

# **Laboratory Diagnosis of Vaginitis**

# Termonology and Pathogenesis

- Vulvovaginitis, vulvitis, and vaginitis
- Are general terms that refer to the inflammation of the vagina and/or vulva
- Normal flora
- Lactobacilli
- Changes in the vaginal acidity or disturb the normal bacteria in the vagina may predispose to an infection .

# Characteristics of the Vagina and Cervix in Women of Reproductive Age

	Vagina	Cervix
pH	<4.5	7.0
Epithelial cells	Squamous	Columnar
Pathogens/ Syndrome	Bacterial vaginosis <i>Candida species</i> <i>Trichomonas vaginalis</i>	<i>Neisseria gonorrhoeae</i> <i>Chlamydia trachomatis</i>

# VAGINOSIS /VAGINITIS

- Most common reason for patient visit to OB/GYN.
- Three primary infections in order of prevalence:
  - Bacterial vaginosis
  - Candidiasis
  - Trichomoniasis

# Causes of vulvovaginitis

- **Bacterial** : Bacterial vaginosis (40%)
- **Fungal** : Candida vulvovaginitis (25%)
- **Parasitic** : trichomonal vulvovaginitis (25%)
- **Low estrogen levels** (called "atrophic vaginitis")
- **Allergic or irritation or injury response** from spermicidal products, condoms, soaps, and bubble bath called “contact vulvovaginitis”.

# History

- General gynecological history
- Menstrual history
- Pregnancy
- Sexual Hx
- Contraception
- Sexual relationship
- Prior infection
- General medical Hx
  - Allergies
  - DM
  - Malignancies
  - Immunodeficiency
- Medication
  - OCP < steroids, diuretics
- Symptoms

# Bacterial Vaginosis

- Most common of vaginal syndrome
- A change in the balance of normal vaginal bacteria .
- Very high numbers of bacteria such as
- *Gardnerella vaginalis*, *Mycoplasma hominis*, *Bacteroides* species and *Mobiluncus* species.
- In contrast, *Lactobacillus* bacteria are in very low numbers or completely absent.

# Clinical Features

- Itching and burning.
- Fishy-smelling (specially after sexual intercourse and menses) thin, milky-white or gray vaginal discharge.



# Clinical presentation of BV



# BV Sequelae

## OB complication

- Preterm delivery
- Premature rupture of membranes
- Amniotic fluid infection
- Chorioamnionitis
- Postpartum endometritis
- Premature labor
- Low birth weight

## GYN Complication

- Pelvic inflammatory disease (PID)
- Postaportal pelvic inflammatory disease
- Post hysterectomy infections
- Mucopurulent cervicitis
- Endometritis
- Increased risk of HIV/STD

# Diagnosis

- Related symptoms and sexual history.
- Examination of introitus may reveal erythema of the vulva and edema of the labia.
- Speculum examination.
- A sample of the vaginal swab.

# Office Diagnostics for Vaginitis

- Empiric diagnoses often inaccurate and lead to incorrect treatment and management.
- Need for rapid, accurate and inexpensive diagnostic tests.

## **OFFICE-BASED TESTS FOR VAGINITIS ARE UNDERUTILIZED**

- Simple, inexpensive, office-based tests were underutilized.
  - ❖ Microscopy
  - ❖ PH measurement
  - ❖ Whiff amine test

# CLINICAL DIAGNOSIS OF BV

Clinical diagnosis.

❖ 3 out of 4 of these criteria.

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1. PH greater than 4.5
2. Positive Whiff test
3. Any clue cells
4. Homogenous discharge.

# Clue cell wet mount



# Gram Stain Diagnosis

- Predominance of lactobacilli = normal.
- mixed small gram-positive and gram-negative rods  $\pm$  curved rods = BV.



