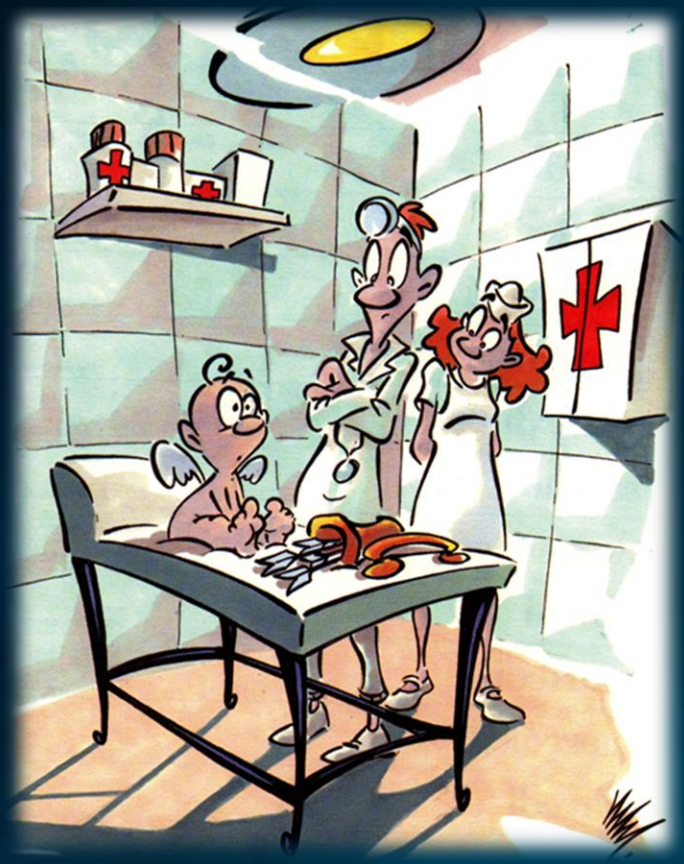
Non Viral Cervico-Vaginal Infections



G. MINIELLO



Cervico-vaginal infections represent the most common reason of gynecological consultation

Friedrich EG. Am J Obstet Gynec 51:247, 1985



Cervico-vaginal infections may show characteristic colposcopic features which indicate the agent or suggest further specific investigations

Different pathologies may show





the same colposcopic finding

Isolation of the infecting organisms is considered as the clearest method of establishing aetiology and susceptibility to antibiotics



This, however,

is not the only

way in which

investigators can contribute

to an understanding

of infectious process



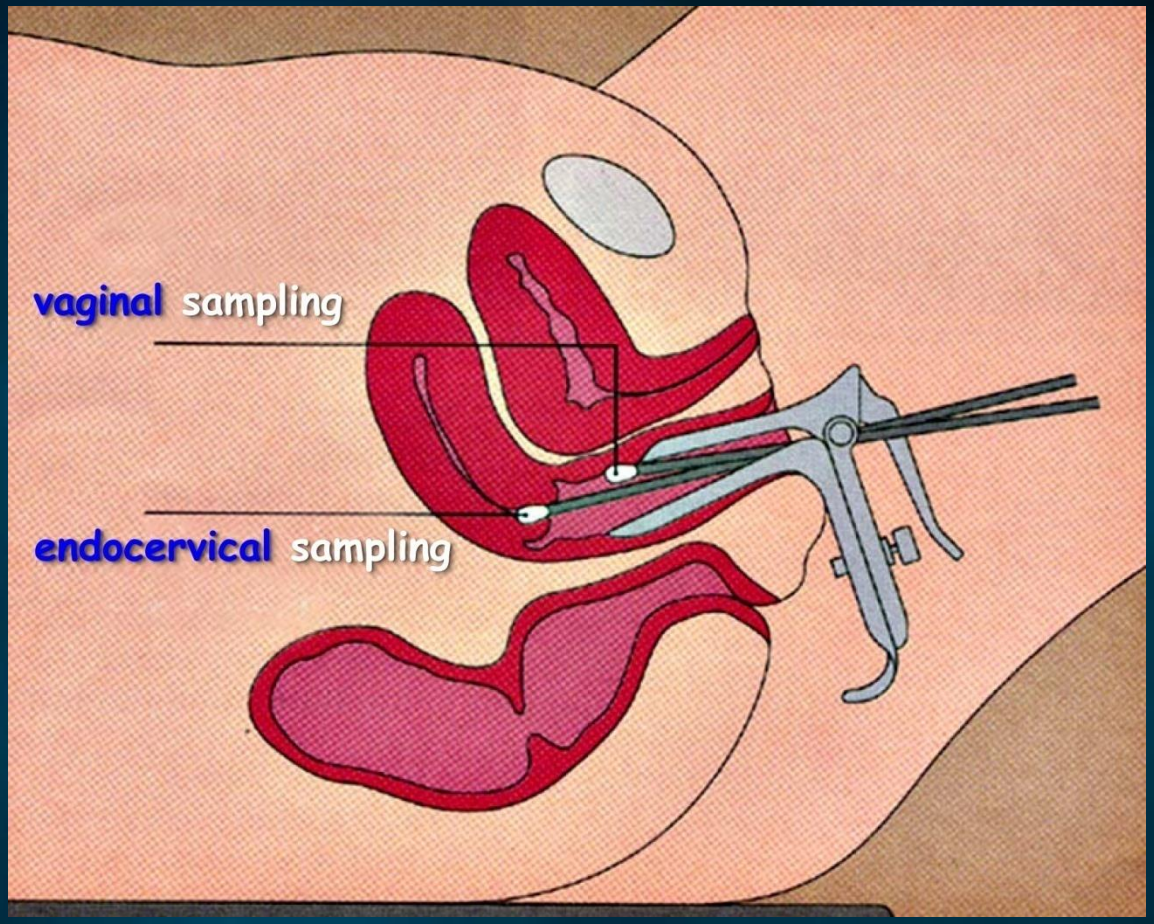


In our current practice **wet mount** or **direct** microscopy is usually performed as an extension of the daily gynecologic checkup, in order to obtain more complete information



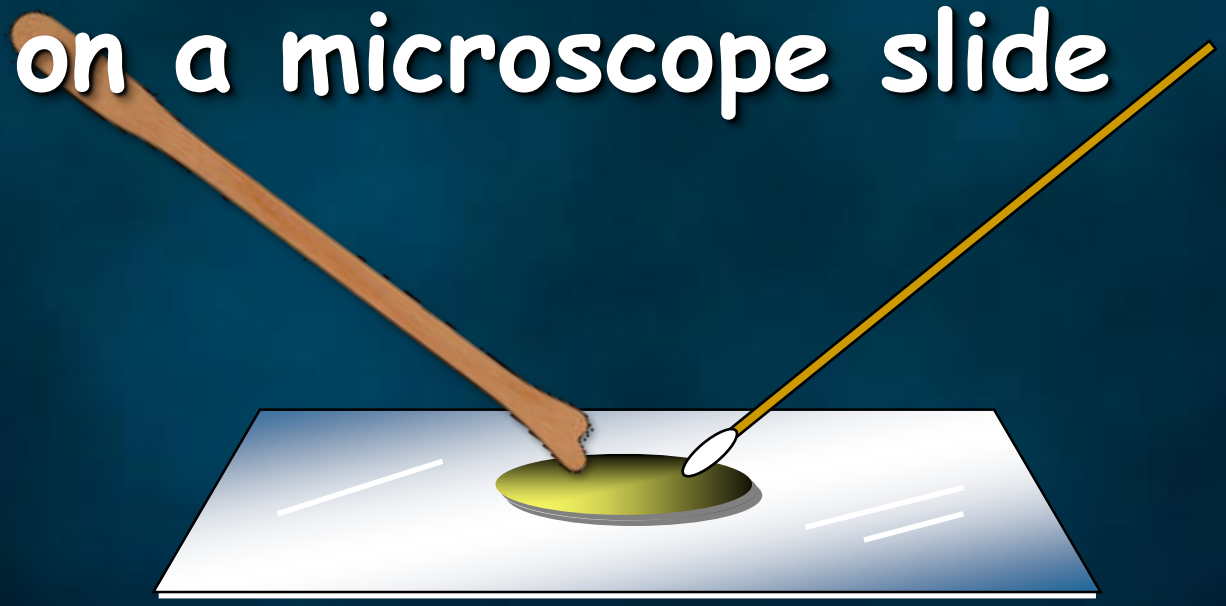


Phase contrast microscopy was developed in 1935 by a Dutch physicist Frits Zernike, **Nobel** laureate in 1953



Vaginal discharge and cervical secretion are collected by swabs or spatulas

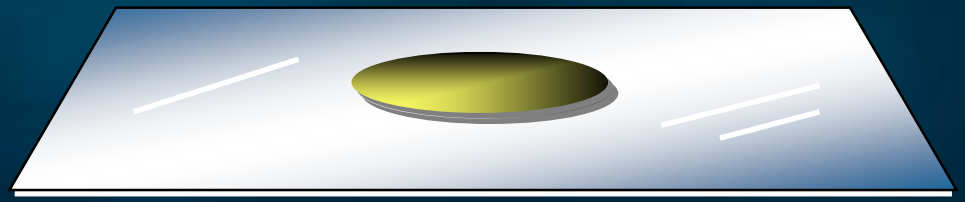
The device is immediately
and **gently** dabbed
in a drop of saline,
previously applied
on a microscope slide



Immediately after, the specimen is mounted with a coverslip and the sample is thus **ready** to be examined by a Ph microscope

without fixation or **staining**



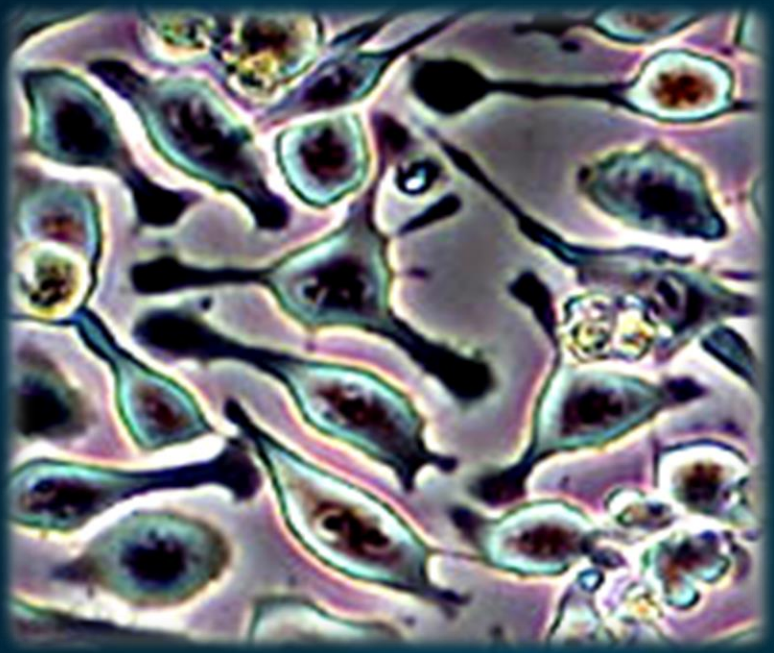


The tonality of the pictures is due to a stained glass placed on the filter holder



Due to the physical peculiarity of Ph microscopy **monochromatic** light enables **optimum contrast**





Phase contrast microscope



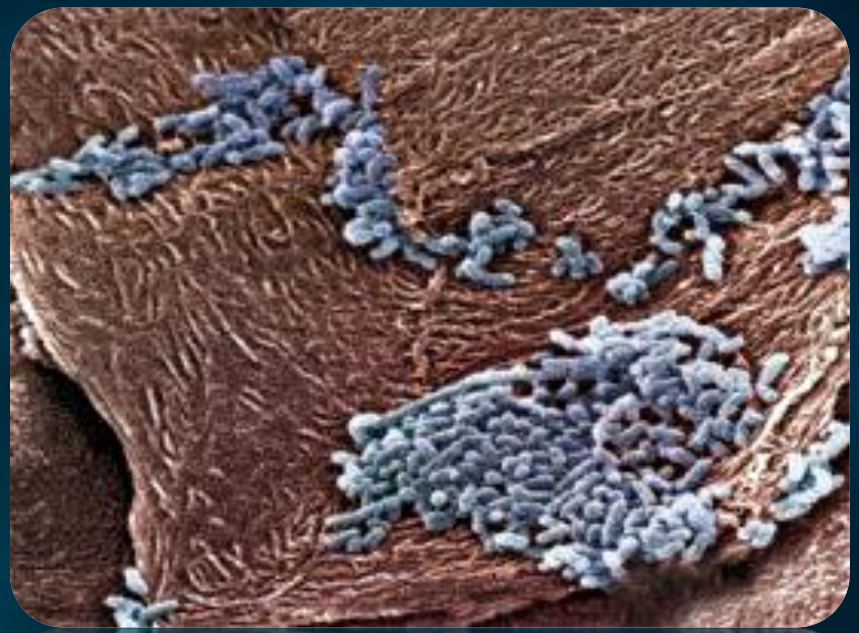
A wet prep can provide immediate information about:

- ✓ hormone status
- ✓ stages of metaplastic process
- ✓ cervico-vaginal microbiology
- ✓ cell changes induced by pathogens
- ✓ cell-mediated immunity
- ✓ presence of atypical cells

WET MOUNTS

- ✓ Cervico-vaginal wet mount
- ✓ Cutaneous wet mount
- ✓ Urinary wet mount
- ✓ Buccal wet mount
- ✓ Rectal wet mount

Bacterial vaginosis



Bacterial vaginosis (BV) is the most frequently found pathology of the female genital tract

Wilson J. SexTransm Infect. Feb;80(1):8, 2004

Bacterial Vaginosis (40%-50%)



Trichomoniasis (15%-20%)

Candidiasis (20%-25%)

Mylonas I et al. Obstet Gynecol Surv. Jun;66(6):359, 2011

BV SEQUELAE

- ✓ PID
- ✓ infertility
- ✓ increased complications in pregnancy
- ✓ increased risk of acquiring HIV
- ✓ cofactor to HPV in the development of CIN

Wilson J. Sex Transm Infect. Feb;80(1):8, 2004

DIAGNOSTIC CRITERIA

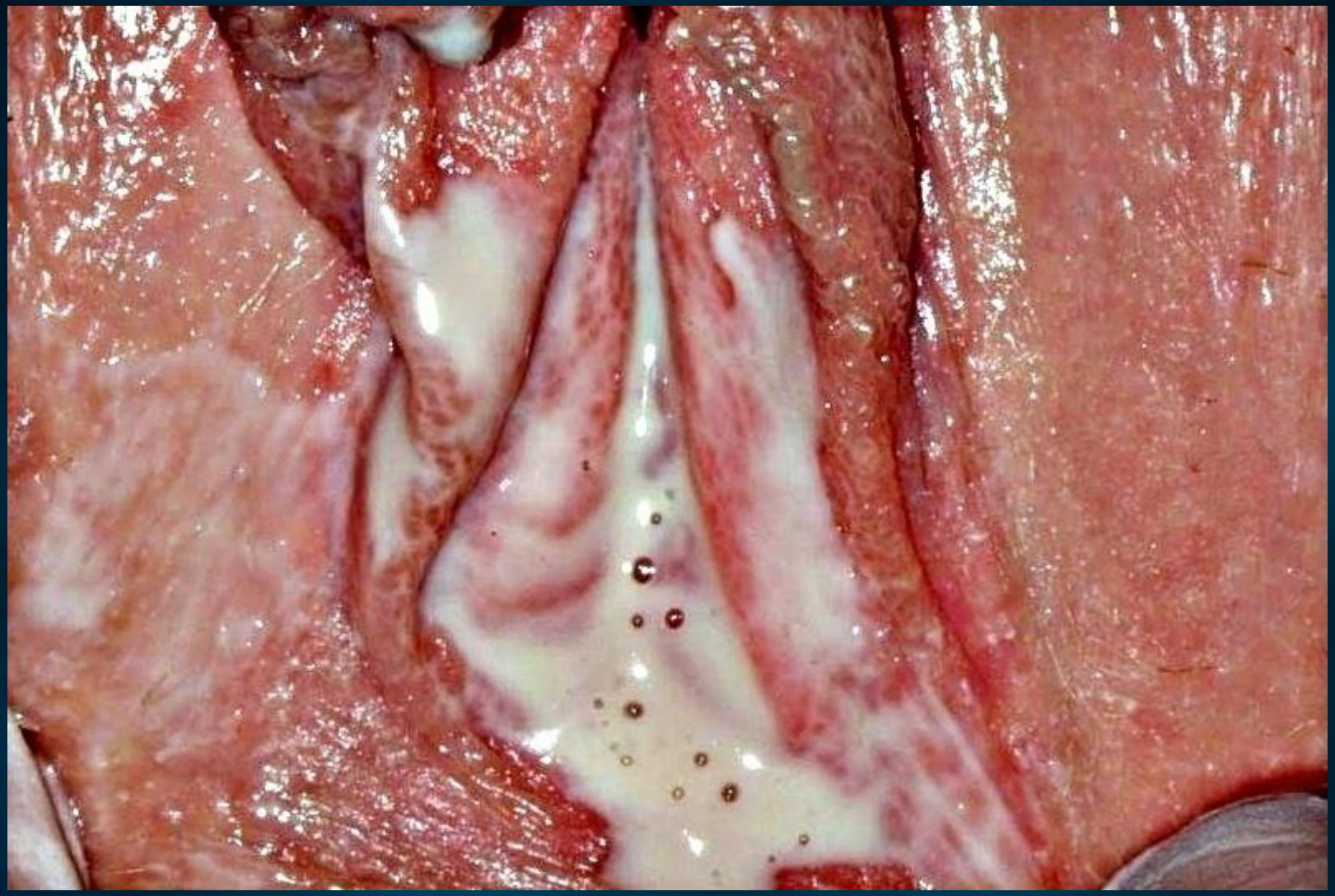
- fishy smell (sniff test)
- white, omogeneous, frothy and malodorous discharge
- vaginal pH > 4.5
- positive amine-test (whiff test)
- clue cells at microscopy



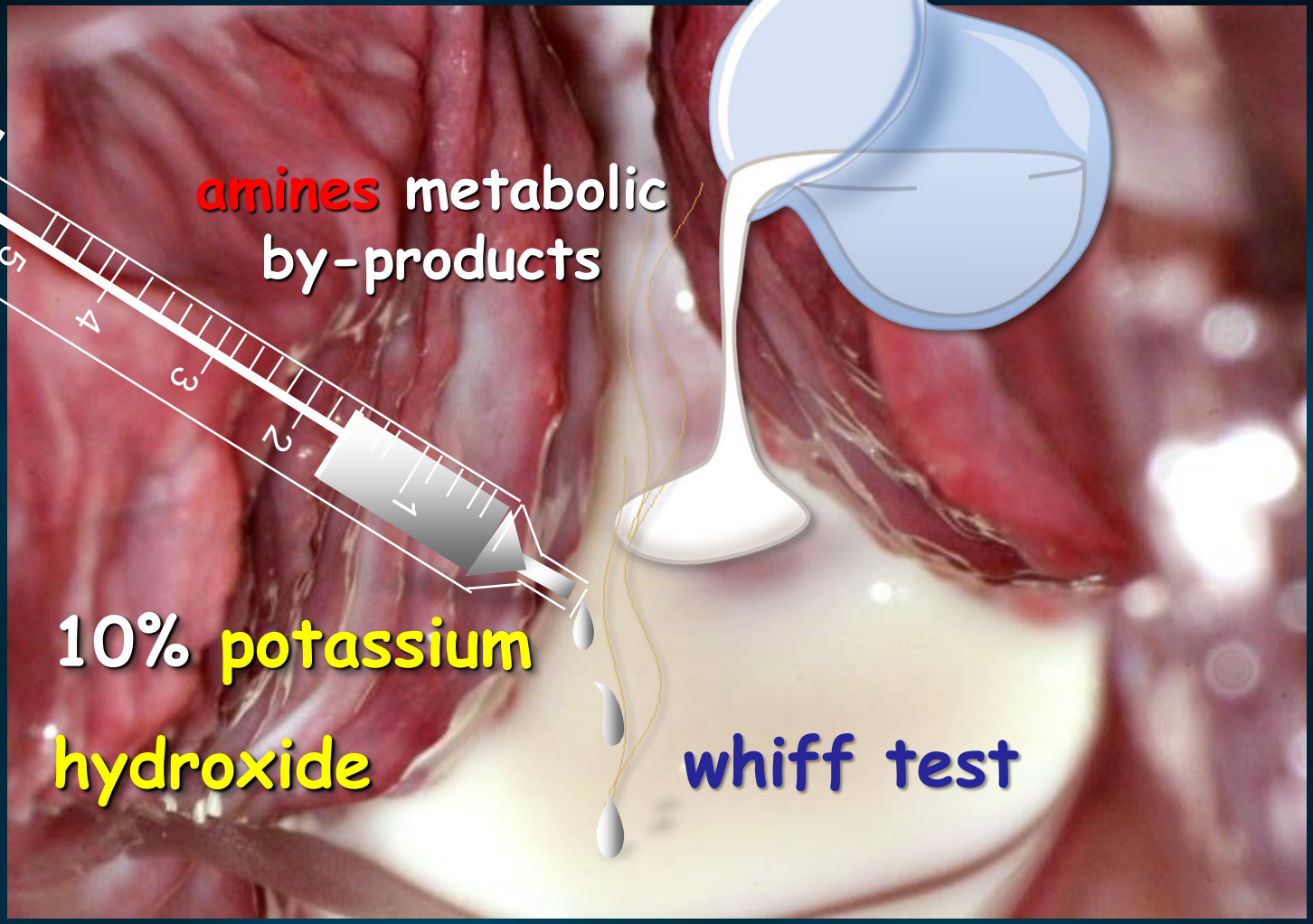
fishy smell



sniff test



white, omogeneous and frothy discharge



abundant white discharge as if milk was poured into the vagina

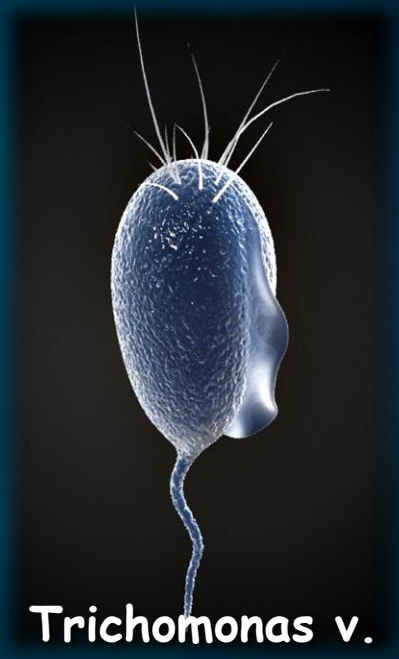


Sometimes it is not enough to be good somellier…

DIAGNOSTIC CRITERIA

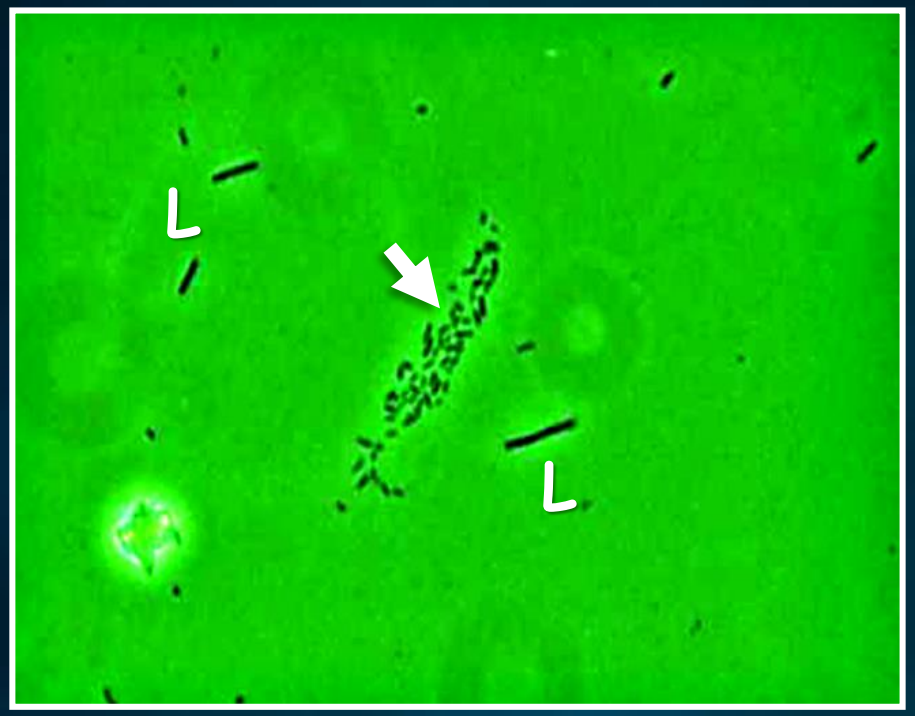


- fis[illegible] smell (sniff test)
- white, omogeneous, frothy and malodorous discharge
- vaginal pH > 4.5
- positive amine-test (whiff test)

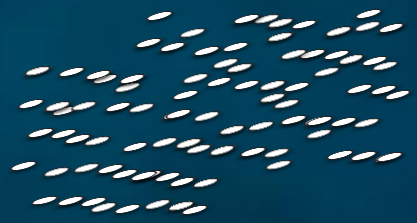


Trichomonas v.

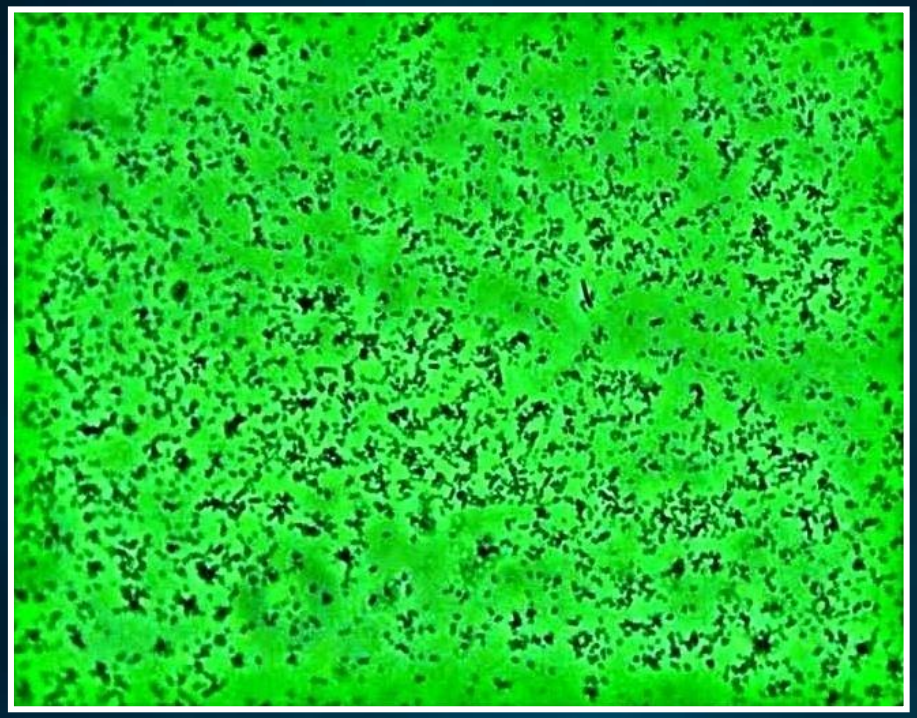
- clue cells at microscopy BV

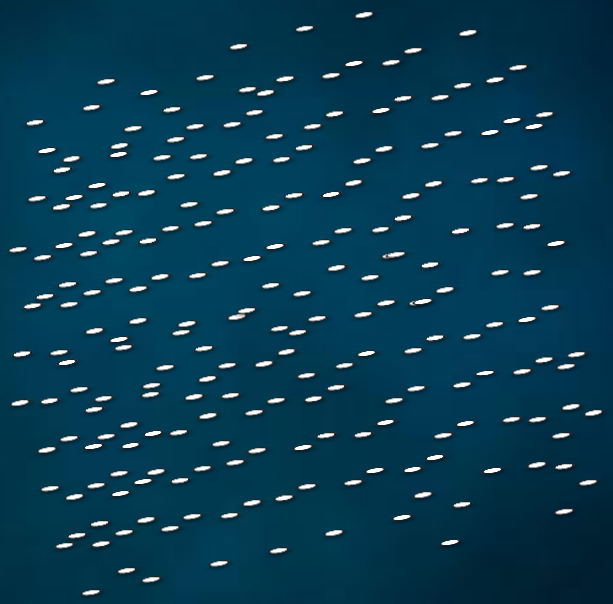


cluster of
pleomorphic bacteria

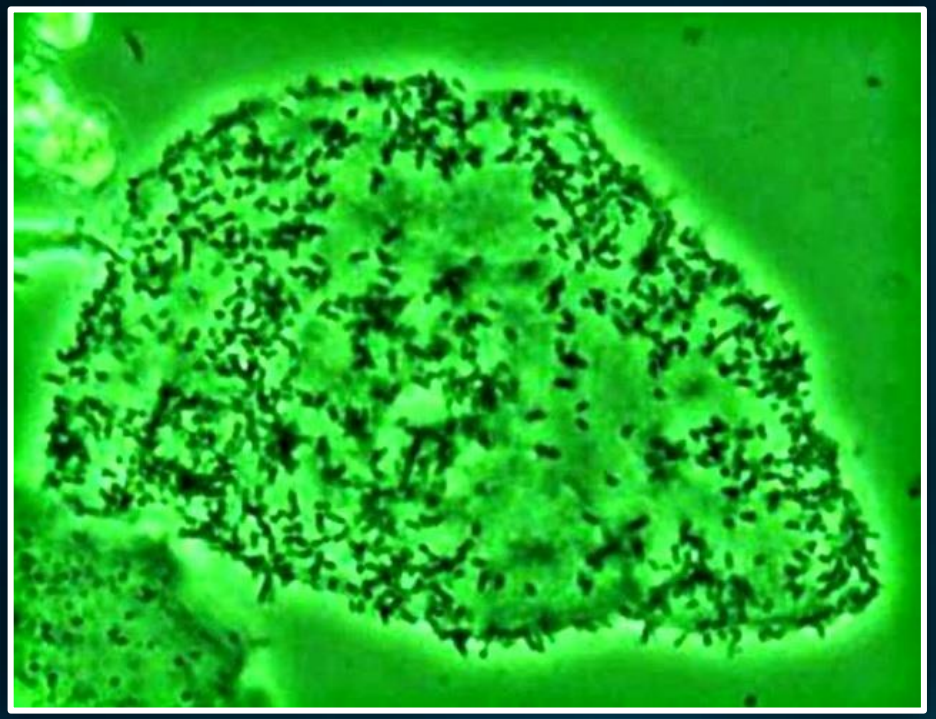


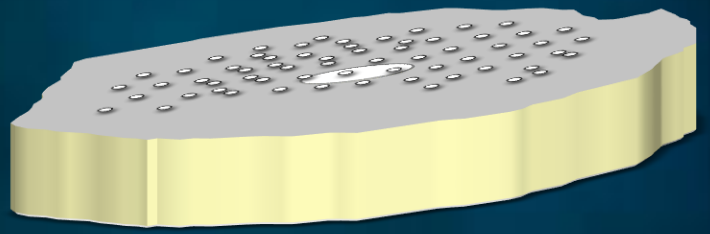






free floating
pleomorphic bacteria





adhered
pleomorphic bacteria:
clue cell

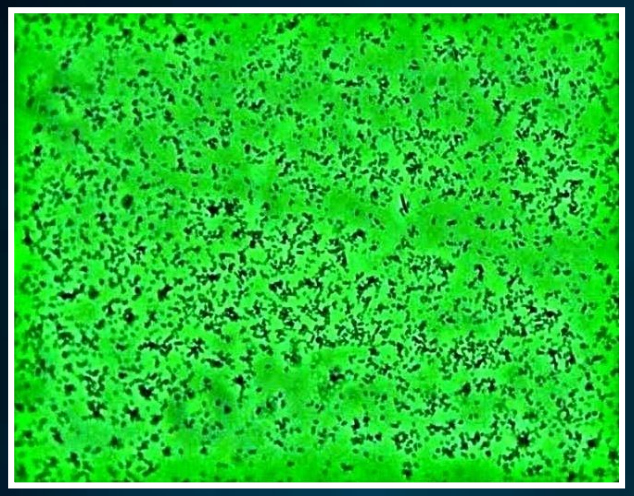
The microscope is the most valuable diagnostic aid, the clue cell being a high characteristic feature (specificity 98%, sensitivity 90%)



van der Meijden WI. Scand J Infect Dis 40(suppl):85, 1983

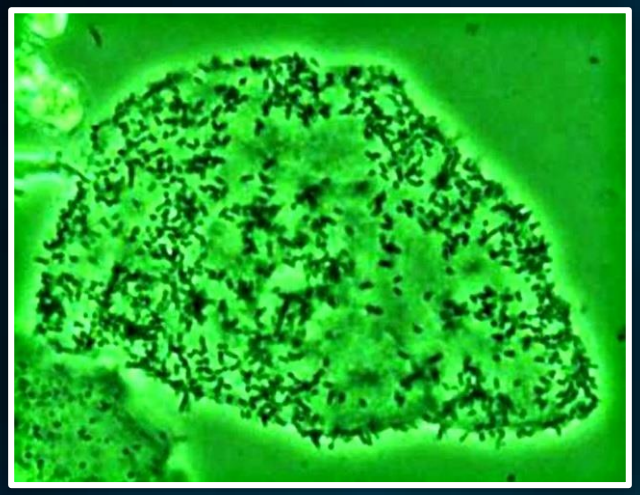
Laboratory Traps





Vaginal cultures have excellent sensitivity for the diagnosis of bacterial vaginosis

