

Body Fluid Examination

Dr Asma Bibi

Body Cavity Fluids

- Ascitic
- Pleural
- Pericardial
- CSF
- Synovial
- Others

Cerebrospinal fluid

- Secretion through choroid plexus ; at the rate of 500 ml/day
- Collects wastes, circulates nutrients & lubricates CNS
- Normal CSF volume:

Adults: 90-150 ml; Neonates: 10-60 ml

Indications for Lumbar Puncture

- Infections
- Malignancy
- SAH
- Demyelinating diseases
- Normal Leukocyte count:

Adults: 0 -5 cells/cu.mm

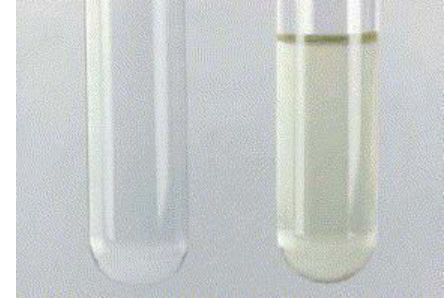
Neonates: 0 -30 cells/cu.mm

Gross examination

- Quantity
- Colour
- Appearance
- Clot
- Turbid fluids - Supernatant

Clear - Cellular elements

Hazy - Chylous (obst. of Thoracic duct)



Gross examination

- Coagulum
- Xanthochromia
- Haemorrhagic cerebrospinal fluid after centrifugation shows a yellow colour which suggests that blood was not introduced during puncture

Microscopic examination

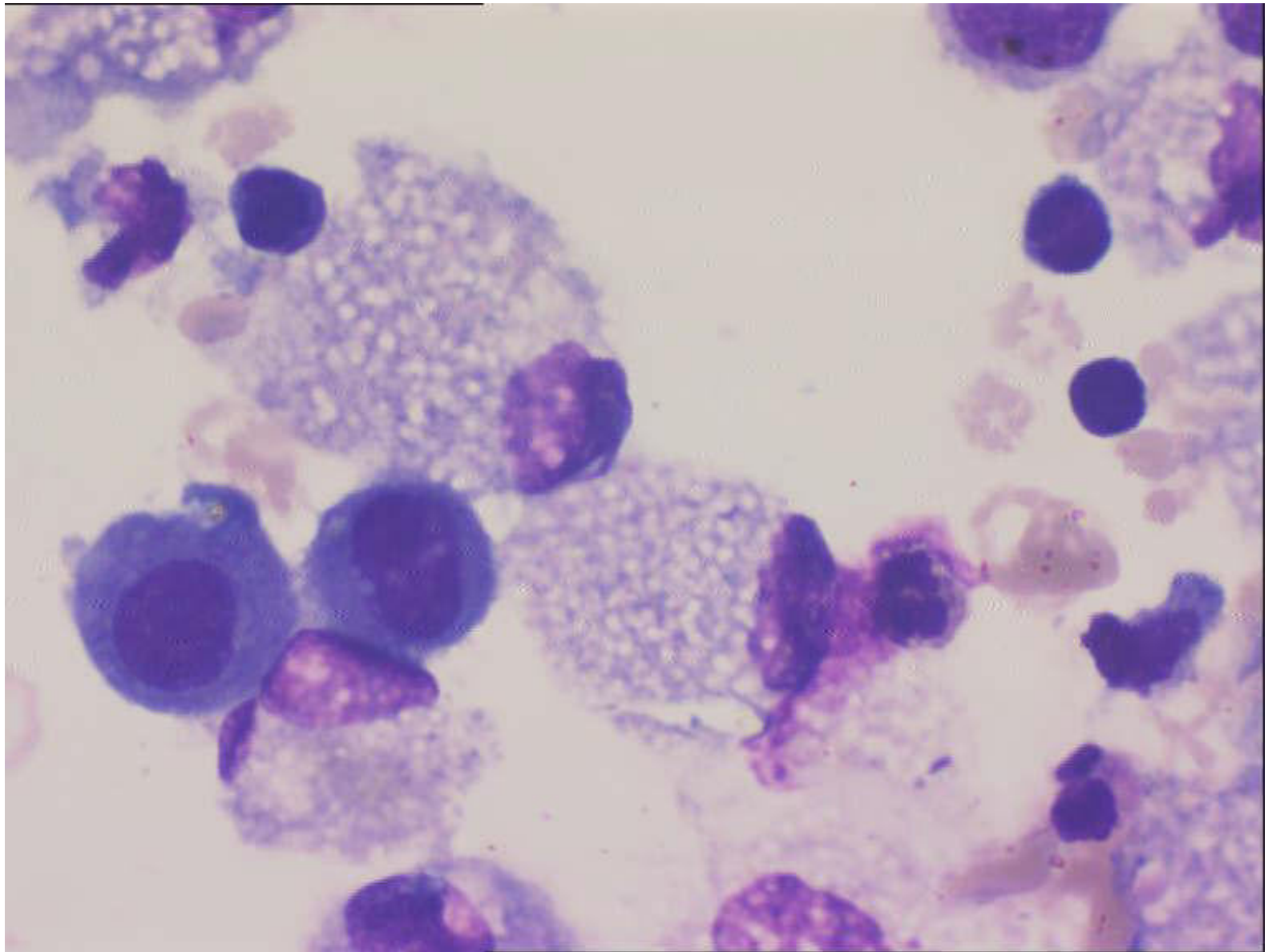
- Cell counts (Neubauer chamber)
- Cell type (Cytospin Smear)

