

# **BODY CAVITY FLUIDS**

## **CELL COUNT AND CYTOMORPHOLOGY**

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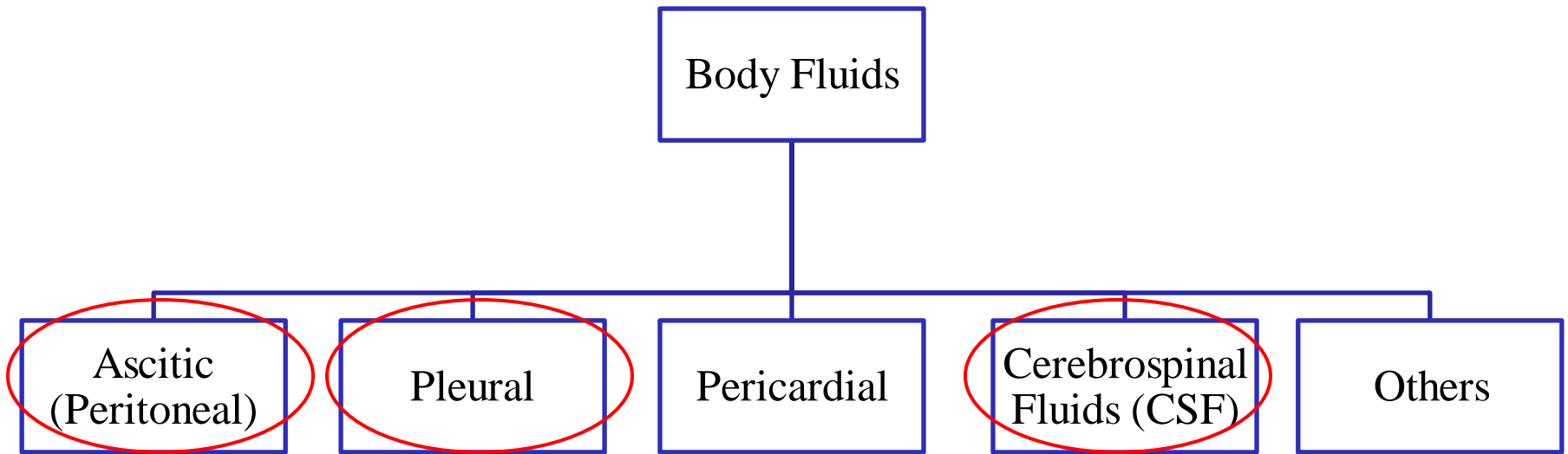
Fellow Hematopathology Laboratory

Tata Memorial Hospital

# Plan of my talk

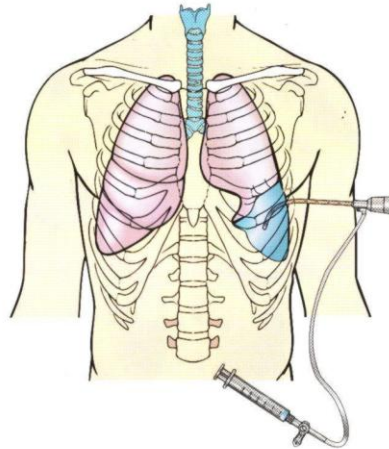
- Introduction
- Sample collection
- Examination – Gross and Microscopy

# Body Cavity Fluids

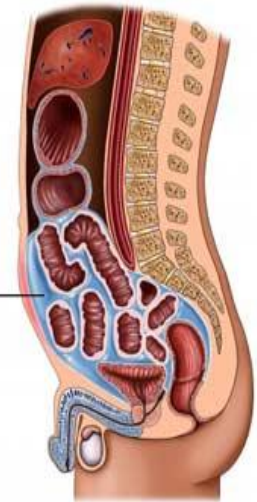


# PLEURAL / ASCITIC FLUID

Pleural cavity normally contains small amounts of fluid facilitating movement of parietal & visceral pleura, which are lined by mesothelium.



Abnormal accumulation of abdominal fluids (ascites)



Peritoneum is lined by mesothelium and contains small amounts of peritoneal fluid. Increased accumulation of fluid is called as Ascites.

# CEREBROSPINAL FLUID

- Secretion through choroid plexus
- Produced at the rate of 500 ml/day
- Collects wastes, circulates nutrients and lubricates CNS.
- **Normal CSF volumes:**
  - In Adults: 90 - 150 ml
  - In Neonates: 10 - 60 ml
- **Normal Leukocyte counts:**
  - In Adults: 0 - 5 cells/cumm
  - In Neonates: 0 - 30 cells/cumm

## INDICATIONS FOR LUMBAR PUNCTURE

- Infections
- Malignancy
- SAH
- Demyelinating diseases

# Sample Collection

## Serous fluids

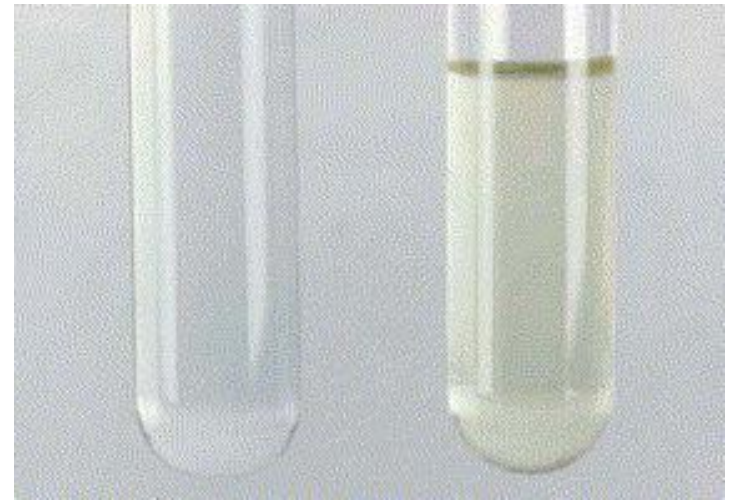
- EDTA for cell counts and morphology
- Heparin or blood culture tubes