# Gram Stain Diagnosis (cont.)

Score: 0, no cells present

1+, <1cell/OIF

2+, 1-5 cells/OIF

3+, 5-30 cells/OIF

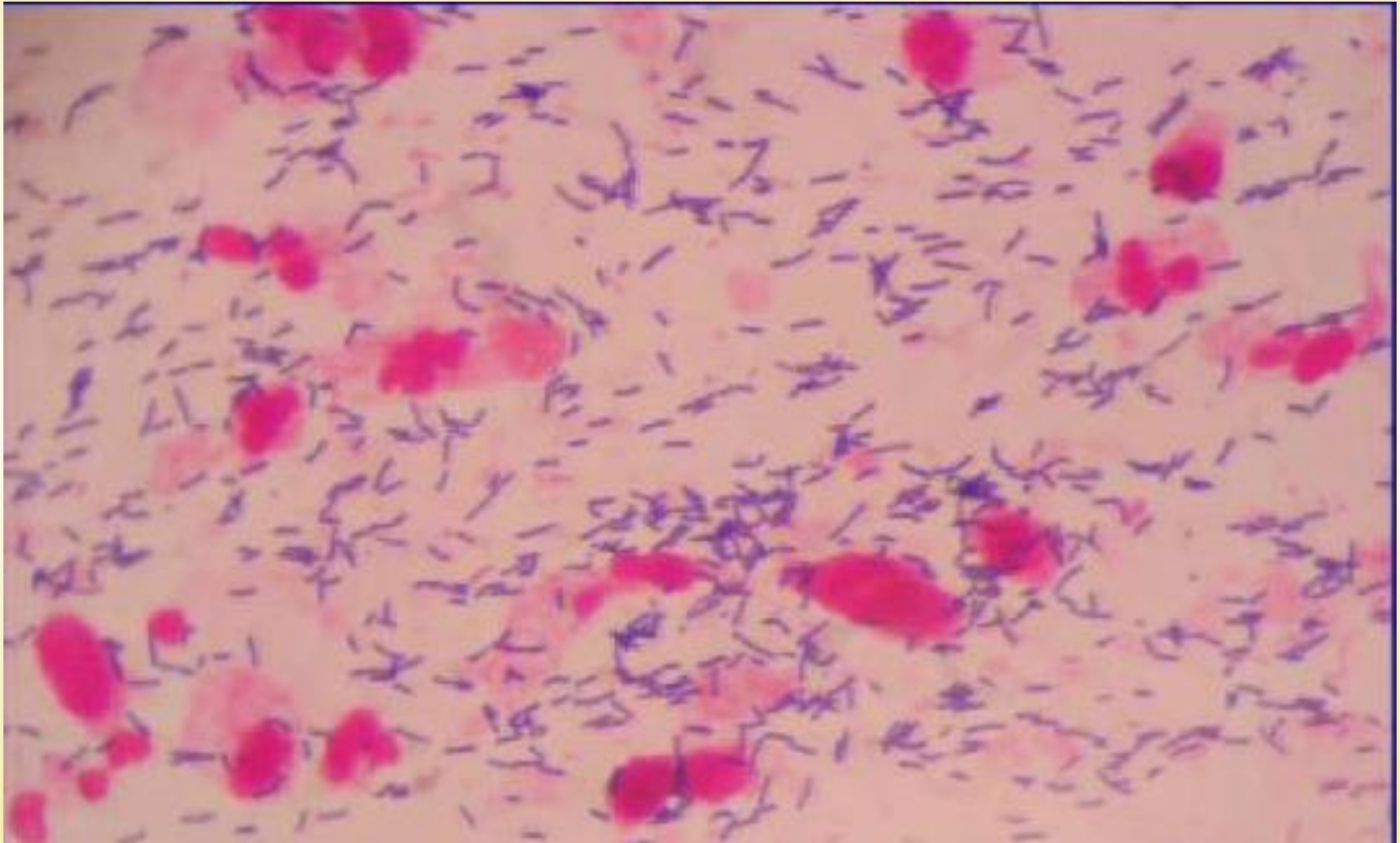
4+, >30 cells/OIF

## Nugent Scoring System

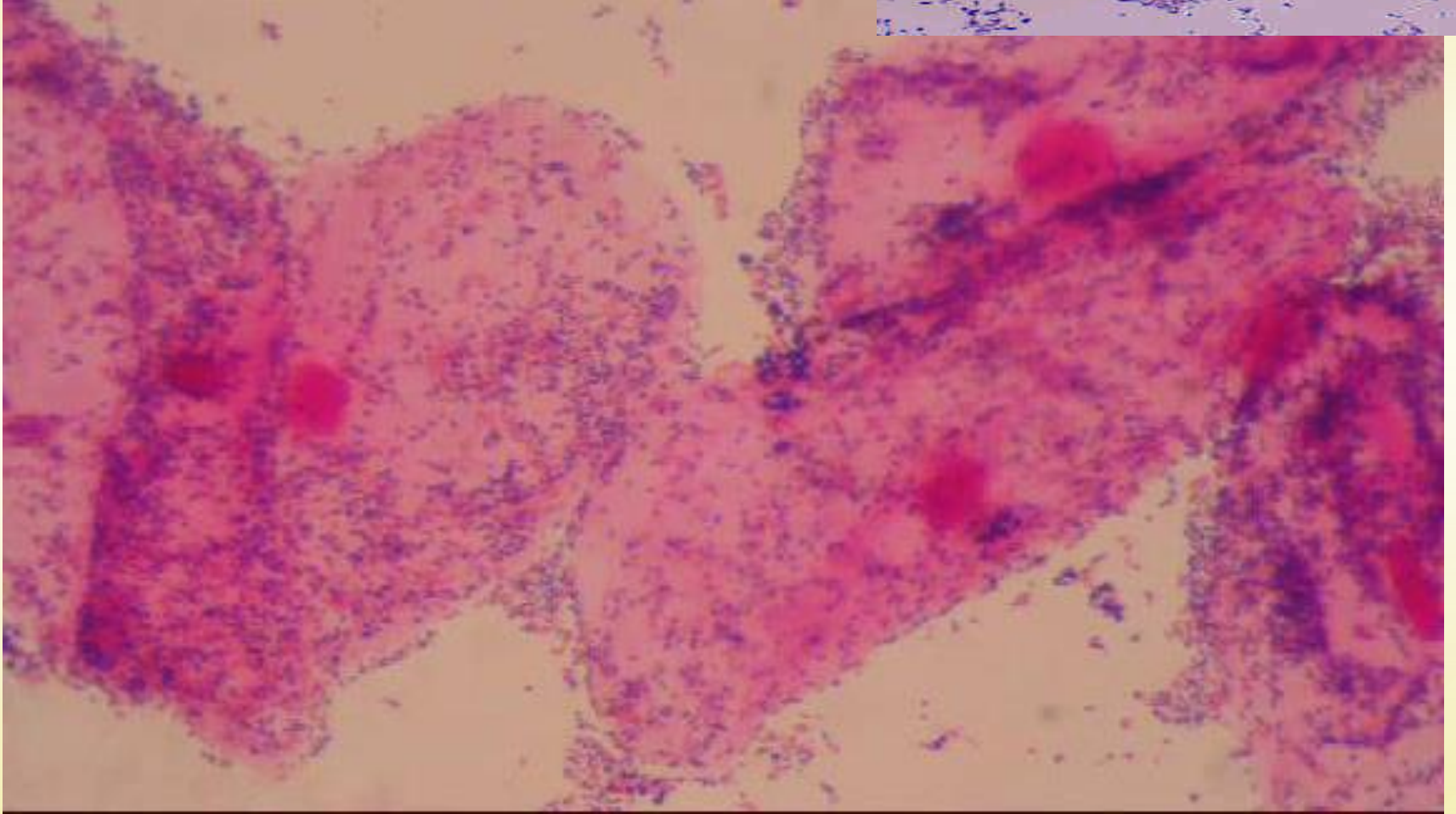
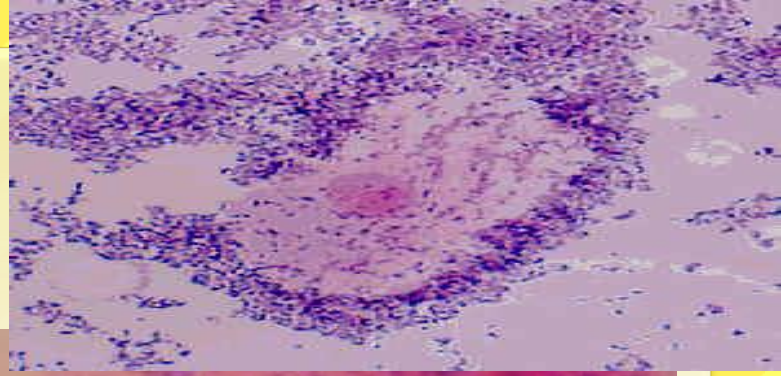
Score	<i>Lactobacillus</i> morphotype	<i>Gardnerella</i> and <i>Prevotella</i> morphotypes	<i>Mobiluncus</i> morphotype
0	4	0	0
1	3+	1+	1+ or 2+
2	2+	2+	3+ or 4+
3	1+	3+	
4	0	4+	