Hillier SL. Am J Obstet Gynecol; 169:455, 1993

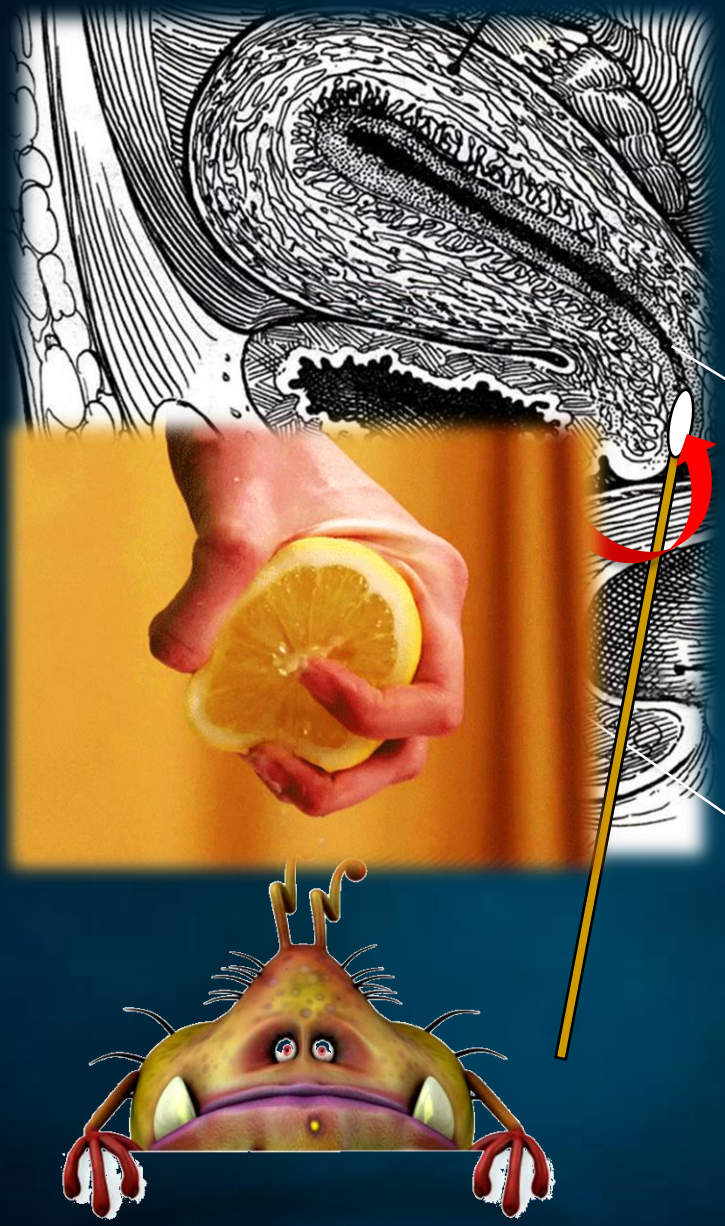


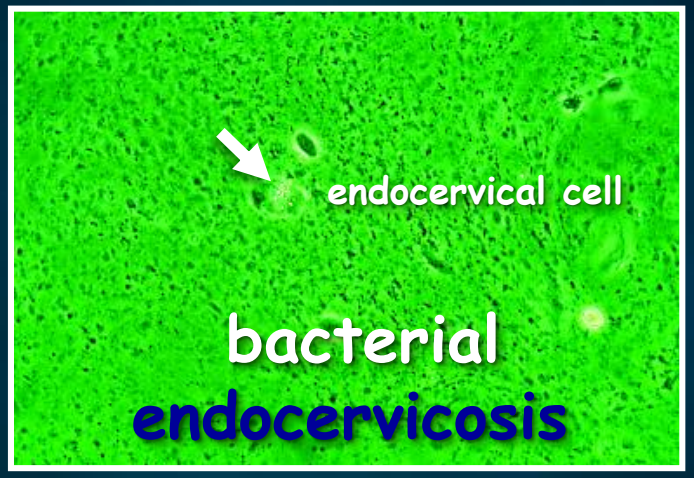
But because the predictive value of a positive G. vaginalis culture is less than 50%

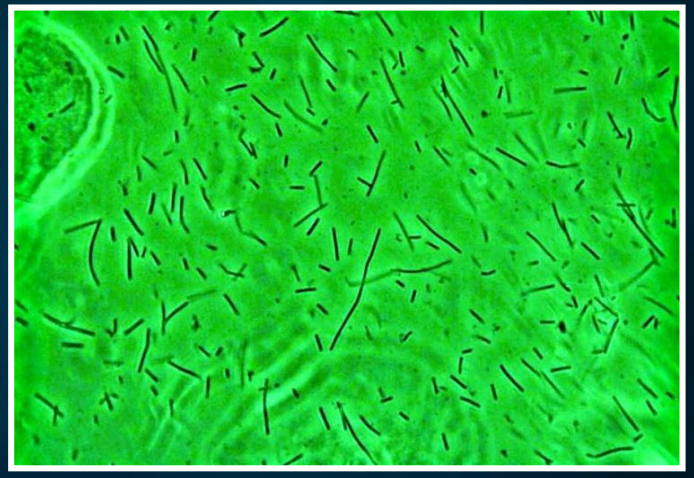
cultures are not recommended

Hillier SL. Am J Obstet Gynecol; 169:455, 1993

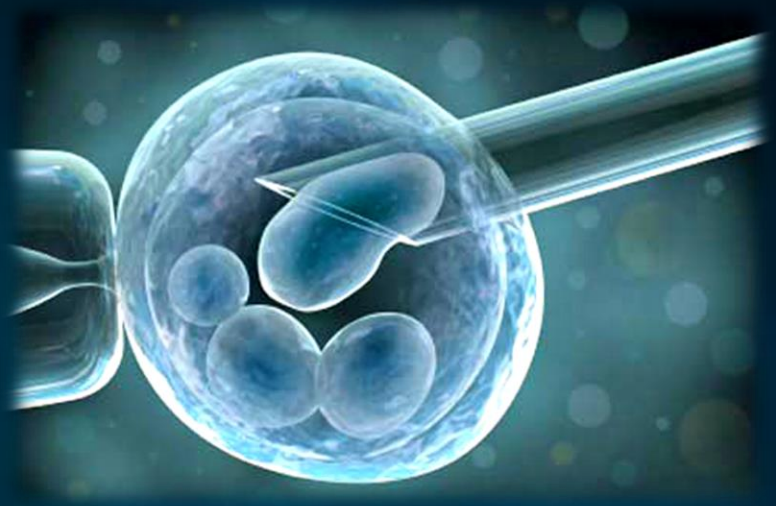
ENDOCERVICAL wet mount







BV is associated with an increased risk of miscarriage in the first trimester in women undergoing IVF, independent of other risk factors



Ralph SG et al. BMJ Jul 24;319(7204):220-3, 1999



Factors associated with recurrence support a possible role for sexual transmission in the pathogenesis of recurrent BV

Bradshaw CS et al. J infect Dis. Jun; 193(11): 1478. Epub Apr 26, 2006

Infective

male partner

usually presents

no penile signs

or symptoms





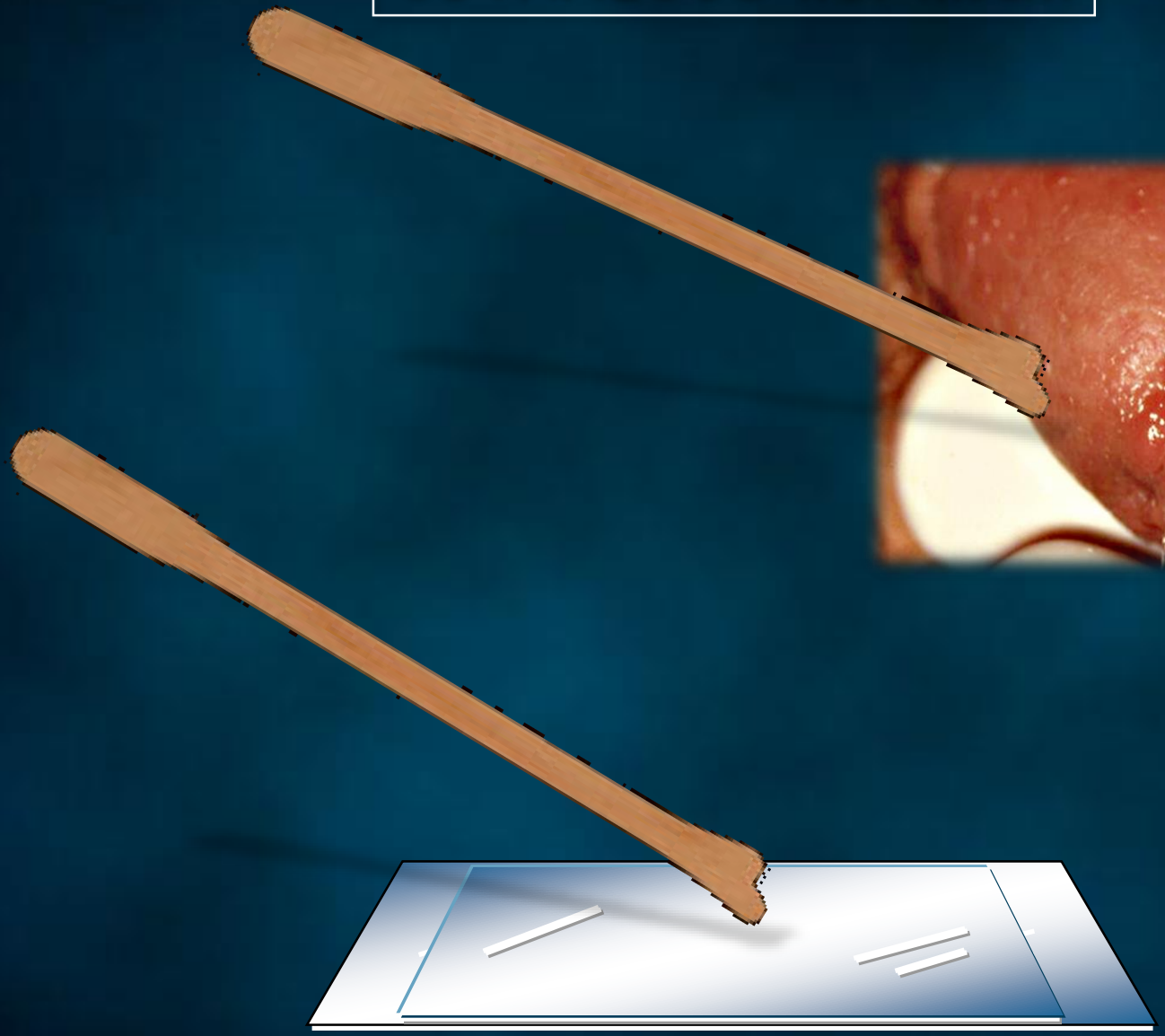
Is it possible to investigate the reactionary male partner?

WET MOUNTS

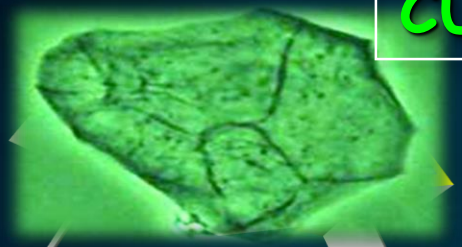
- ✓ Cervico-vaginal wet mount
- ✓ Cutaneous wet mount
- ✓ Urinary wet mount
- ✓ Buccal wet mount
- ✓ Rectal wet mount

CUTANEOUS wet mount

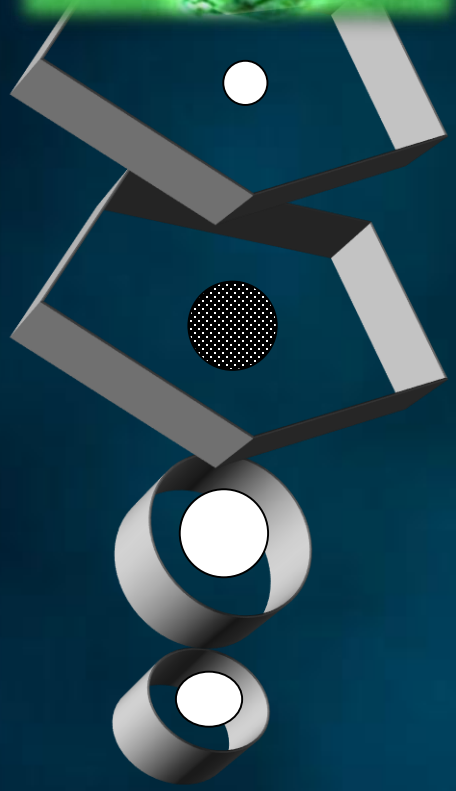




CUTANEOUS wet mount



horny cell





keratinized stratified
SQUAMOUS
epithelium

CUTANEOUS wet mount





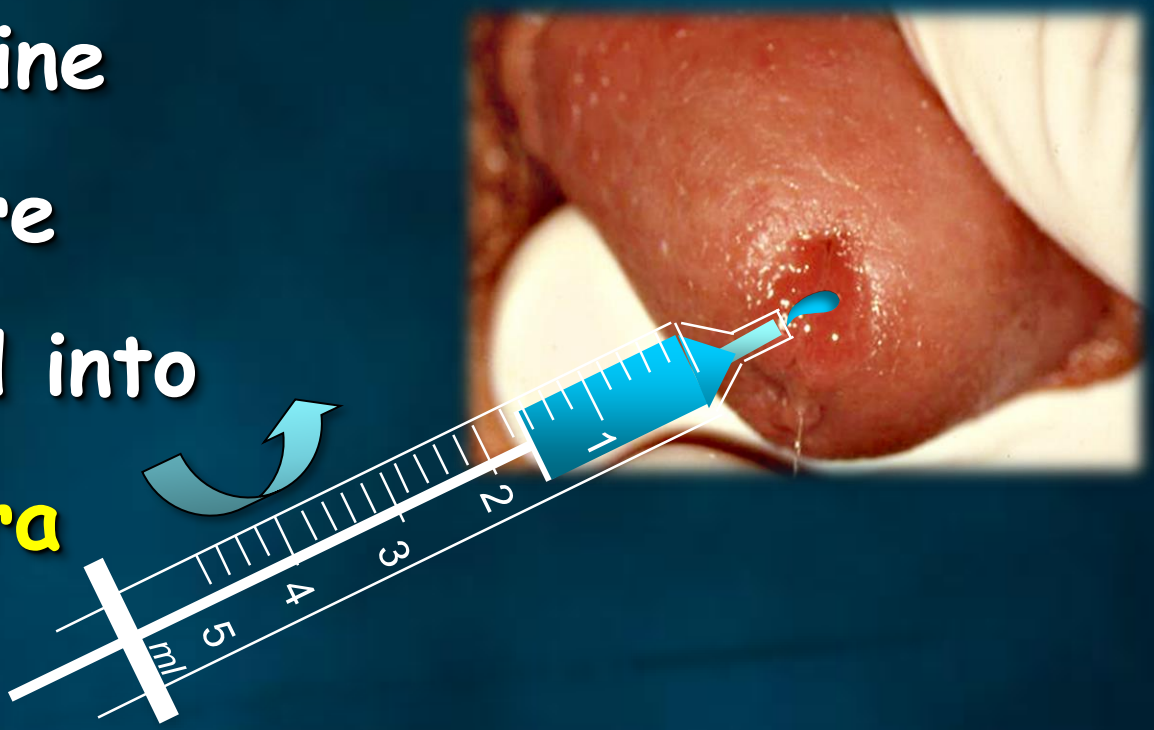
clue cell (horny cell)

WET MOUNTS

- ✓ Cervico-vaginal wet mount
- ✓ Cutaneous wet mount
- ✓ Urinary wet mount
- ✓ Buccal wet mount
- ✓ Rectal wet mount

URINARY wet mount

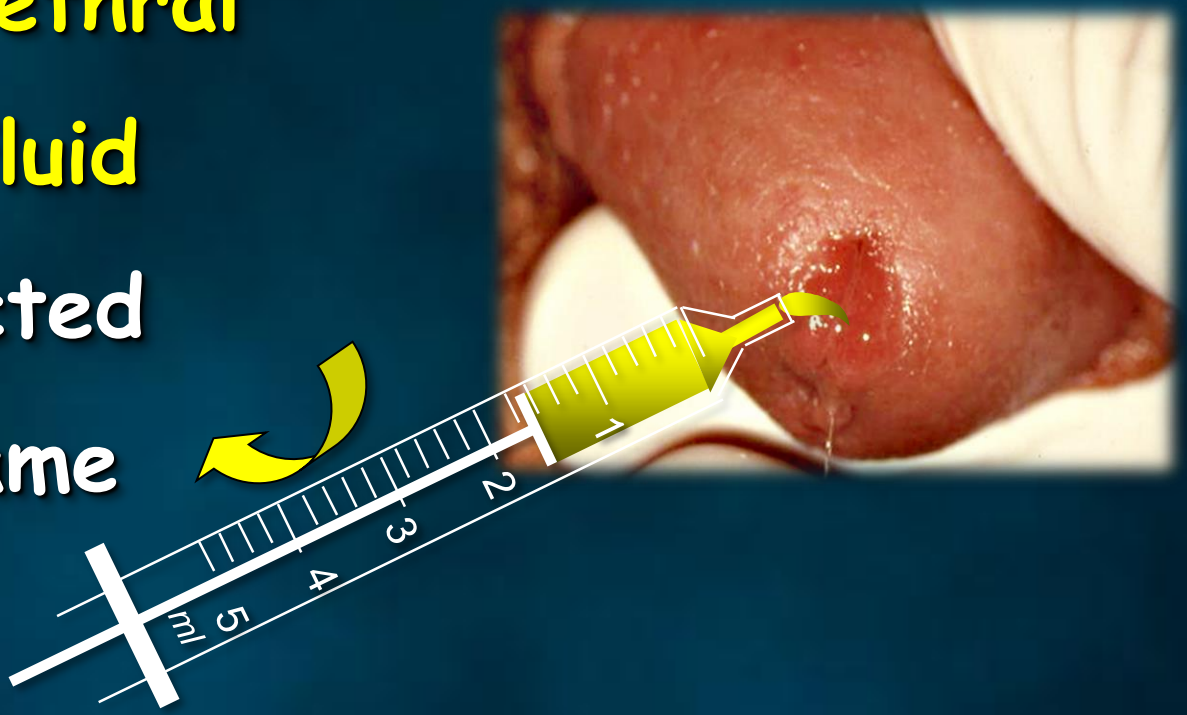
5-10 ml of sterile saline solution are introduced into the urethra



Miniello G. Gynecological Urology; p.52, Orient Longman Eds., 2001

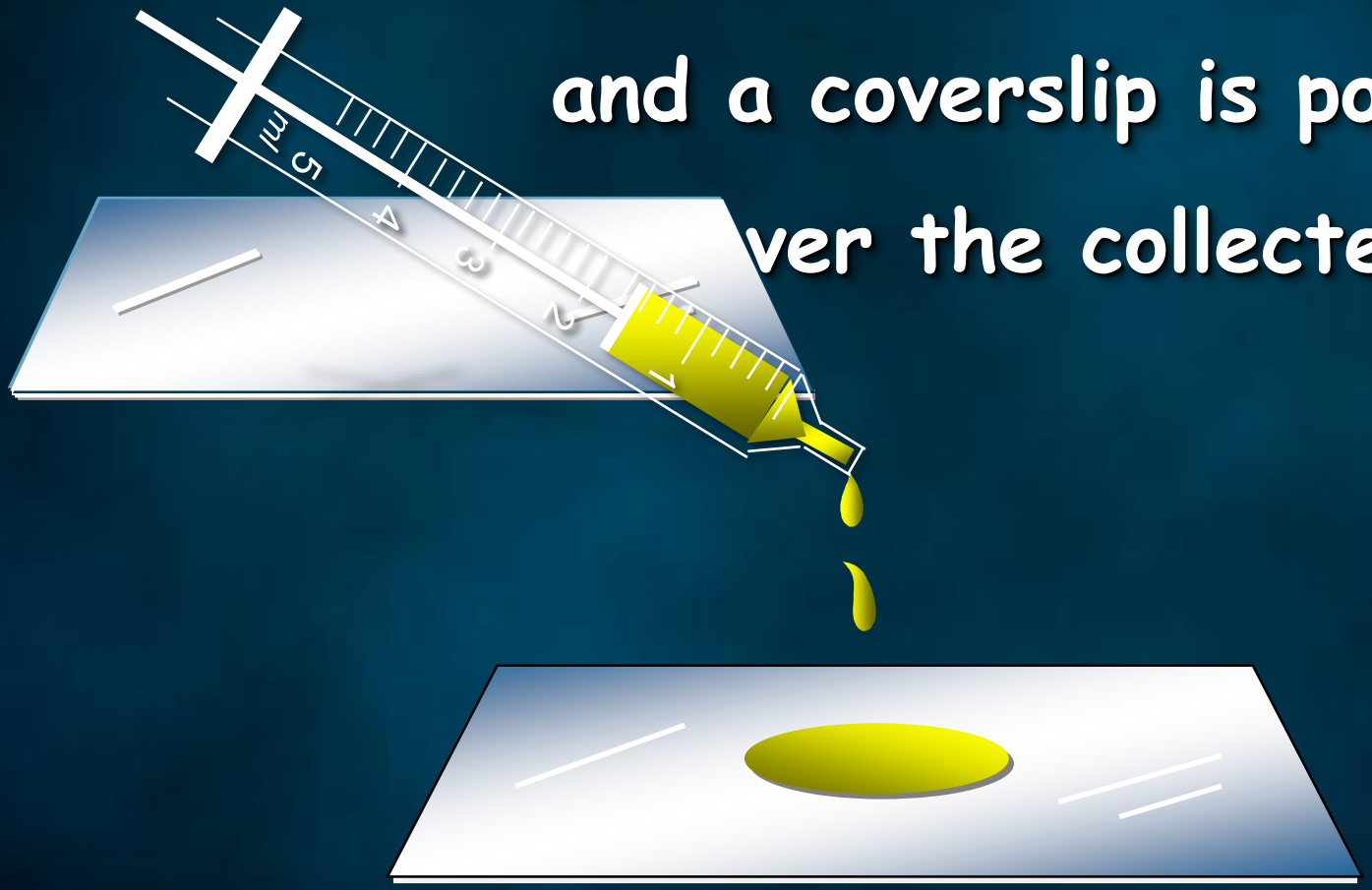
URINARY wet mount

Some drops of the urethral washing fluid are collected by the same syringe



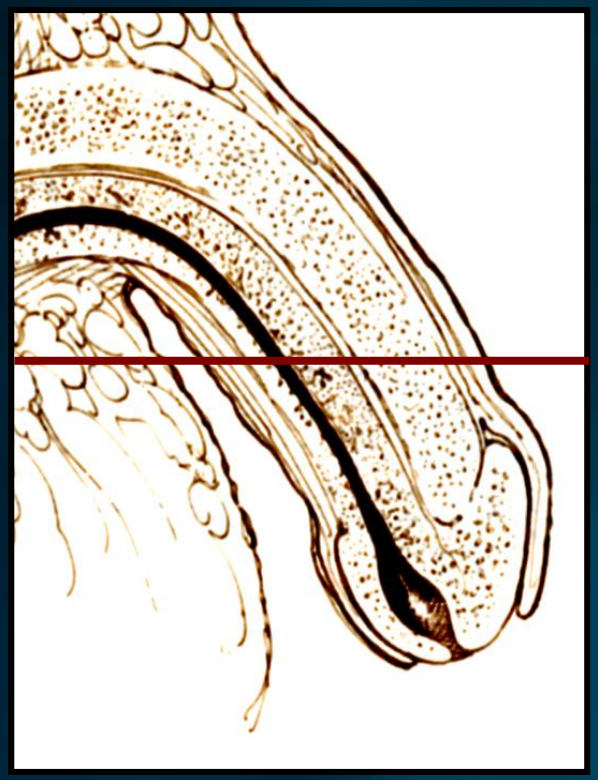
Miniello G. Gynecological Urology; p.52, Orient Longman Eds., 2001

A few drops of the urethral washing fluid are applied to a microscope slide and a coverslip is positioned over the collected drops