## CSF

- Lumbar puncture
- 3-4 tubes in plain sterile tubes

# GROSS EXAMINATION

- Quantity
- Colour
- Appearance
- Clot



- Turbid fluids - **Supernatant** → **Clear - Cellular elements**  
→ **Hazy - Chylous (obst. of Thoracic duct)**

- Coagulum
- Xanthochromia

Haemorrhagic cerebrospinal fluid after centrifugation shows a yellow colour, which proves that blood was not introduced during puncture.

# MICROSCOPIC EXAMINATION

- Cell counts (Neubauer chamber)
- Cell type (Cytospin Smear)

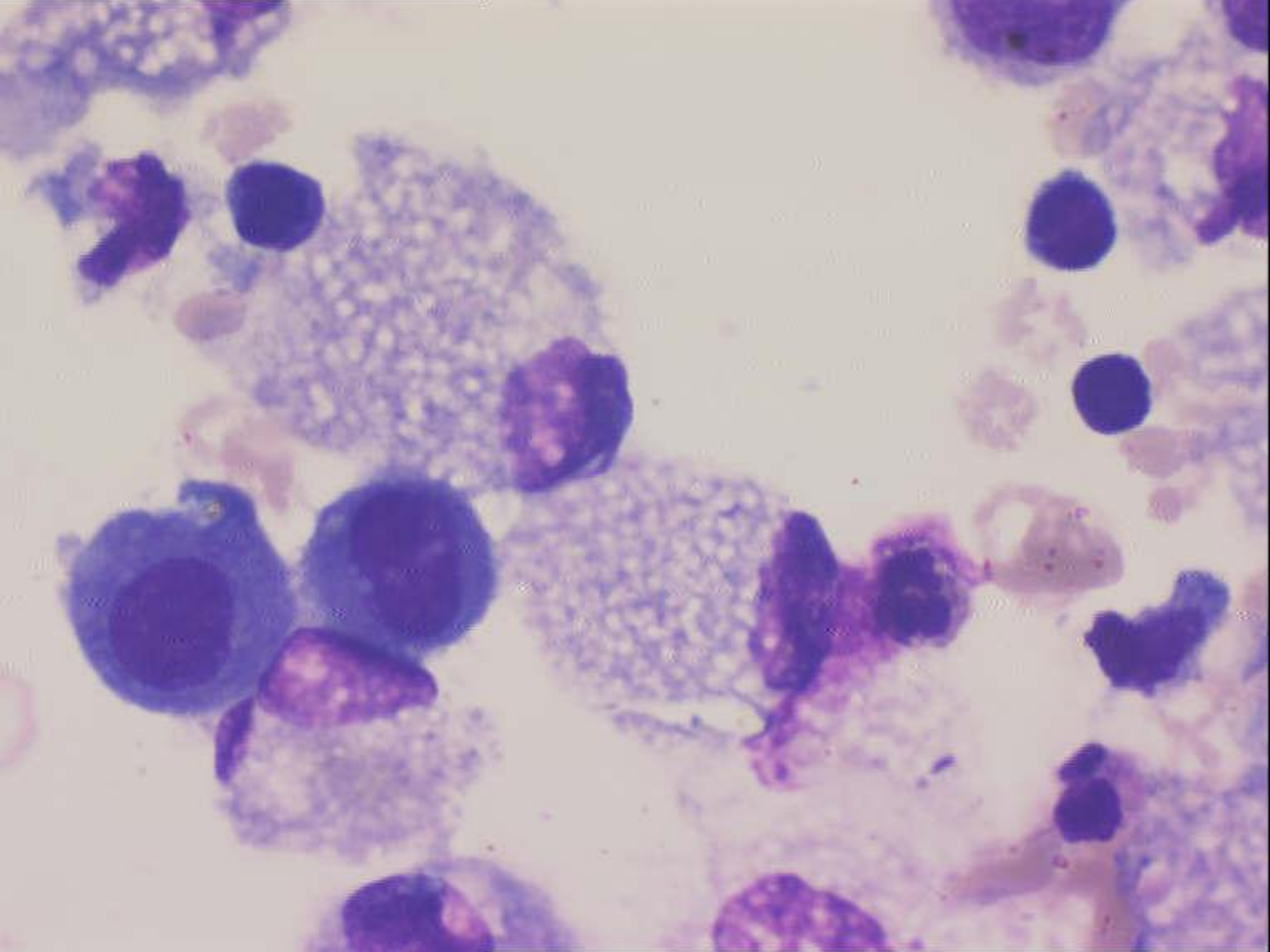
## Normal cells of Pleural/Ascitic Fluids