Interpretation: 1-3, normal; 4-6 intermediate (altered vaginal flora); 7-10, BV

# Normal vaginal gram stain

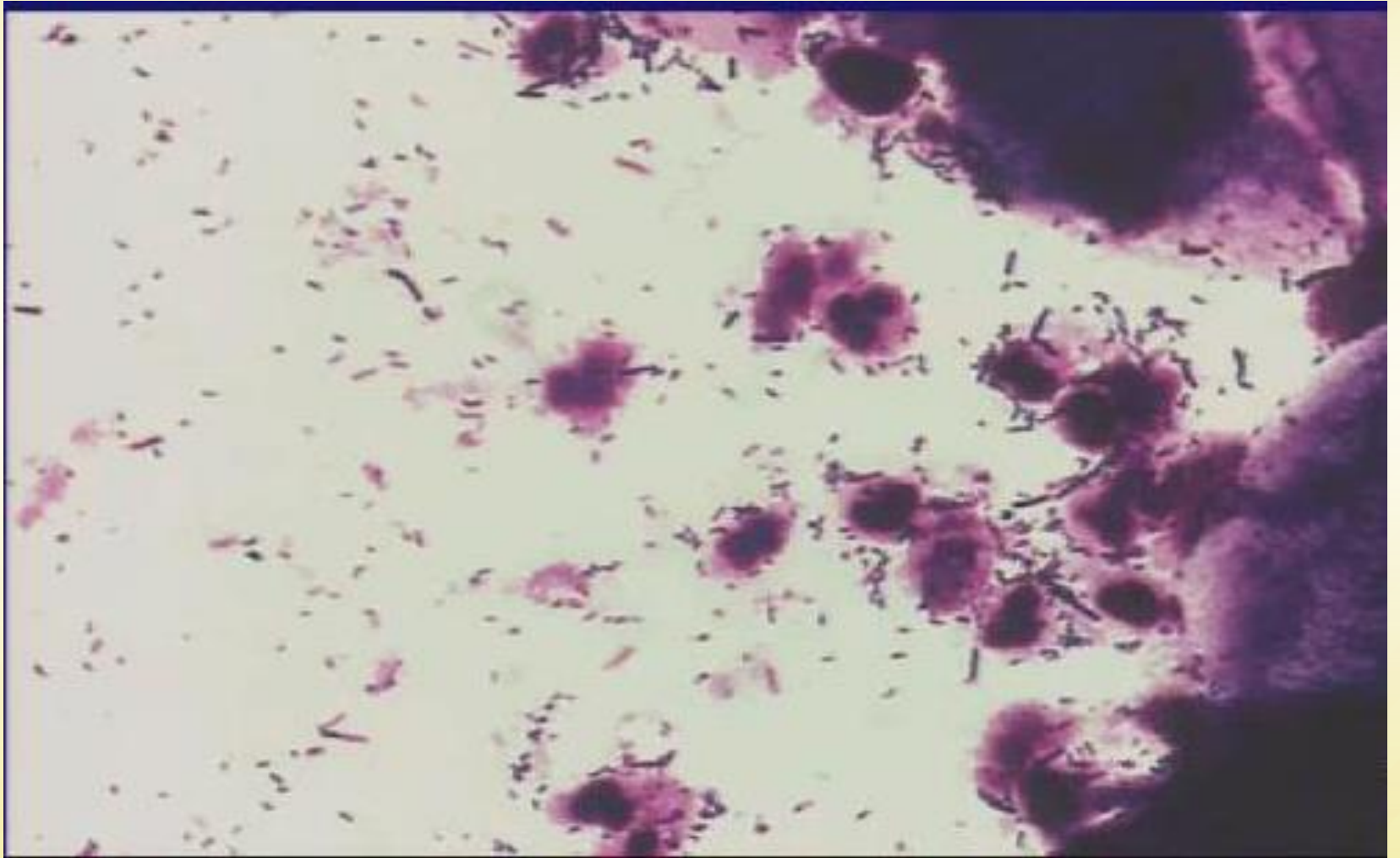


**BV**





# Intermediate gram stain



# PH TEST

- PH indicator strips: pH 3.5 ~ 7.0
- Place sample of vaginal secretion on test strip: read while still moist.
- PH > 4.5 indicates abnormality (i.e. *BV*-*Trichomonas*- or menstrual blood).
- Be careful not to sample the cervix; cervical secretions and blood have a PH 7.0