Miniello G. Gynecological Urology; p.52, Orient Longman Eds., 2001

URINARY EPITHELIA



Colonization Level

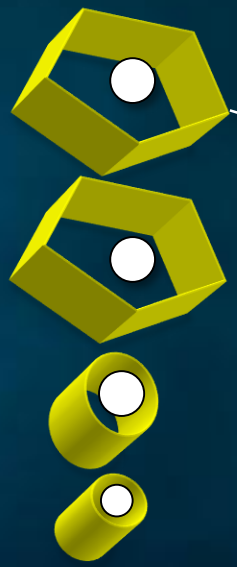


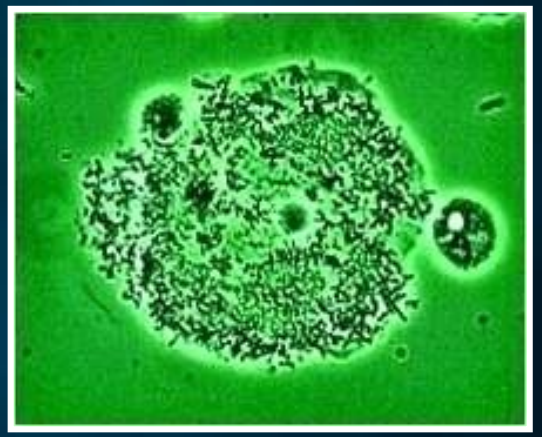
URINARY EPITHELIA

URO-wet mount

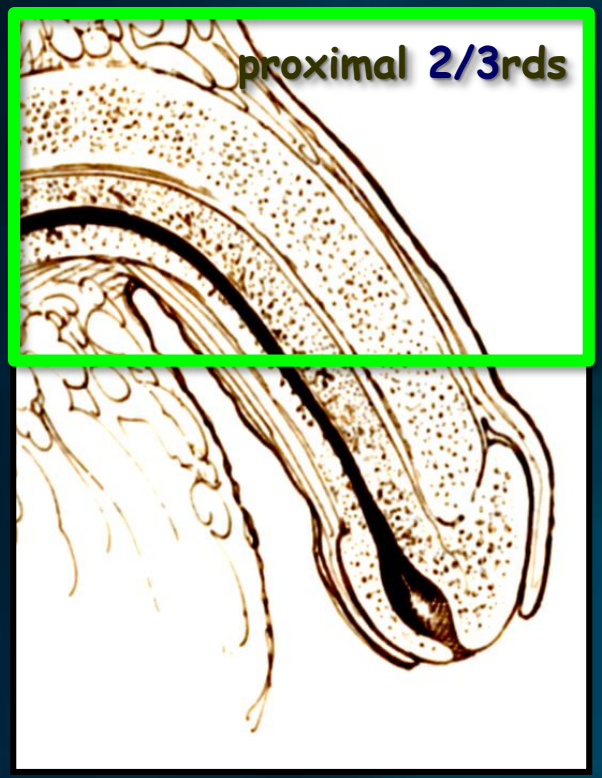


squamous

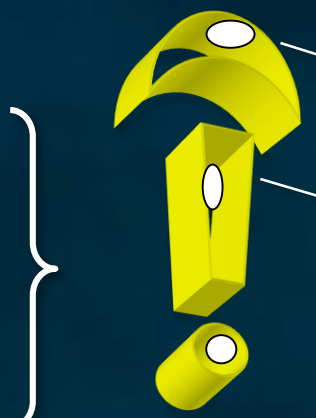




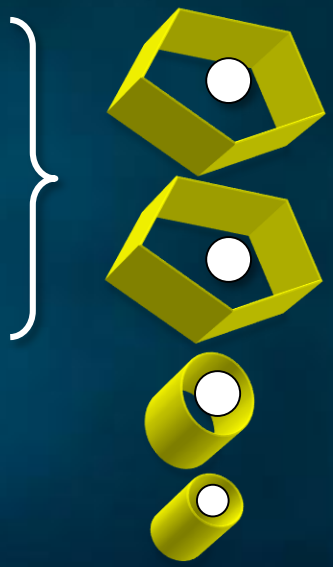
URINARY EPITHELIA



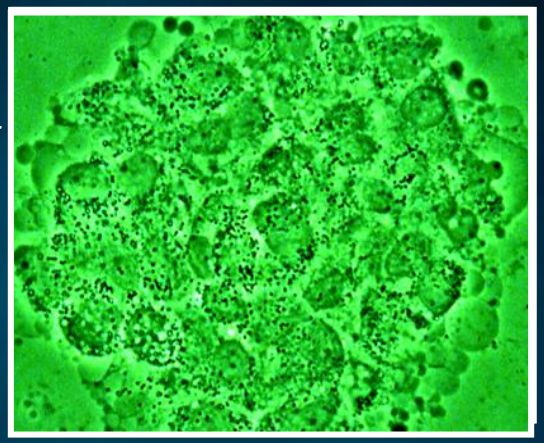
transitional

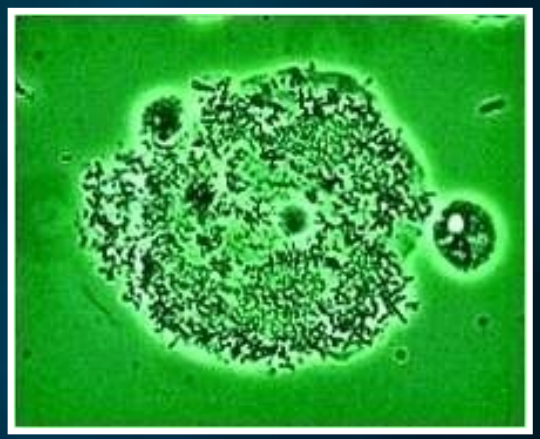


squamous



URO-wet mount

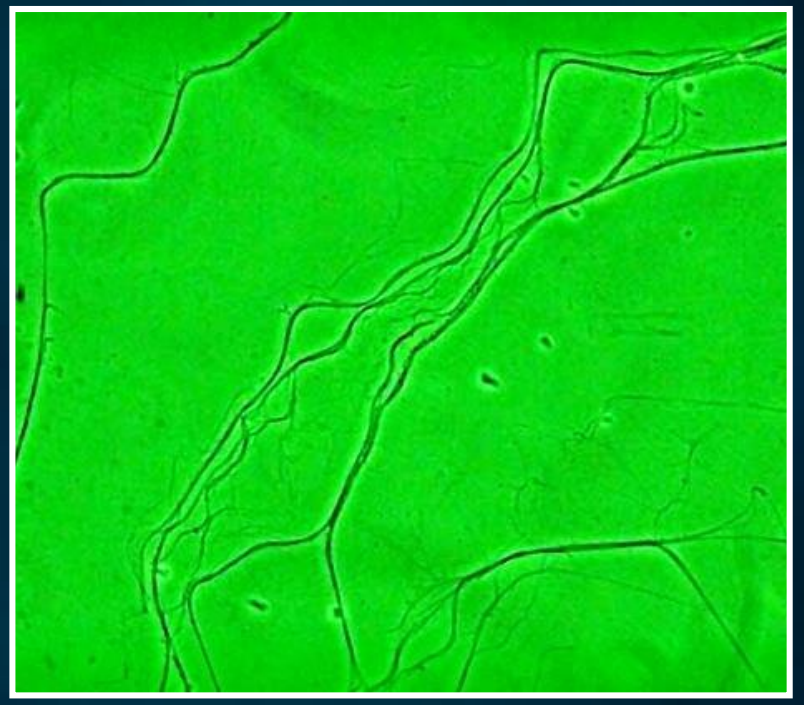




URINARY wet mount

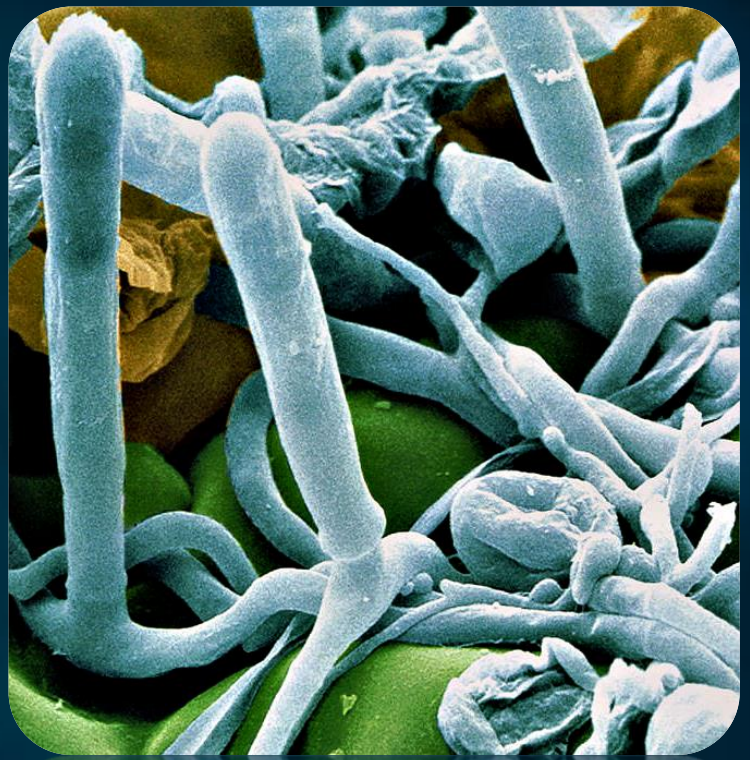


Adhered bacteria to mucus filaments



Clean mucus filaments after treatment

Candida albicans



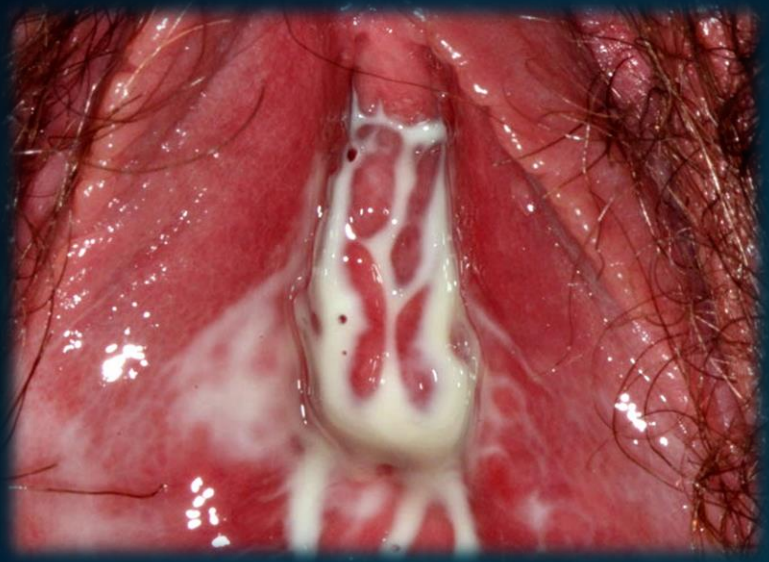
Bacterial Vaginosis
(40%-50%)



Trichomoniasis
(15%-20%)

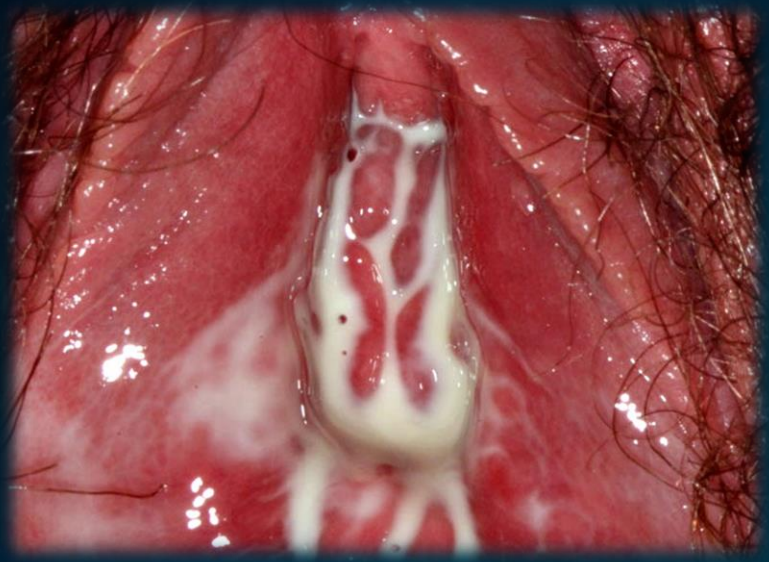
Candidiasis
(20%-25%)

Mylonas I et al. Obstet Gynecol Surv. Jun;66(6):359, 2011



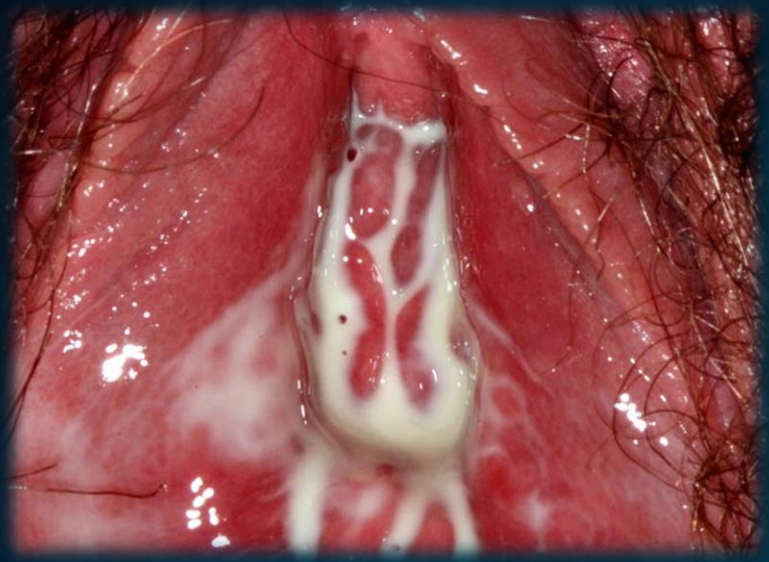
Approximately three-quarters of women will experience an episode of VVC at least once in their life

Ono F et al. Nihon Rinsho Jan;67(1)157, 2009



5-8% of them will have more than four attacks within a year

Ono F et al. Nihon Rinsho Jan;67(1)157, 2009

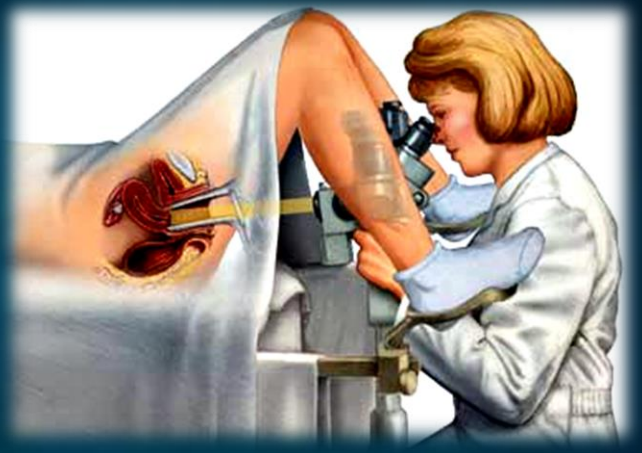


This condition has been designed as recurrent VVC

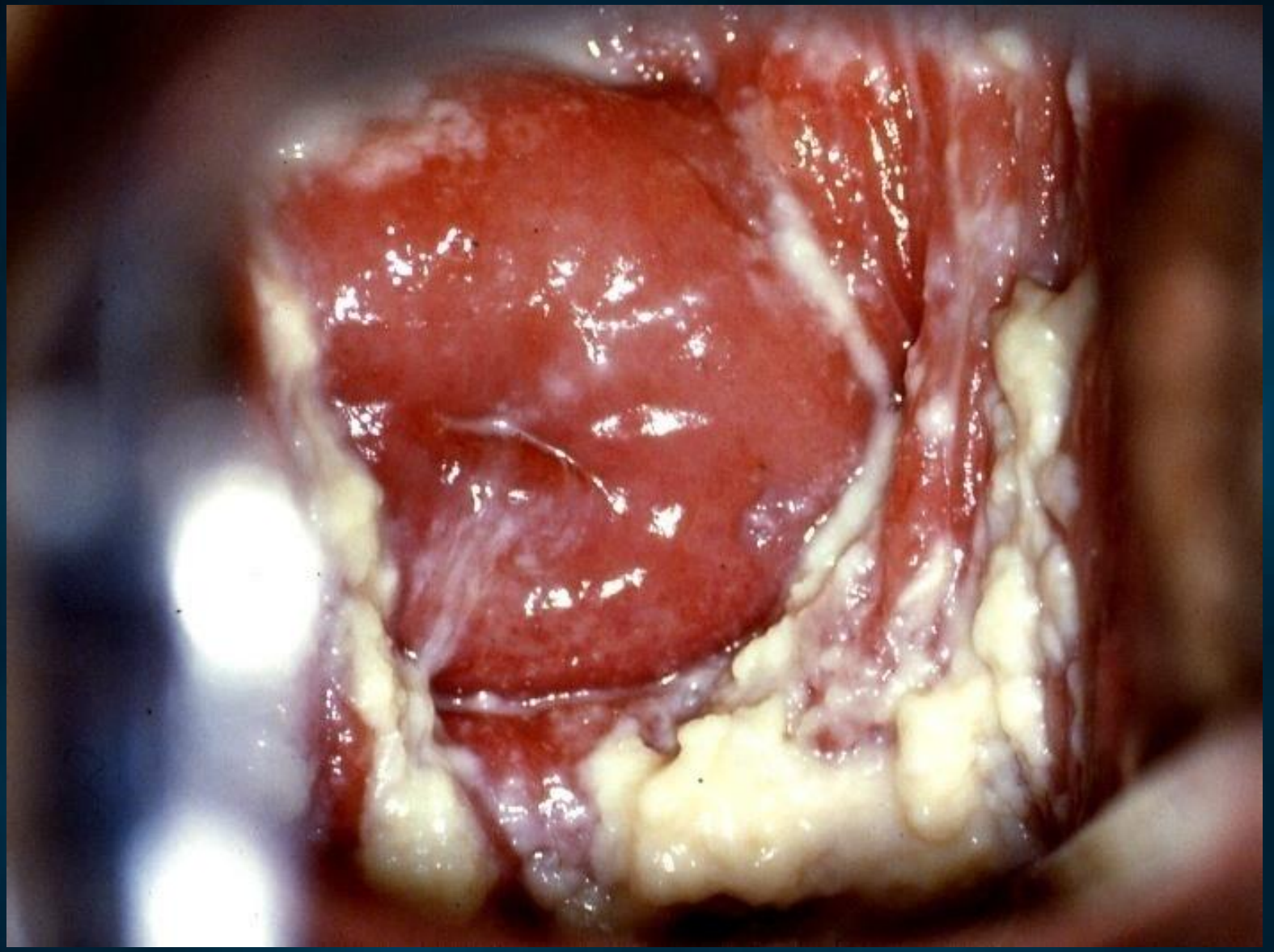
Ono F et al. Nihon Rinsho Jan;67(1)157, 2009

CANDIDA

colposcopy:



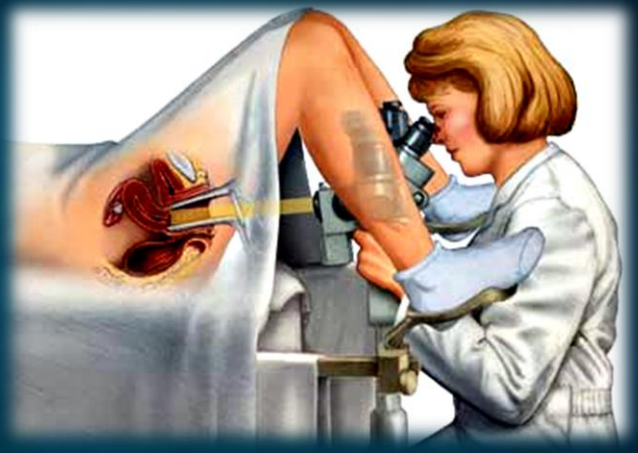
- cervical congestion and, white and **clumpy** discharge
- erythematous maculae
- erythematous papulae
- white punctation



white and clumpy discharge

CANDIDA

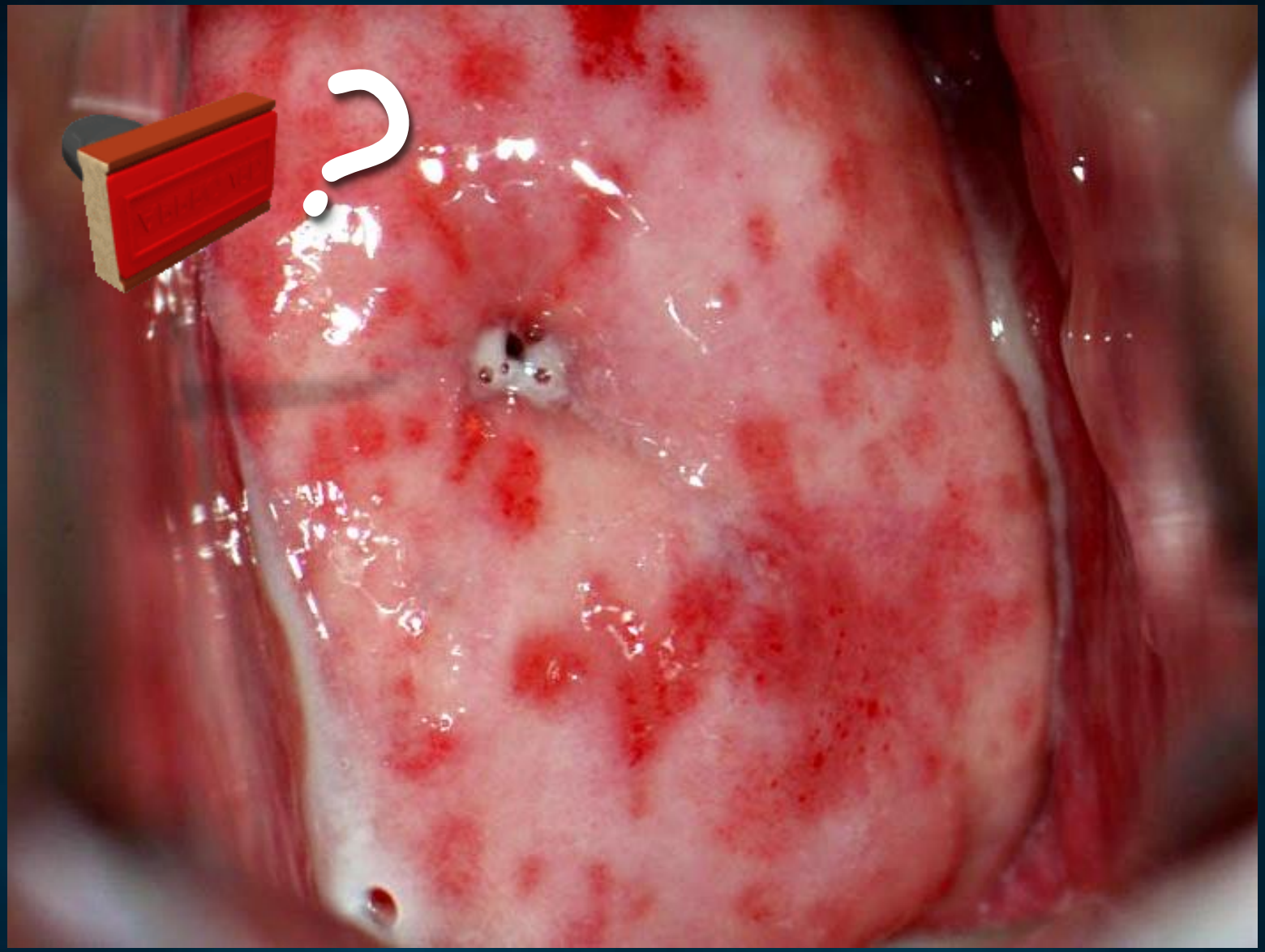
colposcopy:



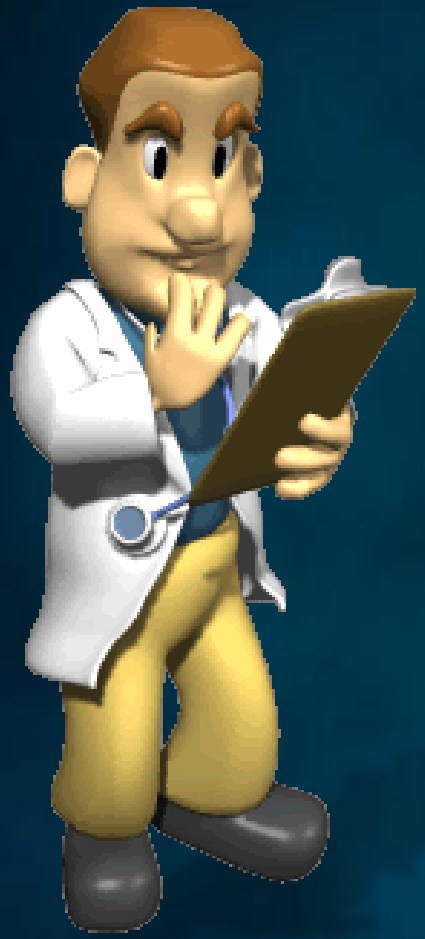
- cervical congestion and, white and **clumpy** discharge
- **erythematous maculae**
- **erythematous papulae**
- **white punctation**



fungal erythematous maculae



fungal erythematous maculae

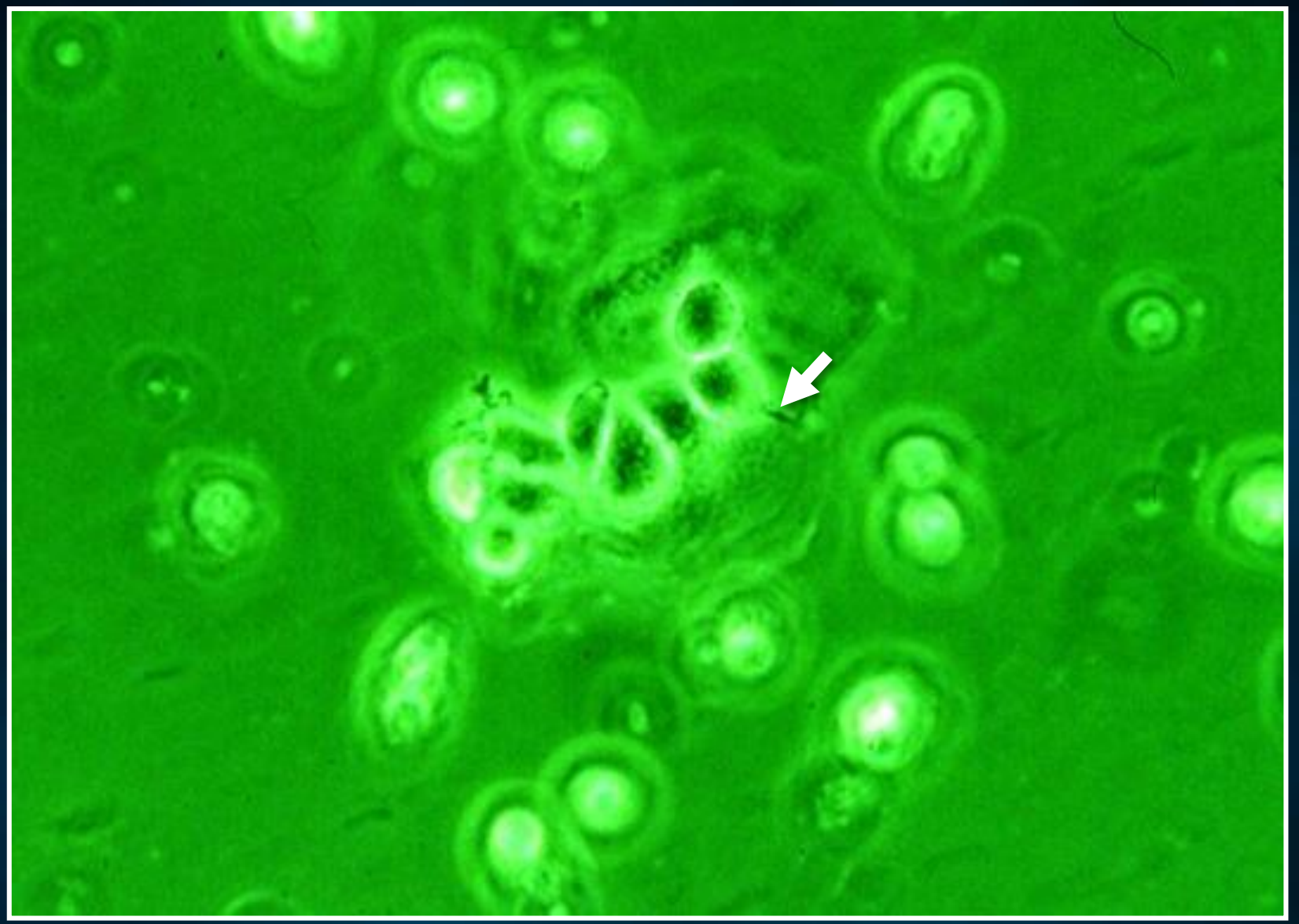


Differential diagnosis

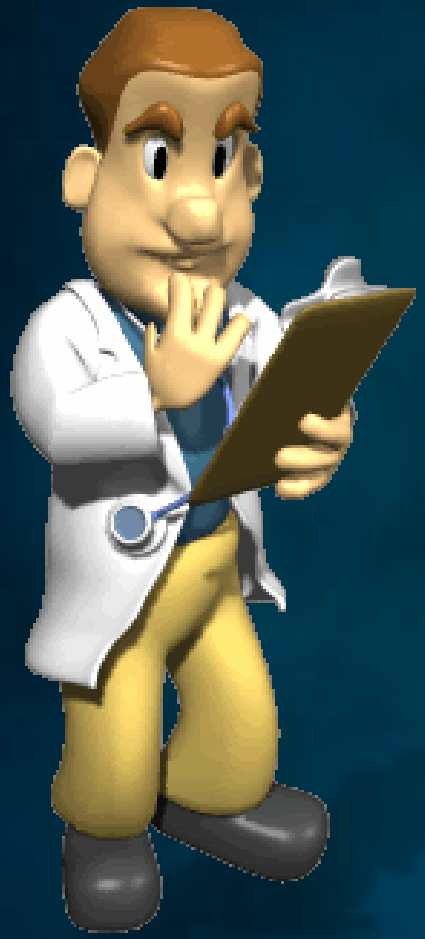
vs Trichomonas petechiae



Trichomonas strawberry appearance



cluster of Tricomonads

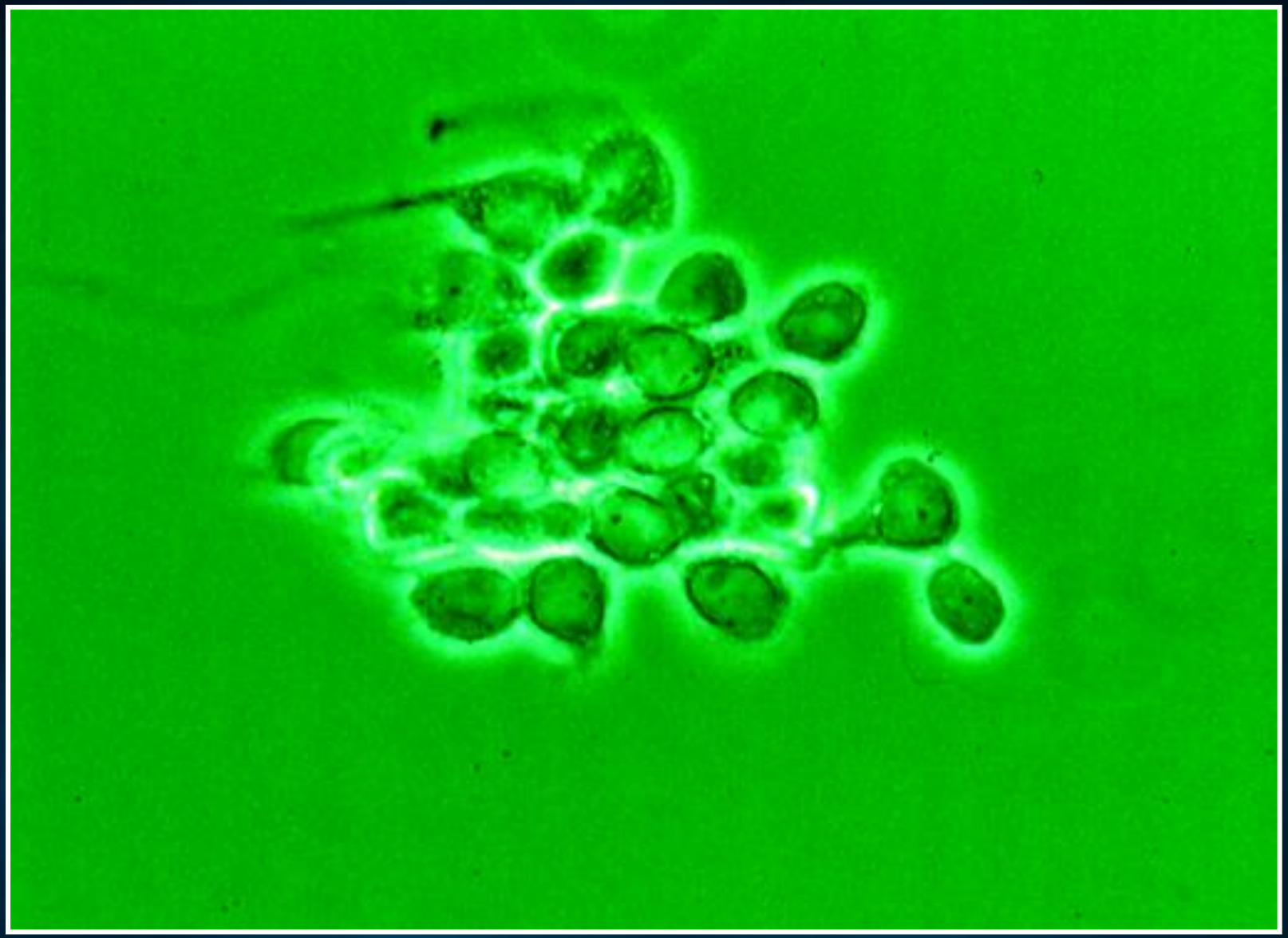


Differential diagnosis

vs dystrophic petechiae



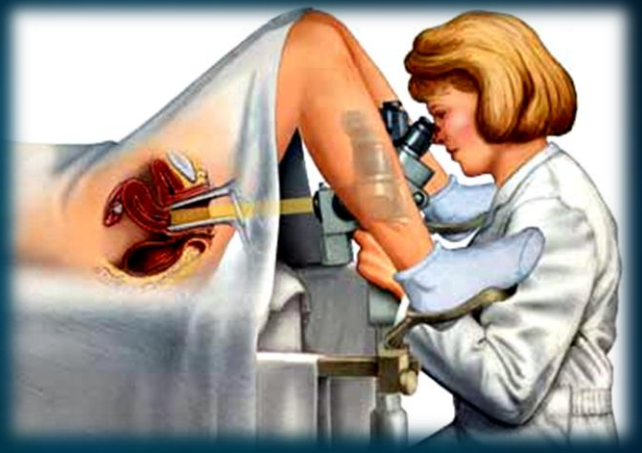
dystrophic petechiae



atropic smear

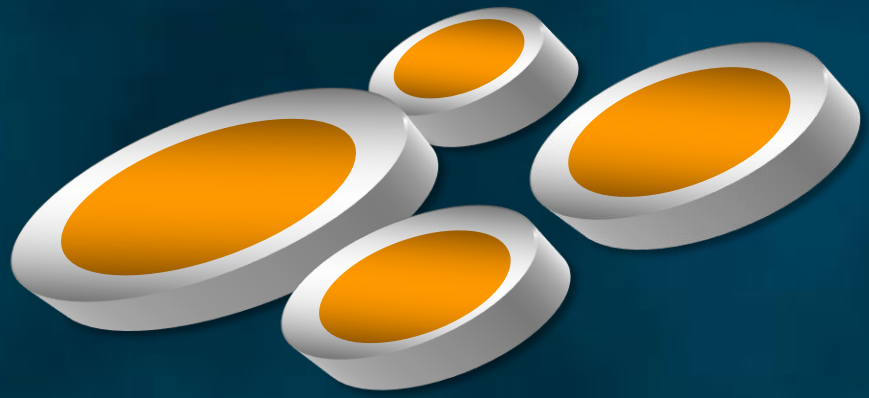
CANDIDA

colposcopy:



- cervical congestion and, white and **clumpy** discharge
- **erythematous maculae**
- **erythematous papulae**
- **white punctation**

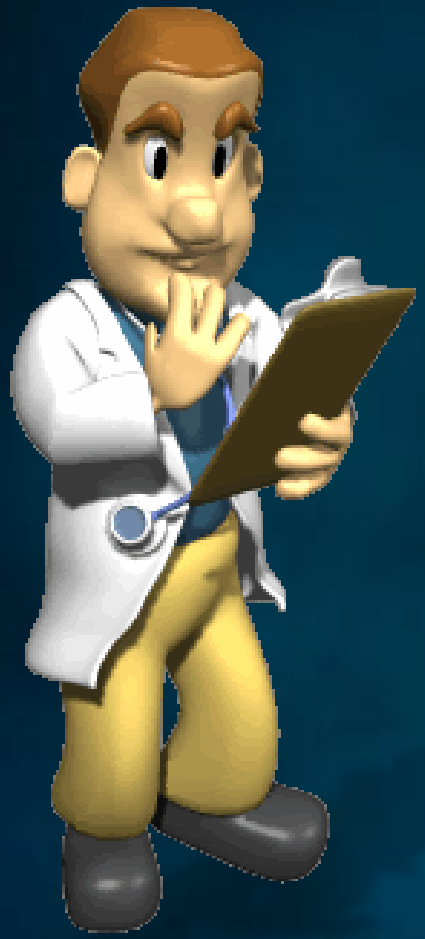
PAPULAE



smooth, centrally depressed and hyperemic



fungal erithematous papulae

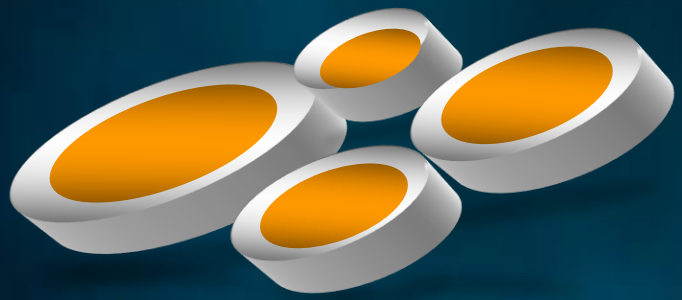


Differential diagnosis

vs HPV micropapillary lesions

PAPULAE

Fungal papulae



smooth, centrally depressed and hyperemic

HPV micropapillary lesions



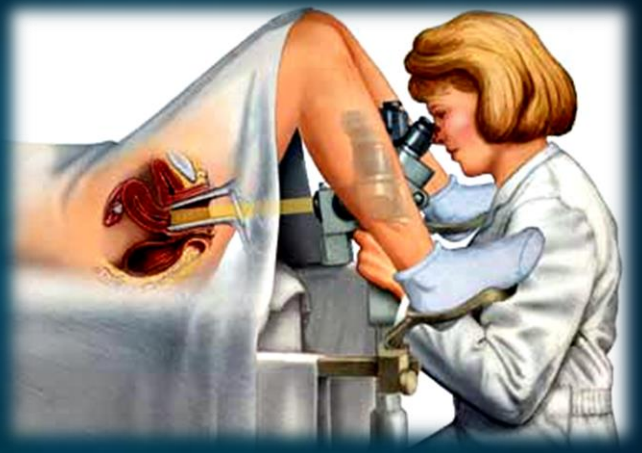
rough and uniformly acetowhite



HPV micropapillary lesions

CANDIDA

colposcopy:



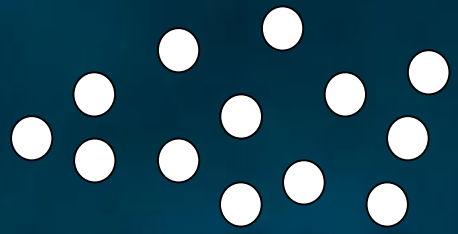
- cervical congestion and, white and **clumpy** discharge
- **erythematous maculae**
- **erythematous papulae**
- **white punctation**

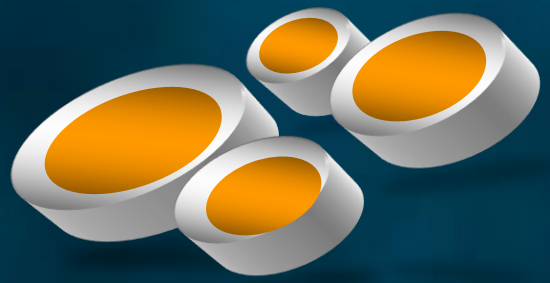
WHITE PUNCTATION

- Fungal
- Metaplastic
- Viral

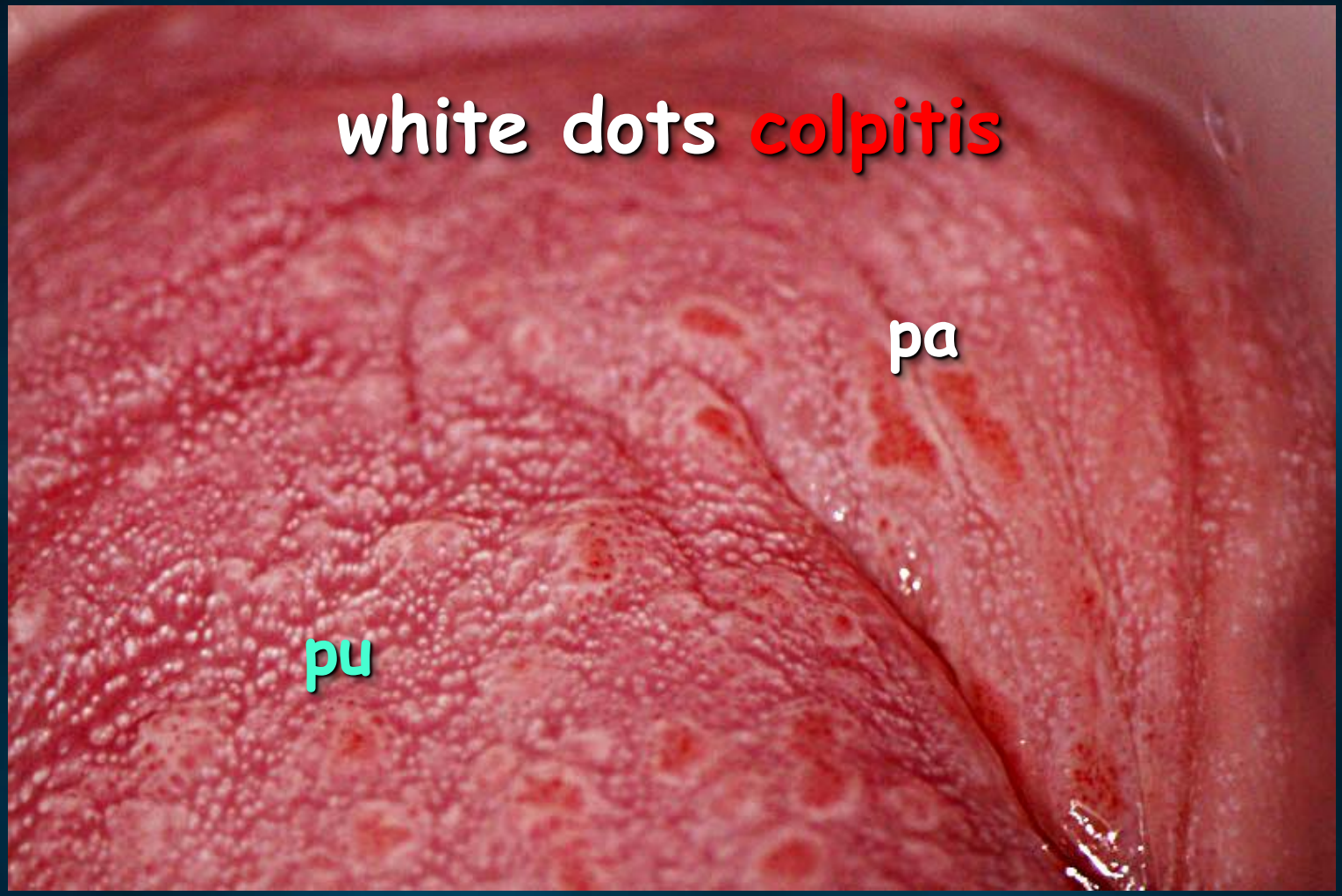
WHITE PUNCTATION

- Fungal

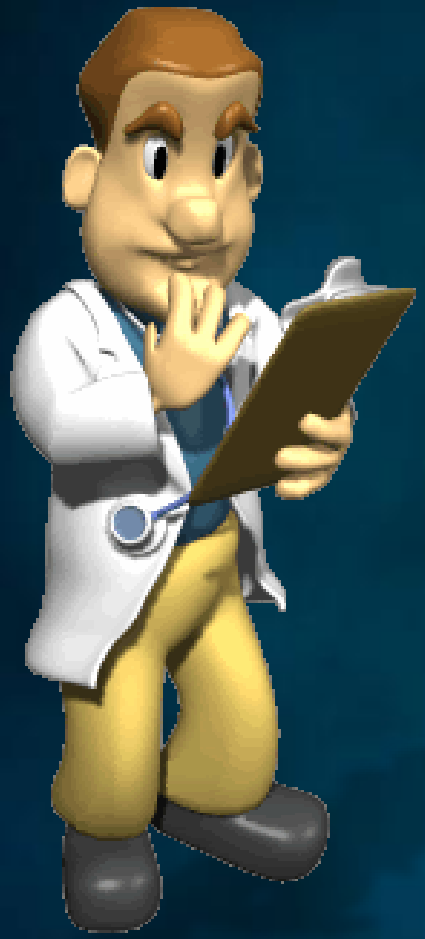




regular, close to depressed papulae (disappear after treatment)



fungal punctation & erythematous papulae

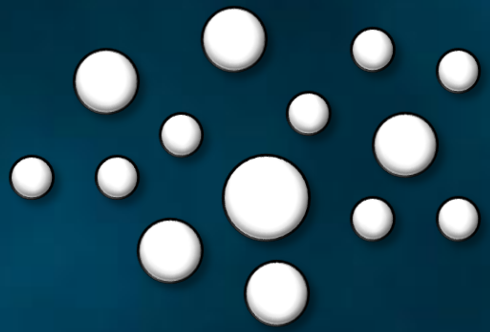


Differential diagnosis

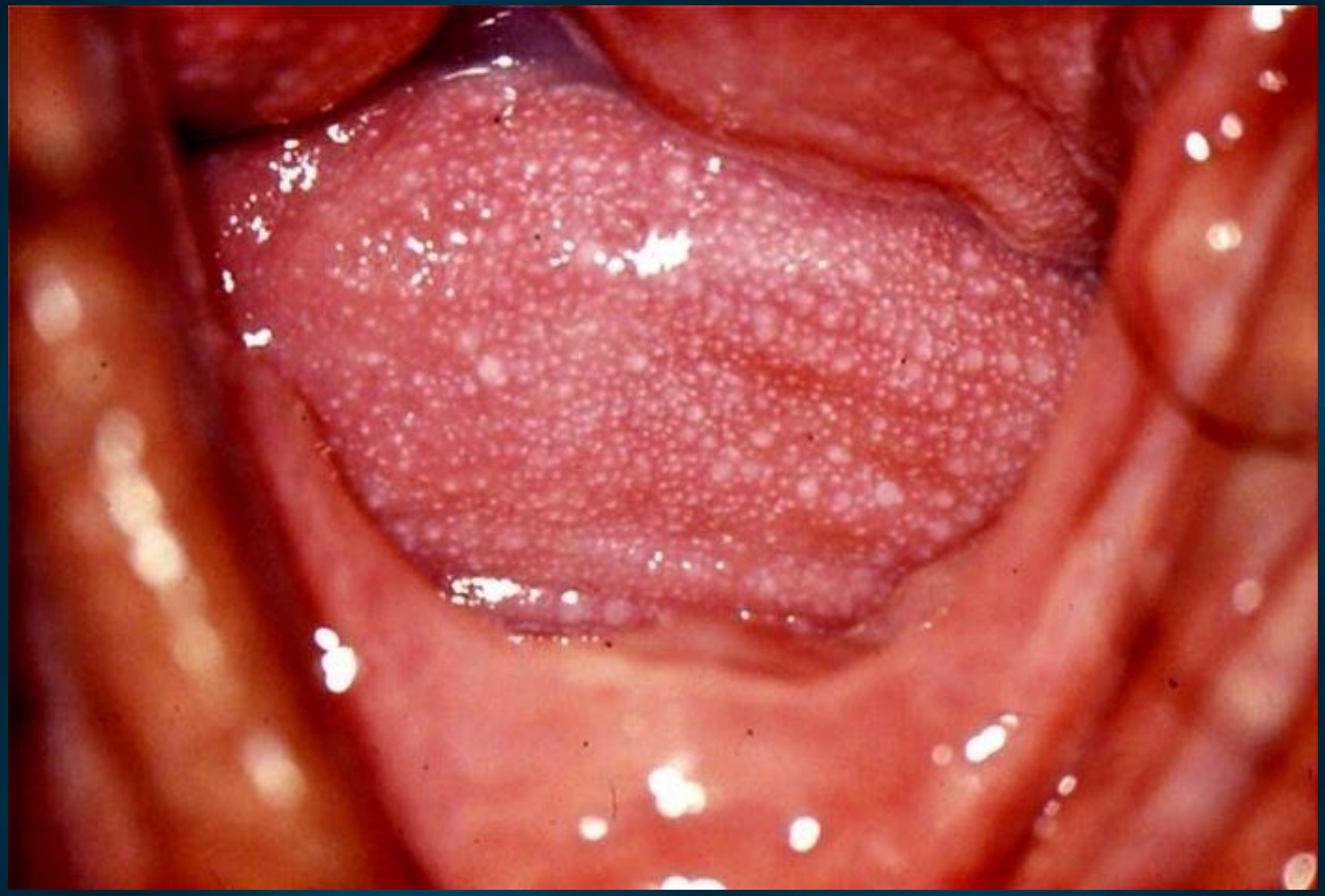
vs Viral white punctation

WHITE PUNCTATION

- Viral (HPV)



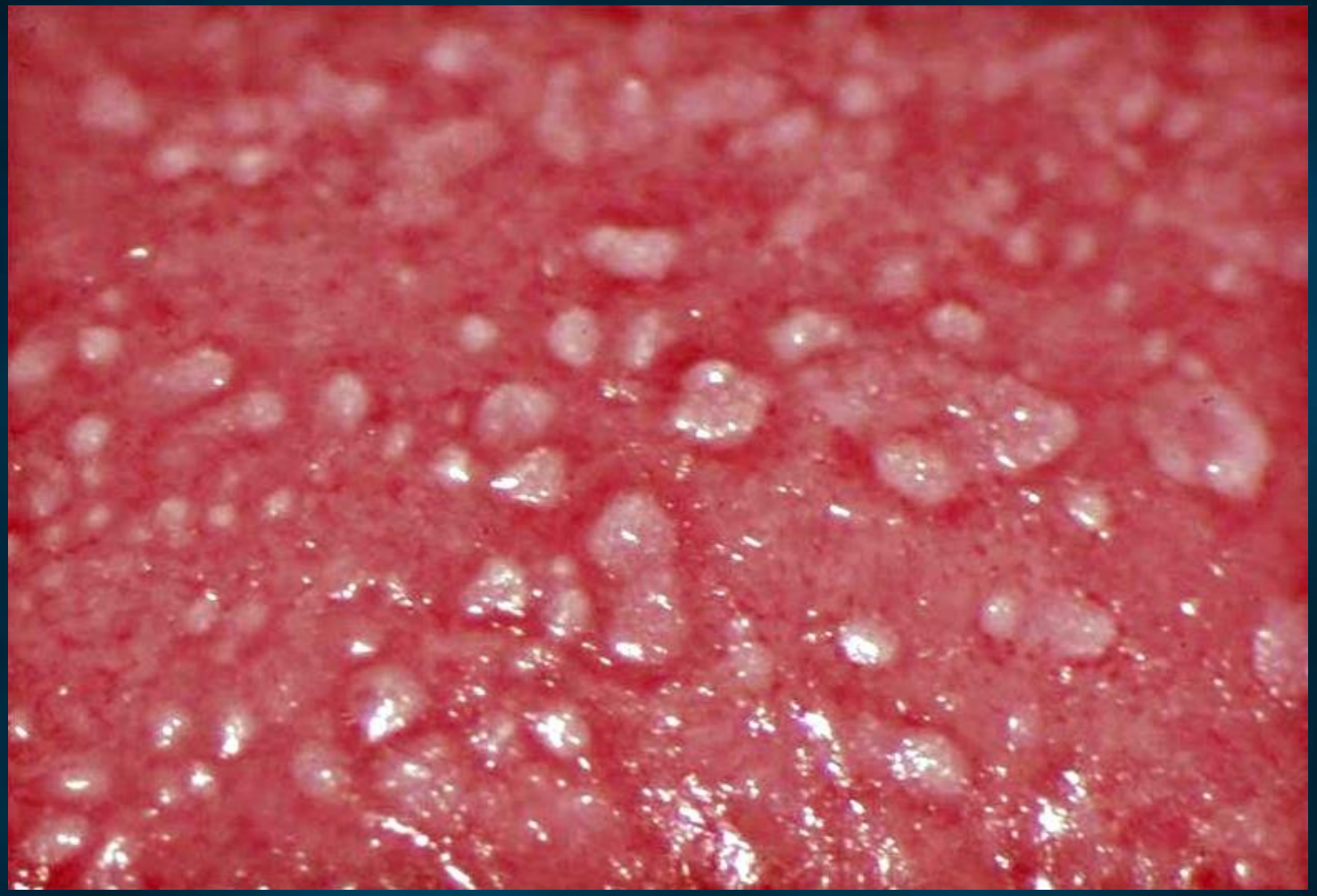
irregular and coarse



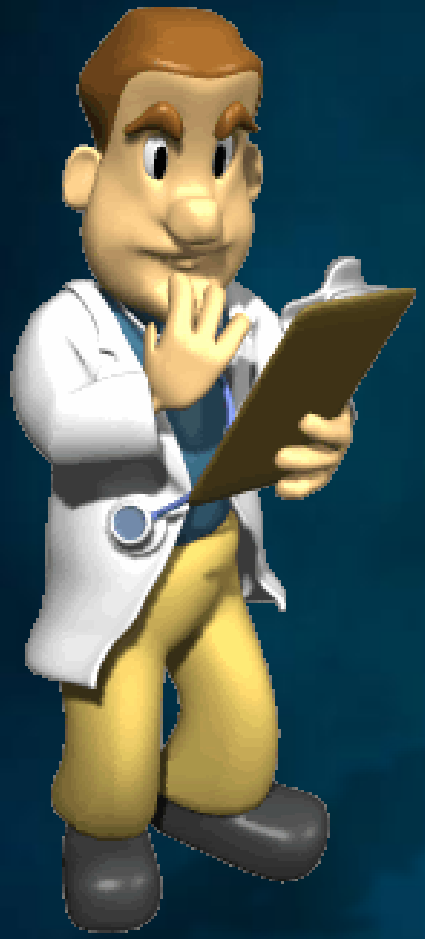
vaginal viral white punctation



cervical viral white punctation



cervical viral white punctation

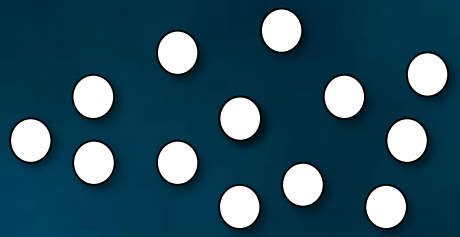


Differential diagnosis

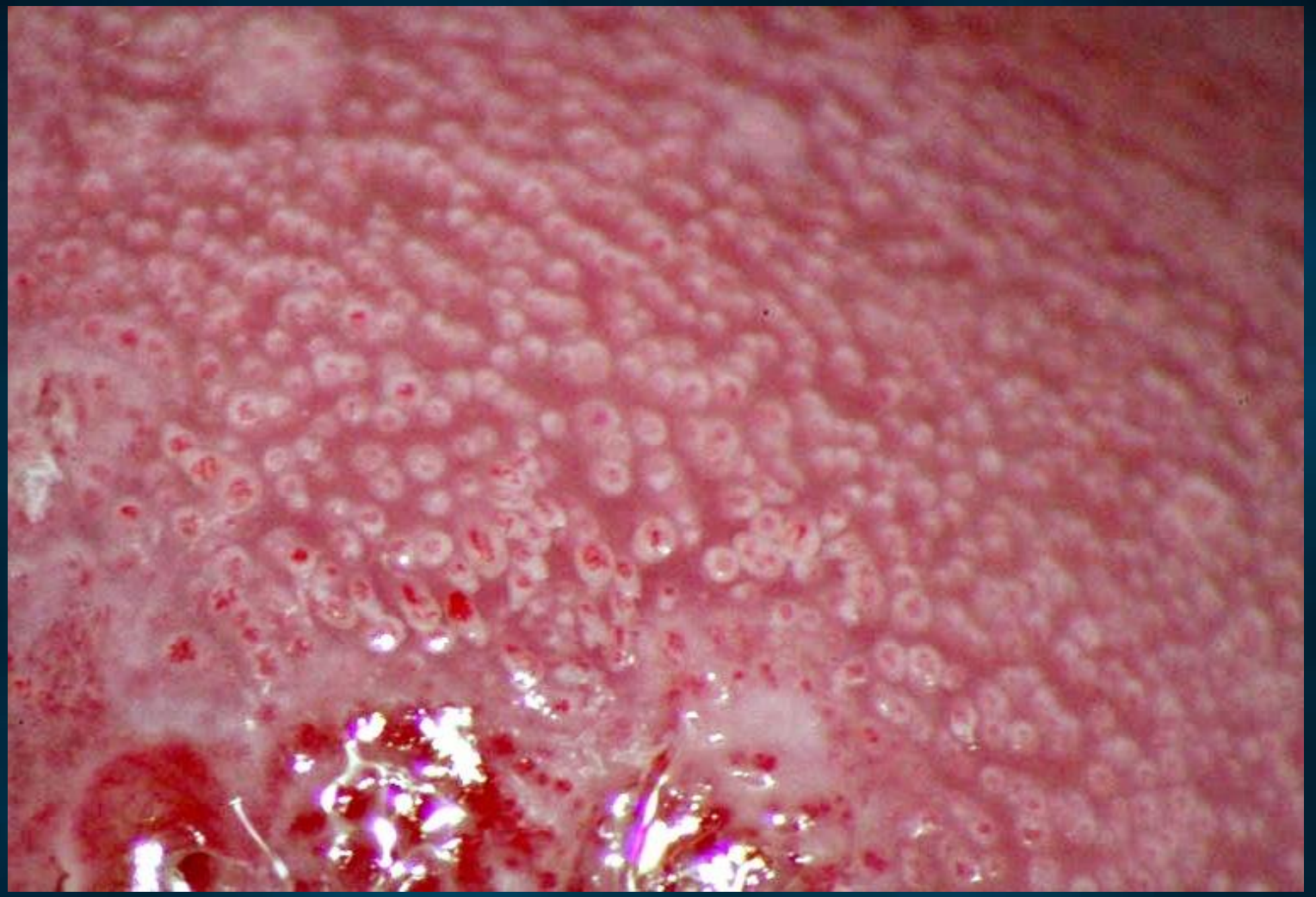
vs Metaplastic white punctation

WHITE PUNCTATION

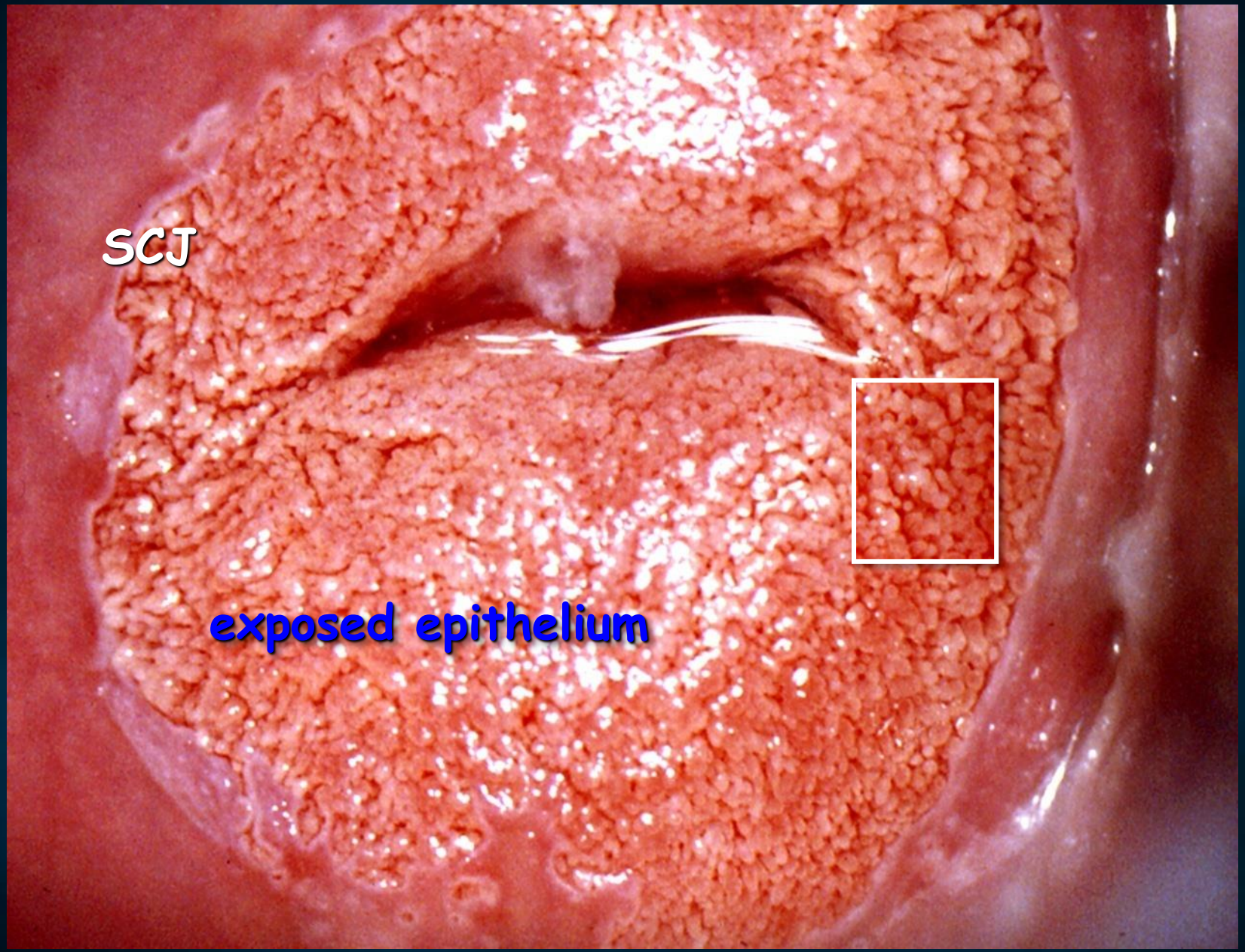
- Metaplastic



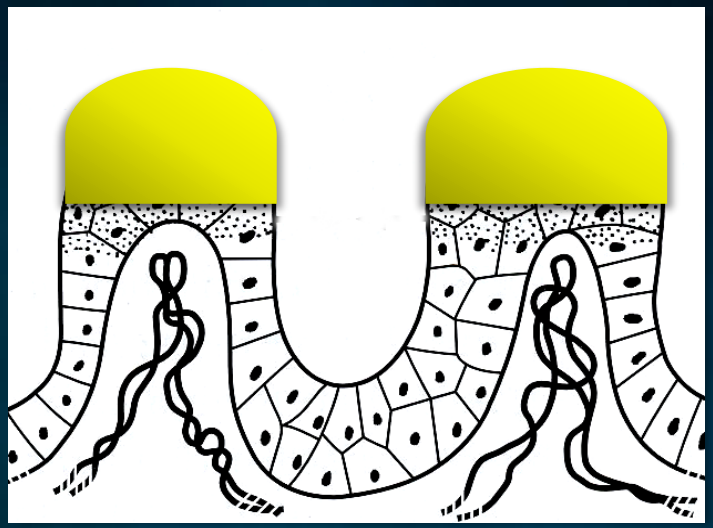
regular, close to SCJ



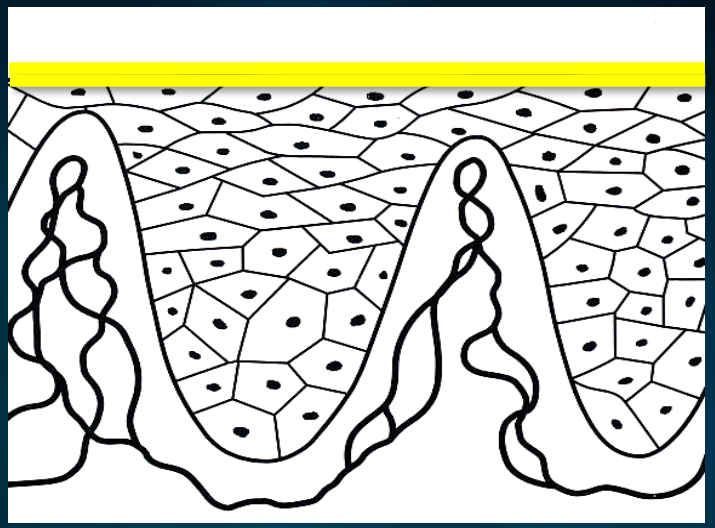
metaplastic white punctation


SCJ
exposed epithelium

At the beginning, the acetowhite metaplastic epithelium caps the villi



Later, it extends into the clefts of two adjacent villi, until a smooth surface is produced