- **Mesothelial cells**
- **Macrophages**
- **Lymphocytes**
- **Monocytes**

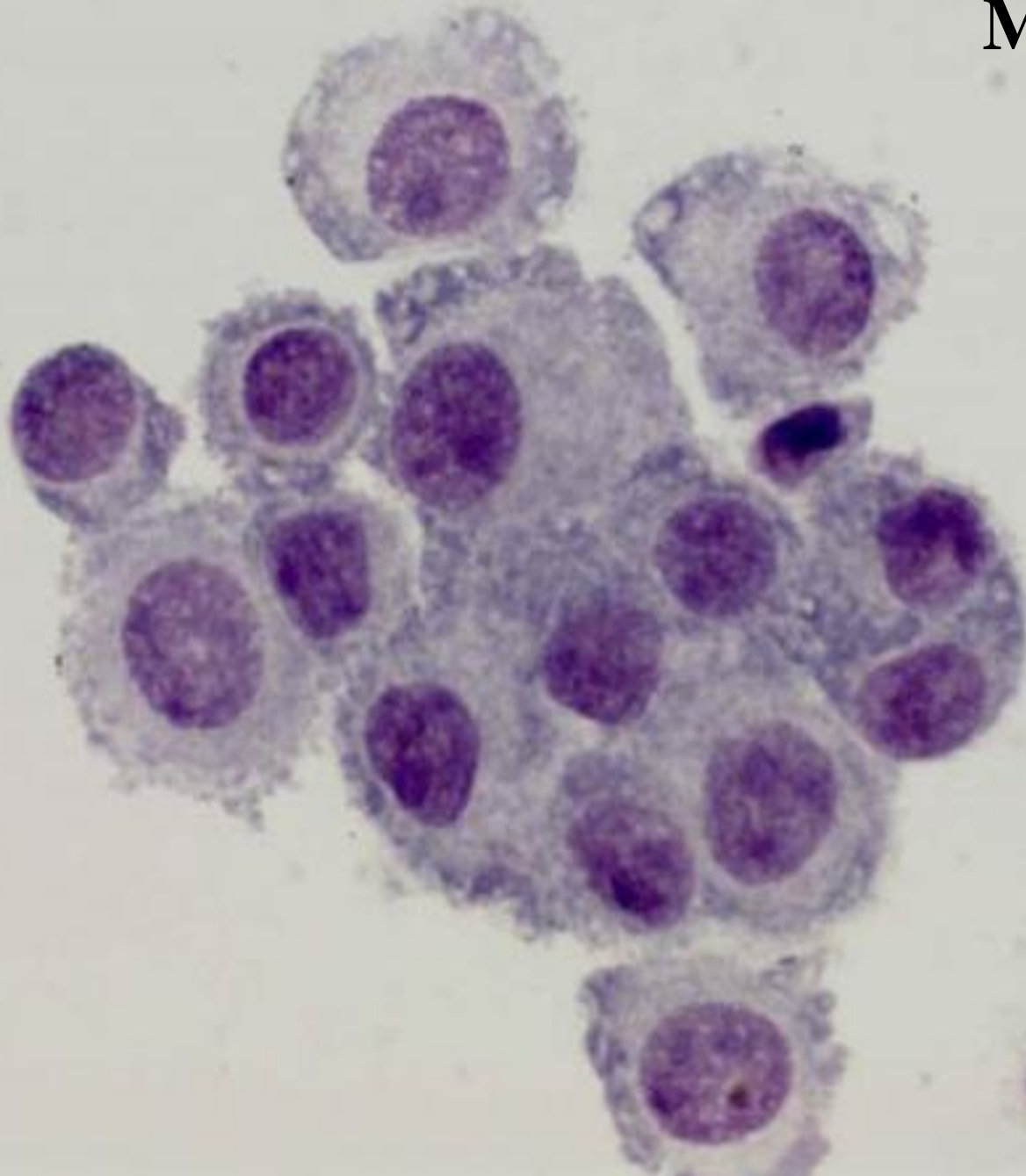


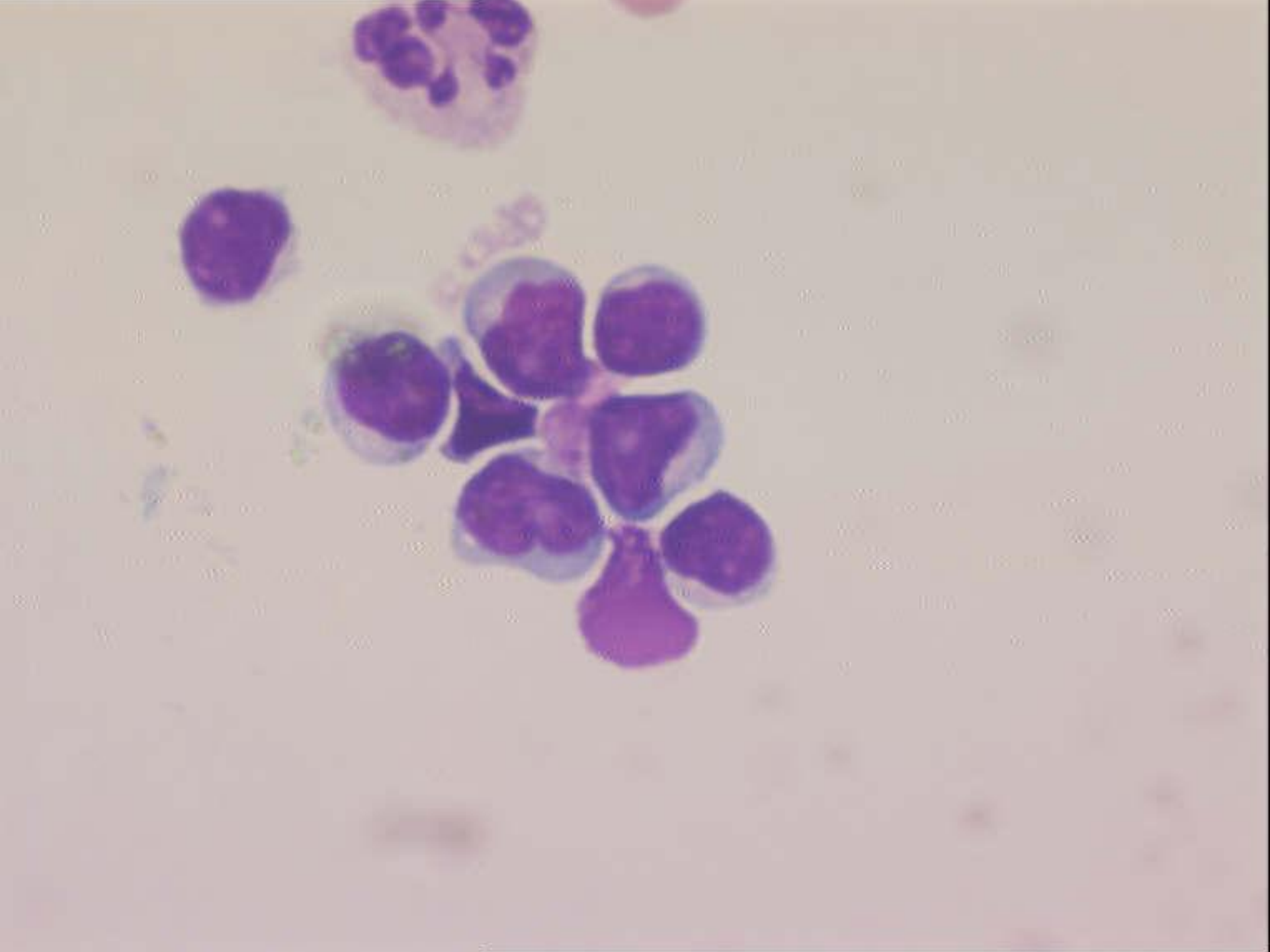
# MESOTHELIAL CELLS

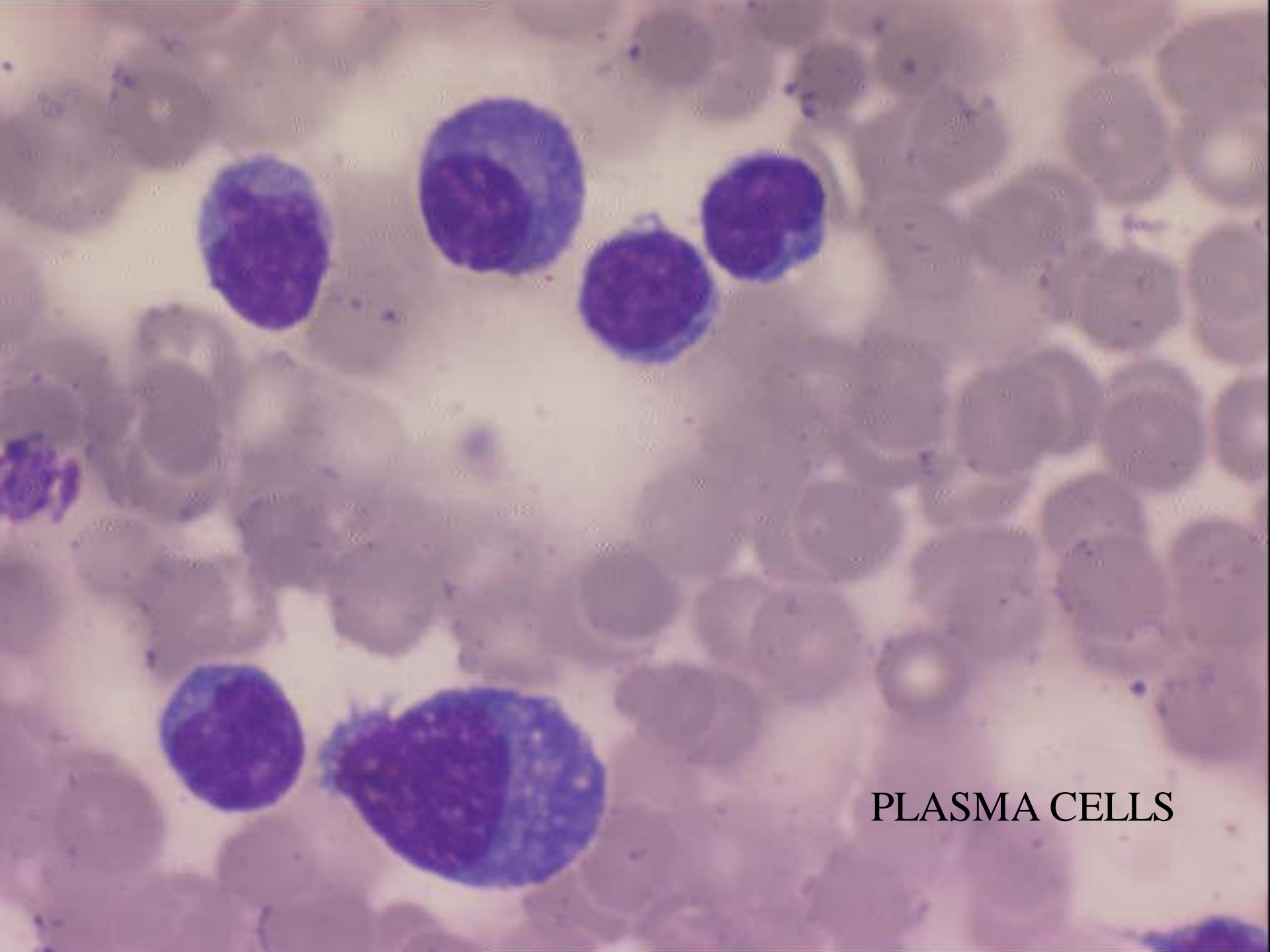
- Bland cells forming a monolayer covering serous surfaces of body cavities
- 20 - 40 microns in diameter
- Round to oval nuclei, inconspicuous nucleoli, cytoplasm exhibits varying degrees of peripheral vacuolization, 'Feathery appearance'
- Two cells joined by 'window'
- Irritated by inflammation, chemical agents & trauma
- Cells enlarged with nuclear atypia