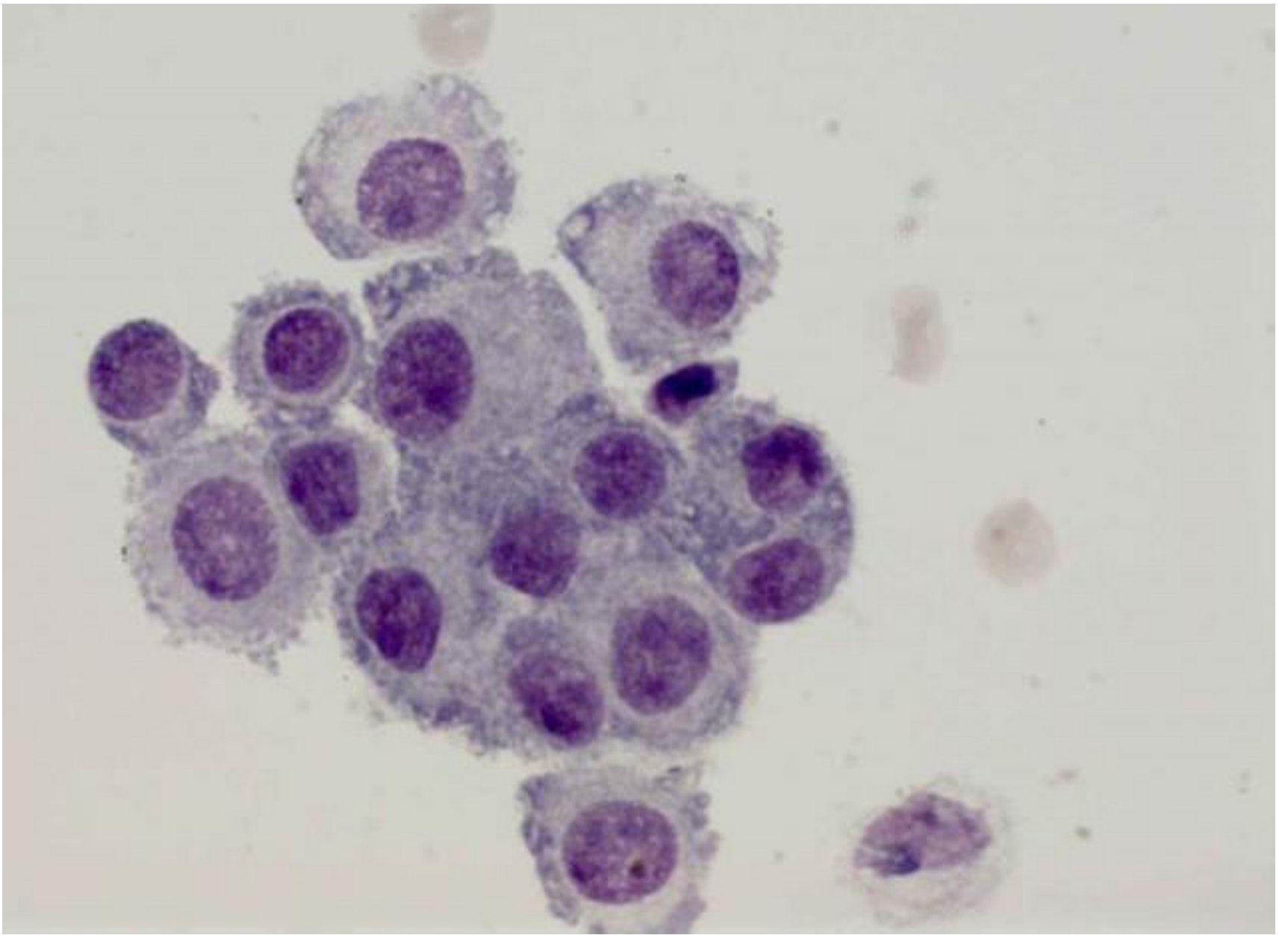
Normal cells of body cavity fluid

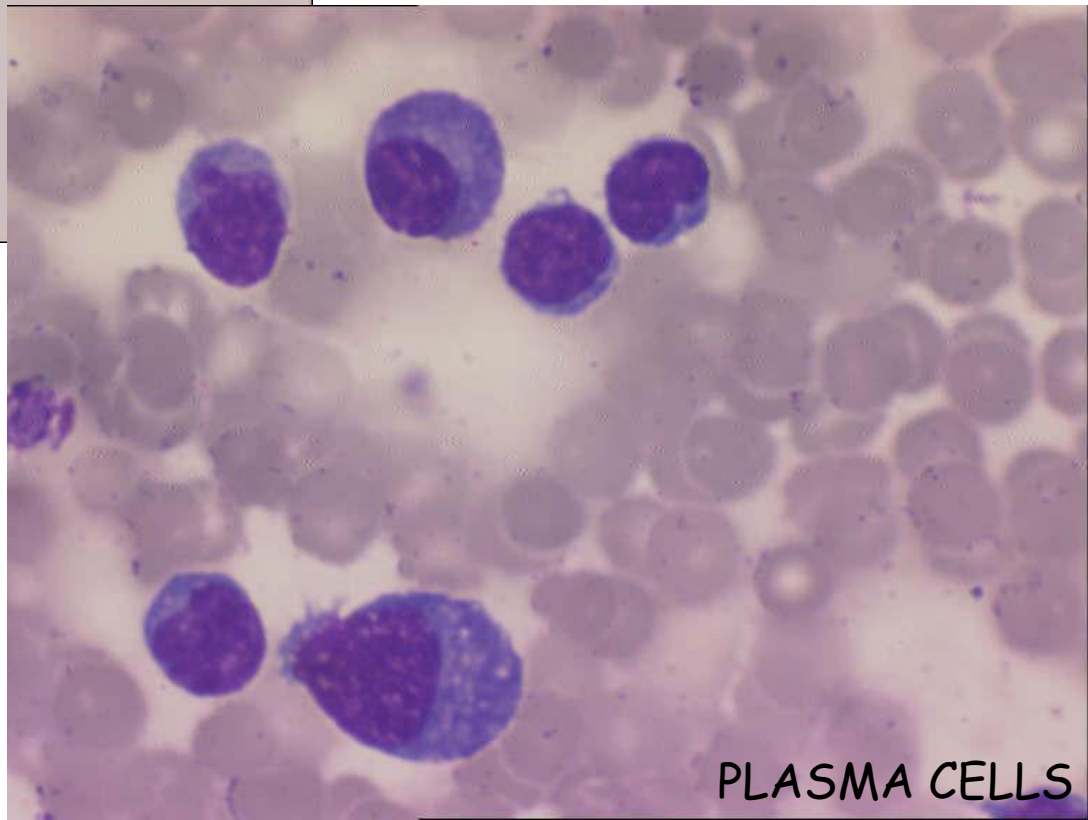