# KOH "WHIFF" TEST

- Sample of vaginal secretions are placed in a test tube with 10% KOH.
- KOH alkalizes amines produced by anaerobic bacteria~results in a sharp "fishy odor"

# WET MOUNT PREPARATION

- Vaginal secretion sample from the anterior fornix and lateral wall
- Place swab in test tube with small amount of normal saline and place sample on glass slide with cover slip
- Visualize at both low and high power
- Clue cells, yeast, *Trichomonas*, WBC, bacteria.





# NORMAL-WET MOUNT

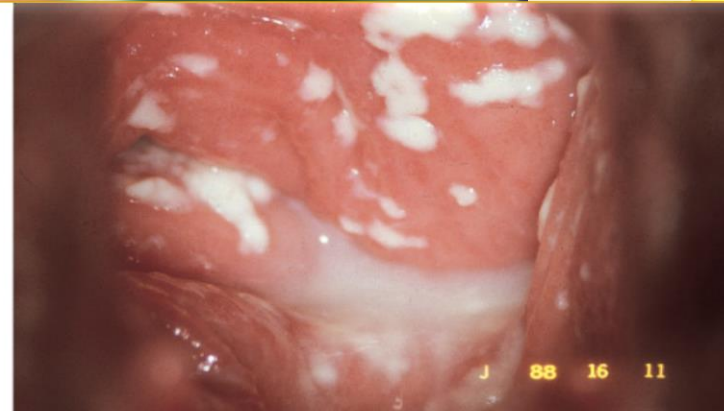
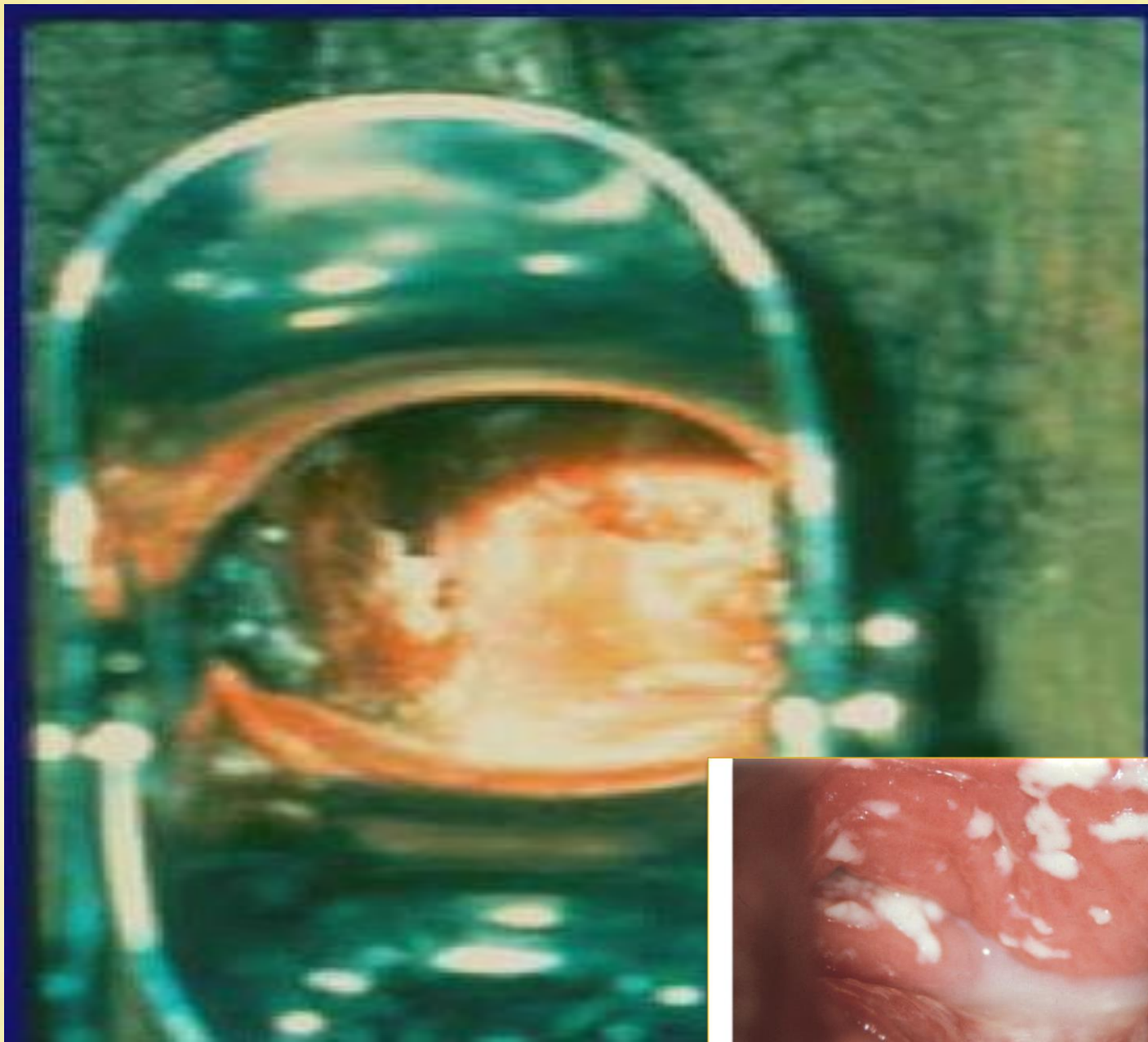