# Mesothelial cells

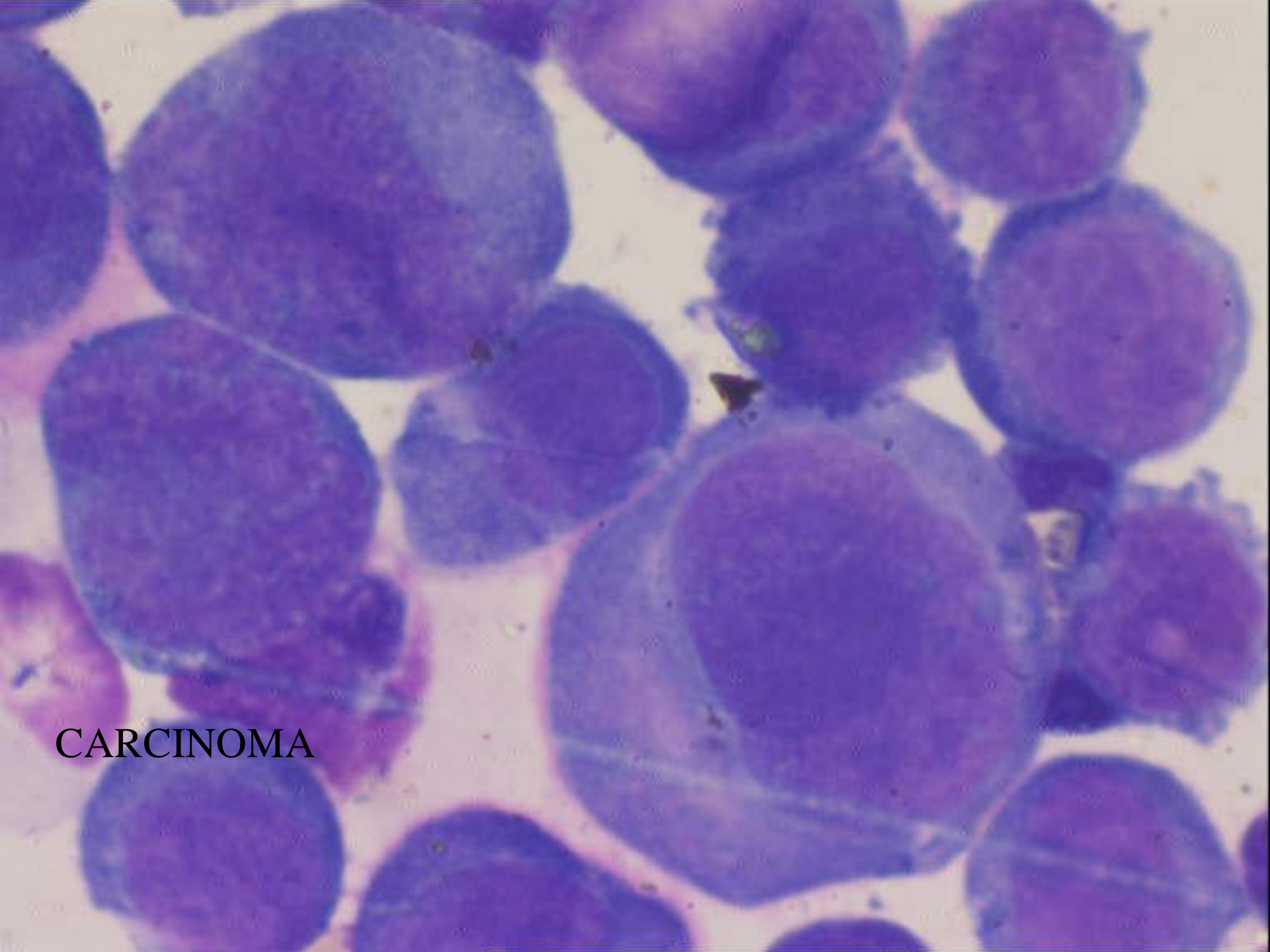






PLASMA CELLS





CARCINOMA

# CEREBROSPINAL FLUID (CSF)

Collection of specimen: 3 tubes

- Cell count, Cytomorphology, Cytochemistry
- Biochemistry
- Microbiology

Specimen should be processed within one hour of sample collection

Material required:

## WBC DILUTING FLUID (Turk's Fluid):

- Methylene Blue (30mg/ml)
- Glacial acetic acid
- Distilled water

Neubauer chamber:

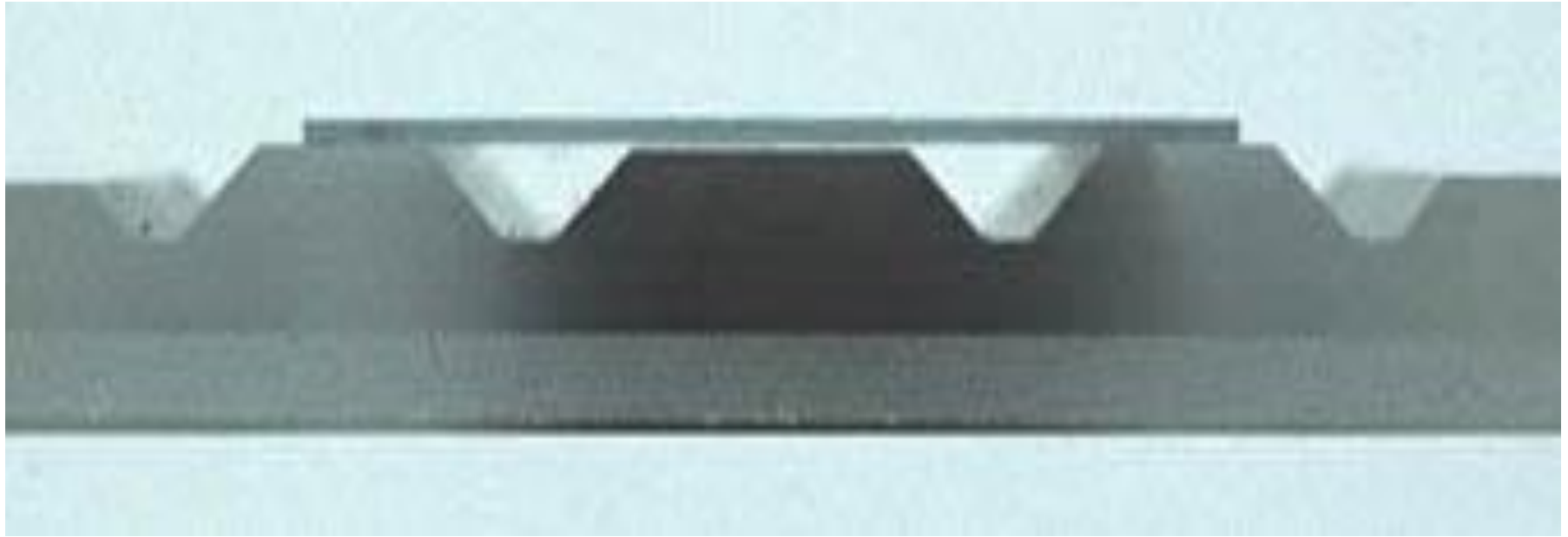


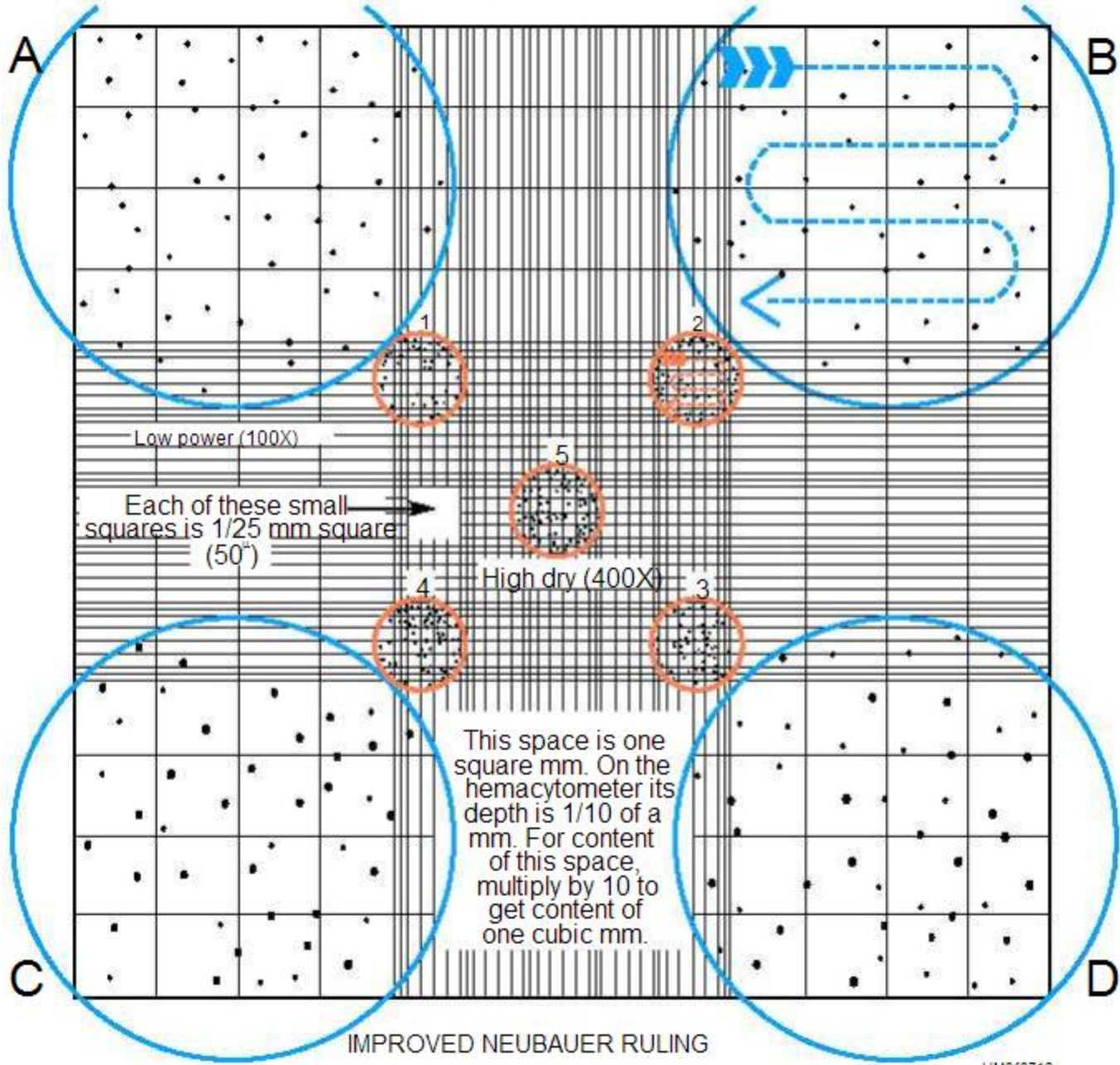
Tiefe  
0,100mm

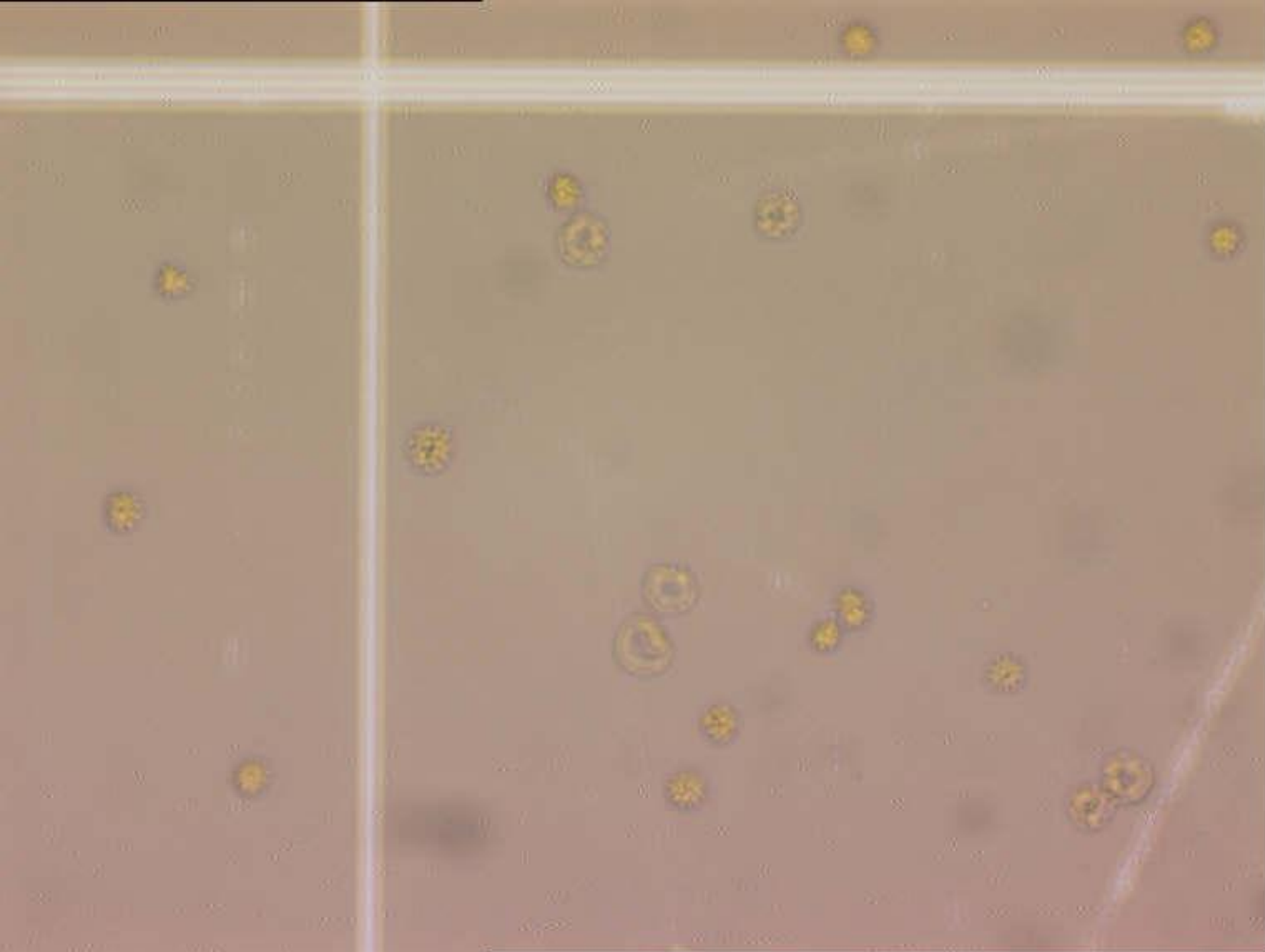
0,0025mm<sup>2</sup>

Neubauer  
Improved









# Calculation of Cell count

$$\text{Total cell count} = \frac{N \times \text{Dilution factor}}{\text{Area of total squares counted} \times \text{Depth}}$$

Correlation of cell count with cytomorphological findings is essential.

QUALITY CONTROL IN OUR LAB

# MICROSCOPIC EXAMINATION

## **PREPARATION BY CYTOCENTRIFUGE**

# PARTS OF CYTOSPIN

- Auto-locking, plastic outer lid
- Autoclavable Sealed Head
- Disposable sample chambers with caps
- Safety alarms that protect users and specimens
- Wipe-clean control panel



