

CYTOLOGY

- Diagnostic cytology is the science of interpretation of cells either exfoliated from epithelial surfaces or removed from various tissues
- George N Papanicolou introduced cytology as a tool to detect cancer and pre-cancer in 1928.

Methods of sample collection

Cells may be collected and studied in following ways:

A. Exfoliative Cytology:

- study of cells shed or removed from the epithelial surface of various organs
- Cells from all organs, which communicate with the exterior of the body, are suitable for study
- Ex: cervical/vaginal smears, vaginal pool smears, sputum cytology, oesophageal washings and brushing etc

B. Body Fluids: Body fluids like urine, pleural, pericardial, peritoneal, synovial and cerebrospinal fluids

C. Fine Needle Aspiration Cytology (FNAC):

- technique used to obtain material from organs that do not shed cells spontaneously
- valuable in diagnosis of lesions of the breast, thyroid, lymph nodes, liver, lungs, skin, soft tissues and bones

PAP SMEAR

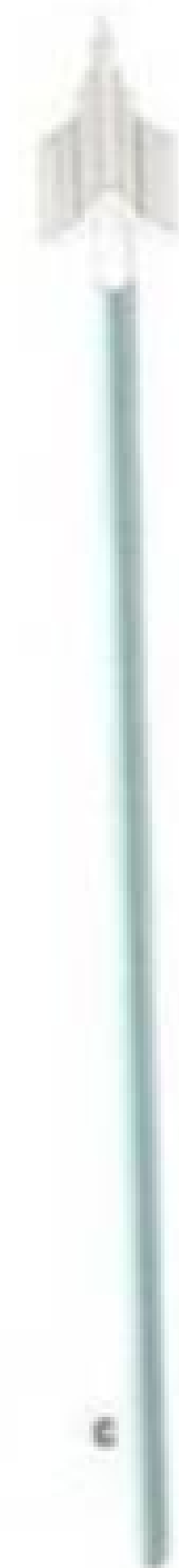
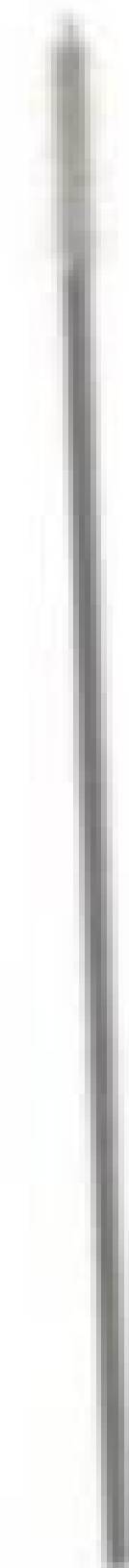
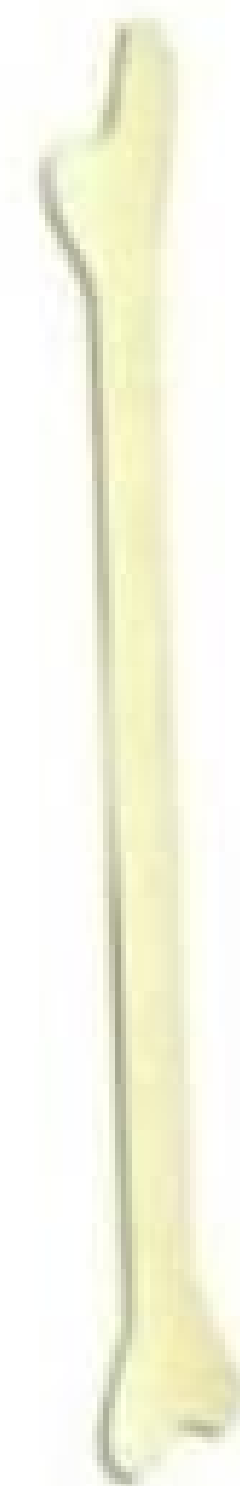
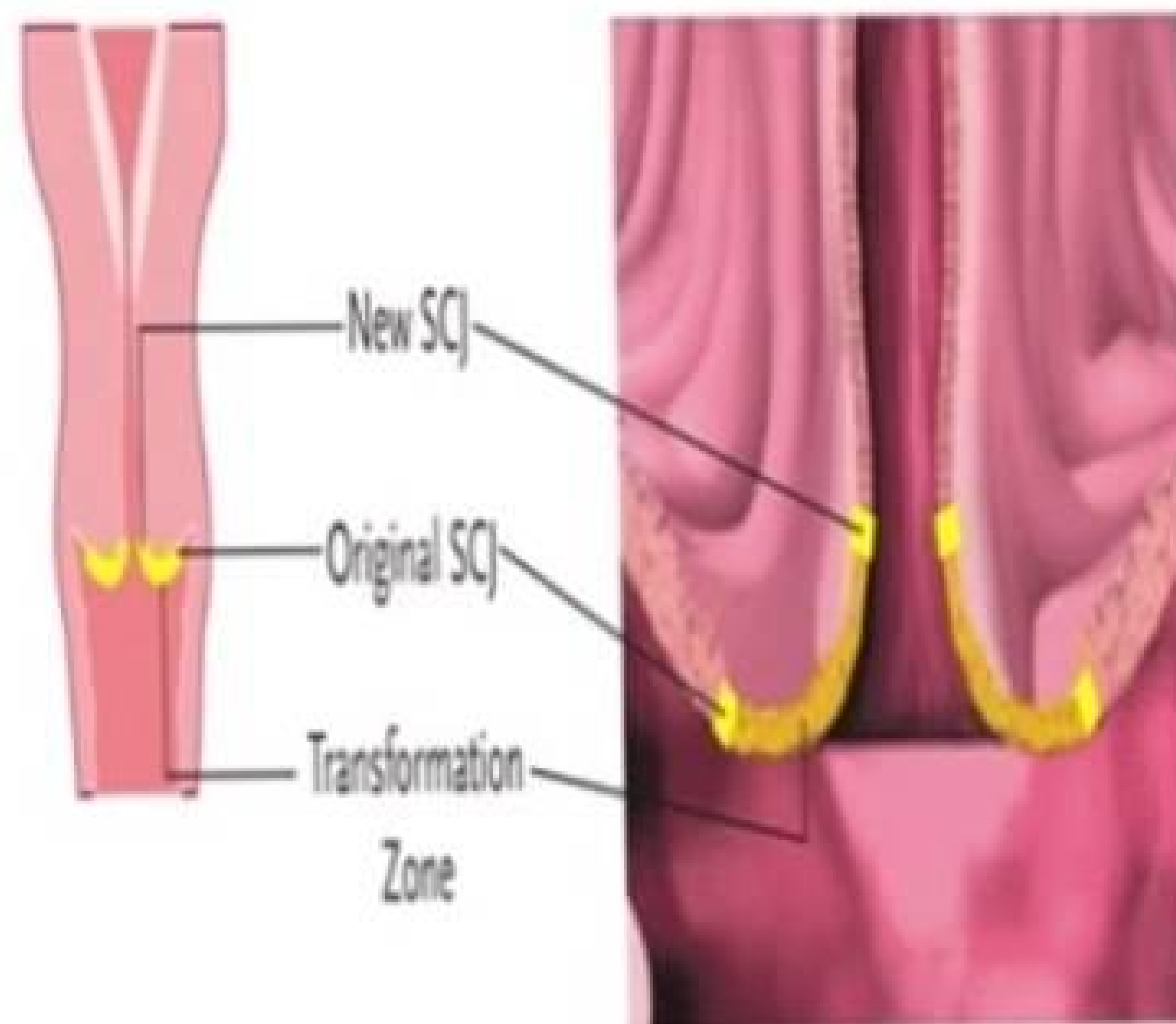
- PAP SMEAR: Named after Dr. George Papanicolaou (1928).
- It is a microscopic examination of cells scraped from the cervix and is used to detect cancerous and pre-cancerous conditions of cervix.
- Pap smear has helped to reduce cervical cancer incidence and mortality rates by 75%.

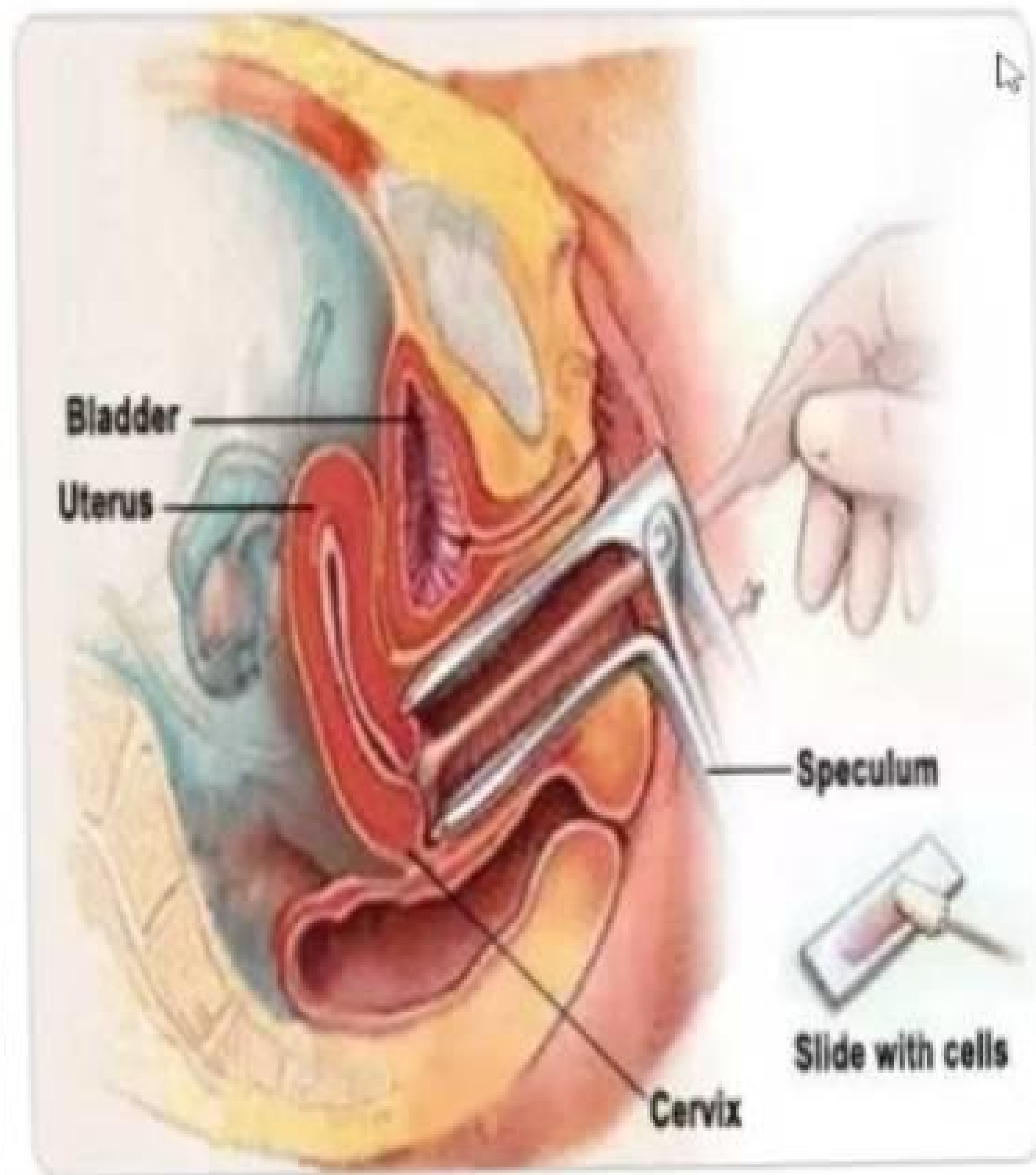
WHEN TO SCREEN..???

- Start at age of 21.
- **Screening frequency**
 - ✓ Women aged 21-29 every 3 years.
 - ✓ Women aged 30-65 should have a pap test and a HPV test every 5 years.
 - ✓ Its acceptable to have pap test alone every 3 year.
- **When to stop...??**
 - ✓ At age of 65 and adequate recent screening.
 - Three negative pap test in a row or two negative co test in row within past 10 years.