# Normal vaginal Gram Stain



# CANDIDIASIS

- Overgrowth of a normal inhabitant of the vagina.
- Predisposing factors: Pregnancy , DM, Immunocompromized conditions, antibacterial treatment .
- Clinical Presentation : Irritation, pruritus, soreness, painful sexual intercourse burring on passing urine, and a thick, curdy, white (like cottage cheese) vaginal discharge.



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# Diagnosis of VVC

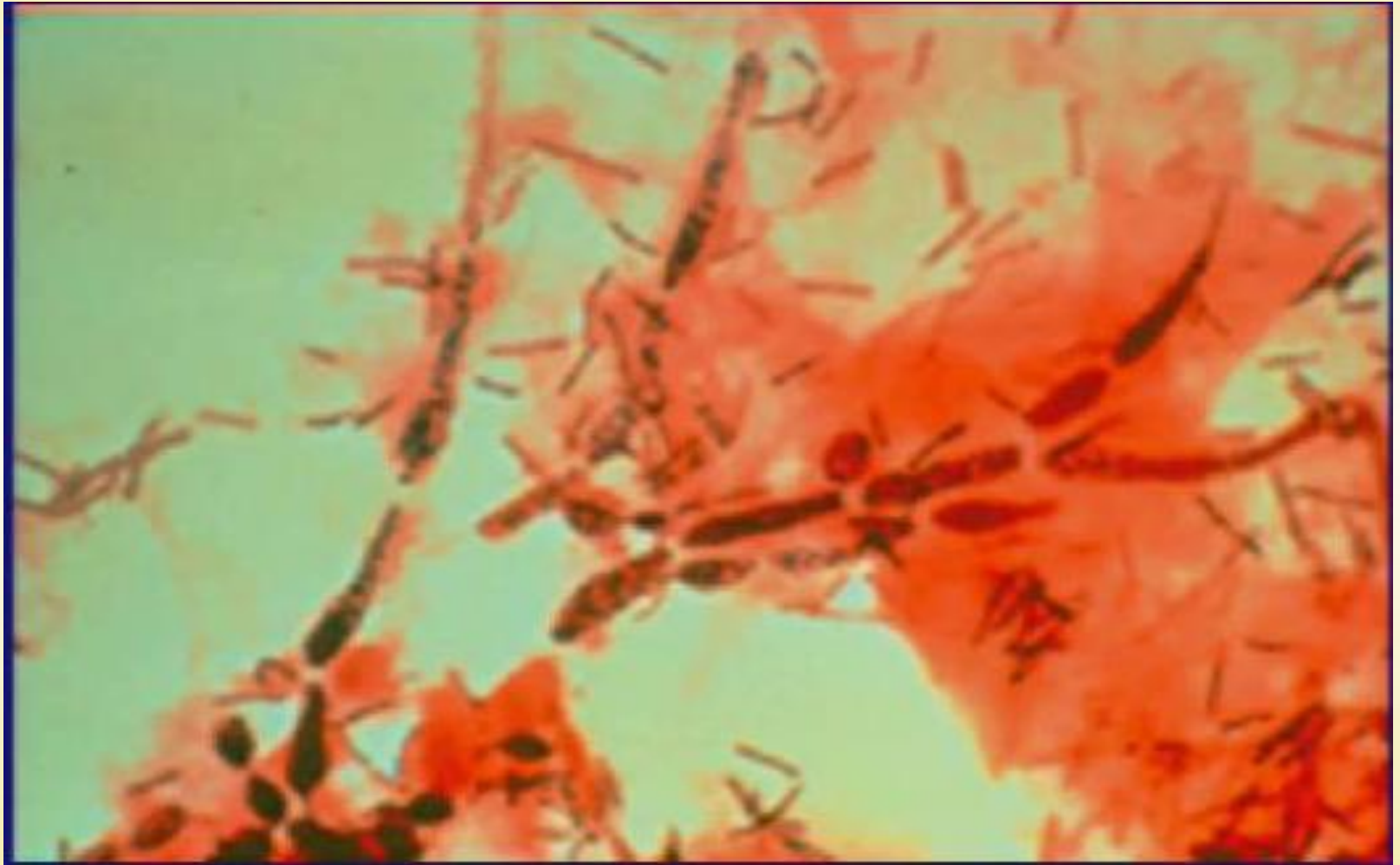
- Wet prep to see clumps of pseudohyphae.
- Budding yeast and no pseudohyphae in patients with *C. glabrata*.
- KOH prep helpful but not always necessary.



