

# Vaginosis, Vaginitis, & Wet Preps

## I. INTRODUCTION

### NORMAL EXAM (pH 3.5 - 4.5)

- Epithelial Cells
- Parabasal Cells
- Lactobacilli - 5 to 15  $\mu$
- Occasional WBC's

### VAGINOSIS

- Bacterial Vaginosis
  - 'Clues'/Cocci/Mobiluncus
  - pH > 4.5
- Lactobacillosis/Leptothrix
  - Lactobacilli - 40 to 75  $\mu$
  - pH  $\leq$  4.5
- Cytolytic Vaginosis
  - Lactobacillus Overgrowth Syndrome - 5 to 15  $\mu$
  - pH  $\leq$  4.5

### VAGINITIS

- Candidiasis
  - pH < 4.5
- Trichomoniasis
  - pH > 4.5/5

## II. BACKGROUND

- 1/2 all outpatient female visits
- Most common self referral complt.
- Occurs in sexually inactive & active
- 1/3 of all female STD clinic visits
- **10 million office visits a year**
- Vaginitis is NOT a specific disease
- 40% of overall vaginal problems
- Occurs in children and the elderly

**COMMON SYMPTOMS:** - vaginal discharge, malodor, itching, spotting, pain

**NON-INFECTIOUS:** - chemical or allergic vaginitis(eg., soaps, dyes, douches), atrophic vaginitis, foreign body, collagen vascular diseases, Behçet syndrome, pemphigus, etc.

**INFECTIOUS:** - bacterial vaginosis, vulvovaginal candidiasis(yeast), trichomoniasis, Staphylococcus aureus associated toxic shock syndrome, streptococcal vaginitis, etc.

## III. VAGINAL WET PREP

### A. COLLECTION

- Swab as needed: posterior fornix, cervical os, urethral meatus, visible discharge
- Transfer specimens for:
  - \*IMMEDIATE INSPECTION - microscope **slides** with added **saline & coverslips** OR
  - \*DELAYED INSPECTION - 1/2 to 1 ml of **normal saline** or **Ringers' lactate** in a test tube for later observation if a 5 to 10 minute delay is expected
- 4 ADDITIONAL PREPARATIONS:
  - 1) **10% KOH** - for yeast
  - 2) **10% KOH 'Whiff Test'** - for 'fishy' volatile amines of Bacterial Vaginosis (or Trichomonas)
  - 3) **Gram stain** - for bacteria (eg., gonorrhea = Gram neg. diplococci)
  - 4) **Cultures** - for gonorrhea, chlamydia, herpes
- 2 MAIN ERRORS OF COLLECTION: (1) inadequate swabbing & (2) allowing slide to dry out

### B. GENERAL EXAMINATION

- 1) **Epithelial Cells** - large rounded cells with sharp, wispy, well defined edges
- 2) **WBC's** - smaller, rounded cells with a normal ratio = **WBC / Epi of  $\leq$  1**
- 3) **NL Vaginal Flora** - predominantly very small rod shaped **lactobacilli** with notable **BROWNIAN MOTION** that stain **Gram positive (purple)**
- 4) The "Vaginitis" Examination - MAIN CAUSES:
  - (1) **Vaginosis** (*Bacterial - Lactobacillosis - Cytolytic*) > (2) **Candidiasis** > (3) **Trichomoniasis**  
(BV, Candida, & Trich = account for > 90% all cases of 'vaginitis' complaints)

#### MIMICKING CONDITIONS:

- 1) **Mucopurulent cervicitis** (2° to gonorrhea, chlamydia, or herpes)
- 2) **Excessive normal secretions**

(These 2 conditions + 3 main causes of vaginitis ≈ 95% of all vaginal complaints)

### IV. BACTERIAL VAGINOSIS

- BV is a disturbance of the vaginal microbial ecosystem rather than a true infection = little inflammation
- **TYPE 1 BV** = few WBC's      **TYPE 2 BV** = many WBC's - most likely a 'mixed' infection
- Loss of predominant lactobacilli
- Massive overgrowth of cocco-bacillary mixed flora including:      **Gardnerella vaginalis PLUS Mobiluncus + bacteroides + peptostreptococci + genital mycoplasmas**, and more