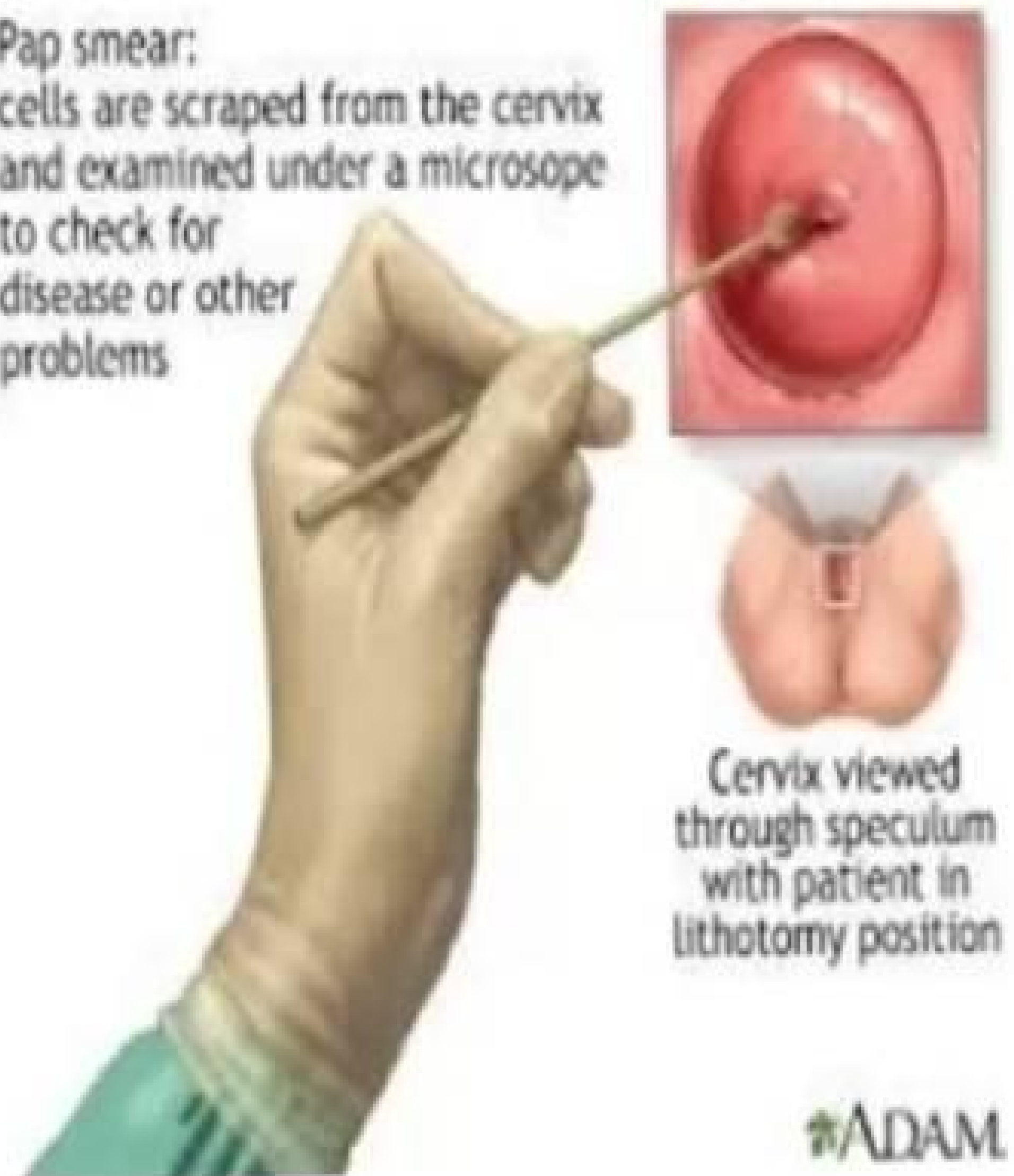
SAMPLE COLLECTION

- **METHODS**
 - ✓ Aylesbury spatula (Ayers Spatula)
 - ✓ Brush method
 - ✓ Plastic-fronded broom – Liquid based cytology
- **Done during the second half of the menstrual cycle (day 14).**
- **PRECAUTIONS :**
 - ✓ Abstain from sexual intercourse
 - ✓ Avoid vaginal medications or contraceptives before 48hrs.
- **Smear is taken from the squamo columnar junction by rotating the spatula to 360 degree.**
- **FIXATIVE :** 95% Ethanol.
- **STAIN:** PAP stain – Multichromatic stain.





Pap smear:
cells are scraped from the cervix
and examined under a microscope
to check for
disease or other
problems



Papanicolaou stain

The three main advantages of this staining procedure are:

- (1) Good definition of nuclear detail.
- (2) Cytoplasmic transparency.
- (3) Indication of cellular differentiation of squamous epithelium.

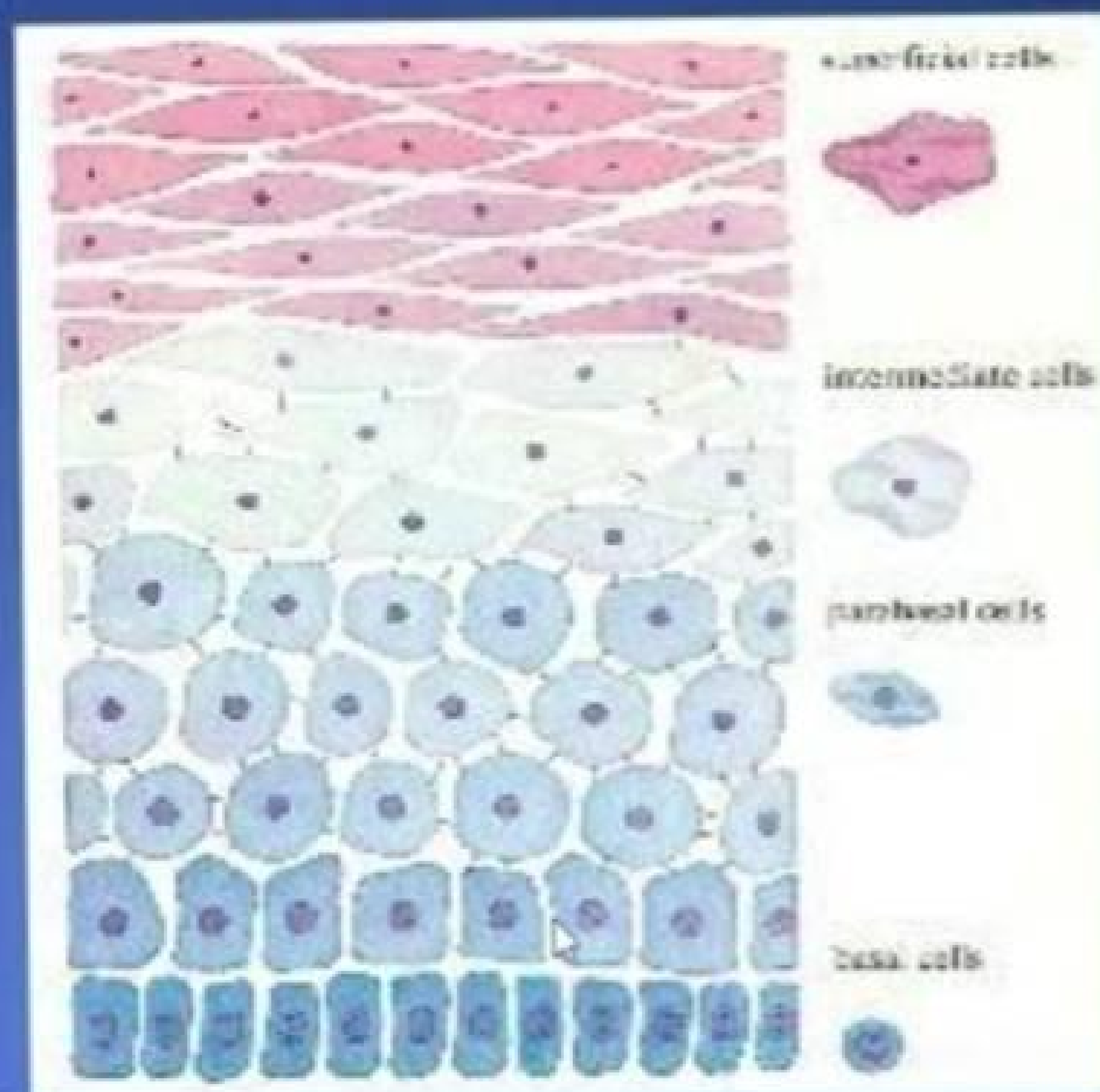
ADEQUACY OF SMEAR

- Adequate number of squamous epithelial cells.
 - * Conventional smear - 8,000 to 12,000 cells.
- Evidence that the transformation zone was sampled (i.e., at least 10 well preserved endocervical cells/squamous metaplastic cells singly or in clusters).
- Epithelial cells not obscured by blood ,inflammatory cells or foreign material.
- Appropriately preserved.

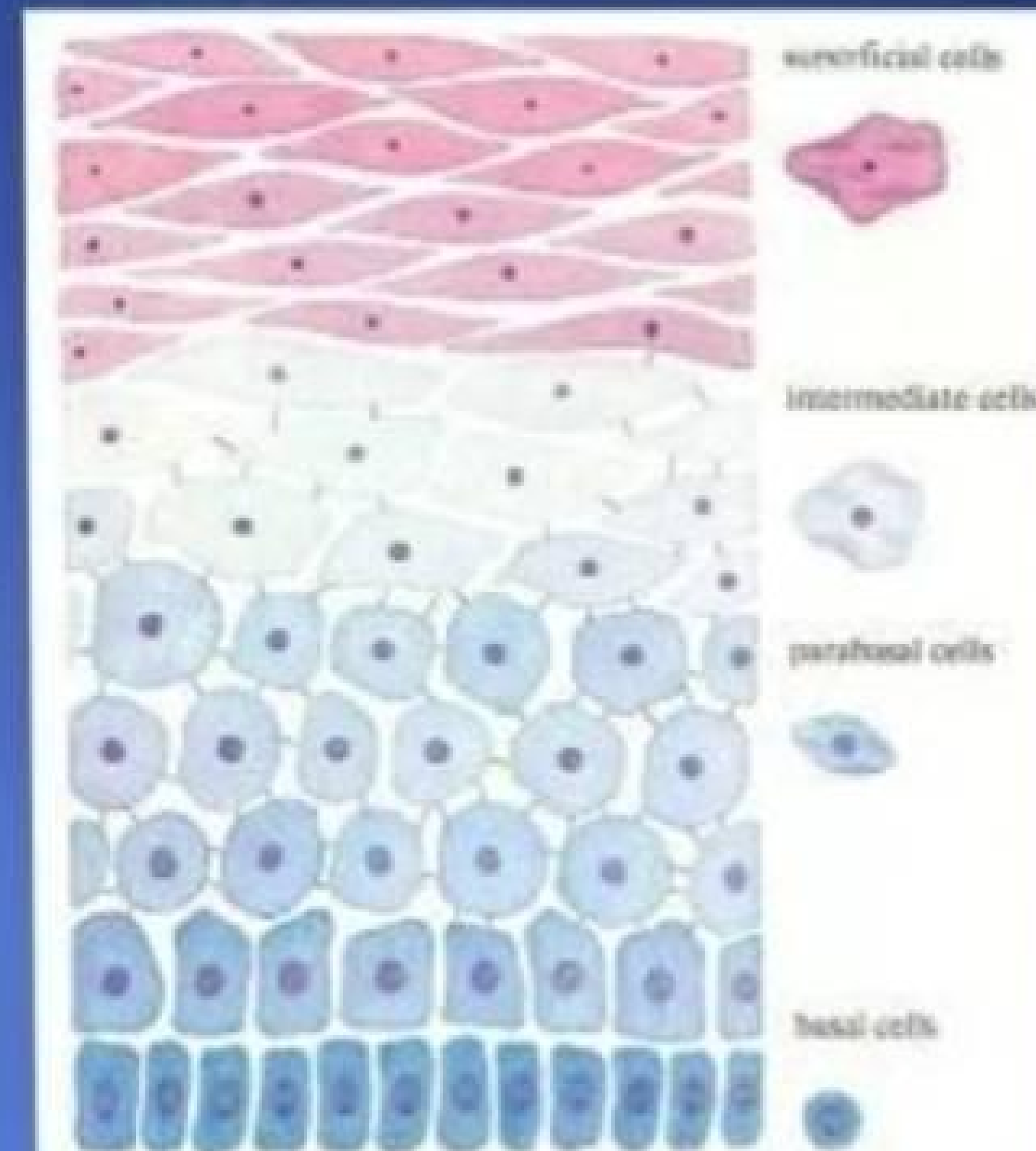
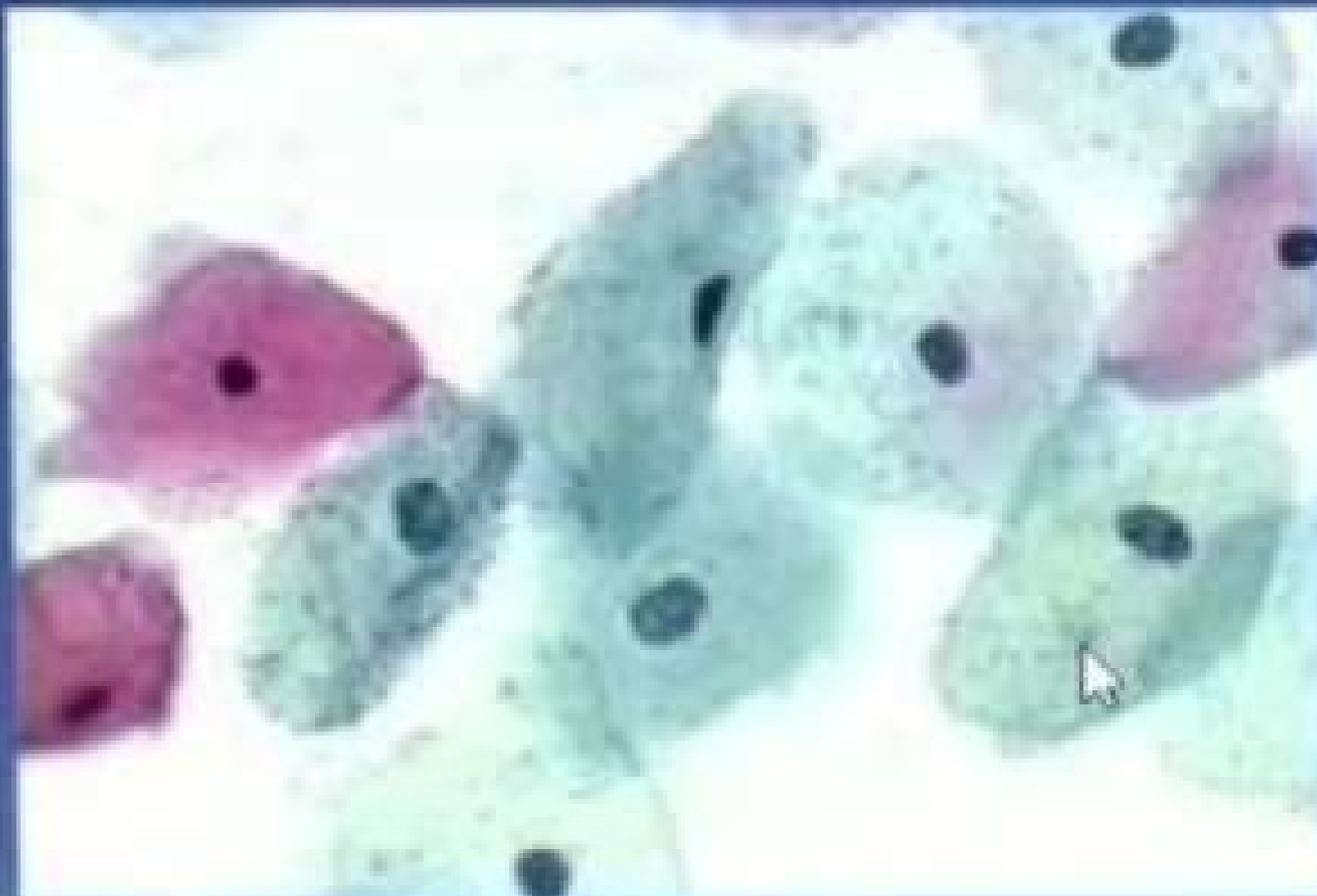
INTERPRETATION OF NORMAL PAP SMEAR