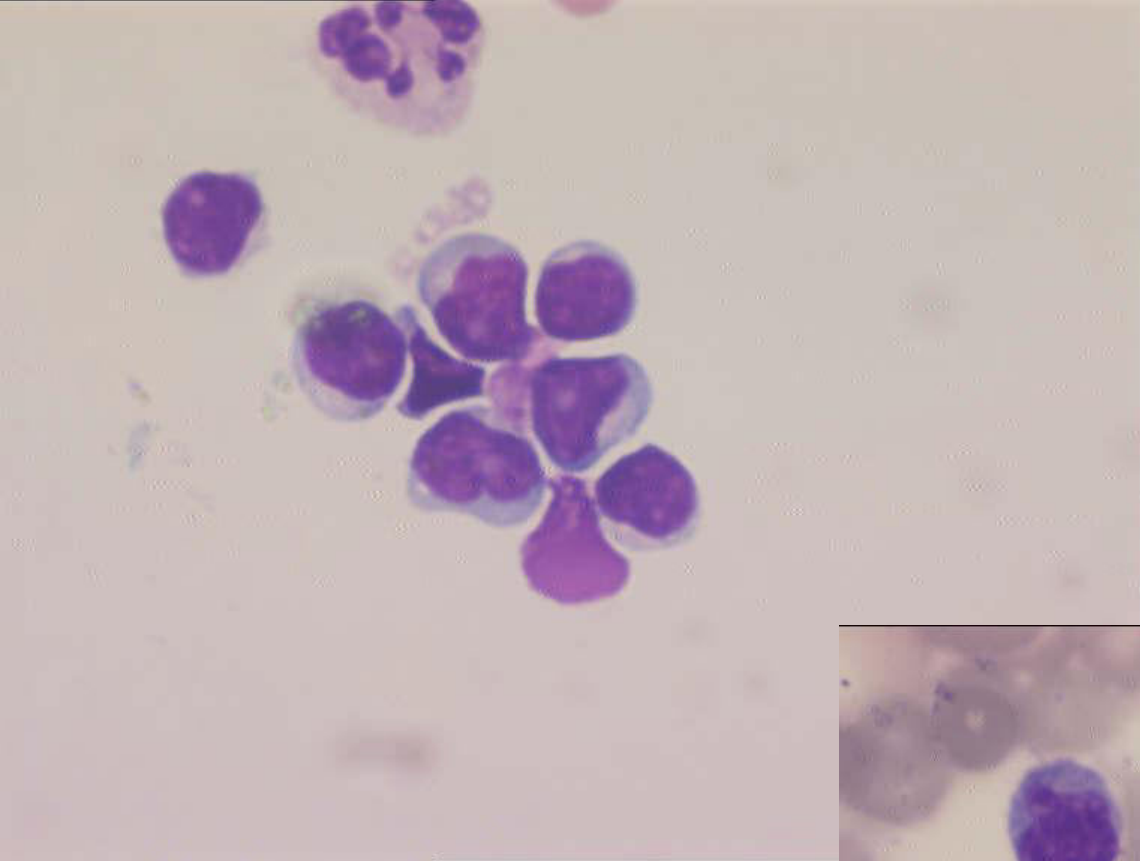
- Mesothelial cells
- Macrophages
- Lymphocytes
- Monocytes

