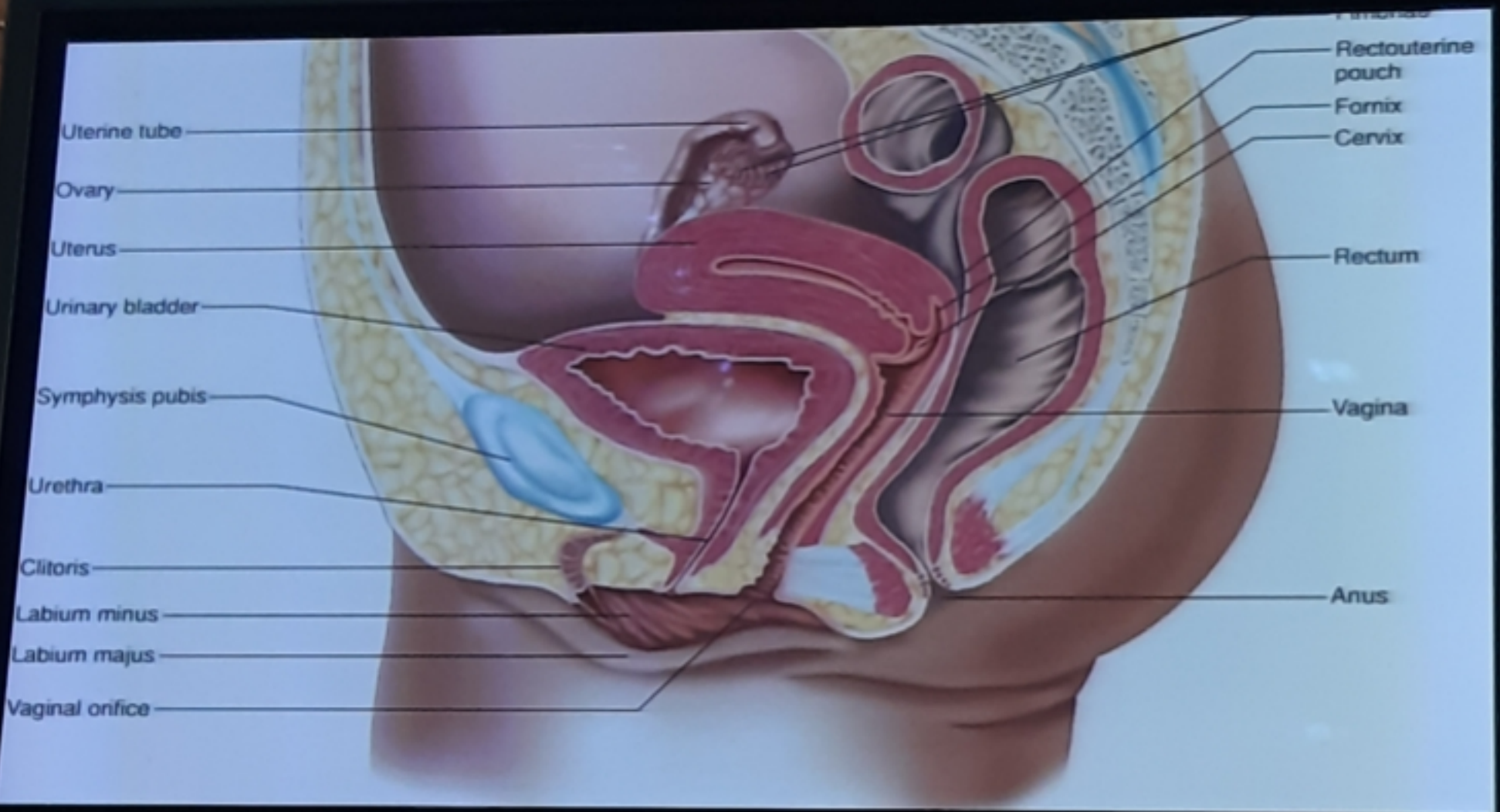


# Genital tract infections

# Genital tract

- Genital system = reproductive system
  - Male reproductive system: testes, epididymis, vas deferens, prostate gland, scrotum, and penis
    - Defenses: flushing action of urine
  - Female reproductive system: uterus, fallopian tubes, ovaries, and vagina
    - Defenses vary over the lifetime of the woman
      - Childhood and after menopause: mucus is the major defense with secretory IgA antibodies
      - During reproductive years: changes in pH
- \*Microbiome