#### 4 DIAGNOSTIC CRITERIA:

- 1) **Thin gray vaginal discharge**
  - 2) **Vaginal pH ≥ 4.5** (Swab middle 1/3 of vagina. AVOID CERVIX & BLOOD = Alkaline.)
  - 3) **Positive 10% KOH Whiff/Sniff Test** (= fishy odor of volatile amines)  
3 MAJOR AMINES = **Cadaverine, Putrescine, Trimethylamine**
  - 4) **Clue Cells** - vaginal epithelial cells covered with adherent bacteria
    - Epi's = cells are granular & stippled with loss of clear cell borders
    - Up to **30% of normal women** - **CAN** have Clue Cells
    - Up to **30% of culture positive cases** - may **NOT** have Clue Cells
    - Gardnerella vaginalis is the most common adherent bacteria
    - other organisms such as Mobiluncus can and do adhere
    - FALSE CLUE CELLS = Epi's with adherent lactobacilli
      - consider **Cytolytic Vaginosis (Lactobacillus Overgrowth Syndrome)**
      - **≥ 20% of all cells must be CLUE CELLS** to be of diagnostic significance
- **Mobiluncus** are smaller than lactobacilli, curved, motile with active corkscrew and spinning motions  
2 STRAINS: 1) Mobiluncus curtisii - Gram variable    2) Mobiluncus mulieris - Gram neg., slightly larger
  - REMEMBER there are usually FEW white blood cells present in true BV. If there are many WBC's suspect a mixed infection (eg., gonorrheal or chlamydial cervicitis)

### V. CANDIDIASIS (YEAST)

- Fungal infections caused by **Candida albicans** (candidiasis) and **Candida glabrata** (yeast) in most cases
  - \***Candidiasis** - (1) **blastospores** (oval)    (2) **budding yeast**    (3) **pseudohyphae** (invasive)
  - \***Yeast** - (1) **spores only**                    (2) **budding yeast** (clusters or 'cumuli' which branch)
- An **intestinal reservoir** allows cross contamination & asymptomatic vaginal colonization when **pH < 4.5**
- **Candidiasis** - Under certain conditions the blastospore germinates producing invasive pseudohyphae
- Pseudohyphae invade & cause symptoms; cell damage & sloughing obscure the hyphae
- **10% KOH Prep** - make epithelial cell walls transparent and make the pseudohyphae easier to see
- "Yeast" infections have highly adherent 'cottage cheese-like' plaques attached to the vaginal walls
- *Candida albicans* stains **Gram positive (purple)** and identifies well via this method
- WBC's are often present and vary directly with the degree of invasion & inflammation

### VI. TRICHOMONIASIS

- Trichomoniasis is a protozoal (single cell) infection caused by the ovoid **Trichomonas vaginalis**
- Trichomonads are motile with ameboid characteristics, have an **undulating membrane**,  
4 highly active beating **anterior flagella**, & a stiff **posterior axostyle**
- Trichomonads = very inflammatory to the vaginal mucosa & lead to **many WBC's** & cause:
  - "**COLPITIS MACULARIS**" (**STRAWBERRY CERVIX**) = punctate cervical hemorrhages
  - **Vaginal Discharge** - (1) copious, yellow-green, frothy    (2) possible **positive 'Whiff Test'**    (3) **pH > 5**
  - **pH < 4.5** = Trichomonads will 'round-out' and will persist in small numbers as '**pseudocysts**'
- Dry slides can also kill, pin, and 'round-out' the trichomonads making them indistinguishable from WBC's

**RULE OF THUMB** = ere on the side of **too much** rather than too little **normal saline**

- GONORRHEA**
- highly associated with Trichomoniasis and also causes many WBC's
  - remember to check for GC by Gram stain and/or culture
  - GC is a **Gram negative (red to pale pink)** small diplococci within the WBC's