- Superficial cell – Acidophilic with pyknotic nuclei
- Intermediate cell – Basophilic with vesicular nuclei
- Parabasal cell – Small , round cell and basophilic with large nuclei
- OTHER CELLS : Endocervical cells.
Endometrial cells.
Squamous metaplastic cells.
Non epithelial cells

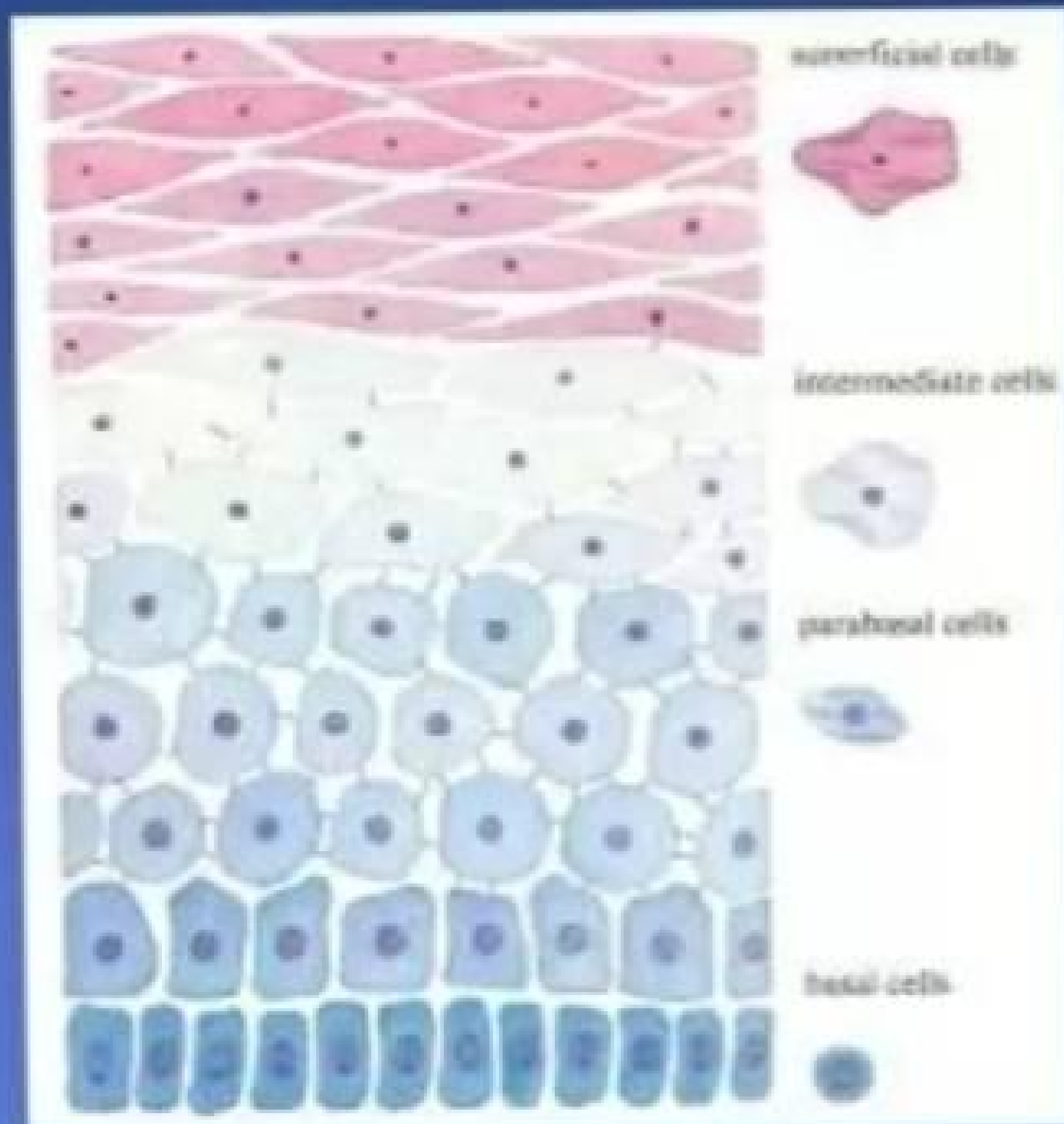