# Yeast-Wet Prep



# Candidiasis





# Vaginal Yeast Cultures

- Probably not routinely indicated ~ many women are colonized with Candida
- If obtained must correlate with patient signs and symptoms
- For recurrent infections culture and susceptibility testing may be helpful

# TRICHOMONIASIS

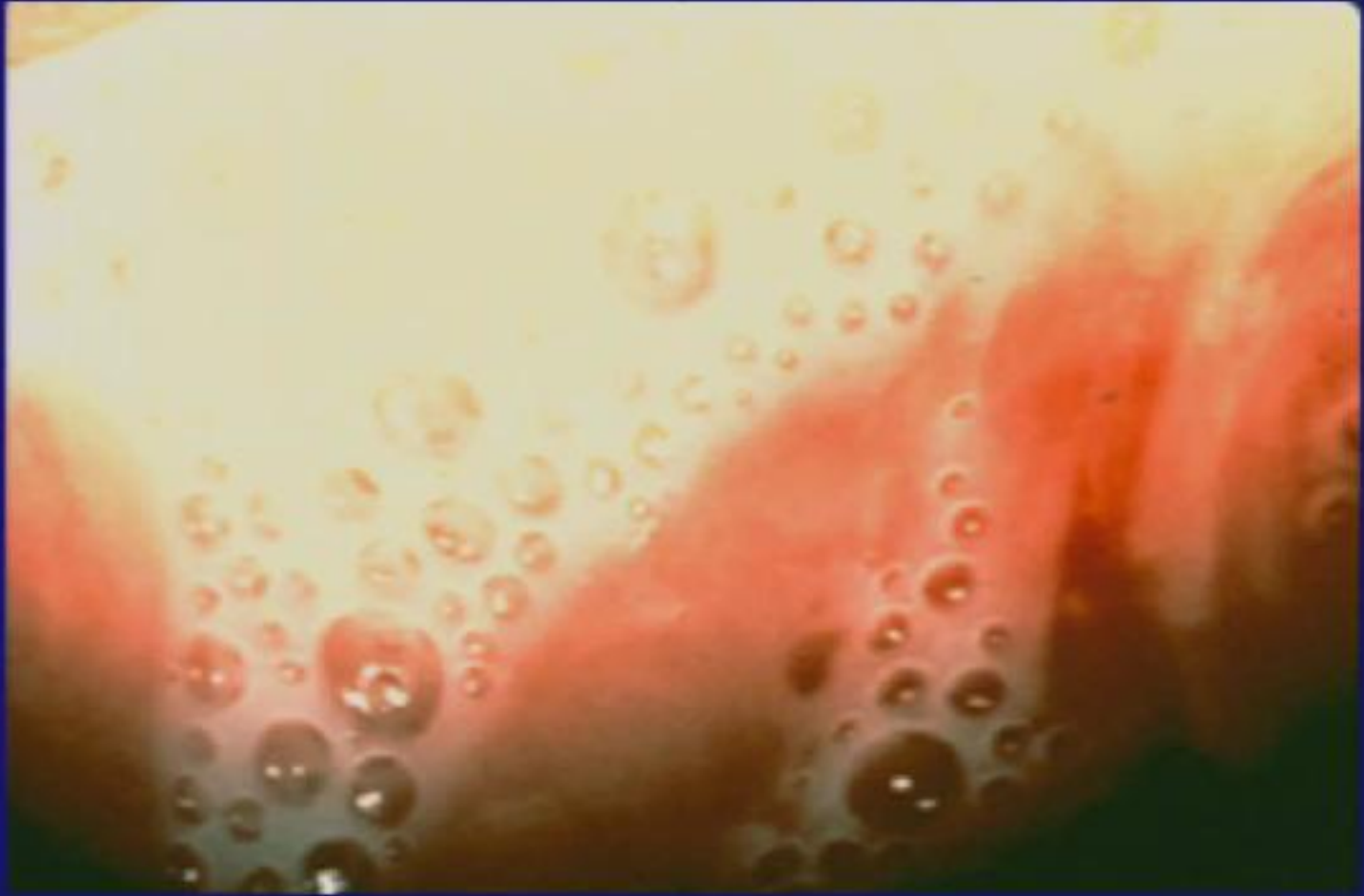
- Sexually transmitted parasite
- *Trichomonas* is the most prevalent non-viral sexually transmitted disease (STD) agent.