Mesothelial cells

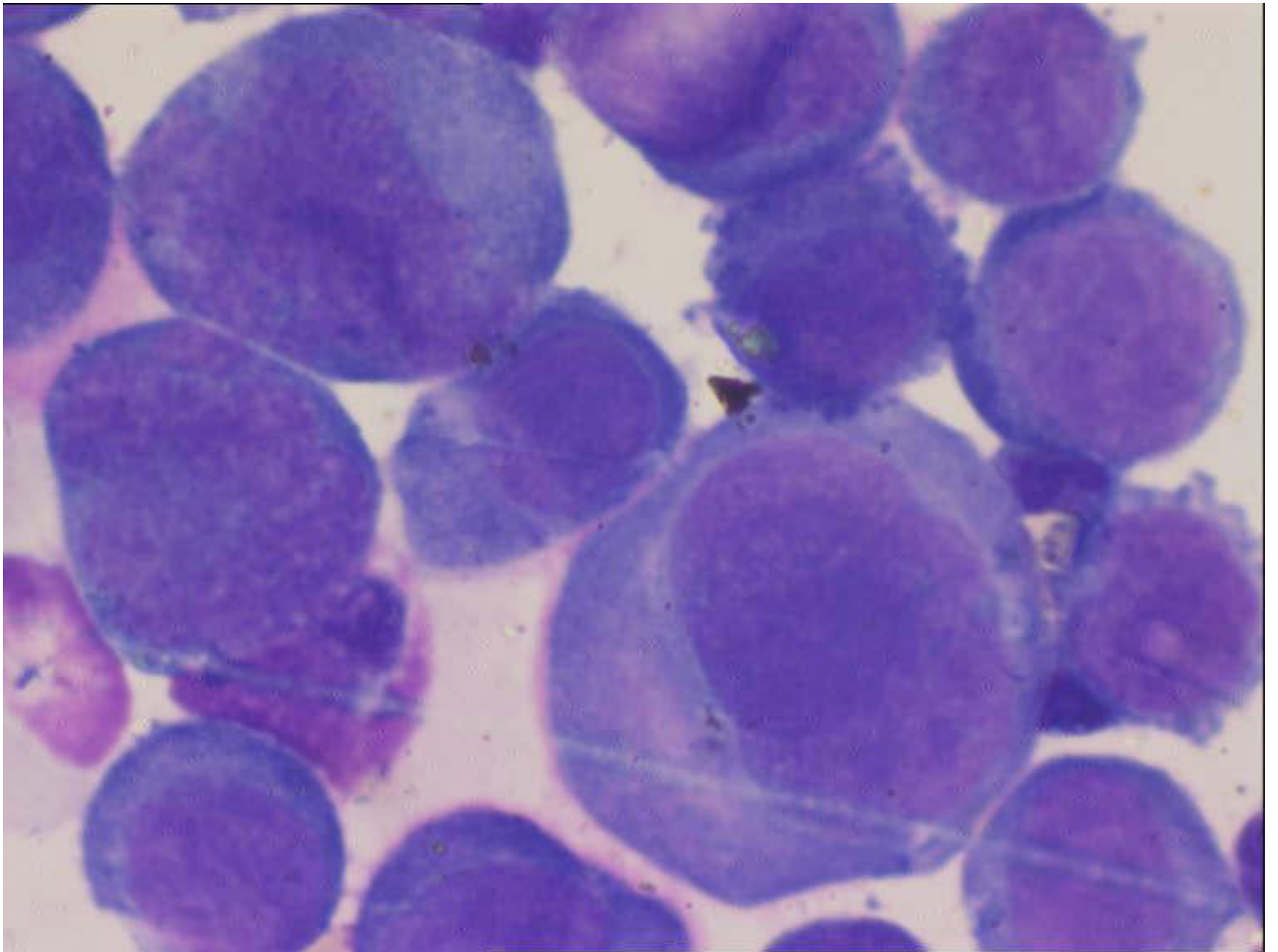
- Bland cells forming a monolayer covering serous surfaces of body cavities
- 20 - 40 μ
- Round to oval nuclei, inconspicuous nucleoli, cytoplasm exhibits varying degrees of peripheral vacuolization, 'Feathery appearance'
- Two cells joined by 'window'
- Inflammation, chemical agents & trauma
- Cells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







