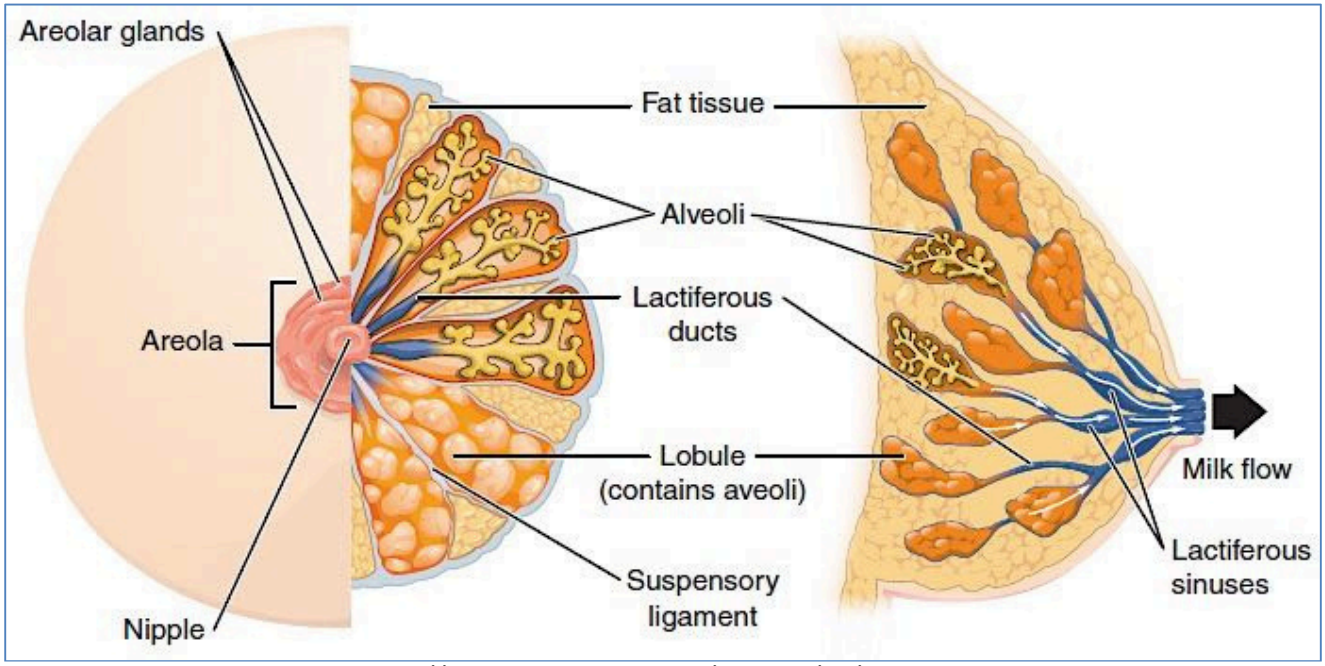

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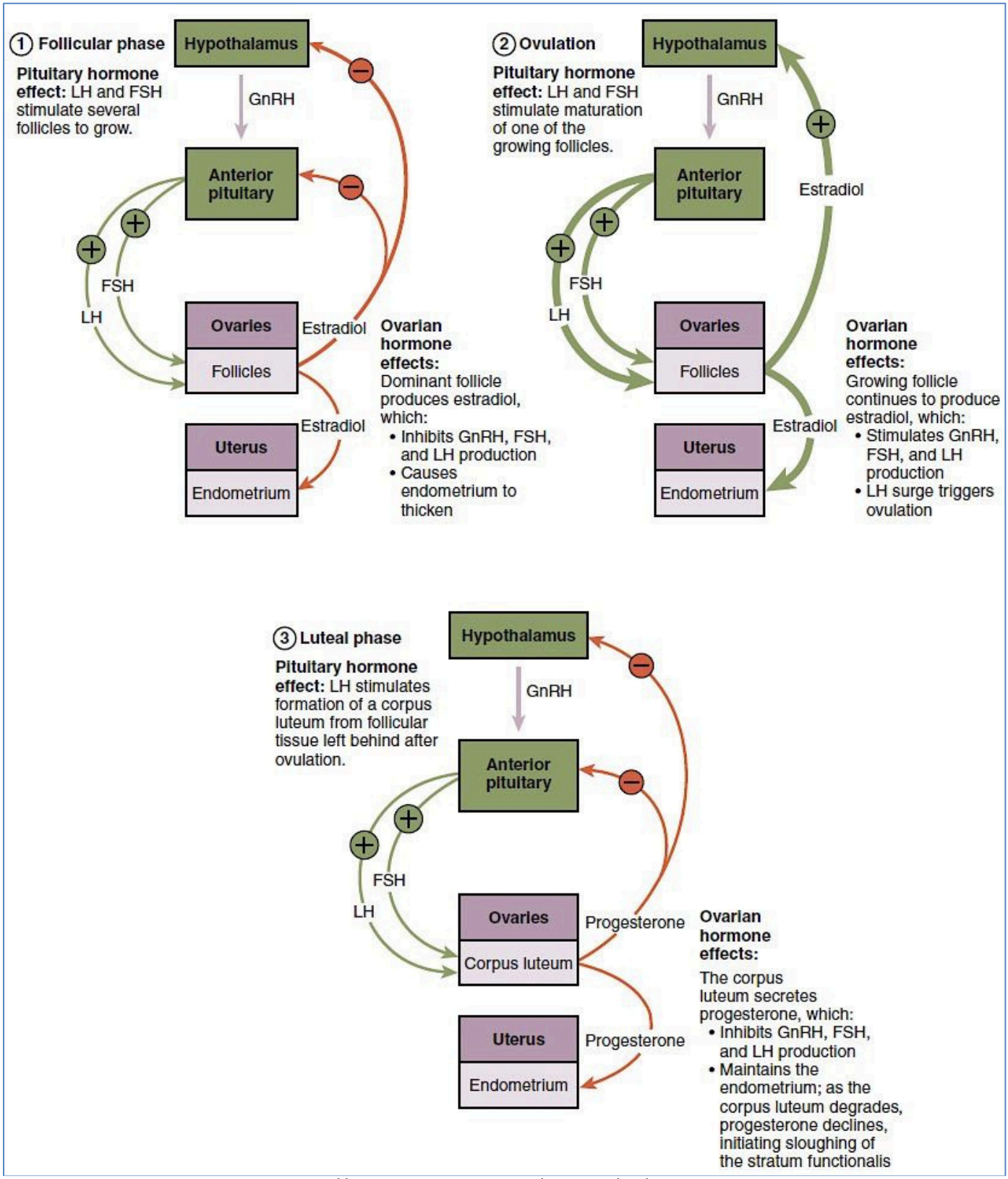
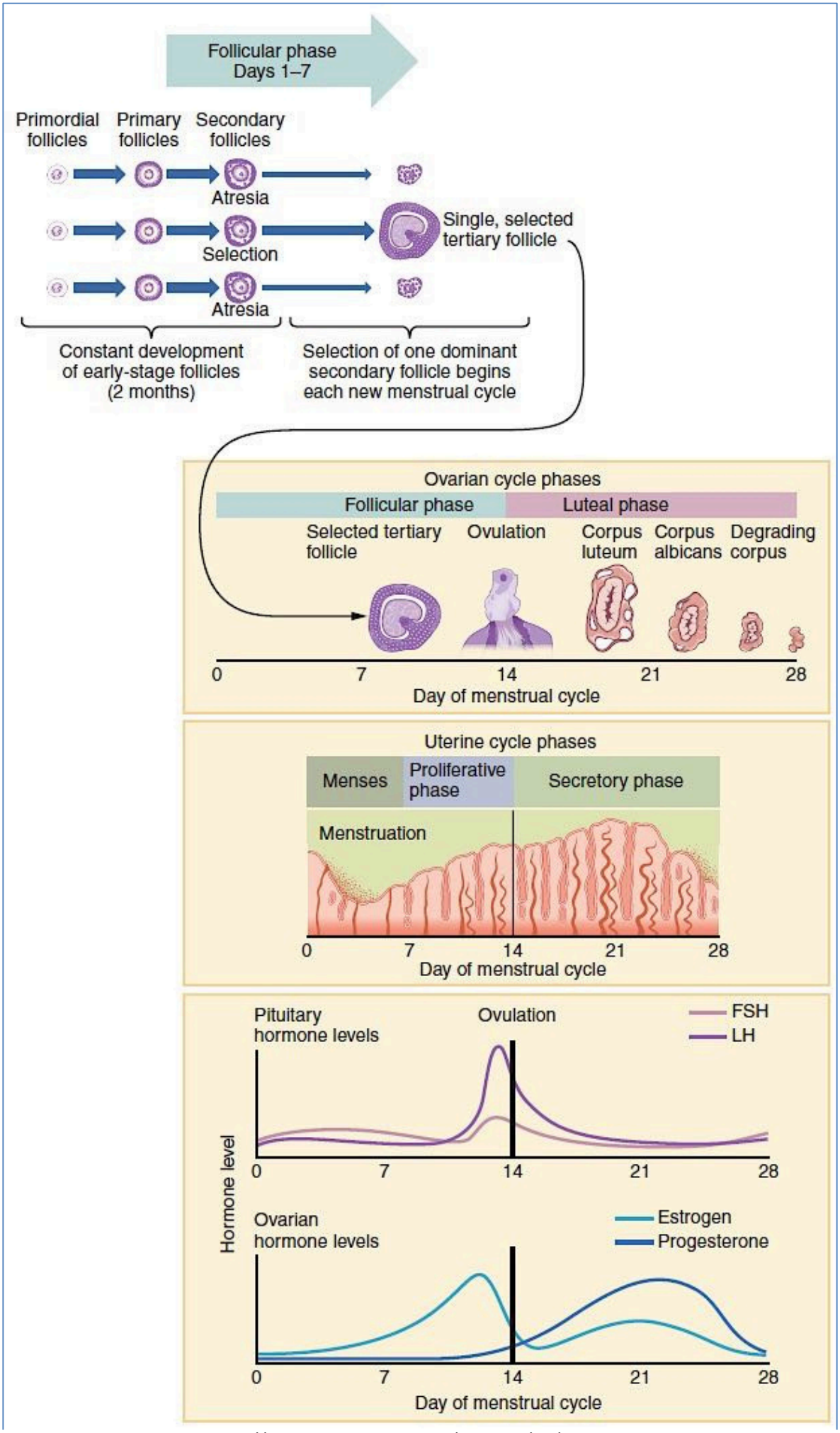
Review of Female Reproductive Physiology:

- **Puberty:**
  - o A gradual series of events that transform a child into a sexually mature adult.
  - o **Female:** Marked by first menstrual period (average age 13)
  - o **(Male:** Marked by physical development of Male Sex Characteristics)
- **Initiation:**
  - o Activation of **Hypothalamo-Pituitary-Gonadal Axis** → establishes regulation of gonadal function.
    - § **At puberty** → ↓ Sensitivity of the hypothalamus to Inhibitory Steroid Hormones →↑GnRH →↑FSH & LH → ↑Gonadal Testosterone/Oestrogen/Progesterone → Sexual Maturation.
- **The Female Reproductive Cycle:**
  - o The monthly series of events associated with the maturation of an egg.
  - o Typically 28 days long.
  - o **Days 1-5: *Menstruation*:**
    - § **Shedding of the Endometrium**
    - § Low levels of all hormones (FSH, LH, Oest. & Prog).
  - o **Days 5-14: The Follicular/Proliferative Phase:**
    - § **Follicular Recruitment & Growth**
    - § **+ Endometrial Proliferation**
    - § Rising levels of Oestrogen as Follicle/s get larger.
  - o **Day 14 (Mid-Cycle): *Ovulation*:**
    - § Surge of FSH & LH → Ovulation into peritoneal cavity → Oocyte enters Fallopian Tubes.
    - § **FERTILE**
  - o **Days 14-28: The Luteal Phase:**
    - § **Transformation of Follicle → Corpus Luteum**
    - § Corpus Luteum Secretes Mainly Progesterone (& Some Oestrogen)
      - Degenerates (Unless pregnancy occurs →C.L. persists until the placenta can take over).
    - § **FERTILE**
  - o **Day 28: End of Cycle:**
    - § **Corpus Luteum Degenerates** → No Oestrogen/Progesterone to sustain Thick Endometrium →Endometrial Arteries become Spastic & Tortuous → Menstruation.

(Diagram over the page)





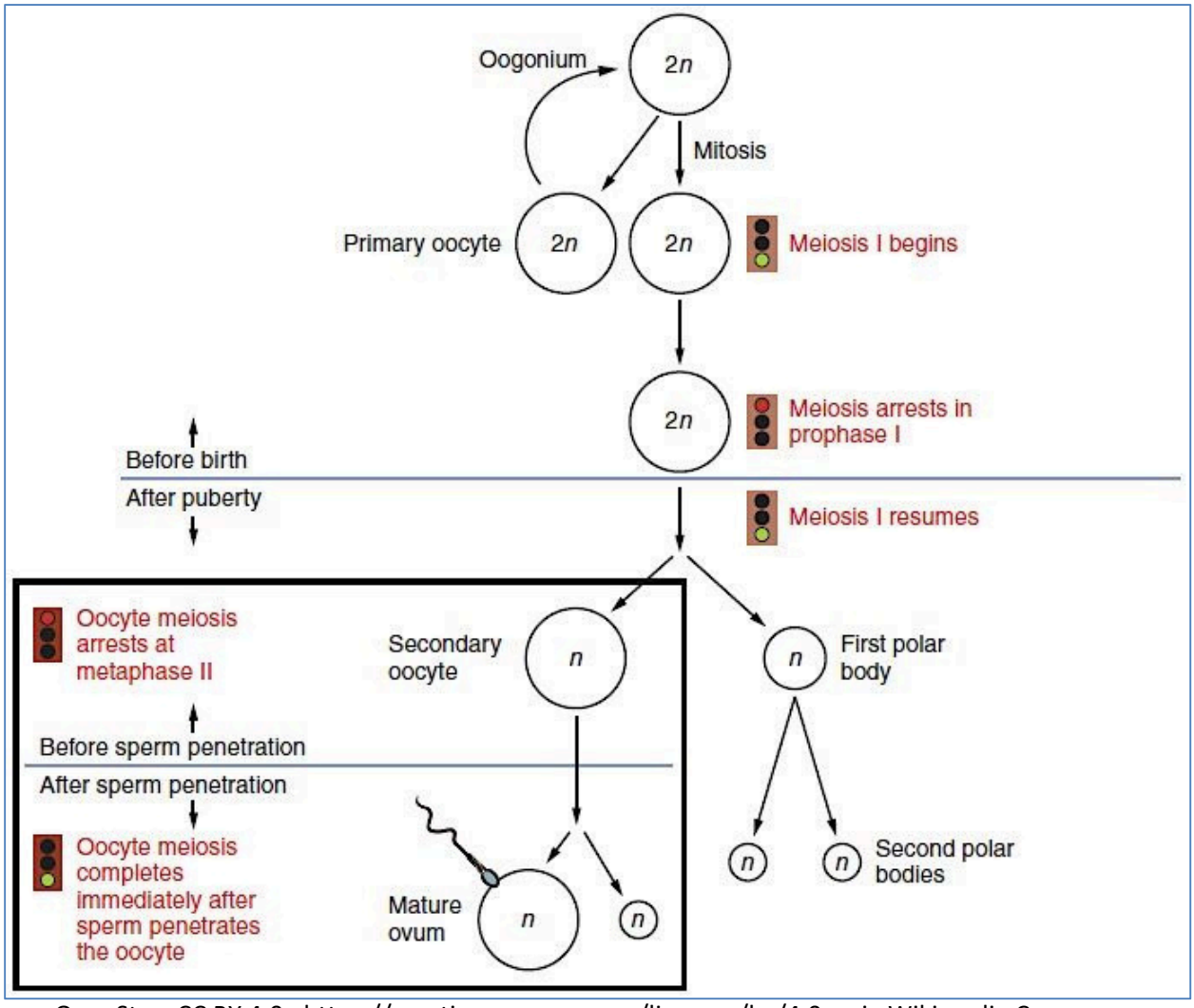
M eiosis (Fem ale) – O ogenesis:

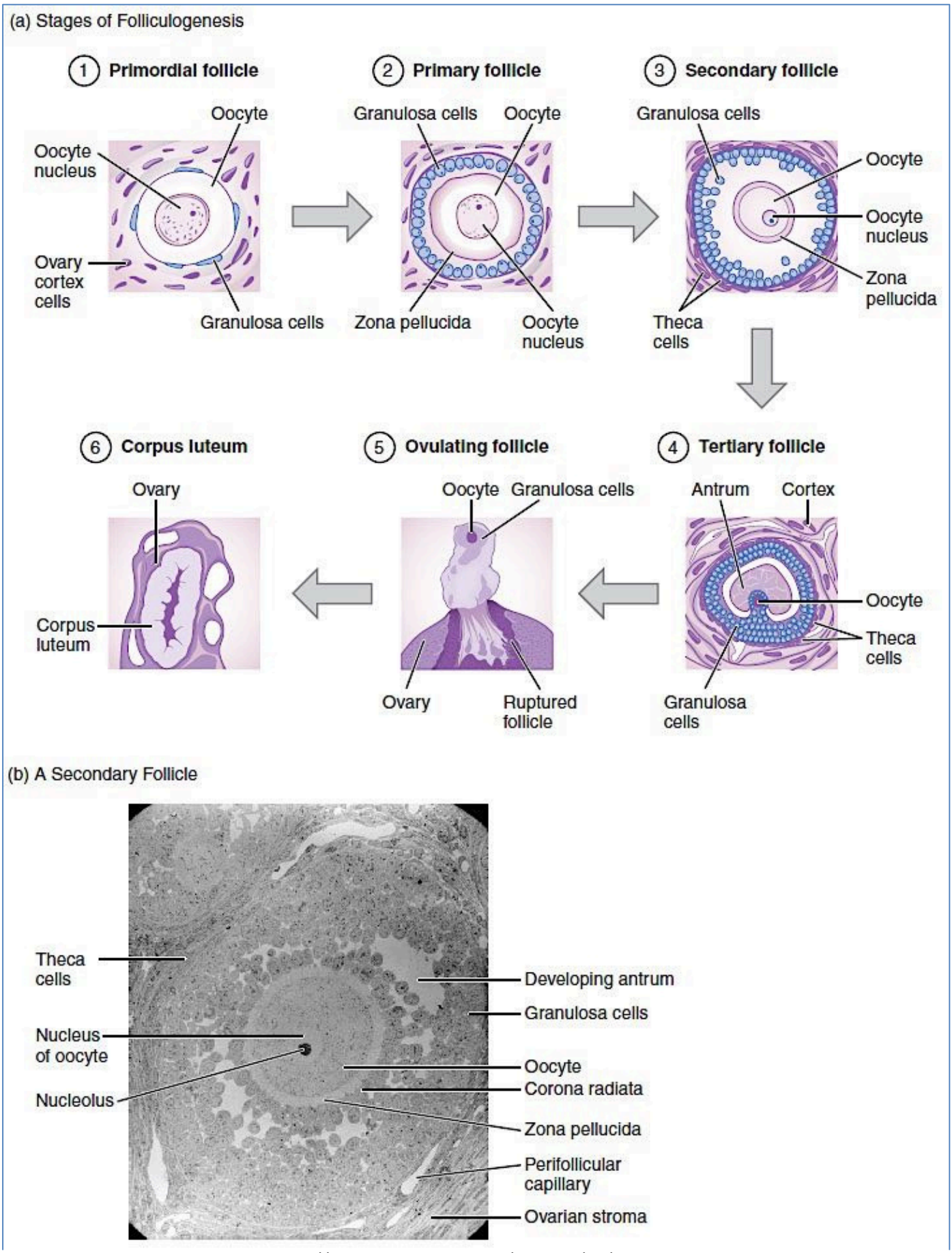
- It is thought that in general, the total number of eggs in a female is predetermined at birth.
- **Female gamete production = Oogenesis.**
    - o Done through **meiosis**
        - § Specialized cell division
        - § Usually produces 4 haploid cells.

1) **Foetal period** - the, **Oogonia** (diploid ovarian stem cells) multiply rapidly by mitosis, then enter a growth phase and lay in nutrient reserves as **Primary Oocytes**.
2) These **Primary Oocytes** then become **surrounded by** a single layer of **Follicle Cells** forming a **Primordial Follicle.**
3) **Primary Oocytes** (of the primordial follicles) then begin the **first meiotic division.** However, they are **arrested in prophase I.**
4) Female is born with approx. 2million primary oocytes. By puberty, 250000 primary oocytes are left.
5) **Puberty—Menopause:** Each month, a small number of **primary oocytes** are recruited in response to the LH surge midway through the menstrual cycle. (Luteinising Hormone) As these **primary oocytes** prepare to divide, a spindle forms on its edge, creating a small "nipple" where half of the chromosomes will be cast during division.
6) Only **one of the primary oocytes** is selected to **continue meiosis I.** Produces **2 haploid cells** (23 chromosomes each) **dissimilar in size**. The smaller cell is the "**first polar body"** (little->no cytoplasm) and the larger cell is the **secondary oocyte**. → The **secondary oocyte** is then arrested in **metaphase II** and **OVULATED.** (unequal Cytoplasmic divisions ensure that a fertilised egg has ample nutrients for its week-journey to the uterus.)
7) The **ovulated secondary oocyte MUST be penetrated by a SPERM for it to complete MEIOSIS II,** yielding one large **OVUM** and a **"Second polar body"**

***Note: -** The potential products of oogenesis are 3 small polar bodies and one large ovum. (3 polar bodies aren't always formed – first polar body often perishes before meiosis II)

-Only the **OVUM** is a ***functional gamete.***





Menopause:

- **Terminology:**
  - **"Menopause" = >12mths of Amenorrhoea since the Last Menstrual Period.**
    - (Note: And not accounted for by any other cause)
  - **"Pre-Menopause" = Early symptoms of Menstrual Irregularity**
  - **"Perimenopause" = From onset of *Pre-Menopausal Symptoms (Ie: >2skipped Cycles)*, to 12mths since the Last Menstrual Period.**
- **Types:**
  - **Physiological:** Spontaneous menopause ~45-55yrs
  - **Premature:** <40yrs (Due to Premature Ovarian Failure)
  - **Iatrogenic:** Medically Induced (Eg: Chemotherapy/Radiotherapy)
- **Mechanism:**
  - ↓Follicle Sensitivity to FSH → ↓Follicles Recruited →↓Oestrogen Levels Production → Progressive Oligomenorrhoea → Amenorrhoea
  - (Note: Gradual process over 3-5yrs)
- **Clinical Features:**
  - **Epidemiology:**
    - **Average ages:** 45-55
  - **Symptoms:**
    - **Menstrual Irregularity:**
      - Oligomenorrhoea (Irregular/Lighter Periods)
      - (Occasionally Intermittent Menorrhagia/DUB)
    - **Hormonal Symptoms - (Note: Can persist for <5yrs Post-"Menopause"):**
      - **Hot/Cold Flushes/Night-Sweats (Pathognomonic):**
        - 75% of Women
        - Onset @ Pre-Menopause (<2yrs before); Last for <2yrs after Menopause.
      - **Mood Changes:**
        - Mood Swings – Depression/Anxiety/Irritability
        - (+ Poor Concentration/Memory/Insomnia)
        - ↓Libido
      - **Associated Syx:**
        - Palpitations/Dizziness/Headaches
    - **Genitourinary:**
      - Vaginal Dryness →
        - Itching/Burning
        - Dyspareunia
      - Urethral Atrophy → ↑UTIs
      - ↓Ovulation → Infertility
  - **Anatomical Changes:**
    - **Uterus/Cervix:** Atrophy (Note: Any pre-existing Fibroids shrink as well)
    - **Vagina:** Dryness, ↑pH (and Lactobacilli ↓), Mucosal Atrophy, ↓Elasticity
    - **Vulva:** Atrophy
    - **Pelvic Floor:** ↓Muscle Tone (→ Uterovaginal Prolapse)
    - **Ovaries:** Atrophy, Stop producing follicles.
  - **Complications:**
    - ****Osteoporosis**** (Loss of Oestrogen-Mediated Ca-Deposition in Bone)
    - **↑Risk of Heart Disease** (Protective effects of oestrogen is lost)
- **Diagnosis:**
  - **Clinical Hx:**
    - Symptoms
    - Lifestyle Impact
  - **Examination:**
    - Complete Physical (including Breast & Pelvic)
  - **(Definitive Dx - ↑FSH & ↓Estradiol = Ovarian Failure)**

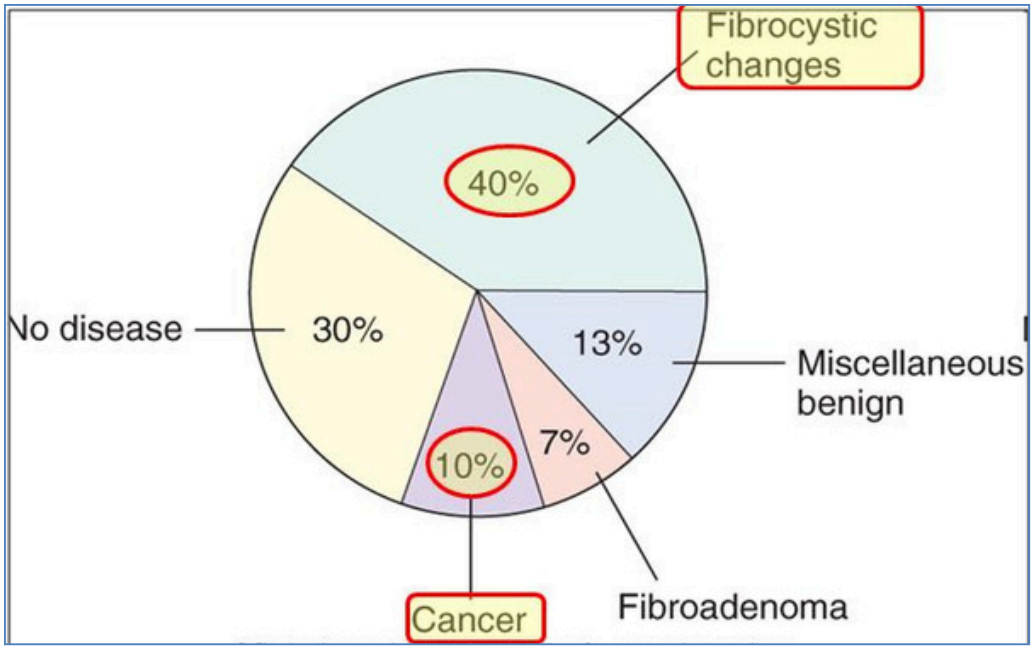
- **Baseline Investigations:**
  - FBC/LFTs/TFTs/Lipids/Coags
  - Bone-Mineral Density Scan (?Osteoporosis)
  - Mammogram & Pap Smear
- **Non-Pharmacological Management:**
  - Advise healthy lifestyle (Diet, Weight Loss, Weight-Bearing Exercise)
  - Calcium & Vit-D Supplements
  - **+ Breast/Colon Cancer Screening:**
    - Annual Mammograms
    - Annual FOBT; 5yrly Colonoscopy
    - 2yrly Pap-Smears
- **Pharmacological Management:**
  - **HRT (Pharmacological):**
    - **Strategy:**
      - **Duration:** Only for SHORT TERM Symptomatic Relief (Ie: 2-3yrs MAX)
      - **Smallest Dose:** Titrated to symptom relief
      - **Taper Doses:** To avoid "*Rebound Menopause*" when ceased
    - **Options:**
      - ****Combined Oestrogen +Progesterone** (If Intact Uterus – To prevent Endometrial Cancer)
        - **Cyclical** – For *Peri-Menopausal*
        - **Continuous** – For *Post-Menopause*
      - **Oestrogen Only** (For women without a Uterus; Or Mirena Inserted)
    - **Benefits:**
      - ↓Hormonal Symptoms (Flushes/Mood)
      - ↓Vaginal Dryness
      - ↓Risk of Osteoporosis
    - **Side Effects:**
      - Breakthrough Bleeding
      - Breast Tenderness
      - Headaches/Nausea/Mood Swings
      - Small ↑Risk of Cardiovascular Disease
      - Small ↑Risk of Breast & Colorectal Cancers
      - (↑ Risk of Endometrial/Ovarian Ca ONLY IF Unopposed Oestrogen Therapy)
      - Small ↑Risk of VTE & Stroke
    - **CONTRAINDICATIONS:**
      - Hx of Thromboembolism (DVT/PE/CVA)
      - Hx of Stroke
      - Unexplained Post-Menopausal Bleeding – (Suspected Endometrial/Breast Ca.)
      - Acute Liver Disease
      - Hx of Breast Cancer
      - Pre-Existing Cardiovascular Disease – (Incl. Hypertension & ↑Cholesterol)
      - Migraine Suffers
  - **+/- Bisphosphonates (*Eg: Alendronate [Fosamax]*):**
    - To prevent Osteoporosis

BREAST MASSES

BREAST MASSES

Breast Lump Diagnostic Features:

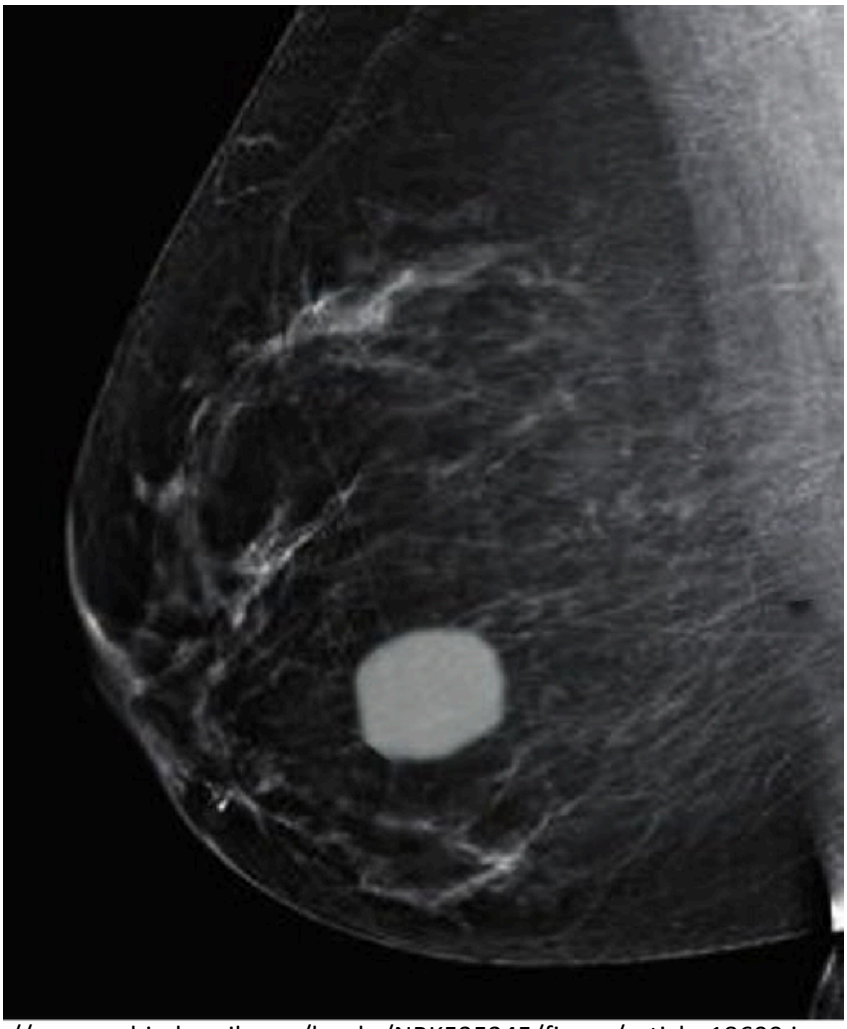
Clinical Presentation:	Most Common Dx:	DDx:
Single, Mobile Lump	*Fibroadenoma*	*Phyllodes Tumour (if >55yrs)*
M ultiple, Irregular Lum py Areas + Cyclical Pain	*Fibrocystic Change*	-
Firm, Tethered Lump	*Carcinoma*	-
Clear/Pus Nipple Discharge	*Duct Ectasia*	-
Bloody Nipple Discharge	*Duct Ectasia*	*Duct Papilloma* *Ductile Ca. In Situ (DCIS)*
Nipple Ulceration & Eczema	*Paget's Disease of the Breast*	*Nipple Adenoma*
Milky Discharge + Visual Changes + Headaches	*Prolactinoma*	*Pituitary Adenoma*



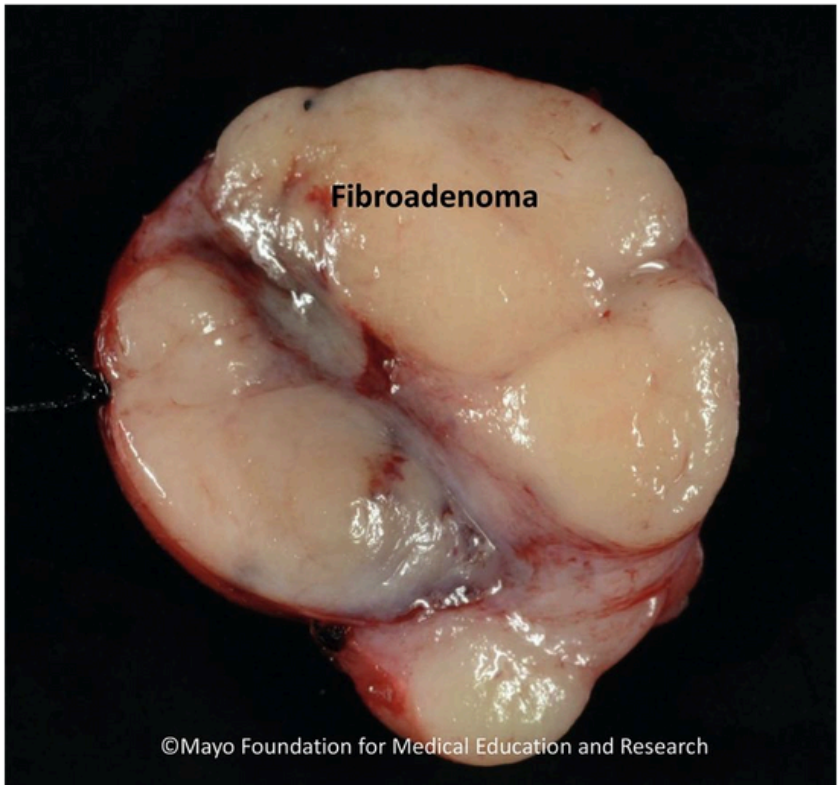
*FIBROADENOMA ("BREAST MOUSE"):

- **Aetiology:**
  - o Benign Tumour of Intralobular Stroma (Loose Connective Tissue)
- **Pathogenesis:**
- - o Benign Tumour of Intralobular Stroma (Loose Connective Tissue) + Some Acinar (Gland) Proliferation

  Morphology:
  - o Capsulated, Firm, Homogenous, Grey, Nodular Tumour, *Without* Cysts.
- **Clinical Features:**
  - o **Most common *Benign Tumour* of the Breast**
    - § Note: 50% Involute Spontaneously
    - § NO risk of Malignancy.
  - o **Presentation:**
    - § Typically 20-40yrs
    - § Typically Multiple & Bilateral
    - § Palpable Mass Or Mammographic Density/s or Calcifications
    - § Variable Size – Typically <5cm Rounded Tumour
    - § Highly Mobile ("Breast Mouse")
    - § Hormonal Stimulation - (May increase with pregnancy or HRT)
- **Treatment:**
  - o Excision = Cure. But not necessary.



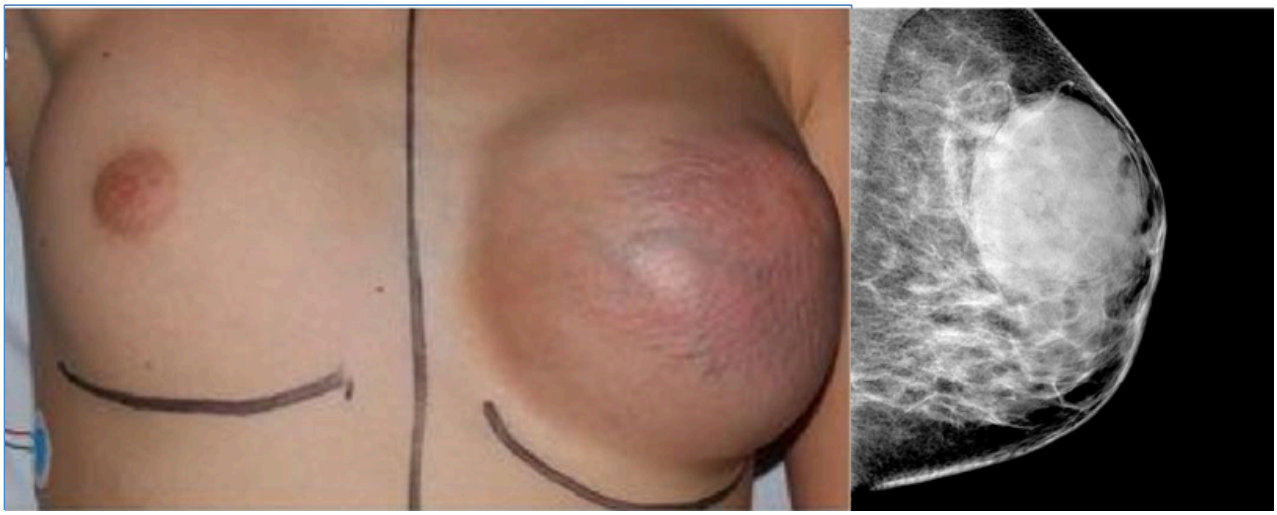
https://www.ncbi.nlm.nih.gov/books/NBK535345/figure/article-18600.image.f1/



Fibroadenoma of the Breast, Lori A. Erickson, MD; Beiyun Chen, MD, PhD, DOI: https://doi.org/10.1016/j.mayocp.2020.08.040

"PHYLLODES TUMOUR"/GIANT FIBROADENOMAS:

- **Basically same as Fibroadenomas, except Typically occur in 50-60yrs (Cf. 20-40yrs for Fibroadenomas)**
- **Aetiology:**
  - o Benign Tumour of Intralobular Stroma (Loose Connective Tissue)
- **Pathogenesis:**
  - o Benign Tumour of Intralobular Stroma (Loose Connective Tissue) + Some Acinar (Gland) Proliferation
- **Morphology:**
  - o Capsulated, Firm, Homogenous, Grey, Nodular Tumour, *Without* Cysts.
  - o ***PLUS*** – *"Phyllodes" ("Leaf-Like")* clefts and slits *throughout Tumour.*
- **Clinical Features:**
  - o Typically Benign **BUT Requires Excision** to avoid Local Recurrences.
    - § Metastasis is Rare.
    - § Note: can be premalignant in older people
  - o Note: An expanding lesion :. No retraction
- **Management:**
  - o **Excision** to avoid Local Recurrences



1.Giant breast fibroadenomas in adolescents: Diagnostic and therapeutic procedures; Beatriz Corredor Andrés, María Márquez Rivera; DOI: 10.1016/j.anpede.2018.01.013

2. Credit: https://radiopaedia.org/articles/giant-fibroadenoma

Figure 1: Gross specimen of the mass.

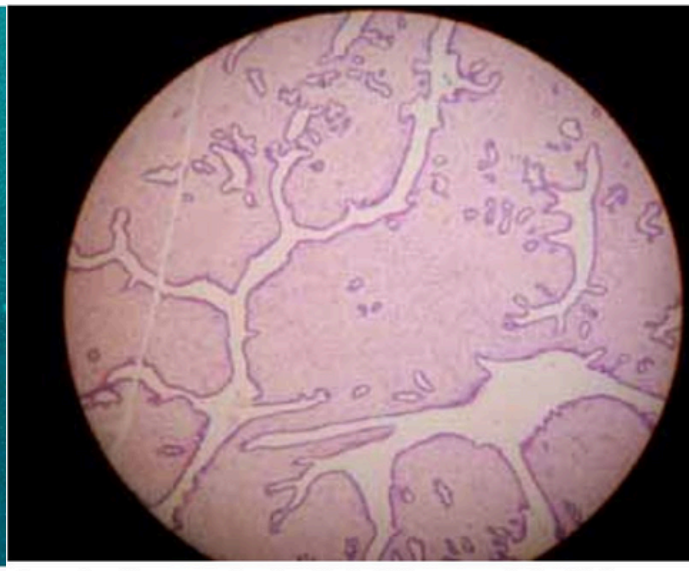
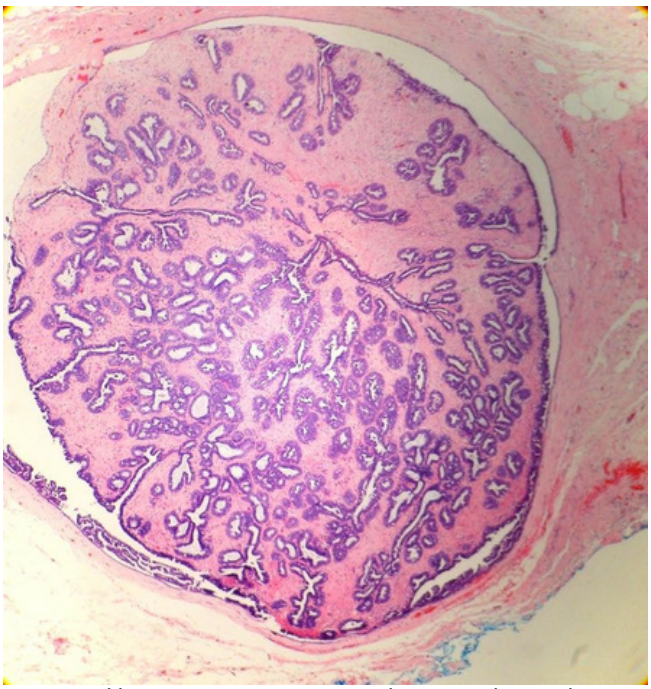


Figure 2: Microscopy showing the leaf like pattern (H&E 10×).

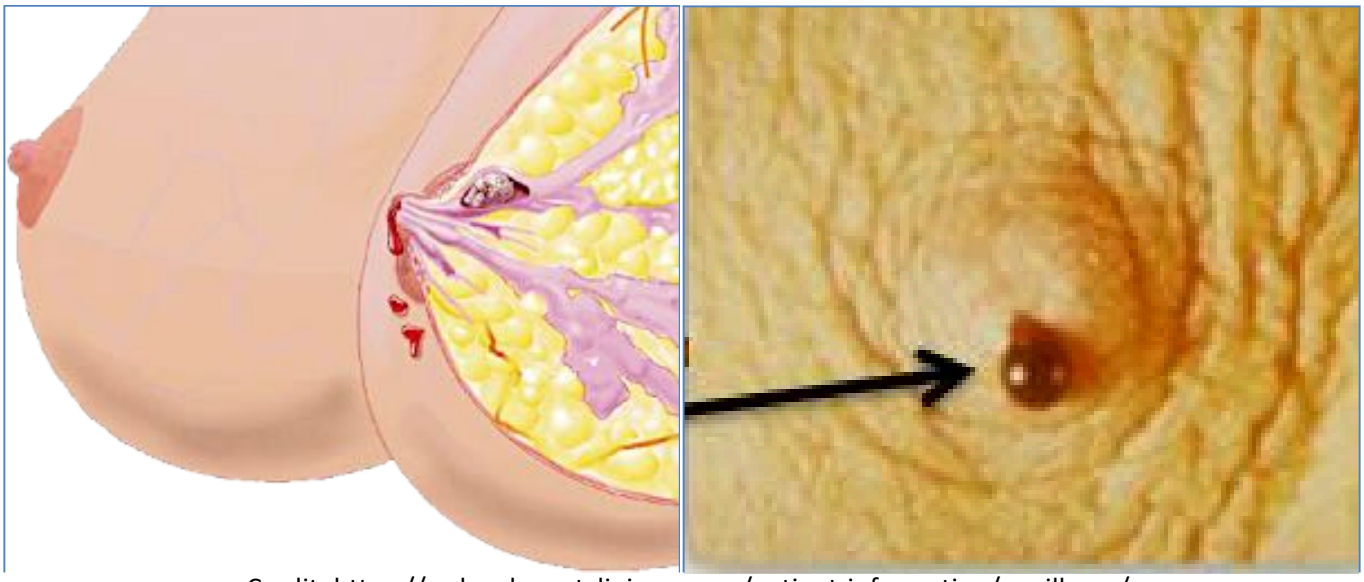
1.Giant Fibroadenoma of Breast in an Adolescent Girl, Nithya Thuruthiyath,1* Purna Chandra Das,2 K Shreedhara 2.Avabratha,1 Vanessa Mascarenhas,1 Nisha Marla3; DOI 10.5001/omj.2012.77

INTRADUCTAL PAPILLOMA:

- **Aetiology:**
  - o Benign Tumour of Duct Epithelium
- **Pathogenesis:**
  - o Benign Tumour of Duct Epithelium → Papillary Projections *Within* a Dilated Duct
- **Morphology:**
  - o Solitary, Intra-ductal Papillary Proliferation.
  - o Typically Occur in the Lactiferous Sinuses of the Nipple (:. Sub-Areolar)
- **Clinical Features:**
  - o Middle age
  - o **Bloody Nipple Discharge (Commonest cause of Bloody Nipple Discharge)**
  - o Small Sub-Areolar Lump.(Irregular, small, ***Sub-Areolar*** lump)
- **Management:**
  - o **Core Needle Biopsy**
  - o **Excisional Biopsy →** Once Confirmed Intraductal Papilloma, no need for further Rx.
- **Prognosis**:
  - o Recurrent, but NO risk of malignancy. (rare)



Sarahkayb, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons



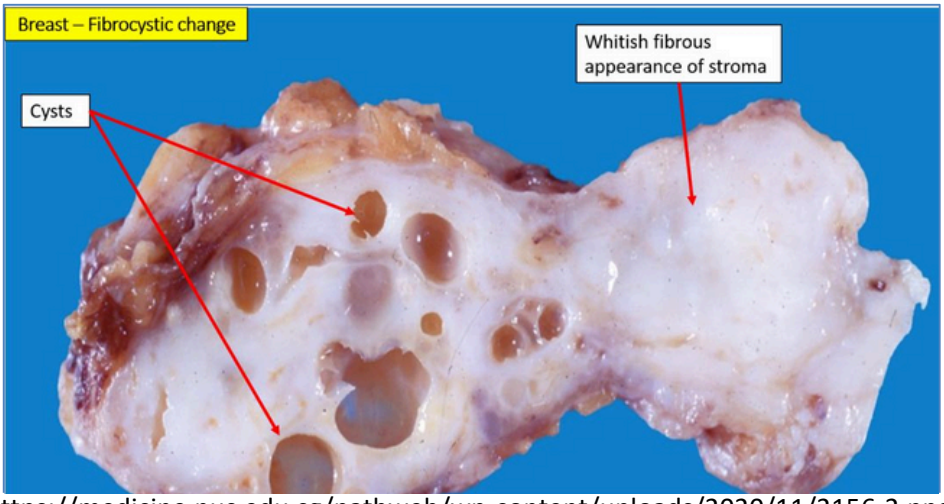
Credit: https://sydneybreastclinic.com.au/patient-information/papilloma/

FIBROCYSTIC DISEASE:

- **Aetiology:**
  - o Hormone-Induced ***Acinar & Fibrous Hyperplasia***
- **Pathogenesis:**
  - o Oestrogens → ***Acinar & Fibrous Hyperplasia*** → Multiple, Bilateral, Irregular Lumpy Breasts.
  - o (May be cyclical)
- **Morphology:**
  - o Grey-white Scar Tissue (Fibrosis)
  - o Multiple Cystic Lesions.
  - o **Proliferative:** When there is Epithelial Hyperplasia → ***PREMALIGNANT***
  - o **Non-Proliferative:** No Epithelial Hyperplasia → Not Premalignant.
- **Clinical Features:**
  - o **Commonest (40%) cause of lumps in 20-40y.**
  - o Multiple, Bilateral, Irregular "Lumpy Bumpy" Breasts.
  - o (Note: UNLIKE Malignancy, they are multiple, bilateral, highly mobile)
  - o Cyclical Pain/Discomfort.
  - o Mammogram – Diffuse Fibrosis with Cystic Spaces
  - o **Proliferative:** Epithelial Hyperplasia (>2 Cell Layers) → ***PREMALIGNANT → DCIS → Ca.***
  - o **Non-Proliferative:** No Epithelial Hyperplasia → Not Premalignant.
- **Management:**
  - o **Optional Biopsy**
  - o **Excision if Pre-Malignant**
- **Proliferative FCD: Epithelial Hyperplasia** May → Dysplasia → DCIS – (once the cells fill the whole duct).

