Cytology Preparation Technique

Cell Block

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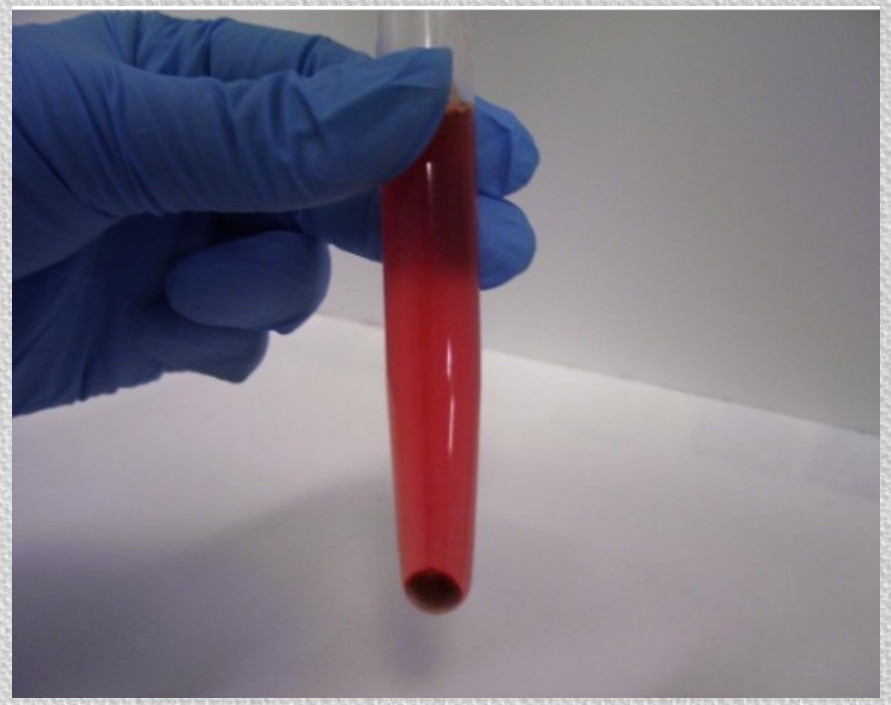
Learning Objectives

1. **Define Cell Block (CB) Techniques**
2. **List CBs Specimens**
3. **Explain different CBs Methods**
4. **List CB Fixation methods**
5. **Discuss Advantages & disadvantages of CB**

5.Cell blocks (CBs) Definition



It is a procedure to **convert** cell **sediment** into **paraffin** block

further pathological procedures can be performed like Immunohistochemistry (IHC).

Application

This protocol can be used on any non-gynecologic specimen, most commonly:

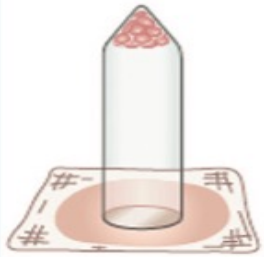
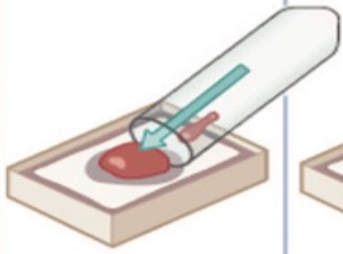
1. Serous effusions
2. Pelvic/abdominal washes
3. Fine needle aspirations
4. Liquid based specimens

Procedure for cell block should be applied if there is visible sediment after being centrifuged

Methods Of Cell Block Preparation

1. Plasma thrombin method
2. Agar embedding method
3. Collodion bag method
4. HistoGel method
5. Automated CB preparation system
6. NextGen Celbloking