PLASMA CELLS



Cerebrospinal fluid

- Collection of specimen: 3 tubes
- Cell count, Cytomorphology, Cytochemistry
- Biochemistry
- Microbiology

Specimen should be processed within one hour
of sample collection

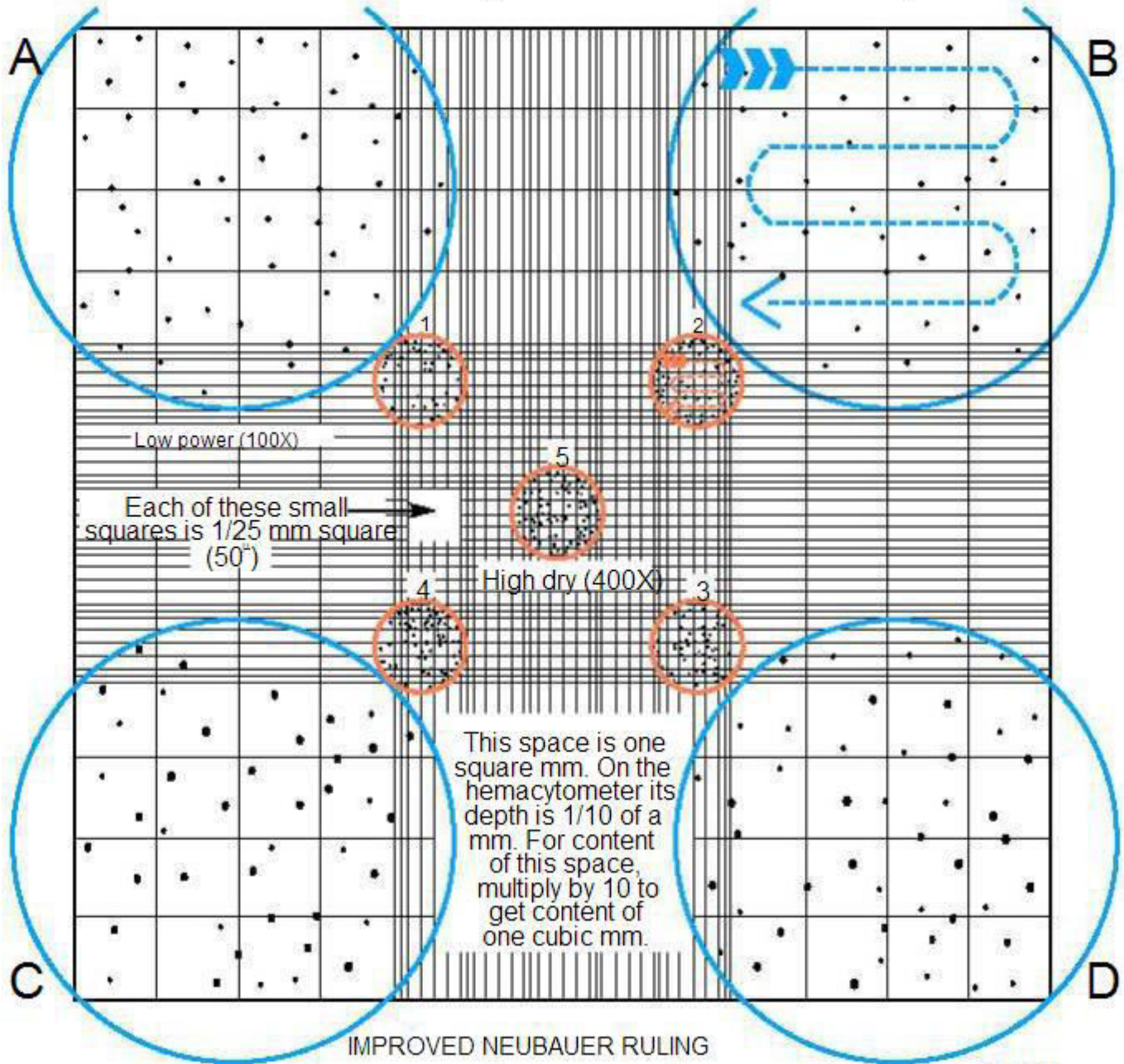
Material required

WBC diluting fluid (Turk Fluid)