## VAGINOSIS

**Table 1: Diagnostic Criteria as Extrapolated from Reviewed Literature**

<b>Diagnostic Criteria</b>	<b>Normal</b>	<b>Bacterial Vaginosis</b>	<b>Lactobacillosis</b>	<b>Cytolytic Vaginosis</b>
<b>Signs and Symptoms</b>	-----	*Heavy discharge *Foul odor possibly worse after intercourse or during menses	*Variable discharge *Pruritus *Vulvar dysuria *Cyclic increase of symptoms in the luteal phase of the menstrual cycle	*Variable discharge *Pruritus *Dyspareunia *Vulvar dysuria *Cyclic increase of symptoms in the luteal phase of the menstrual cycle
<b>Discharge Characteristics</b>	*White *Flocculent	*White to gray-white *Thin *Adherent *Homogeneous *Increased	*Variable discharge *Thick, white, creamy, or curdy	*Variable discharge *Thick or thin *White cheesy
<b>Amine Odor</b>	<b>Absent</b>	<b>Present</b>	<b>Absent</b>	<b>Absent</b>
<b>Vaginal Ph</b>	<b>3.8-4.2</b>	<b>&gt;4.5</b>	<b>3.6-4.7</b>	<b>3.5-4.5</b>
<b>Microscopic Findings</b>	Lactobacillis WBC at a ratio of 1 to 5 Epithelial cells	Clue Cells, Few Lactobacilli, Few WBC	Long chains of Bacilli (40-60 microns in length)	Few WBCs, Desquamated Epithelial cells, Large number of lactobacilli (false clue cells)

**Table 2: Treatment as Extrapolated from Reviewed Literature**

<b>Treatment</b>	<b>Normal</b>	<b>Bacterial Vaginosis</b>	<b>Lactobacillosis</b>	<b>Cytolytic Vaginosis</b>
<b>Recommended Medication regimens</b>	-----	Metronidazole 500mg po bid x 7 days (During pregnancy) Metronidazole 250mg po TID x 7 days	Augmentin 500mg TID x 7 days If penicillin sensitive Doxycycline 100mg BID x 10 days	Bicarbonate Sitz bath x 15 minutes 2-3 times in the first week, then 1-2 times weekly as needed
<b>Education</b>	Reinforce appropriate genital hygiene	*Genital hygiene education *STRESS avoidance of douching *Use condoms to decrease vaginal pH alterations	*Genital hygiene education *Avoid self treatment with OTC products	*Genital hygiene education *Discontinue tampon use until symptom-free for 6 months

# Know Normal!

## 1. Epithelial Cells

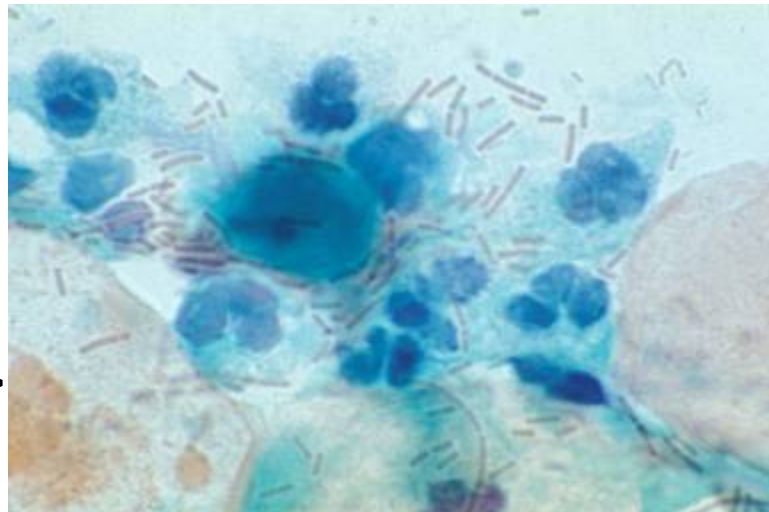
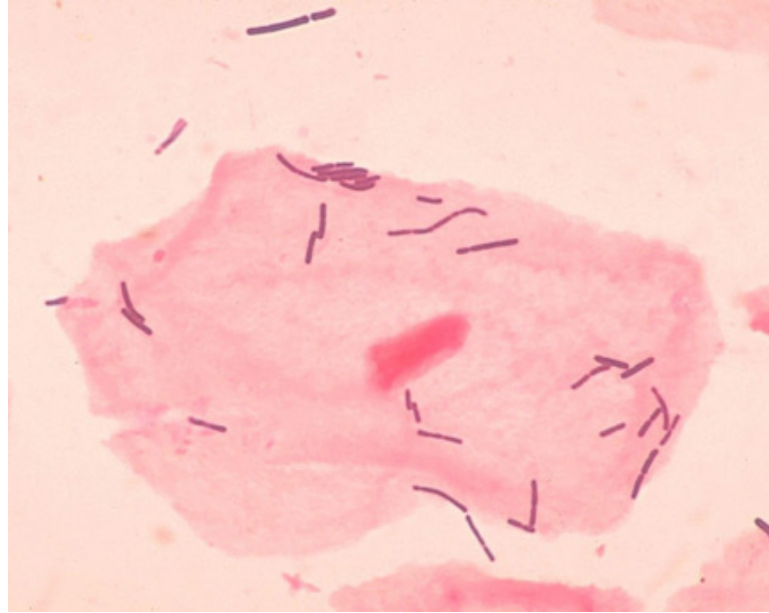
## 2. Lactobacilli