1.https://www.saintlukeskc.org/health-library/what-are-fibrocystic-breasts

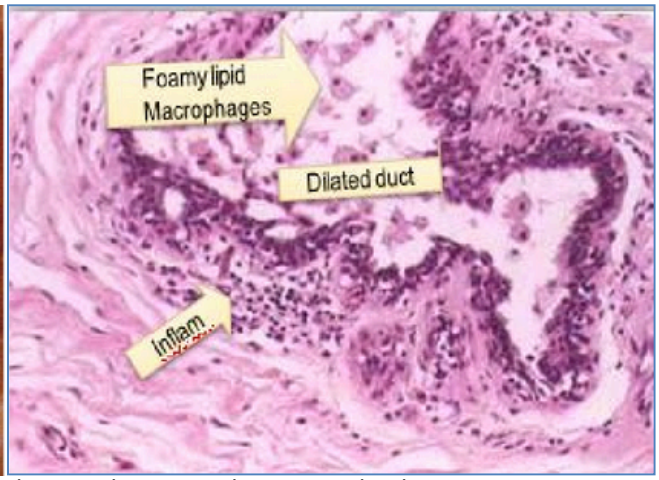
2.Nephron, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons



https://medicine.nus.edu.sg/pathweb/wp-content/uploads/2020/11/2156-2.png

DUCT ECTASIA:

- **Aetiology:**
  - Nipple Outflow Duct Obstruction
- **Pathogenesis:**
  - (*Remember – Kind of like *'Cystic Acne'* of the Nipple.)
  - Nipple Outflow Duct Obstruction → Stagnation of Breast Secretions → Inflammation
  - Note: Healing phase may → Fibrosis → may cause nipple inversion (a DDx of malignancy)
- **Morphology:**
  - Dilation (Ectasia) of Lactiferous Ducts
  - Duct filled with Concentrated Secretions & Debris
- **Clinical Features:**
  - Typically Multiparous Women 40-60yo.
  - **Symptoms/Signs:**
    - ***Poorly-Defined Periareolar Mass + Nipple Discharge.**
      - Nipple Discharge – (Serous/White/Frank Pus/or Frank Blood).
      - May → Fibrosis → Nipple Retraction/Inversion
    - Note: Pain is Uncommon
  - **Clinical Significance:**
    - *Fibrotic Response can → Firm, Irregular Periareolar Mass which may Mimic Invasive Carcinoma on Palpation & Mammogram!!*
- **Management:**
  - **Diagnosis:**
    - FNA-Biopsy/Imaging to Investigate for DDx (Eg: Intraductal Papilloma)
  - **Treatment:**
    - Often Self-Limiting
    - +/- Antibiotics
    - (+/- Mammary Duct Excision)



http://www.meddean.luc.edu/lumen/meded/medicine/pulmonar/pd/step30b.htm

GALACTOCOELE: (Obstruction of one of the ducts → accumulation of milk → Cyst)

- **Aetiology:**
  - Protein-Plug Obstruction to Duct Outlet
- **Pathogenesis:**
  - Protein-Plug Obstruction to Duct Outlet → Obstruction → Accumulation of Milk → Cyst
- **Morphology:**
  - **Macro:**
    - Smooth, Malleable breast lump filled with fluid
  - **Micro:** Large Cystic space lined by normal duct epithelium
    -
- **Clinical Features:**
  - Centrally Located, NON-Tender Mass
  - No risk of infection since milk is sterile
  - Drainage is pointless as the Protein Plug remains and Milk Production Continues
- **Treatment:** Self-Limiting Once Lactation Stops. (Drainage NOT Necessary, & recurs)

ACUTE MASTITIS:

- **Aetiology:**
  - Acute Breast Infection (Typically Bacterial Skin Flora – **Staph aureus**/Strep pyogenes)
- **Pathogenesis:**
  - **99.9% - Lactational (First few weeks post-partum)** → Crack in Nipple = Entry Point → Bacterial Infection (*Staph. aureus*, Strep. Pyogenes) → Inflammation + Pain.
- **Morphology:**
  - Acute Inflammation, Swelling, Erythema & Pus.
  - May → Single/Multiple Abscesses.
- **Clinical Features:**
  - Initial Weeks Post-Partum.
  - Unilateral, Painful, Erythematous, & Swollen Breast
  - + Fever, Inflammation, Flu-Like Symptoms
  - (+/- Pus Discharge)
  - (+/- Nipple Cracks/Fissures)
- **Diagnosis:**
  - **Clinical Diagnosis** (Hard, Tender, Red, Swollen Area of one breast + Fever in a Nursing Mother)
    - (Note: Distinguishable from Engorgement which is Bilateral)
    - (Note: Breast USS can distinguish between Mastitis & Abscess)
  - (+/- Breastmilk Culture if Infection is Severe/Hospital-Acquired.)
- **Management:**
  - **Analgesia** (*Ibuprofen*)
  - **Cold Compresses**
  - **Improve Breast-Feeding Techniques** (Eg: Nipple Shields to stop Chapping)
    - (Note: Breastfeeding can continue during treatment)
  - **Antibiotics** (Anti-Staphylococcal; *Cephalexin*/*Dicloxacillin*/*Clindamycin*)

CHRONIC MASTITIS:

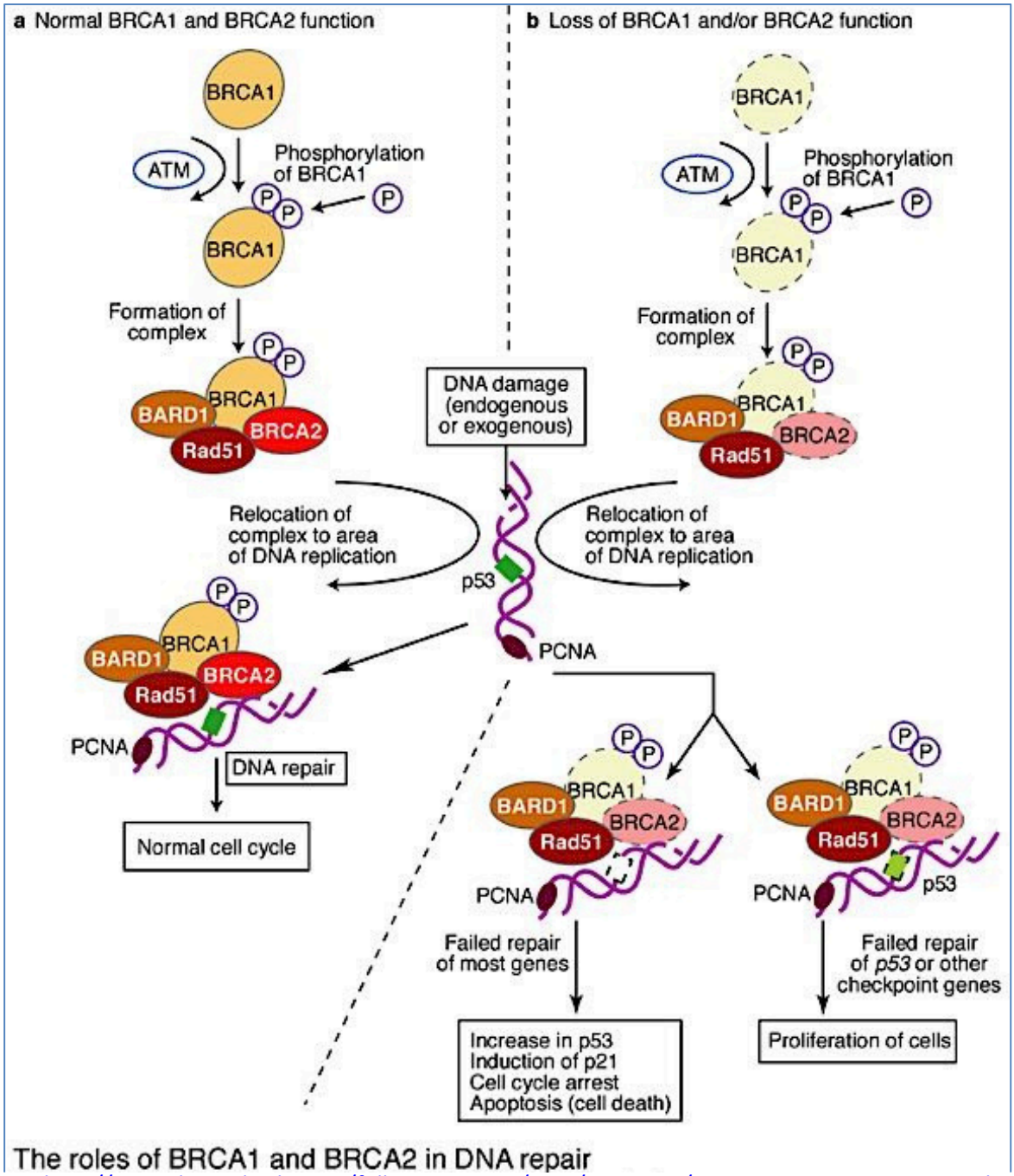
- **Aetiology – (NON-Lactational):**
  - Granulomatous (TB, Fungal, Silicone etc.)
  - Diabetic Mastopathy
- **Pathogenesis:**
  - Chronic Breast Infection (TB, Fungal, Immunocompromise) → Inflammation
- **Morphology:**
  - Localised Inflammation, Swelling & Erythema.
- **Clinical Features:**
  - Chronic
  - Localised Inflammation, Swelling & Erythema.
- **Management:**
  - Swab MCS & Appropriate Antibiotics

BREAST CANCERS:

- **Aetiology/Risk Factors:** (Note: know these for the exam – Eg: "List the risk factors.")
  - o **Hormonal (Sporadic):**
    - § **Gender** (99%F:1%M)
    - § • Affects ≈ 9% of Women
    - § **Age** – Highest in 50-69yrs
    - § **Parity** – Late Parity/Nulliparous Women have ↑Risk of Breast Ca.
    - § • (Early Parity & Breastfeeding → ↓ Risk of Breast Ca)

      Prolonged Oestrogen Exposure – (Early Menarche, Late Menopause, HRT)
      - (Note: OCP Marginally ↑Breast Ca. Risk; BUT also ↓Endometrial Ca. Risk)

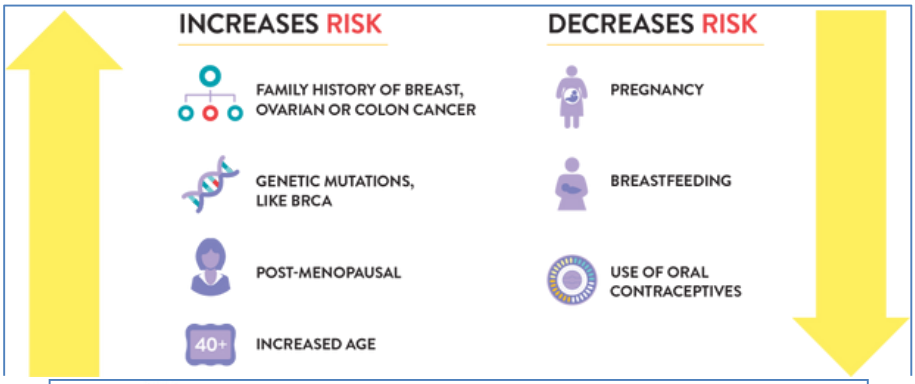
      Pre-Existing Fibrocystic Disease – (Esp. *Proliferative* Subtype)
  - o **Genetic (Familial):**
    - § **ER-Negativity &/Or HER2-Positivity** → Cancer in Young Women
    - § **Hereditary (Only 30% of Breast Cancers):**
      - ↑Risk with ↑# of 1st-Degree Relatives with Breast Ca.
      - ↑Risk with Presence of **BRCA1 or BRCA2 Gene Mutations** (Predisposed)

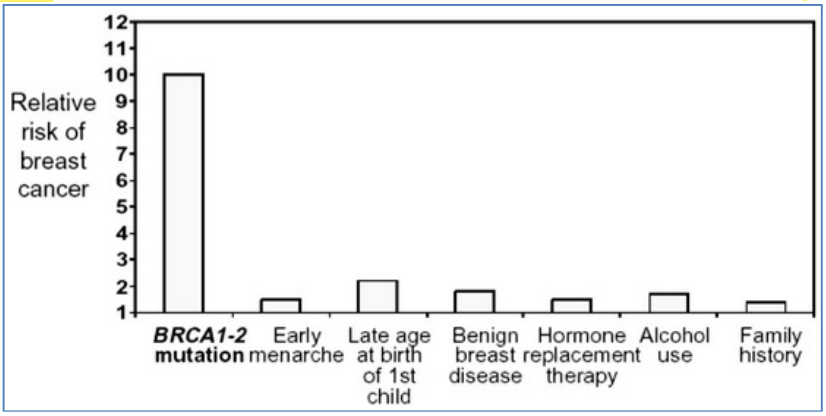


The roles of BRCA1 and BRCA2 in DNA repair

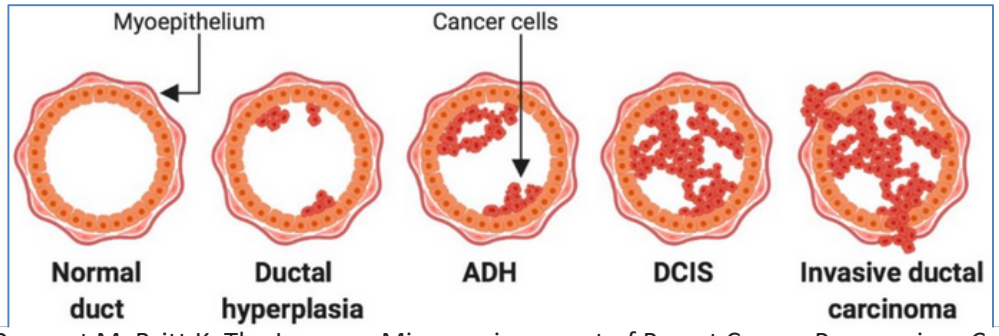
http://journals.cambridge.org/fulltext_content/ERM/ERM3_14/S146239940100309Xsup004.htm

- **Environmental:**
  - § **Radiation Exposure**
  - § **Pesticide Exposure**



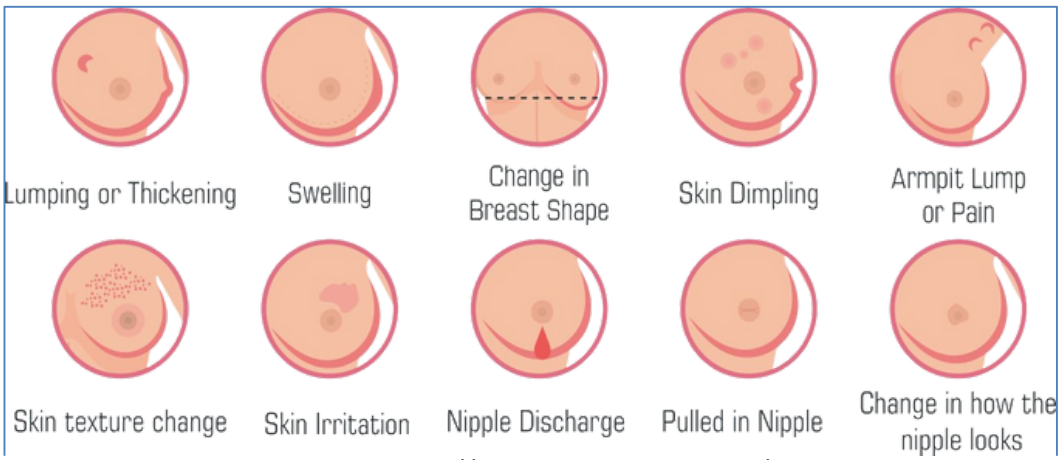


- **Pathogenesis:**
  - o **Carcinogenesis of Duct Epithelial Cells → :. "Ductal Carcinoma"**
  - o As with any other cancer: **(Hyperplasia → Dysplasia → Cancer → Invasion)**



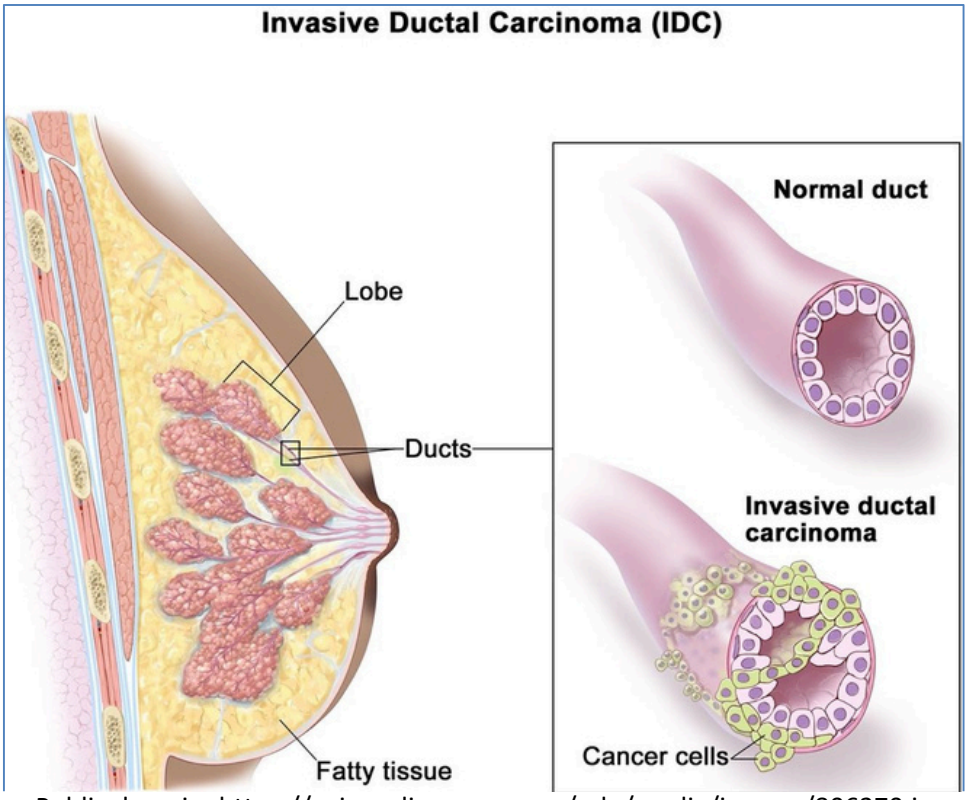
Tower H, Ruppert M, Britt K. The Immune Microenvironment of Breast Cancer Progression. *Cancers*. 2019; 11(9):1375. https://doi.org/10.3390/cancers11091375

- **Clinical Features:**
  - o **Common Signs & Symptoms:**



Source: https://www.pinkribbon.org.pk/

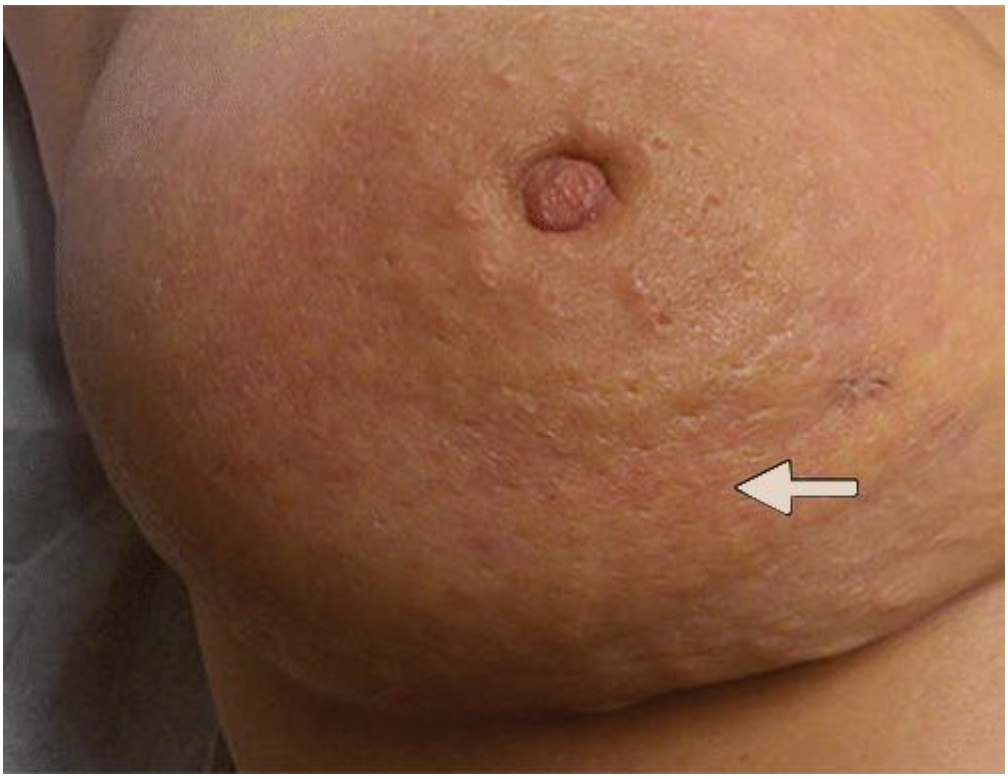
- **Specific Features of DCIS (Ductal Carcinoma In Situ):**
  - **Presentation:**
    - **Bloody Nipple Discharge** (Intraductal papilloma still most common)
  - **Diagnosis:**
    - **Almost Exclusively detected by **Mammography**
  - **Complications:**
    - Localized; No distant metastasis J
    - Spreads through Ducts → Eventually becomes an **Invasive Duct Carcinoma**.



Public domain: https://nci-media.cancer.gov/pdq/media/images/806270.jpg

- **Specific Features Of Ductal Carcinoma (Typical "*Schirrhous*" Type):**
  - **Presentation:**
    - **Nipple Retraction!!!**
    - **Skin puckering**
    - **Axillary Lymphadenopathy**
    - **Peu'de'Orange** – (Lymphedema due to Lymphatic Infiltration by Ca. Cells)
  - **Quadrant Distribution:**
    - 50% occur in Upper-Outer Quadrant
    - 10% occur in each remaining Quadrants
    - 20% Sub-Areolar.
  - **Diagnosis – Triple Assessment:**
    - **1: Clinical History/Examination** (Firm, irregular, fixed lump)
    - **2: Imaging** (Mammography → Radial Fibrosis)
    - **3: Biopsy** (Malignant Adenocarcinoma)
  - **Complications:**
    - → Metastasis
    - → Death

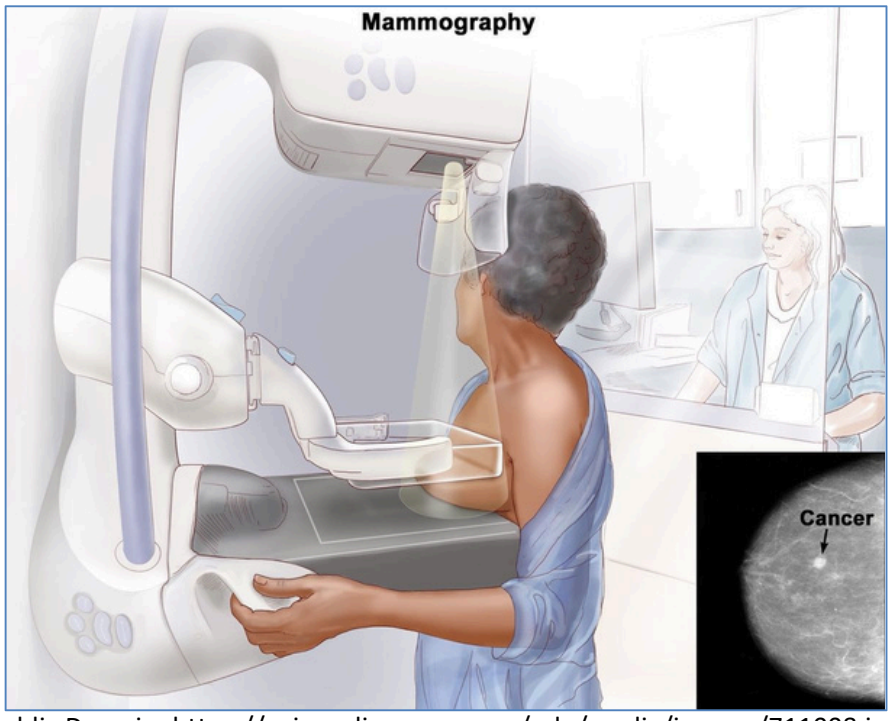
Peu'de'Orange & Nipple Retraction



Eren D. Yeh, Heather A. Jacene, Jennifer R. Bellon; https://doi.org/10.1148/rg.337135503

- **Diagnosis – "Triple Testing" (Clinical, Imaging & Biopsy):**
  - o **1: Clinical History & Examination First** (Firm, irregular, fixed lump + Lymphadenopathy, etc)
  - o **2: Imaging – (Mammogram):**
    - § **Mechanism:**
      - Low radiation dose (0.1rad)
      - Light compression by plates to stabilize and spread its interior structures.
    - § **Very Sensitive; Low Specificity** – (Detects Lumps 1-2y before Physical Breast Exam)
    - § (Note: This increases with age as breast density decreases)
    - § **Recommended every 2yrs for Women 50-69yo. –** (Yearly for high risk Pts).

      Signs of Breast Ca = *Densities & Calcifications*.



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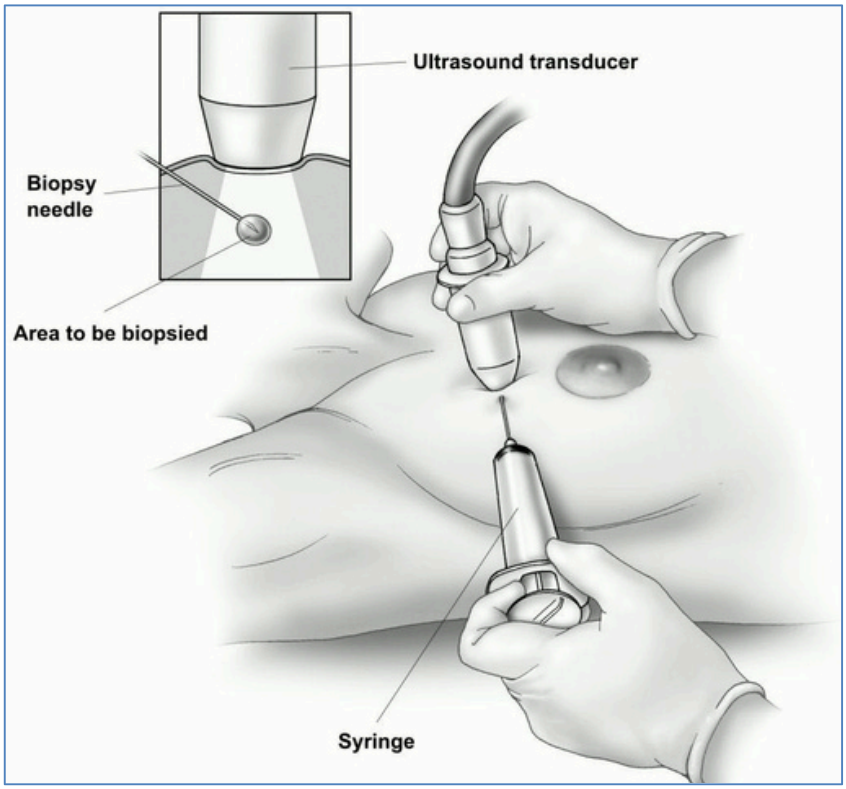
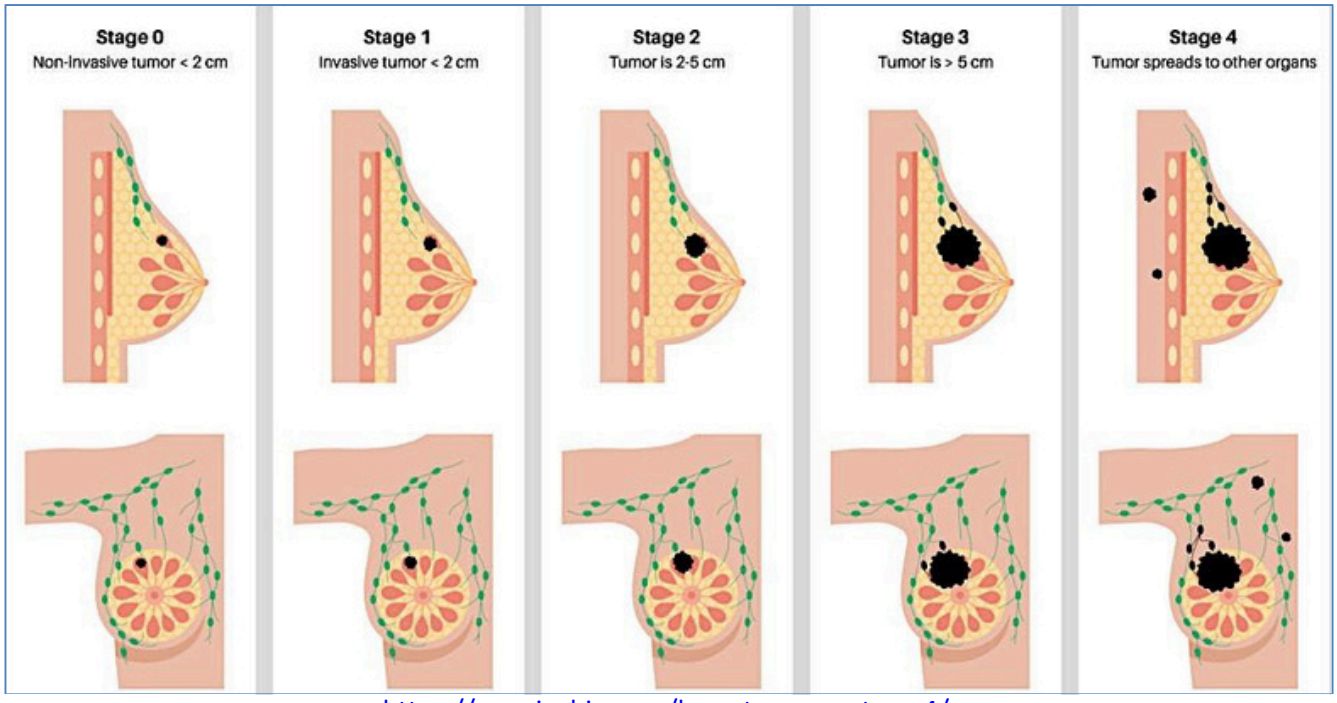
- **3: Fine Needle Biopsy/Sectional Biopsy (Cytology):**
  - **Microscopy:** Dysplasia/Pleomorphism
  - **Staining** – for *HER2 & ER Status* (Dictates Management & Prognosis)
  - **Gene Detection:** Familial BRCA1 & BRCA2 Gene Mutations



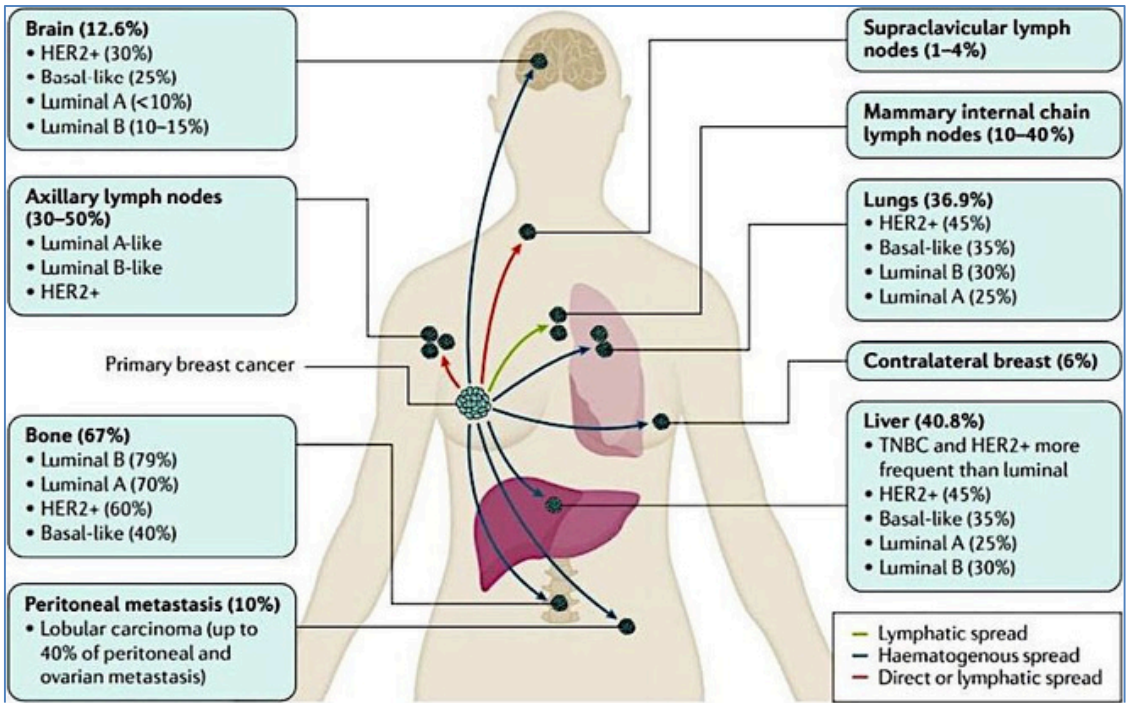
https://www.cancer.org/cancer/breast-cancer/screening-tests-and-early-detection/breast-biopsy/fine-needle-aspiration-biopsy-of-the-breast.html

- **Calculating Prognosis:**
  - Grading - **Based on Tumour Markers (Low Grade → High Grade):**
    - **1: 'Luminal A' – (98% 5yr Survival):**
      - ER-Positive (Good Sign)
      - HER2-Negative (Good Sign)
      - **Responsive to Anti-Oestrogen (Tamoxifen) Therapy**
    - **2: 'Luminal B':**
      - ER-Positive (Good Sign)
      - HER2-Positive (Bad Sign)
      - **Responsive to Chemotherapy**
    - **3: 'Basal-Like'/'Triple Negative':**
      - ER-Negative (Bad Sign)
      - HER2-Negative (Good Sign)
      - But BRCA1 Positive (Bad Sign)
      - **Poor Prognosis + Young**
    - **4: 'HER2 Positive' – (16% 5yr Survival):**
      - ER-Negative (Bad Sign)
      - PR-Negative (Progesterone) (Bad Sign)
      - HER2-Positive (Bad Sign)
      - **Poor Prognosis + Early Brain Mets**
      - **Note: BUT has a Targeted Treatment ("Trastuzumab"/"Herceptin")**
    - (Note: ER = Oestrogen Receptor. Loss is Abnormal)
    - (Note: HER = Human Epidermal Growth-factor Receptor. Presence is Abnormal)
    - (Note: E-Cadherin = Cell Adhesion protein)
    - (Note: BRCA = Breast Ca. Antigen)

- **Staging:**
  - **Investigations for Staging:**
    - Mammogram/USS if not already done
    - CXR
    - CT/MRI/PET Scans
    - Bone scan
  - **Based on TNM System:**
    - **T –** (Size of Primary Tumour) **N –**
    - (# of Regional Lymph Nodes Involved)
    - **M –** (Metastases?)
  - **Stages: 0 –** DCIS
    - **1 –** T<2cm, N0, M0
    - **2 –** T<5cm, N0, M0 98% 5YS
    - **3 –** T>5cm, N1, M0 85% 5YS
    - **4 –** T>5cm, N+, M+ 50% 5YS
    - 16% 5YS



https://massivebio.com/breast-cancer-stage-4/



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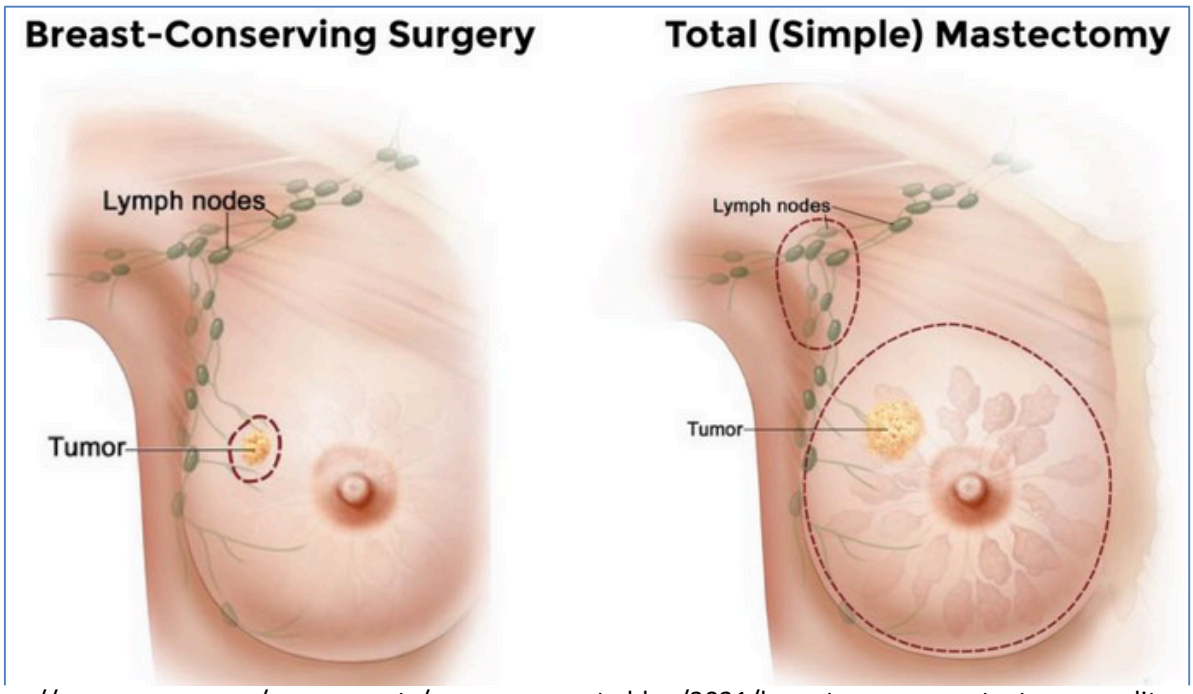
Breast Cancer Staging & Prognosis in Detail:

Stage	TNM	Description	5-year Survival
0	Tis N0 M0	Carcinoma in situ. No tumor in regional lymph nodes, No distant metastases	99%
I	T1 N0 M0	Tumor is less than or equal to 2 centimetres, No tumor in regional lymph nodes, No distant metastases	92%
IIA	T0 N1 M0 T1 N1 M0 T2 N0 M0	No evidence of primary tumor, metastases to movable ipsilateral nodes, No distant metastases. Tumor is less than or equal to 2 centimetres, metastases to movable ipsilateral nodes, No distant metastases. Tumor is between 2 and 5 centimetres, No tumor in regional lymph nodes, No distant metastases	82%
IIB	T2 N1 M0 T3 N0 M0	Tumor is between 2 and 5 centimetres, metastases to movable ipsilateral nodes, No distant metastases. Tumor is over 5 centimetres, No tumor in regional lymph nodes, No distant metastases.	65%
IIIA	T0 N2 M0 T1 N2 M0 T2 N2 M0 T3 N1, N2 M0	No evidence of primary tumor, metastases to fixed ipsilateral nodes, no distant metastases. Tumor is less than or equal to 2 centimetres, metastases to fixed ipsilateral nodes, No distant metastases. Tumor is between 2 and 5 centimetres, metastases to fixed ipsilateral nodes, no distant metastases. Tumor is over 5 centimetres, metastases to movable or fixed ipsilateral nodes, no distant metastases.	47%
IIIB	T4 Any N M0 Any T N3 M0	Tumor extends to chest wall, any nodal involvement, no distant metastases. Any primary tumor involvement, metastases to ipsilateral internal mammary nodes, no distant metastases.	44%
IV	Any T Any N M1	Any primary tumor involvement, any nodal involvement, distant metastases.	14%

Reference: Cancer Monthly Article with reference to Marc E. Lippman, *Breast Cancer*, in HARRISON'S PRINCIPLES OF INTERNAL MEDICINE, pt. 5 § 76, at 516-523 (Dennis L. Kasper, M.D. et al., eds, 16th ed 2005).

- **Treatment – Surgical or Pharmacotherapy:**
  - o **Surgery - May be Radical (Mastectomy) or Conservative (Local Excision + Chemo/Radio)**
  - o **Pharmacotherapy - Depends on Hormonal Status:**
    - § Positive ER/PgR Status (Typically BRCA1) → Anti-Hormone Therapy (Tamoxifen)
    - § Negative ER/PgR Status (Typically BRCA2) → Chemotherapy
    - § **Eg: Tamoxifen – An ER Antagonist →** 45% Risk Reduction in ***ER-Positive*** Tumours.
    - § **Eg: Herceptin – A HER2 Antagonist →** Used in ***HER2-Positive*** Tumours
  - o ***If DCIS (Stage 0):***
  - o § Conservative Surgery + Radiotherapy

  If Breast Cancer (Stage 1-4):
    - § Surgery – (Optional Conservative [*Stage 1-2*], OR Mastectomy [*Stage 1-3*] +/- L-Nodes)
    - § • (Note: If [*Stage 4*], surgery is only Palliative)
    - § + Radiotherapy & Chemotherapy - (↓Risk of Reoccurrence & Metastases)
    - § (+/- Hormonal therapy (**Tamoxifen**) if ER-Positive)
      (+/- Targeted therapy (**Herceptin**) if HER2-Positive)



https://www.cancer.gov/news-events/cancer-currents-blog/2021/breast-cancer-mastectomy-quality-of-life

- **Screening & Prevention:**
  - **Population Screening Recommendations (UpToDate):**
    - **BSE** (Breast Self-Examination) advised Monthly from 18yo
    - **CBE** (Clinical Breast Examination) advised Annually from 25yo
    - ***Mammogram 1-2yrly from 40yo until old age (Recommended by UpToDate)**
    - ***+/- BRCA-Gene Testing for Pts with a FamHx of Breast/Ovarian Ca. (90% Sensitive)**
  - **Prevention of BRCA-Associated Cancers:**
    - **Breast:**
      - **Prophylactic Double Mastectomy:**
      - (≈ 90% Reduced Risk of Breast Ca.)

        +/- Prophylactic Oophorectomy (↓Oestrogen Stimulation):
        - (≈95% Reduced Risk of Ovarian Ca.)
        - (≈50% Reduced Risk of Breast Ca.)
    - **Ovarian:**
      - **Prophylactic Oophorectomy (↓Oestrogen Stimulation)**
      - **Surveillance**

Treatment (In More Detail):

- **DCIS** o
  - o o Breast conserving surgery
  - o Hormonal therapy may be useful, side effects often out weight benefit Radiotherapy post surgery
    Possible node resection (rarely)

- **Early breast cancer**
  - o Breast sparing surgery or mastectomy +/- breast reconstruction
  - o Chemotherapy lowers risk of reoccurrence – given after surgery
  - o Radiotherapy almost always given – sole agent or after chemo
  - o Hormonal therapy of benefit solely or in combination with other agents
  - o Targeted therapy (Herceptin) only suitable in some women
- **Inflammatory breast cancer**
  - o If no lump in breast, begin with Chemotherapy
  - o Mastectomy +/- nodal resection if responding well to chemotherapy +/- breast reconstruction
  - o Radiotherapy is almost always used before or after surgery or as a replacement to surgery if response to chemotherapy is good.
  - o Targeted therapy only suitable for some women
  - o Hormonal therapy suitable for some women and can be used alone or with other agents
- **Locally advanced breast cancer**
  - o Chemotherapy
  - o Mastectomy for some, not all women.
  - o Radiotherapy may be used before or after – local, axillary, neck and surrounding areas
  - o Targeted therapies only suitable for some women
  - o Hormonal therapies used if hormone sensitive and can be used alone or with other treatments
- **Metastatic breast cancer**
  - o Hormonal are used as first treatment if hormone sensitive alone or with other agents
  - o Chemotherapy for non-hormone sensitive cancers or in combination with hormone therapies for rapid-growing cancers particularly in liver or lung
  - o Targeted therapies are only suitable for some women and are used with other treatments
  - o Radiotherapy can be used to reduce size of tumours and secondaries in an effort to reduce pain, especially in bones
  - o Surgery is not routinely used, but may be used to reduce symptoms at the sites of secondaries, such as bones, lung or brain and rarely liver.

Reference: Australian Government Cancer Australia online at: http://canceraustralia.nbocc.org.au/breast-cancer/treatment/treatment-options-by-breast-cancer-type

AMENORRHOEA CAUSES

AMENORRHOEA CAUSES

Amenorrhoea:

- **Definition:**
  - o Absence of a Menstrual period *In a woman of Reproductive Age*

Hormonal Contraceptives (Refractory/Extended Cycle Use/Progesterone-Only)

- **Aetiology:**
  - o Retained effectiveness of ceased hormonal contraceptives (Eg: Depo Injection)
  - o Extended cycle use of COCP (Skipping the "sugar pills")
  - o Progesterone-Only Contraceptives (Depo-Provera/Mirena/Implanon)
- **Pathogenesis:**
  - o Retained Effectiveness – Some hormonal contraceptives are still active in the blood after the drug is ceased (Esp. Depo – guaranteed for 3mths, but can last for <1yr)
  - o Extended Cycle Use of OCP – Skipping "Sugar Pills" → Constant Oestrogen & Progesterone Levels → Amenorrhoea
  - o Progesterone-Only Contraceptives – Note: The Major Side-Effect of POCs is Poor Menstrual Cycle Control (Ie: Irregular/Erratic/Prolonged/No Menstruation)
    - § *The Exception:* Depo-Provera Injection → Thickens Cervical Mucus + Suppresses Ovulation (& therefore suppresses menstruation)

Hypothalamic (Anorexia/Female Athlete Triad)

- **Aetiology:**
- o Anorexia/Female Athlete Triad/Excessive Exercise

Pathogenesis:

- o Insufficient caloric intake (or excessive caloric expenditure) → Energy Availability is Insufficient to maintain normal menstrual cycles.
- **Clinical Features:**
  - o Excessively Low BMI
  - o Female Athlete Triad (Fatigue, Amenorrhea, Osteoporosis)
  - o Amenorrhoea
- **Treatment:**
  - o Exercise Moderation
  - o Correction of Eating Disorders/Maintain Healthy Diet

Physiological (Pregnancy & Lactation):

- **Aetiology:**
- o Pregnancy & Breast-Feeding

Physiology:

- o **Pregnancy:** High levels of β-HCG (Similar to LH) → Sustains the Corpus Luteum, which maintains secretion of Progesterone → Suppresses Menstruation → **Amenorrhoea**.
- o **Breast Feeding:** High levels of Prolactin (Secreted by Anterior Pituitary due to Suckling) → Inhibits Ovulation (:. Inhibits subsequent menstruation) → **Amenorrhoea**

Premature Menopause:

- **Aetiology:**
- o Idiopathic/Autoimmune/Chemotherapy/Radiotherapy/Surgical Oophorectomy

Pathogenesis:

- o Premature Ovarian Failure (No Follicles Left)→ ↓Oestrogen → ↑GnRH & ↑FSH
- o ↓Oestrogen → Amenorrhoea
- **Clinical:**
  - o Menopausal Symptoms (Hot Flushes, Mood Swings, Vaginal Dryness, Dry Skin)
  - o ↑Risk of Osteoporosis
- **Treatment:**
  - o HRT – Combined Hormone Replacement Therapy

POLYCYSTIC OVARIAN SYNDROME (PCOS):

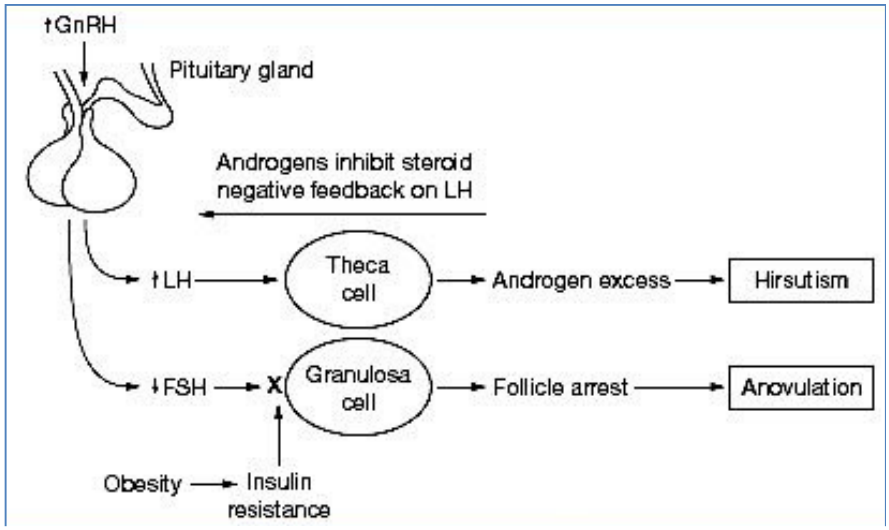
- **Aetiology:**
- o **Genetic – Sex-Limited Autosomal Dominant** (50% Chance of Inheritance if Female)

Pathogenesis:

o **Deranged Hypothalamo-Pituitary-Gonadal Axis Activity (↓FSH & ↑LH) →**

§ → ↑Thecal Cell Stimulation (Androgen Producers)

§ → ↓Follicular Maturation → Follicular Arrest



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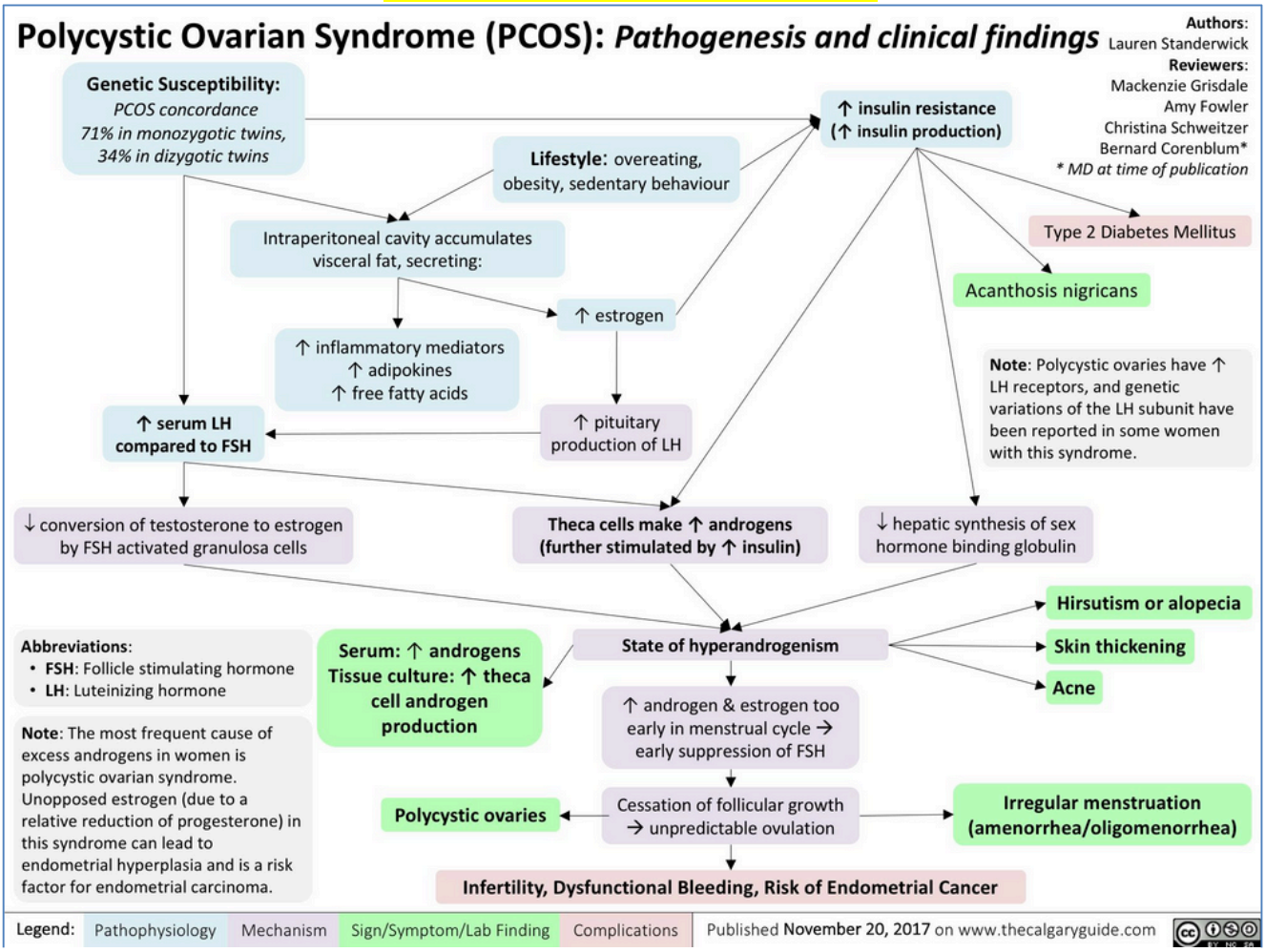
o **→"Follicular Arrest":**

§ Follicles grow normally to the Mid-Antral stage, but then maturation ceases.