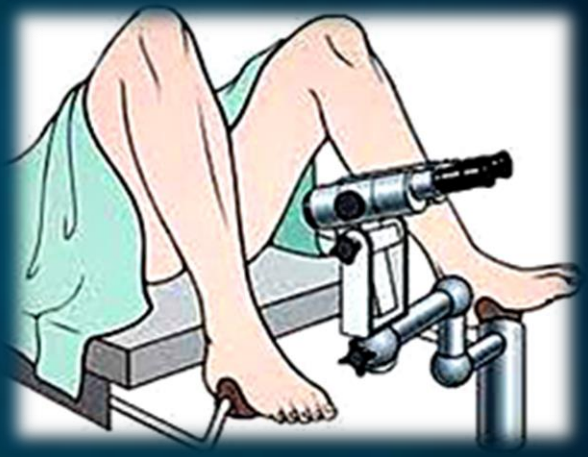


The acetowhite metaplastic epithelium over the villi may exceed in height the smooth surface, developing white punctation



CANDIDA

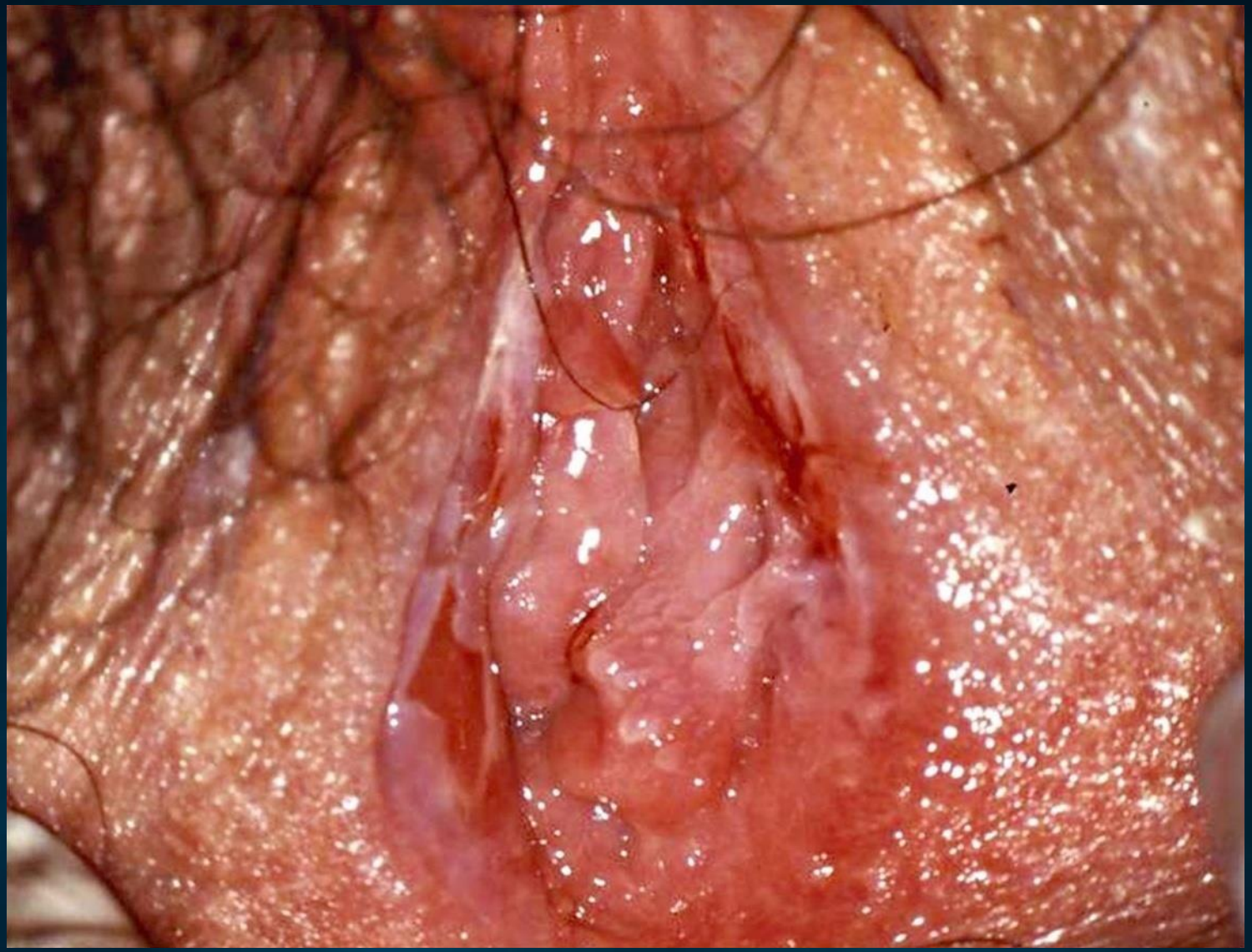
vulvoscopy:



- fissuration
- erythema
- indurated erythema
- white and curdy discharge



vulvar fissures



vestibular fissures



perianal fissures



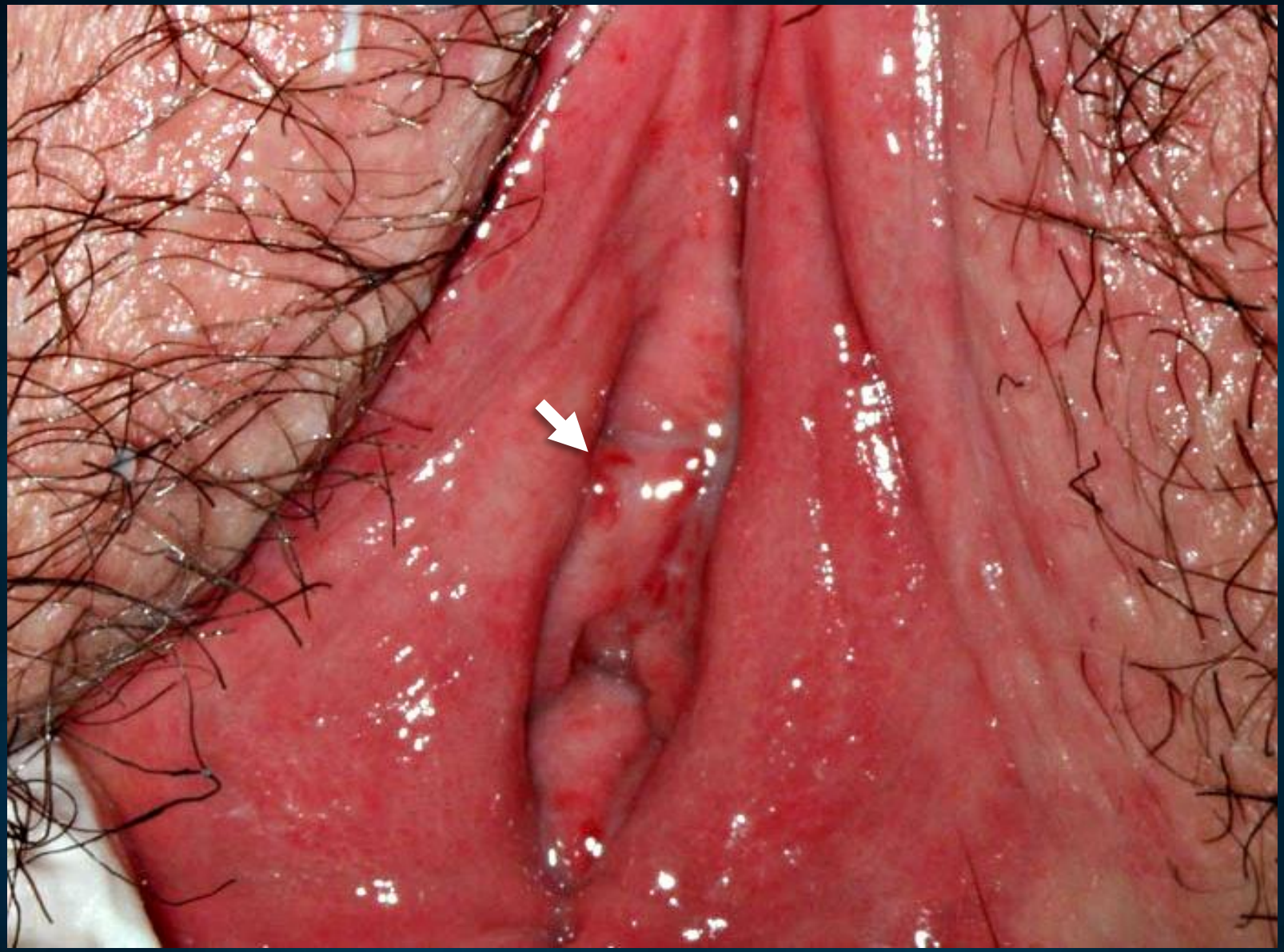
scratching lesions



vulvar edema



vulvar erythema



vulvar erythema and petechiae



vulvar erythema in 6 yr child



vulvar, perianal and crural erythema



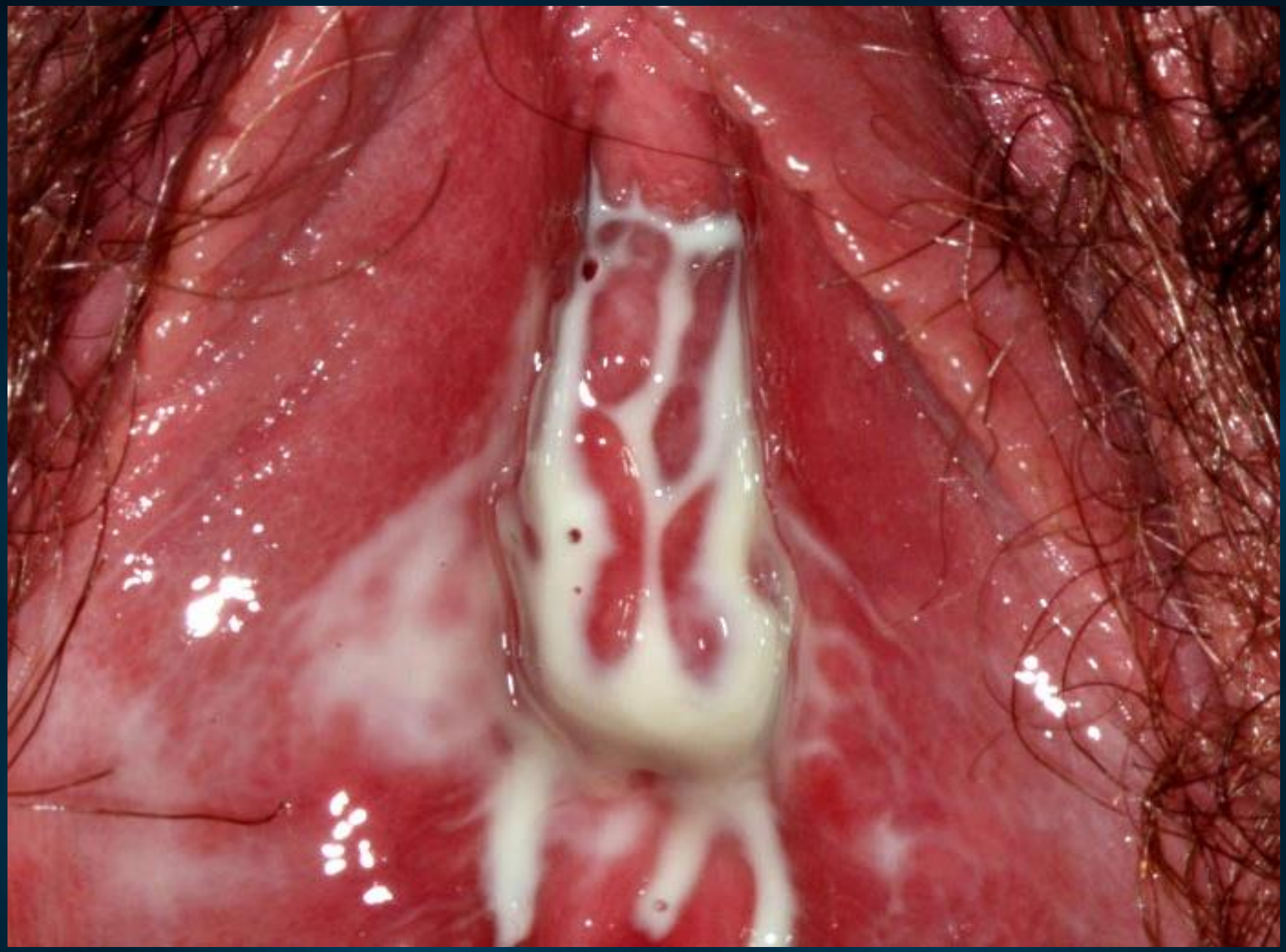
crural erythema



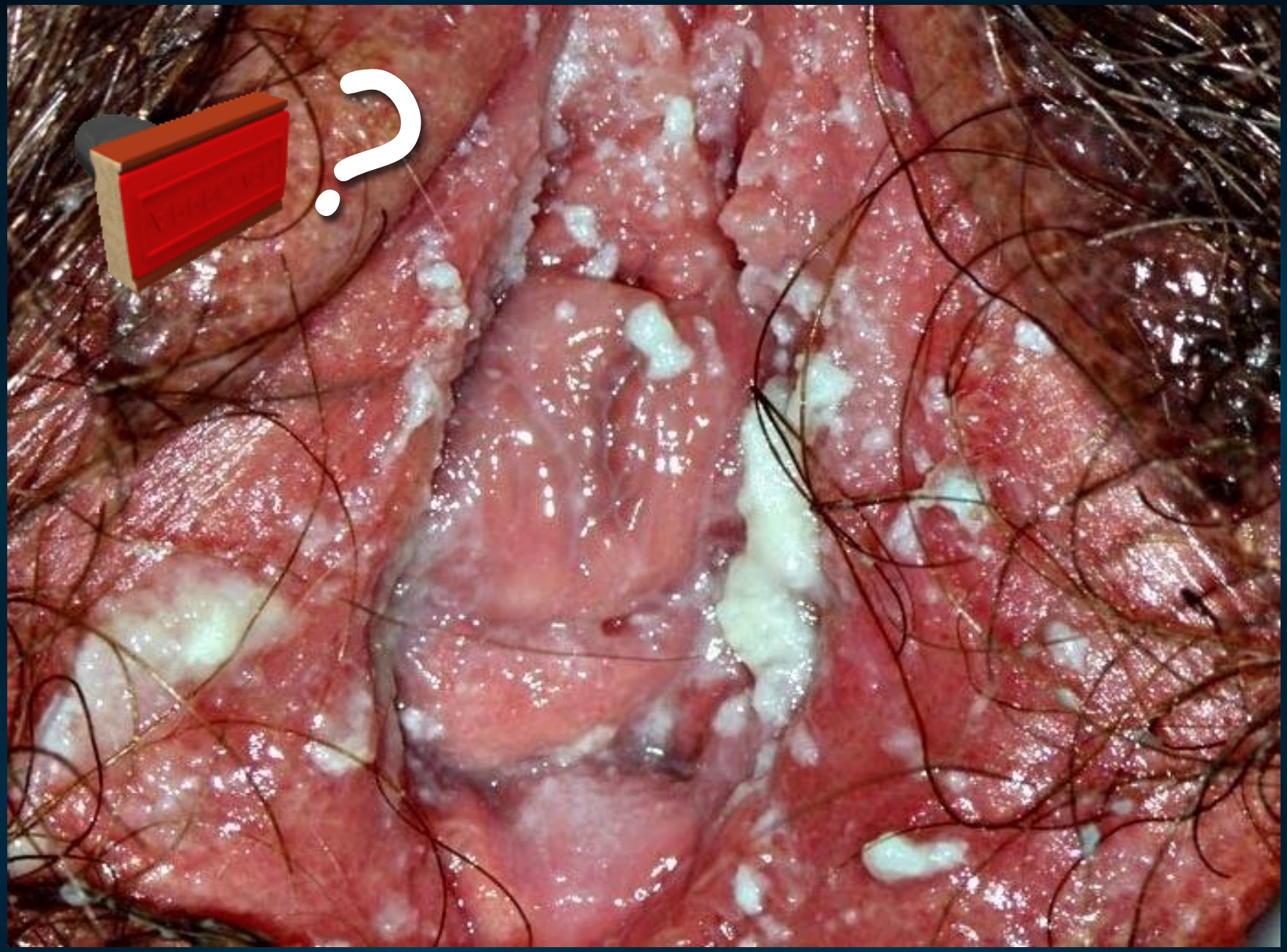
erithrodermic psoriasis



indurated erythema



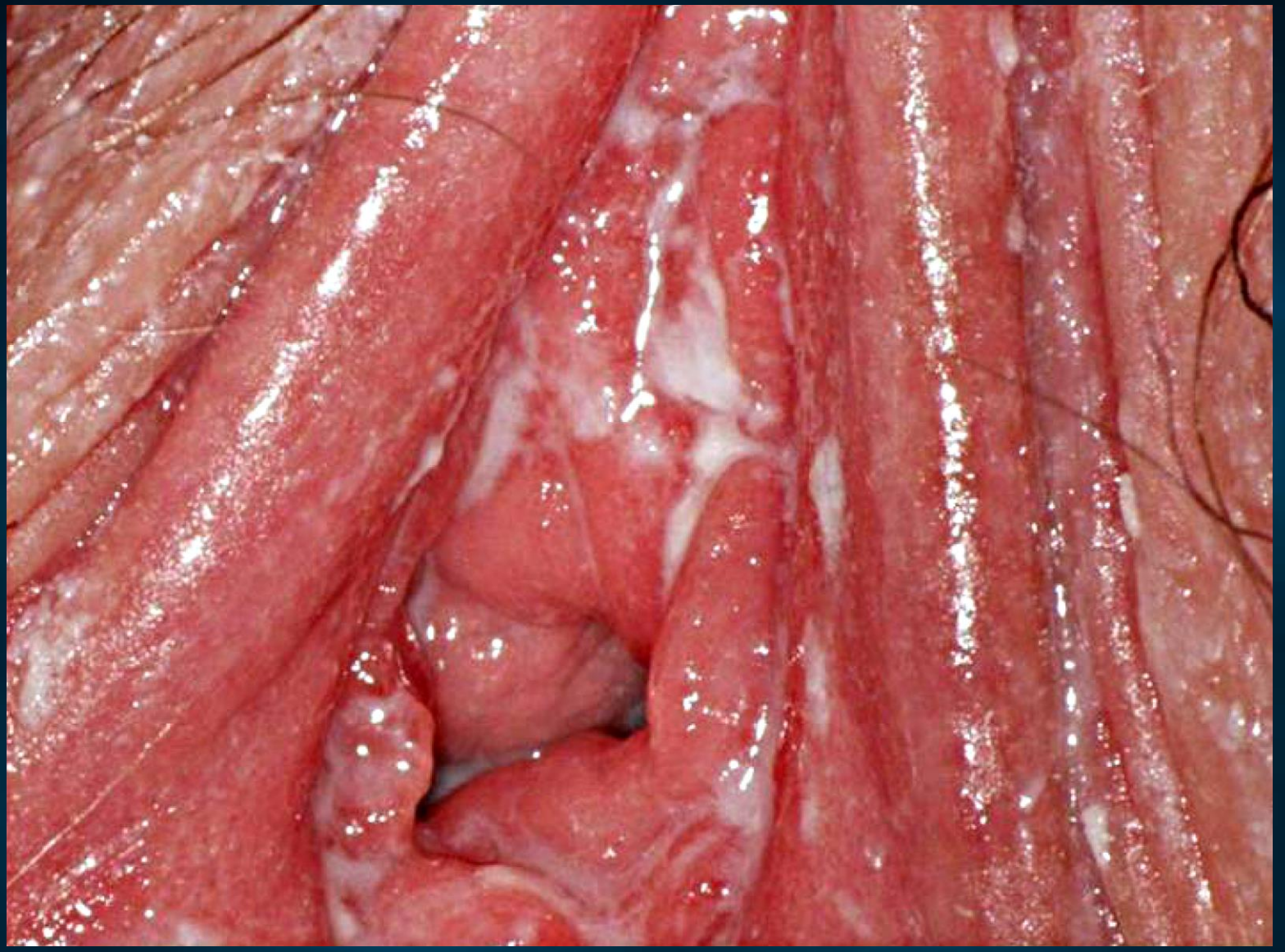
milky leukorrhea



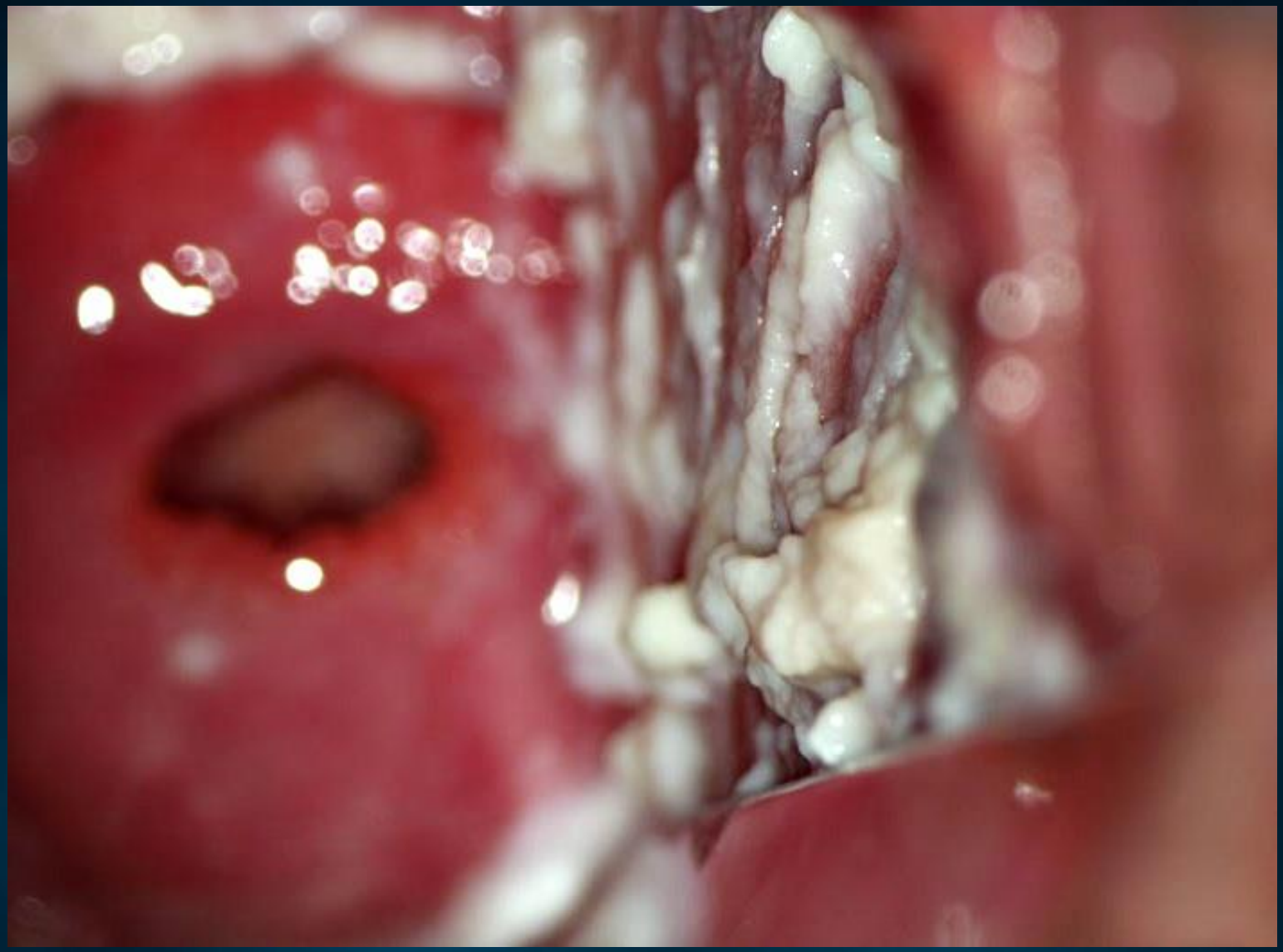
white and clumpy discharge

Clinical Traps





vulvar erythema and creamy discharge



white and clumpy discharge



post-coital erythema



In some of the patients who have symptoms and signs of vaginal candidiasis, which is unresponsive to antifungal drugs, a diagnosis of cytolytic vaginosis may have to be suspected

Suresh A et al. Indian J Sex Transm Dis. Jan-Jun; 30(1): 48, 2009



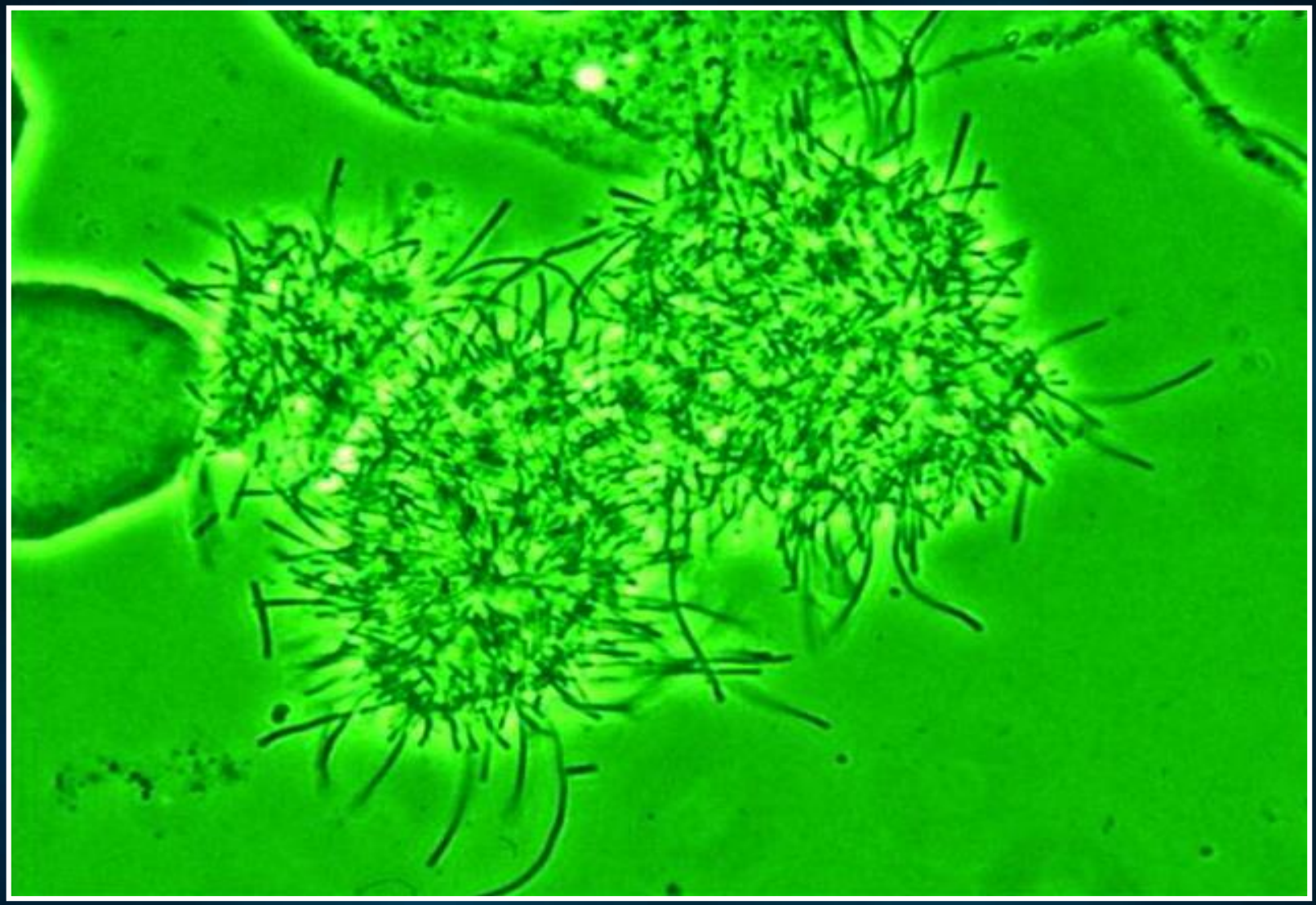
Cytolytic vaginosis is also known as Lactobacillus overgrowth syndrome or Doderlein's cytolysis

Suresh A et al. Indian J Sex Transm Dis. Jan-Jun; 30(1): 48, 2009

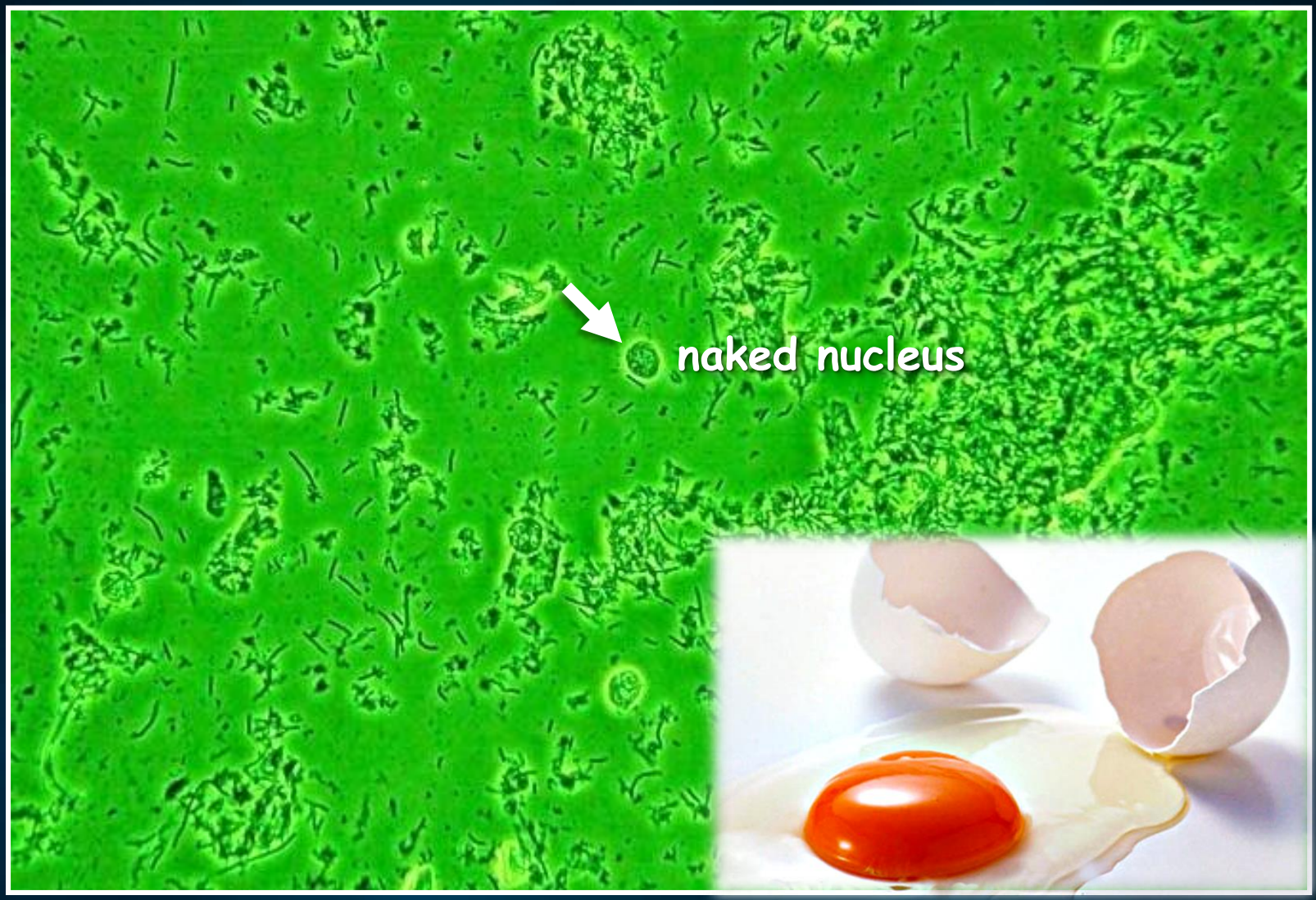


It is characterized by abundant growth of Lactobacilli resulting in lysis of vaginal epithelial cells