- 5 to 15  $\mu$

## 3. WBCs

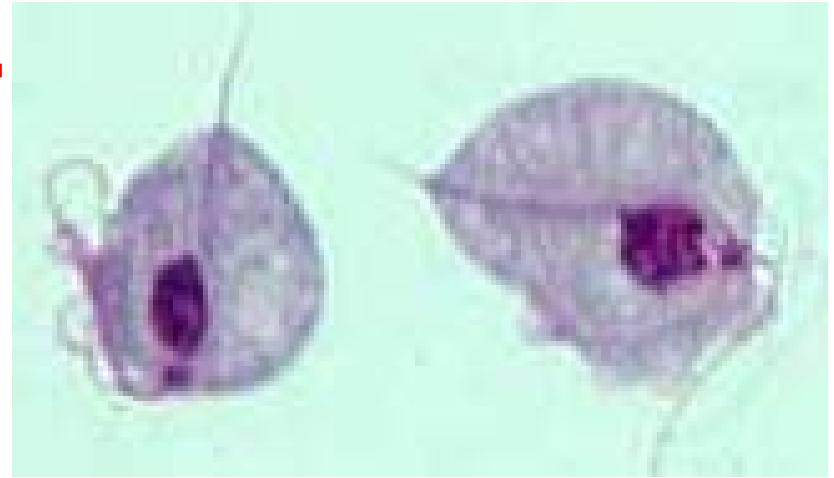
- Few = NL
- Never > Epi's
- Many = **Inflammation**

(Parabasilar Cell) >



# Vaginitis - Know 2+

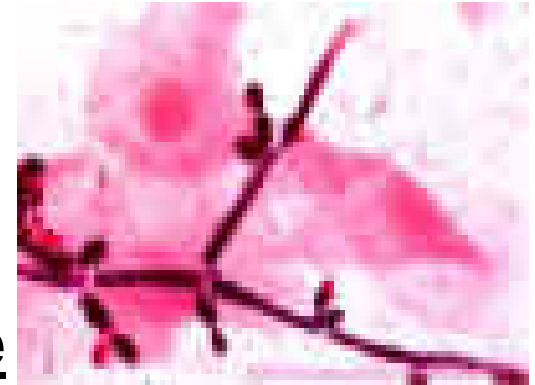
## 1. Trichomonas



## 2. Candidiasis/Yeast

- *Candida albicans*  
"CANDIDIASIS"

- 1) Blastospores
- 2) Budding Yeast
- 3) Pseudohyphae

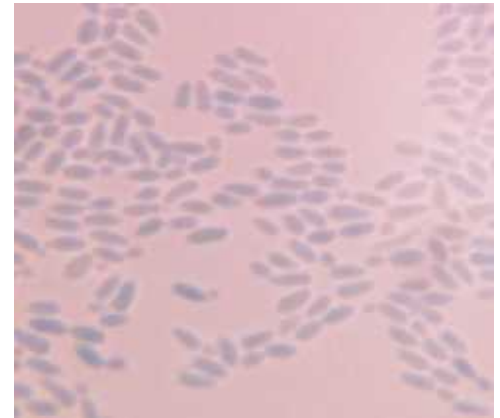


- *Candida glabrata*  
(Torulopsis g.)