Superficial Cells



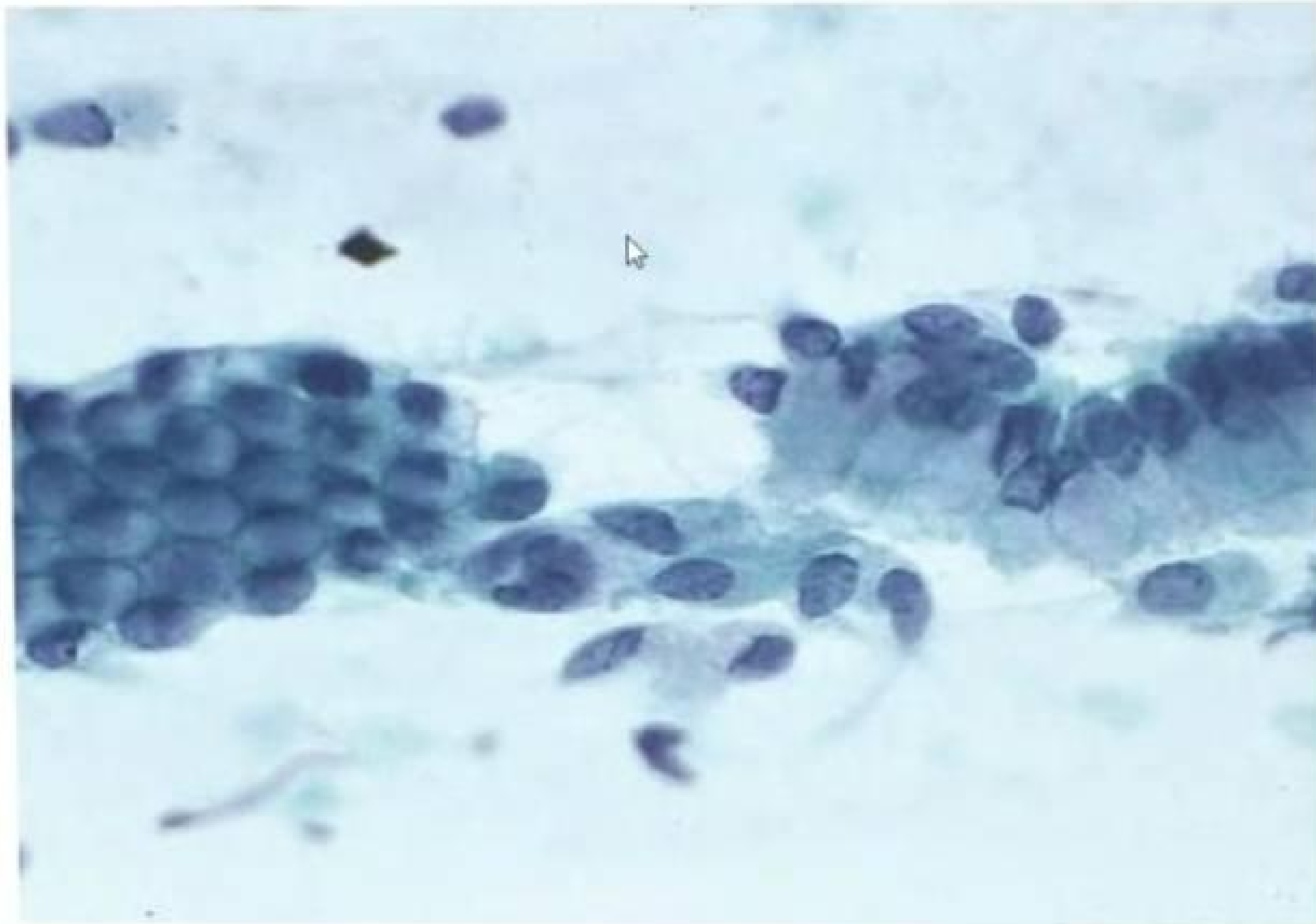
Intermediate Cells



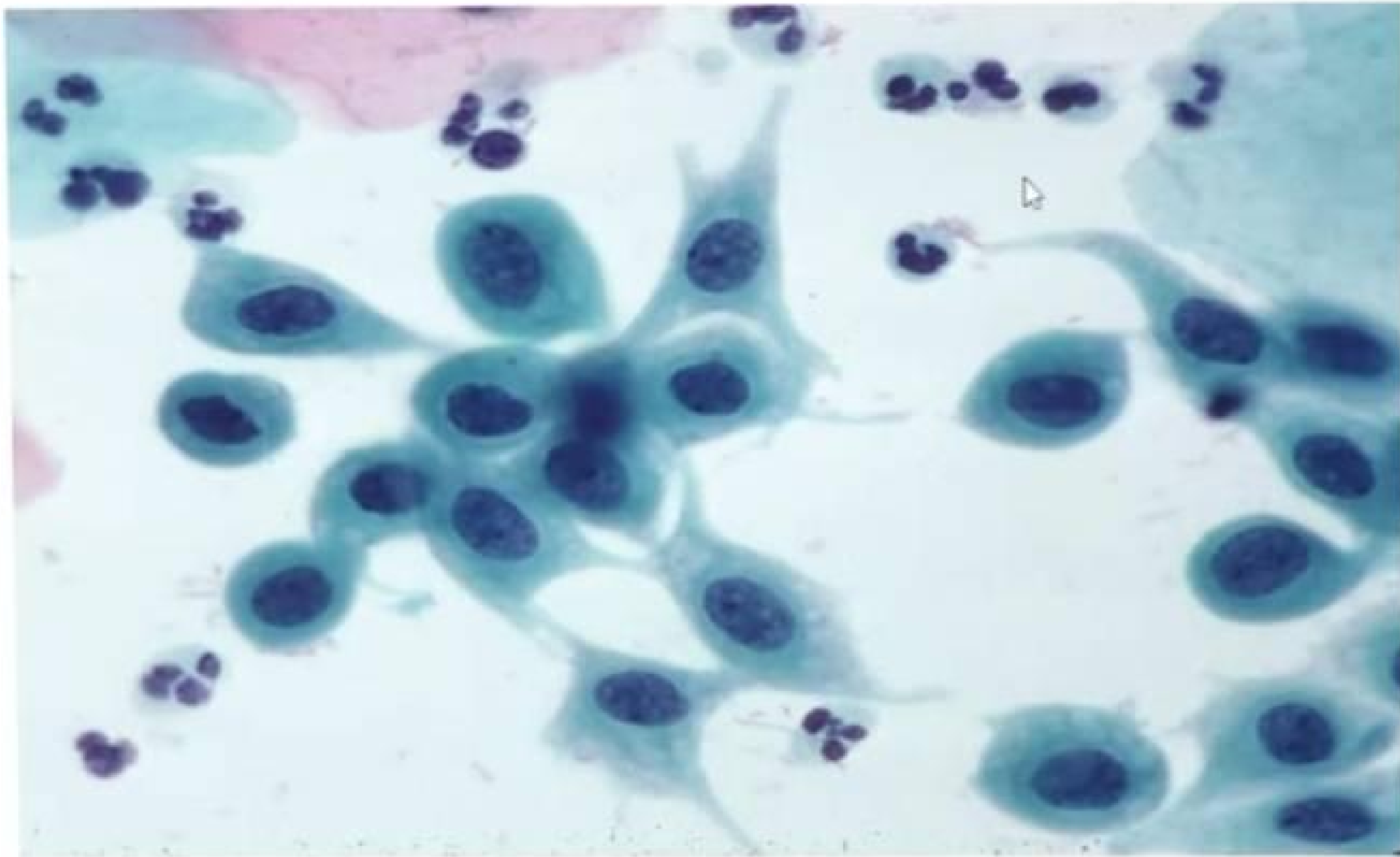
Parabasal Cells



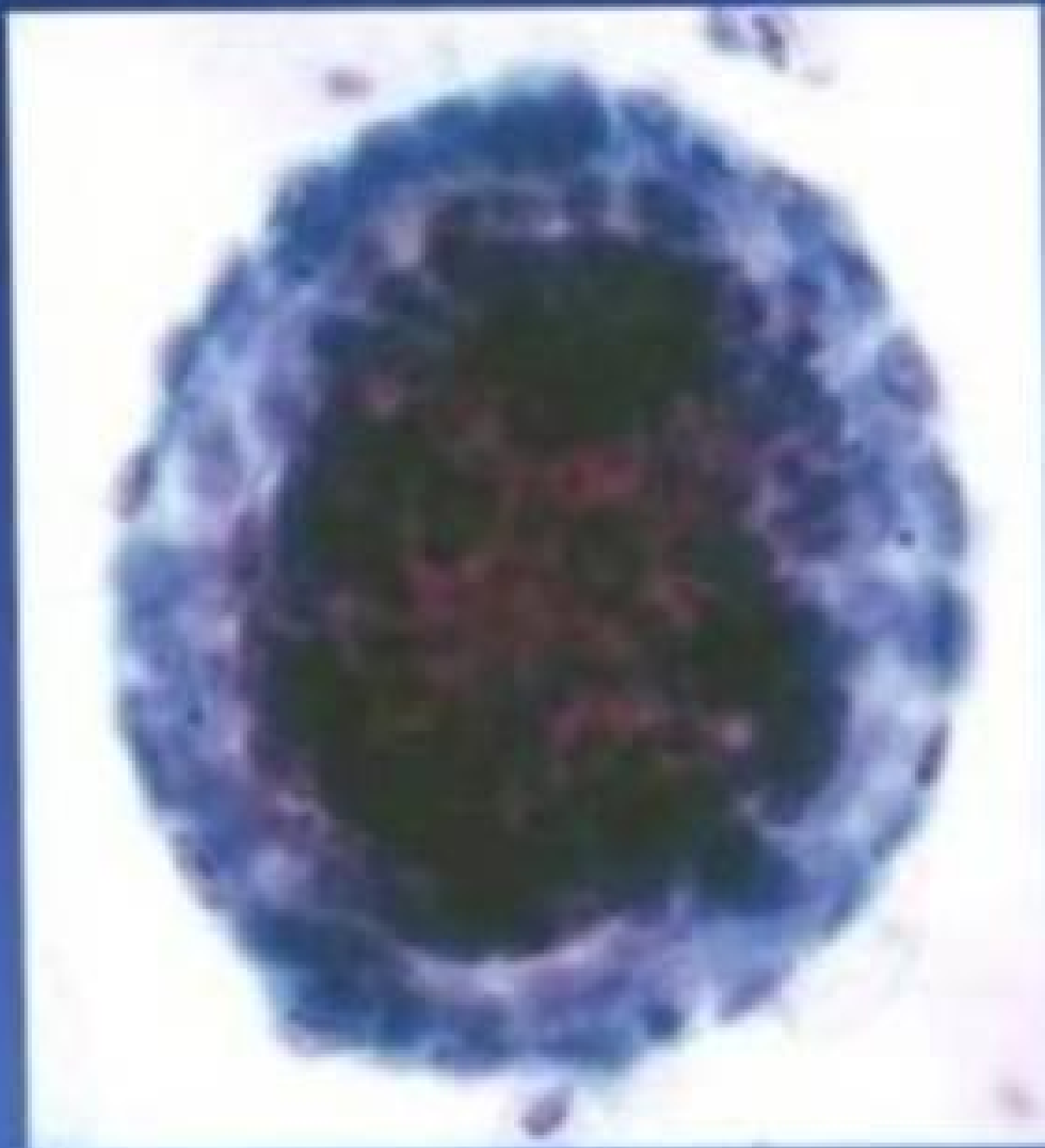
ENDOCERVICAL CELLS



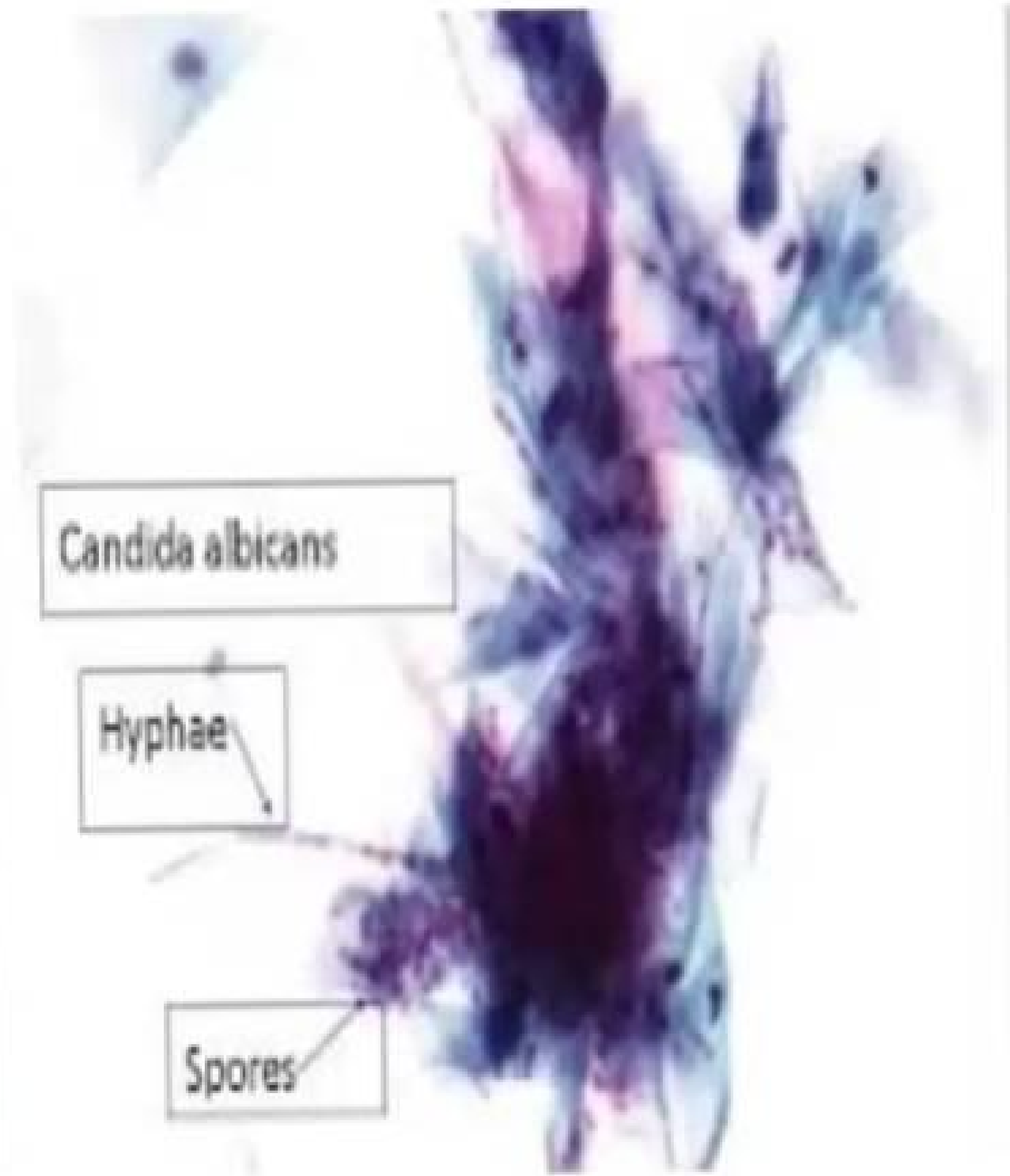
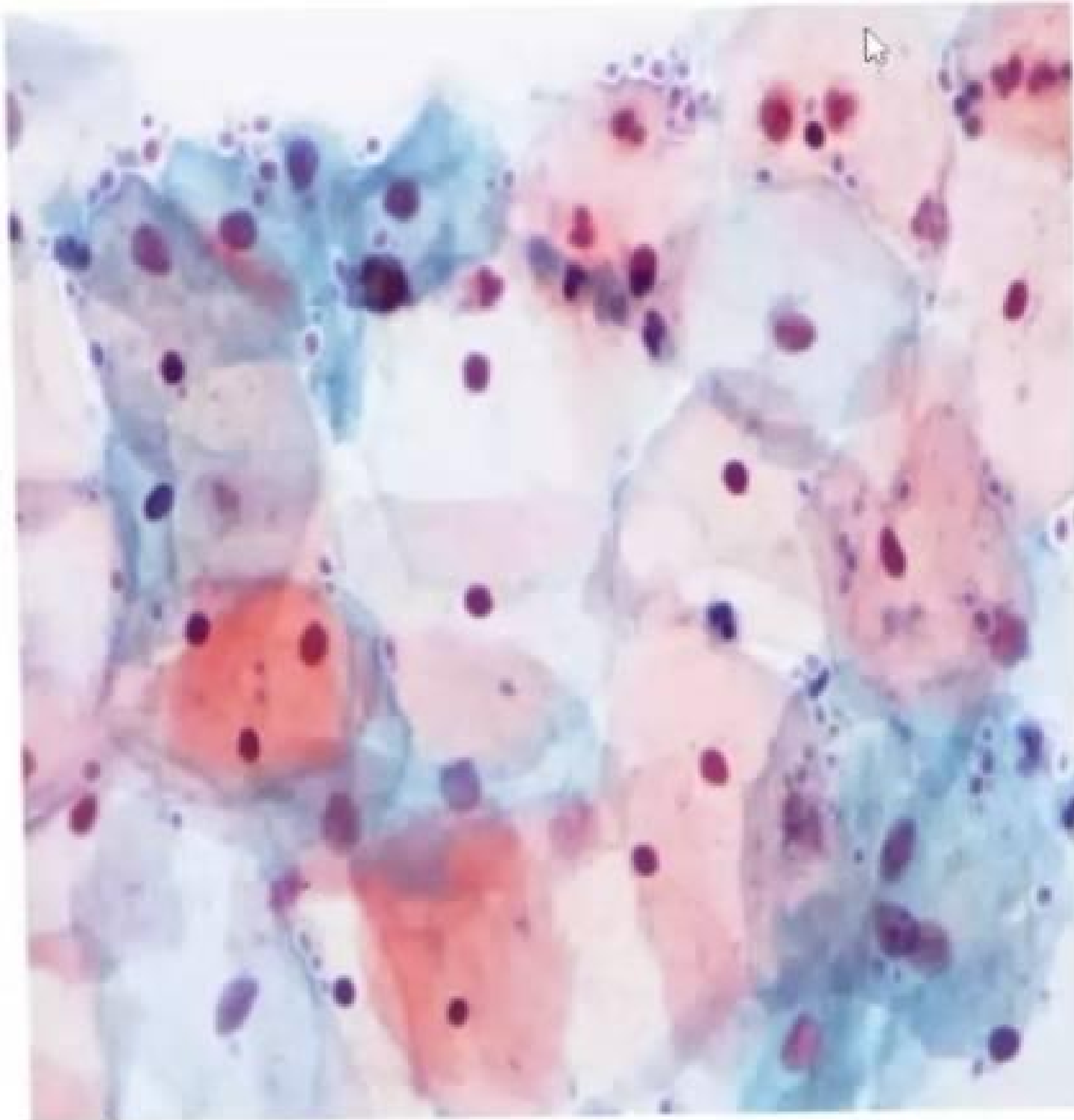
SQUAMOUS METAPLASTIC CELLS