§ Follicles retain endocrine capacity, but over time the Granulosa Layer thins →

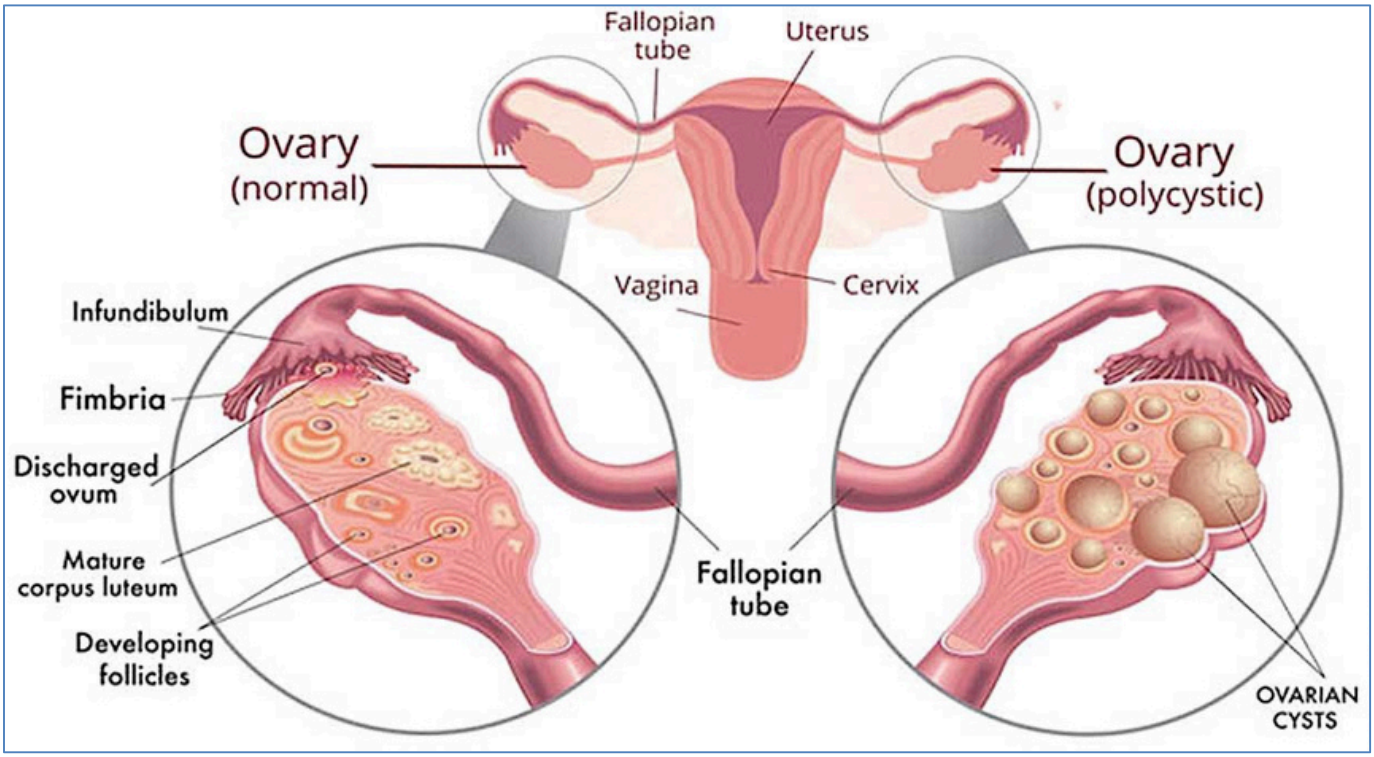
- **→Ovaries Can't Convert Androgens (from Thecal Cells) to Oestrogen.**

o **→ Hyperandrogenism (↑Testosterone).**



Source: thecalgaryguide.com

- **Morphology:**
  - o Polycystic Ovaries – Abnormally high number of Developing Eggs → Cysts.
  - o Cysts are peripheral → "String of Pearls" appearance.



Credit: www.pcos.org

- **Typical Features:**
  - o **Ovarian Cycle Derangements:**
    - § Oligomenorrhoea/Amenorrhea (Irregular/few/absent menstruation)
    - § Anovulation (resulting in enlarged ovaries with numerous Cystic Follicles)
    - § Infertility (result of Anovulation) & Recurrent Miscarriage
  - o **Endocrine Derangements:**
    - § Hyperandrogenism → Irregular Menstruation (Can lead to Infertility)
    - § Hirsutism (Excessive & Increased Body Hair)
    - § Acne
    - § Deepening Voice
    - § Hyperinsulinemia
  - o **Associated Metabolic Dysfunction:**
    - § Insulin Resistance
    - § Dyslipidaemia
    - § Obesity
  - o **Polycystic Ovaries (Many cysts on the ovaries):**
    - § Follicles grow normally to the Mid-Antral stage, but then maturation ceases.
    - § Follicles retain their endocrine capacity, but over time the Granulosa Layer gets thin →
      - • →Poor conversion of Androgens (Produced by the Thecal Cells) to Oestrogen.
        - o → Hyperandrogenism.
- **Sum m ary of Clinical Features:**
  - o **1: Infertility:** Due to Anovulation
  - o **2: Menstrual Changes:** Amenorrhoea → Infertility
  - o **3: Excess Testosterone:** Acne, Hirsutism (↑Hair), Deepening Voice
  - o **4: Metabolic Syndrome ("Synd. X"):** Insulin Resistance (+/- Obesity, D2M, ↑Cholesterol)
- **Diagnosis:**
  - o **Clinical:** (See Above)
  - o **Pelvic Ultrasound:** Bilateral Polycystic Ovaries
  - o **Blood Test:** ↑Serum Testosterone
  - o **(DDX:** *Hypothyroidism, Congenital Adrenal Hyperplasia, Cushing's Syndrome*)

- **Treatment Goals:**
  - o Reverse signs/symptoms of Androgen Excess
  - o Establish cyclic menstruation
  - o Restore Fertility
  - o Improve Metabolic/Endocrine Disturbances
  - o **Management:**
    - § **#1: Immediate Concerns:**
      - Hirsutism
      - Acne
      - Anovulatory Infertility
    - § **#2: Long Term Consequences:**
      - Metabolic Disturbances (Diabetes/Obesity)
      - Dyslipidaemia → Cardiovascular Disease
      - Chronic High Oestrogen → Endometrial Cancer
      - Hypertension
- **Treatment Options:**
  - o **OCP/IUD/Anti-Androgens.** (Improves Hirsutism & Irregular Periods)
  - o **Weight Loss** (Prevent Diabetes & Dyslipidaemia)
  - o **Metformin** (Prevent Diabetes & Promotes Ovulation for ↑Fertility)
  - o **+/- Hormonal Ovulatory Induction where fertility is desired.**
- **Prognosis:**
  - o → **↑Risks of:** ***Endometrial Cancer & *D2M**

DYSMENORRHOEA CAUSES

DYSMENORRHOEA CAUSES

Dysmenorrhoea:

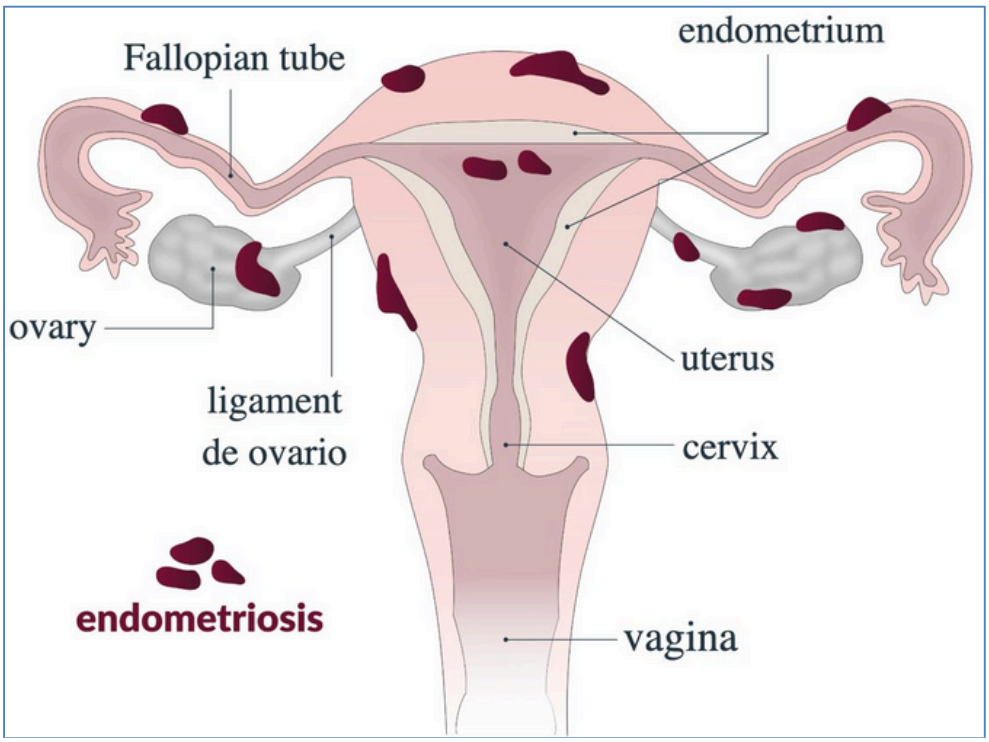
- **Definition:**
  - o Excessively Painful Menstruation (Sharp/Throbbing/Dull/Nauseating/Burning/Shooting)
  - o – May Precede Menstruation by several days
  - o – Often Associated with Menorrhagia

(Primary Dysmenorrhoea) Physiological Dysmenorrhoea:

- Prostaglandins & Other Inflammatory Mediators →
  - o → Constrict Blood Vessels in the Endometrium → Shedding
  - o → Uterine Contractions → Ejection of Menstrual Products (+ Cramping Pain)

(Secondary Dysmenorrhoea) ENDOMETRIOSIS:

- **Aetiology:**
  - o Retrograde Menstruation
  - o (Or Vascular/Lymphatic Spread of Live Endometrial Tissue)
- **Pathogenesis:**
  - o Spread of Live Endometrium beyond the Uterus →
    - § → Pelvic Peritoneum
    - § → Pouch of Douglas
    - § → Ovaries/Fallopian Tubes
  - o Chronic Cyclical Peritonitis → Pelvic, Abdominal & Lower-Back Pain/Cramping
- **Morphology:**
  - o Small "Powder Burn" Lesions in Peritoneum, on Ovaries or on Uterus.
  - o Dark Purple Nodules in Peritoneal Cavity
  - o Ovarian "Chocolate Cysts"
- **Clinical Features:**
  - o Dysmenorrhoea (Chronic & Cyclical Pelvic, Abdominal & Lower-Back Pain/Cramping)
  - o Dyspareunia
  - o Unexplained Chronic Pelvic/Lower-Back pain
- **Complications:**
  - o **Pelvic Fibrosis/Frozen Pelvis →**
    - § Infertility
    - § Bowel Obstruction
  - o ***Rupture of Endometriotic Cyst may** → Acute Abdomen (Emergency)
- **Treatment:**
  - o **Surgical** – Laparoscopic Ablation of Endometrial Tissue
  - o **Or Drugs:**
    - § Oestrogen-Lowering Drugs (Aromatase Inhibitors)
    - § Progesterone-Only OCP
    - § **+ Analgesia**
- **Prognosis:**
  - o **No Cure – But typically goes away after**
    - § Pregnancy
    - § Or Menopause.



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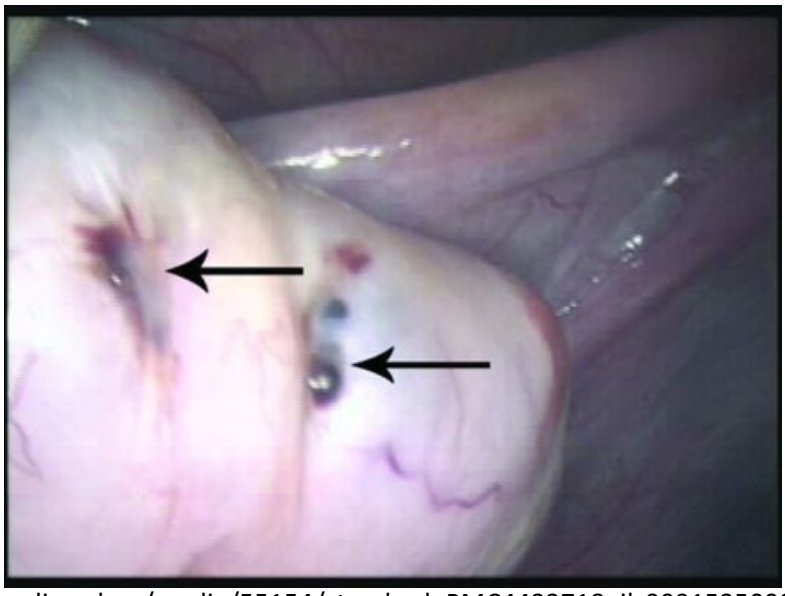

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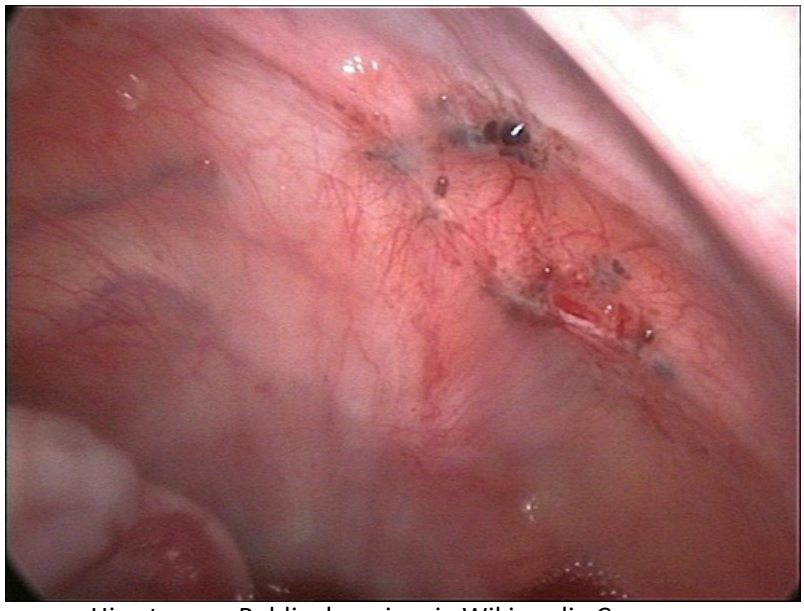

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MENORRHAGIA CAUSES

MENORRHAGIA CAUSES

MENORRHAGIA (In General):

- **Definition:**
- o Heavy periods/Heavy menstrual bleeding (>80mL during every period)(Note: Hard to measure)

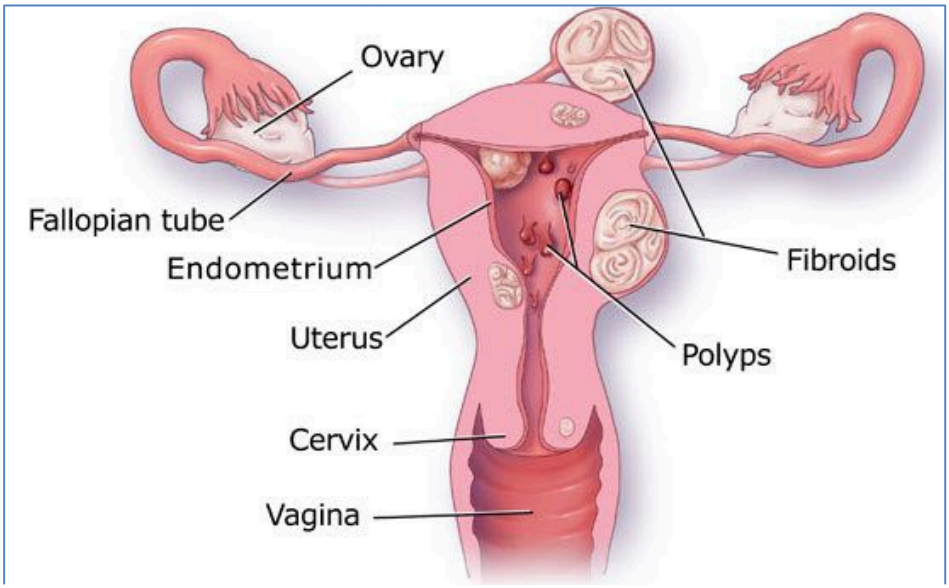
Clinical Presentation:

o Unusually Heavy Periods (Changing pads/tampons *more than once every 4hrs*)
o Long Periods: >7days (~5 days = normal)
o Flooding of *blood NOT contained by pads/tampons*.
o Blood clots >3cm diameter (Note: Small, stringy clots are normal)
o Symptoms of Iron Deficiency Anaemia
o **(Note: Common – 1 in 5 healthy women)**

- **Diagnostic Tests:**
  - o **VE:**
  - o § Masses

    Trans-Vaginal USS:
    - § **(No Physical Abnormality = Dysfunctional Uterine Bleeding)**
    - § **(Well-Defined Mass in Myometrium = Uterine Fibroid)**
    - § **(Endometrial Thickening = Endometrial Hyperplasia)**
    - § **(Myometrial Thickening = Adenomyosis)**
  - o **Pipelle Endometrial Biopsy**
    - § For Biopsy-Confirmation of Abnormal USS
  - o **Hysteroscopy:**
  - o § For Biopsy-Confirmation of Abnormal USS

    Laparoscopy:
    - § If Menorrhagia + Pelvic Pain/Infertility/Ovarian Abnormality
- **Treating Menorrhagia:**
  - o **Medical:**
    - § **Progesterone-Only Contraceptive Tablets/IUDs (Most Effective):**
      - **MOA:** (Reduces Endometrial Proliferation → Lighter Periods)
      - **Pros:** →95% reduction in blood-loss; Contraception; Effective for 5years.
      - **Cons:** Irregular light bleeding in the initial months.
    - § **Or Combined Oral Contraceptive Pill** (↓ blood loss by ~30%)
    - § **+ NSAIDs – Eg: Aspirin** (↓ blood loss by ~30% + Relieve period pain)
    - § **Iron Supplements for Anaemia**
  - o **Surgical (Note: NOT for women planning for Children):**
    - § Hysteroscopic Endometrial Ablation (<85% Effective; BUT 40% → INFERTILE)
    - § Hysterectomy (Abdominal/Laparoscopic/Vaginal) (100% Effective; → 100% Infertility)
- **(Note: Other Less-Common Causes:** *Hyperthyroidism, IUDs, Bleeding Disorders, Endometrial Cancer***)**

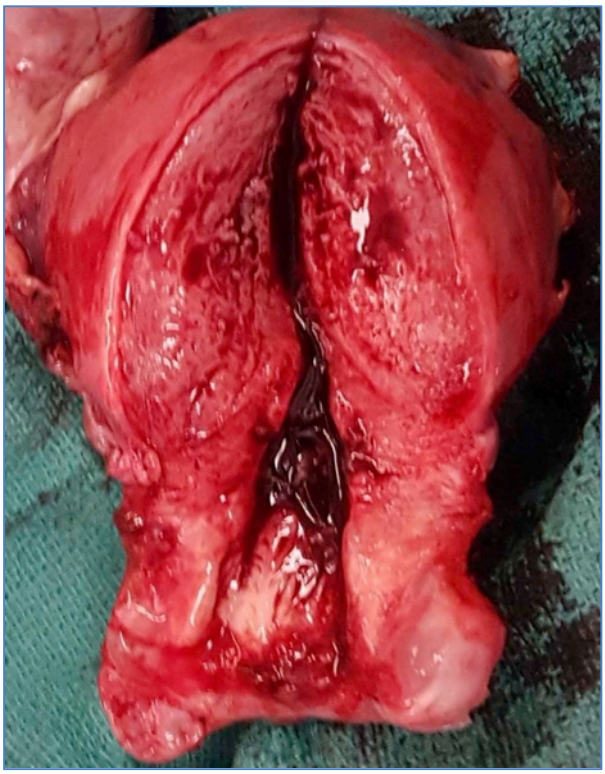


https://www.cdc.gov/ncbddd/blooddisorders/women/menorrhagia.html

ADENOMYOSIS

- **Aetiology:**
- o Hyperestrogenaemia

  Pathogenesis:
  - o Hyperestrogenaemia → Uterine Thickening (Endometrial Hyperplasia) & Invasion of Endometrium (Glands) into Myometrium (Muscle) → *Menorrhagia
- **Morphology:**
  - o **Macro:**
    - § Uterine Thickening (Endometrial Polyps/Thickening)
    - § Haemorrhagic Spots on Endometrial Wall
  - o **Micro:** Endometrial Glands within the Myometrium.
    - § Note: Glands are not normally present in the myometrium (Muscle layer)
    - §
- **Clinical Features:**
  - o **Symptoms:**
    - § *Menorrhagia (Long[8-14d] /Heavy Menstrual Bleeding)
    - § Dysmenorrhoea: Intensely Painful Menstruation & Cramping
    - § Dyspareunia
    - § Heaviness & Dragging sensation.
  - o **Diagnosis:**
    - § Enlarged Uterus on Vaginal Ultrasound/MRI
- **Treatment:**
  - o Progesterone-Only Contraceptive (OCP/Mirena/Implanon/etc)
  - o Hysterectomy if Severe.
- **Prognosis:**
  - o Symptoms abate with Menopause or Hysterectomy
  - o Very rare progression to endometrial cancer.
- **Complications:**
  - o Infertility
  - o Carcinoma
  - o Endometriosis



Conservative Surgery for Adenomyosis and Results; Grace Younes, Togas Tulandi; DOI: https://doi.org/10.1016/j.jmig.2017.07.014

EG. DYSFUNCTIONAL UTERINE BLEEDING:

- **Aetiology:**
- o Excess oestrogen
- **Pathogenesis:**
- o Excess oestrogen → ↑Proliferation of Endometrium → Heavier periods

Clinical:

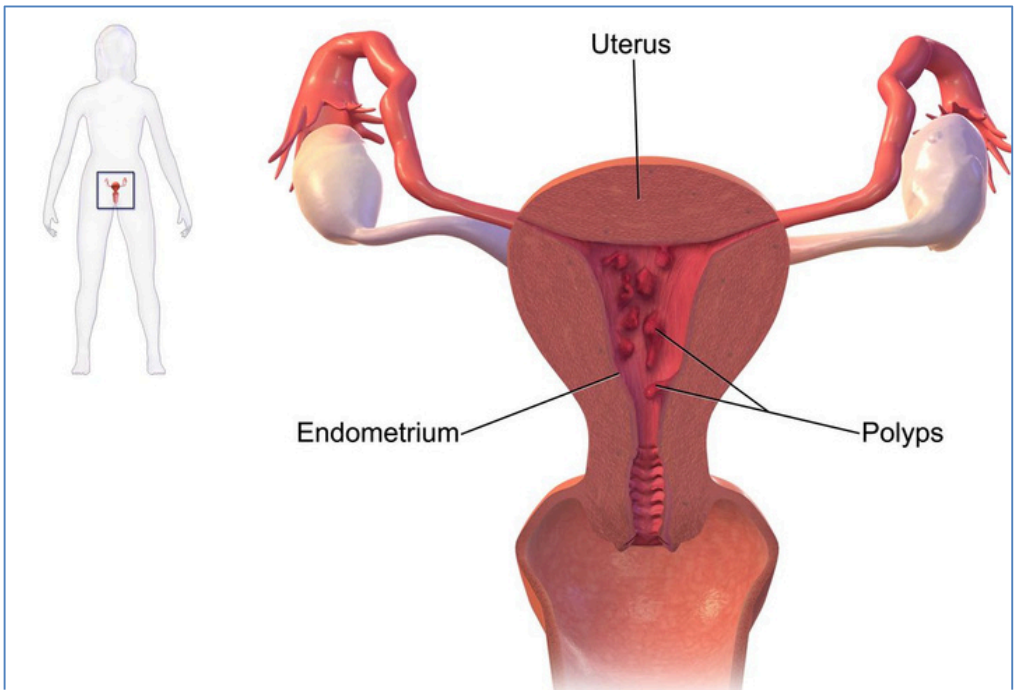
o Diagnosis of Exclusion – Ie: If no abnormality of the uterus is found, it is DUB.

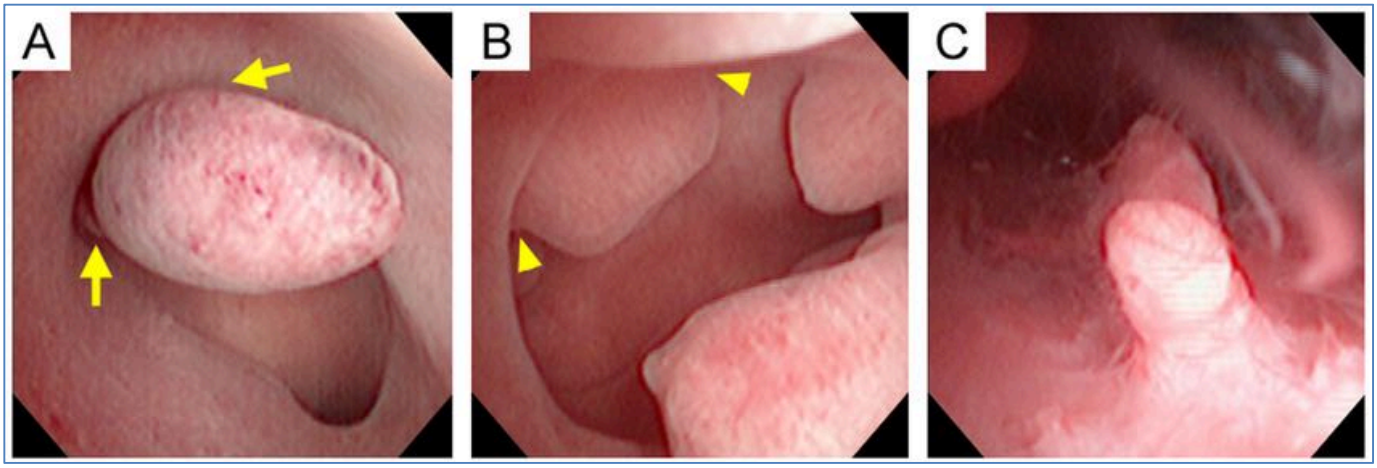
Management:

o **Hormonal Contraception→ Amenorrhoea**

ENDOMETRIAL HYPERPLASIA (POLYPS):

- **Aetiology:**
  - o Hyperestrogenaemia (Eg: Obesity, PCOS, Unopposed HRT)
  - o (Ironically ***Tamoxifen*** [Oestrogen-R-Blocker] actually *stimulates* Endometrial Growth)
- **Pathogenesis:**
  - o Hyperestrogenaemia → Uterine Thickening (Endometrial Hyperplasia)
    - § – (WITHOUT Invasion of Endometrium (Glands) into Myometrium (Muscle))
  - o → *Menorrhagia (Long[8-14d] /Heavy Menstrual Bleeding)
- **Morphology:**
  - o **Macro:**
    - § Single or Multiple Polyps within the Uterine Cavity
  - o **Micro:**
    - § **Simple:** Irregular, Dilated, Cystic Glands
    - § **Complex:** Crowding & budding of Glands
    - § **Atypical:** Simple/Complex Changes + ***Atypical Changes in Cells*** *(Stratification, P leo m o rp h ism , E n la rg ed N u clei & ↑ M ito tic R a te).*
- **Clinical Features:**
  - o **Symptoms:**
    - § *Menorrhagia (Long[8-14d] /Heavy Menstrual Bleeding)
  - o **Diagnosis:**
    - § Endometrial Curettage Biopsy
    - § Endometrium >5mm on USS
- **Treatment:**
  - o ***Progesterone-Only Contraceptive*** (OCP/Mirena/Implanon/etc)
  - o Or ***Hysterectomy***
- **Prognosis:**
  - o Typically Benign (But ↑Risk of Malignancy with Atypical type.)





https://www.researchgate.net/publication/286640221/figure/fig3/AS:340703726063622@1458241506620/Office-hysterosocpic-examination-of-endometrial-polyps-A-Pedunculated-endometrial.png

UTERINE FIBROID (Uterine LeioMYOMAS/FibroMYOMAS/LeiofibroMYOMA) (Benign):

- **Aetiology:**
- o **Probably Multifactorial, BUT *Growth* is ++Oestrogen Dependent.**

Pathogenesis:

o Benign Tumorigenesis/Hyperplasia of the Smooth Muscle (Myometrium)

o **+ Subsequent Growth is Strongly Oestrogen Dependent**

§ (:. Rapid increase during pregnancy; Regresses after menopause)

- **Morphology:**

o **Macro:**

§ Multiple "Fibroids" – Round, Well-Circumscribed, White/Tan, Solid Nodules.

§ Size – Ranges from Microscopic → Grapefruit Sizes

o **Micro:** Whorls of Uniform Smooth Muscle cells (Spindle-Shaped), with Cigar-Shaped Nuclei.

§ Well Demarcated – But Not Encapsulated.

§

- **Clinical Features:**

o **Epidemiology:**

§ <30% of women

§ Typically Perimenopausal.

o **Symptoms:**

§ Asymptomatic if small

§ *Menorrhagia (Long[8-14d] /Heavy Menstrual Bleeding)

§ Dyspareunia

§ Abdo Mass/Bloating/Heaviness/Dragging Sensation/Constipation

§ Urinary Frequency & Urgency (Due to Pelvic Mass Compressing On Bladder)

o **Diagnosis:**

§ Vaginal Ultrasound

§ (Bimanual Pelvic Examination – If Large Fibroids)

o **Complications:**

§ Infertility/Miscarriage

§ Bleeding

§ Post-Renal Failure (Due to Ureteric Obstruction)

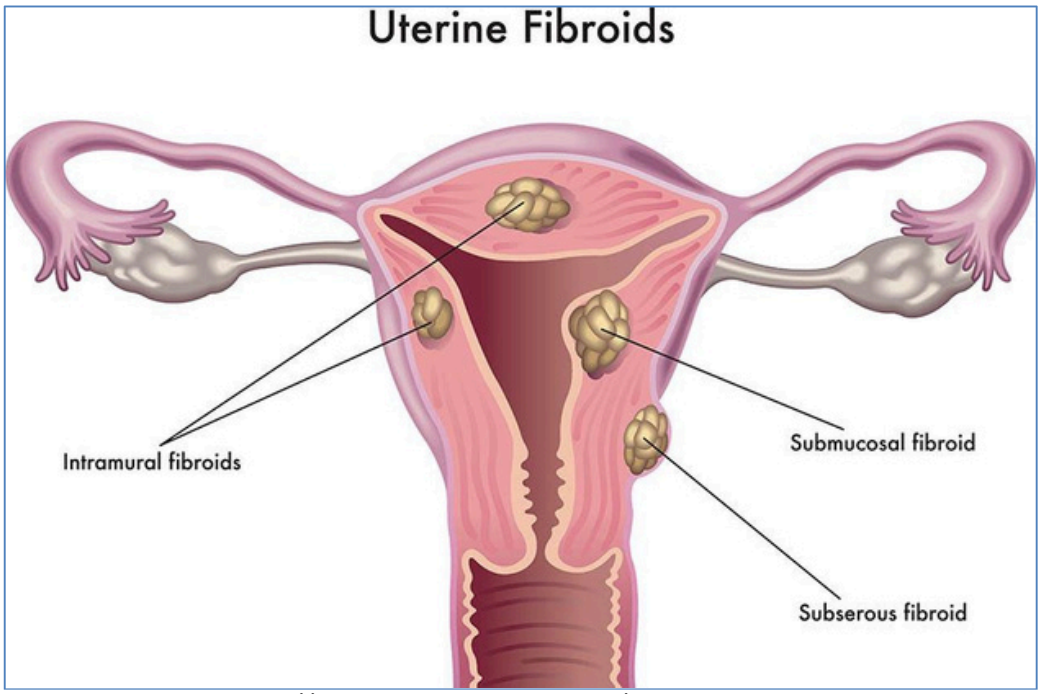
- **Treatment:**

o Surgical Excision.

o Hysterectomy if Symptomatic or Suspected Malignancy.

- **Prognosis:**

o Benign



https://www.healthdirect.gov.au/uterine-fibroids

TRIGGER PAGE - DDX OF ABNORMAL PV BLEEDING

Differential Diagnosis Depends on Demographics:

- **PV Bleeding in children –**
  - Precocious puberty
  - Foreign body in the vagina.
  - Molestation
  - Vaginitis
  - Tumour (rare)
- **Premenopausal women –**
  - Menstruation – menorrhagia/hypomenorrhoea (heavy/light)
  - Intermenstrual bleeding (spotting)
  - Dysfunctional uterine bleeding – common cause of menorrhagia and irregular bleeding. Due to hormonal imbalance and symptoms can be managed with OCP (may be due to PCOS).
  - Uterine fibroids (benign tumours of uterus)
  - Cervical cancer (often presents with contact bleeding – after intercourse)
  - Uterine cancer – irregular and often prolonged bleeding.
  - Endometritis/retained products of conception – in recently pregnant women who have delivered/miscarried.
  - Vaginal trauma/infections/lesions/cancer.
  - Condylomata acuminate of cervix
  - Pelvic inflammatory disease
  - Ovarian cysts
  - Birth control - An IUD (slight bleeding is usually normal), OCP.
  - Following pap smear.
- **Pregnant women –**
  - Vaginal bleeding occurs during 15-25% of 1st trimester pregnancies. Of these, half go on to miscarry and half bring foetus to term.
  - Rupture of small vein on outer rim of placenta
  - Miscarriage
  - Ectopic pregnancy
  - Placenta previa (placenta partially or completely overlying cervix) may bleed profusely.
  - Placental abruption (placenta sheared from wall of uterus)
- **Postmenopausal women –**
  - All vaginal bleeding in postmenopausal women should be medically assessed.
  - 30% unopposed oestrogen
  - 30% atrophic endometritis/vaginitis
  - 15% endometrial cancer
  - 10% endometrial/cervical polyps.
  - 5% endometrial hyperplasia
  - 10% other –
    - Vaginal dryness – trauma.
    - Drugs (Eg: anticoagulant)
    - Inherited bleeding disorders

Diagnostic approach:

- Bleeding history -
  - Last episode of vaginal bleeding
  - LNMP
  - Regularity/cycle length.
  - Menorrhagia
  - Associated symptoms.
  - Previous episodes of abnormal bleeding
  - Postcoital bleeding
  - Intermenstrual bleeding
  - Pregnant/previous pregnancies
  - Present sexual activity
  - Use of birth control
  - No. of sexual partners
  - Hx of recent surgeries or gynae procedures.
- Physical examination
- Pregnancy tests
- Hormonal tests
- FBC + clotting tests (maybe)
- Thyroid (maybe)
- Pap smear
- Transvaginal USS
- Treatment directed by cause.

Intermenstrual Bleeding

- **Definition:**
  - Vaginal bleeding (except postcoital) during the menstrual cycle other than menstruation.

Causes:

- **Pregnancy Related:**
  - Ectopic Pregnancy
  - Gestational Trophoblastic Disease
- **Iatrogenic:**
  - Insufficient Dose of Combined Contraceptives
  - Side effect of Progesterone-Only Contraceptives
  - Intra-Uterine Device
- **Cervical Causes:**
  - Cervicitis (Chlamydia/Gonorrhoea)
  - Cervical Polyps
  - Cervical Cancer
- **Uterine Causes:**
  - Uterine Fibroids
  - Adenomyosis
  - Endometrial Cancer

Post-Coital Bleeding:

- **Definition:**
  - Non-menstrual bleeding that occurs immediately after sexual intercourse

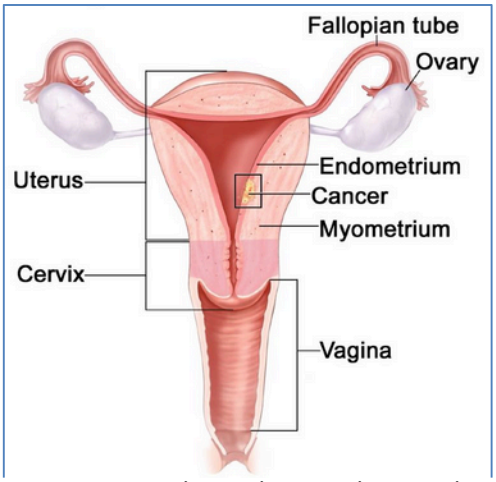
Causes:

- Traumatic Sex (Particularly in Post-Menopausal Women due to Vaginal Dryness)
- Infection (Bacterial Vaginosis/Cervicitis[Chlamydia, Gonorrhoea])
- Vaginal Cancer
- Cervical Cancer

UTERINE CANCERS

ENDOMETRIAL ADENOCARCINOMA:

- **Aetiology:**
  - **Excessive Oestrogen Exposure**
  - **:. Risk Factors –**
    - **↑Oestrogen:** Early Menarche, Nulliparity, Late Menopause, Obesity, PCOS, & Prolonged
    - Oestrogen Therapy (HRT), Tamoxifen
      Others: Hypertension, Diabetes, Pelvic Radiation.
  - (Or progression from Endometrial Hyperplasia)
- **Pathogenesis:**
  - **Hyper-Oestrogenaemia** + Genetic Predisposition → Hyperplasia & Carcinogenesis of Endometrial Epithelium
- **Morphology:**
  - **Macro:**
    - Polypoid/Cauliflower-Like Growth + Distended Uterus
    - Areas of Haemorrhage, Necrosis & Infiltration
  - **Micro:** **Adenocarcinoma of Endometrial Glands:**
    - Numerous, Small, Back-to-Back Glands
    - Irregular & Dysplastic Cells
    - Little Stroma
- **Clinical Features:**
  - **Epi:**
    - Most Common Gynae. Cancers.
    - Mainly in postmenopausal, older women (>60yrs).
  - **Presentation:**
    - Post-Menopausal/Intermenstrual Bleeding
    - Lower Abdo Pain/Cramping
    - Syx of Anaemia
    - Thin White/Clear Vaginal Discharge
  - **Diagnosis:**
    - **Endometrial Aspiration (Via Pipelle) → Biopsy
    - **Endometrial Curettage → Biopsy
    - + Trans-Vaginal USS (>5mm Endometrial Thickness = Suspicious)
    - (+/- Hysteroscopy to eliminate Endometrial Hyperplasia/Polyps or Fibroids.)
- **Treatment:**
  - **Pre-Rx Staging (CXR/CT/MRI/PET)**
  - **Pre-Rx CA-125** (For monitoring)
  - **Total *Hysterectomy* + *Bilateral Salpingo-Oophorectomy* + Pelvic *Lymph Nodes Resected***
    - +/- *Radiotherapy*
    - +/- *Chemotherapy*
- **Prognosis:**
  - Note: Presents early with DUB :. Early Detection → 90% 5yr Survival
  - If Advanced Disease → 15% 5yr Survival



Public Domain: https://www.cancer.gov/types/uterine/patient/endometrial-treatment-pdq

UTERINE LEIOMYOSARCOMA:

- **Aetiology:**
- o Unknown – Probably Genetic + Environmental

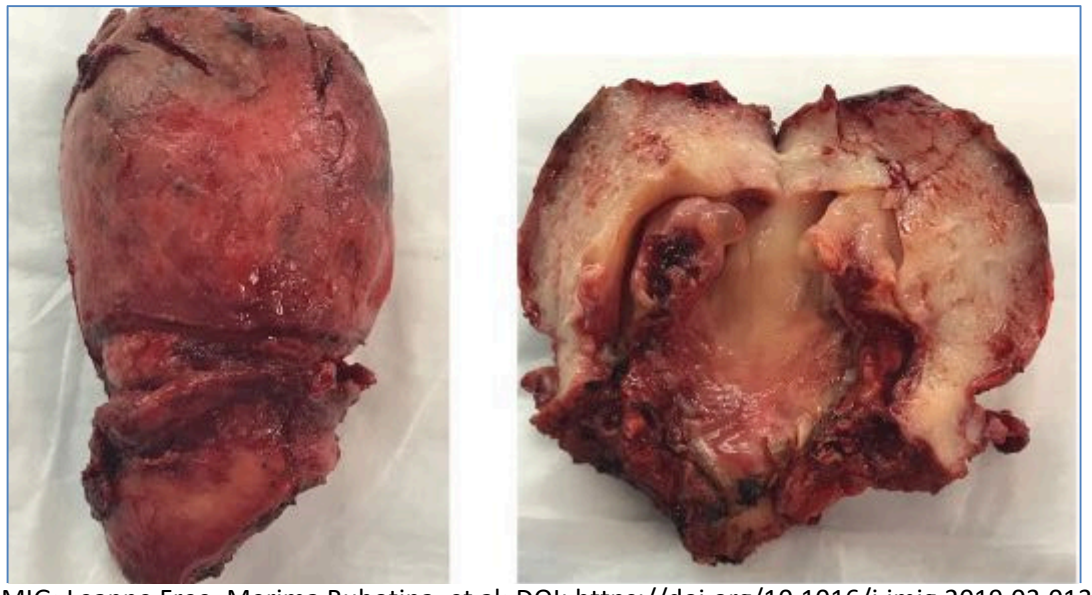
Pathogenesis:

o Connective Tissue Tumour of the Myometrium (Smooth Muscle layer of the Uterus)
o **Note: NOT HORMONALLY DRIVEN**
o (Note: Can also occur in Stomach, SI & Retroperitoneum)

- **Morphology:**
  - o **Macro:**
    - § Solitary, Large (>10cm), Poorly Circumscribed Tumour
    - § Soft Fleshy Consistency
    - § Yellow-Tan Colour
    - § No Capsule + Invasion into the Myometrium
    - § Haemorrhage & Necrosis
- **Clinical Features:**
  - o Rare (1% of Uterine Cancers)
  - o Typically 40-60yrs (Perimenopausal)
  - o Typically present with Advanced Disease
  - o **Presentation:**
    - § *Dysfunctional Uterine Bleeding
    - § Pelvic/Abdominal Pain
    - § *Weight Loss, Lethargy, Weakness, Fever
    - § Enlarged Uterus + may prolapsed into the vagina.
- **Diagnosis:**
  - o Hysteroscopy & Biopsy
  - o (Imaging is NOT sufficient)
- **Treatment:**
- o **Surgical – *Total Hysterectomy* +/- *Radiation* & *Chemotherapy*.**

Prognosis:

o Typically present with Advanced Disease
o Aggressive & Can spread by any route → Poor Prognosis
o <70% 5yr Survival



JMIG; Leanne Free, Merima Ruhotina, et al; DOI: https://doi.org/10.1016/j.jmig.2019.03.013

CONDITIONS OF THE VAGINA

CONDITIONS OF THE VAGINA

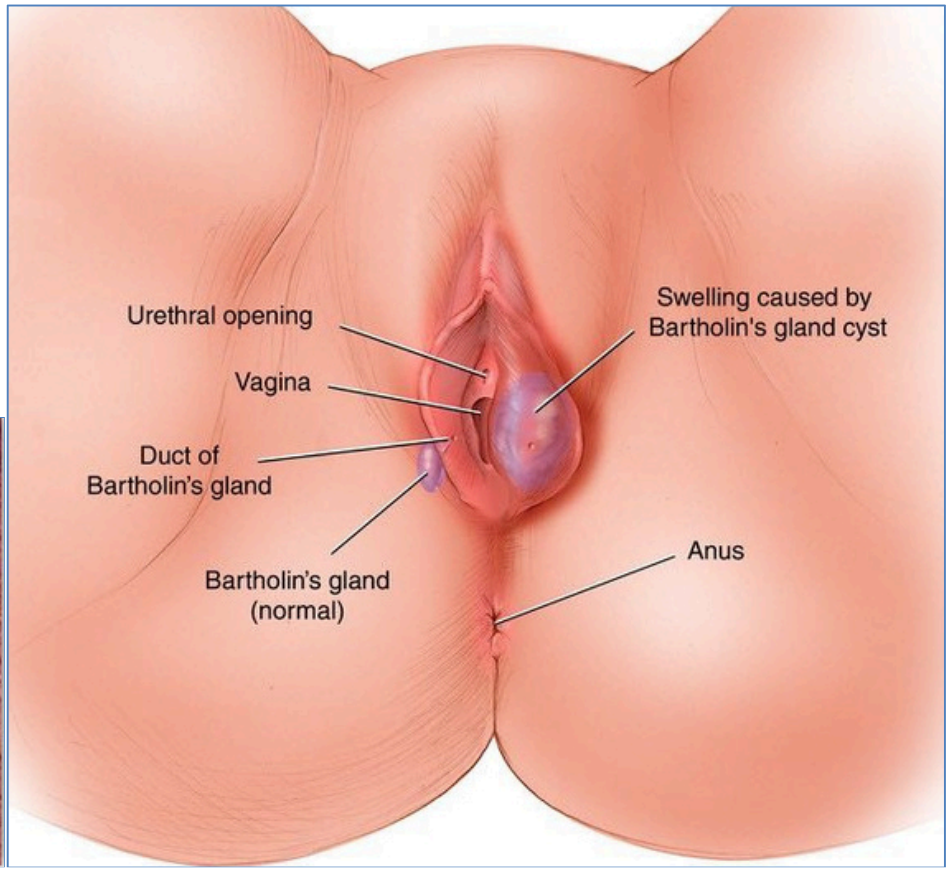
BARTHOLIN GLAND CYST (or Greater Vestibular Gland Cyst):

- **Aetiology:**
  - Physical Blockage of the Bartholin (Greater Vestibular) Gland
- **Pathogenesis:**
  - May result from Infection/Inflammation/Mucous Plug/other → Blockage of Greater Vestibular Gland

Morphology:

- **Macro:**
  - Range from Pea-Sized → Egg-Sized.
- **Micro:** Large Cystic Duct
  -

- **Clinical Features:**
  - (Typically Women of Child-Bearing Age)
  - **Symptoms:**
    - Very Painful (→ Difficulty Walking)
    - Cysts may recur
  - **Complication:**
    - Secondary Infection of Cyst → Bartholin's Abscess
- **Treatment:**
  - Surgery → Create new duct opening



https://hhma.org/healthadvisor/aha-barthcys-wha/

VULVAL CANCER (Squamous Cell Cancer):

- **Aetiology:**
- o HPV-16 & -18

Pathogenesis:

o HPV-16 & -18 Infection → Dysplasia
o (Lichen Sclerosis can also → Vulval Cancer)

- **Morphology:**
  - o **Macro:**
    - § Unifocal Lesion on Labia Majora
  - o **Micro:** **SCC** – Pleomorphic Squamous Cells + **Epithelial Keratin Pearls**
    - §
- **Clinical Features:**
  - o Typically Post-Menopausal Women
  - o **Symptoms:**
    - § Unifocal Lesion/Lump/Ulcer on Labia Majora
    - § Itching/Irritation
    - § Local Bleeding/Discharge
    - § Dyspareunia
  - o **Diagnosis:**
    - § Pelvic Exam / Pap Smear / Colposcopy
    - § →Biopsy
- **Treatment:**
  - o **Surgery – (*Wide Local Excision*)**
    - § (or Radical Vulvectomy + Lymph Node Resection)
  - o **+/- *Radiotherapy***
  - o **+/- *Chemotherapy***
- **Prognosis:**
  - o Spreads via Lymphatics. May → Pelvic Lymph Nodes
  - o **Stage 1-3 ≈75% 5yr Survival**

Gynaecological Oncology for the MRCOG; DOI: https://doi.org/10.1017/9781316986844.014

2 DIFFERENTIALS FOR MALIGNANCY

LICHEN SCLEROSUS:

- **Pathogenesis:**
- o Autoimmune → Atrophy

Morphology:

- o **Macro:**
  - § White Patches on Skin
  - § Scarring on/around Genital Skin.

- **Clinical Features:**
  - o (Typically Peri-Menopausal Women)
  - o Typically Affects Vulva & Perineum (*Also occurs in males)
  - o Glistening Ivory-White Plaques
  - o May be Itchy
  - o Thinning, Shrinkage & Traction of Genital Area → Dyspareunia, Dysuria, Dyschezia.
- **Treatment:**
  - o ***Potent Topical Steroids*** (2-3mths)
  - o ***+/- Cryotherapy***
- **Prognosis:**
  - o Higher Risk of Cancer

Credit: http://dermis.net

LICHEN SIMPLEX CHRONICUS (NEURODERMATITIS):

- **Aetiology:**
- o Chronic Infection

Pathogenesis:

- o Chronic Infection → Chronic Pruritis → Constant Scratching → Hyperkeratosis (Hypertrophy), AKA: Acanthosis.