Suresh A et al. Indian J Sex Transm Dis. Jan-Jun; 30(1): 48, 2009



Doderlein's cytolysis



Doderlein's cytolysis



Very annoying, **profuse** vaginal discharge, often associated with vulvar and vaginal itching

Miniello G. Direct Microscopy in Gynecologic Practice, Edra Ed. 2017



The etiology is unknown and the prevalence is approximately 15%

Ventolini G et al. J Clin Gynecol Obstet. 3(3):81, 2014



If vaginal lactobacillosis is misinterpreted as a fungal infection, allergic reactions to antimycotic therapy may result in perpetuation of symptoms that are incorrectly thought to be caused by yeast

Witkin SS et al. It J Gynaecol Obstet; 3:114, 2000

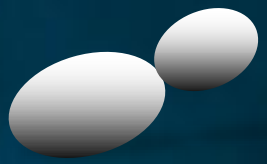
CANDIDA

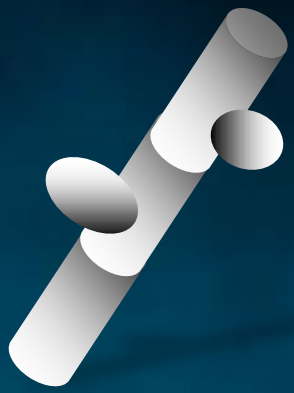
Direct microscopy:

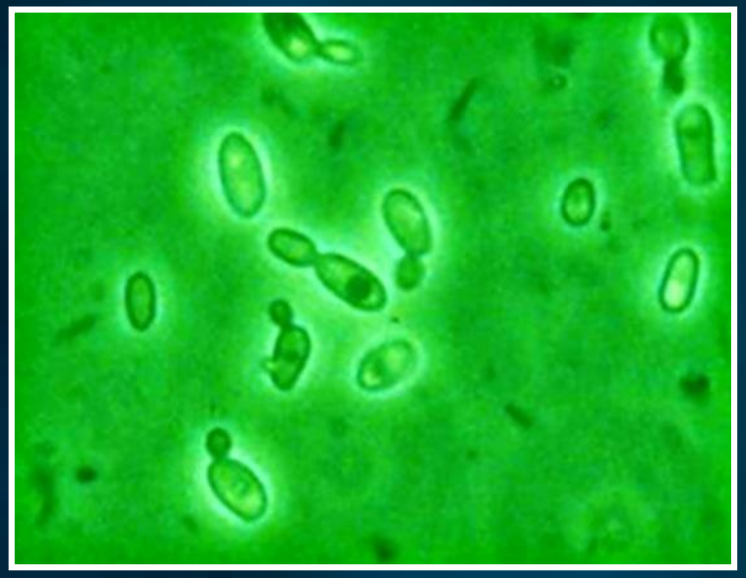


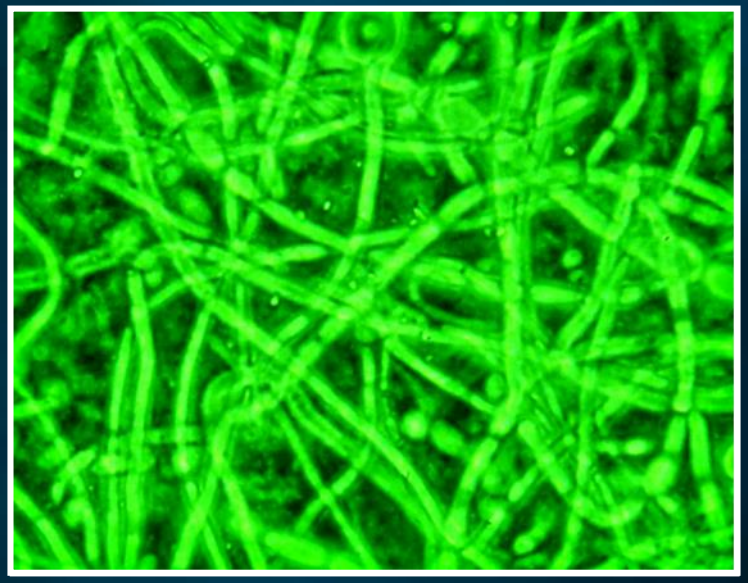
- blastospores
- hyphae
- Candida cytopathy

CANDIDA



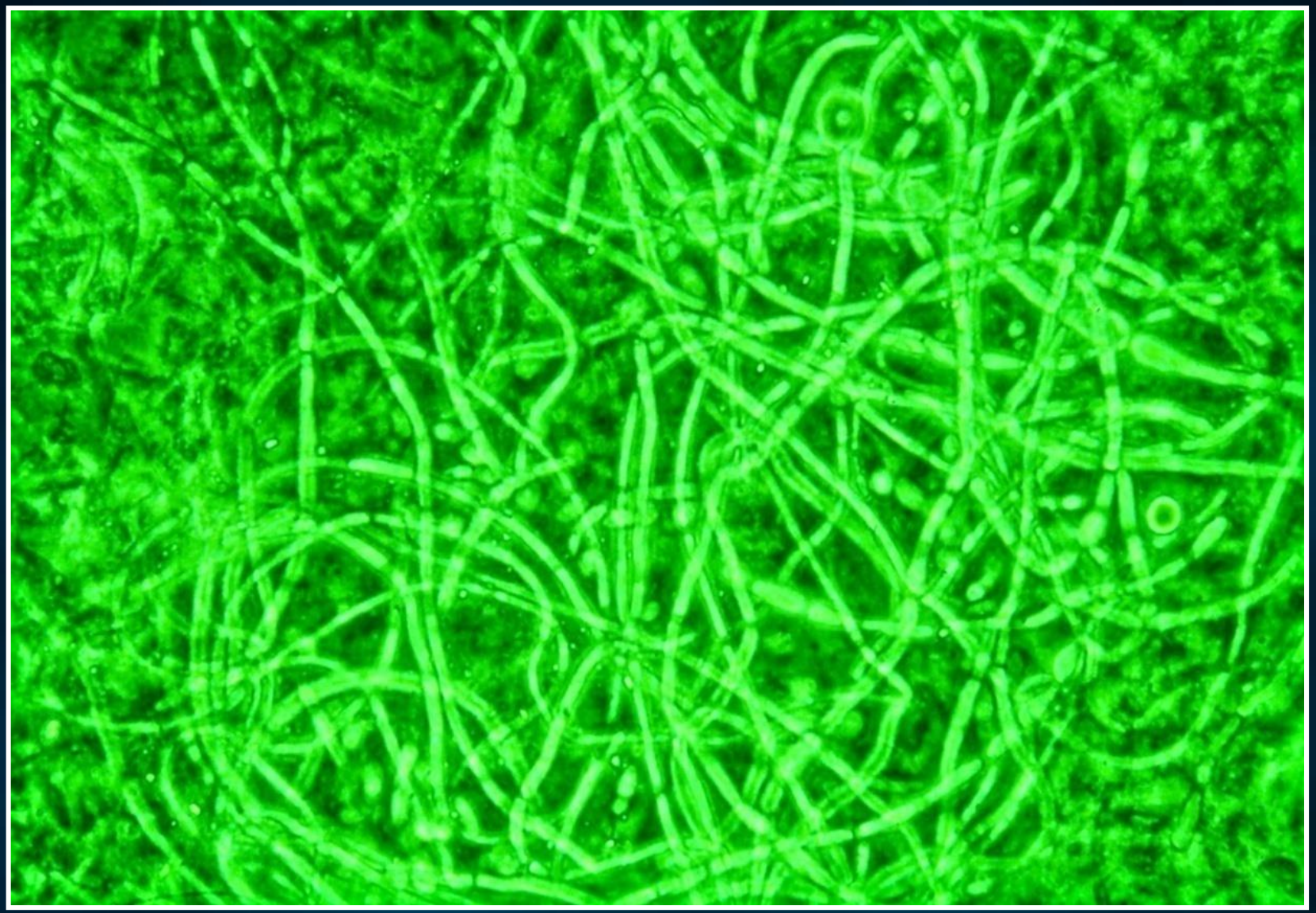






budding blastospores

branching hyphae



branching and budding hyphae

American Journal of Obstetrics and Gynecology

Founded in 1920

volume 178 *number* 2 FEBRUARY 1998

CLINICAL OPINION

Vulvovaginal candidiasis: Epidemiologic, diagnostic, and therapeutic considerations

Jack D. Sobel, MD,[a] Sabastian Faro, MD, PhD,[b] Rex W. Force, PharmD,[c] Betsy Foxman, PhD,[d] William J. Ledger, MD,[e] Paul R. Nyirjesy, MD,[f] Barbara D. Reed, MD, MSPH,[g] and Paul R. Summers, MD[h]

Detroit and Ann Arbor, Michigan, Chicago, Illinois, Pocatello, Idaho, New York, New York, Philadelphia, Pennsylvania, and Salt Lake City, Utah

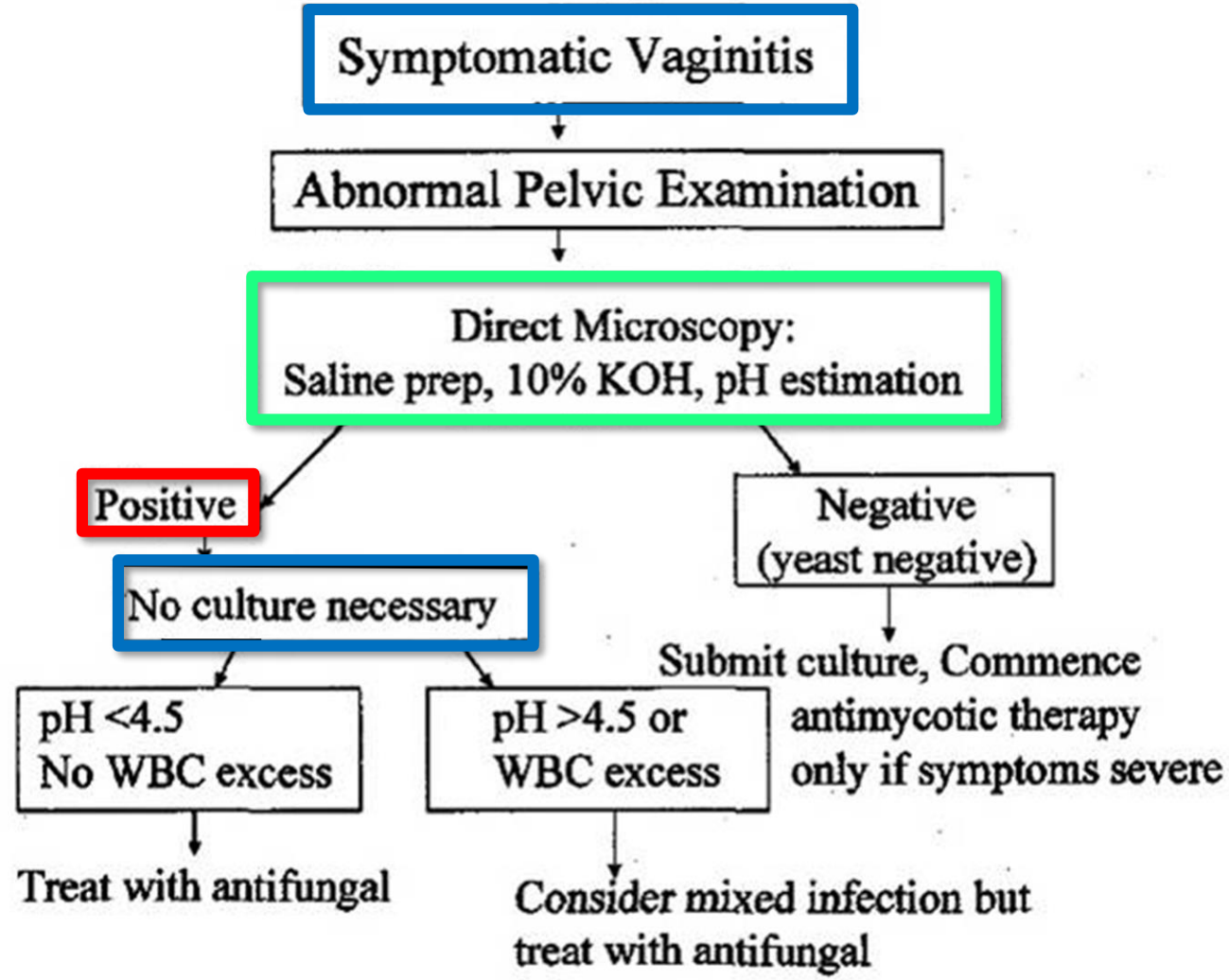


Fig. 1. Diagnostic investigation and strategy in women with vulvovaginal symptoms and signs of vulvovaginitis.

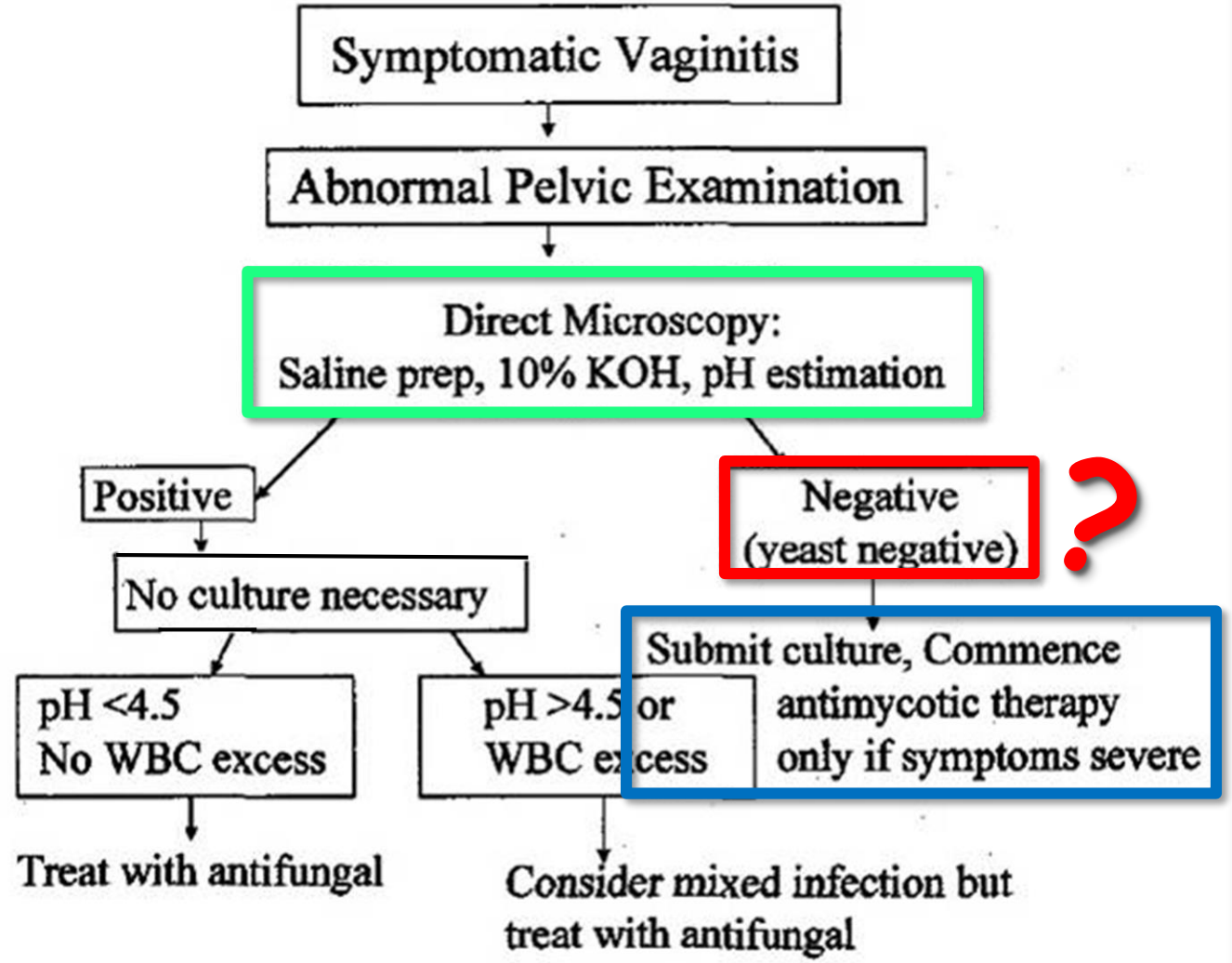


Fig. 1. Diagnostic investigation and strategy in women with vulvovaginal symptoms and signs of vulvovaginitis.

Is this "negative" result reliable?



Laboratory Traps

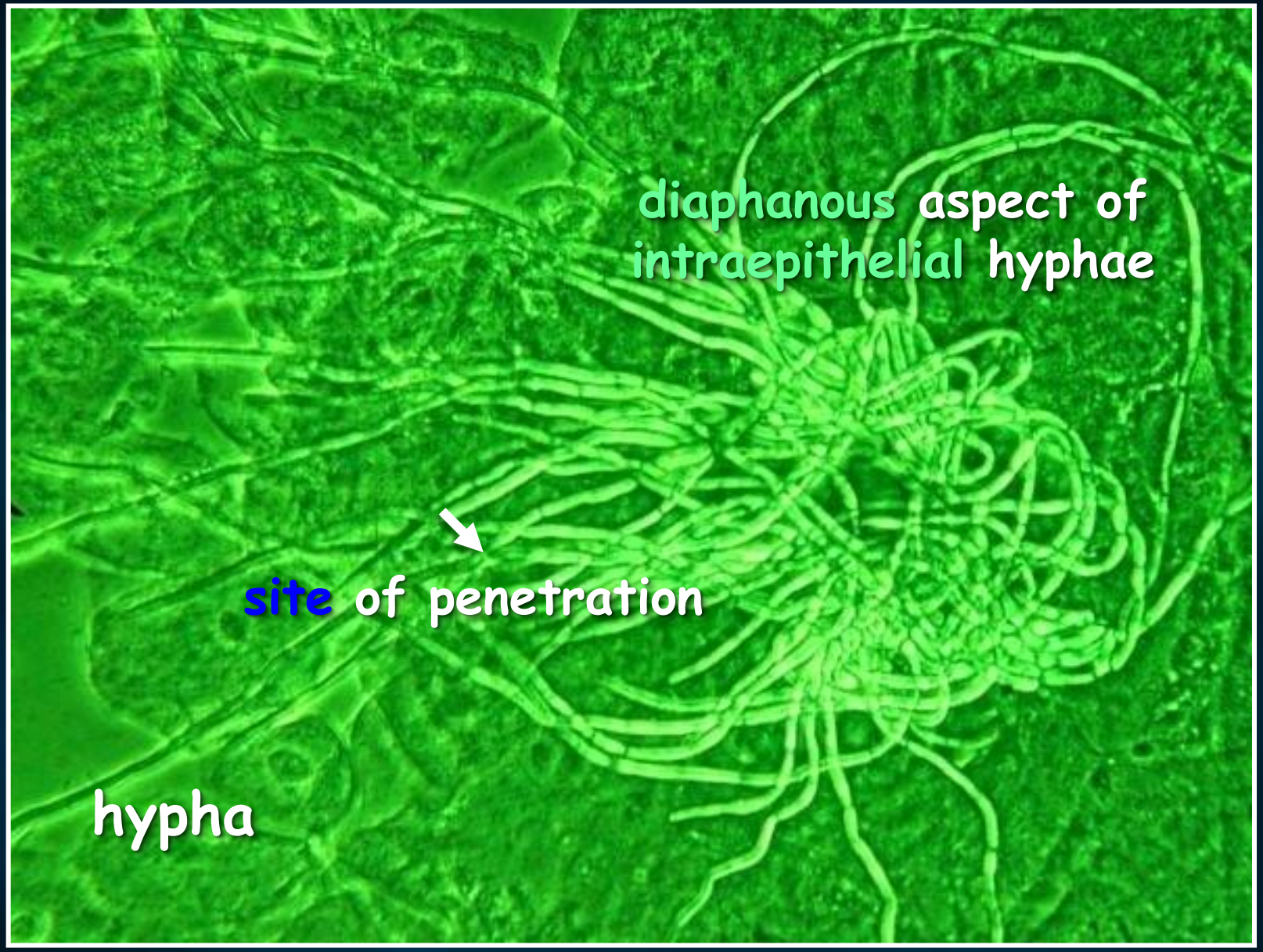


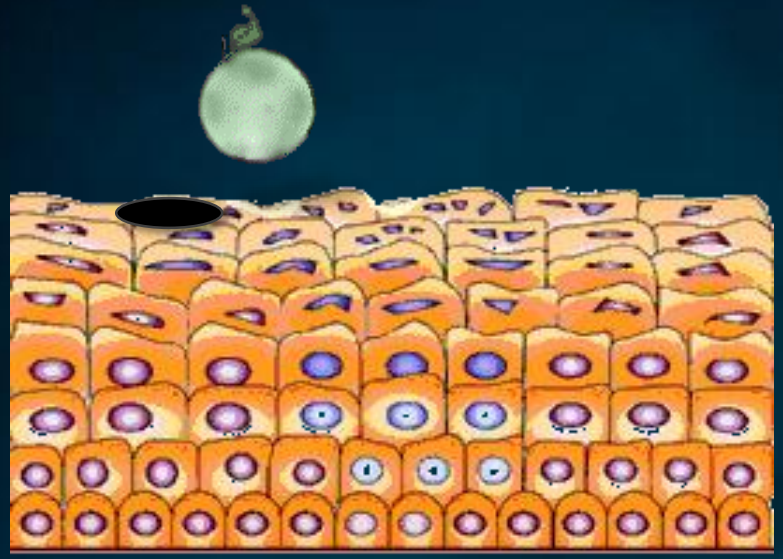
Frequently, despite the presence of irritative symptoms, fungal blastospores and hyphae are not visible under direct microscopic examination and cultures yeld negative results



Candida uses proteases to penetrate through the vaginal epithelium

Miniello G. Vaginal Cytogram CIC Ed, 1994

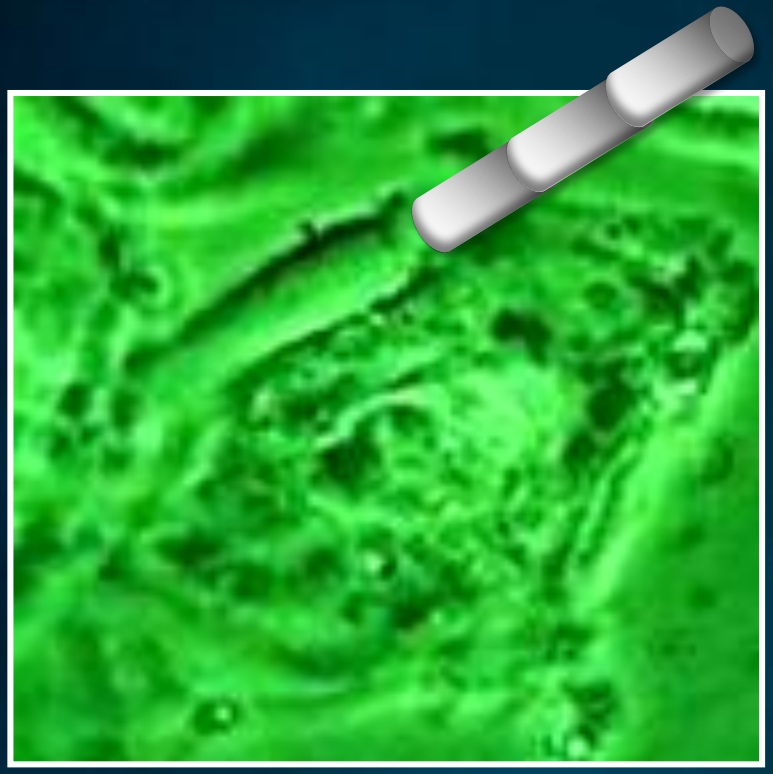

diaphanous aspect of
intraepithelial hyphae
site of penetration
hypha

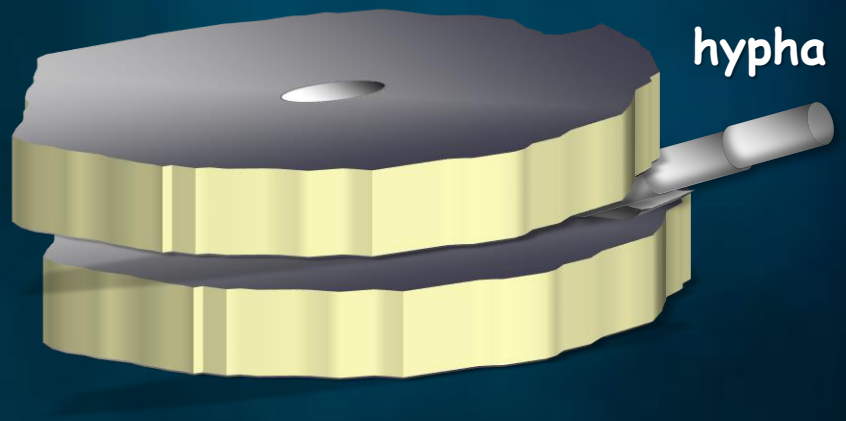


Passing <u>through</u> the vaginal epithelium, Candida causes a specific **cytopathy**, that can be easily detected by **direct microscopy**

Miniello G. Vaginal Fungal Infections by Phase Contrast Microscopy, CIC Ed., 2001