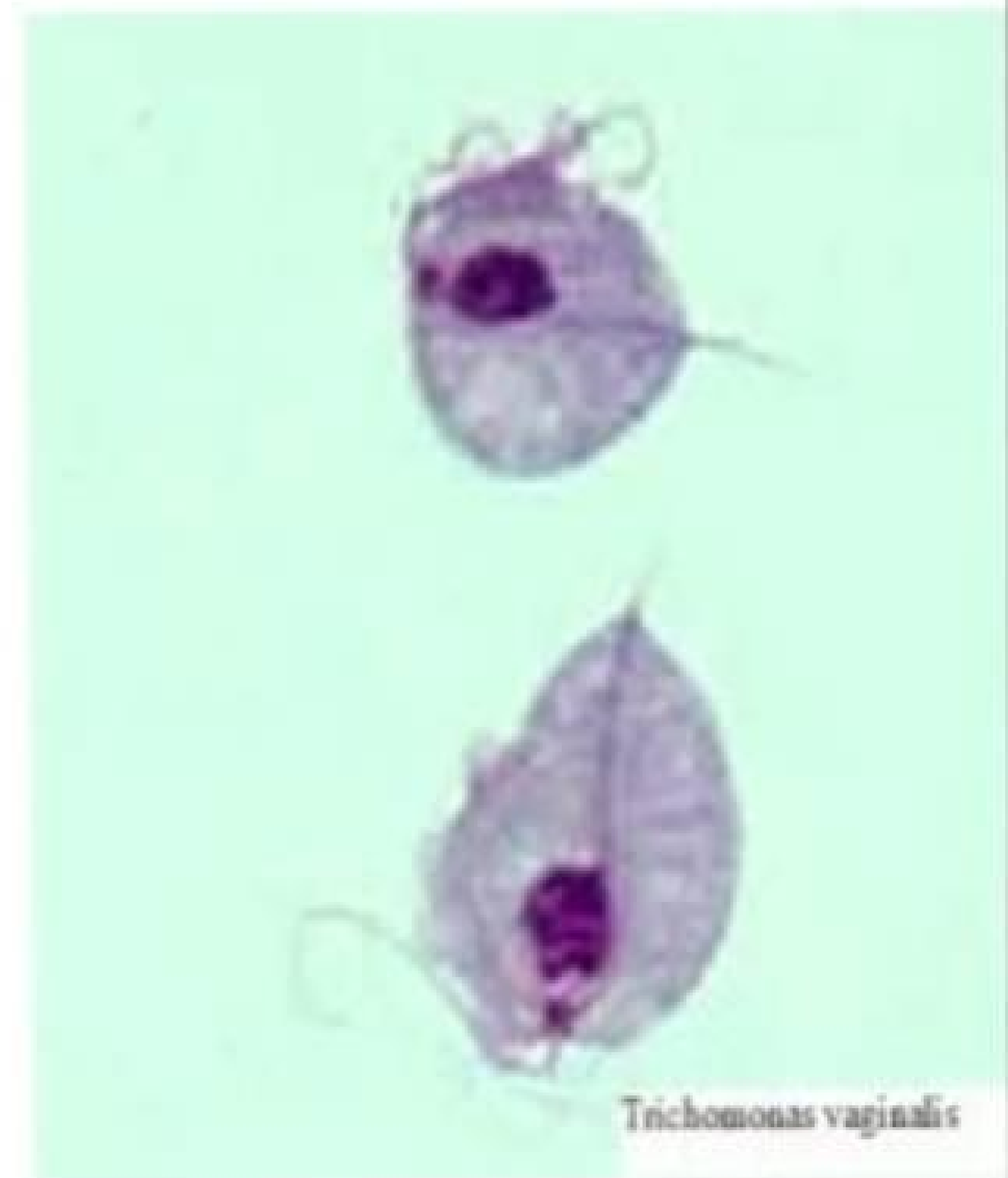
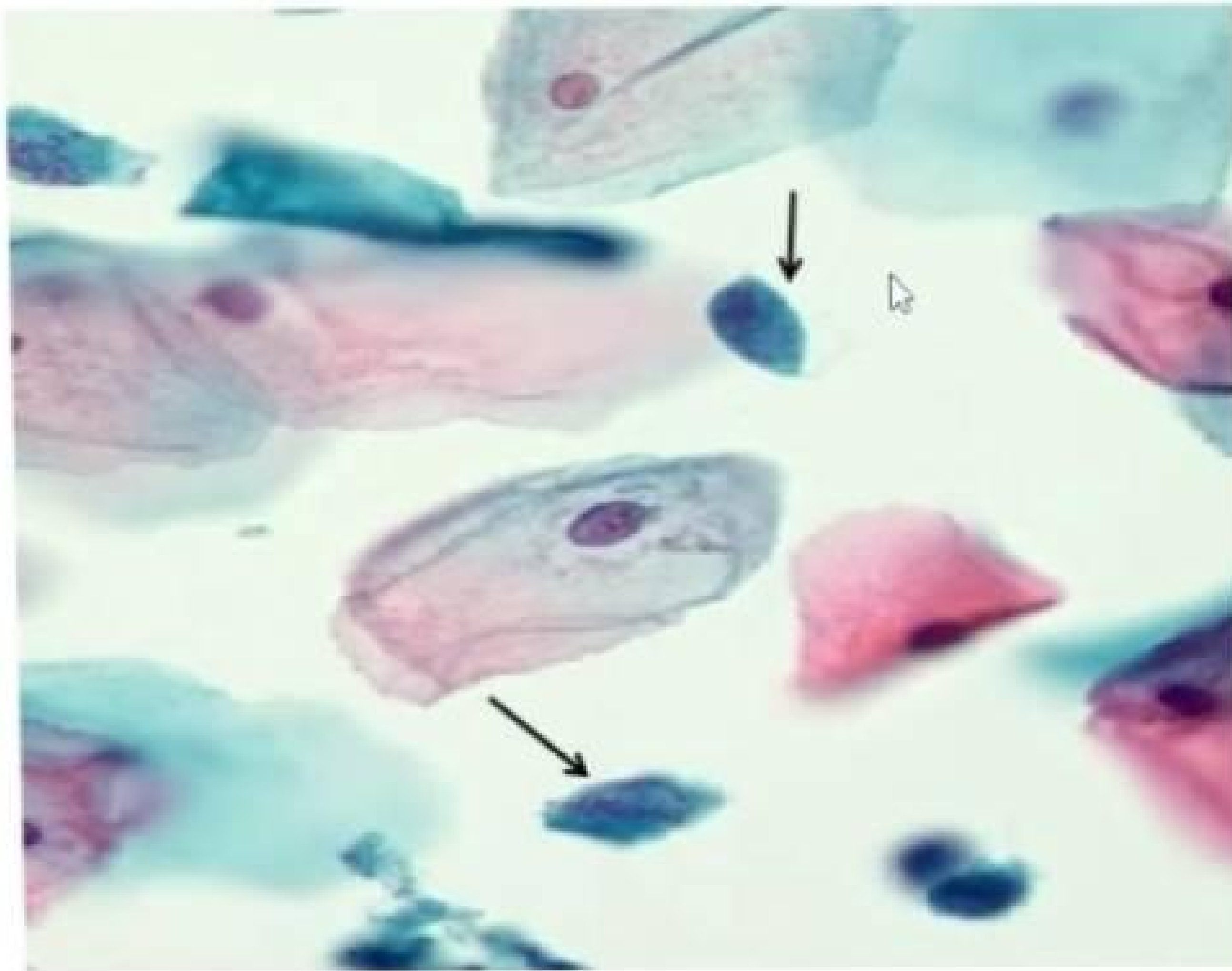
Endometrial Cells