Uterine tube  
Ovary  
Uterus  
Urinary bladder  
Symphysis pubis  
Urethra  
Clitoris  
Labium minus  
Labium majus  
Vaginal orifice

Rectouterine pouch  
Fornix  
Cervix  
Rectum  
Vagina  
Anus



# Infections

- Many are transmitted through sexual contact
- Three broad categories of sexually transmitted diseases according to presentation
  - Discharge diseases
  - Ulcer diseases
  - Wart diseases

# Discharges

*Neisseria gonorrhoeae*

*Chlamydia trachomatis*

*Mycoplasma genitalium*

# Gonorrhoea

## Male

- Urethritis, painful urination and a yellowish discharge
- Can occasionally spread from the urethra to the prostate gland and epididymis
- Scar tissue in the spermatic ducts during healing can cause man infertility

# Gonorrhoea

## Female

- Mucopurulent or bloody vaginal discharge
- Painful urination if urethra is affected
- Large percentage **asymptomatic**
- Major complications occur when the infection ascends from the vagina and cervix to higher reproductive structures
  - Salpingitis
  - Pelvic inflammatory disease
  - Infertility

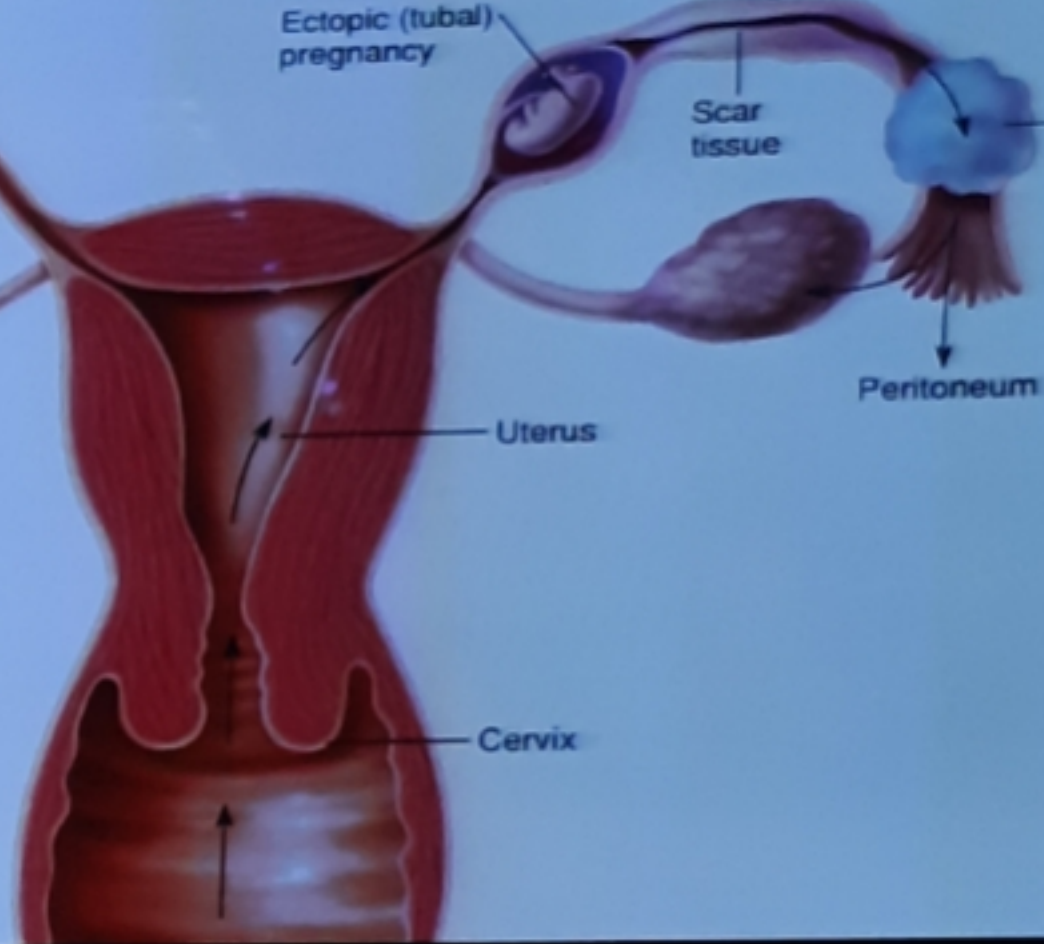


# Gonorrhoea

## Normal



## Ectopic (tubal) pregnancy



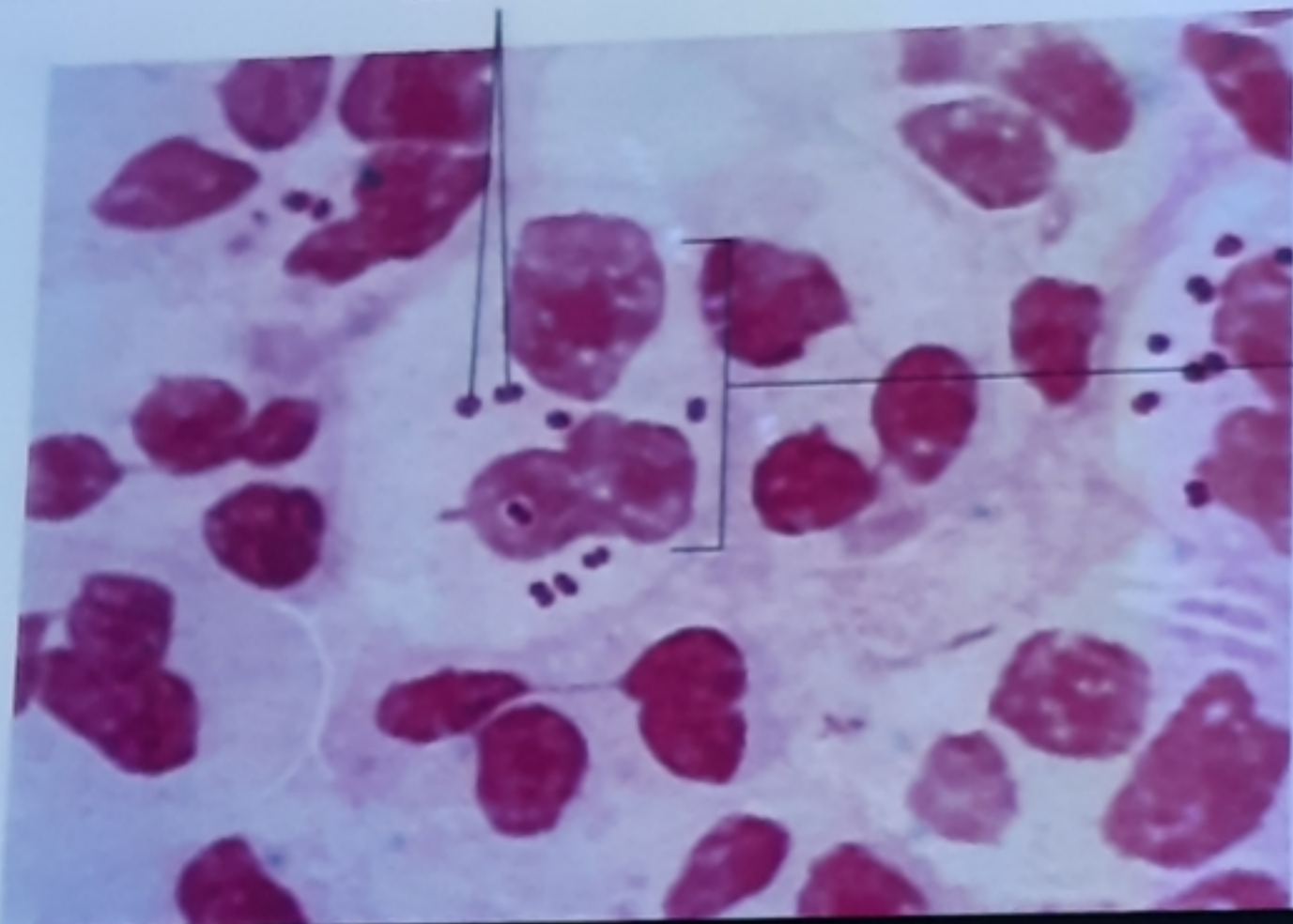
## Scar tissue

## Anaerobic infection





Gonococci



Neutrophil

# Chlamydia

- Majority of cases are asymptomatic