- 1) Blastospores
- 2) Budding yeast

"YEAST"

Grow in clusters = CUMULI >



# Vaginosis - Know 3

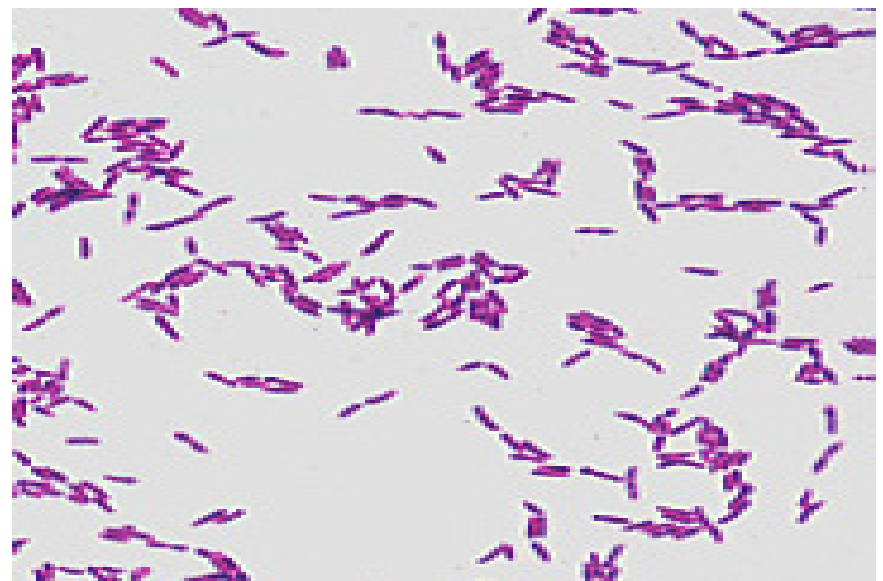
## 1. Bacterial Vaginosis

- **FEW or NO** LACTOBACILLI
- MANY Coccobacillary Orgs.  
= "GARBAGE"
- CLUE CELLS  
= CELL EDGE
- **FEW WBCs!!!!!!!**
- **MOBILUNCUS = MOTILE**