- **Morphology:**
- o Thick, Leathery, Brownish Skin

Clinical Features:

- o Chronic Pruritis
- o Thick, Leathery, Brownish Skin

- **Treatment:**
  - o Itch Relief
  - o **Topical Steroids**

Unattributable

VAGINAL CANDIDIASIS/"THRUSH"/"YEAST-INFECTION":

- **Aetiology:**
- o Candida Albicans overgrowth

Pathogenesis:

- o Overgrowth of *Candia Albicans* in the vagina secondary to...
  - § Excessive douching → Loss of *Lactobacilli* → ↑pH & ↓Microbial Competition
  - § Antibiotic use may → Loss of *Lactobacilli* → ↑pH & ↓Microbial Competition
  - § Immunosuppression (Diabetes/HIV/Chemotherapy/Corticosteroids)
  - § (High sugar intake if Oral Candidiasis)
- o →→Local inflammation & discomfort
- o (Note: Typically not an STI, however may be precipitated by some STI's – Eg: HIV → ↓Immune System)

- **Morphology:**
  - o **Macro:**
    - § Vaginal erythema
    - § Furry white plaques on the vaginal wall
    - § Pinpoint bleeding underneath candida plaques.
  - o **Micro:** Pseudohyphae and budding yeast cells
    - §
- **Clinical Features:**
  - o Vaginal discharge - Thick, milky, curd-like & Odourless.
  - o Vulval Pruritis/Burning/Soreness
  - o Dyspareunia
  - o Spotting
- **Diagnosis:**
  - o Pelvic examination
  - o Discharge MCS
- **Treatment:**
  - o **Treat/Prevent precipitating factor/s.**
  - o **+ Antifungals (*clotrimazole*/*nystatin*/*fluconazole*)**

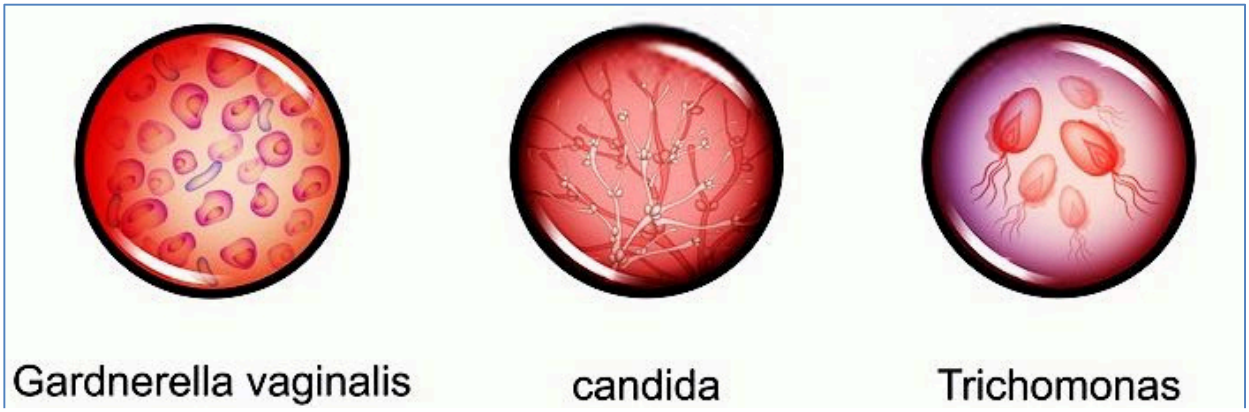
Mikael Häggström, CC0, via Wikimedia Commons

VAGINOSES/VAGINITIS (BACTERIAL, FUNGAL, PROTOZOAN)

- **Aetiology:**
  - o **50% = Bacterial** – Gardnerella vaginalis
  - o **30% = Fungal** – Candida Albicans
  - o **20% = Protozoan** – Trichomonas vaginalis

- **Pathogenesis:**
  - o **50% = Bacterial** – Gardnerella vaginalis
    - § Loss of Normal Vaginal Acidity *or* Loss of Normal Vaginal Flora (Lactobacillus) → Replaced by other Bacteria.
  - o **30% = Fungal –** Candidia Albicans
    - § Typically only in Immunosuppressed (HIV, Diabetes, Corticosteroids, etc)
  - o **20% = Protozoan** – Trichomonas vaginalis
    - § Trichomonas = Bowel Flora → Infects Vagina & LUT
- **Morphology:**
  - o **Micro:**
    - § **Normal –** Blue, gram +ve Lactobacilli.
    - § **Gardnerella** - "Clue cells" on Microscopy (Distinctive Bacteria-coated epithelial cells)
    - § **Candida –** "Pseudohyphae" on Microscopy
    - § **Trichomonas –** Pear-shaped, flagellate Protozoan on Microscopy
- **Clinical Features:**
  - o **Typically → Vaginal Discharge + Odour + Dyspareunia:**
    - § **50% - Gardnerella (Bacterial) =** Profuse Fishy, Grey-White Homogenous Watery Discharge,
    - § Pruritis, Dyspareunia & Dysuria.
    - § **30% - Candida (Fungal) =** Curdy, white, sticky, cheesy discharge + furry white plaques + microbleeding beneath plaques. + vaginal & vulval pruritis → Excoriation
      20% - Trichomonas (Protozoa)= Thin, frothy, yellow-green discharge, small, pruritis, dyspareunia, "strawberry vagina"
- **Diagnosis:**
  - o **Clinical** – '*Is discharge Cervical or Vaginal?*', *Previous STIs?*, *Diabetic?*
  - o **pH test** if Vaginal discharge (Reduced if Bacterial Vaginosis)
  - o **Microscopy:**
    - § ("Clue Cells" if Bacterial Vaginosis [Gardnerella])
    - § ("Pseudohyphae" if Fungal Vaginosis [Candida])
    - § ("Motile Flagellates" if Protozoan Vaginosis [Trichomonas])
  - o **PCR for ?-Trichomonas.**
- **Treatment:**
  - o Specific antimicrobials depending on pathogen.
    - § **Gardnerella** - Oral ***Metronidazole*** BD for 1wk
    - § **Candida** - Oral ***Fluconazole***
    - § **Trichomonas** – Oral ***Metronidazole*** Stat Dose

https://www.labiotech.eu/trends-news/phagomed-biopharma-bacterial-vaginosis/



https://biologydictionary.net/gardnerella-vaginalis/

CONDITIONS OF THE CERVIX

CONDITIONS OF THE CERVIX

CERVICITIS (Infection):

- **Aetiology:**
  - Secondary to Vaginal Infections
  - (Note: High Level of Sexual Activity is the Main Risk Factor)
- **Pathogenesis:**
- Vaginal Infections (Eg: Chlamydia, Gonorrhoea, Trichomonas, Candida) → Inflammation of Cervix

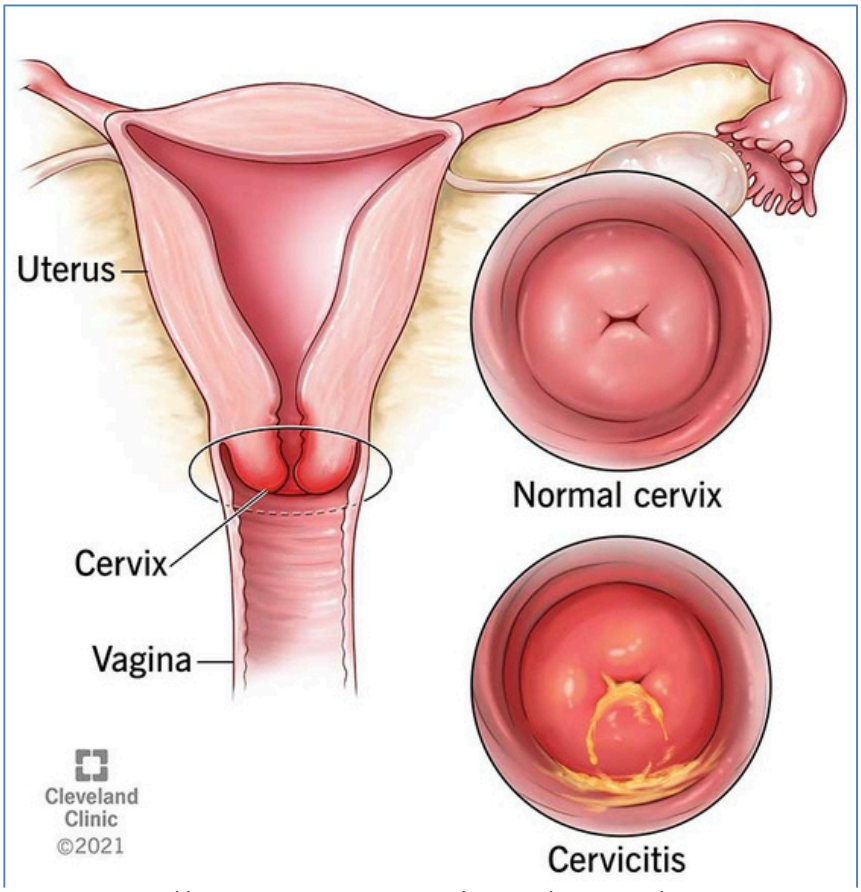
Morphology:

- **Macro:**
  - Red, Inflamed, Swollen Cervix
  - +/- Discharge (Purulent or Mucoid)
- **Micro:** Inflammation & Oedematous Tissue
  - Plenty of Inflammatory Cells in Smear
  -

- **Clinical Features:**
  - Very Common (50% of all women will have it >once in their life)
  - **Symptoms:**
    - Abnormal Vaginal Bleeding (Post Coital/Intermenstrual/Post-Menopausal)
    - Vaginal Discharge (May be Gray/White/Yellow +/- Odour)
    - Dyspareunia
    - Pressure/Heaviness in the Pelvis.
  - **Diagnosis:**
    - Clinical Pelvic Examination
    - Pap Smear
    - Tests for Gonorrhoea &/or Chlamydia
- **Treatment:**
- **Antibiotics – (*Azithromycin* or *Doxycycline*)**

Prognosis:

- If Infection due to HPV → ↑Risk of Cervical Cancer.



Credit: https://my.clevelandclinic.org/health/diseases/15360-cervicitis

ENDOCERVICAL POLYPS (Benign Inflammatory Tumours):

- **Aetiology:**
- o Unknown – But Inflammatory Aetiology.
- **Pathogenesis:**
  - o Inflammation → Hyperplasia of Endocervical Glands → Inflammatory Tumour

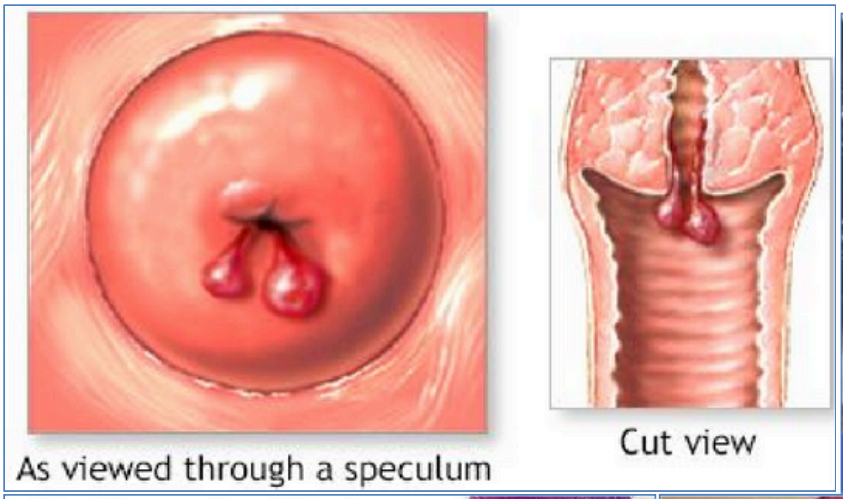
Morphology:

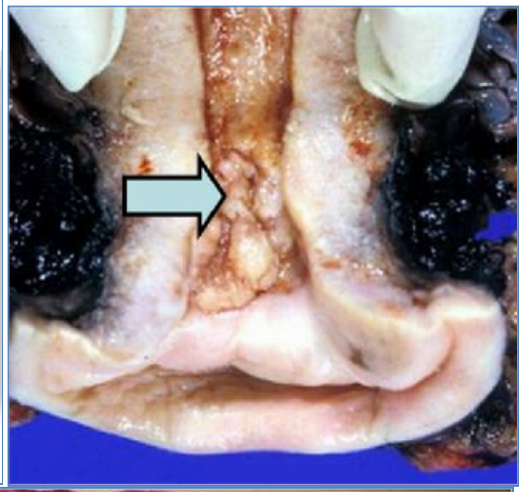
- o **Macro:**
  - § Finger-like Mucoid Polyps in Endocervical Canal
  - § Usually <1cm Diameter.
  - § May Project from the Cervical Canal (Visible on Pelvic Examination)
- o **Micro:** Overgrowth of Benign Fibrous Stroma + Some Glands, covered by Squamous Epithelium.
  - §

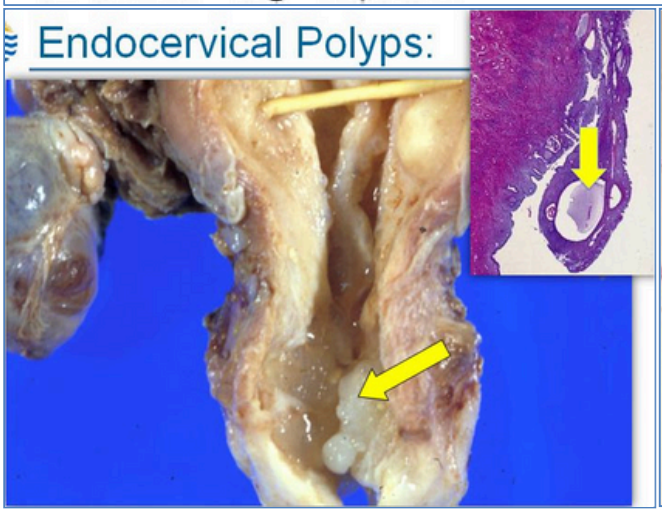
- **Clinical Features:**
  - o (Typically in Peri-Menopausal Women who have had Children)
  - o **Symptoms:**
    - § Irregular Inter-Menstrual Bleeding
    - § Unusually Heavy Menstrual Bleeding (Menorrhagia)
    - § Post-Coital Bleeding
- **Diagnosis:**
  - o Pelvic Examination – (Red/purple projections from the cervical canal)
  - o Cervical Biopsy
- **Treatment:**
- o Simple Surgical Excision/Strangulation of Polyp + Cauterisation of the Base.

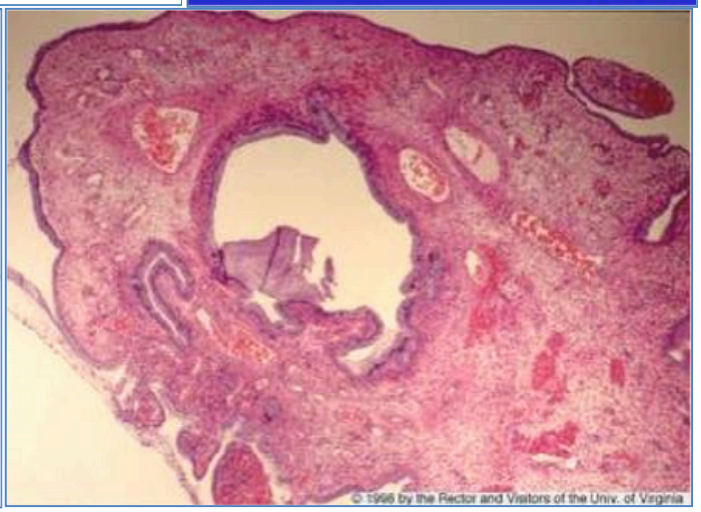
Prognosis:

- o 99% Benign



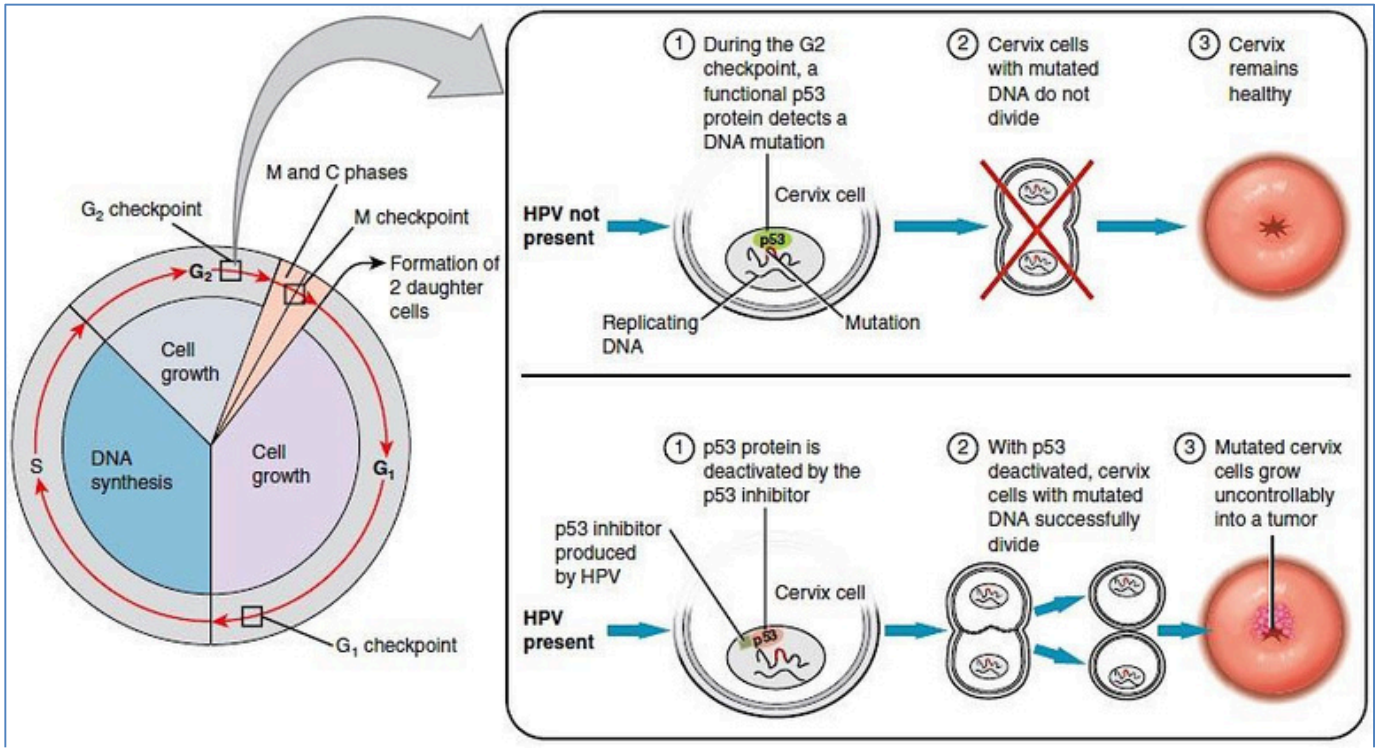






CERVICAL CANCERS: CIN 1 (LSIL) & CIN2-3 (HSIL):

- **Aetiology:**
  - **HPV Infection – Types 16, 18 & 45(& 31 & 33)**
    - (Direct Contact/Sexual Transmission – Highly Contagious)
  - **(Other Risk Factors** – Promiscuity, Family History, ↑Oestrogen Exposure, Smoking**)**
- **Pathogenesis:**
  - **HPV Infection (Almost Ubiquitous) →**
    - E6 Inhibits P53 (Tumour Suppressor Gene)
    - + E7 Inhibits RB (Tumour Suppressor Gene) **→→Cell-**
    - **Cycle Dysregulation → Dysplasia → Malignancy**
  - **+ Estrogens →**
    - Promoter (proliferation inducer)
    - (Ie: Early Menarche, late menopause, nulliparity, HRT, obesity & conditions of estrogen excess are Risk Factors)

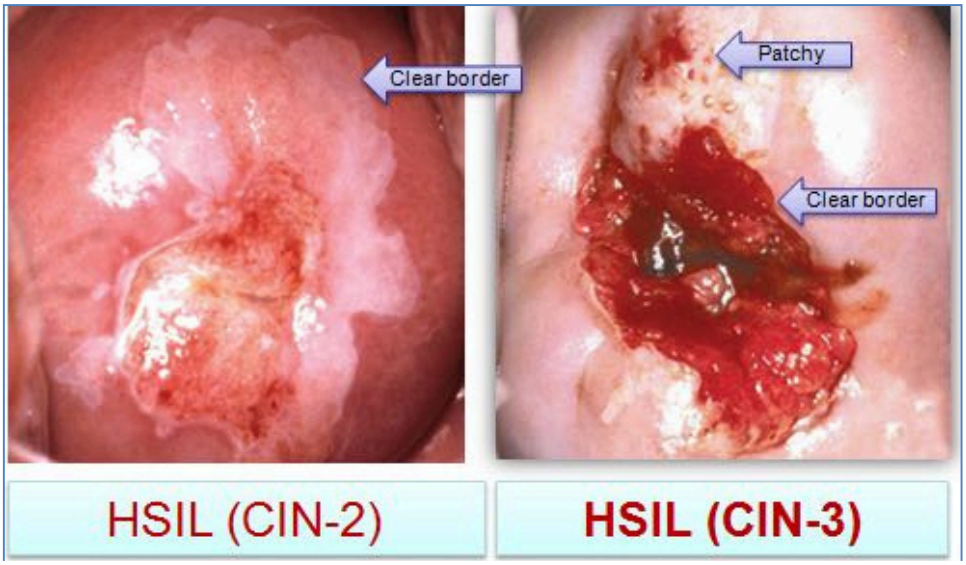


- **Morphology:**
  - **LSIL: "*Low-grade Squamous Intraepithelial Lesion*" - (CIN1: Cervical Intraepithelial Neoplasia):**
    - **Macro:**
    - Small, Distinct, Clearly-Defined areas of Flat Leucoplakia

      Micro: *Koilocytosis - (Perinuclear Halo, Wrinkled Nucleus & Viral Inclusions)
      - *+ Mild* Nuclear Enlargement
      - Atypical cells in Basal region (Basal Layer is ≈Normal: Darker & ↓cytoplasm)
      -
  - **HSIL: "*High-grade Squamous Intraepithelial Lesion*" - (CIN2-3: Cervical Intraepithelial Neoplasia):**
    - **Macro:**
      - **CIN2 -** Larger Areas of Flat Leucoplakia, But Still Distinct & Clearly-Defined.
      - **CIN3 –** Patchy, Poorly-Defined Leucoplakia + Areas of Haemorrhage.
    - **Micro:** *Koilocytosis - (Perinuclear Halo, Wrinkled Nucleus & Viral Inclusions)
      - Complete Replacement of All Normal Cells with Dysplastic Squamous Cells
      -

CIN1

Haeok Lee1,2*, Mary Sue Makin3, Jasintha T Mtengezo4,5 and Address Malata6, CC BY 4.0 <https://creativecommons.org/licenses/by/4.0>, via Wikimedia Commons



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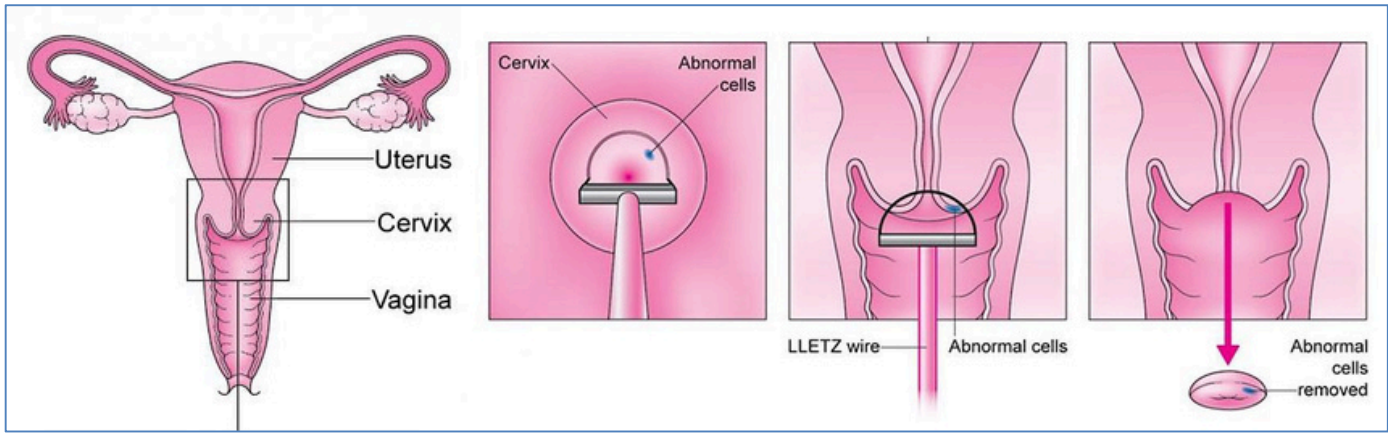
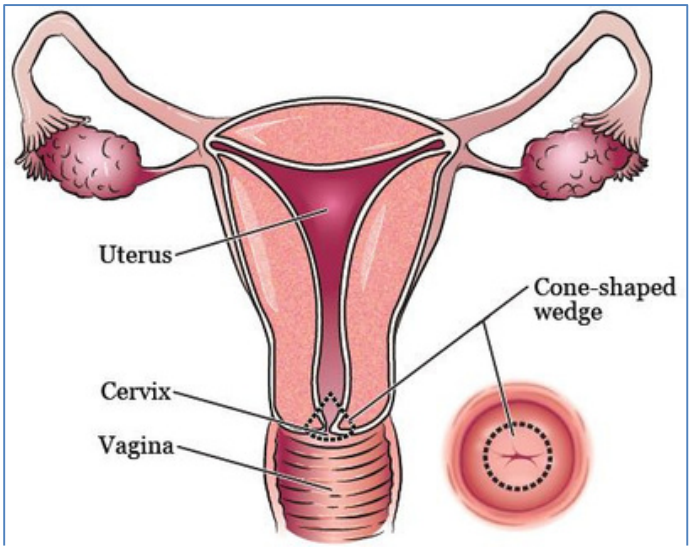
- **Clinical Features:**
  - o Common, Ca. in women, 40-50y
  - o **Symptoms:**
    - § Usually Asymptomatic
    - § But Post-Coital Bleeding in Advanced Disease.
- **Diagnosis:**
  - o Colposcopy & Biopsy
  - o (!!Note: Pap Smear is ONLY useful as a SCREENING TOOL FOR PREVIOUSLY NORMAL CERVIXES – Note: If you suspect cervical cancer, Colposcopy is the FIRST LINE INVESTIGATION!!!!)
- **Staging – CT/MRI:**
  - o **Stage 1** (Cervix Only)
  - o **Stage 2** (Beyond Cx)
  - o **Stage 3** (Pelvic/Vaginal Involvement)
  - o **Stage 4** (Abdomen/Lungs/Liver/Bone)

- **Treatment:**
  - **CIN 2 or 3 → Excision of Transformation Zone via:**
    - **"*LLETZ/LEEP*" – (Electrocautery)**
    - **or "*Cone Biopsy*" - (Cold Knife)**



https://womenobgyn.net/procedures/office-procedures/leep_/

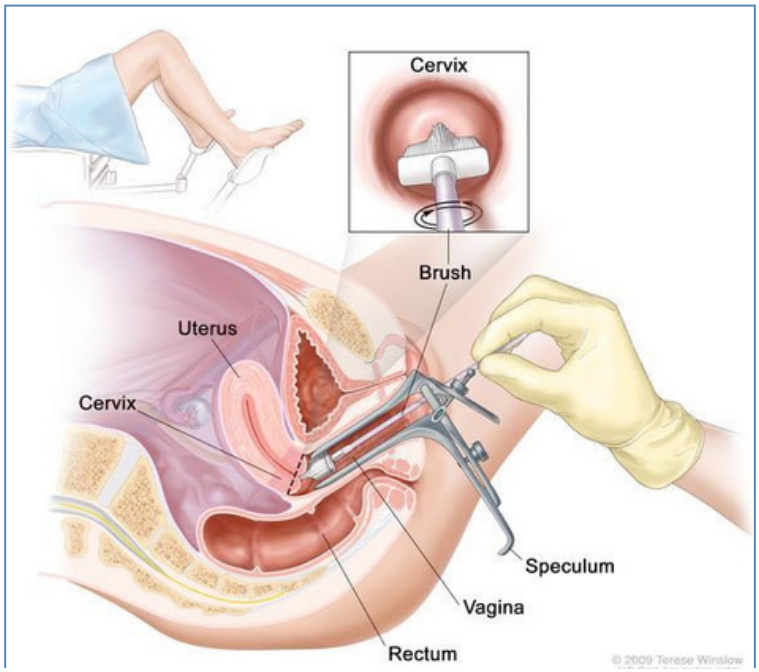


https://www.mskcc.org/cancer-care/patient-education/instructions-after-cone-biopsy-cervix

  - **Otherwise ***Total *Hysterectomy* (+/- *Oophorectomy*) + Lymph Nodes if High Grade**
    - + Radiotherapy (EBRT/Brachy) if High Grade & Stage.
    - + Chemotherapy if Advanced Disease.
- **Prognosis:**
  - ***NOT all CIN's → to Invasive Cancer:***
    - CIN1 >95% → Regression
    - CIN III <30% → Regression (:. 70% → Invasive Cancer)
  - **5y survival:**
    - **Stage 1 (Localized Disease) >80%,**
    - **Stage 4 (Metastatic Spread) ~10%.**
- **Prevention:**
  - **Gardasil Vaccine (Primary Prevention):**
    - **Gardasil = Quadrivalent :. Protects against Types 6, 11, 16 & 18.**
    - **Recommended for girls 9-13y**. (Approved for F:10-26yrs & M:9-15yrs)
    - **3x IM injections @ 0, 2 & 6mths**.
    - Note: Pap Smears should continue in both vaccinated and unvaccinated women.
  - **Pap Screening (Secondary Prevention):**
    - **Pap Screening → Prevents >90% of Cervical Cancer Deaths**
    - ****Recommendations:**
      - ***Every 2yrs**
      - ***Every Woman >18yrs OR As soon as Sexually Active → Even After Menopause***
      - ***Ideal Timing: Within the 1st Week AFTER Menstruation***

§ **Interpretation:**
- An *Abnormal PAP Smear* is NOT Cancer! →Needs (Colposcopy & Biopsy)

§ **Followup:**
- If currently Normal → Repeat in 24mths
- If currently LSIL, but PAP <1yr ago was normal → Repeat in 12mths
- If currently LSIL, but last PAP was >1yr ago → COLPOSCOPY
- If currently HSIL → COLPOSCOPY



https://www.cancer.gov/publications/dictionaries/cancer-terms/def/pap-smear

○ **Colposcopy:**

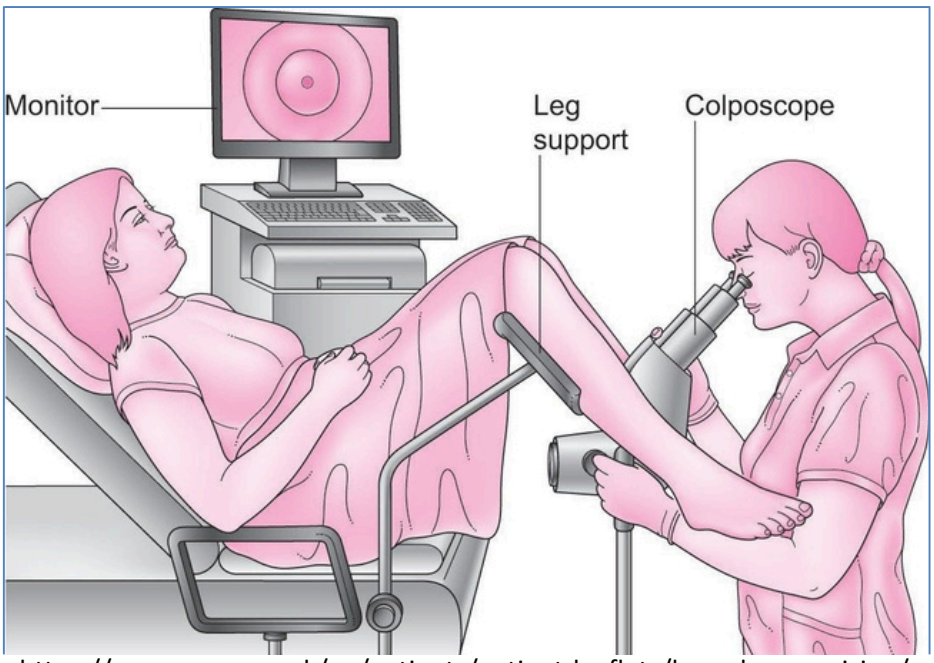
§ **For women with Identified LSIL/HSIL on Abnormal PAP-Smear**

§ →Visually assesses Abnormal Changes in the "Transformation Zone".

§ **1: Acetic Acid:** Abnormal cells stain White

§ **2: "Lugols Iodine":** Abnormal cells DO NOT stain brown (Ie: Stay white)

§ **3: → Punch Biopsy → Histology**
- **If CIN 1** (LSIL) → Watch, Wait & Followup
- **If CIN 2** (HSIL) → Treat (***LLETZ***/***Cone***)
- **If CIN 3** (HSIL) → Treat (***LLETZ***/***Cone***)



https://www.rcog.org.uk/en/patients/patient-leaflets/large-loop-excision/

CONDITIONS OF THE OVARIES

CONDITIONS OF THE OVARIES

OVARIAN CYSTADENOMA (Benign):

- **Aetiology:**
  - Unknown
- **Pathogenesis:**
  - Tumour of the Ovarian Surface Epithelium

Morphology:

- **Macro:**
  - May become very large (>20cm)
  - Multiple cysts containing clear fluid/mucous
  - Uni/Multi-Loculated
  - Little solid tissue
- **Micro:** Big Cyst lined by Cuboidal/columnar epithelium lining cysts
  - Cyst Lining may be Flat, or have Small Papillary Projections
  - Psammoma Bodies (Calcification) may be seen.
  -

- **Clinical Features:**
  - Common & Benign (85%)
  - Young 20-45
  - **Prior to Rupture:** Abdominal Fullness, Heaviness, Pressure
  - **Upon Rupture:** Sudden, sharp Adnexal Pain →Followed by Dull, Aching → Pelvis/Vagina/Back/Thighs
  - **Diagnosis:**
    - Ultrasound
    - CT
    - Confirmed on Biopsy
  - **Complications:**
    - Commonest – Torsion (infarction, perforation, haemoperitoneum & autoamputation)
    - Infection
    - Perforation → Acute Abdomen
- **Treatment:**
  - **Analgesia –** Paracetamol or NSAIDs
  - **COCP –** To prevent follicle stimulation / Shrink existing cyst.
  - **Non-Medical –** Warm Bath/Hot Pack
  - (+/-Surgery (If large / Persistent / Life-Threatening))
- **Prognosis:**
  - Benign (85%)
  - Good Prognosis

Euthman, Public domain, via Wikimedia Commons

OVARIAN CANCER (CYSTADENOCARCINOMA):

- **Aetiology:**
  - Unknown
  - **Risk Factors:**
    - Older >40yrs
    - BRCA1+/2+, & HNPCC
    - Oestrogen Exposure – (Early Menarche/Nulliparity/Late menopause)
    - Family History
    - Smoking
    - **(Note: OCP & Multiparity = Protective)**
- **Pathogenesis:**
- o Carcinogenesis of Ovarian Serous Epithelium
- **Morphology:**
  - o Solid Tumour

  Clinical Features:
  - o **Symptoms:**
    - (Early Stage-I/II = Asymptomatic)
    - Irregular Periods
    - Abdominal/Pelvic Pain/Discomfort
    - Bloating/Constipation.
    - Urinary Frequency/Urgency
  - o **Signs:** Abdominal Mass (Solid, Irregular, Fixed)
    - Weight Loss, Anorexia, Lethargy
    - Ascites
    -
  - o **Diagnosis:**
    - Physical Examination + PV
    - Trans-Vaginal USS
    - CT Abdo/Pelvis
    - *Confirmed by Surgery & Histology
    - ***Note: CA-125 useful only for Post-Diagnosis Monitoring.**
- **Treatment:**
  - **Surgery (Debulking)**
  - **+ Intensive Chemotherapy**
  - +/- Radiotherapy
- **Prevention (UpToDate):**
  - **UpToDate Advises NOT to screen for Ovarian Cancer.**
    - As Trans-Vag-USS & CA-125 are NOT Sensitive OR Specific Enough.
  - **BUT, in *High-Risk* Women, screen from 35yo with a COMBINATION of:**
    - Pelvic exam
    - Trans-Vaginal USS
    - CA-125 marker
  - ***+/- BRCA-Gene Testing for Pts with a FamHx of Breast/Ovarian Cancer. (90% Sensitive)**
    - **If Positive → Prophylactic BSO** (Bilateral Salpingo-Oophorectomy) – (Also ↓Breast Cancer)
      - **+/- Prophylactic Mastectomy** (Due to ↑↑Breast Ca Risk)
- **Prognosis:**
  - Malignant (15%)
  - **POOR Prognosis** - due to late detection:
    - **Stage 1** (Confined to Ovary/s) has 88% 5YS
    - **Stage 2** (Uterine Spread) has 60% 5YS
    - **Stage 3** (Peritoneal Spread) has 27% 5YS
    - **Stage 4** (Distant Mets) has <10 5YS
    - **(The vast majority are Stage 3 at Diagnosis)**

Figure 1: Gross appearance of tumour having sponge-like appearance.

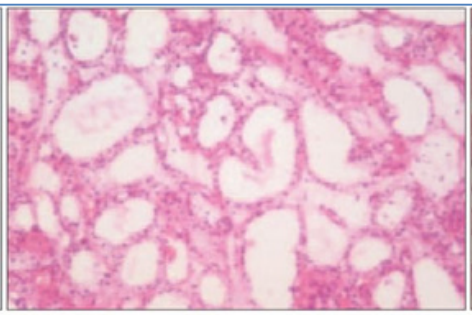


Figure 2: Small cysts lined by cuboidal cells having clear cytoplasm.

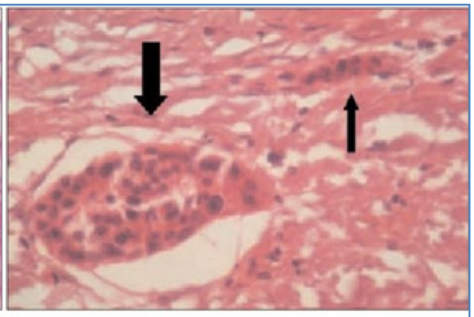


Figure 3: High power magnification showing two clusters of atypical cells showing vascular (large arrow) and soft tissue (small arrow) invasion.

Rathore, Muhammad Usman et al. *Journal of the College of Physicians and Surgeons--Pakistan : JCPSP* 23 6 (2013)

DERMOID CYSTS/TERATOMAS:

- **Aetiology:**
- o Often Congenital (Present @ Birth) – but slow-growing :. Presents later in life.
- **Pathogenesis:**
  - o Abnormal Development of the Pluripotent Germ Cells in Testes(M)/Ovaries(F)

Morphology:

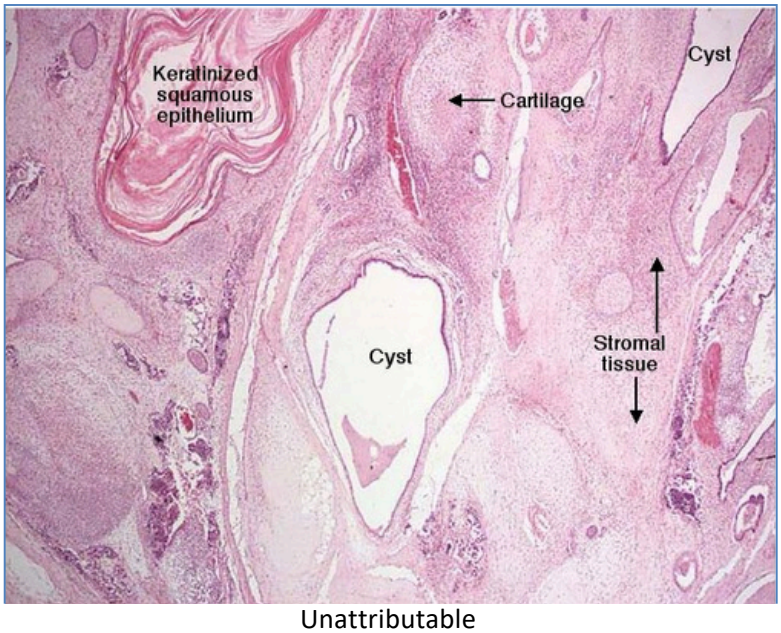
- o **Macro:**
  - § Hair, teeth, gingivae, neural tissue, fat, muscle, eye, retinal, glands etc.
  - § May be cystic
- o **Micro:** Multiple *Mature* Tissues in one tumour
  - § Encapsulated
  - §

- **Clinical Features:**
  - o **Symptoms:**
    - § Abdominal/Pelvic Pain
  - o **Diagnosis:**
    - § Imaging → Biopsy → Histology
  - o **Complications:**
    - § Torsion of Ovary (→infarction, perforation, haemoperitoneum & autoamputation)
    - § May → Paraneoplastic Syndrome (Eg: Hyperthyroidism, Morning Sickness)
- **Treatment:**
- o Surgery

Prognosis:

- o Benign Tumour

Photograph by Ed Uthman, MD., Public domain, via Wikimedia Commons



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PELVIC ORGAN PROLAPSE

PELVIC ORGAN PROLAPSE

D e fin itio n :

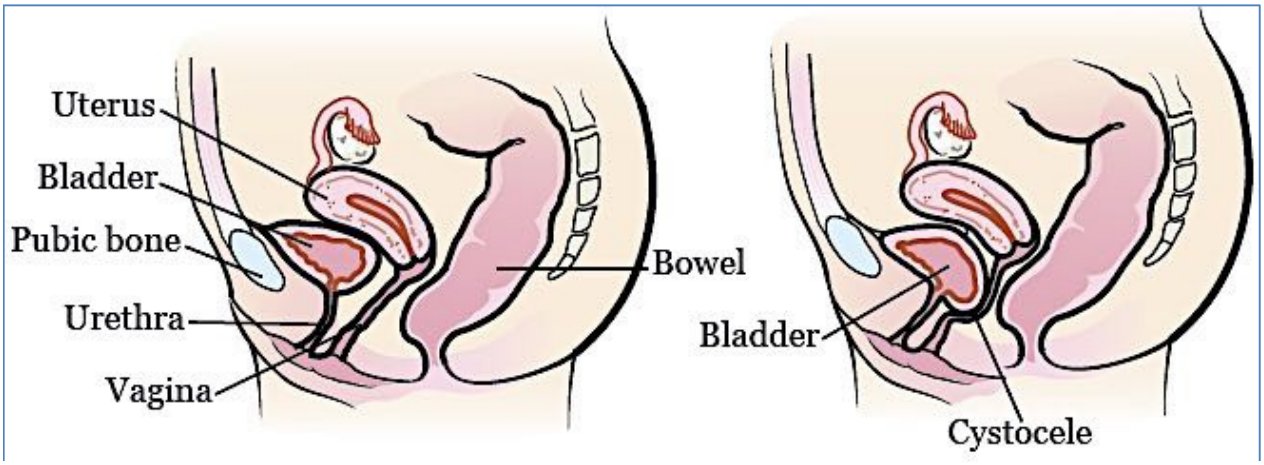
- **= "Protrusion of pelvic organs *Into/Out of* the Vaginal Canal – Due to incompetent pelvic structures"**

Aetiology:

- **Incompetent Pelvic Support Structures –** Relaxation/Weakness/Defect in Uterosacral Ligaments Due to:
  - o Childbirth
  - o Menopause/Oestrogen Deficiency
  - o Ageing
  - o Pelvic Surgery
  - o ↑Intra-Abdominal Pressure (Obesity, Chronic Coughing, Constipation)

Pathophysiology:

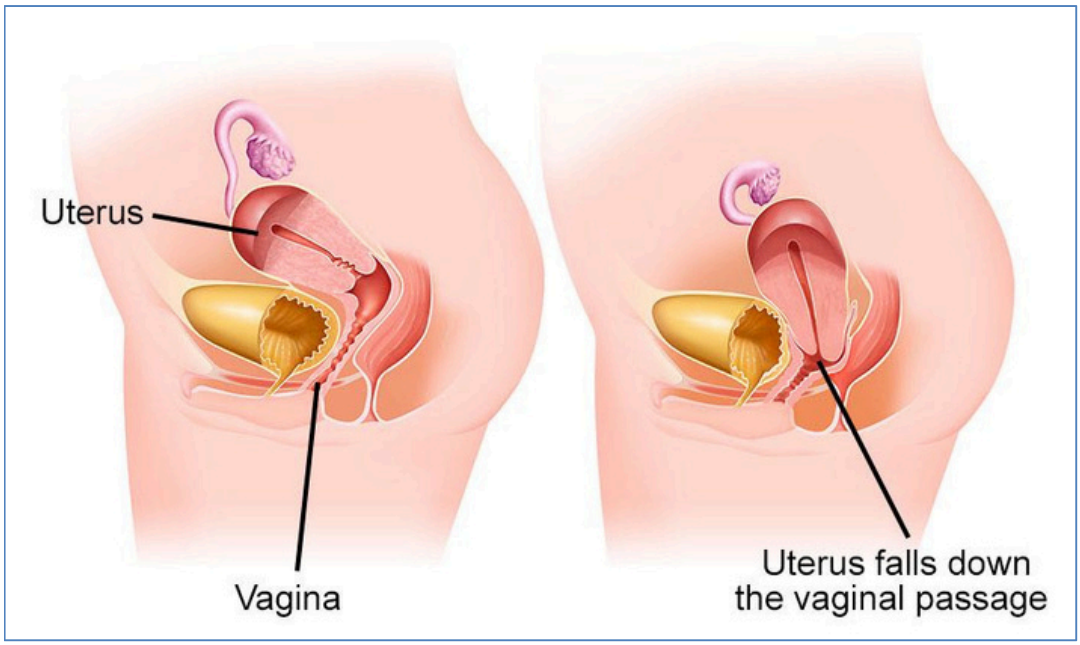
- **Incompetent Pelvic Support Structures → 3x Types of Prolapse:**
  - o ***Anterior Prolapses:***
    - § **CYSTOCOELE/CYSTOURETHROCOELE:**
      - Prolapse of the Bladder &/or Urethra into the Vagina
      - → Urinary Frequency/Urgency/Nocturia/Stress Incontinence/Retention/UTIs



https://www.mskcc.org/cancer-care/patient-education/cystocele-repair-and-sling

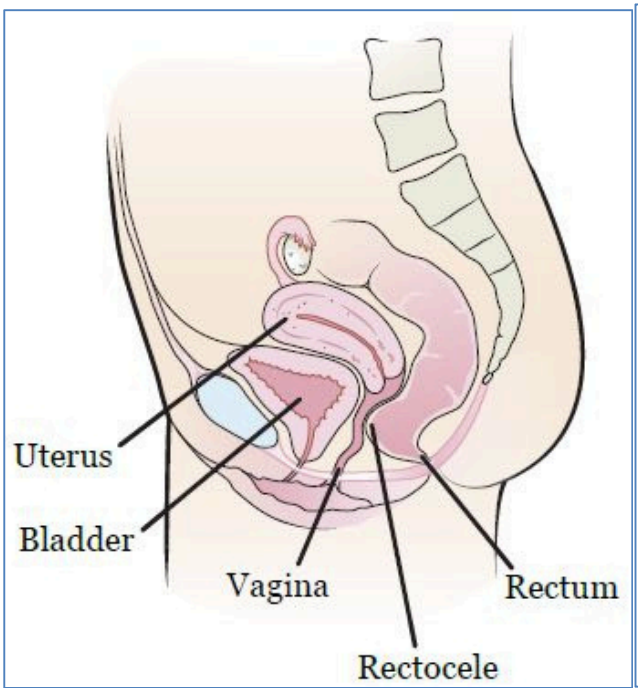
Available from: https://www.researchgate.net/figure/Anterior-vaginal-wall-mass-mimicking-a-cystocele_fig2_43341879

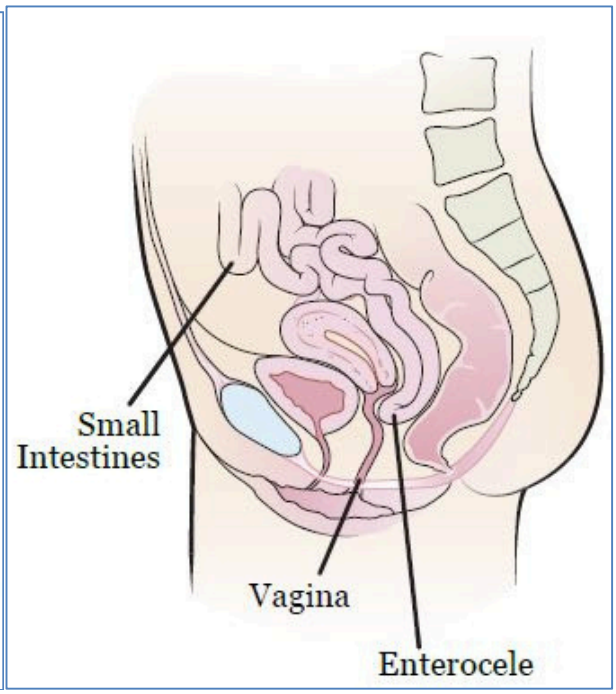
- ***UTEROCERVICAL PROLAPSE:***
  - **Prolapse of the Uterus/Cervix/Vault (Following Hysterectomy)**
  - **3 Degrees:**
    - **1: Inside the Hymen**
    - **2: Up to the Hymen**
    - **3: Beyond the Hymen**



Public Domain: https://www.healthdirect.gov.au/prolapsed-uterus

- ***Posterior Prolapses:***
  - **RECTOCOELE:**
    - Prolapse of the Rectum into the Vagina
    - → Constipation (Pt needs to reduce the rectocele via the vagina to defecate)
  - **ENTEROCOELE:**
    - Prolapse of the Intestines into the Vagina (Via the Pouch of Douglas)





https://www.mskcc.org/cancer-care/patient-education/enterocele-and-rectocele-repairs

Clinical Features:

- **Symptoms:**
  - Heaviness/Fullness/Dragging Sensations – (Worse with Standing/Lifting; Better when Supine)
  - Referred Back Pain
  - Sexual Dysfunction/Dyspareunia
  - **Urinary:**
    - Urinary Frequency/Urgency/Nocturia/
    - Stress Incontinence
    - UTIs
    - Retention
  - Constipation
- **Signs:**
  - Palpable Mass/Bulge at Introitus
  - +/- Palpable Bladder (if retention)
  - +/- Signs of Incontinence

Diagnosis:

- **Clinical Dx** – Pelvic Examination
- **REFER TO GYNAECOLOGIST**
- **CT/MRI** – To Confirm + Pre-Surgery

Treatment:

- **Non-Surgical:**
  - Ring Pessary (if not suitable for surgery – Eg: Old women)
  - Oestrogen Therapy
  - Pelvic Floor Exercises
  - Laxatives for Rectoceles
- **Surgical Repairs:**
  - **"Anterior Repair/Sling"** (For Cystocoeles & Urethrocoeles)
  - **Hysterectomy** (For Utero/Cervico Prolapses
  - **Vault Sling Repair** (For Vault Prolapses)
  - **"Posterior Repair/Sling"** (For Rectoceles & Enterocoeles)

URINARY INCONTINENCE

URINARY INCONTINENCE

Urinary Incontinence:

- **Epidemiology:**
  - o Affects 13% of Men
  - o Affects 37% of Women
  - o F:M = 2:1
- **Definition:**
- o **Incontinence =** "The Involuntary Leakage of Urine sufficient to cause Social/Hygiene Problems"

Pathophysiology:

- o **Continence Depends on 2 Things:**
  - § 1: Compliant Reservoir (Bladder)
  - § 2: Sphincter Competency (External Urinary Sphincter & Intact Pelvic Floor Supports)
- o **Types:**
  - § ***Stress*:** **On Sudden ↑ in Intra-Abdominal Pressure (Coughing/Sneezing)**
    - **Severity -** (Usually only a few drops)
    - **Causes -** (Damage/Weakness of the Pelvic Floor, Urethra or Sphincter)
    - **Risk Factors -** (Child-Bearing, Pelvic Surgery, Menopause)
    - **Diagnosis –** (Urodynamics "Stress Test")
  - § ***Urge*:** **Sudden Strong Urge to Void, but can't get to toilet soon enough.**
    - **Severity -** (Can empty the whole bladder)
    - **Causes -** (*Detrusor Instability*, Cystitis or Neurogenic)
    - **Risk Factors -** (UTIs, Poor Bladder Training, Neurological Detrusor Instability)
    - **Diagnosis –** (Urodynamics shows *Small Volume, Unstable Bladder*)
  - § ***Overflow*:** **Bladder is too full (Retention/Overdistension) → Incontinence**
    - **Severity -** (Occasional Dribbles)
    - **Causes -** (LUT-Obstruction [Eg: BPH, Stricture], Hypotonic Bladder [Diabetes,
    - Autonomic Neuropathy, Anticholinergic Drugs])
    - **Risk Factors -** (Old Age, Diabetic, Neurology)
      Diagnosis – (Urodynamics shows *Large Volume, Immotile Bladder*)
  - § ***Total/Constant*:** **Total loss of continence**
    - **Severity -** (Constant Dribbles – Requires Catheter)
    - **Causes -** (Sphincteric [Surgery, Neurology, Cancer], or Fistula bypassing Sphincter)
    - **Risk Factors -** (Pelvic Surgery, Nerve Damage, Metastatic Disease)
    - **Diagnosis –** (Clinical Diagnosis)
  - § ***Functional/Transient*: Urine loss due to functional disorder (Immobility, Dementia)**
    - **Severity -** (Depends on functional disorder)
    - **Causes -** (Immobility, Cognitive Deficits)
    - **Risk Factors -** (Immobile [Eg: Para/Quadriplegic], Dementia/Retardation)
    - **Diagnosis –** (Clinical Diagnosis)

- **Assessment:**
  - o **History:**
    - § Type of Incontinence? – (Severity? How long? How often? In What Situations? Morbidity?)
    - § Associated Syx? – (Dysuria [UTI], Faecal Incontinence, Menopausal, Prolapse)
    - § Obstetric & Gynaecological Hx? – (#.Children, Pelvic Surgeries)
  - o **Examination:**
    - § Genitourinary Abnormalities – (Prolapse, Fistulae, Infection, Palpable Bladder, Sensation)
    - § DRE – (Sensation, Anal Tone, Rectocele)
  - o **Investigations:**
    - § **Voiding Diary:** Shows Triggers, Frequency, Severity & Morbidity
    - § **Urinalysis:** Rules out Infection (Cystitis/UTI) & Renal Failure (From Urinary Retention)
    - § **Urodynamics:** Differentiates Stress/Urge/Overflow Incontinence.
    - § **Bladder USS:** Determines Pre & Post-Void Bladder Volumes (Urge Vs. Overflow)
    - § **Cystoscopy:** Ix for Cystitis & Obstructive Uropathy
      - (Can also treat Detrusor Instability – [Botox], & Cystitis – [Steroid Injection]).