CANDIDA EPITHELIAL INVASION

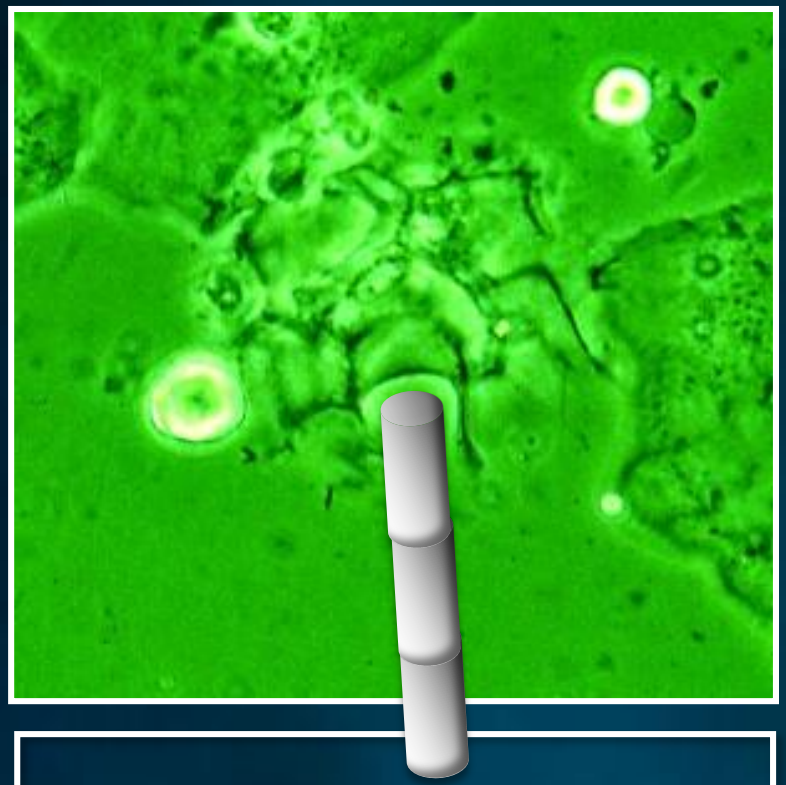




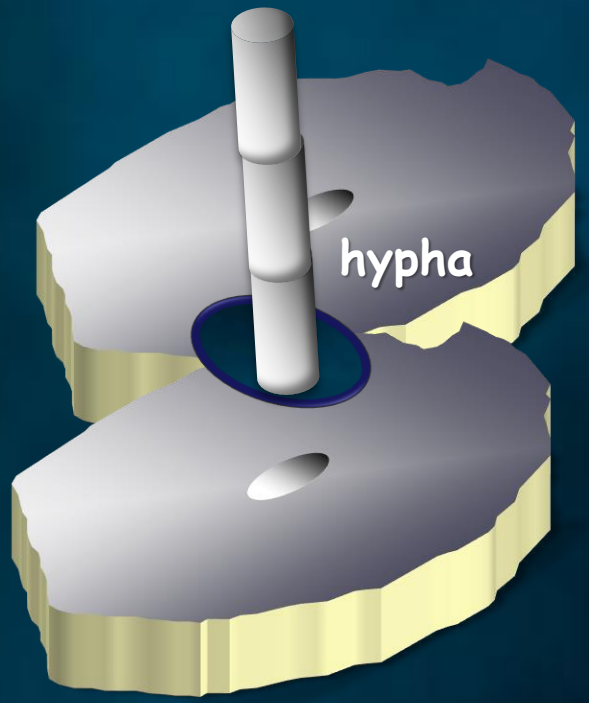
Candida cytopathy:
cytoplasmic GROOVE

Miniello G. Vaginal Cytogram CIC Ed, 1994

CANDIDA EPITHELIAL INVASION



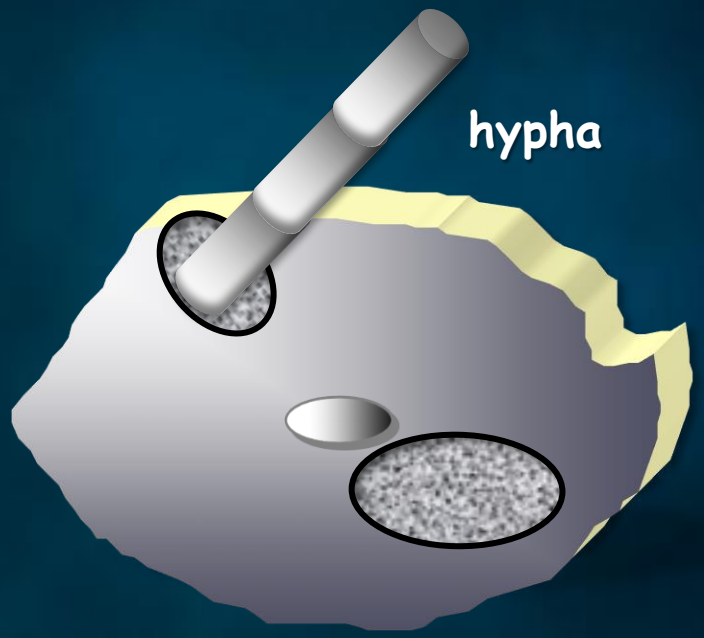
Candida cytopathy:
marginal EROSION



Miniello G. Vaginal Cytogram CIC Ed, 1994

CANDIDA EPITHELIAL INVASION

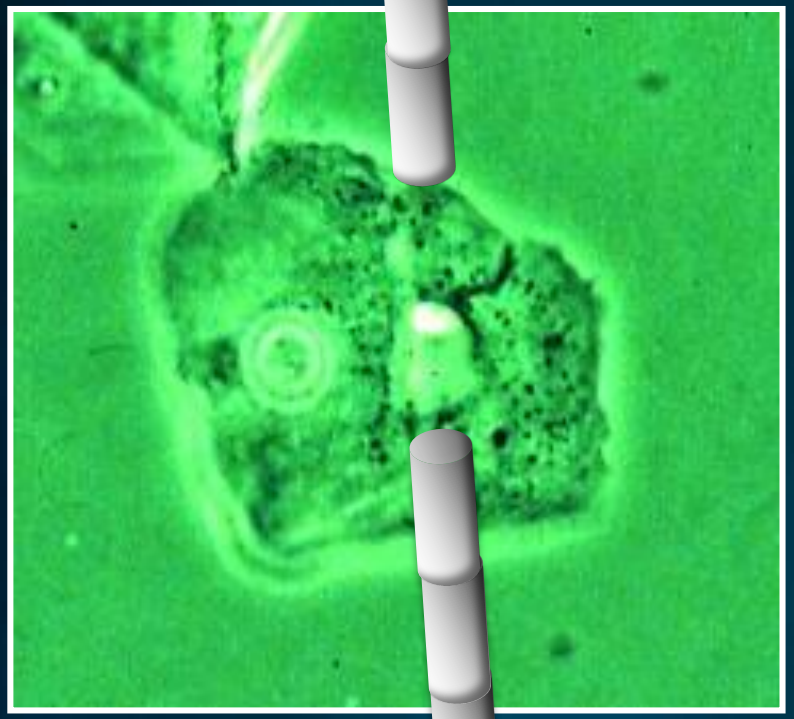




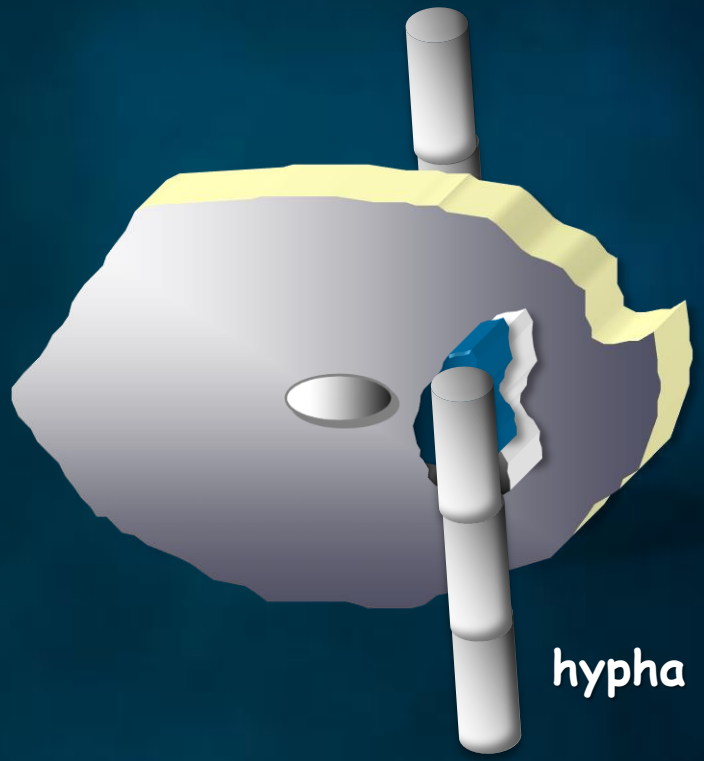
Candida cytopathy:
cytoplasmic HOLES

Miniello G. Vaginal Cytogram CIC Ed, 1994

CANDIDA EPITHELIAL INVASION



Candida cytopathy:
cytoplasmic TUNNEL



Miniello G. Vaginal Cytogram CIC Ed, 1994

CANDIDA EPITHELIAL INVASION

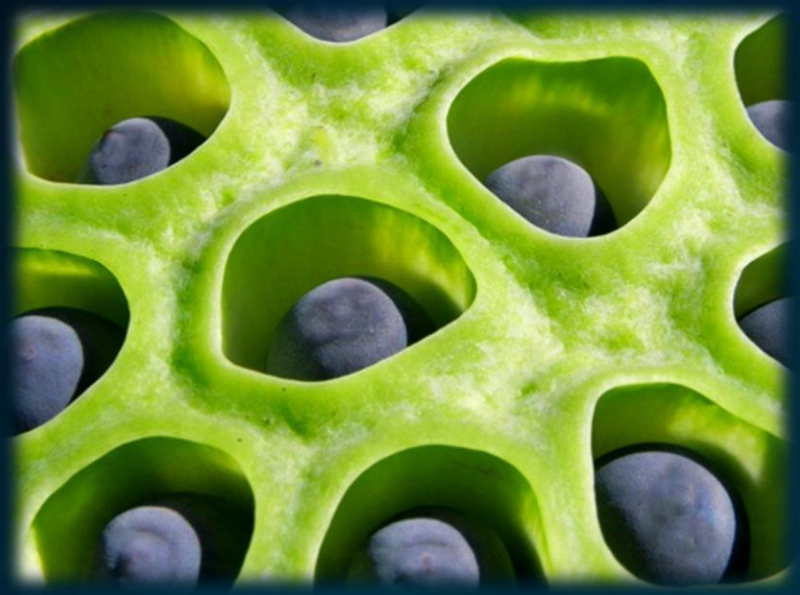


Candida cytopathy

can be recognized

only by the use of

direct microscopy



Candida cytopathy detection may be usefull to diagnose hidden fungal infections in different districts



Candida cytopathy
(cytoplasmic hole
and marginal erosion)



10 ds after local treatment



How vaginal candidiasis can recur?

✓ Relapse

Recurrence



from an adjacent
or distant site

✓ Reinoculum

Infective

male partner

usually presents

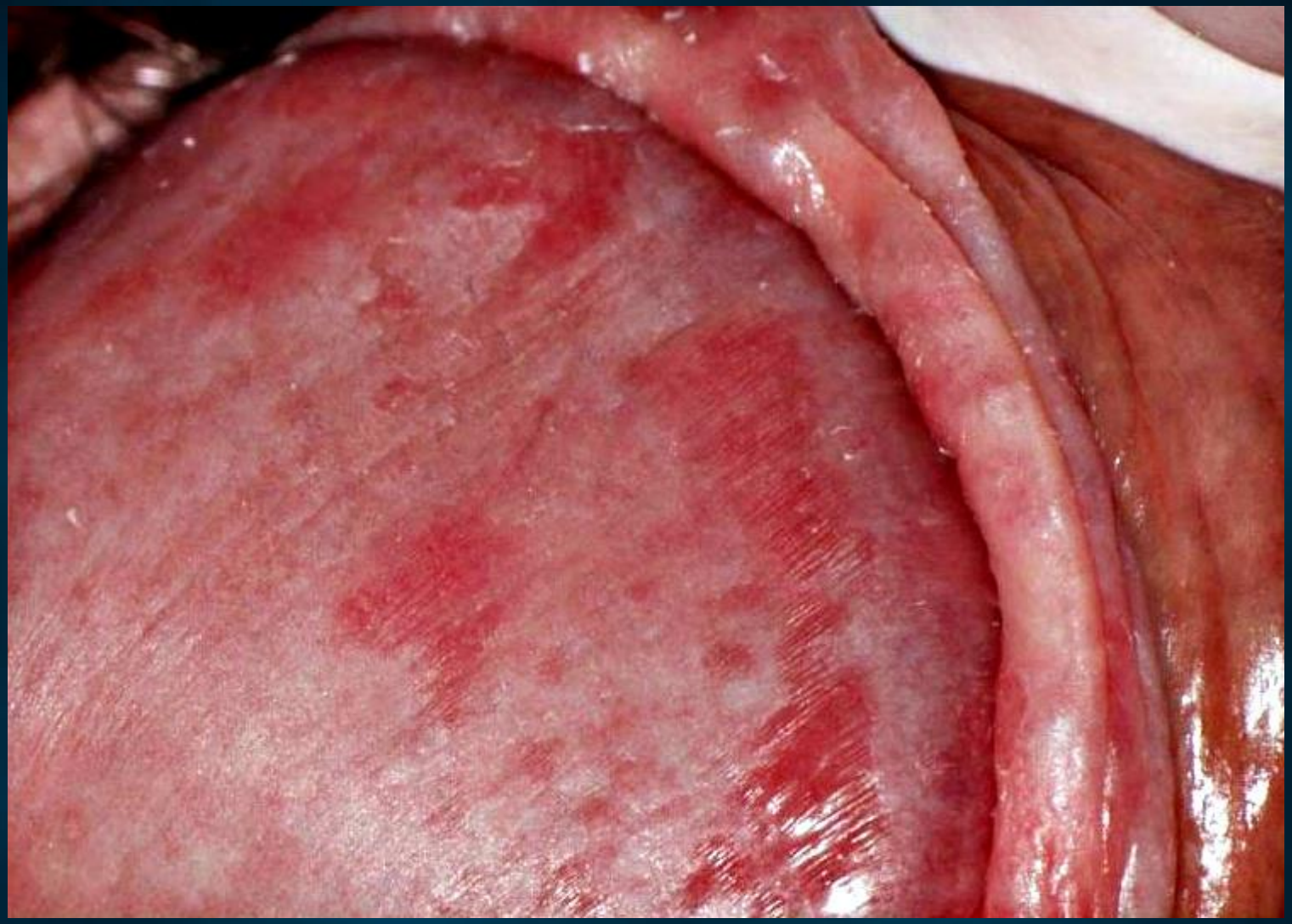
no penile signs

or symptoms





erythematous balanoposthitis



erythematous patches



erythema and fissure



maculae



micro blisters



exfoliating balanoposthitis

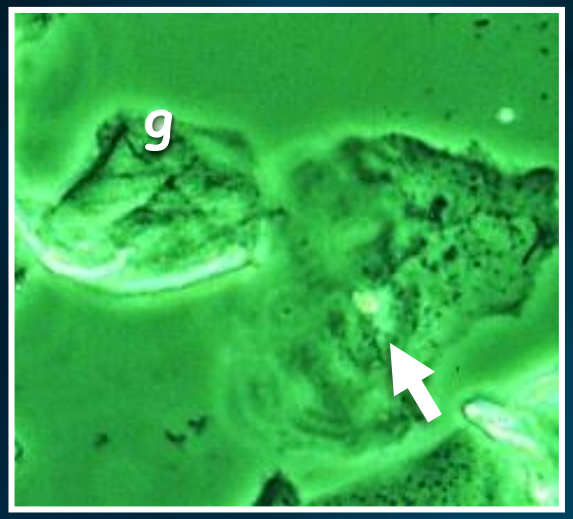


exudative balanoposthitis



Is it possible to investigate the reactionary male partner?

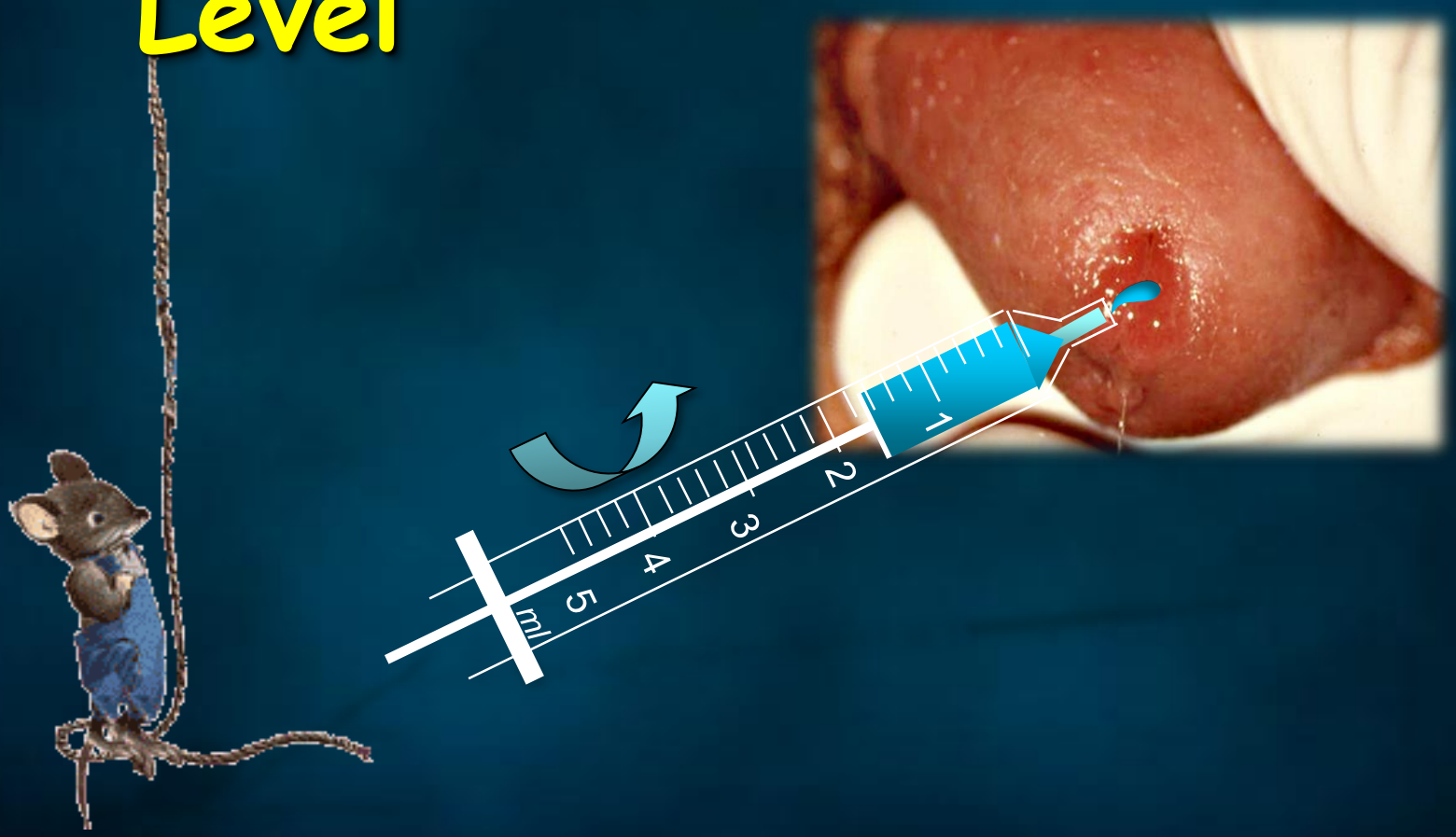
CUTANEOUS wet mount



Candida cytopathy:
(cytoplasmic groove and
and tunnel in horny cell)

URINARY wet mount

Colonization Level

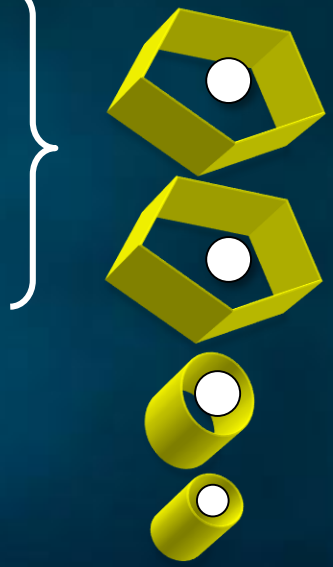


Miniello G. Gynecological Urology; p.52, Orient Longman Eds., 2001

URINARY EPITHELIA



squamous



URO-wet mount

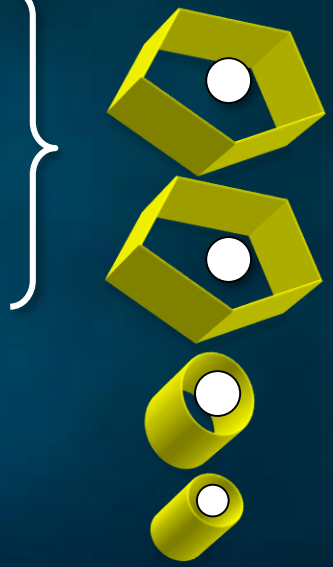


grooves

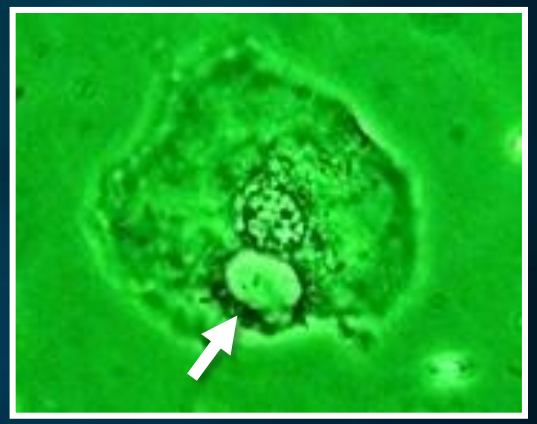
URINARY EPITHELIA



squamous



URO-wet mount



hole

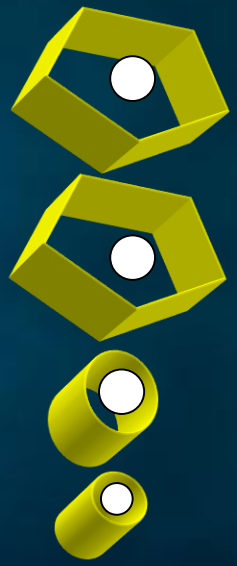
URINARY EPITHELIA



transitional



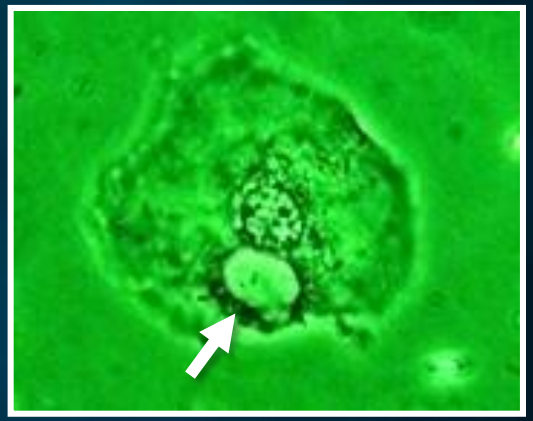
squamous



URO-wet mount

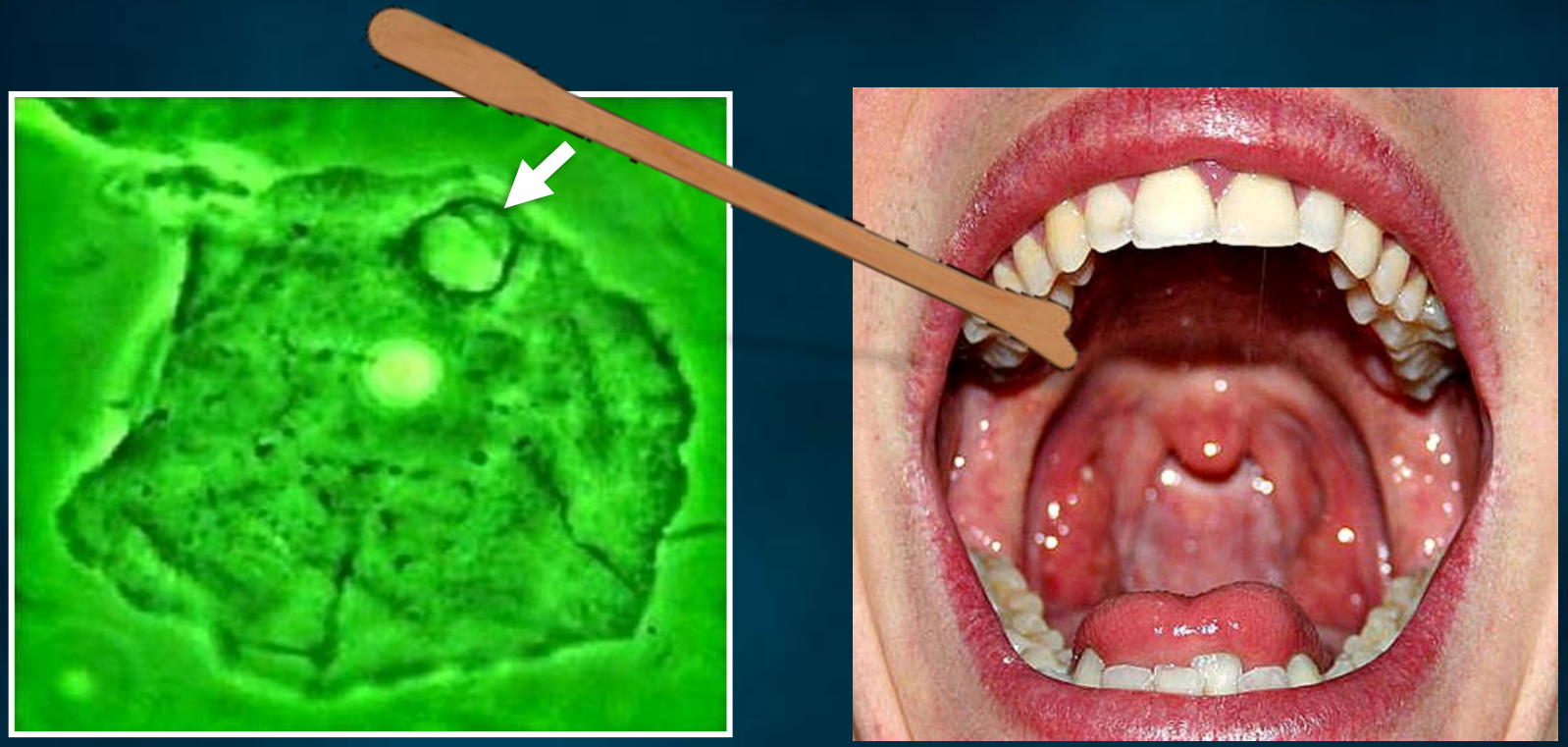


hole



hole

BUCCAL wet mount



Candida cytopathy:
cytoplasmic tunnel

Miniello G. Direct Microscopy in Gynecologic Practice, Edra Ed. 2017

RECTAL wet mount

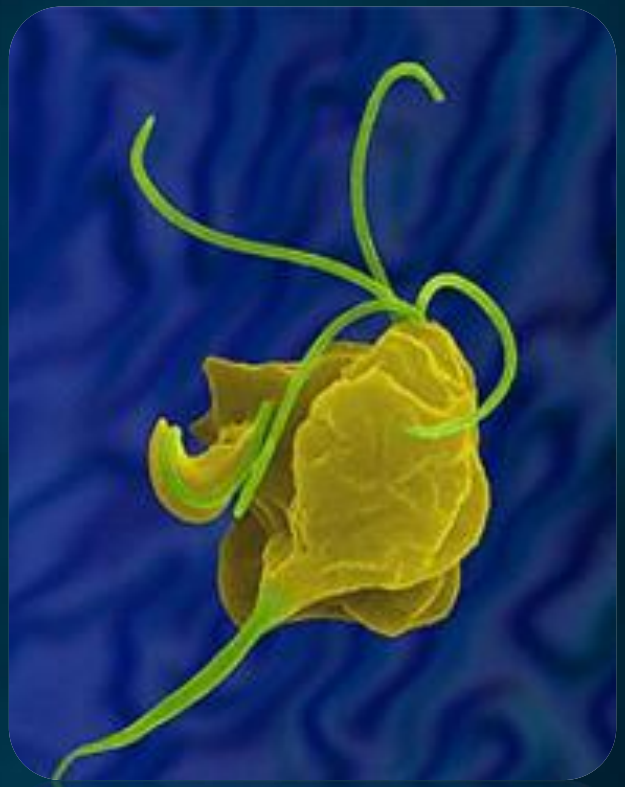




Candida cytopathy:
cytoplasmic holes

Miniello G. Direct Microscopy in Gynecologic Practice, Edra Ed. 2017

Trichomonas vaginalis



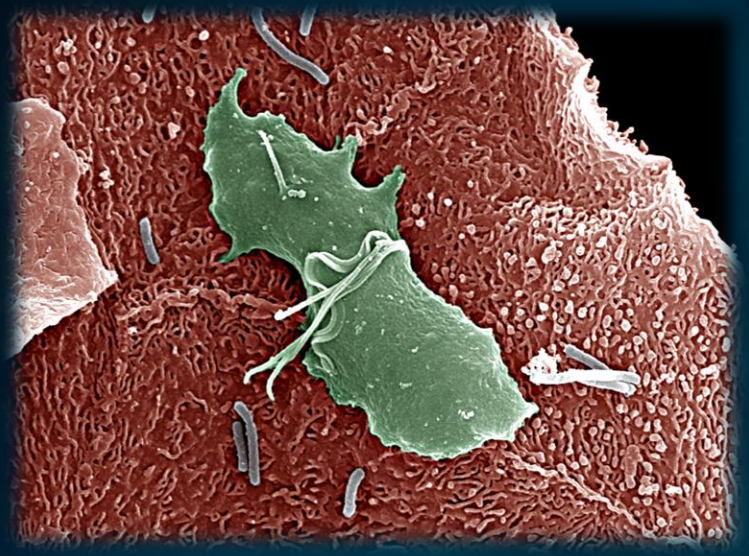
Bacterial Vaginosis
(40%-50%)



Trichomoniasis
(15%-20%)

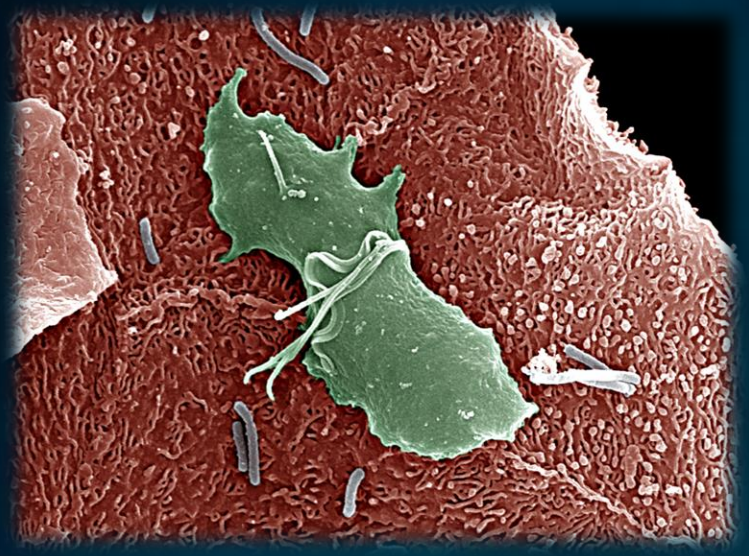
Candidiasis
(20%-25%)

Mylonas I et al. Obstet Gynecol Surv. Jun;66(6):359, 2011



Trichomoniasis is the most common non-viral sexually transmitted pathogen

Fichorova RN. J Immunol Reprod. Dec;83(1-2):185, 2009



The WHO has estimated that more than 160 million people worldwide are annually infected

Harp DF, Chowdhury I. Eur J Obstet Gynecol Reprod Biol. Jul;157(1):3, 2011

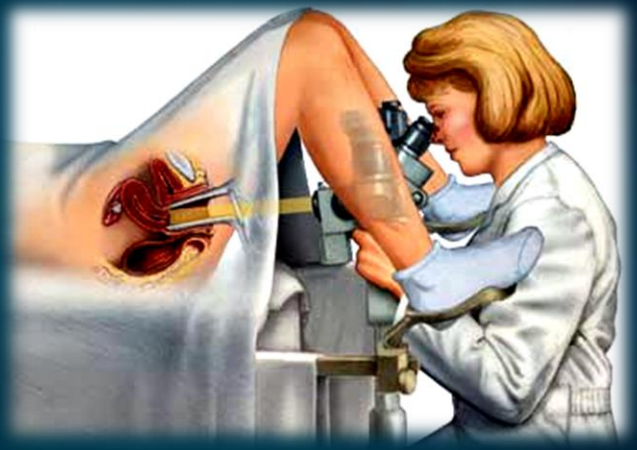
TV has been associated with other STDs such as HIV, and may also be a cause of PID

Lo BM et al. J Emerg Med. Dec;43(6):964, 2012

TRICHOMONAS v.