## 2. Cytolytic Vaginosis

- = "Lactobacillus Overgrowth Syndrome"
- **MANY** LACTOBACILLI
- 5 to 15 μ

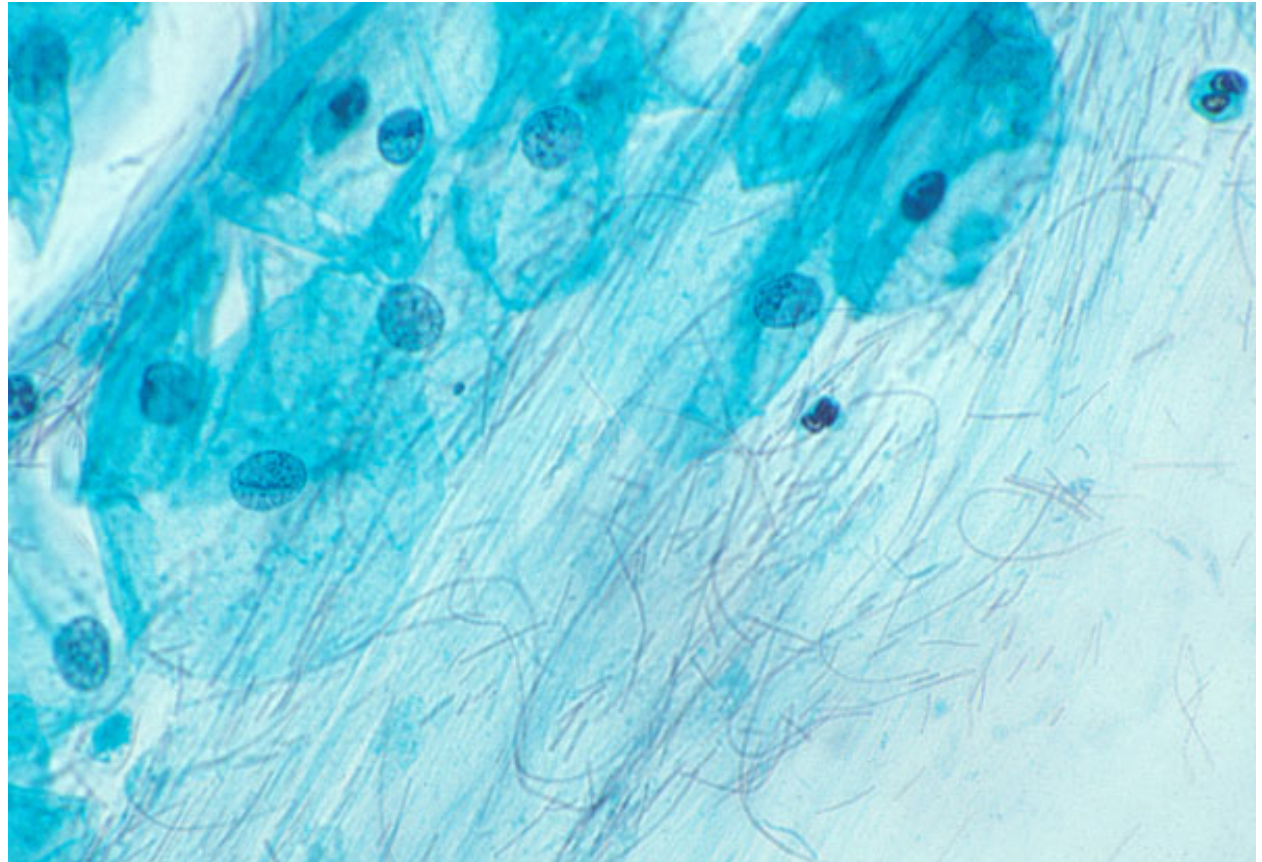


# Vaginosis - Know 3

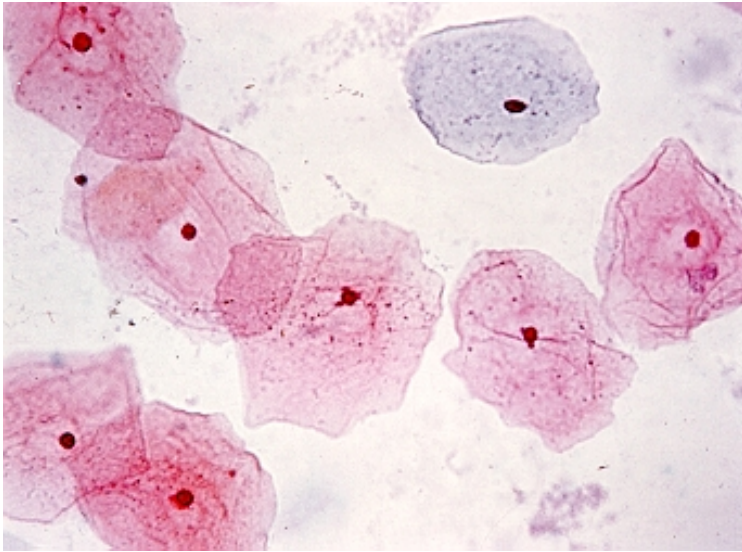
## 3. Lactobacillosis/Leptothrix

- **LONG** LACTOBACILLI

- 40 to 75  $\mu$



# Additional Slides - Normals



**Normal Epithelial Cells  
with Sharp Borders**

**Normal Lactobacilli -  
5 to 15  $\mu$  (note size  
relative to cell nucleus)**