A



B



C





# PRINCIPLES OF CYTOSPIN

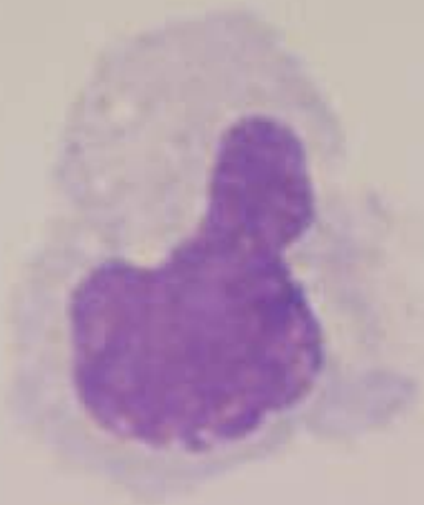
Cytocentrifuge is a microprocessor controlled cell preparation system that uses centrifugal forces to deposit cells onto the slide

- Using centrifugal principles, the Cytospin deposits cells onto a clearly-defined area of a glass slide and allows for the absorption of the residual fluid into the sample chamber's filter card.
- Cyto centrifugation also constructively flattens cells for excellent nuclear presentation.
- During operation, the instrument's spinning action tilts Cytofunnels upright and centrifuges cells onto the deposition area of the slide, giving all cell types equal opportunity for presentation.