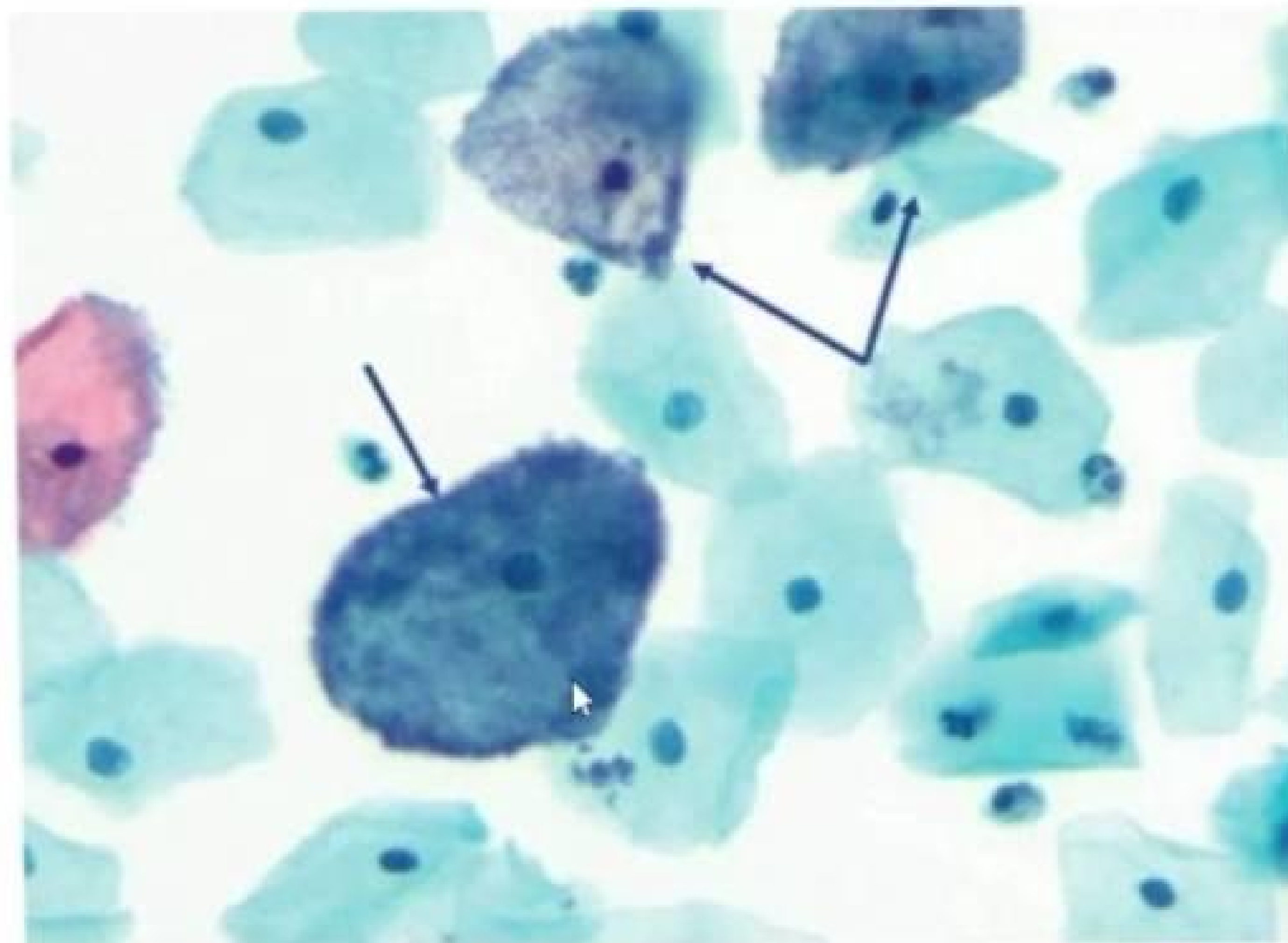
CANDIDA



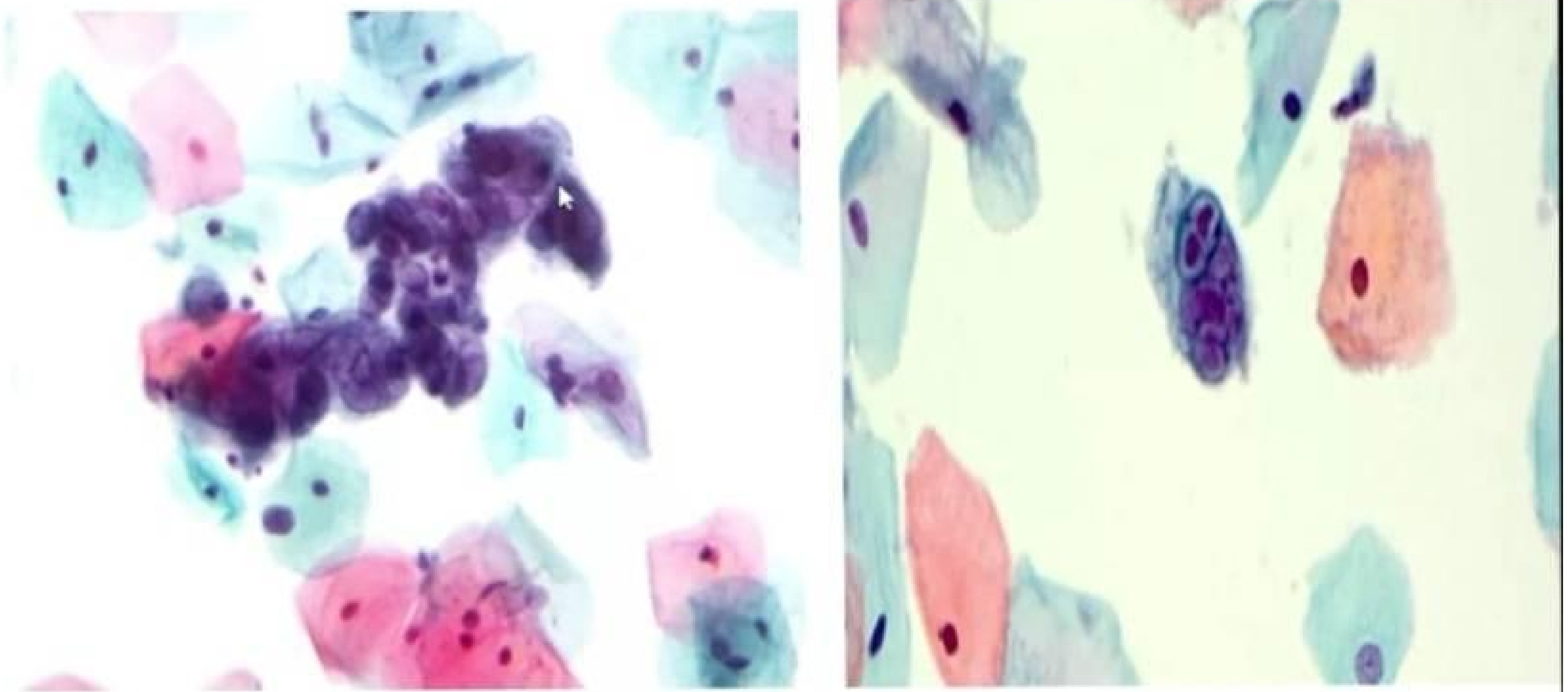
TRICHOMONAS VAGINALIS



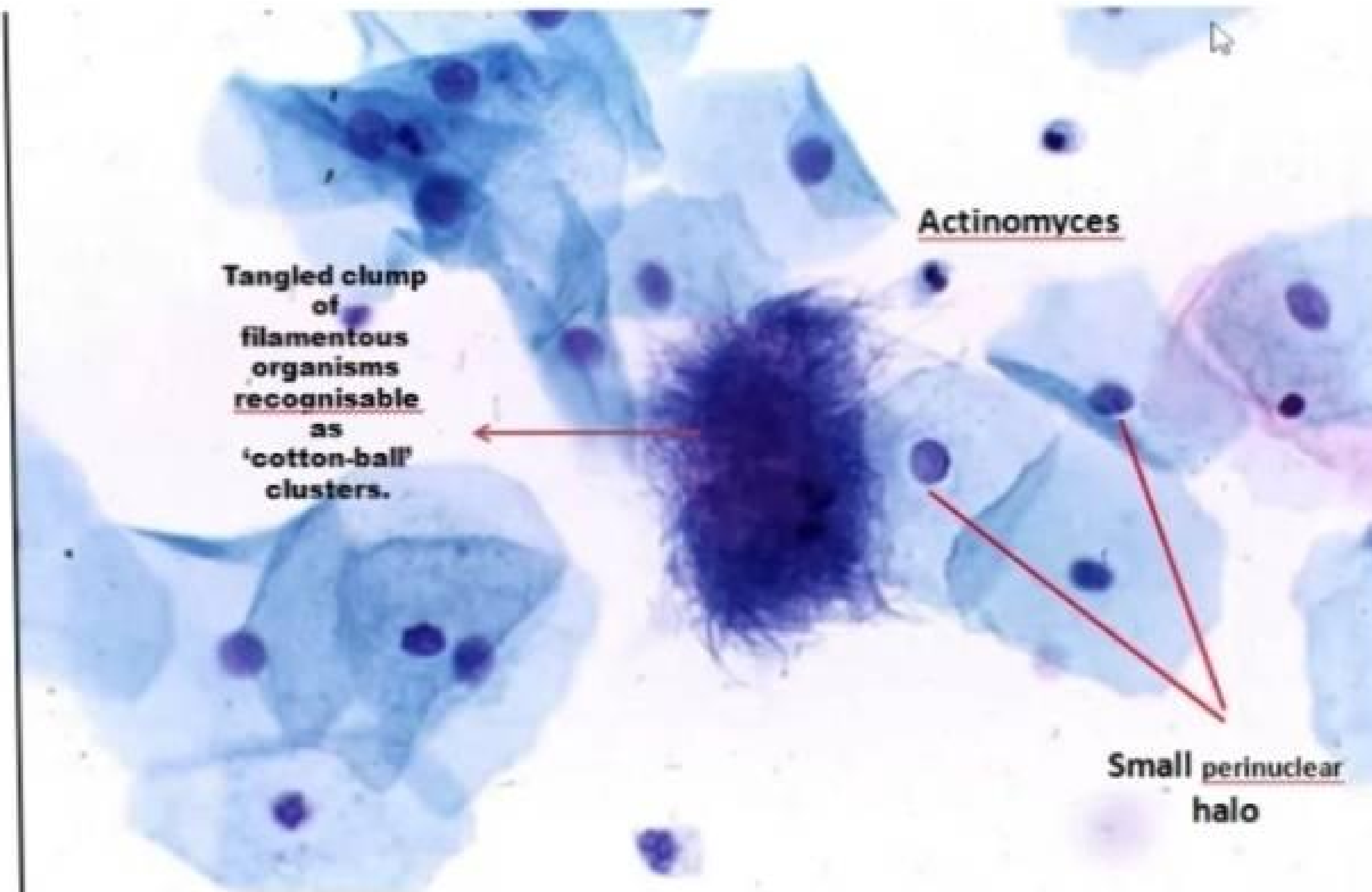
BACTERIAL VAGINOSIS



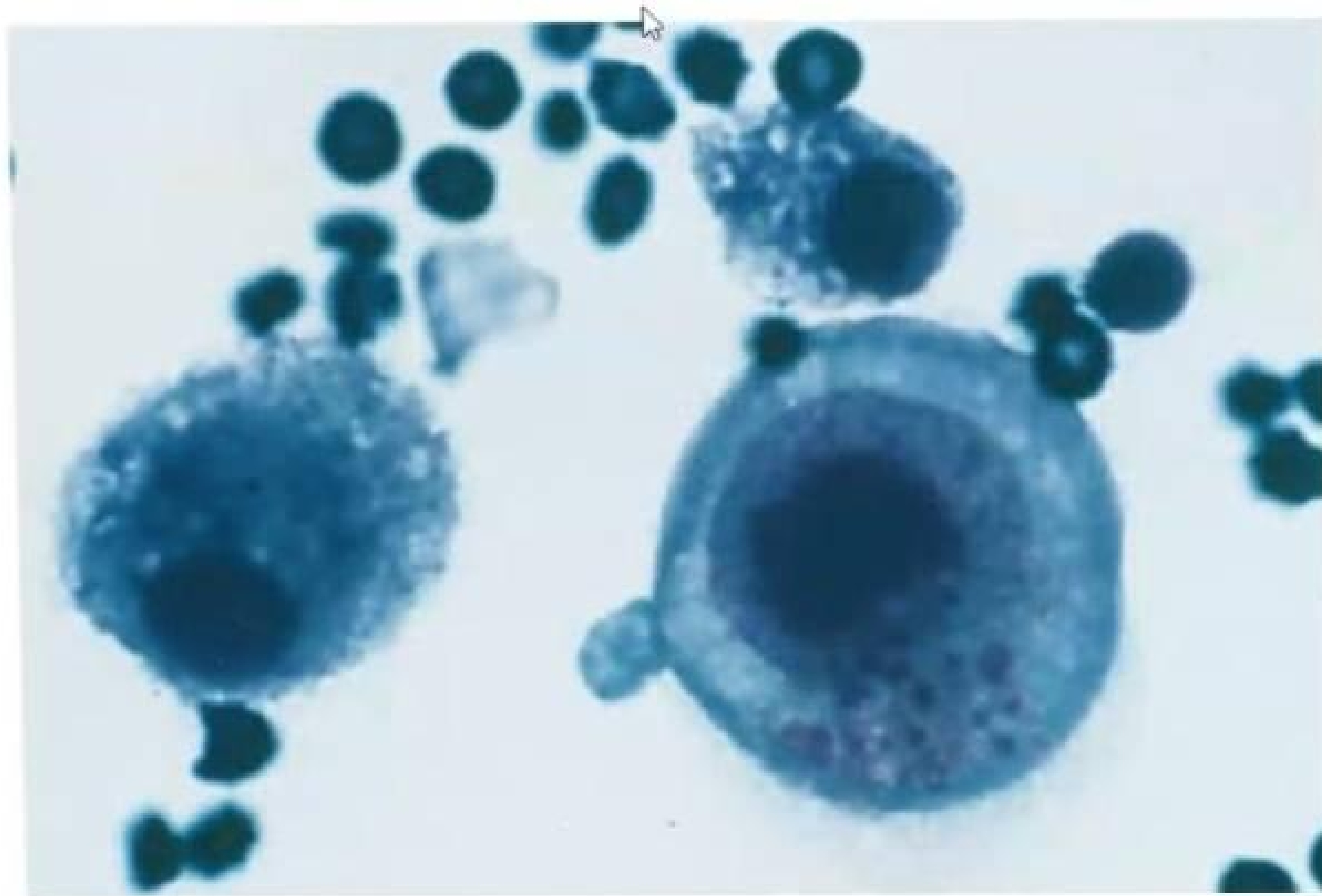
HSV



ACTINOMYCES



CMV



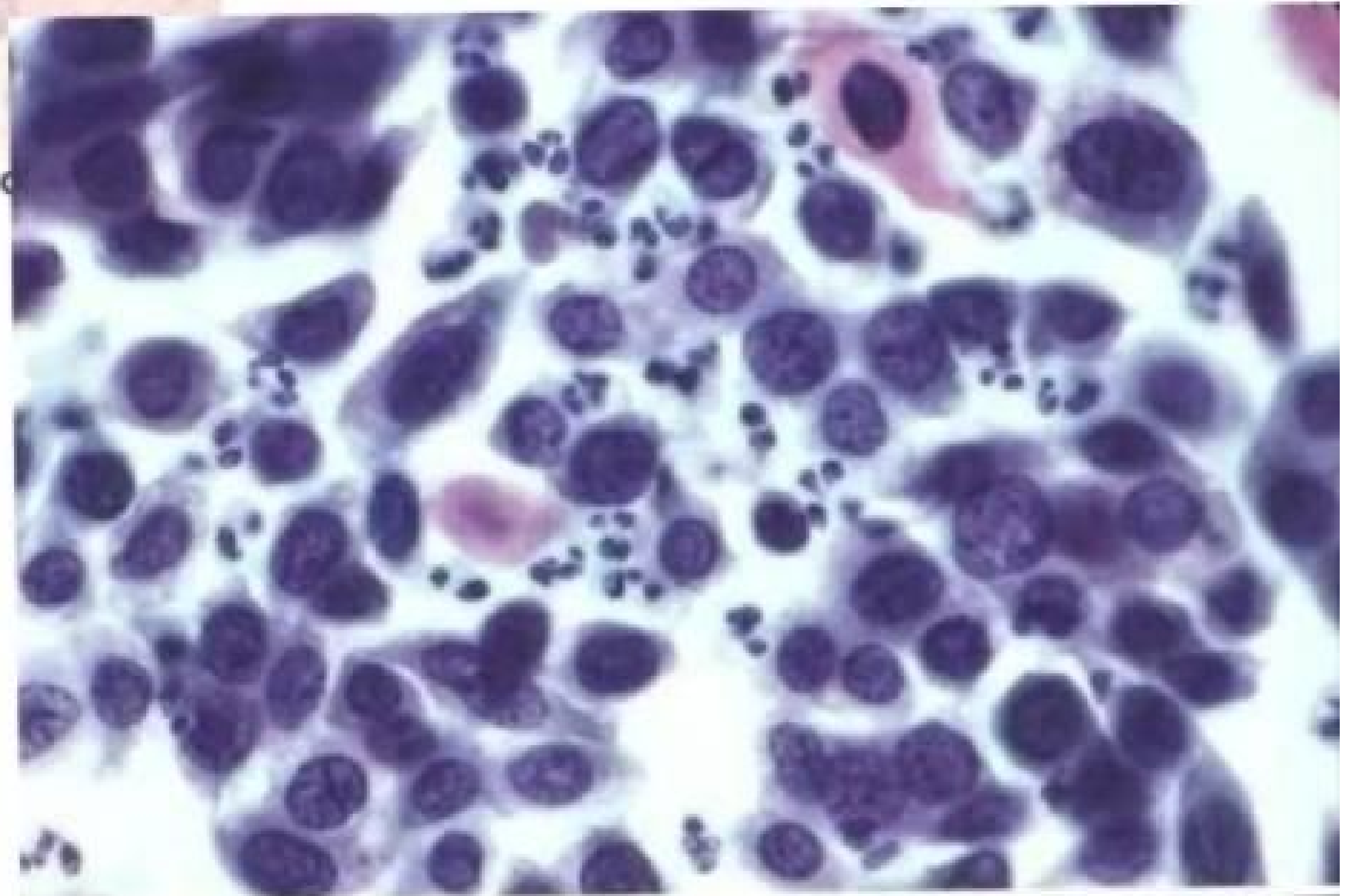
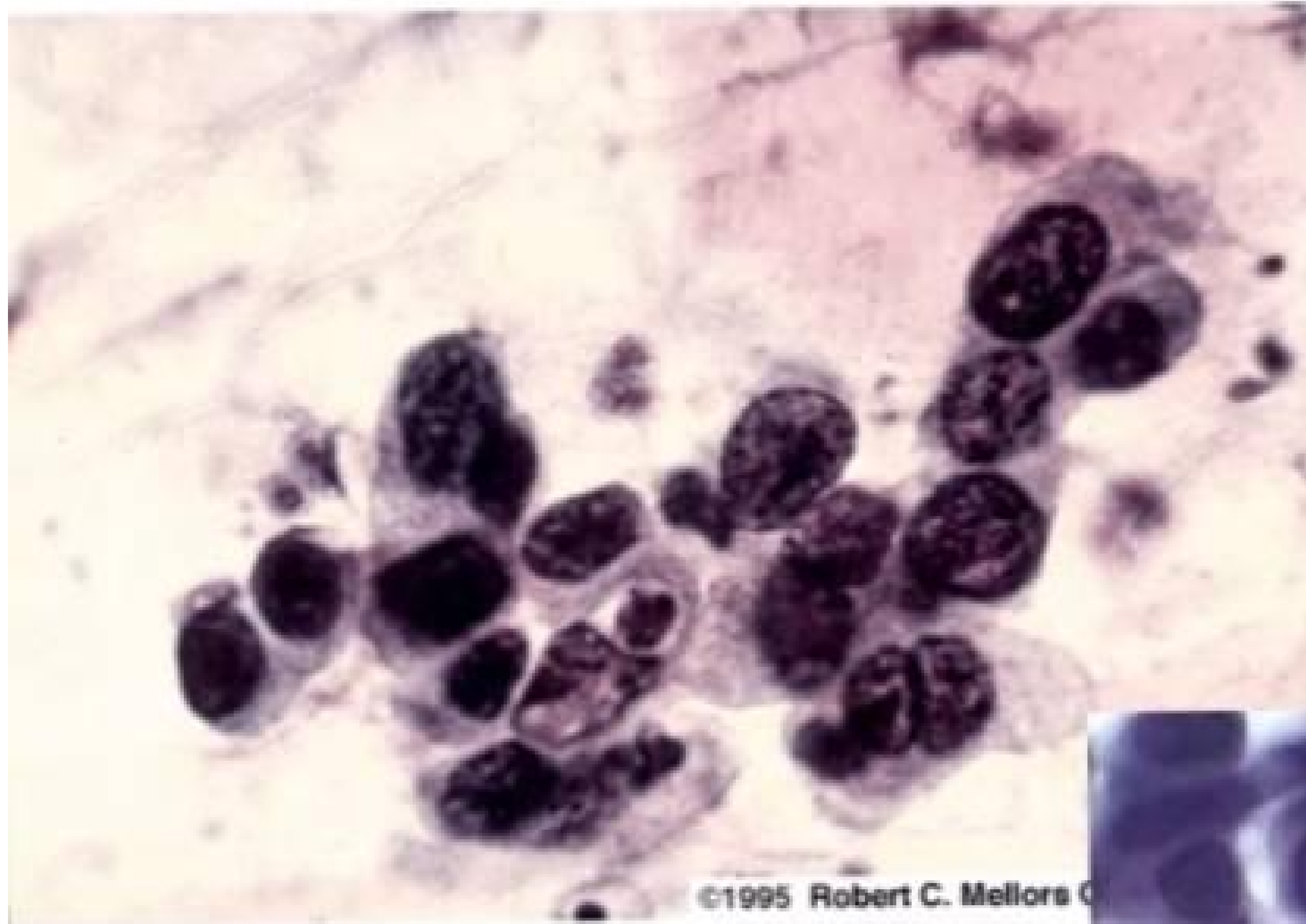