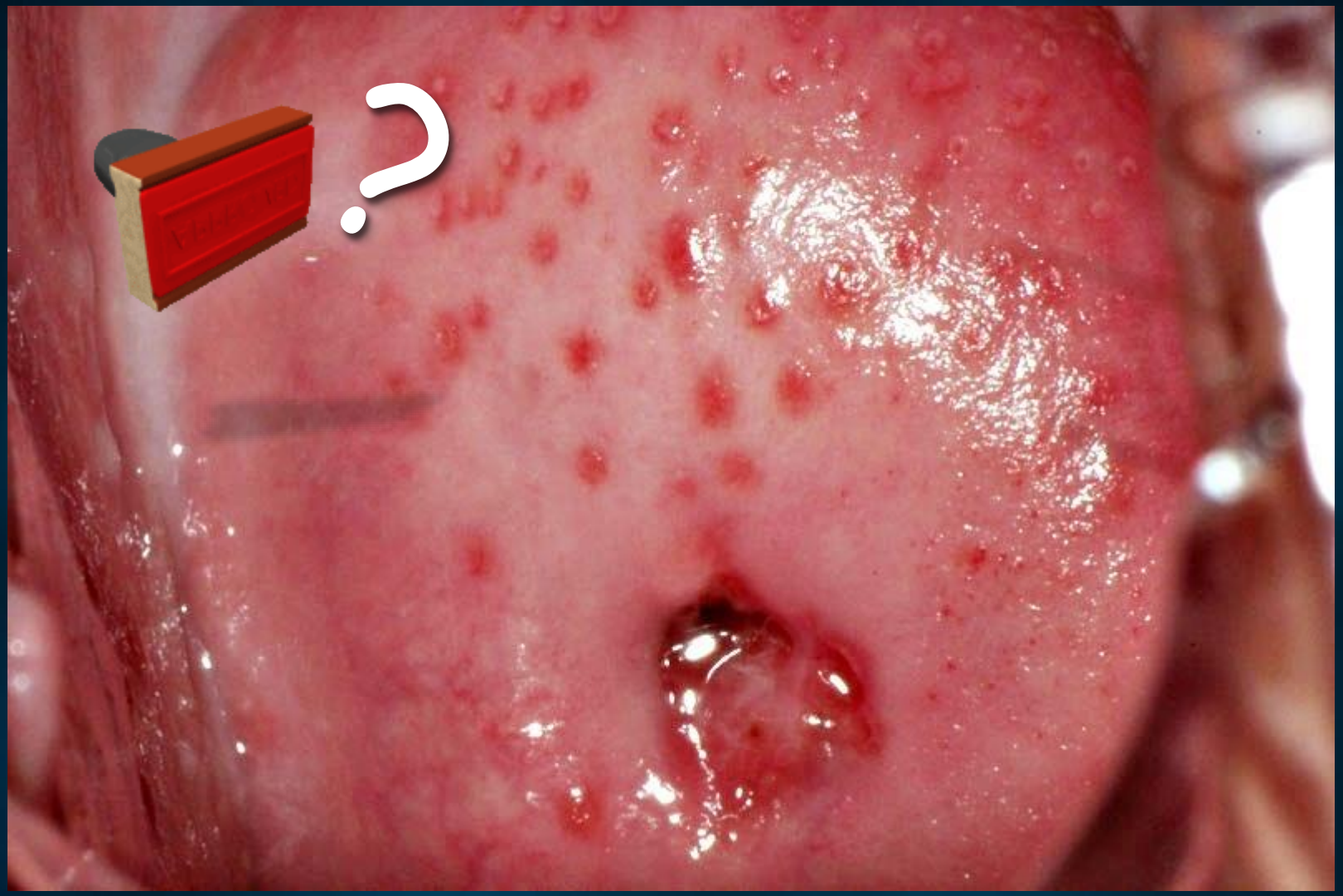
colposcopy:

- subepithelial punctate **petechiae**

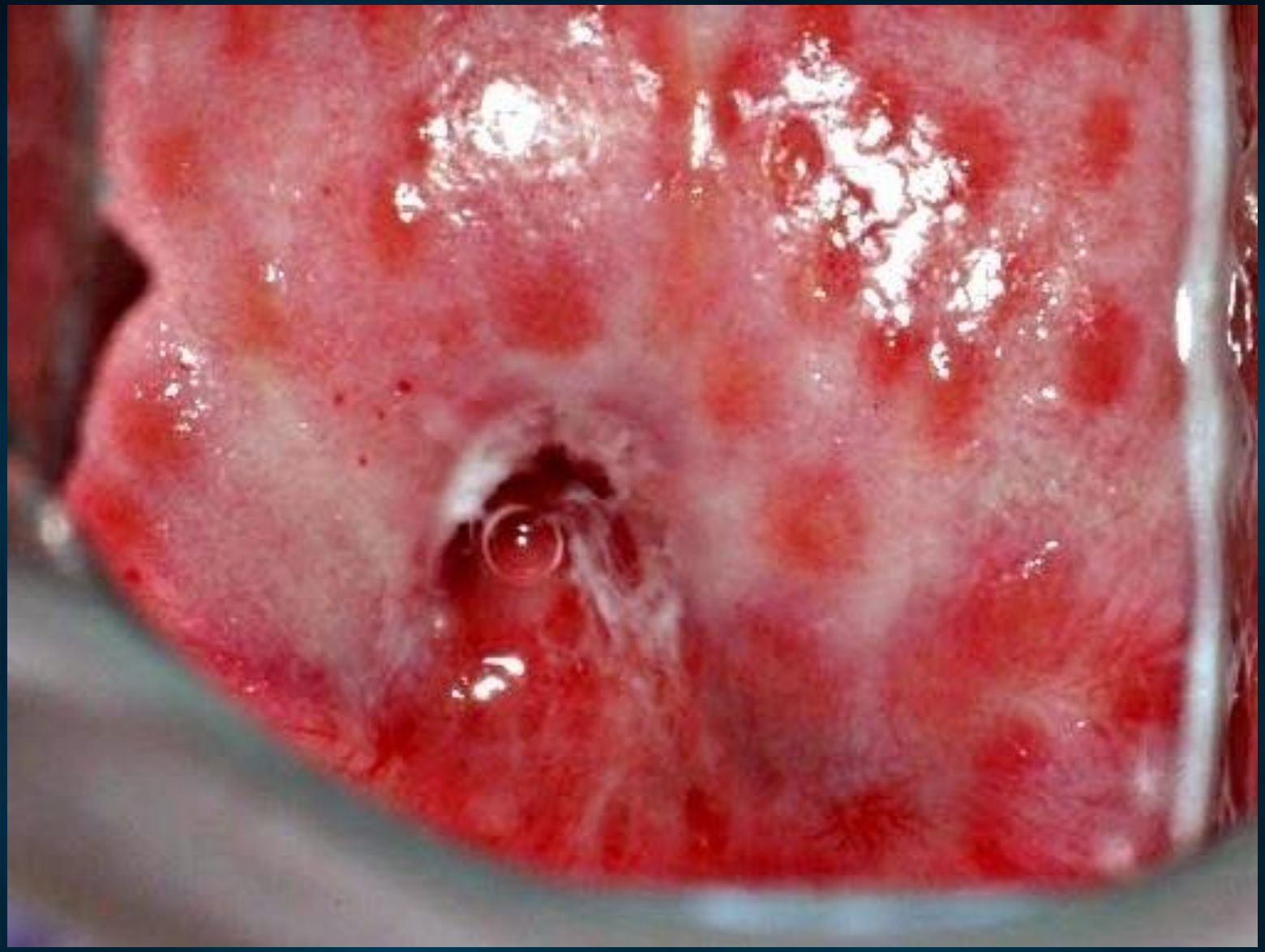




strawberry appearance



Trichomonas strawberry appearance



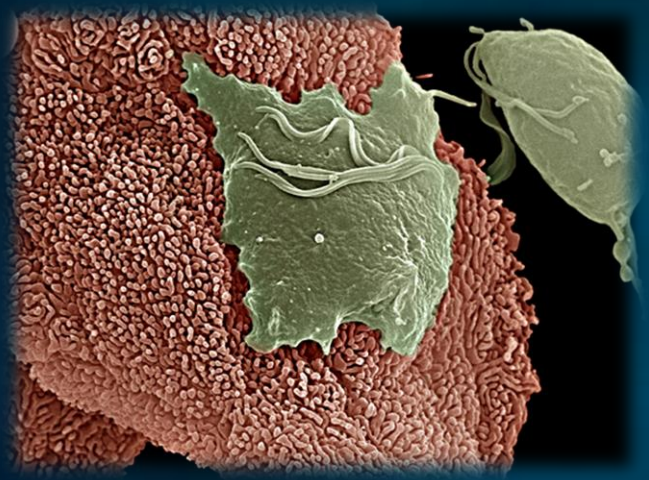
fungal erythematous maculae

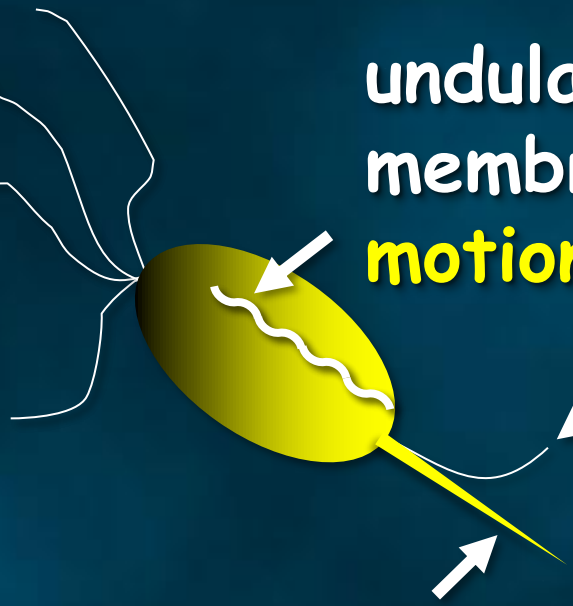
Currently, wet prep is a quick and easy test that can be done in real time and is commonly used to diagnose TV



Lo BM et al. J Emerg Med. Dec;43(6):964, 2012

TRICHOMONAS vaginalis





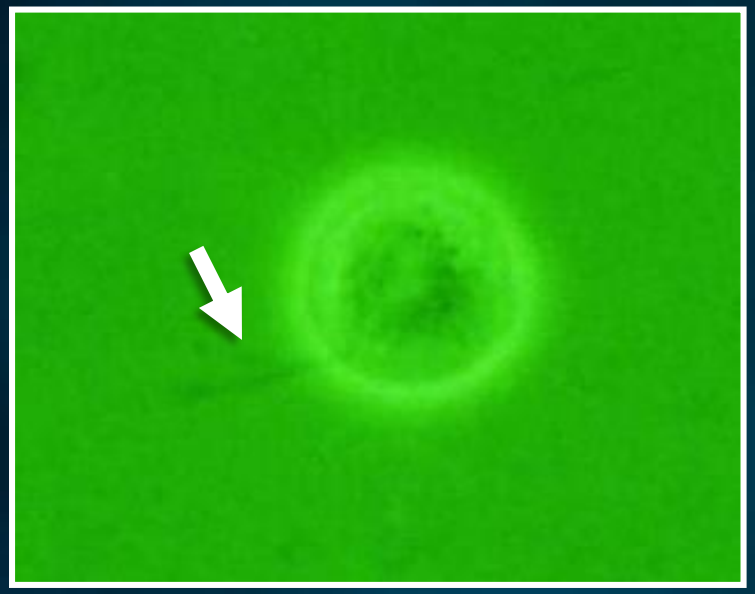
anterior flagella: motion

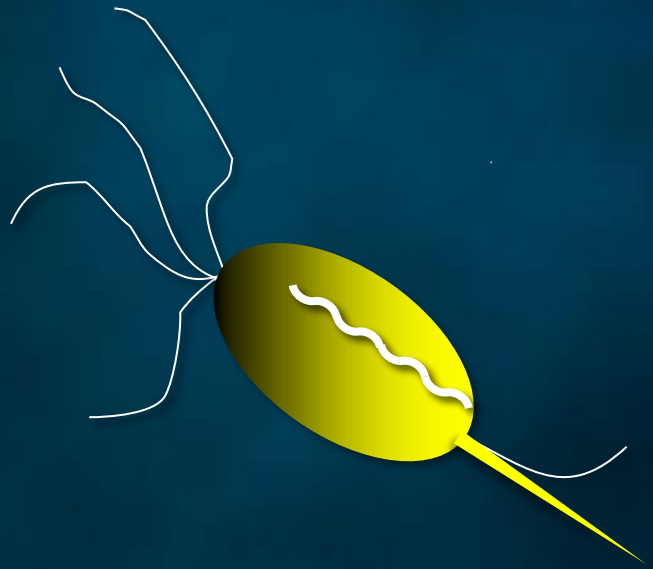
undulating membrane: motion

posterior flagellum: ?

axostyle: cytadherence and tissue damage

TRICHOMONAS vaginalis

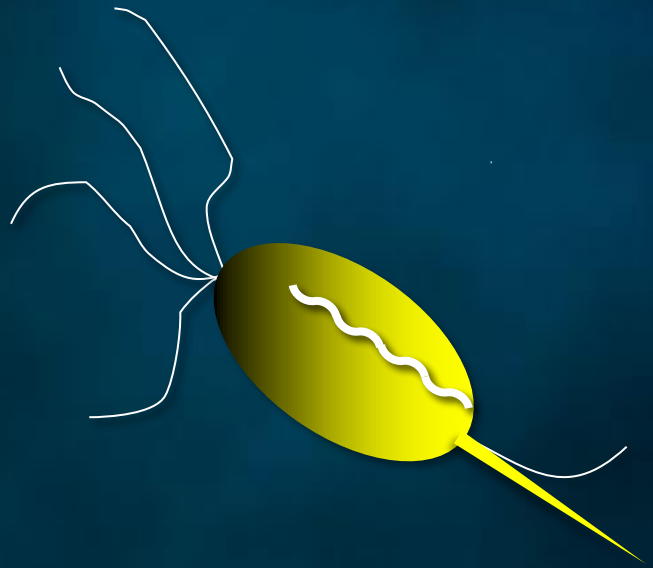




anterior **flagella**

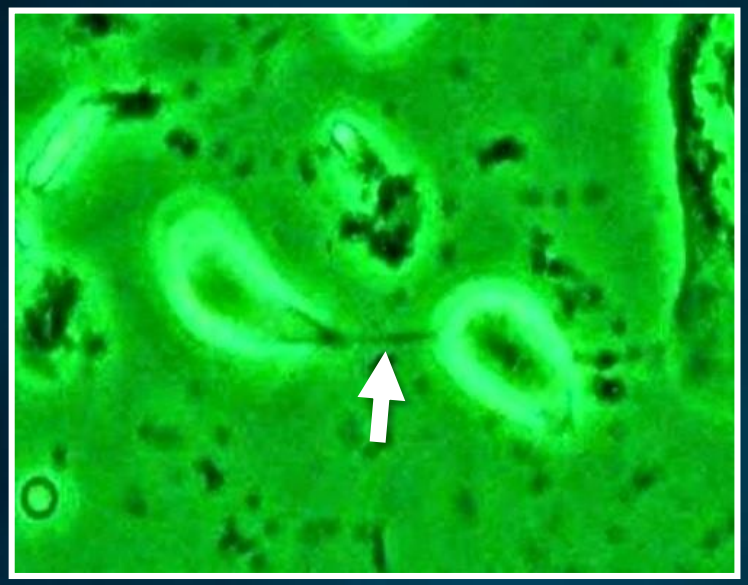
TRICHOMONAS vaginalis

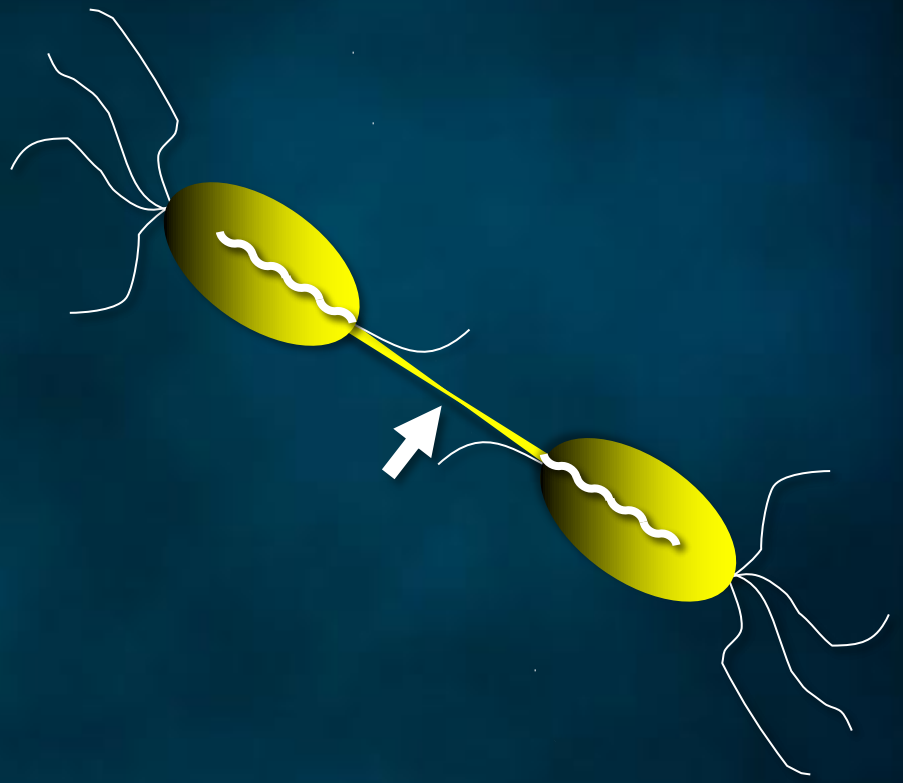




axostyle

TRICHOMONAS vaginalis

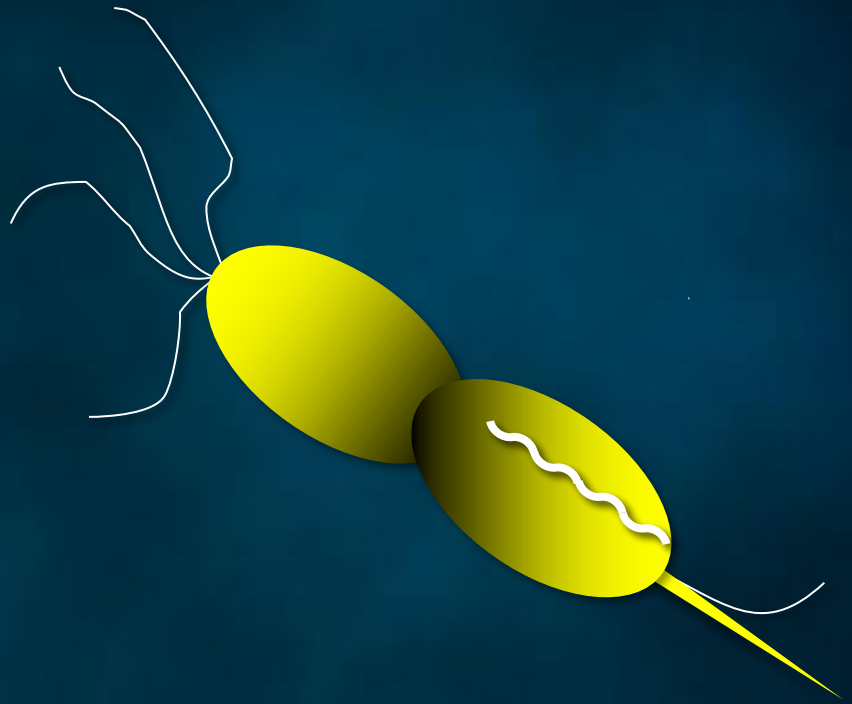




connecting axostyles

TRICHOMONAS vaginalis

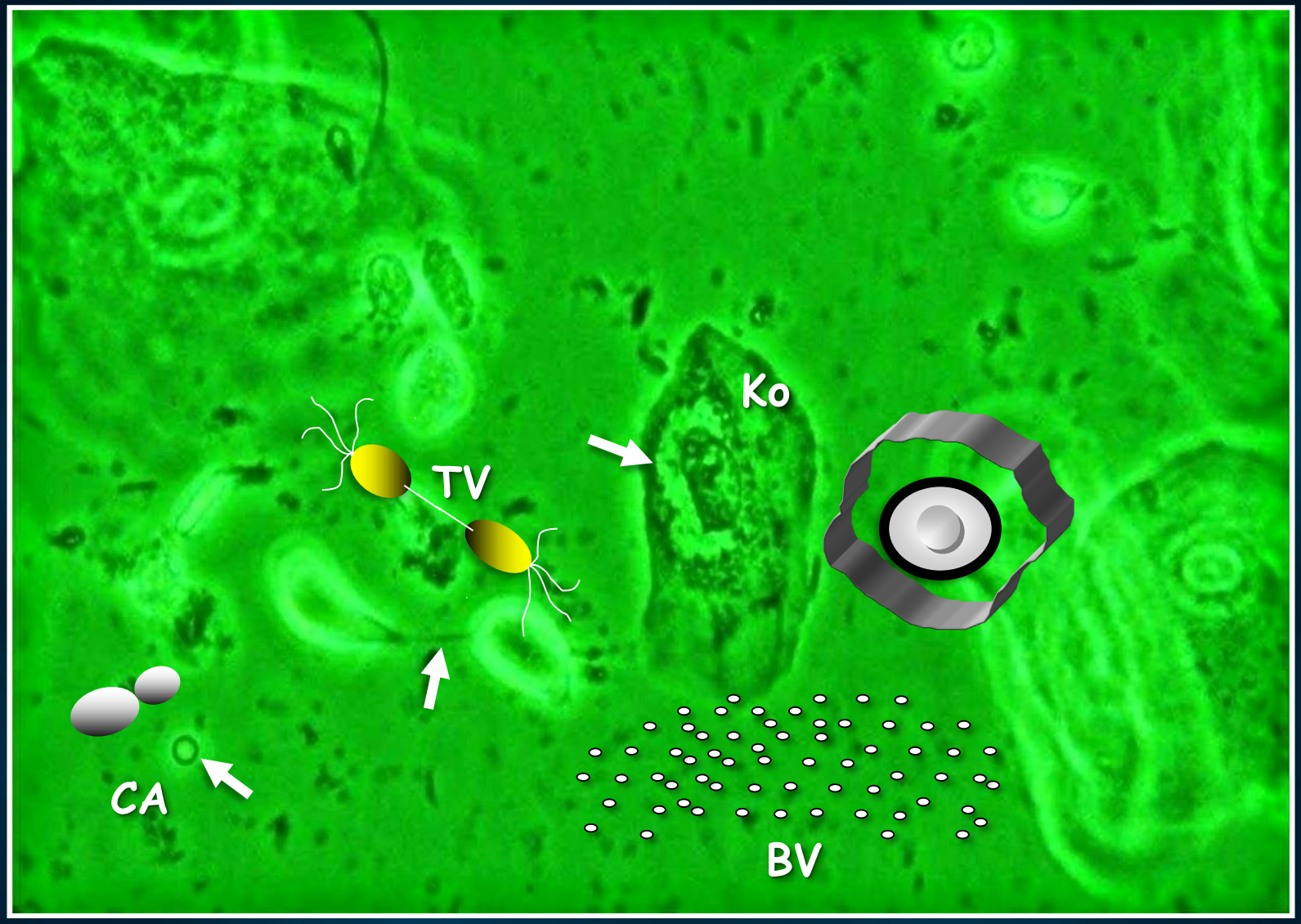


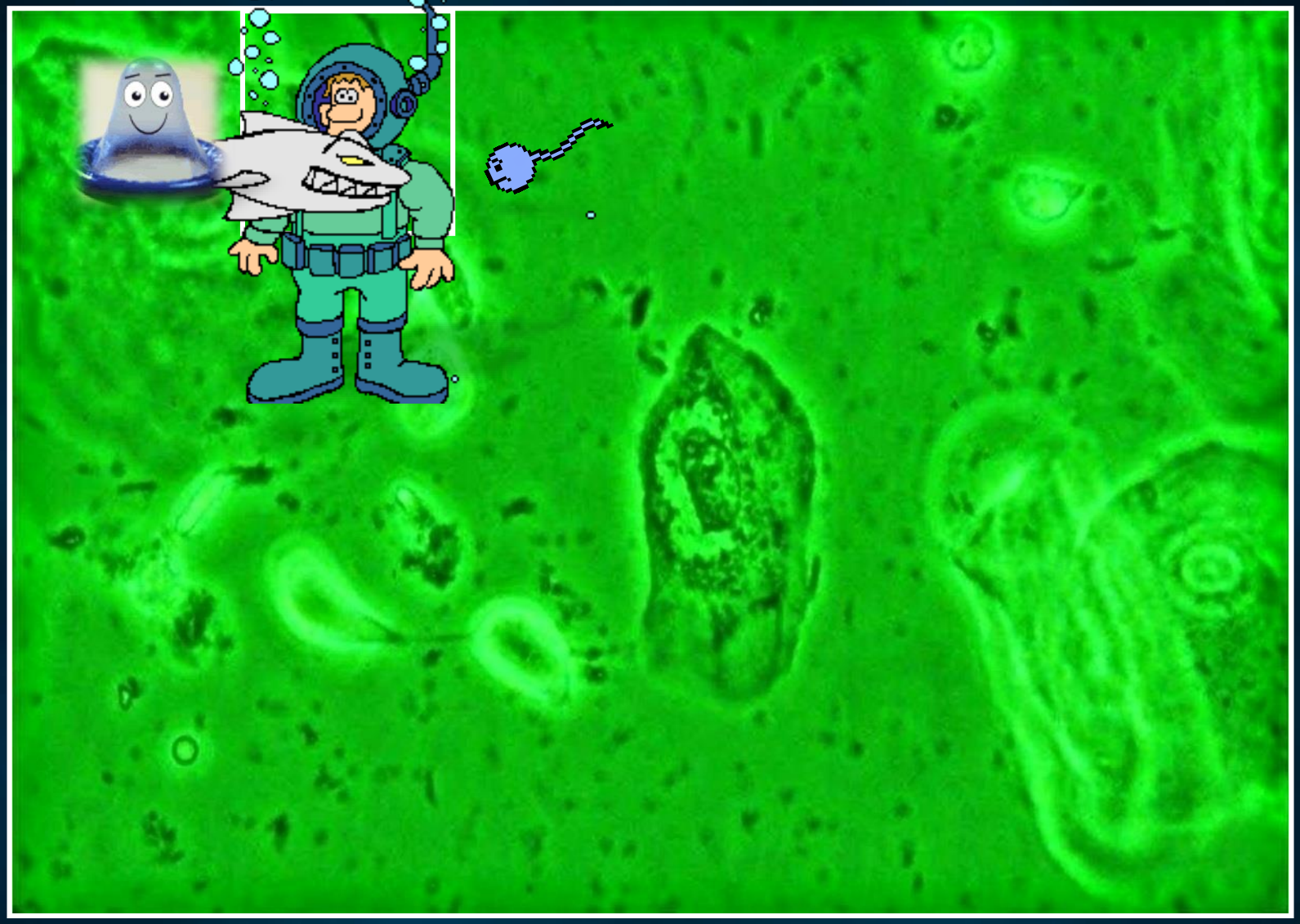


duplication



strawberry appearance


Ko
TV
CA
BV



U.S. Department of Health and Human Serv
Centers for Disease Control and Prevention



Sexually Transmitted Diseases Treatment Guidelines, 2015

Prepared by
Kimberly A. Workowski, MD[1,2]
Gail A. Bolan, MD[1]
[1]*Division of STD Prevention*
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
[2]*Emory University, Atlanta, Georgia*

If infection is suspected as the primary cause, a sample of the vaginal discharge should be taken and examined microscopically

Mylonas I et al. Obstet Gynecol Surv. Jun;66(6):359, 2011

Physicians should assess the clinical practicality and usefulness of wet mount microscopy and use wet mount microscopy to diagnose common vaginal infections

Mylonas I et al. Obstet Gynecol Surv. Jun;66(6):359, 2011

Wonderful Atlas. I have made reference to it many times in my lectures

Albert Singer

Whittington Hospital, London

The quality of the images is excellent and accompanying explanatory text illuminating

Charles Redman

President European Federation of Colposcopy

This text will be a reference work for Gynecologists for many years to come

Walter Prendiville

Past President International Federation of Colposcopy and Cervical Pathology

The Atlas is superb. This publication has a great historic value, as a gift for future generations

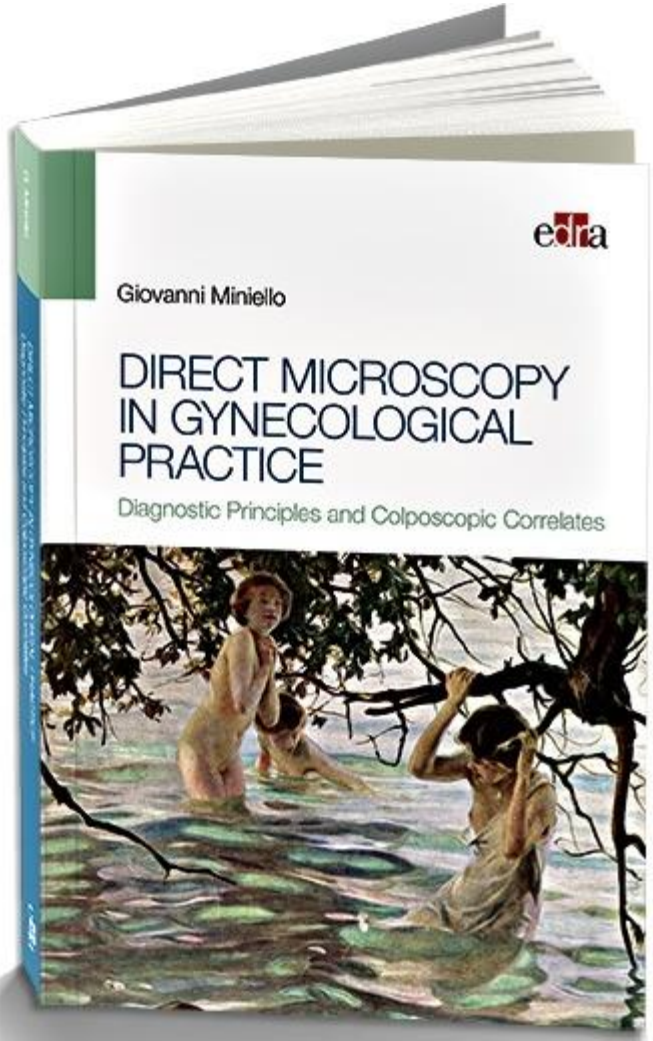
Usha Saraiya

Founder Member and President Indian Academy of Cytologists

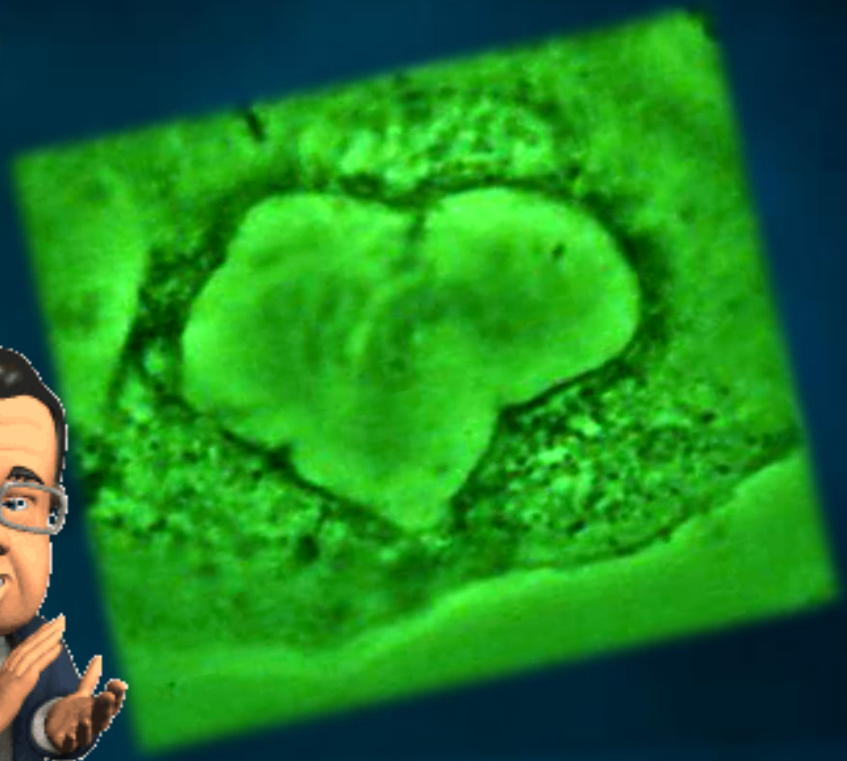
This Atlas, beautifully illustrated, is a ‘master piece’ of work

Sabaratnam Arulkumaran

Past President FIGO









GOOD JOB