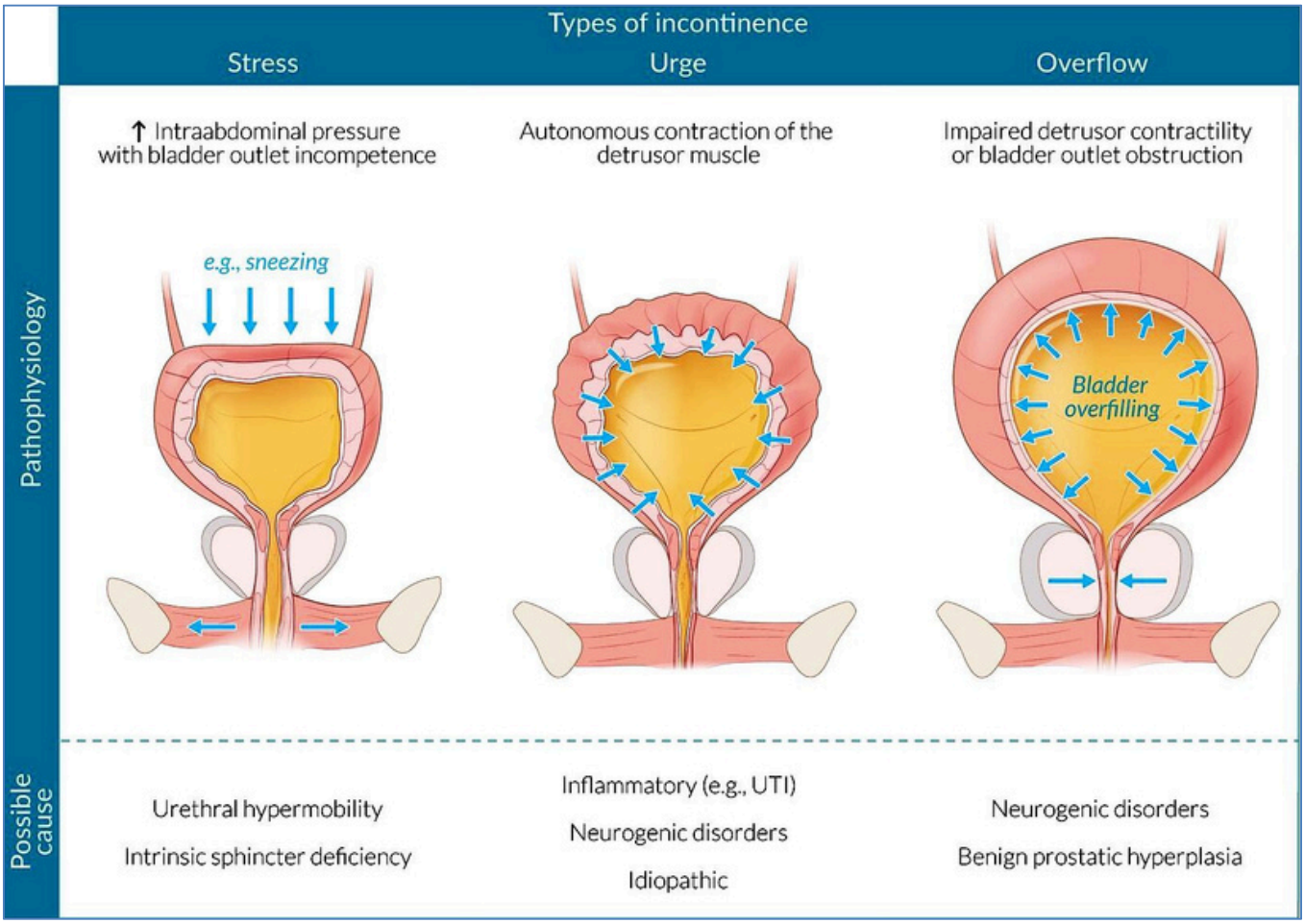
OVERFLOW INCONTINENCE:

- **Aetiology:**
  - o Urinary Flow Obstruction (Eg: BPH, Prostate cancer, Urethral strictures, Cystocoele, uterine prolapse)
  - o Detrusor Muscle disorder (Eg: Diabetic neuropathy, spinal cord injury, cauda equina syndrome, anticholinergics)
- **Pathogenesis:**
- o Urinary retention → bladder pressure increases, exceeds urethral resistance

Clinical Features:

- o Frequent loss of small amount of urine;
- o hesitancy;
- o weak/intermittent urinary stream

- **Diagnosis:**
  - o Urologic History
  - o Urodynamic studies
  - o Abdo USS to identify anatomical anomalies
- **Treatment:**
  - o Cholinergic agents (to increase bladder muscle tone)
  - o Alpha blockers (Eg: Prazosin, tamsulosin → Relax bladder neck smooth muscle)
  - o Surgery (if indicated by urologist/gynaecologist)
  - o Intermittent self-catheterisation



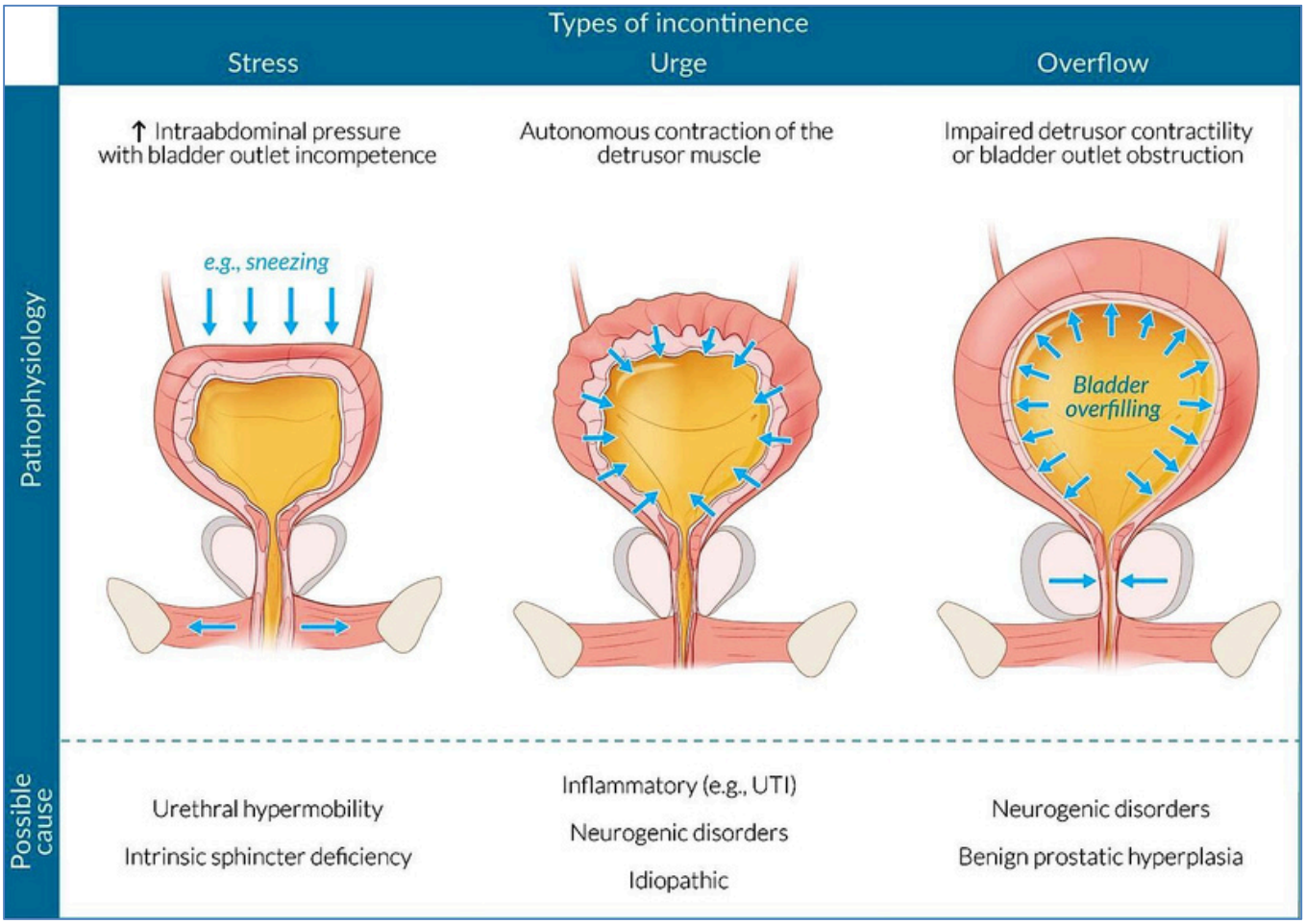
https://www.amboss.com/us/knowledge/Urinary_incontinence

SRESS INCONTINENCE:

- **Aetiology:**
  - o Pelvic Floor Weakness/laxity
  - o Most prevalent in Females <70yrs.
  - o Risk factors (Female, menopause, multiparity, pregnancy, obesity, previous pelvic surgery)
- **Pathogenesis:**
  - o Pelvic floor laxity → urethra loses support → increase in intra-abdominal pressure → overwhelms sphincter muscles
- **Clinical Features:**
- o Spurts of urine when intra-abdominal pressure increases (Eg: sneeze, cough, laugh, exercise)

Diagnosis:

- o Abdo USS to identify anatomical anomalies
- o Urodynamic studies
- o Urologic History
- **Treatment:**
  - o Oestrogen replacement therapy (HRT) for stress incontinence caused by menopause
  - o Lifestyle changes (weight loss)
  - o Kegel exercises (strengthens external sphincter and pelvic floor muscles)
  - o Surgery (Eg: Sling procedures)



https://www.amboss.com/us/knowledge/Urinary_incontinence

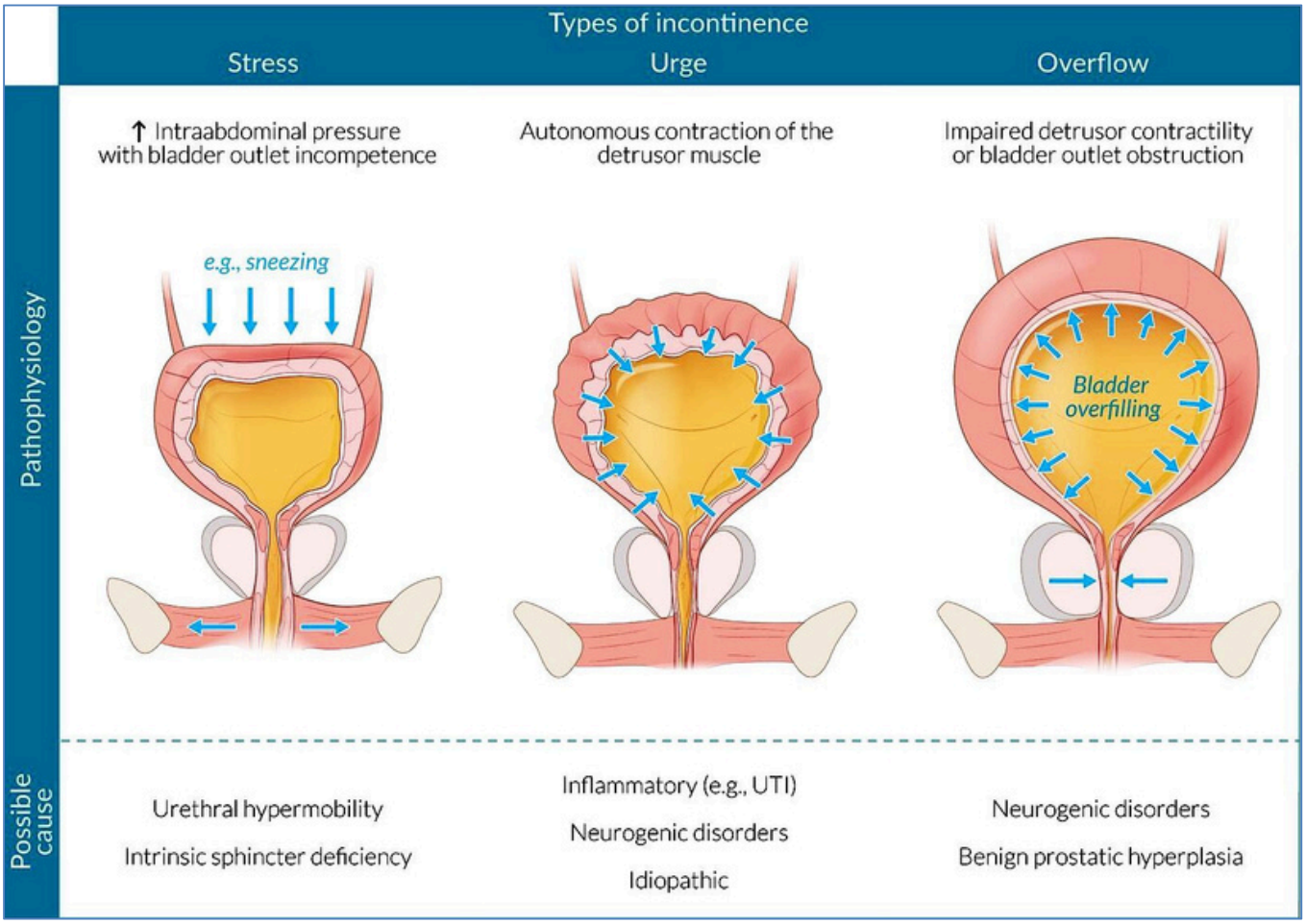
URGE INCONTINENCE:

- **Aetiology:**
  - Overactive Bladder (AKA: Detrusor Instability)
- **Pathogenesis:**
  - uninhibited detrusor muscle contracts randomly → Unintentional voiding

Clinical Features:

- Sudden/great urine leakage,
- strong/ immediate urge to void;
- frequency;
- nocturnal wetting

- **Diagnosis:**
  - Abdo USS to identify anatomical anomalies
  - Urodynamic studies
  - Urologic History
- **Treatment:**
  - Anticholinergic agents → inhibit detrusor overactivity by blocking muscarinic receptors
  - Tricyclic antidepressants (TCAs) → anticholinergic properties
  - Cystoscopic Injections with botulinum toxin → decrease detrusor muscle activity
  - Bladder Training
  - Kegel exercises
  - Sling procedures



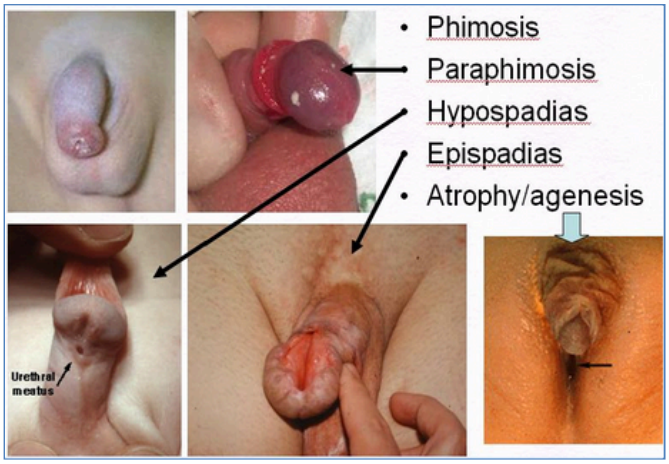
https://www.amboss.com/us/knowledge/Urinary_incontinence

CONDITIONS OF THE MALE GENITALIA

CONDITIONS OF THE MALE GENITALIA

Congenital Penile Abnormalities

- **PHIMOSIS:**
  - o **What?**
    - § Foreskin is ***Too Tight*** retract over Glans.
  - o **Why?** Congenital
    - § Or Repeated Infection → Fibrosis/Scarring of Preputial Ring.
    - §
  - o **Outcome?**
    - § Phimosis Interferes with Cleanliness → Secondary Infections and Carcinoma
- **PARAPHIMOSIS:**
  - o **What?**
    - § Foreskin becomes trapped behind the Glans Penis & Cannot be Pulled Back.
  - o **Why?** Congenital Phimosis
    - § Or Foreskin is Retracted for Too Long → Oedematous → Difficult Reduction
    - §
  - o **Outcome?**
    - § Can → Ischaemia of Glans Penis → Gangrene → Loss of Penis
    - § (:. Medical Emergency)
- **HYPOSPADIAS & EPISPADIAS:**
  - o **What?**
    - § Malformation of Urethral Groove/Canal/Opening – Either on Ventral Surface (*Hypospadias – Most Common*) or on the Dorsal Surface (*Epispadias*)
  - o **Why?**
    - § Congenital
    - § (Note: Statistically associated with Cryptorchidism)
  - o **Outcome?**
    - § Can → Urinary Obstruction → ↑Risk of UTI +/- Ascending.
    - § Also → Abnormal Ejaculation and Insemination.
- **PENILE ATROPHY/AGENESIS:**
  - o **What?**
    - § Male born without a Penis
  - o **Why?** Congenital (1/6000000)
    - § Often Secondary to *Testicular Agenesis* → No Testosterone → No Male Organs
    - §
  - o **Outcome?**
    - § Absence of Urinary Outlet → Requires Surgical Redirection of Urethra
    - § If Testicles are Present → Normal Male Appearance
    - § If Testicles are Absent → Maintained Pre-Pubescent Appearance



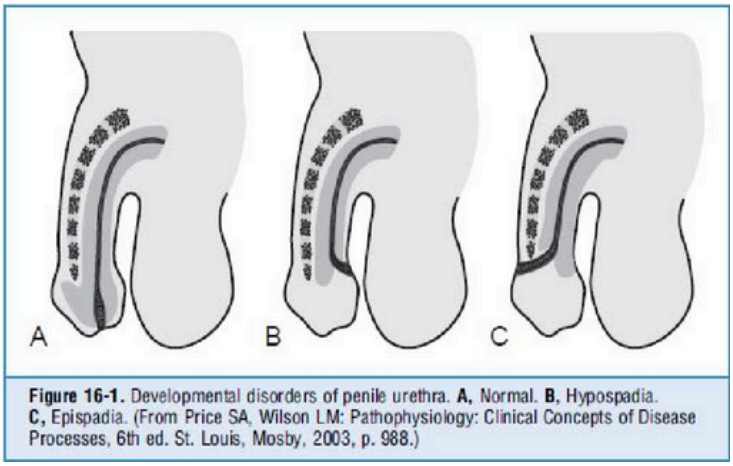


Figure 16-1. Developmental disorders of penile urethra. **A,** Normal. **B,** Hypospadia. **C,** Epispadia. (From Price SA, Wilson LM: Pathophysiology: Clinical Concepts of Disease Processes, 6th ed. St. Louis, Mosby, 2003, p. 988.)

Unattributable

CRYPTORCHIDISM:

- **Aetiology:**
- o Unknown
- **Pathogenesis:**

o Failure of the Intra-Abdominal Testes to descend into scrotal sac

Clinical Features:

o Testicle is undescended (Absent from the scrotum)

§ Note: 90% are palpable in inguinal canal

o Usually unilateral

o **Completely Asymptomatic* – Always incidental discovery.

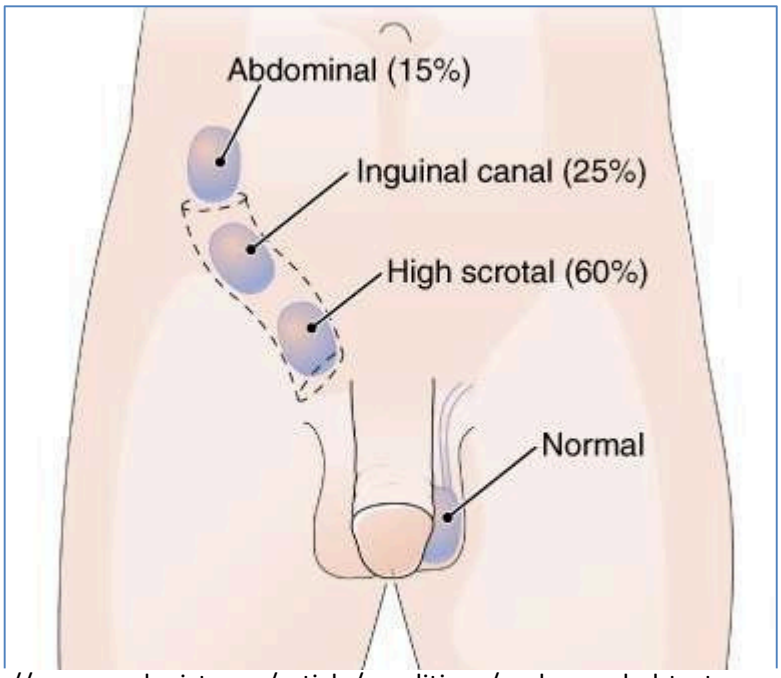
o Most Inguinal Testes descend spontaneously by 1yr, & those that remain require surgical correction before histological deterioration sets in at 2yrs

o **Complications:**

§ GREATLY INCREASED RISK OF TESTICULAR CANCER (3-5x)

§ May → Sterility

§ Testes in Inguinal Canal are Vulnerable to Trauma/Crushing against ligaments.



https://www.urologists.org/article/conditions/undescended-testes-pediatric

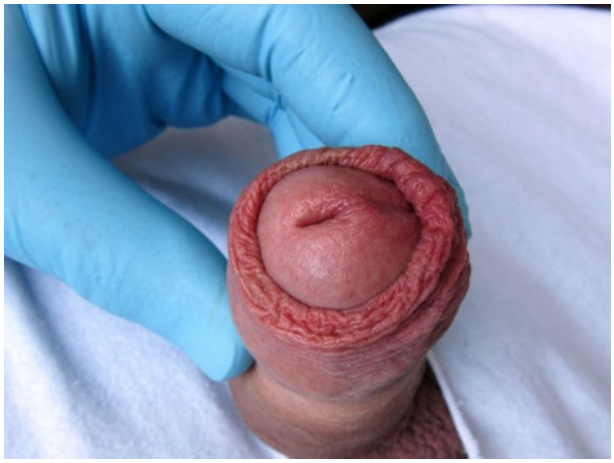
BALANITIS & BALANOPOSTHITIS:

- ***Balanitis*** = Inflammation of the Glans Penis Only
- ***Balanoposthitis*** = Inflammation of the Glans & Prepuce
- **Aetiology:**
  - **Many Possible Causes:**
    - **Infection – Staph, E.coli, Gonorrhoea, Candida**
    - Environmental Irritation
    - Physical Trauma
  - **Risk Factors:**
    - Phimosis
    - Underwashing of Underneath Foreskin
    - Overwashing of Underneath Foreskin
    - Poorly-Controlled Diabetes (Candida)
- **Morphology:**
  - Redness of Glans (Balanitis & Balanoposthitis)
  - Redness of Glans & Prepuce (Balanoposthitis)
- **Clinical Features:**
  - **Symptoms:**
    - 1: Small, Red Erosions on the Glans
    - 2: Redness of Glans (Balanitis & Balanoposthitis)
    - 3: Redness of Glans & Prepuce (Balanoposthitis)
    - 4: Pain
  - **Complications:**
    - May → Phimosis (Scarring of Preputial Ring)
- **Management:**
  - **Antibiotics**
  - **↑Self-Hygiene**

Balanitis

https://www.nidirect.gov.uk/conditions/balanitis

Balanoposthitis



MFN24, CC0, via Wikimedia Commons

DYSPLASIAS OF THE PENIS:

- **Erythroplasia of Queyrat:**
- o = Dysplasia on the Glans Penis
- **Bowen's Dysplasia:**
- o = Dysplasia on the Shaft of the Penis
- **Aetiology:**
  - o HPV Types 16 & 18 – The Cancer Ones! (Cf. 6/11 – Genital Warts, & 18/45 – Cervical Ca.)

Pathogenesis:

- o Virus-Induced DNA damage → Dysplasia

Morphology:

- o Red patch
- o Indurated on Palpation

- **Clinical Features:**
  - o Asymptomatic
  - o Chronic - present for long time.
  - o **Complications:**
    - § Dysplasia is Premalignant → Can → Squamous Cell Carcinoma.

Premalignant male genital dermatoses. Indian Journal of Sexually Transmitted Diseases and AIDS. 2019 Jul-Dec;40(2):97-104. DOI: 10.4103/ijstd.ijstd_106_17

CARCINOMA OF THE PENIS:

- **Aetiology:**
  - HPV Types 16 & 18 – The Cancer Ones!
  - Risk Factors – Phimosis, Poor Hygiene
  - (Note: Some evidence to suggest Circumcision is Preventative)
- **Pathogenesis:**
  - Virus-Induced DNA damage → Dysplasia →
    - → Erythroplasia or Leukoplasia
    - → Carcinogenesis

Morphology:

-
  - **Macro:**
    - Malignant Ulceration
  - **Micro:** Well-Differentiated Squamous Cell Ca.
    - Epithelial pearls
    -
- **Clinical Features:**
  - **Syx:** Redness, Irritation, Ulceration
  - **Complications:** Spreads to Inguinal & Iliac Lymph Nodes First → Metastasis
- **Rx: *Surgery** (Radical or Conservative) + Adjuvant Radiotherapy/Chemotherapy.

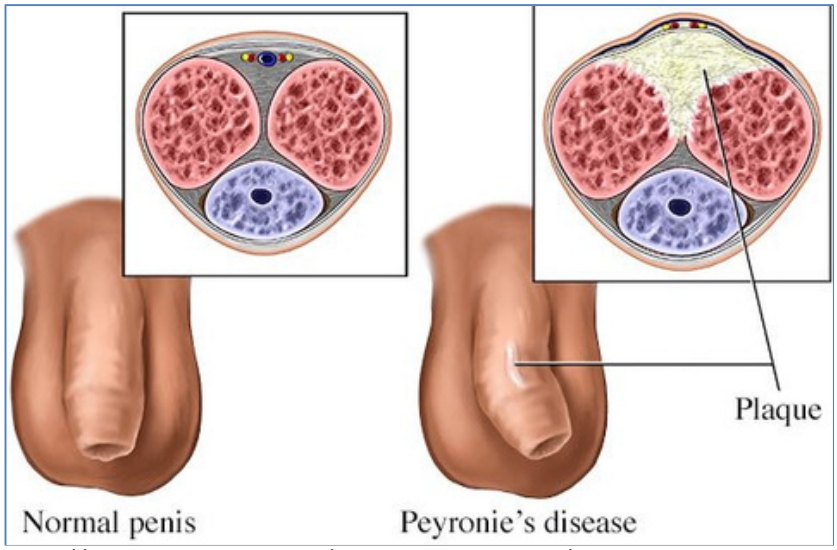
Treatment of squamous cell carcinoma in situ of the penis with 5% Imiquimod cream; DOI: https://doi.org/10.1067/mjd.2002.126580

PEYRONIE'S DISEASE:

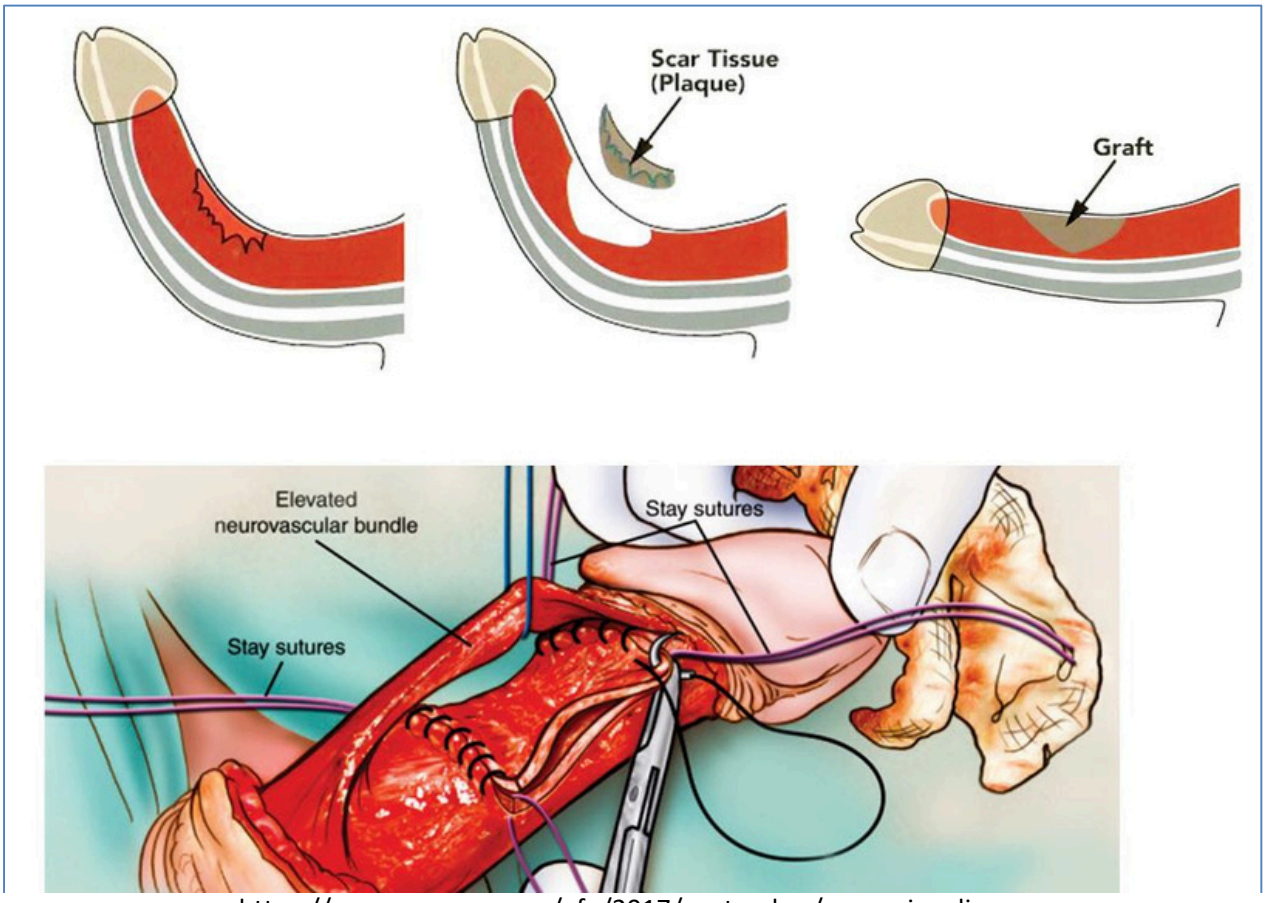
- **Aetiology:**
  - Unknown
  - Note: 25% Association with Dupuytren's Contracture
- **Pathogenesis:**
- o Focal Fibrosis & Contraction of the Tunica Albuginea → Bent Penis
- **Morphology:**
  - o Manifests as a bent penile shaft.

Clinical Features:

- o o Bent Penis
- o Recurs after surgical removal Painful Erection



https://www.dcurology.net/common-problems/peyronies-disease.php



https://www.racgp.org.au/afp/2017/september/peyronies-disease

CONDITIONS OF THE PROSTATE

CONDITIONS OF THE PROSTATE

Prostate Diseases:

- **Typical Locations of Prostate Disease:**

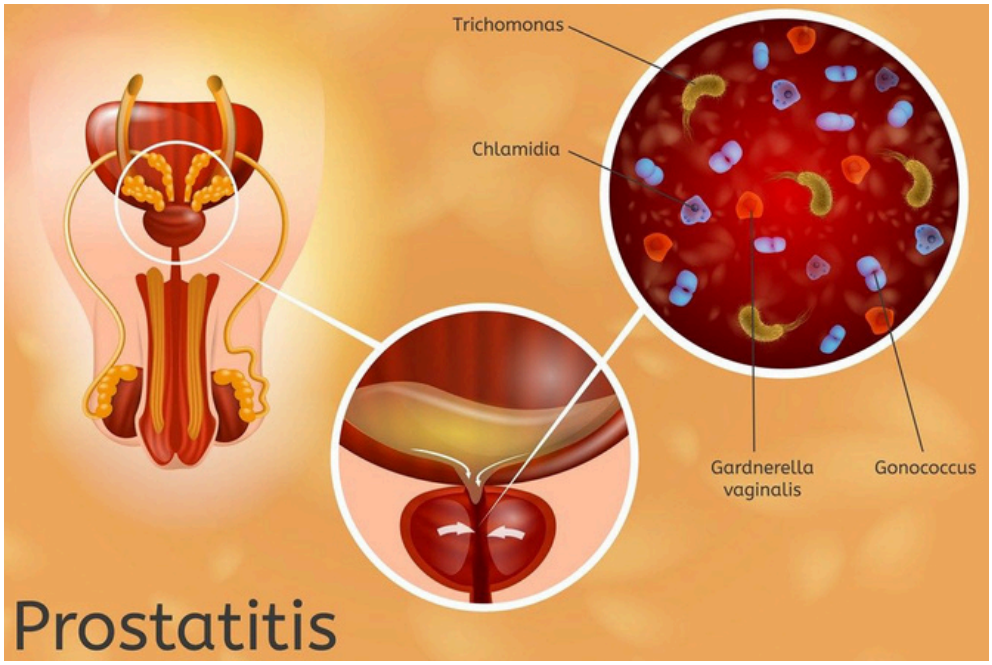
Enlargement:	Disease:	Aetiology:	Morphology:	Clinical:
Diffuse (All Lobes)	Prostatitis	Infective (Inflammation)	Red, Oedematous & Inflamed	Rectal Pain, Dysuria, Obstructive Uropathy
Median Lobe (:. Obstructs Urine)	BPH	Hormone-Mediated Hyperplasia	Smooth, Firm & Nodular Hyperplasia. Median Groove is Preserved.	Urinary Voiding Symptoms (Nocturia, Urgency, Hesitancy, Dribbling, Incomplete voiding). PSA Usually Normal.
***Lateral/Posterior* Lobe** (:. No Urine Obstruct)	Prostate Ca.	Neoplasia	Adenocarcinoma. Hard, Stony, Irregular, Fixed Masse/s. Loss of Median Groove.	Usually Asymptomatic. No Urinary Voiding Syx. Late → Osteoblastic Lesions, Weight Loss, Metastatic Complications. Elevated PSA.

PROSTATITIS:

- **Aetiology:**
- o Infective – Bacterial

  Pathogenesis:
  - o **Acute suppurative prostatitis:**
  - o § E.coli, rarely Staph or N. gonorrhoeae

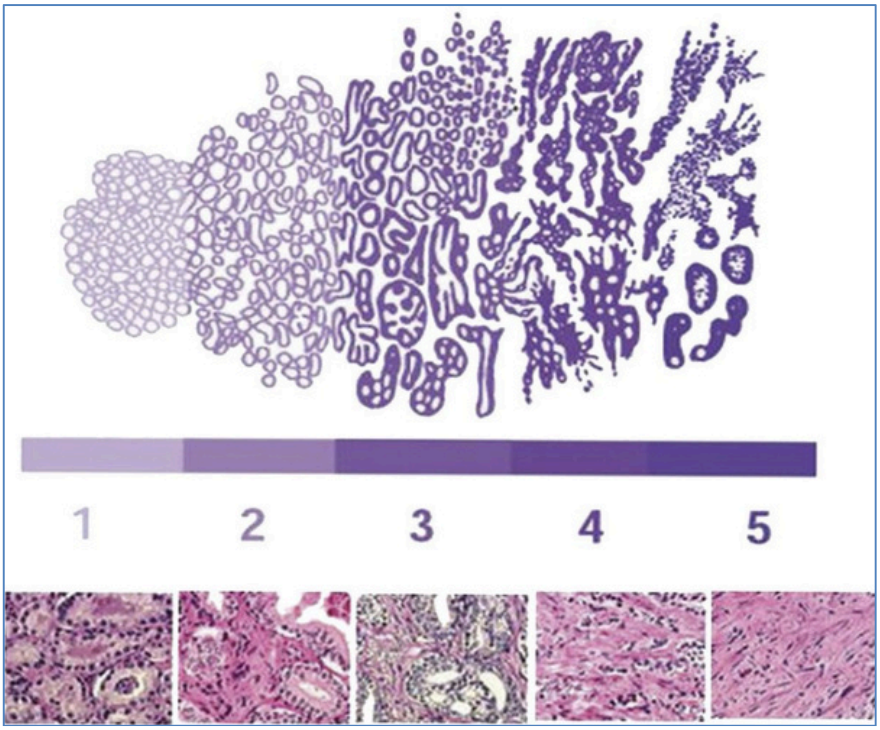
    Chronic non-specific prostatitis:
    - § Recurrent acute → fibrosis, lymph + plasma.
  - o **Granulomatous prostatitis-**
    - § BPH, infarction, post TURP, idiopathic, TB, or allergic(eosinophilic).
- **Clinical Feature:**
  - o Similar to BPH – (Urinary Obstruction/Dysuria/Frequency/etc)
  - o + Rectal Pain
  - o + Fever, Malaise
- **Management:**
  - o Antibiotics – Eg: Ciprofloxacin. ; IVABs if severe.
  - o Alpha blockers – Relax bladder neck to ease dysuria
  - o NSAIDs



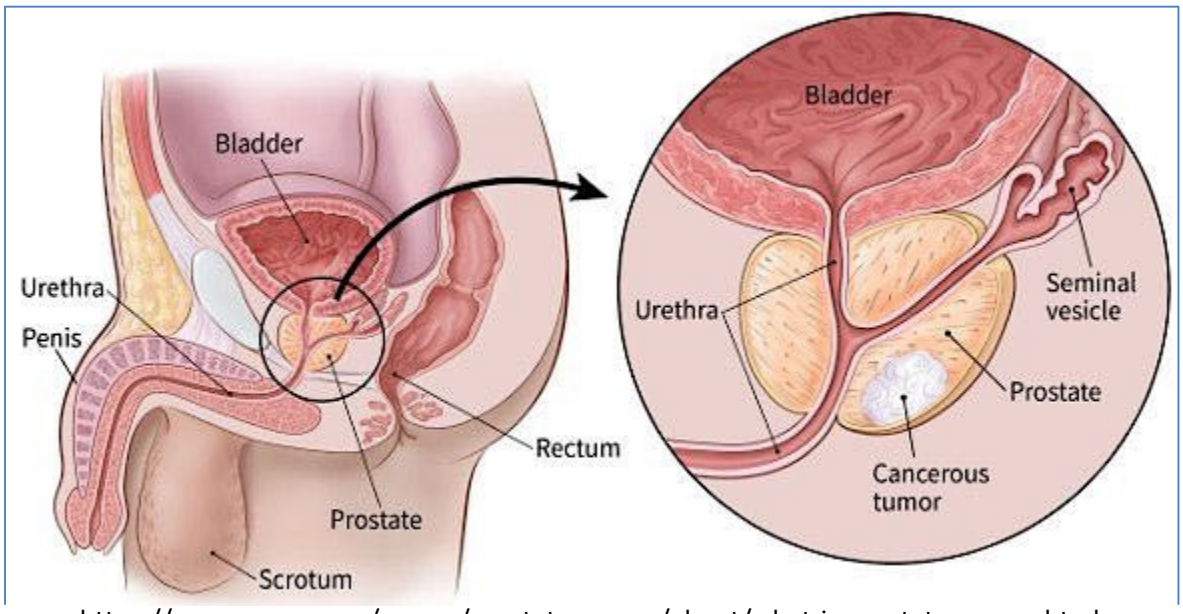
https://www.steadyhealth.com/medical-answers/prostatitis-isnt-always-obvious

PROSTATE ADENOCARCINOMA:

- (Most common cancer in elderly males. Rare before 50yrs, but seen in >70% of men over 70yrs)
- **Aetiology:**
  - o Aetiology unknown - Hormones, genes & environment most likely.
  - o (***NOT*** BPH)
- **Pathogenesis:**
  - o Initially PIN (Prostatic Intraepithelial Neoplasia) – *Multilayered* – Not yet cancer
  - o Then Adenocarcinoma – *Single-Layered* - Cancer
- **Morphology:**
  - o *Lateral/Posterior Lobe* (:. No Urine Obstruct)
  - o Hard, Stony, Irregular, Fixed Masse/s.
  - o Loss of Median Groove.
- **Clinical Features:**
  - o **Symptoms:**
    - § Usually Asymptomatic.
    - § Urinary Voiding Syx.
    - § Late → Weight Loss, Metastatic Complications.
- **Diagnosis:**
  - o **Elevated PSA = *BAD*: Poor Sensitivity, Poor Specificity.**
    - § 4.0ng/L = Upper Limit of Normal
    - § Elevated in: Prostate Damage, Malignancy, Post Ejaculation, Post DRE, Non-Pathology
  - o **Positive Biopsy = Reasonable: Poor Sensitivity, High Specificity**
  - o **DRE = Reasonable: Reasonable Sensitivity, Reasonable Specificity**
    - § Normally = soft, rubbery, with a median groove.
    - § Malignancy = hard, gritty, fixed tumor + Loss of median groove.
  - o **Imaging (US/CT/MRI) = Good: Good Sensitivity if Macroscopic, Good Specificity**
- **Grading - Gleason Scale (1-5):**



- **Treatment:**
  - o **Watch & Wait** (If elderly with multiple comorbidities)
  - o **Surgical** (Radical/Partial Prostatectomy) Note: → Impotence & Incontinence.
  - o **Radiotherapy** (External Beam, or Brachy)
  - o **Chemotherapy** (Hormonal – Antitestosterone Drugs)
  - o **Palliative Chemo + Analgesia** (If advanced/metastatic)
- **Prevention:**
  - o **Screen 2yrly for 50+yrs**
  - o **Screening Procedures – (**Digital Rectal Exam (DRE), PSA**)**.



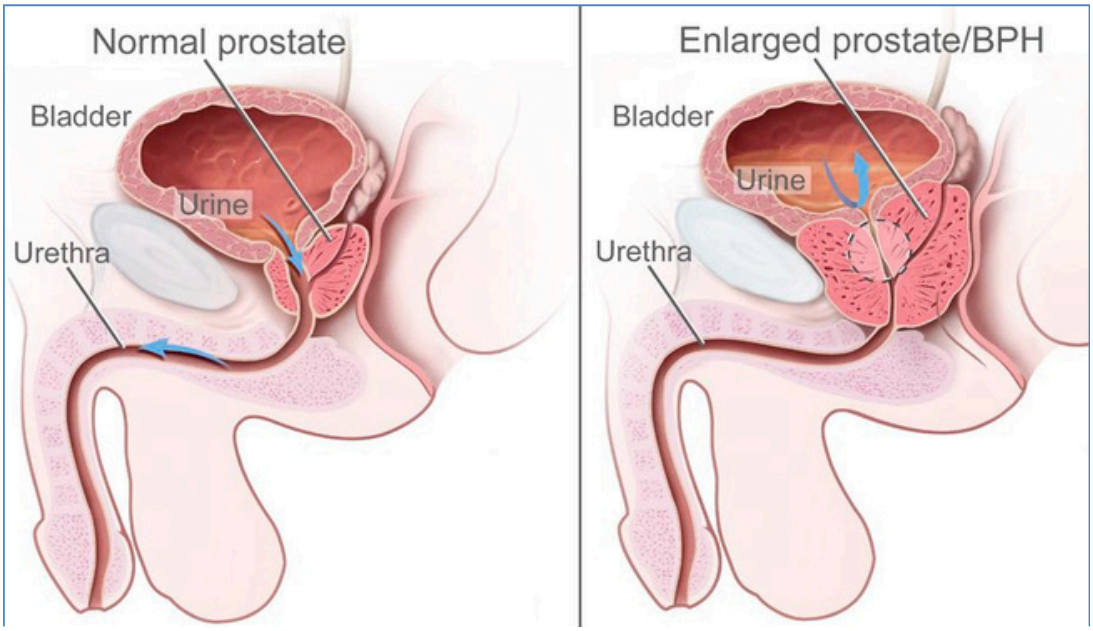
https://www.cancer.org/cancer/prostate-cancer/about/what-is-prostate-cancer.html

BPH – (BENIGN PROSTATIC HYPERTROPHY):

- **Aetiology:**
  - o **Non-Neoplastic Hormone-Induced Hyperplasia**
  - o **Old Age – (**75% among men aged 70-80years**)**
- **Pathogenesis:**
- o **Hormone-Induced (Androgen) Hyperplasia (Note: Castration → no BPH):**

Morphology:

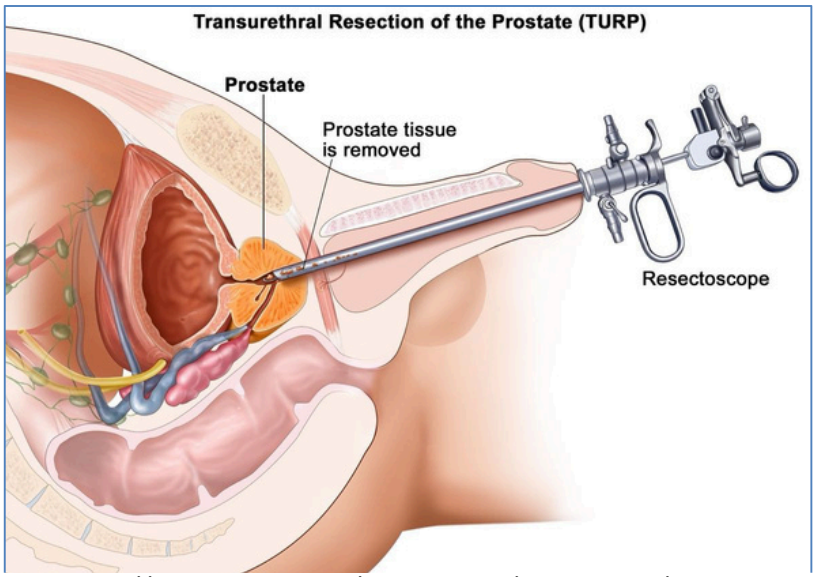
- o **Smooth, Firm & Nodular Hyperplasia.**
  - § Median Groove is Preserved.
  - § Encroaches Into Bladder → ***Ball-Valve Mechanism*** → **Urinary Retention**
- o **Bladder Wall Hypertrophy & Hydronephrosis**



Unknown author, Public domain, via Wikimedia Commons

- **Clinical Features:**
  - o **Lower Urinary Obstruction Symptoms – (***Urgency, Frequency, Dribbling, Nocturia, ↓Flow***)**
- **Treatment:**
  - o ***Finasteride*** **(5-α-Reductase Inhibitor)**
  - o **Surgery (*TURP*)** = Trans-Urethral Resection of the Prostate **(Note: Can → Impotence)**
- **Com plications:**
  - o **UTI** → Cystitis → Inflammation.
  - o **Bladder Diverticuli** → (May even rupture → Uroperitoneum).