Scanned by TapScanner

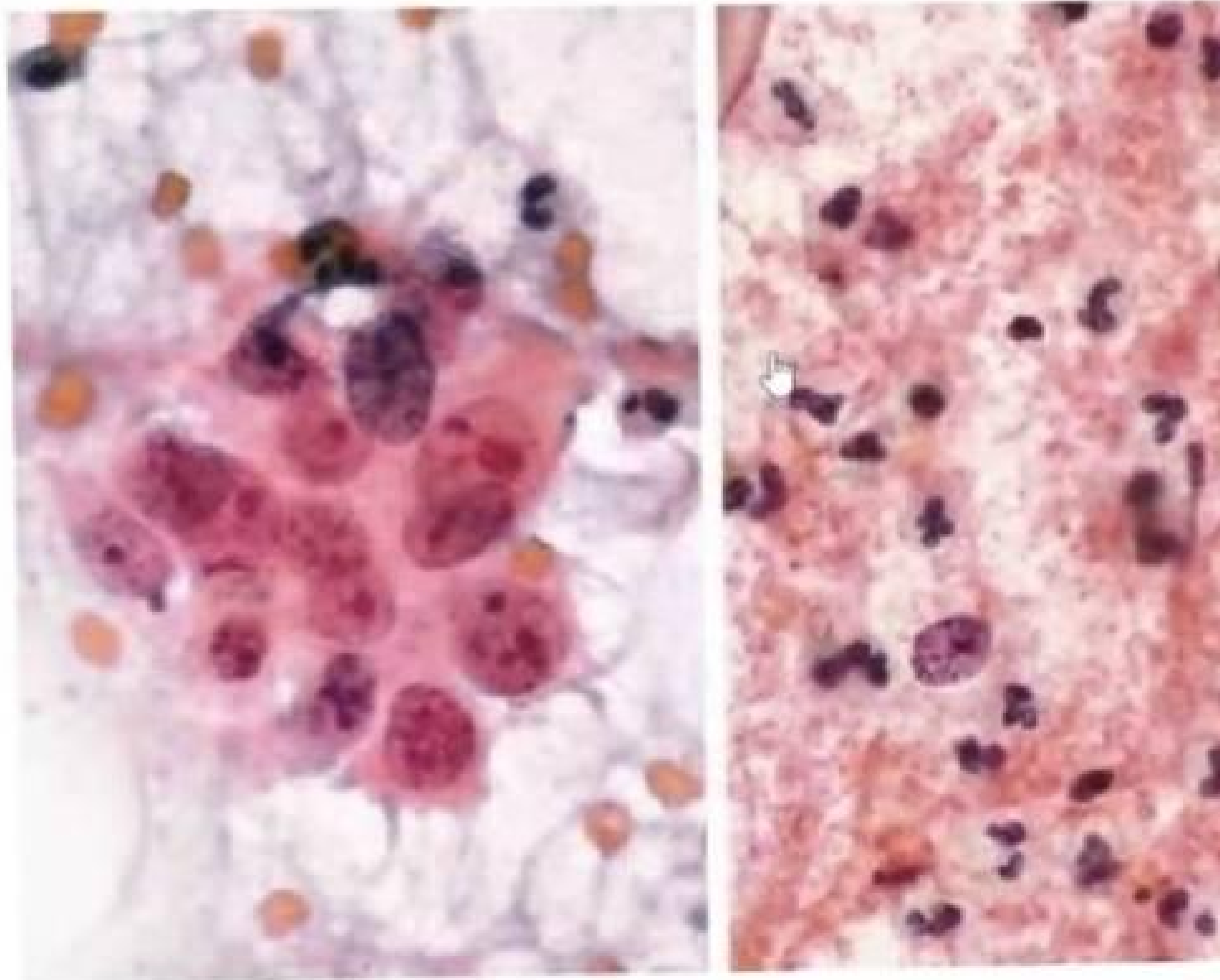
SQUAMOUS CELL CARCINOMA- KERATINIZING

- Relatively few cells, singly/ aggregates
- Marked pleomorphism of cellular & nuclear size & shape
- Numerous dense opaque nuclei
- Chromatin coarsely granular & irregular with parachromatin clearing
- Dense orangophilic cytoplasm, keratosis & pleomorphic parakeratosis
- Macronucleoli & tumour diathesis

PAP SMEAR OF SQUAMOUS CELL CARCINOMA



PAP SMEAR OF SQUAMOUS CELL CARCINOMA



SCC with tumor
diathesis

FINE NEEDLE ASPIRATION CYTOLOGY (FNAC)

- Study of cellular samples obtained through a fine needle under negative pressure
- Useful in lesions that are easily palpable, like subcutaneous soft tissue tumours, thyroid, lymph nodes, salivary glands and breast

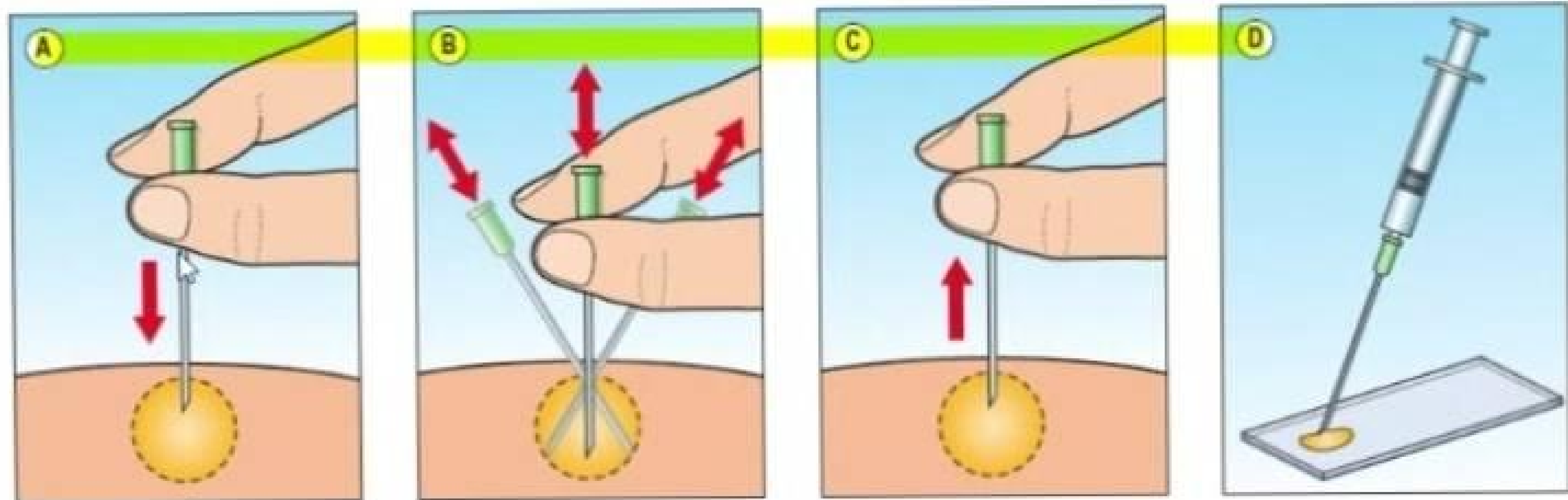
Materials required

- Needles: disposable 22-24 gauge 1-1½-inch needles
- Disposable plastic syringes of 5-10ml and syringe holder
- New glass slides
- Coplin jar with 95% ethanol as fixatives
- Test tubes
- pencil for marking
- Alcohol
- Cotton guage/ dry swabs
- Gloves
- Bed
- Reporting form