# Clinical Features

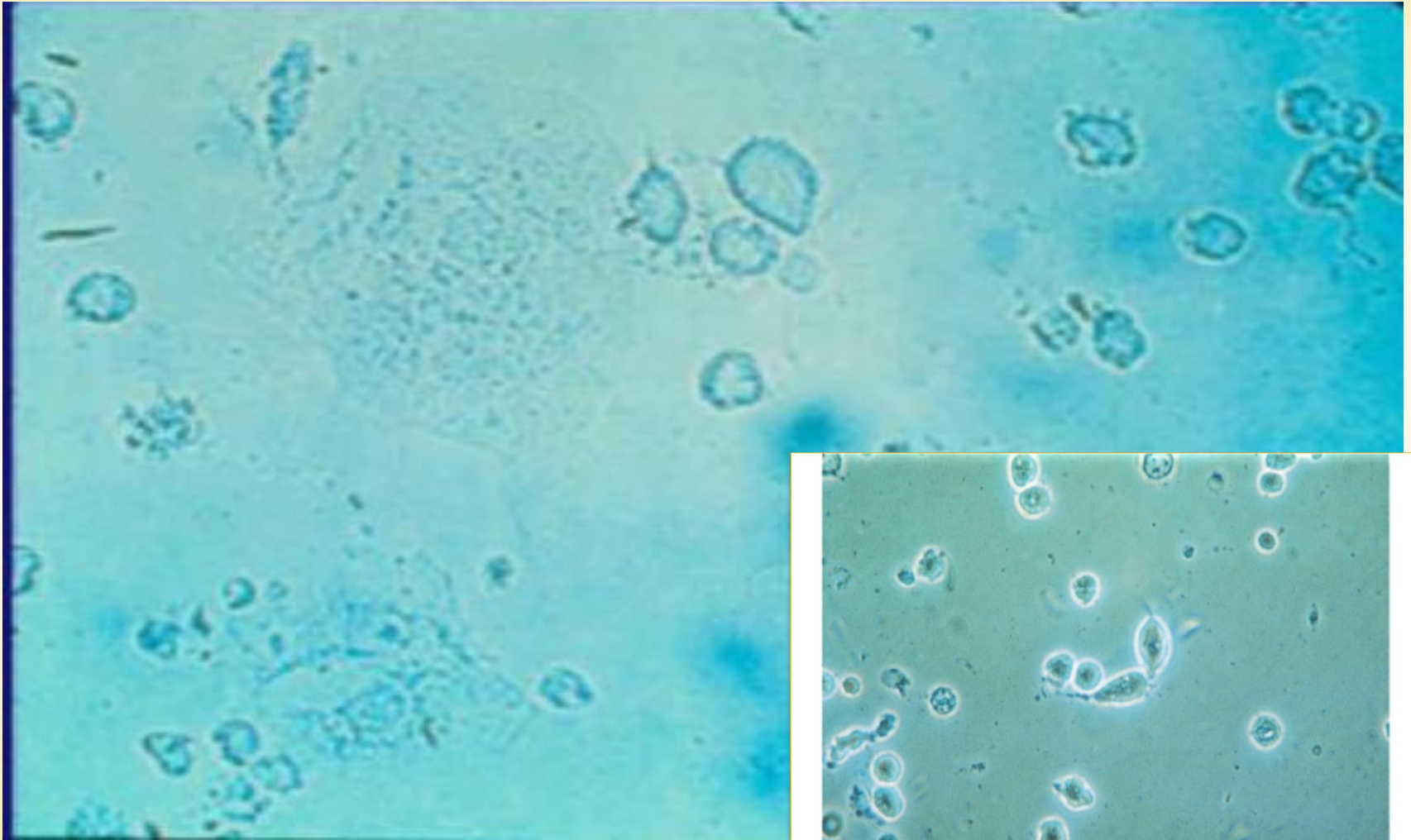
- ❑ Vaginal discharge, pruritus in females, but may be asymptomatic.
- Painful urination, Painful sexual intercourse
- A malodorous smelling yellow~green to gray, sometimes frothy, vaginal discharge.
- ❑ Males usually asymptomatic, but can cause Non-gonococcal urethritis .

# Trichomonas Complications

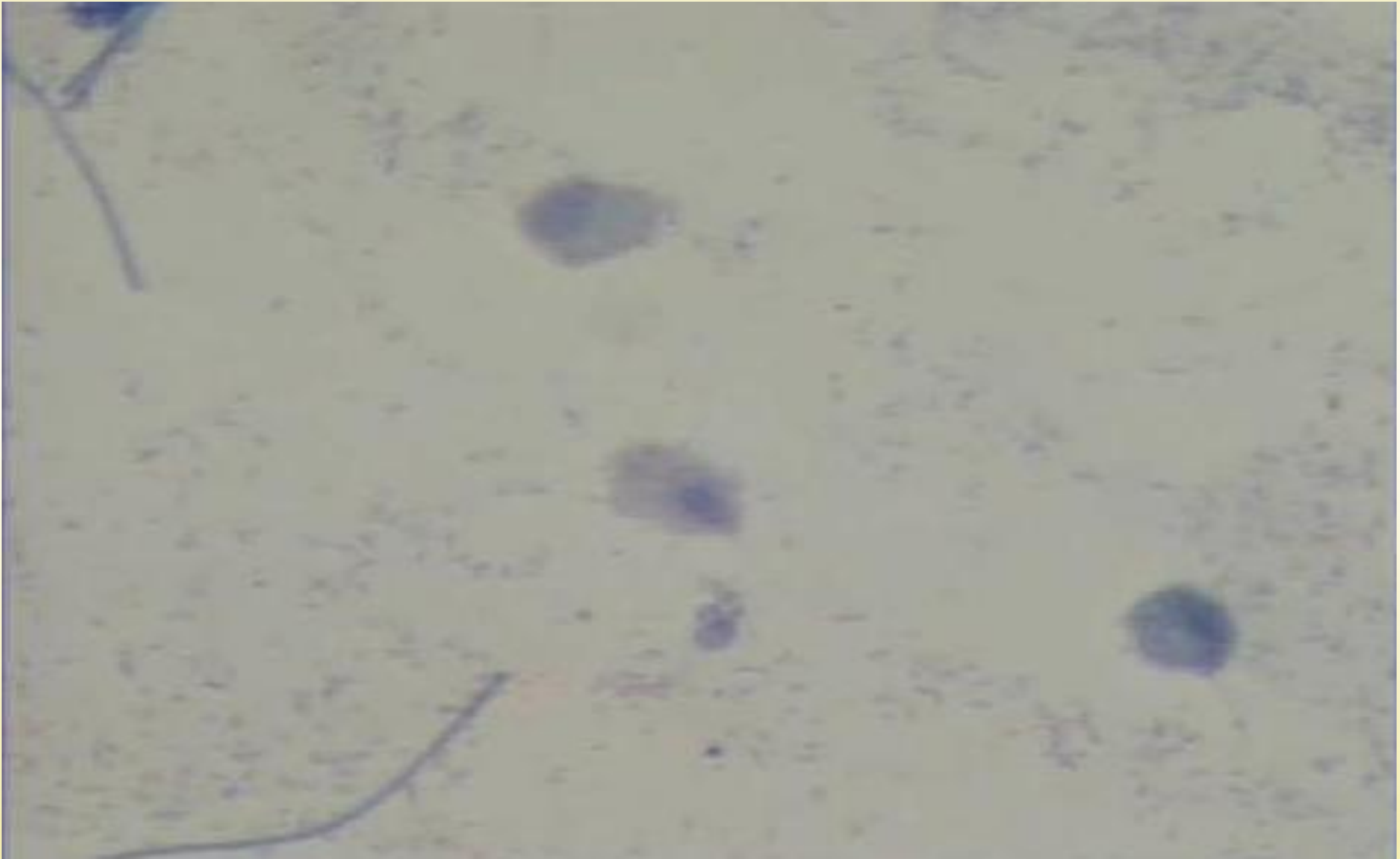
- Trichomonas associated with:
  - Premature rupture of membranes
  - Preterm labor and birth
  - Low birth weight
  - Increased transmission of other STDs including HIV