1.Plasma Thrombin Method

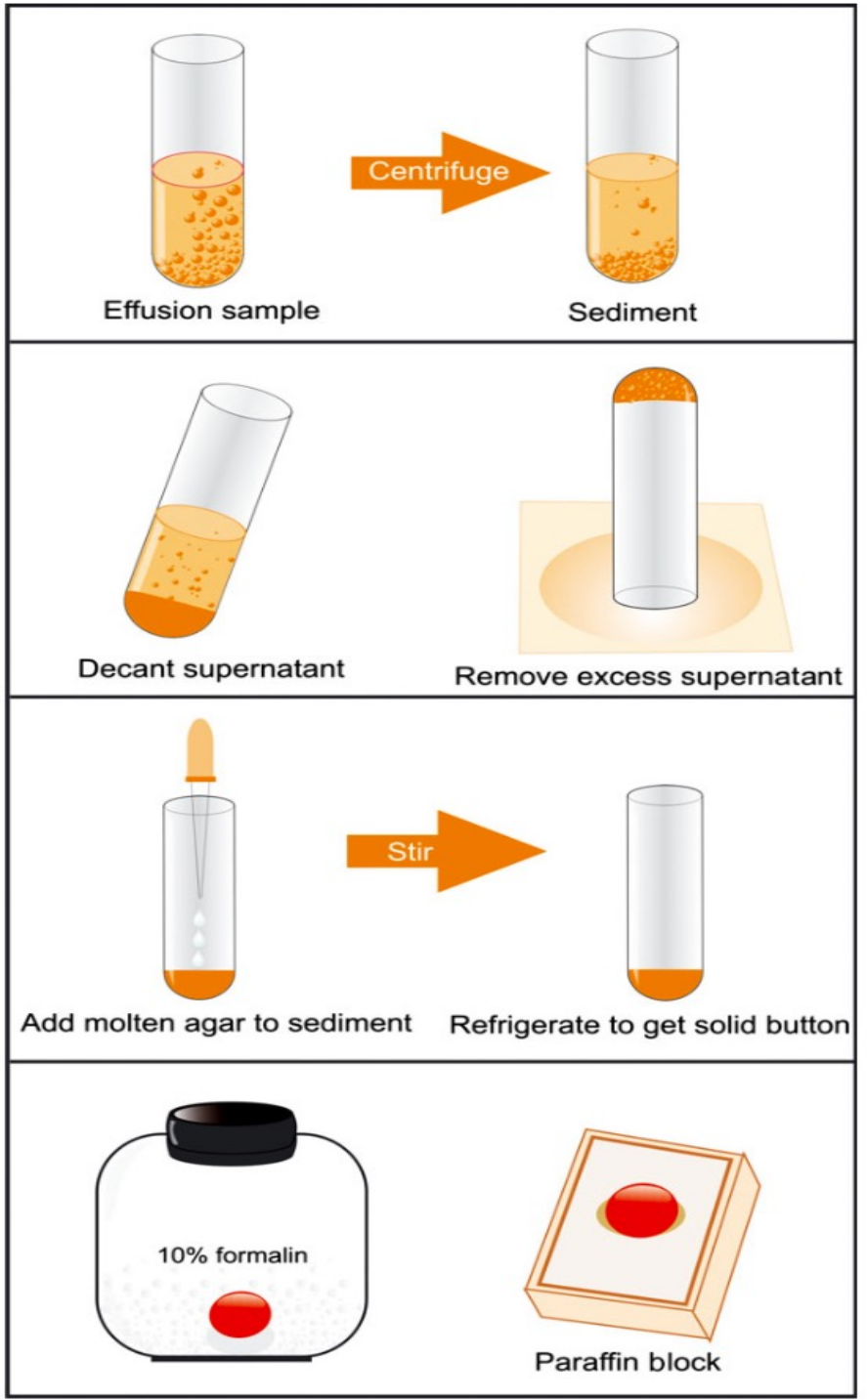
1  Effusion fluid sample	2  Centrifuge	3  Sediment forms	4  Decant supernatant	5  Dry excess supernatant over filter paper	6  Plasma	7  Add 3 drops of plasma to sediment
8  Gently stir with wooden applicator stick to permit the plasma to permeate the sediment	9  Thrombin with syringe	10  Add 3 drops of thrombin	11  Gently stir the sediment with wooden applicator stick to allow thrombin to form clot	12  Clot forms	13  Transfer clot to receptacle	14  Clot ready to be processed

2.The Agar Method

Principle: The concentrated sedimented is supported by a cell adjuvant (agar).