TURP



Public Domain: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/turp

CONDITIONS OF THE TESTES

CONDITIONS OF THE TESTES

EPIDIDYMO-ORCHITIS:

- **Aetiology:**
  - o ***Non-Gonococcal** (*Chlamydia*) – (Most Common ~50%)
  - o **Gonococcal** (*Neisseria gonorrhoeae*)
  - o (Children – *Mumps*)
- **Pathogenesis:**
  - o Infection of the Epididymis & Testis (Via Urethra or Haematogenous) → Inflammation of Epididymis & Testis → Pain + Infective Symptoms
- **Morphology:**
  - o **Macro:**
    - § Swollen, hot, acute inflammation, oedema
  - o **Micro:** Just Oedema, & neutrophilic inflammation + some necrosis
    - §
- **Clinical Features:**
  - o **Symptoms:**
    - § Gradual Onset SEVERE Testicular Pain – Unilateral +/- Radiation to Inguinal Area
    - § Erythema/Oedema of the scrotum
    - § Urethritis, Dysuria, & Discharge
    - § Fever, Urethritis, Dysuria
- **Diagnosis:**
  - o **Doppler Ultrasound** - Exclude torsion/trauma
  - o **FBC** – Infection?
  - o **Microbiology** - MCS, Elisa, PCR, etc
- **Treatment:**
  - o **Antibiotics**
  - o **Analgesia**

Source: https://www.gponline.com/journals-watch-epididymo-orchitis-utis/palliative-end-of-life-care/palliative-end-of-life-care/article/1035226

TESTICULAR ATROPHY:

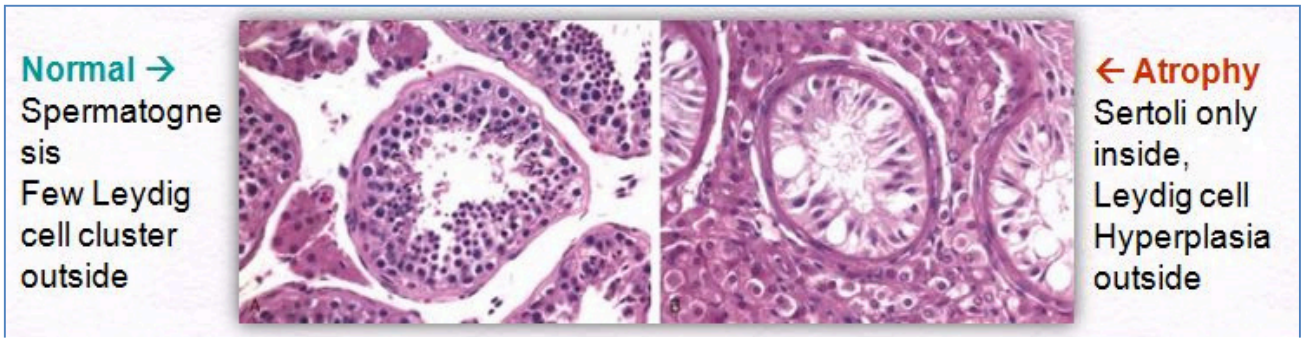
- **Aetiology:**
  - o Hypopituitarism
  - o Chronic Alcoholism
  - o Chronic Liver Disease
  - o Chemotherapy/Radiation
  - o Chronic Anabolic Steroid Use.
- **Pathogenesis:**
- o No Spermatogenesis, Atrophy of Sertoli Cells, & Leydig Cell Hyperplasia
- **Morphology:**
  - o Shrunken Testicle

Clinical Features:

- o **Investigations:**
  - § USS of testicles (look for abnormalities & blood flow)
  - § Swabs or urine tests for STI's
  - § Hormone level tests
- o **Complications:**
  - § High risk of Testicular Cancer
  - § Higher risk of testicular torsion

- **Treatment:**
  - o Hormone replacement therapy if low androgen levels.
  - o Regular self-testicular assessment for lumps (screening for testicular cancer)

https://webpath.med.utah.edu/MALEHTML/MALE082.html



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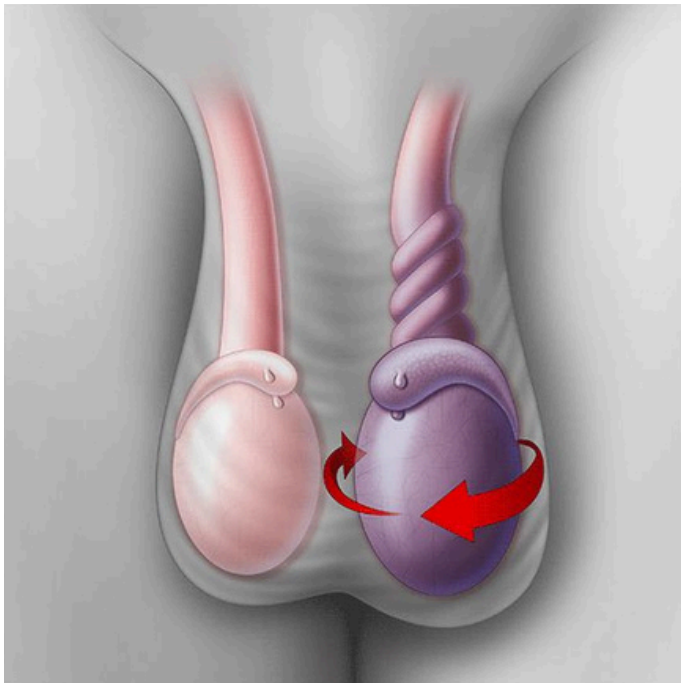
TORSION OF THE TESTIS:

- **Aetiology:**
  - o 90% - Congenital Free-Floating Testis – ("Bell Clapper Deformity")
  - o Precipitated by exertion, contraction of the cremaster muscle, or at rest.
- **Pathogenesis:**
  - o Twisting of spermatic cord on its axis → Obstructs Venous Outflow → Ischaemia → Gangrenous & Haemorrhagic Necrosis of testis → Dark, blackish discoloration
- **Morphology:**
  - o **Macro:**
    - § Dark, blackish discoloration of Testis
  - o **Micro:** Haemorrhagic Necrosis
    - §
- **Clinical Features:**
  - o Typically in either <1yrs or in Teenagers.
  - o **Symptoms:**
    - § Acute Onset Extreme Unilateral Testicular Pain (Relieved upon Passive Elevation)
    - § Swollen, Hard, Retracted Testis.
- **Diagnosis:**
  - o Doppler Ultrasound (No Blood flow)
  - o Absent Cremasteric Reflex
  - o Positive Sign = Elevation of scrotum relieves pain
- **Complications:**
- o Loss of Testicle

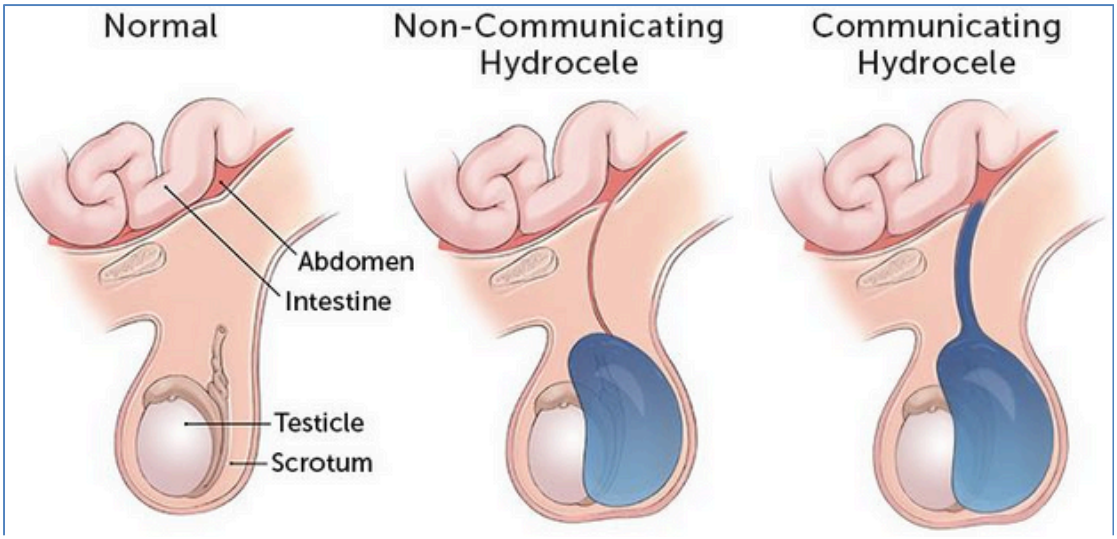
Treatment:

- o **Surgical Emergency <6hrs** (Note: <12hrs → 50% chance of Saving the Testis)
- o **Manual Detorsion with Analgesia**
- o **Orchidectomy of Dead Testicle** to prevent Gangrenous Infection



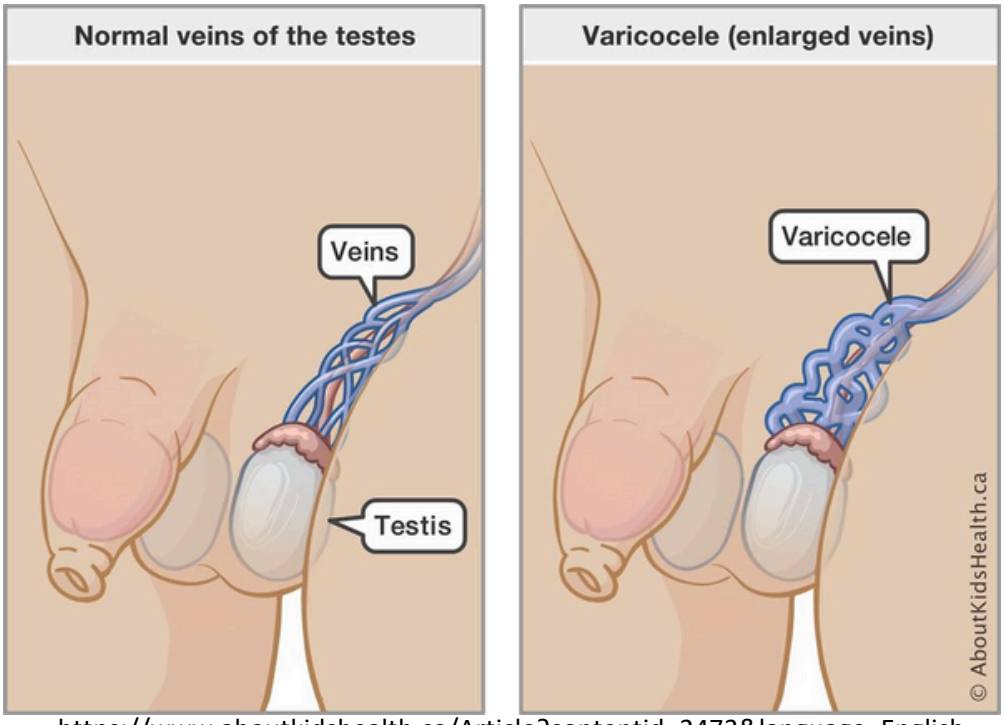
SCROTAL ACCUMULATIONS

- **HYDROCOELE:**
  - o **What?** – Clear Serous Fluid accumulation in Tunica Vaginalis (Surrounding Testis)
  - o **Why?** – Congenital (Incomplete Obliteration of Processus Vaginalis); or 2o to Infection.
  - o **Outcome?** – Displaced Testes & Testicular Atrophy if Untreated.



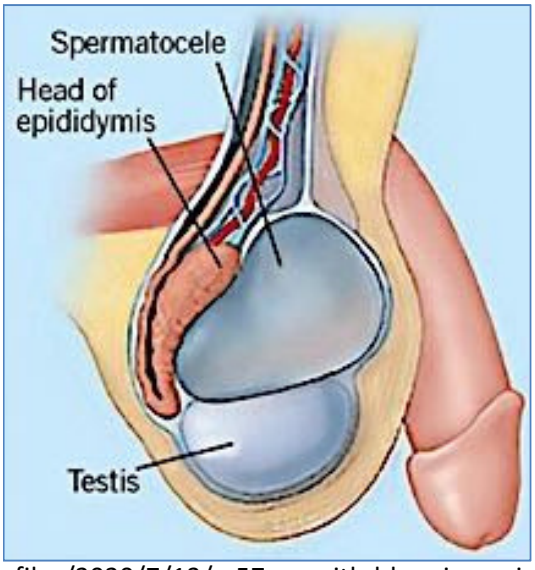
https://www.childrenshospital.org/conditions-and-treatments/conditions/h/hydrocele

- **VARICOCOELE**
  - o **What?** – Engorged spermatic cord veins (Pampiniform plexus)
  - o **Why?** – Incompetent Valves in Pampiniform Plexus → Varicosity
  - o **Outcome?** – Common cause of infertility/oligospermia



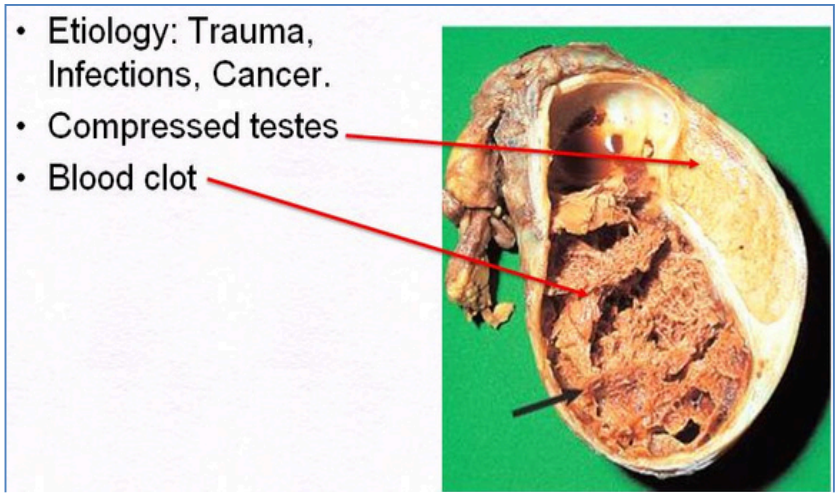
https://www.aboutkidshealth.ca/Article?contentid=2473&language=English

- **SPERMATOCOELE**
  - o **What?** – Sperm-Filled Cyst on the Head of the Epididymis
  - o **Why?** – Epididymis dilatation due to Trauma/Infection
  - o **Outcome?** – Treatment not necessary unless Large or Pt. Discomfort. Note: Surgery may lead to Infertility in that Testicle.



https://everydayebm.org/naunheim-files/2020/7/13/a-57-yo-with-l-hemiparesis-complains-of-scrotal-swelling-you-notice-three-masses-in-the-scrotal-sac

- **HAEMATOCOELE**
  - o **What?** – Blood in the tunica vaginalis
  - o **Why?** – Any trauma/tumours→ Bleeding
  - o **Outcome?** – If Untreated → Compressive Testicular Atrophy



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TESTICULAR TUMOURS

Germ Cell Tumours of the Testis:

- **Aetiology:**
  - Idiopathic/Undescended Testes/Oestrogens

Common Clinical Features:

- **Symptoms:**
  - *Painless* Enlargement – (Typically Unilateral)
  - May → Hydrocele
- **Complications:**
  - Metastasis → Retroperitoneal Masses
  - Gynaecomastia

- ***SEMINOMA*** **- 40% - (Adults):**
  - **Pathogenesis:**
  - Malignant Transformation of Germ Cells (Spermatogonia)

    Pertinent Clinical Features:
    - **Epi:** Commonest in 30-50yrs
  - **Dx:** No serological Tumour Markers for Seminoma
  - **Rx:** Surgery, Radiation, Chemotherapy
  - **Prog:**
    - Behaves like a benign tumour grossly, but is Malignant.
    - Malignant, but Highly Responsive to Treatment
    - Great Prognosis – 40-50yrs
    - 90% Cure Rate

- ***NON-SEMINOMA GERM-CELL TUMOURS (NSGT) - Embryonal Carcinoma*** **- 25% - (Children):**
  - **Pathogenesis:**
  - Malignant Transformation of Yolk-Sac Cells

    Pertinent Clinical Features:
    - **Epi:** Children <4yrs
  - **Dx:** Elevated AFP (Alpha-Fetoprotein) & hCG Tumour Markers
  - **Rx:** Surgery + Chemotherapy
  - **Prog:**
    - Highly Malignant
    - Metastasis Common
    - Poor Response to Treatment (Cf. Seminoma)

- **Note: TERATOCARCINOMA - multiple types of tissue**

https://webpath.med.utah.edu/MALEHTML/MALE089.html

(GYNECOMASTIA):

- **Aetiology:**
  - o Imbalance of Oestrogens (Breast Stimulants) & Androgens (Breast Retardants)
    - § Puberty Old Age Hepatic Cirrhosis, Alcohol,
    - § Testicular Atrophy, Testicular Cancer
    - § Anabolic Steroids,
    - § Klinefelter's XXY Syndrome,
    - § Hyperthyroidism, Anti-
    - § Testosterone Treatment for Prostate Ca.
    - §
    - §
- **Pathogenesis:**
  - o Imbalance of Oestrogens (Breast Stimulants) & Androgens (Breast Retardants) → Hypertrophy of Rudimentary Breast Tissue in Male Breast
- **Morphology:**
  - o **Macro:**
    - § Adolescent-Female-Like Breasts
  - o **Micro:** Duct (Epithelial) & Stromal (Fibrous) Hyperplasia
    - § Note: NO acini
    - §
- **Clinical Features:**
  - o Breast tissue enlargement in men.
- **Management:**
  - o **Anti-Oestrogens**
    - § Eg: Tamoxifen
    - § Eg: Raloxifene
    - § Eg: Clomifine
  - o **Breast Reduction Surgery**

SEXUALLY TRANSMITTED INFECTIONS

SEXUALLY TRANSMITTED INFECTIONS

General STI History-Taking:

- **Determine:**
  - Overall health of Patient (Incl. Psycho-social Hx)
  - Risk of Exposure to an STI/BBV
  - Who else has been at risk (Partners)
- **You need to:**
  - be Non-Judgemental
  - Recognise Signs and Symptoms
  - Know what is normal
  - be clear about sexual behaviour
- **If no time a quick history……**
  - When did you last have unprotected sex?
  - Was that with a regular partner (male or female)?
  - When was your last sex with anyone else?
  - Ever had an STD?
  - OR Have you had sex with any one different in the last 3 months?
  - Do you wonder whether your partner has any other partners?
  -

General STI Examination:

- Weight, BP, Temp
- Skin/Mouth/Pharynx
- Lymph Nodes for Lymphadenopathy - cervical, axillary, inguinal
- Abdomen - masses, tenderness
- Pubic Area:
  - Genital skin for rashes, ulcers, lumps
  - Shaft/Glans/Coronal Sulcus
  - Urethral orifice for rashes, lumps, discharge
  - Scrotum + contents
  - Perianal area
  - Proctoscopy
- **Testing In women**
  - ECS (Endocervical Swab) and a HVS (High Vaginal Swab) ideally (Otherwise consider a self-administered vaginal swab)
  - Tampon testing
  - Consider throat swabs

General Approaches to STI Treatment:

- **Prophylaxis:**
  - Pre-exposure Prophylaxis (pregnancy HBV, HIV)
  - Post-exposure Prophylaxis (HIV, HBV, Epidemiological Treatment of Partners)
- **Aetiology based treatment (Lab diagnosis)**
- **Syndromic Management**

Contact tracing or Partner Notification.

- All partners within 60 days
- Avoid intercourse until symptoms cease
- Maintain Confidentiality of the index case
- **3 Approaches:**
  - – patient does it themselves
  - – provider does it for the patient
  - – conditional referral

GENITAL HERPES SIMPLEX:

- **Aetiology:**
  - **HSV2** in Genital Herpes **(12.5% Prevalence!!)**
  - (HSV1 in Cold sores; but can still cause genital infections) **(70% Prevalence!!)**
- **Pathogenesis:**
  - **Contact Transmission**
  - **1:Lives in Neurons → Latent....2:Reactivation → Travels down Axon into Skin → Lesions.**
- **Morphology:**
- Papular/Vesicular lesions on external Genitalia

DDXs of Genital Ulcers:

- **Infection:** Herpes/Syphilitic Chancre/Donovanosis/Lymphogranuloma Venereum
- **Trauma:** Mechanical/Chemical
- **Allergic:** Contact Wet Dermatitis

- **Clinical Features:**
  - 2F:1M
  - **Symptoms:**
    - **Course:**
      - **<3wks Incubation**
      - **Prodrome –** Paraesthesia, Itching, Redness
      - **Symptoms last for <2wks if untreated.**
        - Clusters of PAINFUL, ITCHY, Papules/Vesicles on External Genitalia
        - Vesicles may Rupture → Painful Ulcerations
      - **Recrudescence:**
        - Typically milder than 1st presentation
        - 1-2 day prodrome (Paraesthesia)
    - **+/- Proctitis/Cervicitis**
    - (Note: *ANY genital ulcer, scabbed, red-edged, multiple, and painful = Think Herpes!*)
- **Diagnosis:**
  - **Clinical Diagnosis**
  - **Swab Vesicle → HSV 1&2 PCR**
  - **Tzanck Smear** (Typical intranuclear inclusion bodies & multi-nucleated giant cells)
  - HSV Serology (limited use)
- **Treatment (NO CURE; Symptomatic & Suppressive Therapy ONLY):**
  - ***Valaciclovir*/Famciclovir/Aciclovir – (Nucleoside Analogue Anti-Virals) (BD 10 days)**
    - Note: "Suppressive Therapy" → 50% Reduction in Transmission.
  - **Analgesia – Lignocaine Gel**
  - **Counselling & Sex-Education**
    - 90% of HSV2 will have recurrences >5x/year
    - (Note: HSV1 have annual recurrences)
  - **Advise Abstinence in the Prodrome or when Lesions are Present.**
    - BUT Note: *Asymptomatic Viral Shedding Still Occurs!!!!*

Creative Commons: https://en.wikipedia.org/wiki/File:SOA-Herpes-genitalis-female.jpg

HUMAN PAPILLOMA VIRUS:

- **Aetiology:**
  - o ***HPV Types 6 & 11** → Genital Warts (Preventable by **Gardasil)***
  - o ***HPV Types 16, 18 & 45*** → Cervical Cancer (Somewhat preventable by ***Gardasil***)
- **Transmission:**
- o (Direct Contact/Sexual Transmission – Highly Contagious)

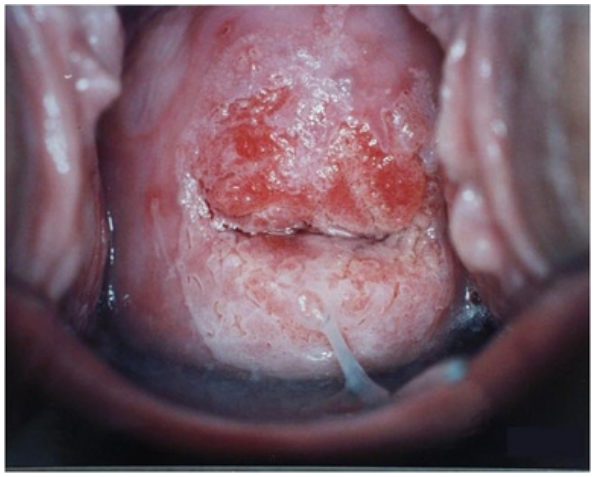
Pathogenesis:

- o Contact & Fomite Transmission
- o **3mth Incubation Period**
- o HPV Infection → Cell-Cycle Dysregulation → Benign Overgrowth

- **Morphology:**
  - o **Macro:**
    - § **Genital/Cervical Warts (6/11) -** Warty Papillomas – External Genitalia/Oral/Anal.

https://www.ncbi.nlm.nih.gov/books/NBK441884/figure/article-22202.image.f2/

- § **Cervical Ca (16/18/45)** – Abnormal looking cervix (Loss of normal smoothness, obvious dysplasia)



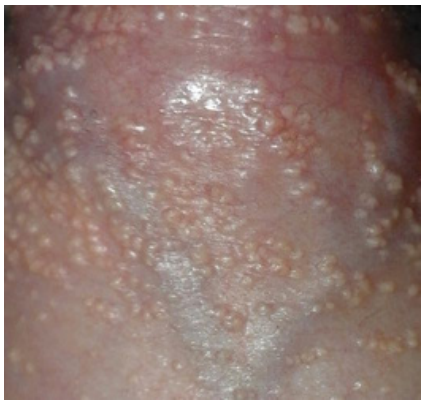
https://oacapps.med.jhmi.edu/OBGYN-101/Text/Pap/Moderate%20Dysplasia.htm

  - o **Micro:**
    - § **Genital/Cervical Warts (6/11) – *"Koilocytosis"*** = Cells with "halo" cytoplasm
    - § **Cervical Ca (16/18/45)** – *Squamous Cell Carcinomas*, or *Adenocarcinomas*
- **Clinical Features:**
  - o **Symptoms:**
    - § Infection is long-term, latent, and usually asymptomatic.
    - § **Genital Warts (6/11)** → Painless, papillary outgrowth on external genitalia
    - § **Cervical Ca (16/18/45)** → Abnormal Vaginal Bleeding, Dyspareunia, Weight-Loss, Fatigue, Pelvic Pain (May be Asymptomatic)

- **Diagnosis:**
  - ***Pap smear &/or Cervical Biopsy***
  - DNA detection
  - Tam Pap (Self-sampling HPV DNA test)
- **Com plications:**
  - *Cervical Cancer* - Metastasis
- **Treatment:**
  - **Genital Warts (6/11)** – ***Podophylin*** Cream, *Aldara (**Imiquimod**)* Cream, ***Excision*** or ***Cryotherapy*** – BUT Will Recur.
    - **+ Counselling**
    - **+/- Refer to Gynae if –** Extensive, Chronic/Recurrent, Cervical or Rectal.
  - **Cervical Ca (16/18/45)** – Surgical Excision +/- Chemotherapy +/- Radiotherapy
- **Prognosis:**
  - **Genital Warts (6/11) – Benign**
    - 70% clear by 12mths (Note: Warts may disappear, but virus may persist)
  - **Cervical Ca (16/18/45) - Malignant**
- **Differential Diagnoses:**
  - **Pearly Penile Papules:**

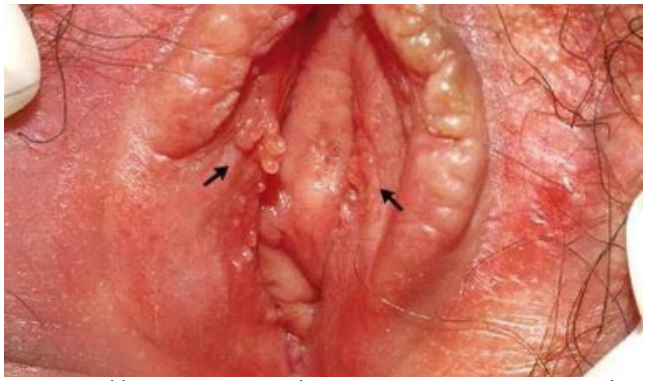
AndyRich48, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

  - **Sebaceous Hyperplasia:**



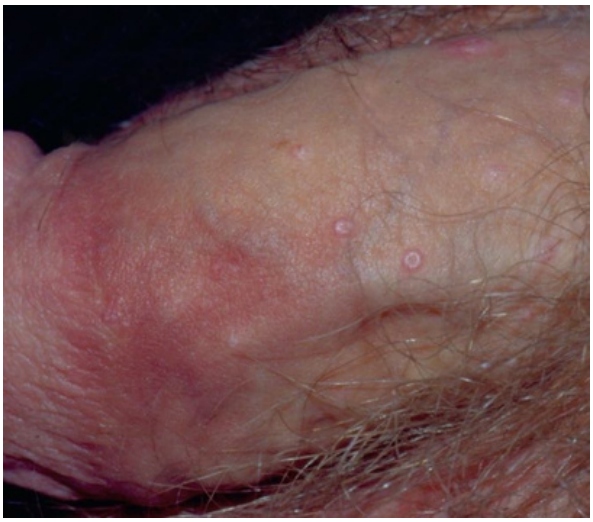
https://patient.info/forums/discuss/phimosis-and-weird-spots-722098

  - **Vestibular Papillae:**



https://healthcop.org/vestibular-papillomatosis/

- **Molluscum Contagiosum:**



https://www.hiv.uw.edu/go/basic-primary-care/cutaneous-manifestations/core-concept/all

- **Secondary Syphilis (Condylomata Lata):**

https://phil.cdc.gov/details.aspx?pid=2372

SYPHILIS:

- **Aetiology:**
- o Treponema Pallidum (Spirochete)

Transmission:

o Contact, Sexual, & Blood (IVDU) Transmission.

o **!!Vertical – 100% Transmission if mother is untreated!!**

- **Pathogenesis:**
- o **Four Stages** – *Primary, Secondary, Latent, Tertiary (CVS/Neurosyphilis)*

Clinical Features:

o ***Primary Syphilis:***

§ **10d-10wks Post-Infection** →Painless Chancre (ulcer) + Lymphadenopathy

https://jetem.org/syphillis_chancre/

o ***Secondary Syphilis –*** (Note: Most contagious during secondary syphilis)***:***

§ **4-8wks Post-Chancre** → Characteristic Rash (Palms, Feet), Lymphadenopathy, Hepatosplenomegaly, Flu-like Illness & "Condylomata Lata" (Wart-like Growths)

https://www.nejm.org/doi/full/10.1056/NEJMicm1502476

- ***Latent Syphilis:***
  - **Months-Lifetime Post-Secondary-Stage** → Asymptomatic but positive serology
  - ¼ of cases → Tertiary Syphilis (Most remain latent for life)
- ***Tertiary Syphilis:***
  - **>1yr Post-Infection** → Formation of *'Gummas'* (Highly-Destructive → bones, skin, nervous tissue, heart & arteries) → Serious complications are Cardiovascular (Aneurysms) & Neurosyphilis (Dementia/Psychosis/Paresis/etc)

https://pharmaceutical-journal.com/article/ld/syphilis-diagnosis-and-management-options

- **Syphilis in Pregnancy:**
  - ***Note: Transmission to the Foetus Typically occurs in the 3rd Trimester of Pregnancy.***
    - Trans-Placental Transmission
      - **Can → Miscarriage/Premature labour**
  - **→ Early Congenital Syphilis:**
    - Snuffles – Profuse Runny Nose
    - Cutaneous Lesions (Often on Palms and Soles)

CDC/ Dr. Norman Cole, Public domain, via Wikimedia Commons

  - **→Late Congenital Syphilis:**
    - Dental Malformations
    - Frontal bossing
    - Short maxilla
    - High palatal arch
    - Deafness

CDC/Susan Lindsley, Public domain, via Wikimedia Commons

- **Diagnosis:**
  - o **Organism can't be cultured**
  - o **Dark-Field Microscopy**
    - § (Too small for Gram stain)
    - § 1: Dark field Microscopy
    - § 2: Fluorescence (Ag labelling)
  - o **Serology (May remain +ve for years after recovery)**
    - § **1: *T. pallidum* haemagglutination assay**
    - § **2: FTA-ABS:** Fluorescent Treponemal Antibody Absorption
    - § **3: VDRL:** Venereal Disease Research lab tests.
    - § **4: RPR – Diagnostic Standard:** Rapid Plasma Reagen
      - Tests for Non-Specific Antibodies in the blood.
      - Good Sensitivity, Poor Specificity.
      - **Interpretation:**
        - o A 2 Titre rise Indicates infection
        - o A 2 Titre fall indicates effective treatment.
- **Com plications:**
  - o *Neurosyphilis* → Meningitis, paresis, personality change, ataxia, dementia.
  - o *Cardiovascular Syphilis* → Typically Syphilitic Aortitis → Aneurysm
  - o ***Congenital Syphilis – 25% Miscarriage; 25% Neonatal Death; The rest are DEFORMED!!***
    - § **→ Early Congenital Syphilis:**
      - Snuffles – Profuse Runny Nose
      - Cutaneous Lesions (Often on Palms and Soles)
    - § **→Late Congenital Syphilis:**
      - Frontal bossing
      - Short maxilla
      - High palatal arch
      - Deafness
- **Treatment:**
  - o ***Azithromycin/Doxycycline***
  - o Or Single Dose ***IM Penicillin-G***
  - o **Treatment of Early Syphilis:**
    - § Benzathine Penicillin
    - § If Truly Allergic to Penicillin –(Azithromycin)
  - o **Treatment of Late/Latent/Unknown Duration of Syphilis:**
    - § Benzathine Penicillin (Intramuscular Injection)
    - § (Painful)
  - o **(Treatment Failure):**
    - § Treatment Failure = Failure to achieve a 4x Fold drop by 6 months.
    - § Failure is more common in late syphilis & most common with neurosyphilis.
  - o **(Why treat syphilis?):**
    - § To prevent transmission to others
      - Sexual
      - Neonatal
    - § To Prevent long term complications
      - Ie: Tertiary syphilis
      - (30% chance of tertiary syphilis if untreated)
    - § To reduce chance of transmission of HIV
      - HIV transmission increases greatly with concomitant transmission

CHLAMYDIA:

- **Aetiology:**
- o Chlamydia Trachomatis

Pathogenesis:

o Vaginal, Anal, Oral & Vertical Transmission.

o **Obligate Intracellular Replication** – (Ie: Replicate like Viruses → Shed by Infected cell lysis)

- **Morphology:**
- o **Micro:** Obligate Intracellular Bacteria → Chlamydial Intracellular Reticulate Bodies

Clinical Features:

o **Symptoms:**

§ **Males –** The COMMONEST cause of Urethritis.

- (May also → Epididymitis, Orchitis, Prostatitis & Proctitis)
- (Note: A *Non-Gonococcal Urethritis:* Ie: Clear, Watery Discharge)

§ **Females –** Asymptomatic, or Urethritis.

§ • (May → Cervicitis, Salpingitis/***PID***)

Neonates:

- Neonatal conjunctivitis (similar to Gonorrhoea)
- Chlamydial pneumonia

Unattributable

- **Diagnosis:**

o **Sample for PCR:**

§ ***1st Catch Urine (Unisex)...or***

§ **Women – Endocervical/High-Vaginal Swab**

§ **Men – Swab of Urethral Discharge**

§ **+/- Throat Swabs:**

o **→ Antigen Detection Tests – PCR**

o **→ Gram stain & Immunofluorescence -** Intracytoplasmic inclusion bodies – Replicate intracellularly

o ***(Note: All Females <25 are screened for Chlamydia) – (Via Non-Invasive PCR)***

- **Com plications:**

o *Trachoma* – (Chlamydial Conjunctivitis)

o *Lymphogranuloma Venereum* - (Lymphatic Chlamydial infection) → Groin Abscesses/Buboes → May becom e ulcerative.

o ***PID*** – can → Infertility, ↑Risk of Ectopic Pregnancy, Chronic Pelvic Pain

o *Reiter's Syndrome Triad* - Reactive Poly-Arthritis + Conjunctivitis + Urethritis

https://www.cehjournal.org/article/who-simplified-trachoma-grading-system/

- **Treatment:**

o **1 Dose *Azithromycin* 1g**

o or ***Doxycycline*** 10days 100mg BD

o Note: Resistant strains may exist in certain communities and susceptibility-directed therapy is recommended.

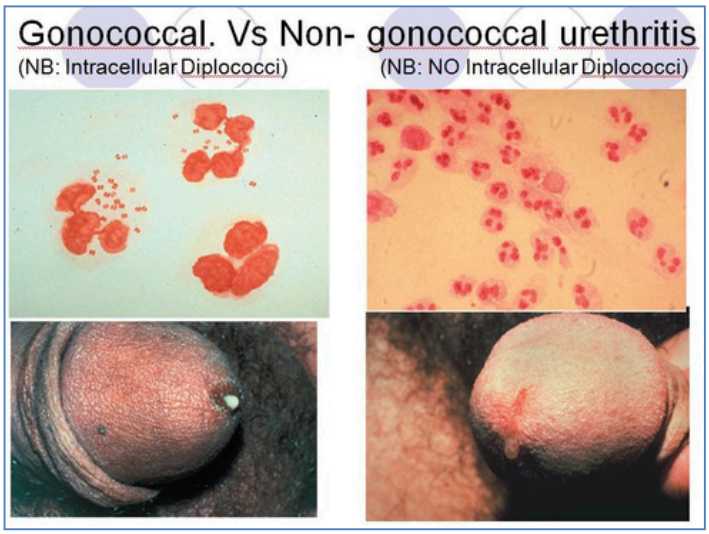
GONORRHOEA:

- **Aetiology:**
- o Neisseria Gonorrhoeae (Gram Negative)

Transmission:

- o **Horizontal via Direct Sexual Contact:**
- o **Vertical – (During childbirth; not trans-placental [like syphilis & hep B])**

- **Pathogenesis:**
  - o **Virulent**, Fastidious (Delicate), aerobic, gram negative diplococcic.
    - § ***Pili*** – anchors to urethral epithelium → Resists Flushing → Infiltrates Epithelium
    - § ***Gonococcal Toxin*** – Endotoxin
    - § ***Protease*** – Destroys secretory IgA
- **Morphology:**
  - o **Macro -** Inflamed Urethra + Thick, Milky-white Discharge
  - o **Micro -** Intracellular Diplococci on Gram Stain (Typically inside neutrophils)
- **Clinical Features:**
  - o **Symptom Onset within <1wk of Infection.**
  - o **Men** → Acute **Gonococcal Urethritis** + Dysuria + Discharge (Thick & milky)
  - o **Women** → Acute **Gonococcal Cervicitis** + Vaginal Discharge. (May also be Asymptomatic in Women)
    + (Note: Can → PID in females)
- **Diagnosis:**
  - o **Clinical:**
    - § **Note: Differentiating Gonococcal Urethritis Vs Non-Gonococcal Urethritis:**
      - **Gonococcal** – Thick, milky, Penile discharge. Gram Negative Diplococci on gram stain of discharge.
      - **Non-Gonococcal** – Thin, watery discharge. No organisms on Gram Stain. (Typically Chlamydia).
  - o **Sample for PCR:**
    - § ***1st Catch Urine (Unisex)...or***
    - § **Women – Endocervical Swab**
    - § **Men – Swab of Urethral Discharge**
  - o **Men + Women – Throat Swabs**
- **Complications:**
  - o *PID* (Females)– can → Infertility
  - o *Urethral Stricture* → Urinary Obstruction → Hydronephrosis
  - o *Epididymitis, Prostatitis*
  - o *Endocarditis*
  - o *Gonococcal Arthritis*
  - o *Ocular Infections, Neonatal Conjunctivitis*
- **Treatment:**
  - o Stat Dose IM ***Ceftriaxone*** + Stat Dose PO ***Azithromycin***
  - o *(Or BD **Doxycycline** for 1wk)*



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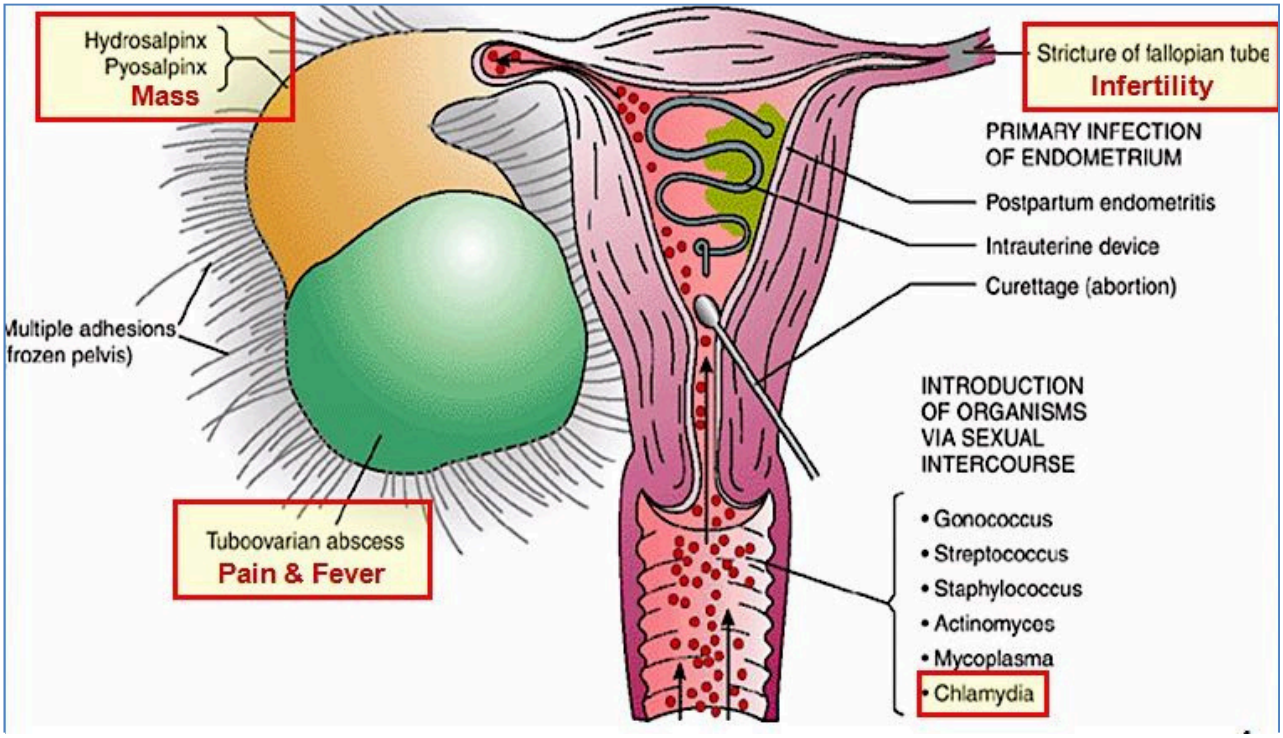
PELVIC INFLAMMATORY DISEASE (PID):

- **Aetiology:**
  - o Typically Bacterial Infection (Often Sexually Transmitted) - (May also be Viral/Fungal/Parasitic)
  - o **Commonest = 50% Chlamydia (C. Trachomatis) or 50% Gonorrhoea (N. Gonorrhoeae)**
    - § (but also strep, staph, etc)
- **Pathogenesis:**
  - o Prolonged/Chronic (Often Subclinical) Infection → Inflammation of the Uterus, Fallopian Tubes &/or Ovaries → Multiple Abscesses & Scar Tissue → Adhesions to Nearby Organs
- **Morphology:**
  - o **Macro:**
    - § Stricture of Fallopian Tube
    - § Tubulo-ovarian abscesses
    - § Dilatation/Cysts/Abscesses → Pelvic Mass
- **Clinical Features:**
  - o (Typically Teenagers or New Mothers)
  - o **Typical Symptoms:**
    - § ***1:Chronic Pelvic Pain (+/- Lower Abdo, Dyspareunia)***
    - § ***2:Fever***
    - § ***3:Infertility*** – A result of Fallopian Tube Scarring/Obstruction.
    - § ***4:Pelvic Mass*** – Due to Dilatations/Cysts/Abscesses
  - o **Differentials –** Appendicitis, Ectopic, Ovarian Cysts/Tumour/Torsion.
- **Diagnosis:**
  - o Clinical + Laparoscopy
  - o Note: Early Detection is Imperative
- **Treatment:**
  - o **Antibiotics – (*Azithromycin / Doxycycline*)**
  - o **IVF for Conception.**
- **Prognosis:**
  - o The *Infection* can be Cured, but Damage/Fibrosis/Infertility is Permanent



Source: Unattributable

DONOVANOSIS:

- **Aetiology:**
  - o Klebsiella Granulomatis (Gram Neg)
  - o (Formerly: *Calymmatobacterium granulomatis*)
- **Pathogenesis:**
- o Direct Contact Transmission with OPEN sores.