- Symptoms in males
  - Inflammation of the urethra
  - Symptoms mimicking gonorrhea
  - Untreated infections may lead to epididymitis
- Symptoms in females
  - Cervicitis
  - Discharge
  - Salpingitis
  - May lead to PID



# Chlamydia

- Lymphogranuloma venereum
  - Headache, fever, muscle aches
  - Lymph nodes fill with granuloma cells and become enlarged and tender
- Babies born to mothers with infections can develop ophthalmia neonatorum and pneumonia



# *Mycoplasma genitalium*

- An emerging STI
- Causes urethritis
- Mucopurulent discharge

# Genital Ulcer diseases

*Treponema pallidum pallidum*

*Haemophilus ducreyi*

# *Treponema pallidum pallidum*

- 3 distinct clinical stages: primary, secondary, and tertiary
- Latent periods of varying duration also occur
- Transmissible during the primary and secondary stages, and the early latency period between secondary and tertiary
- Largely non transmissible during late latent and tertiary stages

# Primary Syphilis

- Appearance of a hard **chancre** at the site of entry of the pathogen (after an incubation period of 9 days to 3 months)
- Lymph nodes draining the affected region become enlarged and firm
- Chancre filled with spirochetes
- Chancre heals spontaneously in 3 to 6 weeks but by then the spirochete has moved into the circulation