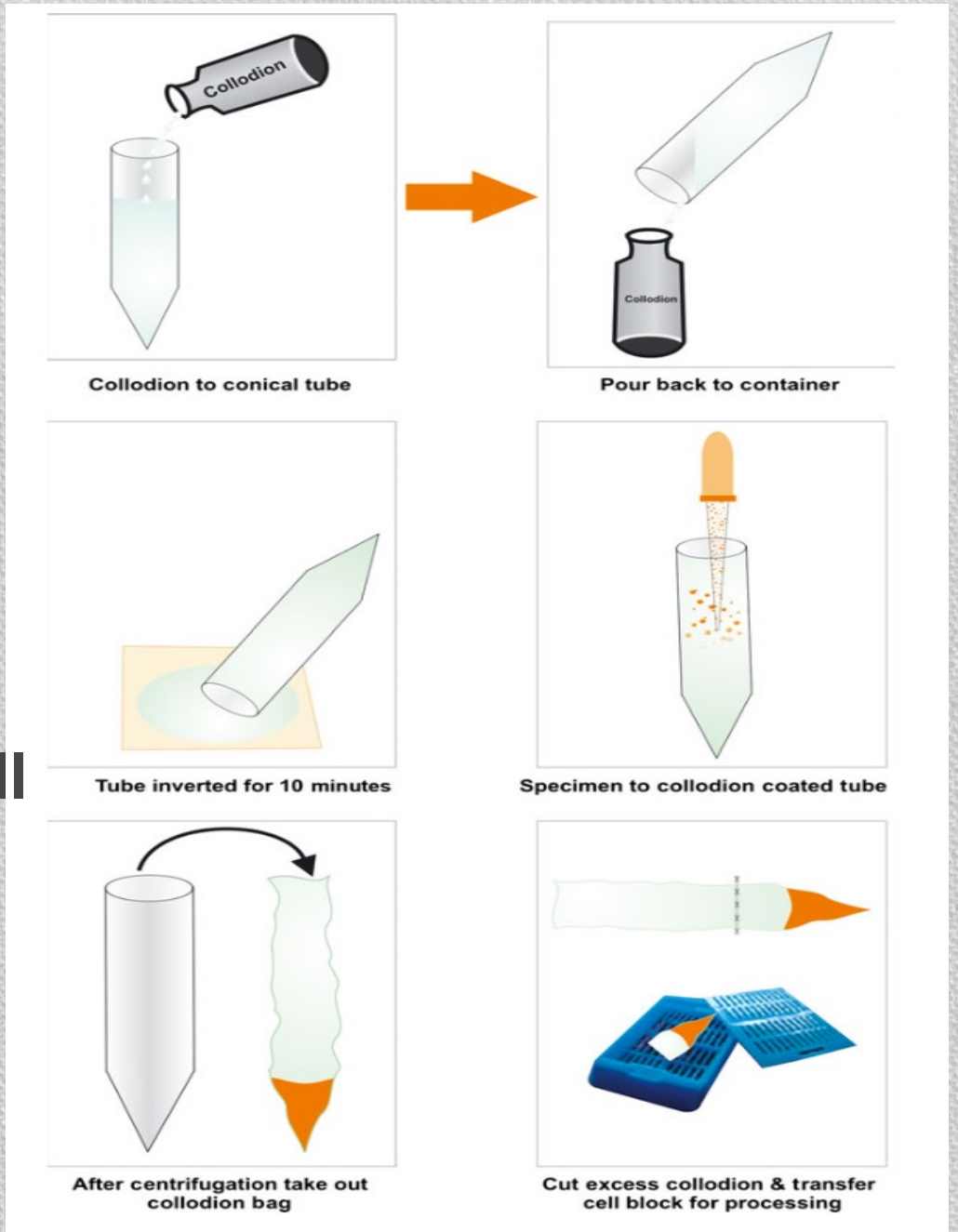
- Centrifuge the cell suspension & discard supernatant
- Melt 4% agar and add it to sediment
- Refrigerate to get a cell button.
- Fix in 10% formalin
- Place in a cassette and process routinely.

Agar solidifies below 50°C.

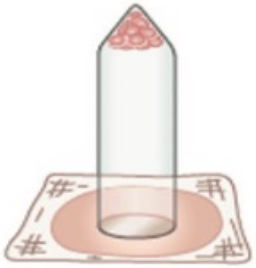
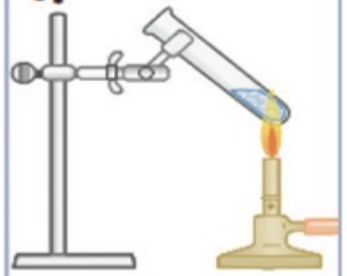
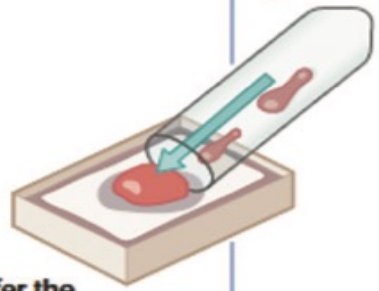