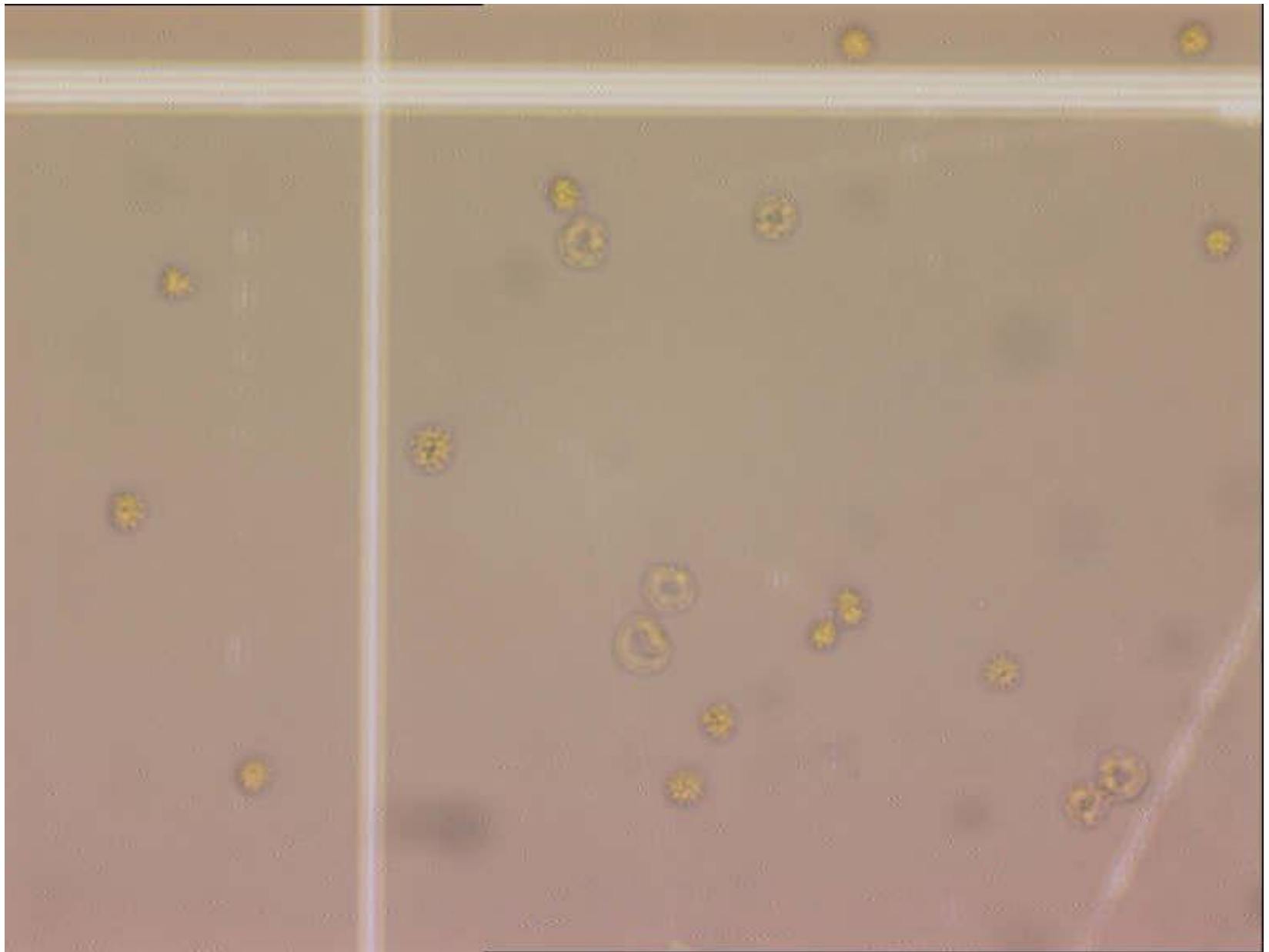
- Methylene Blue (30mg/ml)
- Glacial acetic acid
- Distilled water

Neubauer chamber:





IMPROVED NEUBAUER RULING



Total cell count

- n X Dilution factor

Area of total squares counted X Depth

- Correlation of cell count with cytomorphological findings is essential

Preparation of cytospin smears

- Parts of cytospin
 - i. Auto-locking, plastic outer lid
 - ii. Autoclavable Sealed Head
 - iii. Disposable sample chambers with caps
 - iv. Safety alarms that protect users and specimens
 - v. Wipe-clean control panel