- Load up to 200  $\mu$ l of this suspension in each cuvette.
- Spin at 800 rpm for 3 min ( 500 rpm/ 4 min)
- Extract the slide, paper and cuvette without disarranging.
- Carefully detach the cuvette and the paper without damaging the fresh cytopsin. Hold firmly together glass slide and cuvette when extracting from metal holder.
- Mark the area around the cytocentrifuged cells with dry point or permanent marker.
- Proceed with either immediate fixation or drying. Store unfixed cytopsin for max 2 days at room temperature.

# Normal cells of CSF

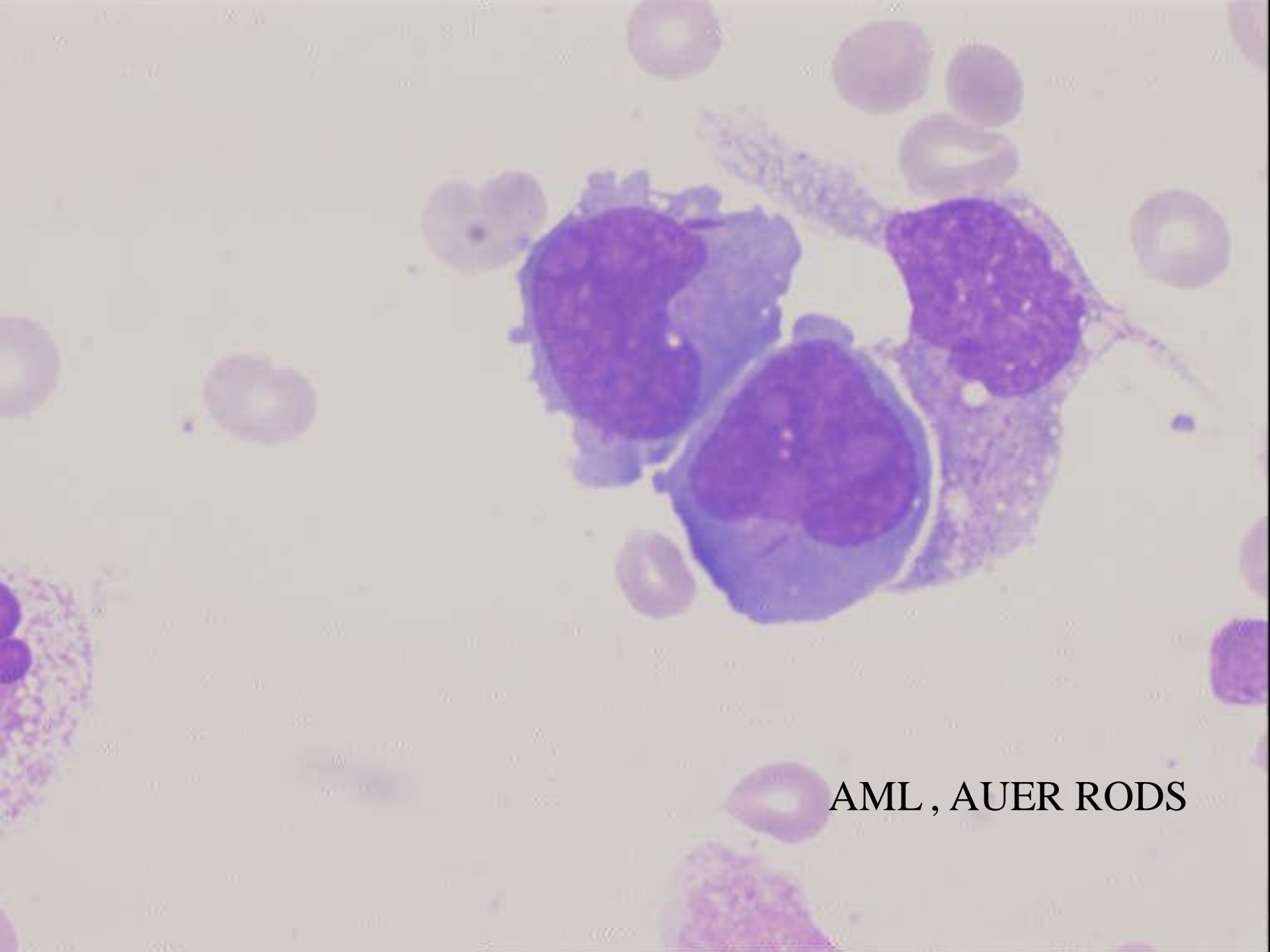
- **Lymphocytes** and **monocytes** are normally present in small numbers in a ratio of 70:30. Monocytes are more in number in neonates and children
- **Choroid plexus** and **ependymal cells** are rarely seen in hydrocephalus and after intra-thecal chemotherapy
- **Cartilage, ganglion cells** and artificial admixture of hematopoietic cells.
- **Contaminants** : fungus and bacteria.



**Monocyte**



**Lymphocyte**



AML , AUER RODS





**Thank You**