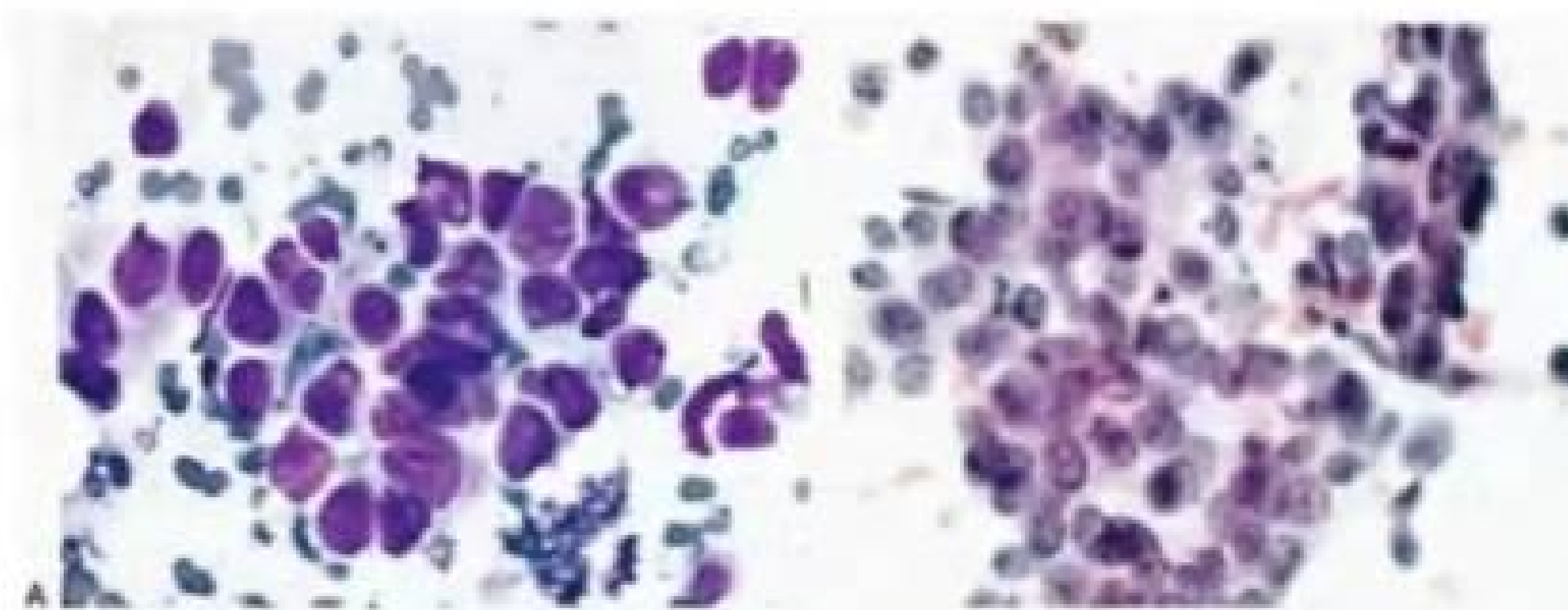
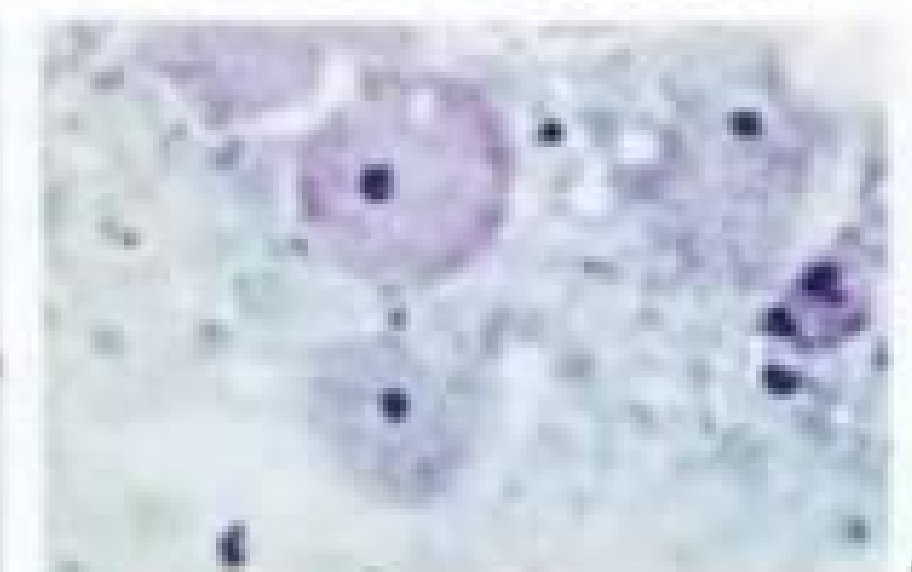
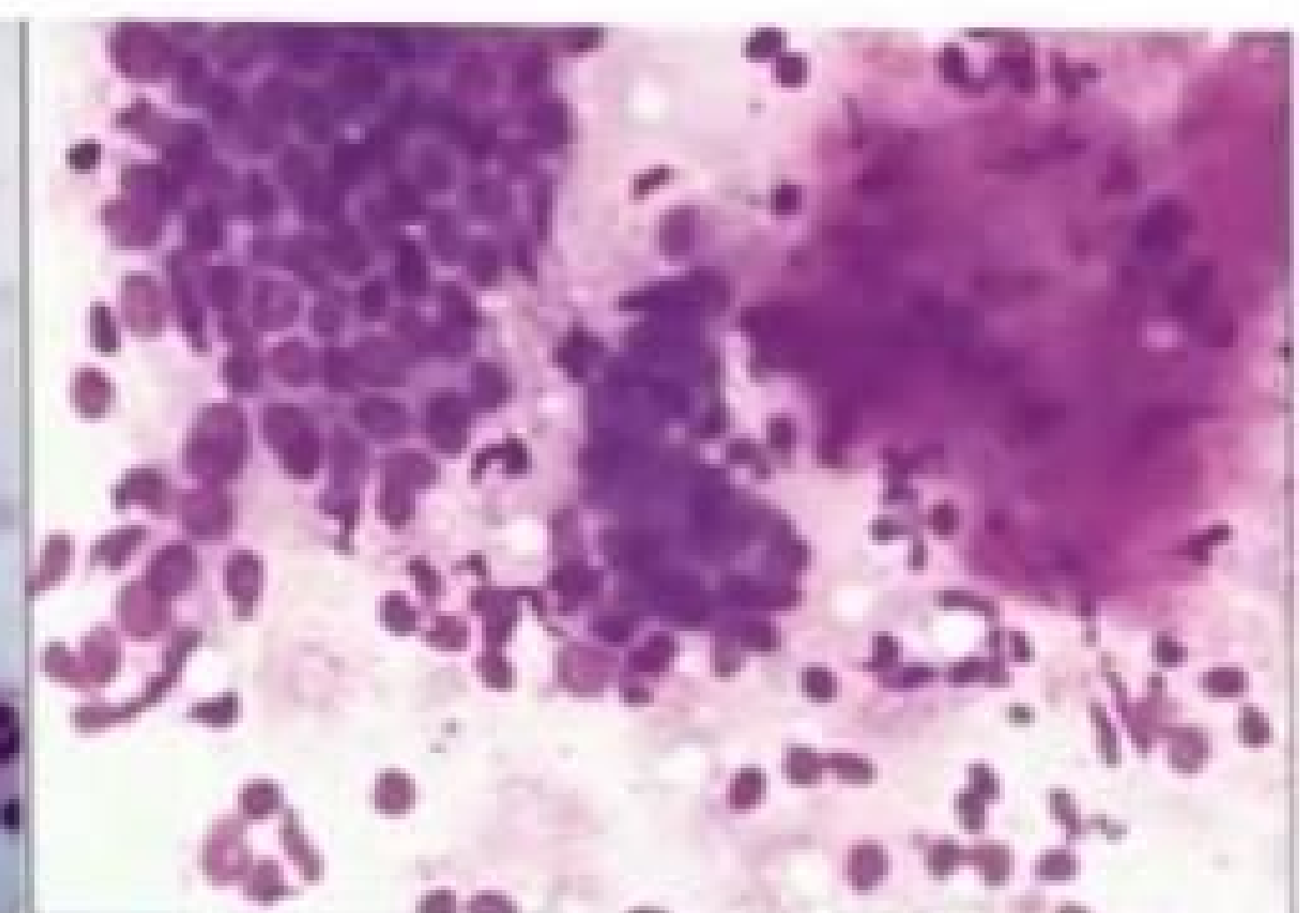
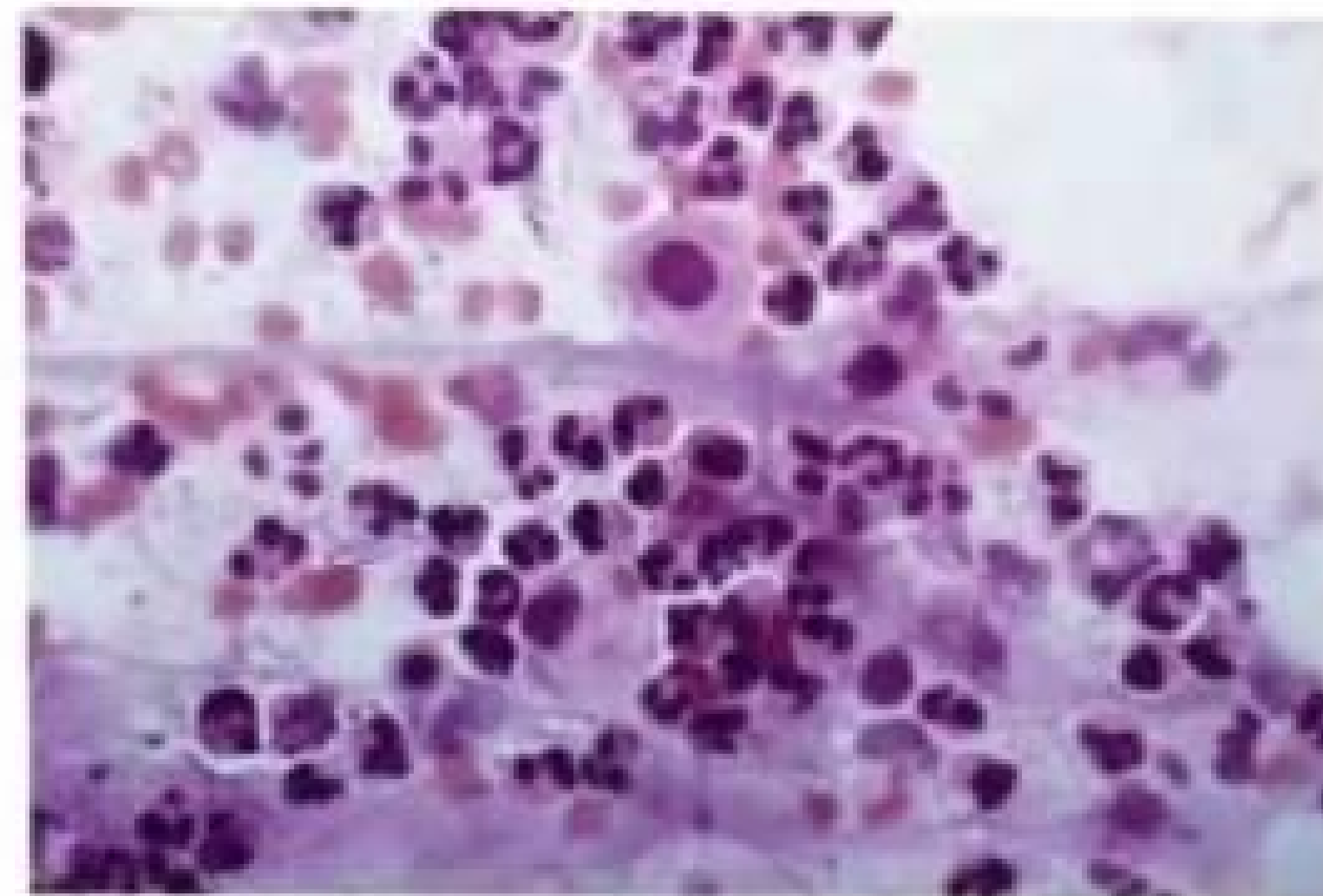
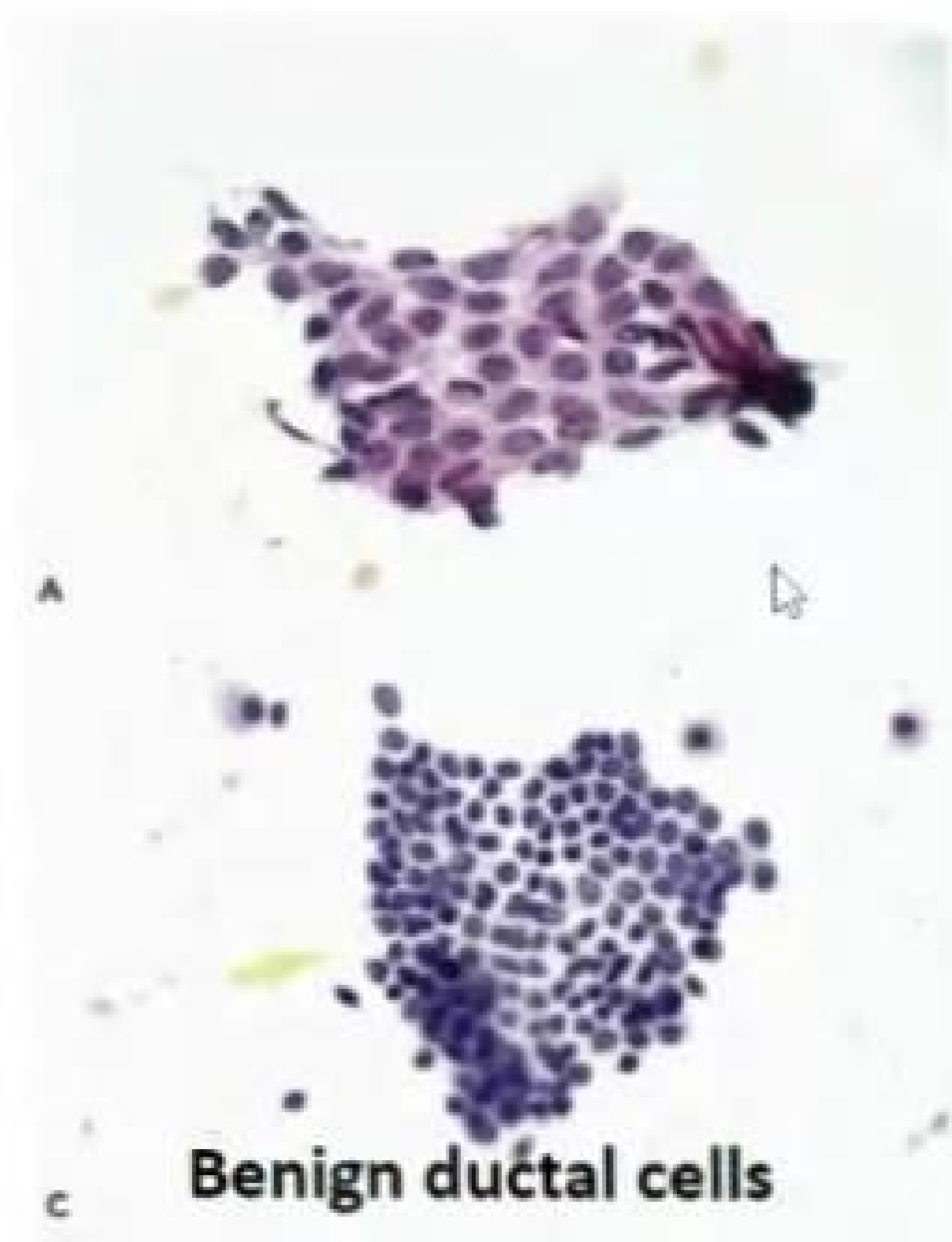
Procedure

- FNA with aspiration:
 - ▣ Relevant history and clinical details, radiological findings, provisional diagnosis etc. must be entered in the requisition form. Site of FNA must be clearly stated
 - The procedure must be clearly explained to the patient and consent and co-operation ensured
 - Ensure that all the required equipment are available
 - Follow all universal precautions
 - Position the patient
 - Palpation of the target- the lesion is carefully localised, Its location, size, mobility, tenderness, differential warmth, consistency, changes on the overlying skin
 - The overlying skin is wiped with antiseptic
 - Immobilization of the Target



Advantages of FNA

- Cost effective (no anaesthesia, other drugs, no hospital admission)
- Perform on out patient basis
- Has patient acceptance (less traumatic)
- Minimally invasive, produces a speedy result and is inexpensive.
- It can be repeated often as necessary
- It is highly accurate in experience hands
- Early diagnosis prepares the clinicians better for management, allays fear in patients with benign cases and prepares the patient for treatment
- Provides materials for other tests (microbiology)
- For follow up cases (recurrence, response)



Body Fluids

- Body fluids like urine, pleural, pericardial, peritoneal, synovial and cerebrospinal fluids.
- Urine : Physical , chemical examination and microscopic examination of urine deposit.
- Pleural, pericardial, peritoneal, synovial and cerebrospinal fluids: Physical examination, cell count, microscopic examination, biochemical evaluation and crystal analysis (SF).

PARAMETERS	TRANSUDATES	EXUDATES
CAUSE	Non inflammatory	Inflammatory
UNILATERAL/BILATERAL	Usually bilateral	Usually unilateral
MECHANISM	Raised hydrostatic pressure or reduced oncotic pressure in capillaries	INCREASED CAPILLARY PERMEABILITY OR LYMPHATIC OBSTRUCTION
APPEARANCE	Clear or straw coloured , no clots	Turbid, cloudy , often clots
SPECIFIC GRAVITY	<1.016	>1.016
PROTEINS	<3gm/dl	>3gm/dl
GLUCOSE	Equivalent to plasma	Low
CELLS	Few lymphocytes, mesothelial cells	Inflammatory cells
ORGANISMS	Nil	Present
LDH	<200	>200
	Eg: CCF, Cirrhosis liver	Infections, malignancy, trauma, collagen disorders

Thank you!