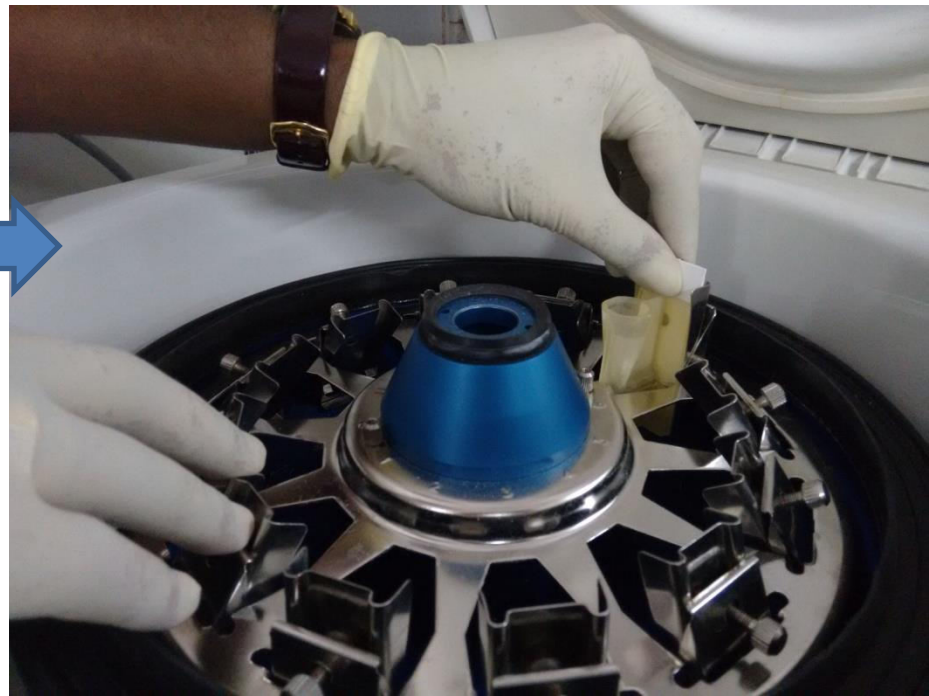
Principles of cytopspin

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

Principles of cytopspin contd...

- Cytopspin 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
- Cytocentrifugation constructively flattens cells for excellent nuclear presentation
- 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



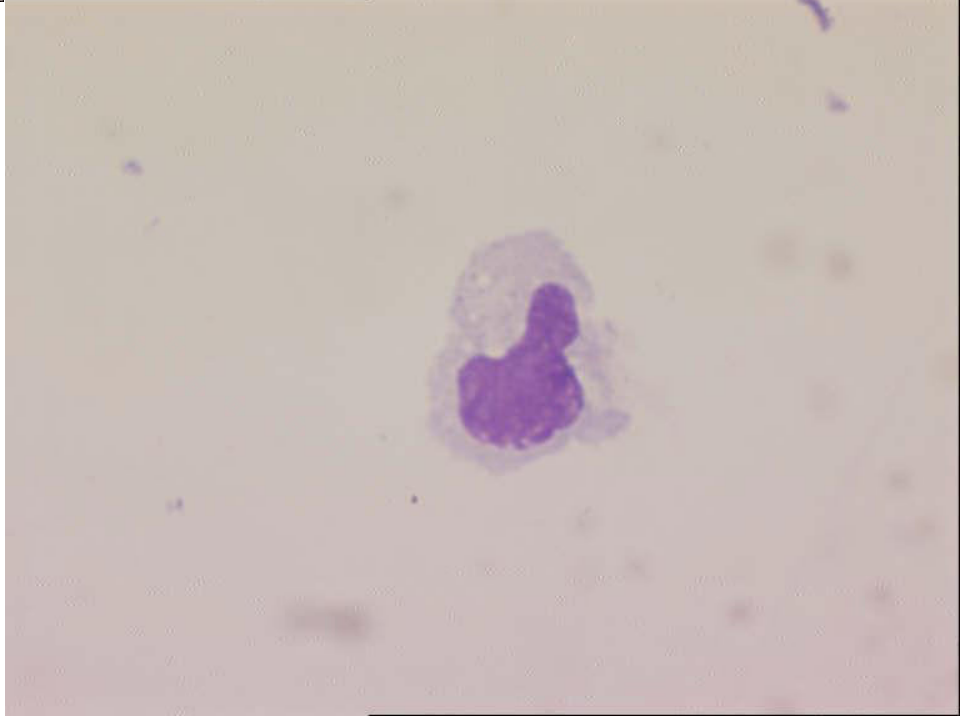
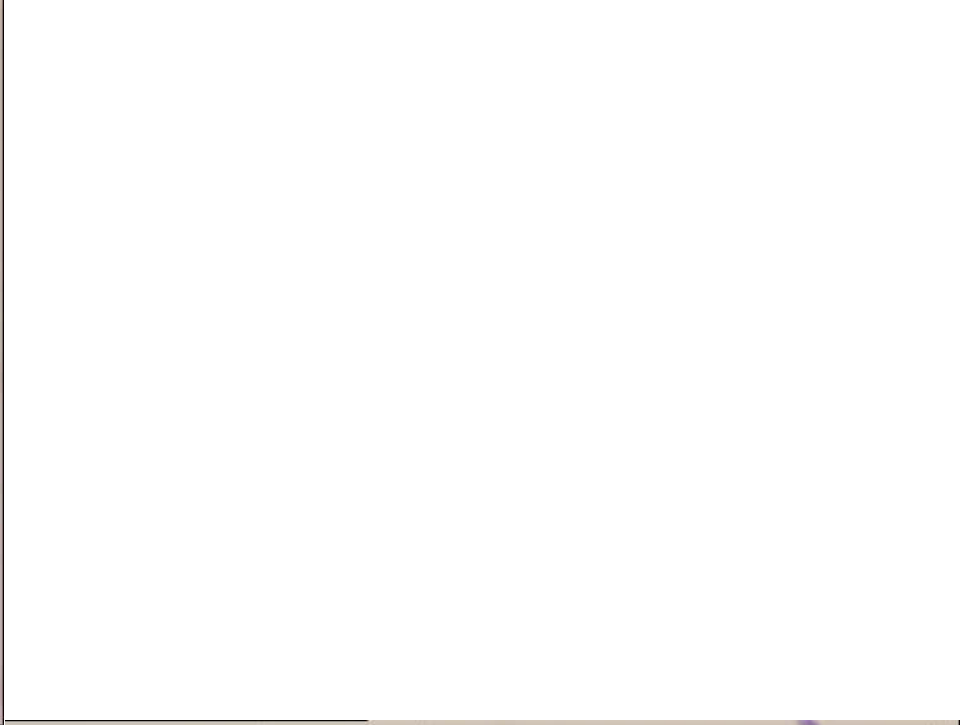