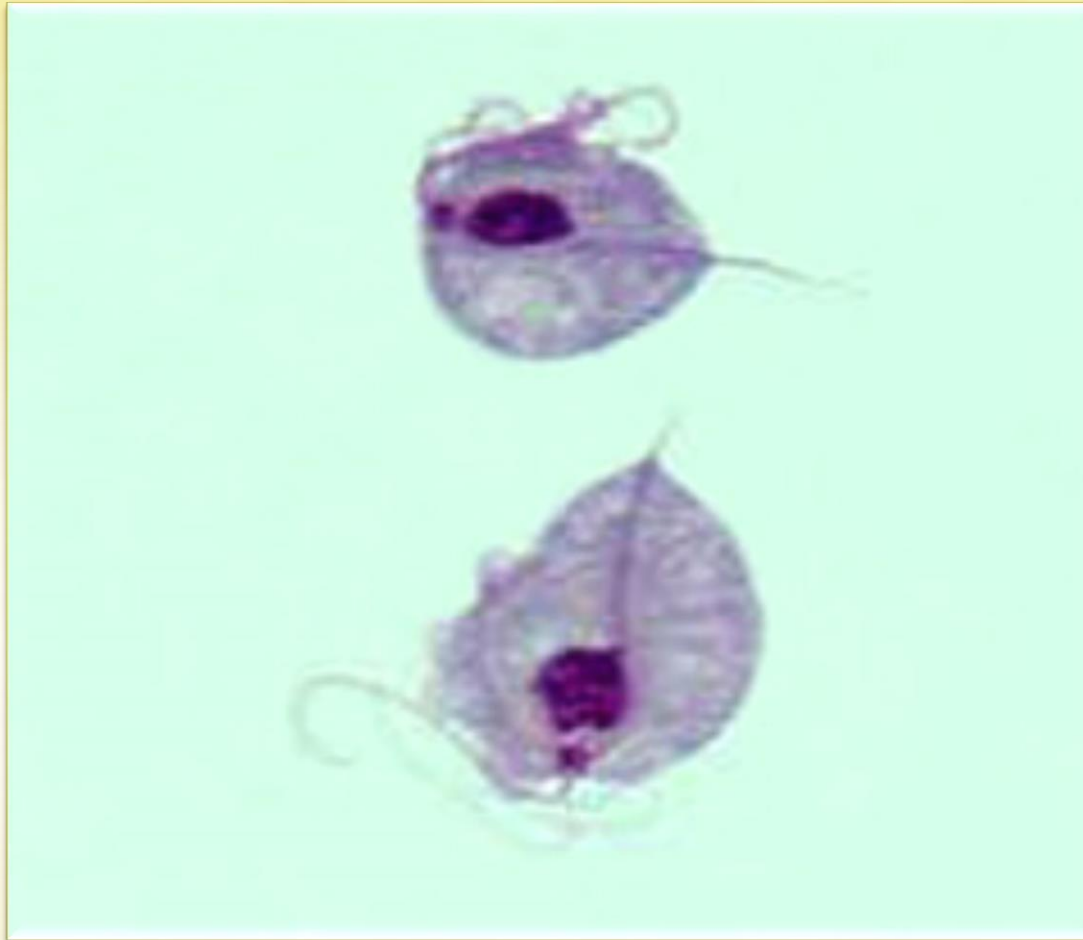
# Trichomonas Wet Prep



# Trichomonas-Pap Smear







Culture is considered the gold standard for the diagnosis of trichomoniasis. Its disadvantages include cost and prolonged time before diagnosis



# Other Methods of Diagnosis

- EIA
- Sensitivity 91.6%
- Specificity 97.7%



- DNA Probe

Clinical syndrome	Etiology	Treatment
<p><b>Bacterial vaginosis</b> Malodorous vaginal discharge, pH &gt;4.5</p>	<p>Etiology unclear: associated with <i>Gardenerella vaginalis</i>, <i>mobiluncus</i>, <i>Prevotella</i> sp.,</p>	<p><b>Metronidazole</b> Tinidazole</p>
<p><b>Trichomoniasis</b> Copious foamy discharge, pH &gt;4.5 Treat sexual partners</p>	<p><i>Trichomonas vaginalis</i></p>	<p><b>Metronidazole</b> Tinidazole</p>
<p><b>Candidiasis</b> Pruritus, thick cheesy discharge, pH &lt;4.5</p>	<p><i>Candida albicans</i> 80-90%. <i>C. Glabrata</i>, <i>C. tropicalis</i></p>	<p><b>Oral azole:</b> <b>Fluconazole</b> Itraconazole</p>