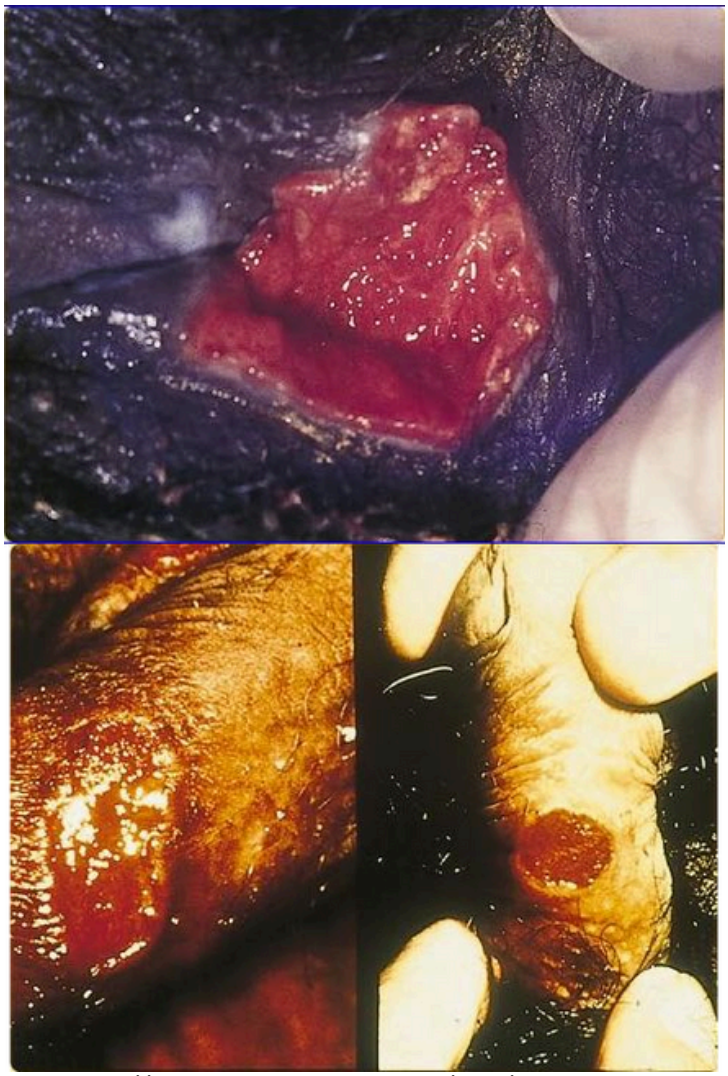
Morphology:

- o **Macro:**
  - § Painless, Oozing, Red Ulcers with Characteristic *Rolled Edges* of Granulation Tissue.
- o **Micro:** Donovan Bodies = Intracellular Rod-Shaped, Oval Organisms seen inside Phagocytes
  - §

- **Clinical Features:**
  - o **Symptoms:**
    - § → Chronic, painless, **offensive, oozing** genital ulcers (Cf. Syphilis = dry) + genital
    - § disfigurement. (Lesions occur on Penis, Labia, or Perineum)
      Note: **NO Lymphadenopathy** (Cf. Syphilis = Lymphadenopathy Present)
- **Diagnosis:**
  - o Thorough history and examination
  - o Scrape → Microscopy (Donovan Bodies)
  - o Swab → PCR
  - o + Rule out Syphilis (RPR, VDRL, TPHA)
- **Complications:**
- o Genital Disfigurement

Treatment:

- o ***Doxycycline***/***Azithromycin***/Erythromycin



Creative Commons: https://commons.wikimedia.org/wiki/File:SOA-Donovanosis-female.jpg

HEPATITIS C:

- **Aetiology:**
- o Hepatitis C Virus

Transmission:

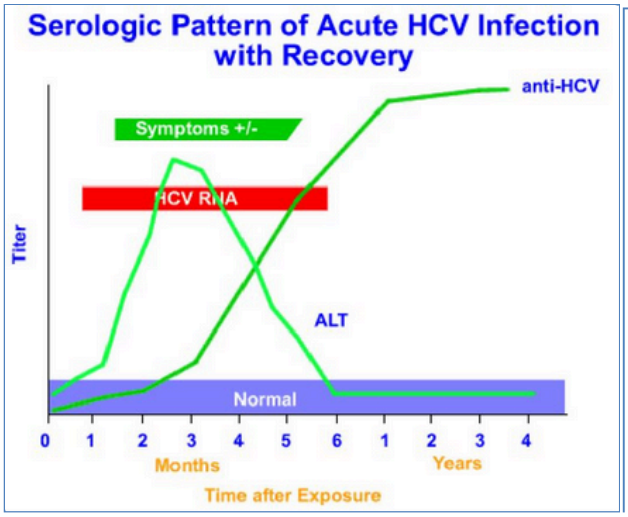
- o **Blood (Eg: IVDU/needle sharing):** As little as 0.0001 mL of blood can transmit the infection
- o **Body fluids (Eg: Sexual):** (Incl. Cervical Secretions and Semen)
- o **Vertical** (Uncommon)

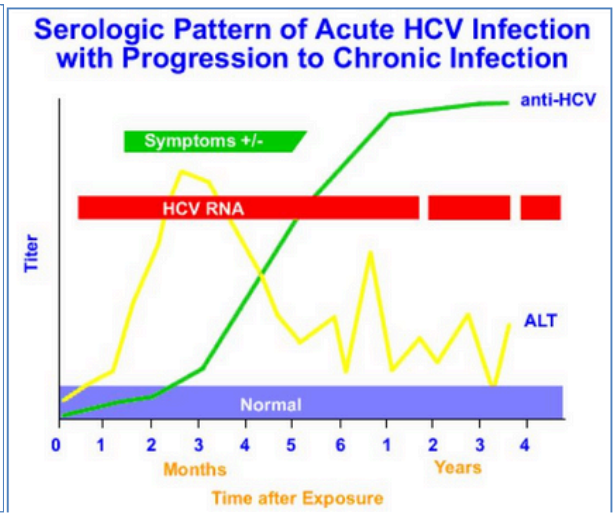
- **Note: Epidemic Potential:**
- o No Vaccines

Pathogenesis:

- o Viral Infection (Horizontal/Vertical) →Virus Replicates in the Liver
  - § Note: Virus is NOT directly Cytopathic; Damage is due to CD8-T-Cell Attack.
- o → Cellular (CD8) Immune Attack on Infected Hepatocytes
- o → ***Chronic, Low-Grade Inflammation*** → **Eventually leads to Fibrosis → Cirrhosis**

- **Morphology – Mostly Chronic:**
  - o Chronic '*Peri-Portal*' Inflammatory Infiltrates
  - o Necrosis, Apoptosis & Fibrosis → Cirrhosis
  - o (Hep C – Mild Fatty Change [Microvesicular Steatosis])
- **Clinical Features:**
  - o **10% →Acute with Recovery –** (Mild Viral Illness + Jaundice)
    - § *May have* Non-Specific Viral Symptoms (Nausea/Anorexia/Fatigue)
    - § *May have* Jaundice
  - o **90% →Chronic with Extrahepatic & Intrahepatic Manifestations:**
    - § Asymptomatic for years (Usually Incidental Diagnosis)
    - § May have Sporadic Mild Viral Illnesses + Jaundice
    - § +/- Arthritis
    - § +/- Glomerulonephritis
  - o **END STAGE (CIRRHOSIS):**
    - § 20-30% → *Cirrhosis* (within 10-30yrs)
    - § 5% → *Hepatocellular Carcinoma* – (Hep C Directly inactivates P53)





- **Investigations:**
  - o **Usually discovered on Routine LFTs – (**Mildly ↑ ALT/AST**)**
  - o **Hep C Serology – (**(+) Anti-HCV**)**
  - o **Hep C PCR – (**(+) HCV-RNA**)**
- **Treatment:**
  - o **Post-Exposure/Acute (Eg: Needlestick):**
    - § ***IFN***
    - § ***Ribavirin***
  - o **Previously incurable.**
  - o **Now up to 95% 'curable' with 'Direct-Acting Antivirals' (DAA's):**
    - § Epclusa® (sofosbuvir + velpatasvir)
    - § Maviret® (glecaprevir/pibrentasvir)
    - § Harvoni® (sofosbuvir + ledipasvir)

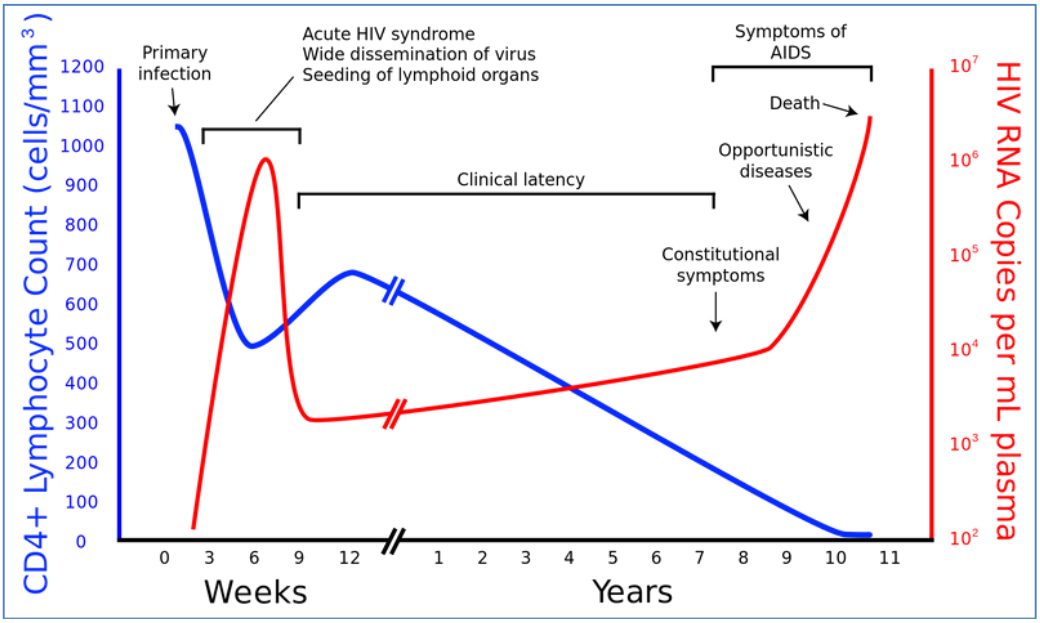
HUMAN IMMUNODEFICIENCY VIRUS:

- **Aetiology:**
- o HIV

Transmission:

- o **Blood** (IVDU, Transfusion)
- o **Body Fluids** (Sexual – Particularly Anal Sex)
- o **Vertical** (Cross-Placental & Breastmilk)

- **Pathogenesis:**
  - o **Lymphotrophic** – Preferentially infects CD4-T-Cells → Integrates into Genome → Uses host DNA-Replication for Reproduction.
  - o CD4-T-Cell Lysis → CD4-T-Cell Depletion (including Memory T-Cells) →**Immunosuppression By:**
    - § ↓IFNy Production
    - § ↓Antibody Production
    - § ↓Antibody Isotype Switching
    - § ↓Macrophage Activation
    - § ↓CD8-T-Cell Activation
- **Clinical Features:**
  - o **Symptoms:**
    - § **1-2 months:**
      - **Acute infection** (Flu-like symptoms + Maculopapular Rash (ITP))
      - Following the acute infection, Antibody titres rise **(*Detectable after 2.5mths*)**
    - § **2-4 Years:**
      - **Asymptomatic** Chronic Infection – (Equilibrium between T-Cells & Viral Mutation Rate)
    - § **8 years:**
      - **Symptomatic** Chronic Infection – (Disequilibrium – HIV Quasispecies outnumber T-Cell Diversity → Body starts to lose the battle)
    - § **10-12 years:** (If no intervention)
      - **AIDS** - Advanced infection – (T-Cell Depletion)
- **Diagnosis:**
  - o Serology (Ab Detection)
  - o Viral PCR (Ag Detection)
- **Complications:**
  - o ↑Infections
  - o ↑Cancer (Esp. **Kaposi's Sarcoma**),
- **Treatment:**
  - o **Fusion Inhibitors – (Eg: CCR5 Inhibitors) -** Prevent binding of HIV to Cell
  - o ***Reverse Transcriptase Inhibitors*** **(RTI's)** – (Blocks addition of nucleotides to DNA)



https://www.wikidoc.org/index.php/HIV_AIDS_natural_history,_complications,_and_prognosis

MORE ON HIV

MORE ON HIV

The Origins of HIV:

- **HIV-l and HIV-2 have sequence homology with corresponding viruses in African primates:**
- o :. It is Likely that HIV originated in African Primates → Crossed over to Humans.

Possibility of Further Transmissions:

- o The original virus still exists in African Primates (& Is *STILL EVOLVING*)
- o :. Further transmission of similar viruses to Humans is Very Possible.
- o (If it has done it once, it will do it again)

Epidemiology of HIV:

- **Sub-Saharan = Most Affected:**
  - o 2/3 of all HIV cases
  - o (24.7 million people in 2006.)
  - o **75%** of all AIDS-Related Deaths occurred in sub-Saharan Africa
- **Developing Countries:**
  - o High Prevalence
- **Developed Countries:**
  - o Low Prevalence – (But Incidence is Increasing)

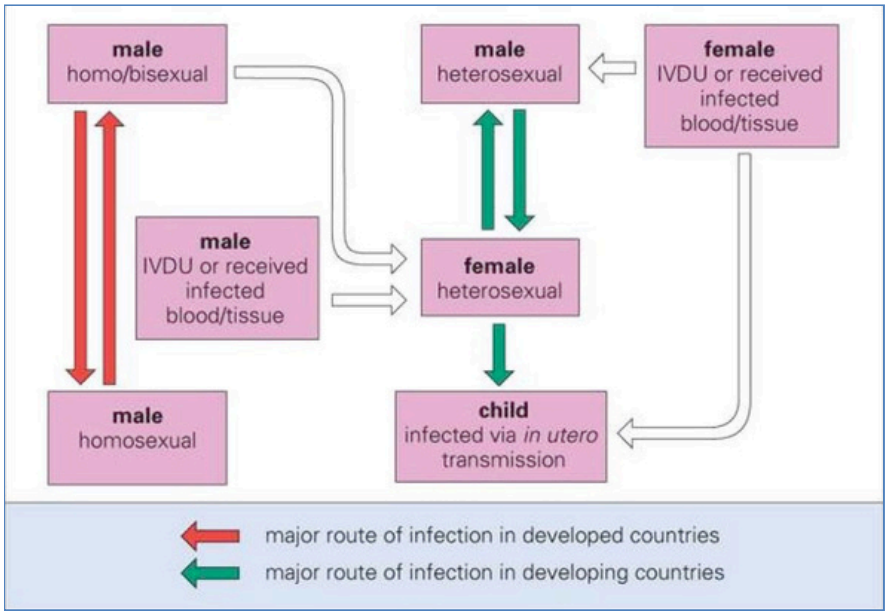
(HIV-2):

- o Less virulent infection
- o Perinatal transmission is less common
- o Most common in West Africa

Transm ission:

- **Sexual Transmission:**
  - o 75% of transmission worldwide
  - o **Risk Factors that Increase Chance of Sexual Transmission:**
    - § **Trauma/Inflammation** - (The Virus must attach to CD4 receptors; Therefore presence of inflam m atory cells @ Site of Inoculation vastly increases risk of transm ission)
    - § **Sexually Transmitted Diseases** (Eg: Gonorrhoea, Chlamydia, trichomoniasis or vaginosis) – Because they lead to Inflammation in the Genital Region.
    - § **Higher risk with Anal Sex rather than Vaginal or Oral Sex:**
      - Vagina is Stratified Squamous (Greater Barrier Protection)
      - Rectum is Simple Columnar (Less Barrier) + Anal Sex commonly causes bleeding.
  - o **Developing Countries:**
    - § Males→Females Transmission (heterosexual transmission)
    - § Vertical Mother→Child transmission.
    - § IV Drug use
    - § Blood Transfusion
  - o **Developed Countries:**
    - § Male→Male Transmission (Homosexuality)
    - § IV Drug use
- **Parenteral Transmission (Blood Transfusion/IV-Needle Sharing):**
  - o Depends on Titre in the Blood & the Amount of Blood Transferred. (Determines the number of Infectious Doses Contained)
- **Perinatal:**
  - o Transplacental infection is becoming one of the most important routes of transmission
  - o Breastmilk.

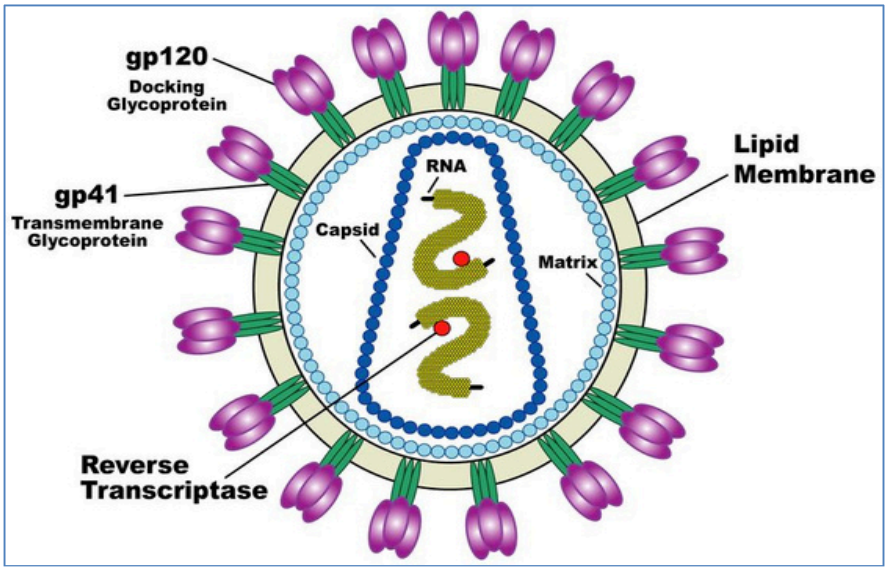
- ***Note: Transmission is Surprisingly Difficult*:**
  - o Risk of Percutaneous Exposure is ≈ 0.3%
  - o Risk of Mucous Membranous Exposure ≈ 0.09%
  - o **Factors =** *Amount of Blood & Titre of Virus*.



Structure of the HIV Virion & Contents:

- **Dicosahedral capsid**
- **2x *Separate Strands* of ssRNA**
- **Envelope with Glycoproteins (Incl. Gp120** – important for adhesion & entry to CD4 T-Cells)
- **Contains Reverse Transcriptase Enzymes:**
- o Necessary for Reverse Transcription of ssRNA genome into DNA to Integrate into host Genome.

Gag ,Pol, Env – Open Reading Frames in Genome



https://www.cgl.ucsf.edu/chimera/data/hiv09/hiv-demo.html

Reverse Transcriptase Enzyme:

- **Necessary for DNA Production from the Positive-ssRNA in the Virus.**
  - o Reverse Transcription of Positive-ssRNA genome into DNA to Integrate into host Genome.
    - § → Produces ssDNA from ssRNA
    - § Then →Produces dsDNA from ssDNA
- **Note: *Highly Error-Prone* → High Mutation Rate → Production of *QUASISPECIES*:**
  - o Quasispecies = Mutant/Recombinant Viral Genomes
  - o Quasispecies are constantly subject to Genetic Variation, Competition & Selection.
  - o → Assists virus to persist in the host. (Overwhelms the Immune Response)

Process of HIV Infection (@ The Cellular Level):

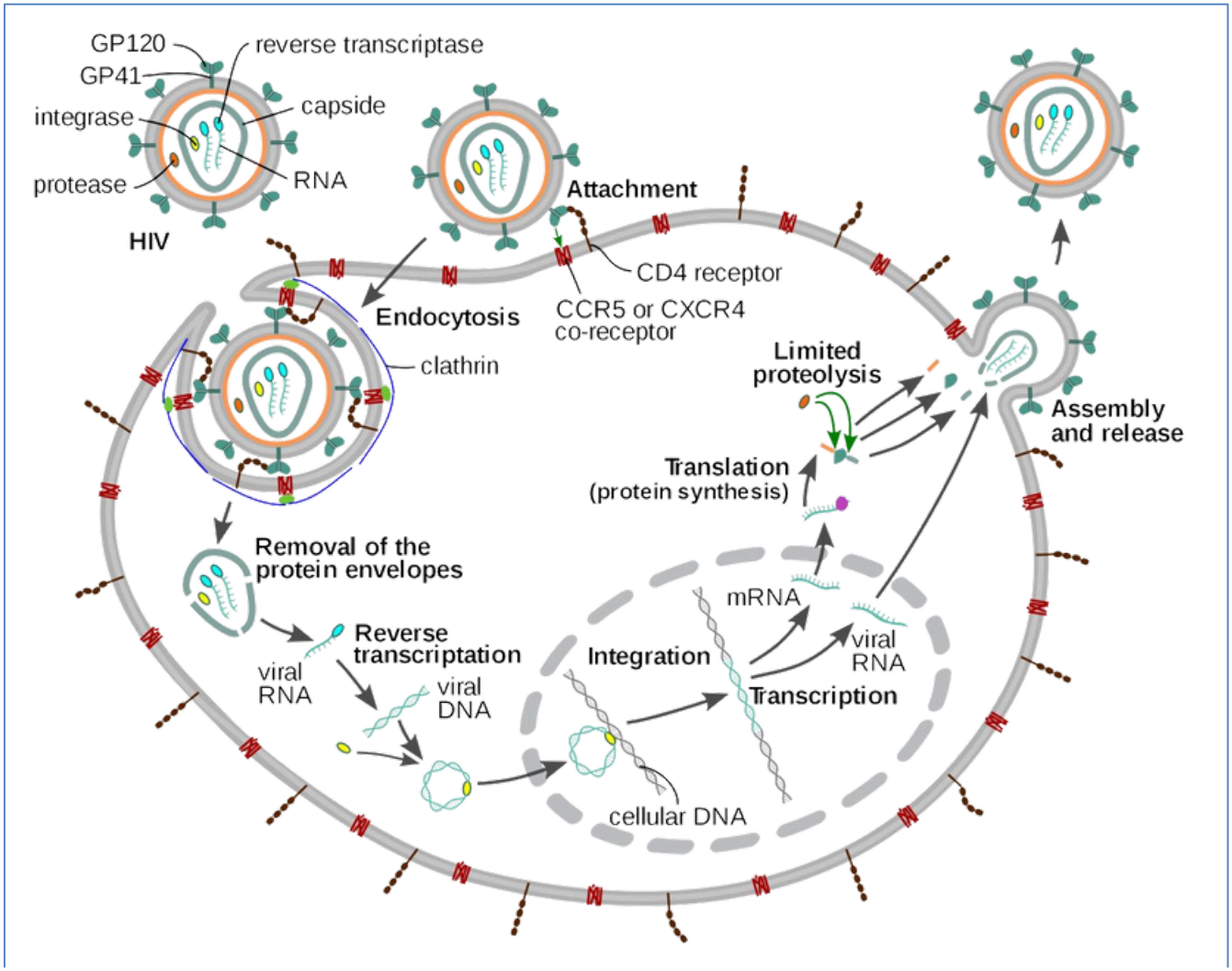
GP120 on Virus Binds to CD4 Receptors

Fusion of Viral Envelope with Cell Membrane → Uptake into cell.

Reverse Transcriptase:

- o → Produces ssDNA from ssRNA
- o Then →Produces dsDNA from ssDNA

- **dsDNA→ Migrates to the Nucleus → Integrates into Host Genome**:
  - o :. HIV Uses host DNA-Replication for Reproduction.
  - o Is Transparent to the Immune System.
  - o Virus replicates with DNA Replication or Cellular Protein Synthesis.
  - o Can also be *transported* by migrating cells into other areas of the body – Eg: Crossing the BBB.
- **Genes Transcribed & Translated** → Viral proteins
- **Assembly**
- **Budding** → Released



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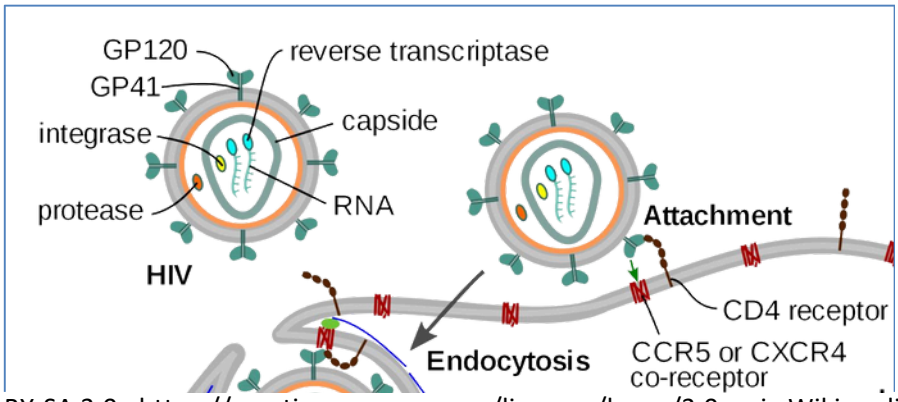
Susceptible Cells

- ****T-Helper Cells**
- **But Also:**
  - o **B lymphocytes**
  - o **Macrophages/Monocytes**
  - o **Dendritic cells**
  - o **Microglia (In CNS)**

Major HIV Receptors:

- **1: The *CD4 molecule* – (on CD4-Th-cells)**
- **2: Chemokine Receptors - (act as *Co-Receptors* for the HIV):**
  - o **T-cell Tropic strains:** use the ***CXCR-4 chemokine*** receptor
    - § Preferentially Infect T-Cells
  - o **Macrophage-Tropic strains:** use the ***CCR-5 chemokine*** receptor
    - § Preferentially Infect Macrophages
    - § (**Note:** Macrophages can readily cross the BBB → Infect Glial Cells → Produce cytokines → wipe out the neurons → AIDS Dementia)



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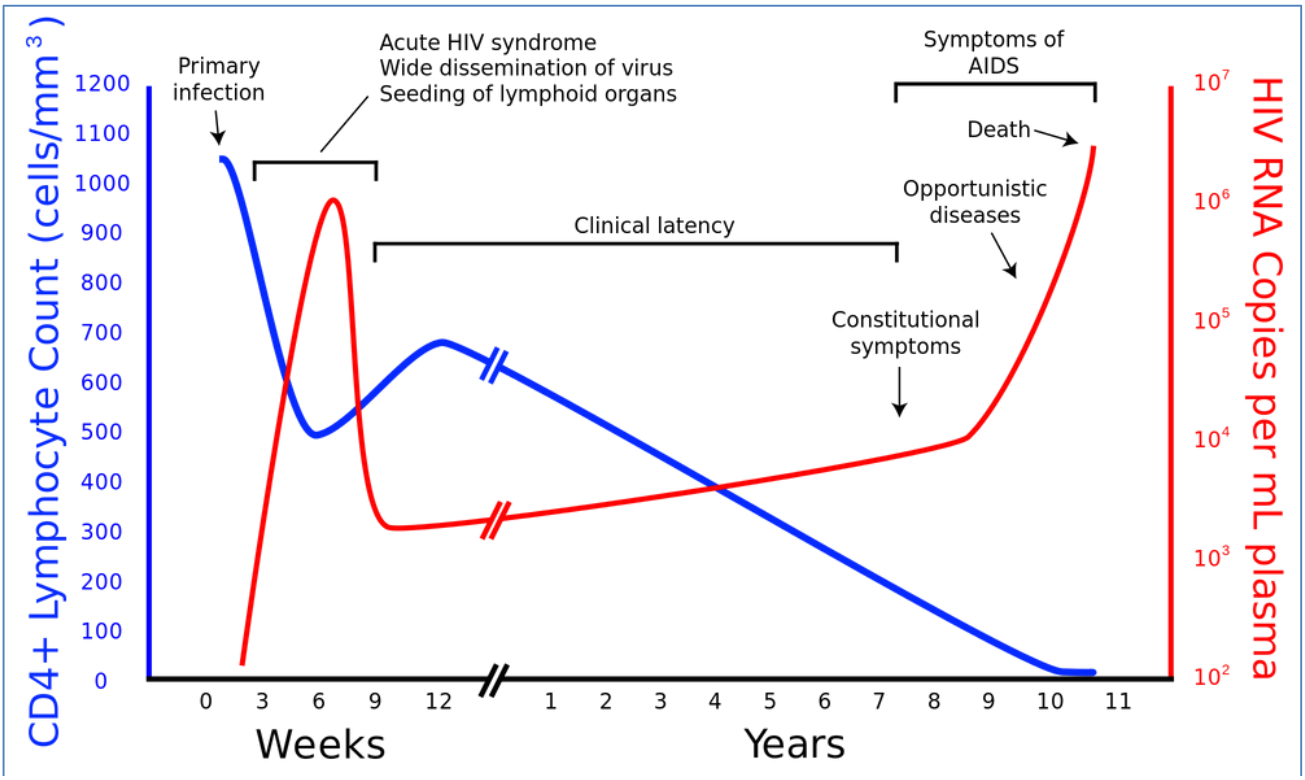
Typical timescale of HIV infection

- **1-2 months:**
  - o Acute infection
  - o Following the acute infection, Antibody titres rise **(*Detectable after 2.5mths*)**
- **2-4 Years:**
- o Asymptomatic infection
- **8 years:**
  - o Symptomatic infection

  10-12 years:
  - o Advanced infection (If no intervention)



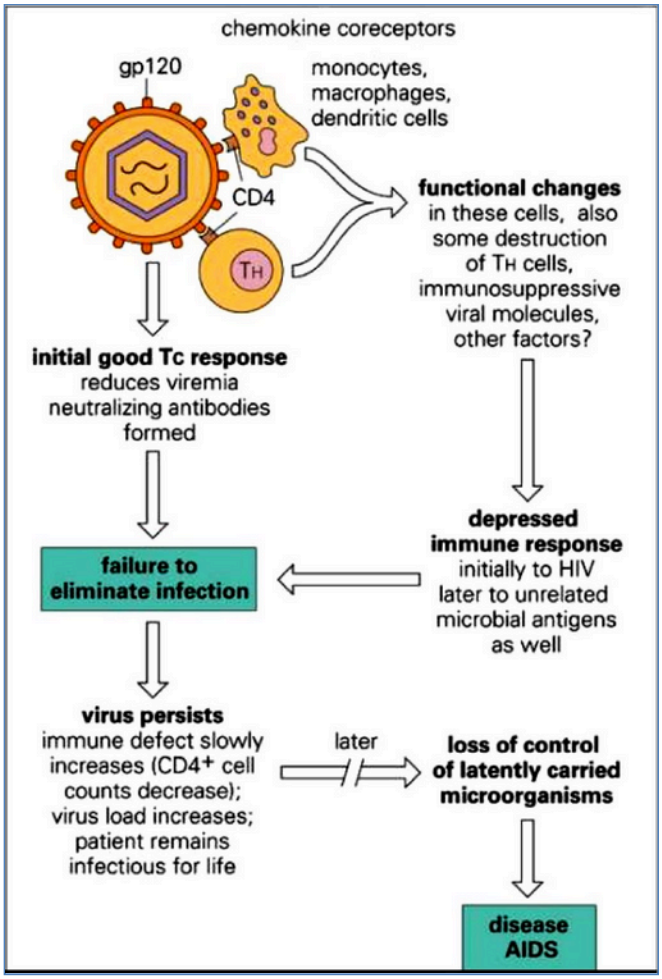
https://www.wikidoc.org/index.php/HIV_AIDS_natural_history,_complications,_and_prognosis

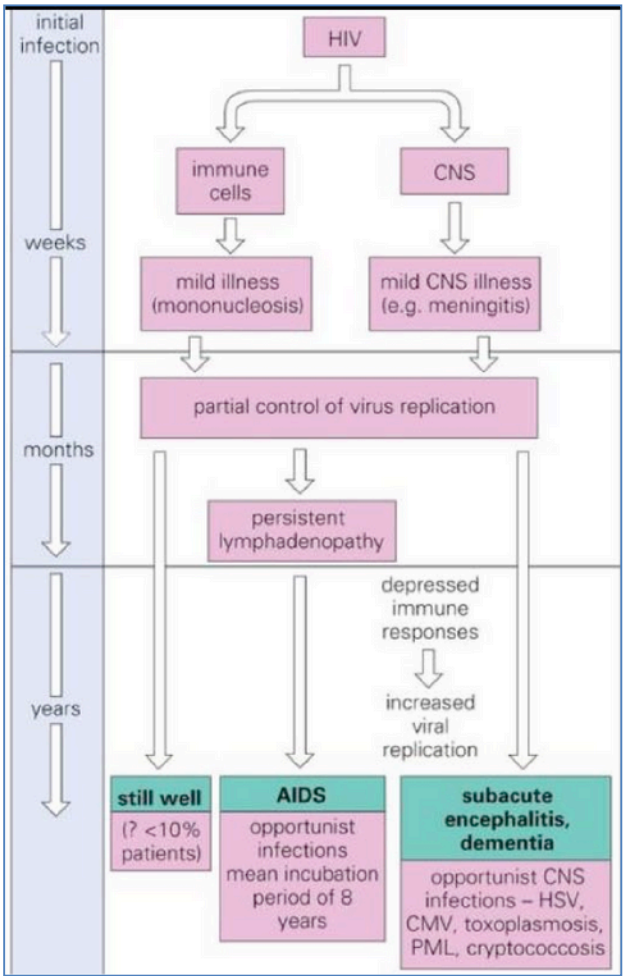
Pathogenesis of AIDS:

- **1: Acute Infection:** (High Risk of Transmission)
  - **Symptoms:**
    - Flu-Like Symptoms
    - Maculopapular Rash (AKA: Immuno-Thrombocytopenic Purpura)
  - **Characterised by:**
    - High plasma Viremia (red line, top)
    - Massive Depletion of CD4/CCR5 Low CD4 ***Memory Cells*** in the ***Mucosal Associated Lymphoid Tissues (MALT).*** (green line, bottom)
      - Loss of Memory Cells requires constant immune activation → Hyperactive immune system
      - During this period, many Quasispecies will be made (due to high polymerase error rate & Rapid CD4-Cell Turnover)
    - Absence of HIV-1 specific antibodies (orange line, bottom).
  - **Viremia drops as cytotoxic CD8+ T Lymphocytes (CTL) develop:**
    - (blue line, bottom)
    - An individual ***Viral-Load Set Point*** is reached during chronic infection.
      - (***Viral set points*** differ greatly among individuals (eg, red dotted line, top) and predict disease progression.)
  - **Note: Takes weeks-months for antibodies to rise.**

- **2: Chronic (Asymptomatic) Infection:**
  - Ineffective cell mediated immune responses lead to the chronic stage of the infection
  - There is Chronic Immune Activation → CD4+ T-cell Depletion (Driven into Apoptosis)
  - Viral diversity increases throughout the disease (closed circles, top).
  - As CD4-T-Cells are Depleted, Viral Titre Rises.
  - Eventually, the virus produces more quasispecies, than the amount of specific CD8-T-cells the body can produce.

- **3: AIDS (Symptomatic):** (High Risk of Transmission)
  - The *Terminal* Stage of the Disease.
  - There are too many HIV Quasispecies for the CD8-Tc-Cells & Antibodies to deal with.
  - **How HIV Causes Immunosuppression:**
    - **CD4 Depletion Via:**
      - Direct CD4-T-Cell Lysis
      - Cytotoxic T-Cells kill CD4-T-Cell
      - Apoptosis of CD4-T-Cell
      - Infected CD4-T-Cells can fuse together →form *'Syncitia'* → Removed by Spleen.
      - (Ie: Predominantly via the Immune Response, not the Virus)
    - **CD4 Depletion → Immunosuppression By:**
      - ↓IFNy Production
      - ↓Antibody Production
      - ↓Antibody Isotype Switching
      - ↓Macrophage Activation
      - ↓CD8-T-Cell Activation
    - **→→Loss of the Adaptive Immune System → Opportunistic Infections.**
  - **HIV can lead to Death of Neurons (AIDs Dementia). How?:**
    - Infected Macrophages can cross the BBB → Infect Glial Cells (Esp. Astrocytes)→ Glia Produce TNF cytokines → Kill Neurons → AIDS Dementia
- **(Note: CD4:CD8 ratios can be a good marker for disease progression)**

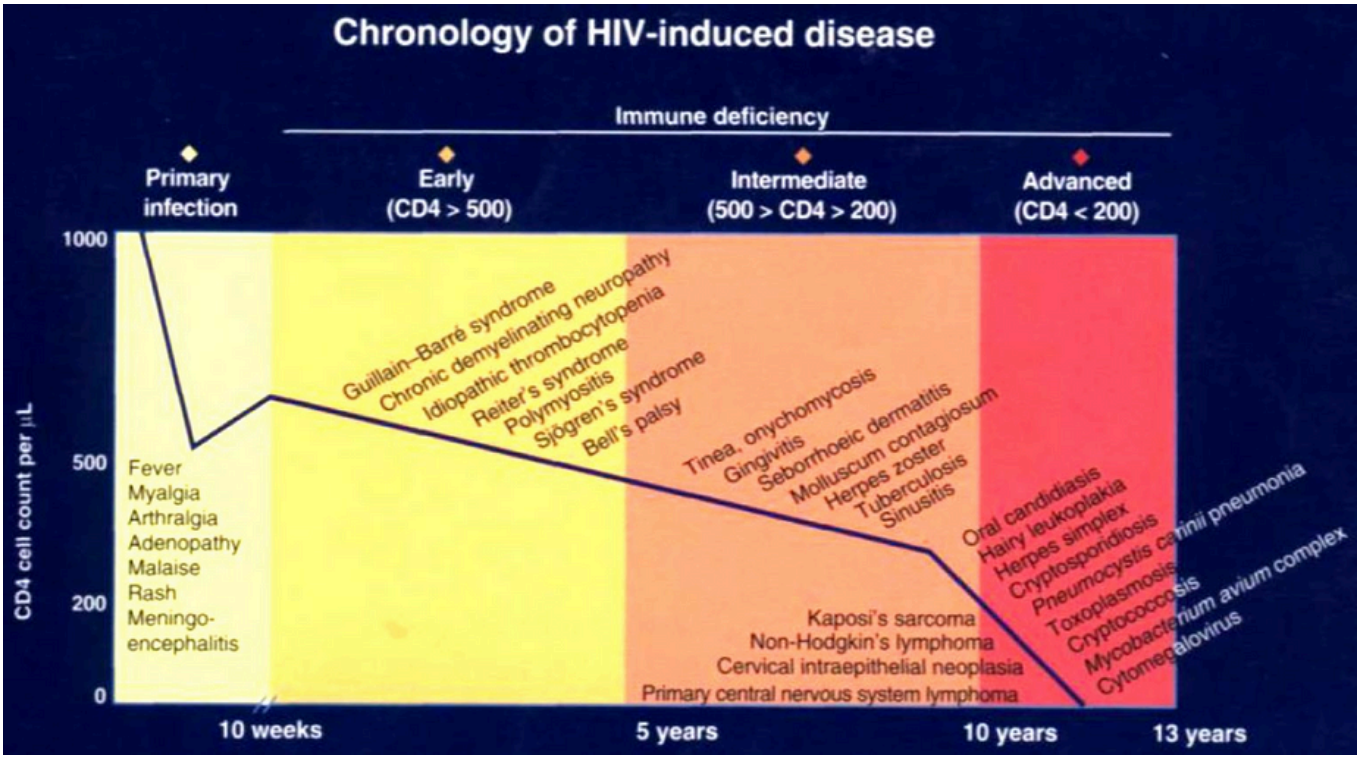




Unattributable

Opportunistic Infections & Tumours in AIDS:

- Loss of CD4 Cells →↓ production of IFNy → ↑Intracellular Viral/Bacterial Infections.
- **What do the common opportunistic infections associated with AIDS have in common?**
  - o Infections where IFNy (from Th-Cells) is really important to protection are the first infections seen (Ie: Those with intracellular viruses/bacteria).
  - o The later infections are typically extracellular bacteria



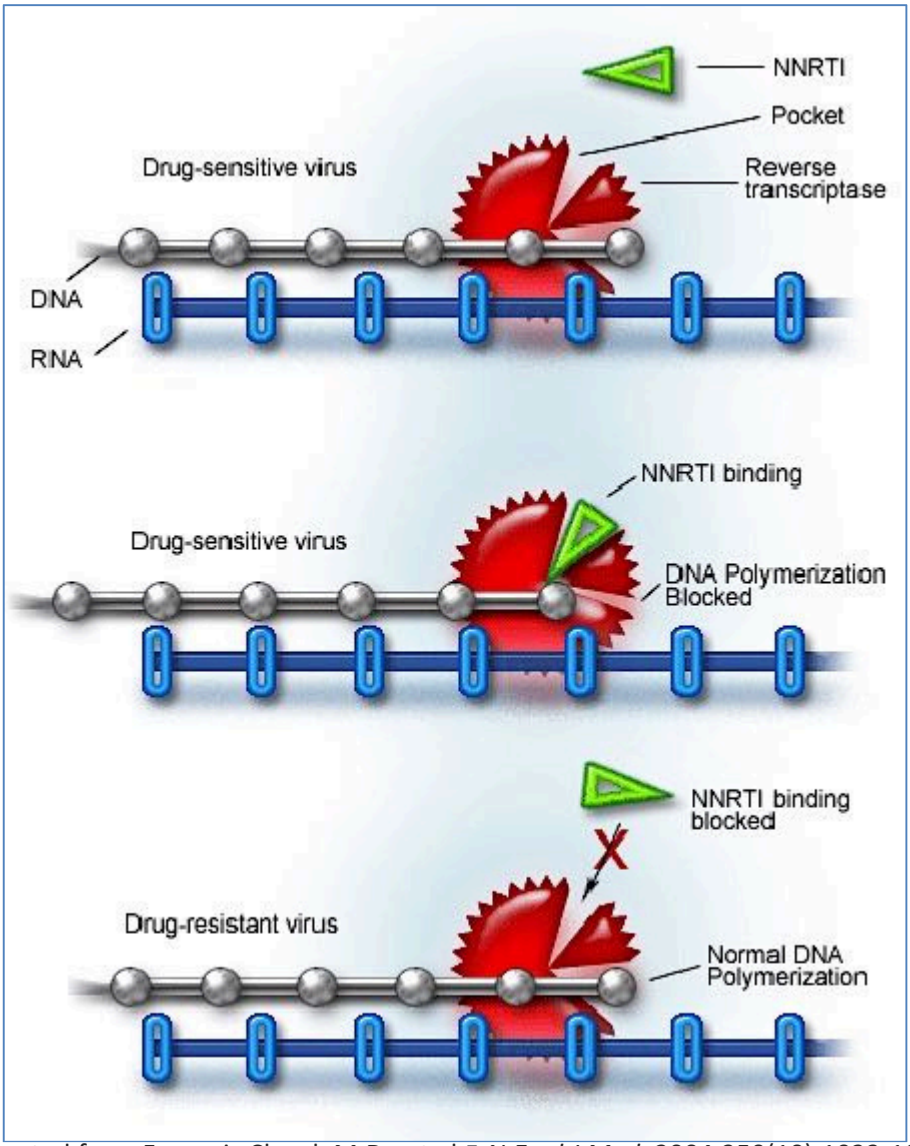
OPPORTUNIST INFECTIONS AND TUMORS IN AIDS	
viruses	disseminated CMV (including retina, brain, peripheral nervous system, gastrointestinal tract) HSV (lungs, gastrointestinal tract, CNS, skin) JC virus (brain – PML) EBV (hairy leukoplakia, primary cerebral lymphoma)
bacteria*	mycobacteria (e.g. *Mycoplasma avium, M. tuberculosis* – disseminated, extrapulmonary) *Salmonella* (recurrent, disseminated) septicemia
protozoa	*Toxoplasma gondii* (disseminated, including CNS) *Cryptosporidium* (chronic diarrhea) *Isospora* (with diarrhea, persisting more than one month)
fungi	*Pneumocystis jiroveci* (pneumonia) *Candida albicans* (esophagitis, lung infection) *Cryptococcus neoformans* (CNS) histoplasmosis (disseminated, extrapulmonary) *Coccidioides* (disseminated, extrapulmonary)
tumors	Kaposi's sarcoma** B cell lymphoma (e.g. in brain, some are EBV induced)
other	wasting disease (cause unknown) HIV encephalopathy

*also pyogenic bacteria (e.g. *Haemophilus, Streptococcus, Pneumococcus*) causing septicemia, pneumonia, meningitis, osteomyelitis, arthritis, abscesses etc.; multiple or recurrent infections, especially in children

**associated with HHV8, an independently-transmitted agent; 300-times as frequent in AIDS as in other immunodeficiencies

HIV Drug Options:

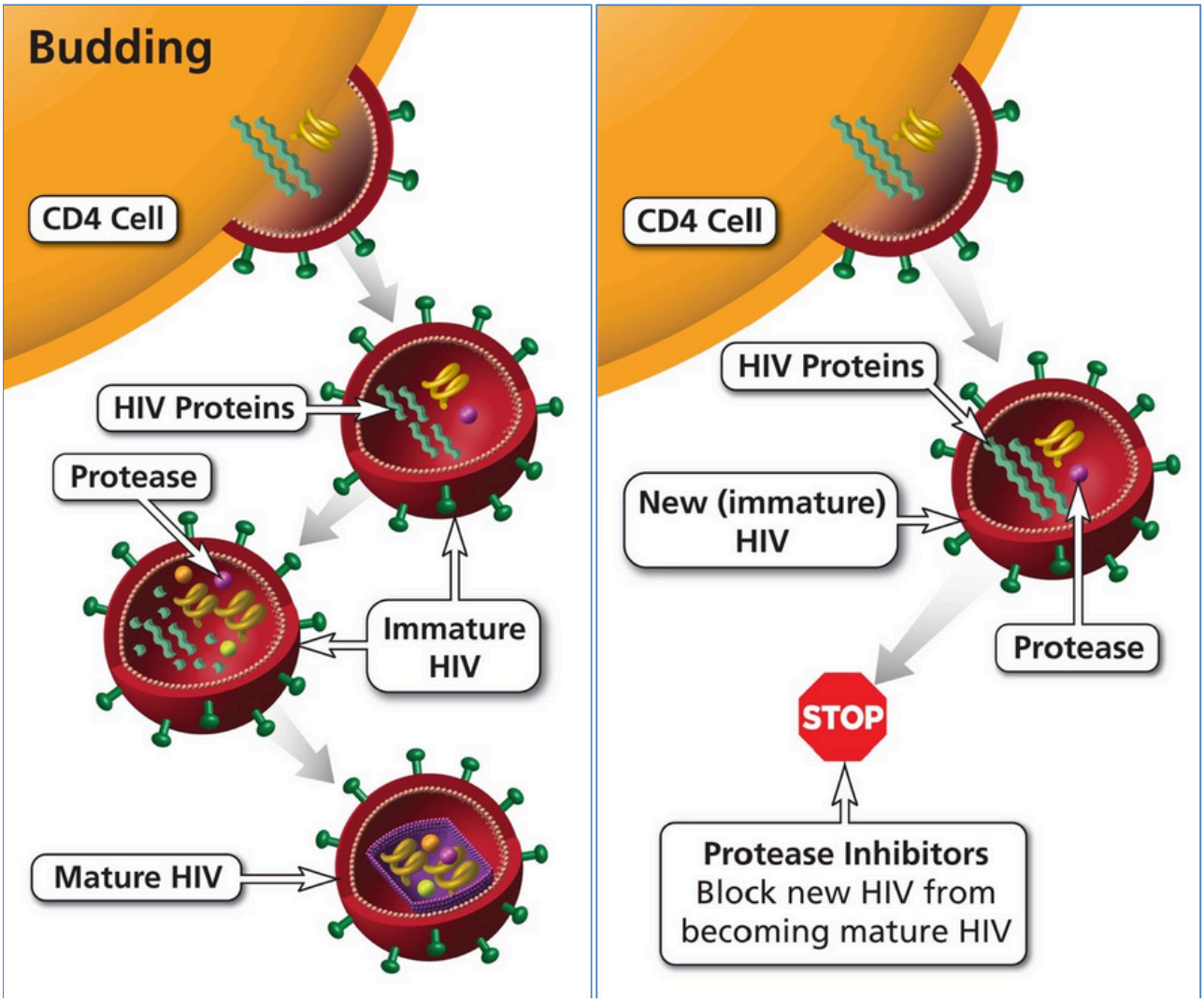
- **Fusion Inhibitors:**
  - **Eg: CCR5 Inhibitors:**
    - Prevent HIV from fusing with the Cellular Membrane
- **Reverse Transcriptase Inhibitors (RTI's)**
  - **Nucleoside Reverse Transcriptase Inhibitors (NRTIs)** – (Blocks addition of purines/pyrimidines to DNA)
    - Zidovudine (azidothymidine, AZT)
    - Didanosine (dideoxyinosine, ddi)
    - Zalcitabine (dideoxycytidine, ddC)
    - Lamivuridine (3TC) (complementary resistance spectrum to AZT)
    - **→ Prevents Extension of the Chain of DNA Synthesis.**



Adapted from François Clavel, M.D., et al.5 *N Engl J Med*. 2004;350(10):1023-1035.

  - **Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs):**
    - Targets the Non-Nucleoside-Binding Site of the HIV's Reverse Transcriptase → Inhibits RT Activity.

- **Protease inhibitors** – (Next generation of drugs):
  - Prevents cleavage of Inactive Poly-Proteins into Active Viral Proteins.
  - → Assembly of ineffective (Non-Infective) viruses.



https://clinicalinfo.hiv.gov/en/glossary/protease-inhibitor-pi

SEXUAL DYSFUNCTIONS & TREATMENT:

SEXUAL DYSFUNCTIONS & TREATMENT:

Both Women & Men:

- **Hypoactive Sexual Desire Disorder:**
  - o Characterised as a marked lack of sexual fantasies/desire for some period of time.
  - o Considered a *Disorder* if it causes distress/interpersonal difficulties and not be accounted for by another medical disorder (depression/drugs/other).
  - o **Treatment:** Psychological 'Couple' Therapy (Relationship/Communication/Sexual Counselling)

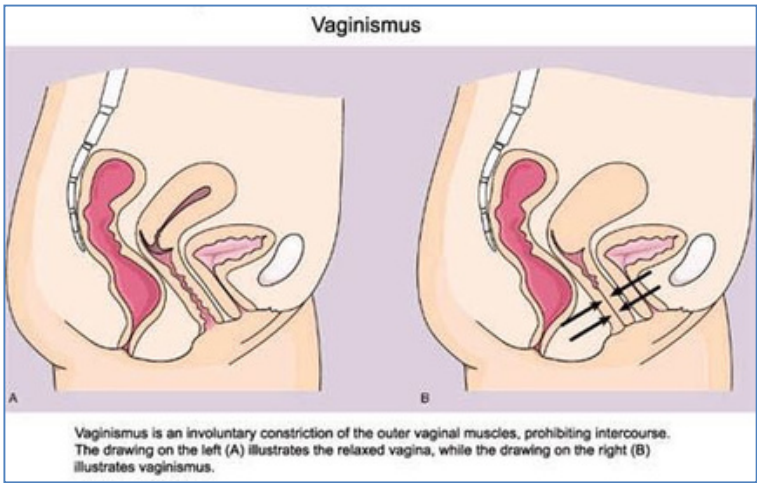
- **Sexual Aversion:**
  - o Characterised as active avoidance of sexual encounters.
  - o (More common in women – Theorized to be due to being the 'receptive' partner → Makes them vulnerable to physical/sexual abuse and they may have less perceived control over sexual experiences.)
  - o **Treatment:** Counselling

- **Dyspareunia:**
  - o Painful sexual intercourse, due to medical or psychological causes.
  - o Women – If she's a virgin, her 1st time can be painful.
    - § - Or if the couple aren't physically size-compatible.
    - § - Or if there is insufficient lubricant production
    - § - STD
  - o Man – If he has phimosis (Tight foreskin)
    - § - STD
  - o **Treatment:** Depends on the cause – self-explanatory.

W om en-Specific:

- **Female Sexual Arousal Disorder:**
  - o Characterised by the inability to attain/maintain an adequate ***Lubrication-Swelling*** response during sexual activity.
  - o **Causes** – Stress, Fatigue, Gender Mis-Identity, Childhood Sexual Abuse, others....
  - o **Treatment:** Exogenous Lubricant, Couple Counselling, Drug 'Bremelanotide' to ↑Libido.

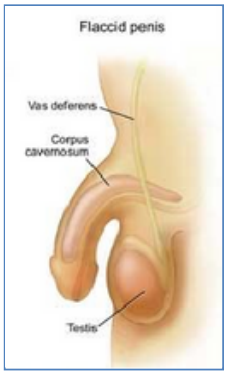
- **Vaginismus:**
  - o *Vaginal Spasm* – painful & often prolonged contraction of the vagina in response to touching of the Vulva or Vagina.
  - o Is the result of a conditioned reflex of the ***Pubococcygeus Muscle*** → contracts in response to any form of penetration.
  - o Affects a woman's ability to engage in any form of Vaginal Penetration.
  - o **Some Causes** – Fear of Painful Sex, Belief that sex is wrong/shameful, traumatic sexual experiences.
  - o **Treatment:**
    - § Psychological – Address the psychological aspects.
    - § Physical – Sensate Focus Exercises, Self-administered Vaginal Dilators (Gradually increasing in size), Botox (Local paralytic)

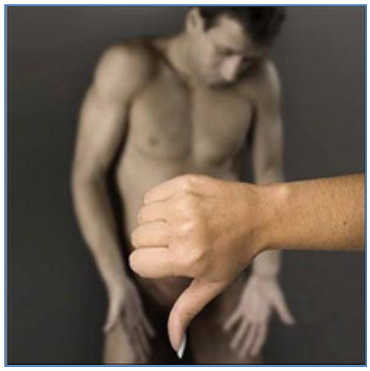


- **Female Orgasmic Disorder:**
  - o Characterised by a Significant Delay/Total Absence of Orgasm during sexual activity.
  - o **Cause** – Can result from Trauma, but can also be acquired through Relationship Problems.
  - o **Treatment** – Research suggests that women can increase orgasm capacity through masturbatory training & "Exploring themselves", and de-stigmatizing sex.

M en-Specific:

- **Male Erectile Disorder:**
  - o 25% of all men over 40yrs.
  - o Inability to develop/maintain an erection of the penis.
  - o **Causes –** Decreased Blood-Flow to the Penis due to:
    - § Damage to Nervi Erigentes,
    - § Diabetes
    - § Depression
  - o **Treatment**- Viagra (sildenafil) / Cialis (tadalafil)





- **Male Orgasmic Disorder:**
  - o Persistent/recurrent inability to achieve orgasm despite lengthy sexual contact/intercourse.
  - o **Cause –** (Rarely physical) Acquired – traumatic sexual experience, strict religious upbringing, hostility over control, lack of trust.
  - o **Treatment** – Counselling & Psychotherapy → ↓performance anxiety, ↑Arousal.


- **Premature Ejaculation:**
  - o A condition where a man ejaculates earlier than he or his partner would like him to.
  - o Defined by *Masters & Johnson* as when the man ejaculates before his partner achieves orgasm more than 50% of the time.
  - o **Cause –** Psychological, Environmental & Physical Factors.
    - § Depression, Stress, Unrealistic Expectations, Sexual Repression, Lack of confidence, poor
    - § em otional intim acy.
      Neurological.
  - o **Treatment –** Topical Lignocaine Sprays, Mental Desensitisation to sex, Low-Dose Tricyclic Antidepressants to prolong serotonergic stimulation.