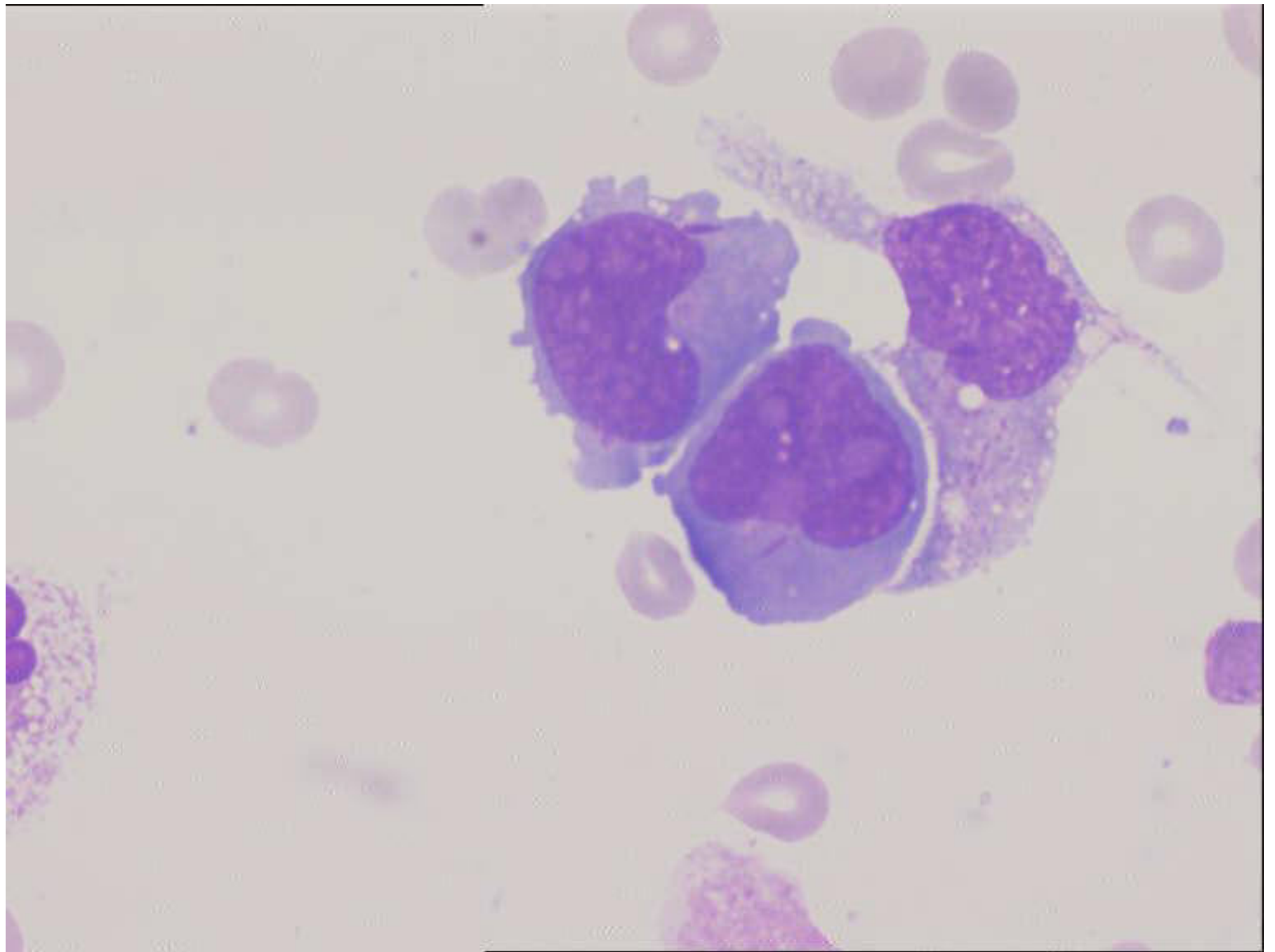
Procedure

- Load up to 200 μ 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 cytospin. 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 cytospins 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.





CNS status

Lymphoblasts in CSF WBC count (cells/cu mm)

CNS1: 0

CNS2: Present <5

CNS3: Present >5 (or cranial nerve
palsy)

* Employ Steinherz Bleyer Alorithm to distinguish
between CNS2 and 3 in a traumatic tap

THANK YOU