# Secondary Syphilis

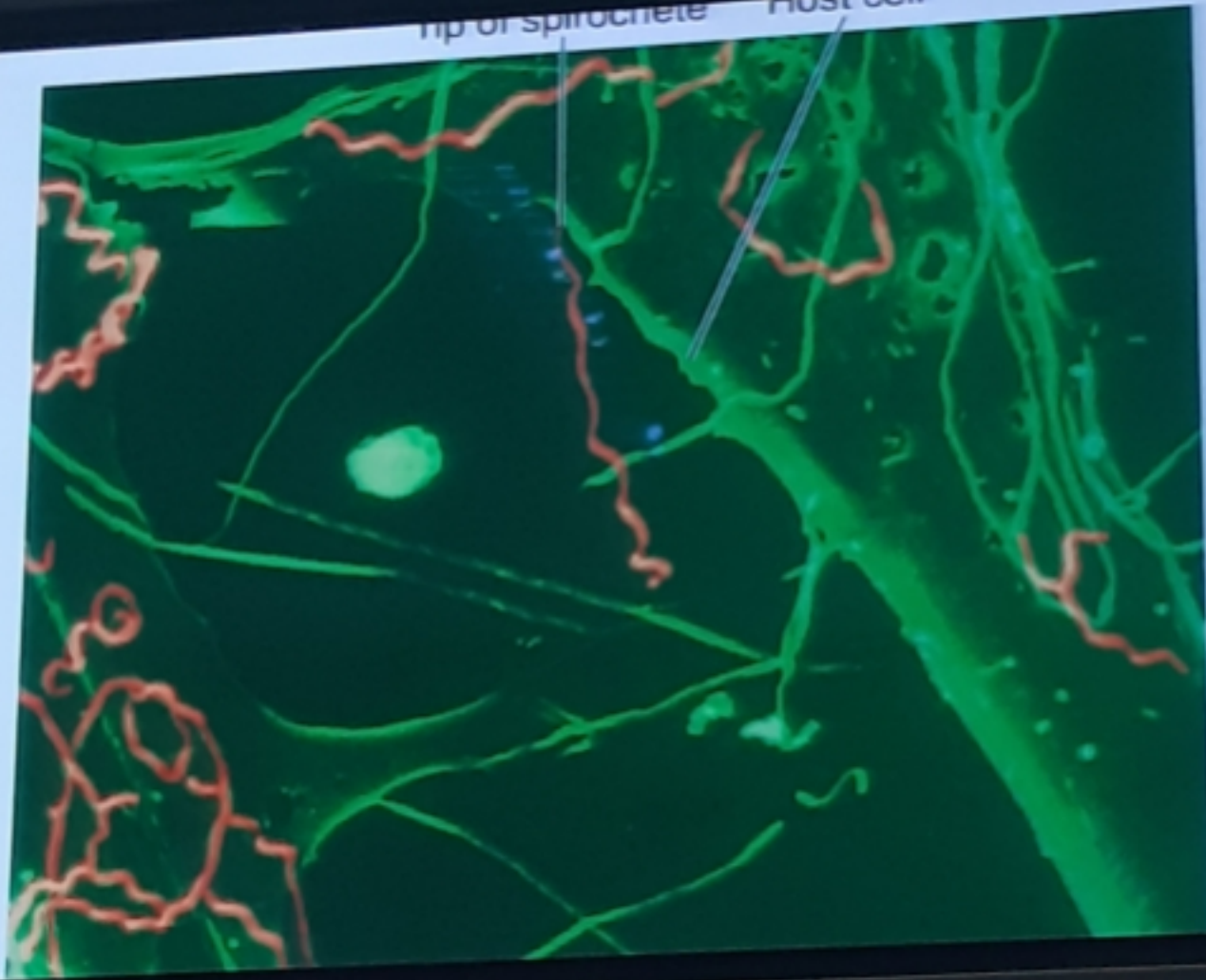
- 3 weeks to 6 months after the chancre heals
- Fever, headache, sore throat, followed by lymphadenopathy and a red or brown rash that breaks out on all skin surfaces
- Hair often falls out
- Lesions contain viable spirochetes and disappear spontaneously in a few weeks
- Major complications occur in bones, hair follicles, joints, liver, eyes, and brain



(a)



Tip of spirochete      Host cell





# Chancroid

- Infection usually begins as a soft papule at the point of contact
- Develops into a soft chancre (painful in men, but may be unnoticed in women)
- Inguinal lymph nodes can become swollen and tender



# Other GUT conditions

Candidiasis

Bacterial vaginosis

Aerobic vaginitis

Prostatitis

# Introduction

- Normal FGT colonized by lactic-producing bacteria
- Ensure an acidic milieu (pH 3.5)
- Also produce antimicrobial compounds (lactic acid,  $H_2O_2$ , etc)
- Stimulate or moderate the local innate immune system
- Protect against complications during pregnancies
- A dysbiosis/dysruption of normal vaginal microbiota can lead to **bacterial vaginosis (BV)**

# Bacterial Vaginosis

- Characterized by decreased lactic acid producing microbiota
- Increased diverse **anaerobic** bacteria
- *Gardnerella vaginalis*, *Prevotella* species, *Mycoplasma hominis*, *Mobiluncus* species
- elevated pH  $\geq 4.5$
- Loss of lactic acid and  $\uparrow$  SCFA



# Aerobic Vaginitis

- Decreased lactic acid bacteria
- More extreme inflammatory changes compared to BV
- Increased aerobic bacteria from the intestinal tract
- Group B *Streptococcus* (*S. agalactiae*), *Enterococcus faecalis*, *Escherichia coli*, and *S. aureus*



# Risk factors

- Vaginal cleansing
- Multiple sexual partners
- Unmarried,
- Engage in intercourse at a young age,
- Sex workers
- Regular douching.

## Effects of AV and BV

- Poor pregnancy outcomes (spontaneous abortion, prematurity, neonatal sepsis)
- Chorioamnionitis
- premature rupture of membranes
- postpartum endometritis
- Increased risk of STI acquisition