Tips for Clinicians When Talking about Sexual Dysfunction:

- **Communication:**
  - o Be comfortable talking about sex
  - o Be empathetic, non-judgemental & understanding
  - o Reassure the individual
  - o Never assume anything
  - o Start with general, non-threatening questions:
    - § Are you sexually active at present?
    - § Do you have any sexual concerns/worries that I might be able to help you with?
  - o Generalise:
    - § "Many people in your situation have sexual worries"
    - § "It's not just you"
  - o Normalise:
    - § "It's normal for people who take this medication...What worries have you had?"
  - o Basic Screening Questions:
    - § When was the last time you had any sexual activity?
    - § Have you engaged in sex with just men/women or both?
    - § How many people have you had sex with in the past year?
    - § How are things going for you sexually?
    - § Any questions/concerns about sex at the present time?
- **Examinations:**
  - o o Sexual History
  - o General Physical (Identify systemic illnesses/signs of abuse) o Genital Privacy
  - o Neurologic & Vascular Exam o Laboratory Testing (Haem/Biochem/Endocrine) o **Women:**
    - § Pap Smear
    - § Vaginal Culture
    - § Hormones
  - o **Men:** Hormones
    - §

CONTRACEPTION

CONTRACEPTION

Definitions:

- **Contraception:** prevention of conception (before fertilisation)
- **Contragestion:** prevention of pregnancy (after fertilisation)
- **Fertility:** capacity to conceive & produce offspring (98% of trying couples should conceive within 1 year)
- **Infertility:** Clinically – inability to conceive after 12 months of frequent unprotected sex.
- **Fecundability:** probability of achieving pregnancy in 1 menstrual cycle (25%ish in healthy young couples)
- **Fecundity:** ability to achieve live birth in 1 menstrual cycle.

"Ideal" Contraceptives:

- 100% effective (0% failure rate)
- 100% sexually convenient (doesn't interfere with spontaneity)
- 100% reversible (fertility returns after use)
- 100% free of dangerous side effects
- 100% free of annoying side effects
- 100% maintenance-free
- Easily available
- Cheap
- Perhaps some good side effects.

Failure Rate: -how often the method will fail if used exactly as directed.

- Expressed as percentages
- Typical (user) failure rate takes into account human error.

Types of Contraception:

- **Sterilisation** (vasectomy/tubular ligation)
- **Barrier methods** (condoms/diaphragm/cervical cap)
- **Spermicide**
- **Withdrawal**
- **Periodic Abstinence** (natural family planning = predicting ovulation + abstain during fertile periods)
- **Hormonal**
    - o Combined oral – oestrogen & progesterone
    - o o Progesterone only
    - o Emergency contraception – morning after pill o Vaginal ring – secretes oestrogen & progesterone
    - Arm implant – long term contraception.

- **IUCD – IntraUterine Contraceptive Device**
    - o Mirena
    - o Copper Rod

Initial Interview:

- **What are the reasons for the contraception?**
  - The ***reasons*** for contraception will decide what ***type*** you should give:
    - Eg: Prevention of pregnancy
    - Eg: Menorrhagia
    - Eg: Irregular Periods
    - Eg: Prevention of STIs
- **Assess Age/Maturity of Patient:**
  - Eg: If Young/Immature/Irresponsible – Consider foolproof, Effective Contraception + Barrier
  - Eg: If Mature/Responsible – Consider Lowest Side-Effect Contraception + Barrier
  - Eg: If Multiparous – Consider Tubal Ligation/Vasectomy
- **Sexual History:**
  - Are you sexually active?
  - Do you currently have one or more sexual partners? How many in last 6mths?
  - Have you ever been diagnosed with any STIs? Which ones? Treated?
  - Last STI screen?
  - Do you practice safe sex?
  - Any current/past contraceptives?
    - Which one/s?
    - For how long?
    - Compliance?
    - Understanding of how to use it effectively?
    - Any side effects? (weight gain, mood swings)
  - Any barrier protection?
- **Menstrual History**
  - Age of Menarche (& Menopause if relevant)?
  - LMP – Last menstrual period? (& Was the last period '*normal*'?)
  - Regularity of periods? (N ≈Predictable timing of menses)
    - Duration of cycle? (N ≈28days)
    - Duration of menstruation? (N ≈5days)
    - (Note: Irregular can = PCOS/Stress/Anorexia/PID/Fibroids/etc)
  - Quantity of bleeding? (Amenorrhoea, Menorrhagia)
  - Intermenstrual Bleeding – Ie: bleeding between periods?
  - Dysmenorrhoea – Ie: Painful periods?
  - Dyspareunia – Painful Intercourse (Endometriosis)
  - Associated Symptoms: Abdominal pain, Fever, Vaginal Discharge
- **Gynaecological History**
  - Up to date with Pap-Smears? Results of last Pap-Smear? Any Previous Smear Abnormalities?
  - Gardasil Vaccinations? – All 3?
  - Previous Colposcopy?
  - Past Gynaecological Surgeries?
- **Obstetric History:**
  - Gravidity (Number of pregnancies)
  - Parity (Number of births)
  - Pregnancy complications?
- **Relevant Medical History:**
  - Hx/FamHx of Breast Cancer
  - Hx/FamHx of Endometrial Cancer
  - Hx/FamHx of Colon Cancer (HNPCC – Related to some gynaecological cancers)
- **Discuss Contraceptive Options:**
  - **Barrier Contraceptives –** (Condoms, Female Condoms, Diaphragm)
  - **Hormonal Contraceptives –** (COCP/Minipill/Depo Provera/"Implanon"/IUCDs/Vaginal "Nuvaring")
  - **Surgical Sterilisations –** (Tubal Ligation, Vasectomy, Hysterectomy)
  - **Lactating Women:**
    - Condoms
    - **Progesterone-Only Contraceptives –** (Minipill, Depot-Provera, Implanon, Mirena)

Highest Yield/Most Popular = Oral Contraceptive Pills:

Eg: Case 1:

- 17yo nulligravid girl comes to see you (GP) asking for the "OCP". She is in a sexually-active relationship with a 25yo male who has never been tested for STDs, and they don't use "protection". She also complains of dysmenorrhoea, and menorrhagia. Manage this patient.

Management:

- **PC/HxPC**
- **Sexual Hx –** (Incl. What contraception do/have you used?)
- **Menstrual Hx –** (Esp. Any Undiagnosed Menstrual Abnormalities?)
- **Obstetric Hx –** (Nulligravid)
- **PMH/PSH –** (Particularly Cardiovascular/Liver/Gynaecological/Haematological/Diabetes/Migraines)
- **Social Hx:**
  - **HEADSS Assessment –** (Home, Education, Activity, Depression, Sex, Suicide) **– Esp. For <18yo's**
    - **Incl. Non-Consensual Sex**
    - **Incl. Significant Age gaps >5yrs (Inappropriate power differential)**
  - **ATODS Inquiry? –** (Particularly Smoking – Note: Smoking + >35yrs = Absolute Contraindication)
- **Contraception Counselling:**
  - **Pt's Reasons/Goals?**
  - **Discuss Options:**
    - **Barriers - (Condoms)**
    - **Hormonals – (OCP, Depot-Provera, Implanon, Mirena)**
- **BEFORE STARTING COCP:**
  - **Assess Absolute Contraindications!**
    - Current Pregnancy/Breastfeeding?
    - >35 & Smoker?
    - Undiagnosed Menstrual Abnormalities?
    - Cardiovascular Disease?
      - Coronary Artery Disease?
      - Hyperlipidaemia?
      - Mod→Severe Hypertension?
    - Thromboembolic History? (DVT/PE/STROKE)
    - Liver Disease?
    - Diabetes?
    - Epilepsy? (Antiepileptics)
    - Hx of Breast/Uterine Tumours?
    - Migraines with Aura/Neurology?
  - **Physical Examination:**
    - BP, Weight, Liver Exam, Peripheral Vascular Exam, + Breast Exam, Pelvic Exam + PAP Smear)
  - **Investigations:**

Pregnancy Test
Bloods – (FBC, Coags, Lipids, LFTs, BSL)
+/- STI Screen – (FCU & Swabs for Chlamydia/Gonorrhoea, TPPA/RPR for Syphilis, HepB/C, HIV, HSV serology)

  - **Counsel on "Missed Pills":**
    - **If 1 Missed Pill:**
      - Take 'make-up' pill as soon as remembered, then the next pill @ usual time.
    - **If 2 Missed Pills During 1st 2 wks:**
      - Take 2x 'make-up' pills as soon as remembered, then 2x pills the next day.
      - + Advise backup contraception for next 7days
    - **If 2 Missed Pills During last 2wks:**
      - No need for 'make-up' pill; Just continue 1x Pill/day until end of cycle.
      - + Advise backup contraception for next 7days
    - **If >3Missed Pills:**
      - No need for 'make-up' pill; Just continue 1x Pill/day until end of cycle.
      - + Advise backup contraception for next 7days

- **When to start the Pill?**
  - **1:** Aim to start in the 1st 5days of cycle
  - **2:** Use 'Back-up' contraception for the 1st 7days on OCP.
- **Final Cautions:**
  - **Abstain from sex &/or Use 'Back-up' contraception if:**
    - On Antibiotics (Esp. Rifampicin)
    - Experiencing Vomiting/Diarrhoea
  - **Possible Side Effects:**
    - Tender Breasts
    - Weight Gain
    - Nausea
    - Headaches
  - **If Prescribing Progesterone Only Pill:**
    - *MUST BE TAKEN AT THE SAME TIME EVERYDAY!!!*
    - Possible Irregular Spotting

- **Arrange Followup after 3mths & <Annually Thereafter.**

Other Issues:

- **What to do about 'Breakthrough Bleeding' on an OCP?**
  - **1: Rule out following causes:**
    - Missed Pills?
    - Medication Interactions? – (Some Antibiotics, Antiepileptics [Except Valproate & Clonazepam], Antacids, St. John's W ort)
    - Vomiting/Diarrhoea – (Ie: ↓Absorption of Drug)
    - Infection
    - Smoking? (50% more likely to have breakthrough bleeding)
    - Gynae Causes of Intermenstrual Bleeding – (Endometriosis, Endometrial Hyperplasia, Fibroids, Miscarriage, Pregnancy, Endometrial Cancer, Cervical Cancer)
  - **2: Then Change OCP Formulation/Brand**

- **EMERGENCY POST-COITAL CONTRACEPTION:**
  - **Goal:**
    - Last-chance contraception if current contraceptive failed (Eg: Broken Condom)
  - **Timing:**
    - ASAP after unprotected sex. (<120hrs / 5days)
  - **Methods:**
    - **#1 Prog-Only:** (AKA: "*Plan-B*") Single Dose – 1.5mg – (Effective <72hrs & Fewer Side Effects)
    - **Copper IUD:** Best efficacy; But inconvenient & invasive.
    - **(Note:** Combined [AKA: "*Yupze Regimen*"] <72hrs is *Less Effective* than "*Plan-B*" & has ↑SE's**)**

Note: Progesterone-Only OCP:

- **Slightly higher failure rates than COCP – but due to user-error. (Also only stops 10% of Ovulation)**
- ***Must be taken strictly – WITHIN a 3hr window each day***
- **o If missed/taken late → 'Back-up' contraception required for 2days**
- **Fewer Contraindications - Pregnancy is the only *Absolute*.**
  Fewer Side Effects – Just Breakthrough/Irregular Spotting

Note: Depo-Provera:

- **Prevents Ovulation, Thickens Cervical Mucus & Inhospitable Endometrium**
- **Guaranteed Effectiveness for >3mths**
- **When to start – Within the 1st 5days of Cycle, >6wks post-partum, Exclude Pregnancy**
- **Poor Reversibility <9mths until return to cycle**
- **Contraindications – Pregnancy, Lactating, Breast Cancer, VTE/MI/STROKE, Liver, Unexplained Bleeding**
- **Side Effects – Irregular Bleeding, 'Irreversible', Weight Gain, ↓Libido**

Note: Implanon:

- **Sub-Cutaneous Rod**
- **Effective for >3yrs; but <20% Removed in 12mths due to Nuisance Bleeding/Irregularity & Weight Gain.**
- **Contraindications – Pregnancy, Lactation, Breast Ca, VTE, Liver Disease.**

Note: Mirena:

- **Thickens Cervical Mucus; Inhospitable Endometrium**
  - **o ALSO Useful for treating Menorrhagia**
  - **o ALSO Useful as the Progesterone Component of HRT (Can give Oestrogen Only if on Mirena)**
- **Effective for <5yrs**
- **Side Effects:**
  - **o Nuisance Bleeding/Irregularity usually only lasts 3-5mths**
  - **o Less Hormonal-Side-Effects (Due to 'Topical' admin, NOT Systemic)**
  - **o + Oestrogen Levels = Normal = No Bone Density Concerns.**
- **Contraindications – Pregnancy, PID, Unexplained Bleeding (Ca. Uterus/Cervix), Breast Ca, Nulliparous.**

Note: Copper IUDs:

- **Induces Sterile Endometritis → Prevents Fertilisation & Implantation.**
- **o Also effective as Emergency Contraception within 5days of Unprotected Sex.**
- **Effective for <5yrs**
  Side Effects – Dysmenorrhoea & Menorrhagia, ↑Ectopic Risk

Note: Barrriers

- **Condoms/Female Diaphragms**

Perm anent Sterilisation

- **Vasectomy/Tubal Ligation**

Contraceptive Options:

	Combined Pill (Global Oest+Prog)	Minipill – Prog. Only (Systemic Prog)	Depo-Provera (Systemic Prog)	Implanon SC (Systemic Prog)	Mirena IUD (Local Prog)	Copper Rod IUD (Non-Hormonal)	Condoms (Barrier)	Family Planning (Non-Hormonal)	Tubal Ligation (Surgical)	Vasectomy (Surgical)
MOA:	Inhibits Ovulation Thickens Cx Mucus	Inhibits Ovulation Thickens Cx Mucus	Inhibits Ovulation Thickens Cervical Mucus	Inhibits Ovulation Thickens Cx Mucus	Thickens Cx Mucus (↓ Endometrial Growth)	Causes Sterile Endometritis (Hospitable Uterus)	Barrier – Prevents Insemination	Avoiding Coitus During Most Fertile Periods (D8-19)	Barrier – Prevents Oocyte from entering Uterus	Barrier – Prevents Sperm from mixing with Ejaculate.
Duration of Action:	24hrs	22hrs	3 Months	3 Years	5 Years	3-5 Years	Per-Usage	11 Days	Permanent	Permanent
Efficacy:	Excellent-Moderate 0.1-5% Failure	Excellent-Moderate 0.1-5% Failure	Excellent <0.3% Failure	Excellent <0.2% Failure	Excellent <0.1% Failure	Good <1% Failure	Moderate-Poor 3-15% Failure	Poor <25% Failure	Excellent <0.5% Failure	Excellent <0.5% Failure
Reversibility:	Yes – 24hrs	Yes – 22hrs	Yes – 3-9mths	Yes – 1 Cycle	Yes – 1 Cycle	Yes – 1 Cycle	Yes – Instantly	Yes – 11 Days	No	No
Spontaneity:	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Poor	Poor	Excellent	Excellent
Pros:	Effective if used properly. Controls Periods (if skip sugar pills). Reduced cramping. Protects against ovarian & endometrial Ca. (a Rx for Acne) (a Rx for PCOS) (Off-label usage)	Effective if used properly. Inhibits Ovulation NOT Affected by Antibiotics Safe for Smokers >35 Safe for Lactating Women	Highly Effective Inhibits Ovulation NOT Affected by Antibiotics LOW dependence on user – 3mthly injections. High Spontanaeity Moderate Duration Safe for Lactating Women	Highly Effective Inhibits Ovulation NOT Affected by Antibiotics NOT dependent on user – Once off Insertion High Spontanaeity Easily Removed & Reversed Long Lasting Safe for Lactating Women	Highly Effective & Long-Lasting NOT Affected by Antibiotics NOT dependent on user – Once off Insertion High Spontanaeity Easily Removed & Reversed Safe for Lactating Women (a Rx for Menorrhagia)	Highly Effective NOT Affected by Antibiotics NOT dependent on user – Once off Insertion High Spontanaeity Easily Removed & Reversed Safe for Lactating Women No hormonal side effects	Easily Available STI Protection (HIV, HPV, Chlamydia, Gonorrhoea) No hormonal side effects Safe for Lactating Women	100% natural (No exogenous hormones/devices)	<100% Effective 1-off Procedure → Permanent Lifelong Contraception No hormonal side effects NO User Dependence	<100% Effective 1-off Procedure → Permanent Lifelong Contraception No hormonal side effects NO User Dependence Reversible Father can freeze sperm at the blood bank if unsure about future children.
Cons:	Highly User Dependent – DAILY Tender Breasts, Weight Gain Nausea, Headaches. Inhibits Lactation **Drug Interactions:** Antibiotics, Barbiturates, Antiepileptics, St.John's Wort.	Highly User Dependent - Taken SAME TIME EVERYDAY Tender Breasts, Irregular Spotting NOT protective for ovarian/endometrial ca's.	POOR Reversibility of Contraception AND SIDE EFFECTS– up to 9mths Require repeat GP visits for injections 3mthly. Weight Gain	Painful SC Insertion Transient initial spotting Tender Breasts, Headaches.	Invasive/Painful Insertion Ovulation still occurs Menstruation still occurs (but lighter & shorter) Transient initial spotting	Invasive/Painful Insertion Ovulation still occurs Menstruation still occurs (AND is HEAVIER & MORE PAINFUL)	Not Very Effective (Can break/slip off) Poor Spontaneity	HIGHLY UNRELIABLE Poor Spontaneity (when fertile) Highly dependent on couple.	NOT Reversible Surg/Anaesthetic Risks Expensive	Surg/Anaesthetic Risks Expensive Doesn't stop the woman from getting pregnant via other means.
Contraindications:	Smokers >35yrs Breast Feeding Epilepsy Vascular Risk Factors POOR COMPLIANCE	Previous Ectopic Pregnancy POOR COMPLIANCE	-	-	-	Primigravid/para Iron Deficiency Anaemia	Latex Allergy	Couples who cannot afford unwanted pregnancies.	Any contraindications to surgery or anaesthesia.	Any contraindications to surgery or anaesthesia.
Suitability:	For Compliant, Non-Breast-Feeding, Non-Smoking, Non-Epileptic Pts who want reversible & reliable contraception.	For HIGHLY Compliant pts who have contraindications to the COCP. (Ie. Breast-Feeding, Smoking, Epilepsy, Vasculopaths)	Pts who want low-maintenance, reliable, medium-term contraception who DONT WANT an IUD or an Implant.	Pts who require LOW-Maintenance, Reliable, Long-Term Contraception ...AND/OR... Are Breast-Feeding/ don't tolerate oest.	Pts who require LOW-Maintenance, Reliable, Long-Term contraception ....AND/OR.... Have Menorrhagia	Older Multiparous pts who require LOW-Maintenance, Non-Hormonal, Reliable, Long-Term contraception	Advisable for all sexual encounters with random partners. Also a good adjunct for any other contraceptive.	For Couples who don't mind accidental pregnancy.	For women who are 100% sure they want no more children.	For couples who are ≈ certain they don't want future children. (But Artificial Insemination is an option)

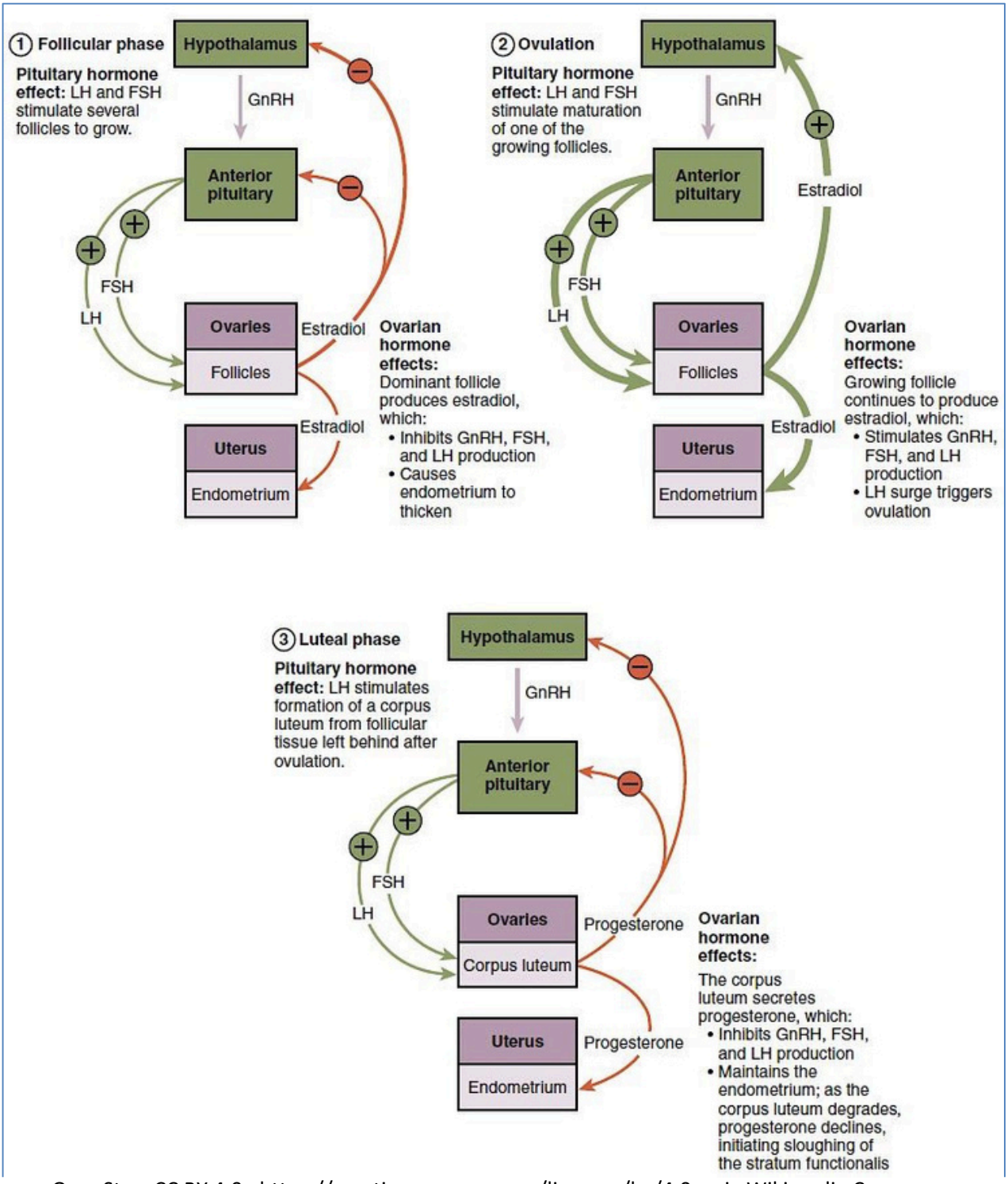
General MOAs of Hormonal Contraceptives:

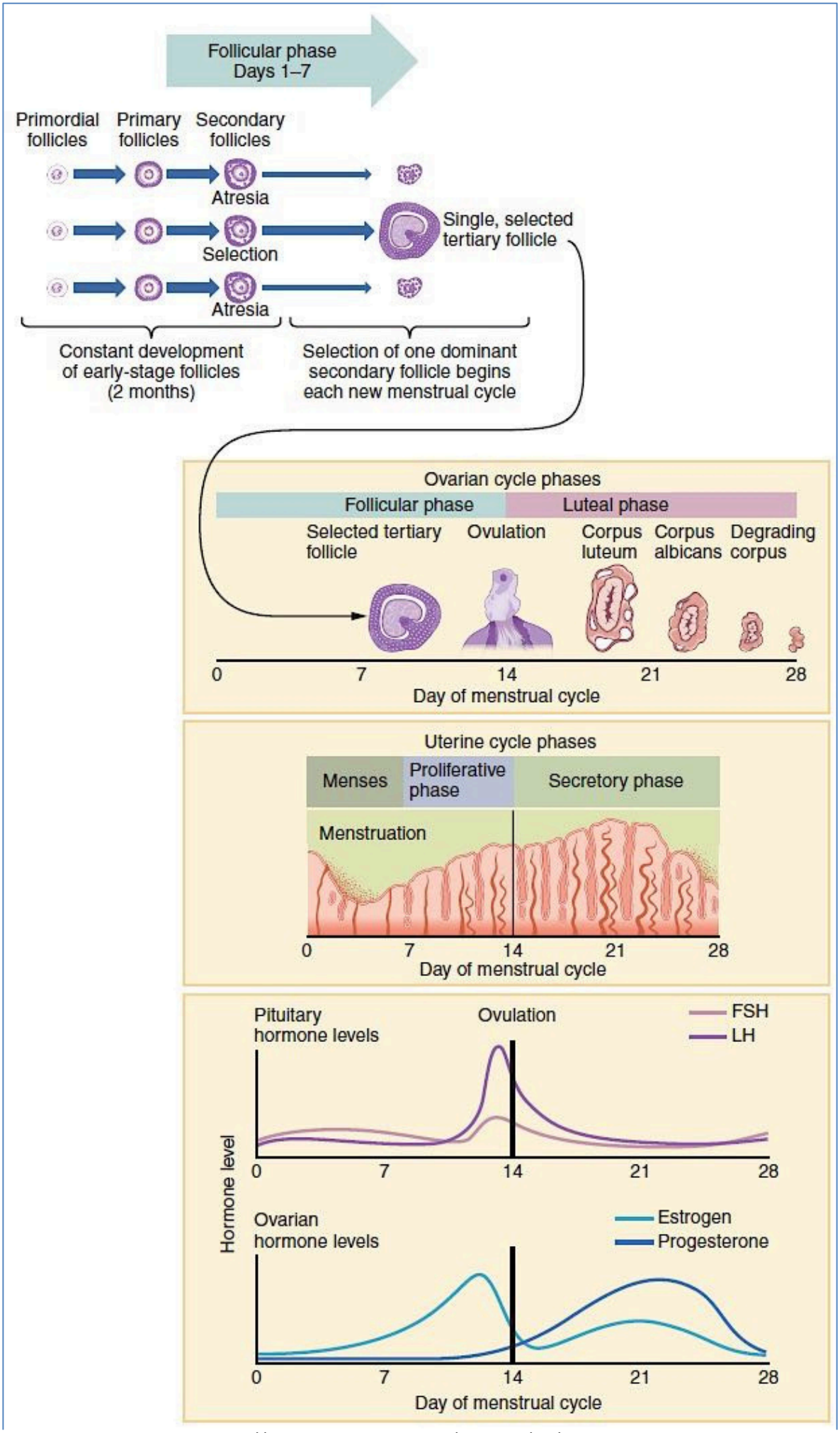
Oestrogen MOA:

- (Initially included in oral contraceptives for better cycle control (Stabilise endometrium & reduce
- breakthrough/intermenstrual bleeding).
  Slightly Elevated Oestrogen → Negative feedback on **Anterior Pituitary** → ↓FSH & LH
  - o ↓FSH → Inhibits follicular development
  - o ↓LH → Inhibits Ovulation

Progesterone MOA:

- High Progesterone → Negative feedback to the **Hypothalamus** → ↓GnRH → ↓FSH & LH
  - o ↓FSH → Inhibits follicular development
  - o ↓LH → Inhibits Ovulation
- ALSO → Thickens cervical mucus → Inhibits sperm from crossing cervix.





EMERGENCY CONTRACEPTION & ABORTION

Emergency Contraception:

- **Goal:**
- o Last-chance contraception if current contraceptive failed (Eg: Broken Condom)

Timing:

- o ASAP after unprotected sex. (<120hrs / 5days)
- o **Note: Completely ineffective Post-Implantation**

- **Methods:**
  - o **#1 Prog-Only:** (AKA: ***"Plan-B"***) Single Dose – 1.5mg – (Effective <72hrs & Fewer Side Effects)
    - § ***Note: NOT Effective After Implantation!!***
  - o **Copper IUD:** Best efficacy; But inconvenient & invasive.
    - § ***Still Effective After Implantation***
  - o (Note: Combined [AKA: "Yupze Regimen"] <72hrs is Less Effective than "Plan-B" & has ↑SE's)

Abortion Pre-Requisites:

1. **Counselling on Alternatives (Eg: Adoption)**
2. **Informed Consent**
3. **Comprehensive History**
4. **Discuss Contraception *After* Abortion**
5. **STI-Screen & Education**
6. **Antibiotic Prophylaxis Prior to Abortion**

Abortion:

- **Early Medical Abortion (<6wks):**
  - o **STAT DOSE - *Mifepristone/RU486*:**
    - § *Progesterone Receptor Agonist* → Prevents Endometrium from supporting Fertilised Egg.
    - § Effective <63days (7wks) since last period.
    - § No need to come into Hospital
  - o **Or Methotrexate – (Used more in Ectopic Pregnancies)**
- **Early Surgical Abortion (<14wks):**
  - o **Dilation & Suction Curettage:**
    - § Available up to 14wks Gestation
- **Late Medical Abortion (14-20wks):**
  - o **STAT DOSE - *Mifepristone/RU486*:**
    - § *Progesterone Receptor Agonist* → Prevents Endometrium from supporting Fertilised Egg.
    - § Effective <63days (7wks) since last period.
  - o **48HRS LATER – *Vaginal Misoprostol*:**
    - § *Synthetic Prostaglandin* → Ripens Cervix & Induces Labour
    - § + Analgesia, +/- Anti-Emetics, +/- Anti-D-Ig in Rh-Negative Mothers
    - § Very Safe – Small risk of bleeding; <1:100000 risk of death.

INFERTILITY

INFERTILITY

Infertility Definition:

- **Generic:** "Failure to conceive following >1yr of regular unprotected sex during fertile periods"
- **Primary:** "As above – but in a Nulligravid woman"
- **Secondary:** "As above – but in a uni/multi-parous woman"

Infertility – Epidemiology:

- Incidence = 20%
- Male Causes = 40%
- Female Causes = 40%
- Combined M&F = 20%

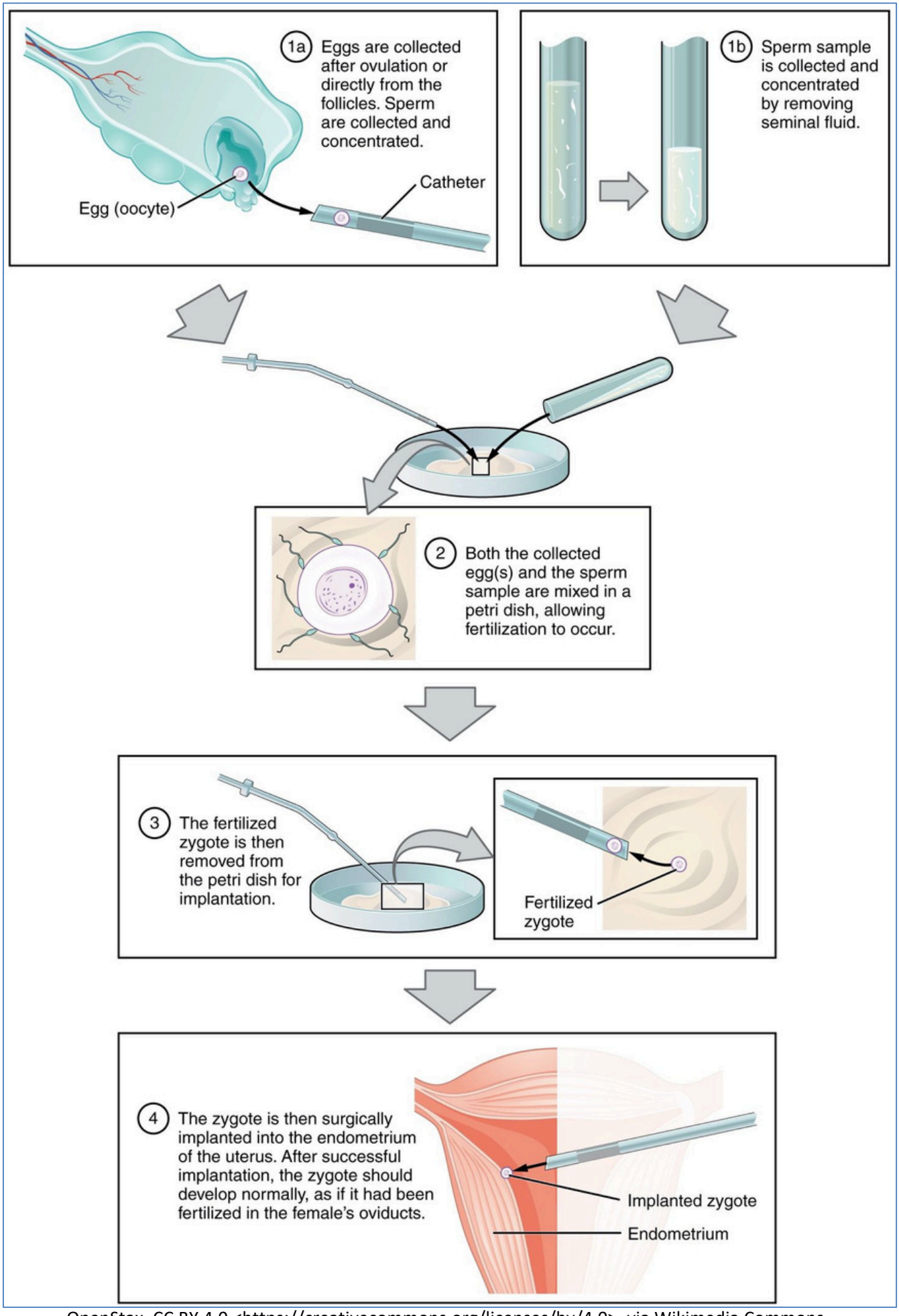
Evaluation of Infertility:

1. **Male Factor –** ***Adequate functional & motile sperms?***
   - **a. Sperm Concentration:** Normal = >20million/mL (<20M/mL = Oligospermia; No sperm = Aspermia)
   - **b. Motility:** Normal = >50% are forward progressive.
   - **c. Morphology:** Normal = >30% normal morphology
2. **Ovulation –** ***Is ovulation occurring?***
   - **a. Menstrual History:** Normal = 28 +/- 7days
   - **b. Cervical Mucus Studies** (@ Day 12-14)
   - **c. Ultrasound Scan** (Follicle Monitoring @ Day 10)
   - **d. Hormonal Assays** (Oestrogen @ Day 12, LH Levels @ Day13 , Progesterone @ Day21)
   - **e. Laparoscopy** (looking for ruptured ovarian follicle & Luteum @ Day 21-23)
3. **Cervical Function –** ***Can the sperm get through the cervix?***
   - **a. Post-Coital Test (PCT)** (Intercourse on D12-13 → Examine Cervical Secretions @ 8hrs → >10 Actively Motile Sperms per High-Power Field = Satisfactory)
4. **Tubal Function–** ***Can the sperm & egg meet?***
   - **a. Hystero-salpingography** (Radiological Dye) (Both @ D7-10)
   - **b. Laparoscopy + Blue Dye** (Naked Eye) (Both @ D7-10)
   - **c. Falloscopy** (Hysteroscopic examination of proximal fallopian tubes)
   - **d. Salpingoscopy** (Laparoscopic examination of distal fallopian tubes)
5. **Uterine Function –** ***Can Implantation occur and be maintained?***
   - **a. Ultrasound Scan** (Endometrium Normal? Or Fibroids/Polyps/Congenital) (@ Day 7-10)
   - **b. Hysteroscopy** (Endometrium Normal? Or Fibroids/Polyps/Congenital) (@ Day 7-10)

ART – Assisted Reproductive Technologies ***(Note: <30% Success Rate)*****:**

- **Ovulation Induction** (Using exogenous hormones to induce ovulation)
- **Luteal Phase Support** (Supplemental Progesterone *Post-ovulation* → Prevents early Menstruation)
- **IUI – Intrauterine Insemination** (Direct insemination into the uterus - Bypasses Cervical Barriers)
- **IVF-ET – InVitro Fertilisation & Embryo Transfer** (Fertilisation outside the body → Direct Embryo Transfer
- into Uterus)
- **GIFT –** Gamete intra fallopian transfer (sperm & egg artificially injected into fallopian tubes)
- **ZIFT** – Zygote intra fallopian transfer (fertilised egg transferred into the fallopian tubes)
- **ICSI – IntraCytoplasmic Sperm Injection** (Sperm directly injected into Oocyte *In-Vitro*)
- **TESA – Testicular Epididymal Sperm Aspiration** (Bypasses any semen/ejaculatory problems)

(Surrogacy/Adoption)



Infertility - Female Causes:

- **Endometriosis:** ***(Note: 40-60% of women conceive within 18mths of surgery)***
- **Pelvic Inflammatory Disease (PID):**
- **Polycystic Ovarian Syndrome (PCOS):**
- **Hypothalamic Amenorrhoea (Underweight/Eating Disorders/Female Athlete Triad)**
- **Other Causes:**
  - **Advanced Maternal Age (>35)/ Menopause (~>45)**
  - **Smoking (Reduces Fertility by 60%)**
  - **Chemotherapy/Radiotherapy**
  - **Turner's Syndrome**
  - **Ovarian Cancer**
  - **Anti-Sperm Antibodies**

Infertility - Male Causes:

- **Pre-Testicular Problems:**
  - **Pituitary Failure ("*Hypogonadotrophic Hypogonadism*")**
  - **Strenuous Riding (Cycling/Horseriding)**
  - **Chemotherapy/Radiotherapy**
  - **Anabolic Steroids**
  - **Impotence**
- **Testicular Problems:**
  - **Klinefelter's Syndrome**
  - **Testicular Cancer**
  - **Cryptorchidism**
- **Post-Testicular Problems:**
  - **Vas-Deferens Fibrosis (Chlamydia/Gonorrhoea)**
  - **Vas-Deferens Occlusion (Cystic Fibrosis)**
  - **Vas-Deferens Compression by Varicocoele**
  - **Retrograde Ejaculation (Bladder Neck Sphincter Dysfunction – Eg: BPH, Prostate Surgery, Spinal Injury, Diabetic Neuropathy, Hypertension)**
- **Sperm Problems:**
  - **Eg: Low Sperm Count (Oligospermia <20M sperm/mL; Aspermia 0.sperm/mL)**
  - **Eg: Low Sperm Motility**
  - **Eg: Abnormally-Shaped Sperm**

BREASTFEEDING

BREASTFEEDING:

The Importance of Breastfeeding:

- **Advantages of Breastmilk:**
  - **Exactly suited to Bub's nutritional needs**
  - It adapts to your baby's changing needs:
    - The 1st half of a feed is thirst-quenching & sugary, and the last half is rich, creamy and full of
    - good fats.
      Throughout lactation and as your baby has fewer feeds.
  - Breastmilk is hygienic.
  - **Protects from infection**
  - **Protects against SIDS**
  - Convenient & free(No bottles, sterilising, mixing, etc)
  - Aids development of:
    - Eyesight
    - Speech
    - Jaw and mouth development.
  - The taste of breastmilk changes with mum's diet, meaning a breastfed baby is likely to accept foods you like when you introduce solids.
  - Skin-to-skin contact provides a physical connection & stimulates oxytocins release.

Guidelines:

- Feed (Breast/bottle) Newborns every 2-3hrs (day & night) for the 1st 3mths. (Ie: >8x/Day)
- Feeds should last 20-30mins.
- Ensure baby is getting enough:
  - >5 wet heavy disposable nappies per 24hrs
  - or >6-8 wet normal nappies
- If bub is hungry all the time, try to increase milk production by expressing into a bottle between feeds and supplementing feeds with pre-expressed milk (or formula) in a bottle.

How long to Breastfeed?

- Health authorities recommend mothers breastfeed exclusively for >6mths
- (The World Health Organization recommends breastfeeding until your child is two years and beyond, for as long as you and child desire.)
- Once you introduce solids, experts suggest it's best for your baby if you continue breastfeeding along with those solids until your baby is at least 12 months old.
- After that, it's really up to you and your baby how long you continue.

Don't expect too much of yourself – breastfeeding just doesn't work for everyone.

The basic feeding routine

1) Comfy chair with good back support
2) Large glass of water on side (Avoid caffeine)
3) Bring baby up to breast. "Chin-To-Breast"
4) Aim the nipple upwards towards the hard palate.
5) Ensure nose is clear
6) Listen for the occasional swallow
7) Once bub is satisfied, give it a chance to burp (Sit her upright and gently rub/pat her back)
8) Change Nappy
9) If still hungry, offer the other breast.

Attaching to the breast

1. Hold bub chest-to-chest with nose in line with nipple. Brushing the nipple over bub's upper lip or cheek triggers the "Rooting Reflex" – turns head & opens mouth.
2. When bub's mouth is open, **bring bub to breast chin first**.
3. **Correct attachment:**
    - Most of the areola should be in bub's mouth (not just nipple sucking)
    - Chin tucked into the breast.
    - Nose clear
    - Deep and regular sucks + occasional swallowing.
4. If baby hasn't attached correctly, stop, and try attaching again.

Breastfeeding positions

1. **'front hold'** or **'cradle position'**.
2. **'underarm position'** or **'footy hold'**. (good for twins)
3. **'lying down'** (good for mums who've had caesareans).
4. **'twin hold'**.
5. **breastfeeding in public**

Breastfeeding Challenges:

- **Sore Nipples:**
    - Typically due to **malattachment**.
    - Solutions:
        - Nipple shields (short term only)
        - Express either by hand (the gentlest method) or breast pump
- **Nipple infections:**
    - Typically due to infiltration of cracked nipples by S-Aureus or Candida
    - Solutions:
        - Moisturiser between feeds (Preventative)
        - Antibiotics/ointment (Antibacterial/Antifungal)
- **Blocked milk ducts:**
    - → Rapidly appearing tender lump in breast but otherwise feel well.
    - **Solutions:**
        - Feed frequently →empty affected breast.
        - Feed/Express from the affected breast first.
        - Gently massage the lump towards the nipple. (Even under hot shower)
        - Use a warm compress before the feed.
        - Ensure your bra isn't too tight.
    - **Complication = Mastitis** (Syx: Blockage persists for >12 hours + Onset of Malaise (Eg: Flu-like syx)
- **Mastitis**
    - = Abnormally **inflamed, sore, swollen or red breast** + MALAISE +/- chills.
    - Solution:
        - **See GP asap → For A**ntibiotics (Note: You can keep breastfeeding while taking these)
        - Continue feeding until syx have cleared, as Mastitis can → Breast Abscess if you stop breastfeeding during this time. (Note: The breastmilk is still safe for your baby).

- **Engorgement/Oversupply:**
  - **Signs:**
    - **Engorgement (full, sore breasts)**
    - Baby might have a tummy ache or wind
    - Baby might cry a lot after feeds.
    - Your milk flows so quickly that bub can't swallow fast enough.
  - Solution:
    - **Watch and wait (Supply automatically adjusts to baby's demands** within a few weeks).
    - Or...
    - Feed from only one breast at each feed. Use the other breast for the next feed.
    - Expressing before feeds can make the flow less overwhelming for bub.
    - Ice-pack/cabbage leaf on the breast after breastfeeding to relieve pain.
- **Undersupply**
  - Signs that baby is NOT getting enough milk:
    - Less than 6-8 wet cloth nappies OR Less than 5 disposables in 24 hours
    - Has LESS than 1x bowel motion per day (if younger than 6-8 weeks old)
    - Failing to thrive (Ie: Not gaining enough weight; or Losing weight).
      - (Newborns normally lose <10% of birthweight in 1st week, but should be back to
      - normal by day 14)
        Infants should gain ~30g/day for 1st 3mths, then ~20g/day for next 9mths.
  - **Solutions:**
    - Give extra milk (Either your expressed breastmilk, or infant formula)
    - **Build up your supply by Breastfeeding/Expressing often**.
    - Give 'top-up' breastfeeds 20-30 minutes after a full feed.
- **Reflux:**
  - = Bub spits up a large volumes every feed
  - Causes:
    - Normal - common in 1st 6mths.
    - Abnormal – causing failure to thrive or is causing bub pain. (Typically pyloric stenosis)
  - Solutions:
    - If normal reflux:
      - Feed in a 'Head-up, Tail-down' position (Ie: Let gravity keep milk down)
      - Elevate head of bub's cot
    - If abnormal (projectile reflux, or failure to thrive):
      - Contact GP/Paediatrician.
- **Breast refusal**
  - Causes:
    - baby has a cold.
    - baby is uncomfortable or in pain.
    - baby is having trouble attaching.
    - baby is overstimulated/distracted (normal in older babies –Feed in a quiet place).
  - Solutions:
    - Typically only transient. (No need to give up breastfeeding)
    - Try new feeding positions
    - Express some milk into your baby's mouth
    - Play relaxing background music.
    - Feed in a rocking chair.
    - Offer a feed when baby is stirring from sleep or even still asleep.

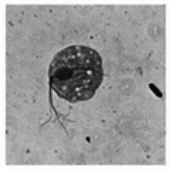
About bottle-feeding:

- If you can't breastfeed, feeding options are:
  - 1: Expressed breastmilk in a bottle
  - 2: Infant formulas in a bottle **(Infant formulas are the ONLY safe alternative to breastmilk)**
- (Always prepare formula according to the instructions).

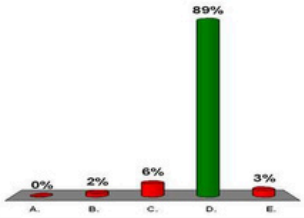
QUIZ QUESTIONS

QUIZ QUESTIONS:

A 28 year old female, greenish vaginal discharge, wet film showed oval motile organisms. What is the likely causative organism?

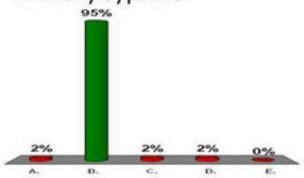


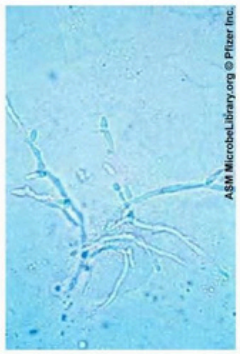
A. Candida albicans
B. Chlamydia trachomatis
C. Gardnerella vaginalis
D. Trichomonas vaginalis
E. Neisseria gonorrhoea



A 35 yr old female, vulval prurutis, erythema, dysuria and white vaginal discharge. Image shows wet film appearance. ? Most likely diagnosis

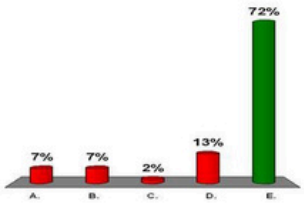
A. Gonorrhoea
B. Candidiasis
C. Bacterial vaginosis
D. Trichomoniasis
E. Primary syphilis





A 55 yr old male presents with red oedematous, painful scrotal swelling; pain relieved by scrotal elevation. What is the most likely causative organism?

A. Chlamydia trachomatis
B. Haemophilus ducreyi
C. Staphylococcus aureus
D. Neisseria gonorrhoea
E. Escherichia coli

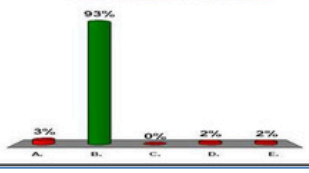


A 25 yr old male, painless ulcerative lesion with exudate on the penis. Which of the following is the most appropriate first line diagnostic procedure?

A. Dark ground microscopy of exudate
B. Culture and sensitivity of the exudate
C. Gram stain of the exudate
D. Wet film microscopy of exudate
E. Negative staining of the exudate

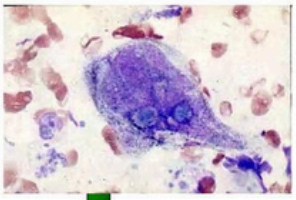
A 40 yr old male, painless cauliflower like outgrowths with itching and irritation. Biopsy of these lesions shows 'koilocytes" Causative organism?

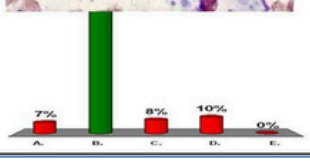
A. Herpes simplex virus
B. Human papilloma virus
C. Cytomegalo virus
D. Treponema pallidum
E. Chlamydia trachomatis



A 45 yr old female, painful, recurrent, multiple genital ulcers around labia and vulva. Image shows a smear taken from the ulcer. What diagnostic feature is seen in the image?

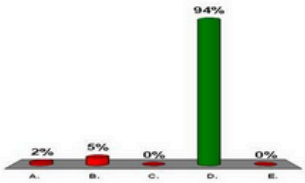
A. Donovan bodies.
B. Multinucleated giant cell.
C. Intracytoplasmic inclusion bodies.
D. Cowdry type B inclusion bodies.
E. Negri bodies.





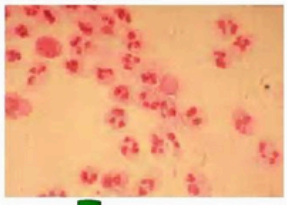
A 32 yr old female, profuse watery vaginal discharge with fishy odour. Gram stain of discharge shows decreased number of lactobacillii & squamous epithelial cells studded with gram negative bacilli. What is the likely diagnosis?

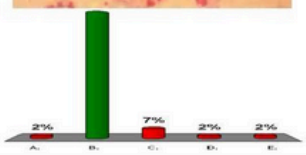
A. Gonorrhoea
B. Trichomoniasis
C. Secondary syphilis
D. Bacterial vaginosis
E. Chlamydial infection



A 48 yr old male, dysuria and urethral discharge; Culture of discharge shows no growth. Image shows gram stain of the discharge. What is the most likely causative organism?

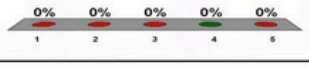
A. Treponema pallidum
B. Chlamydia trachomatis
C. Neisseria gonorrhoea
D. Calymmatobacterium granulomatosis.
E. Haemophilus ducreyi.





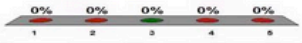
A 20-year-old man presents with dysuria, urgency, and urethral discharge. Physical examination shows suppurative urethritis, with redness and swelling at the urethral meatus. Which of the following is the most likely etiology of urethritis in this patient?

1. Borrelia recurrentis
2. Chlamydia trachomatis
3. Haemophilus ducreyi
4. Neisseria gonorrhoeae
5. Treponema pallidum



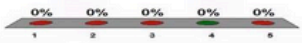
24y male, dysuria, discharge ? Diagnosis

A. Chlamydial Urethritis
B. Syphilis
C. Gonorrhoea
D. Reiters syndrome
E. E.coli - UTI



24y male, dysuria, discharge ? Diagnosis

A. Chlamydial Arthritis
B. Syphilis
C. Gonorrhoea
D. Reiters syndrome
E. E.coli - Arthritis



25y male, painless papule with ulcer. Cytology darkfield microscopy: ? Diagnosis

1. Human Papilloma virus
2. Chlamydia trachomatis
3. Mycobacterium
4. Treponema pallidum
5. Neisseria gonorrhoeae.