3.Collodion Bag Method

1. Add collodion to the conical tube
2. Pour it back to the collodion container
3. Invert the tube for 10 minutes
4. Add the specimen to the collodion coated tube
5. centrifuge to take out the collodion bag
6. Cut excess collodion bag & transfer the cell block for processing

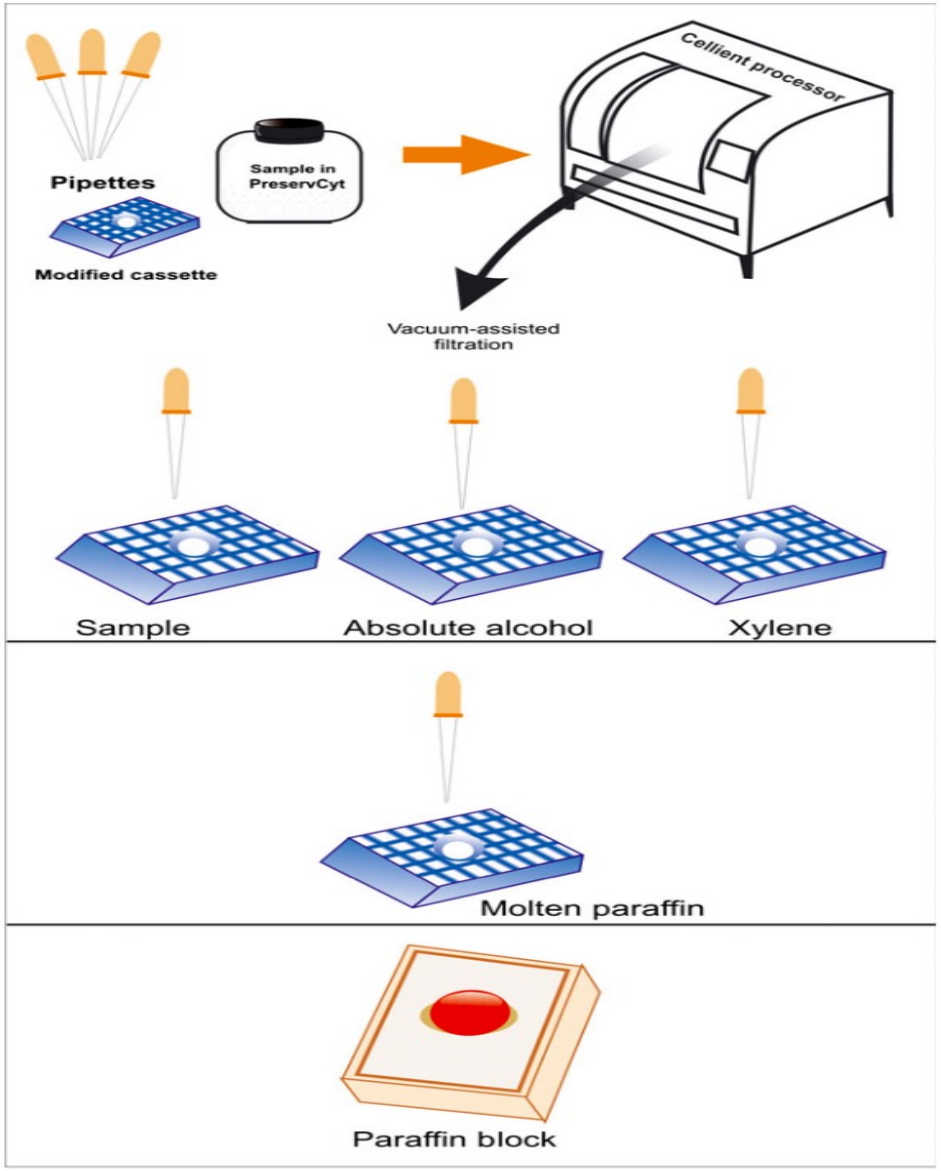


4.HistoGel Cell block method

1  Fluid sample	2  Centrifuge	3  Sediment forms	4  Decant supernatant	5  Dry excess supernatant over filter paper	6.  Melt HistoGel™ according to manufacturer's instructions *
7  Add a few drops of molten HistoGel™	8  Gently stir with wooden applicator stick or vortex to permit mixing of HistoGel™ with the sediment	9  Cool by refrigerating sediment and HistoGel™ mixture for 5–10 minutes or until solid	10  Transfer the solidified HistoGel™ to tissue processing cassette with tissue paper to wrap with the help of small spatula as needed	11 Fix in 10% formalin	12  Process for paraffin embedding

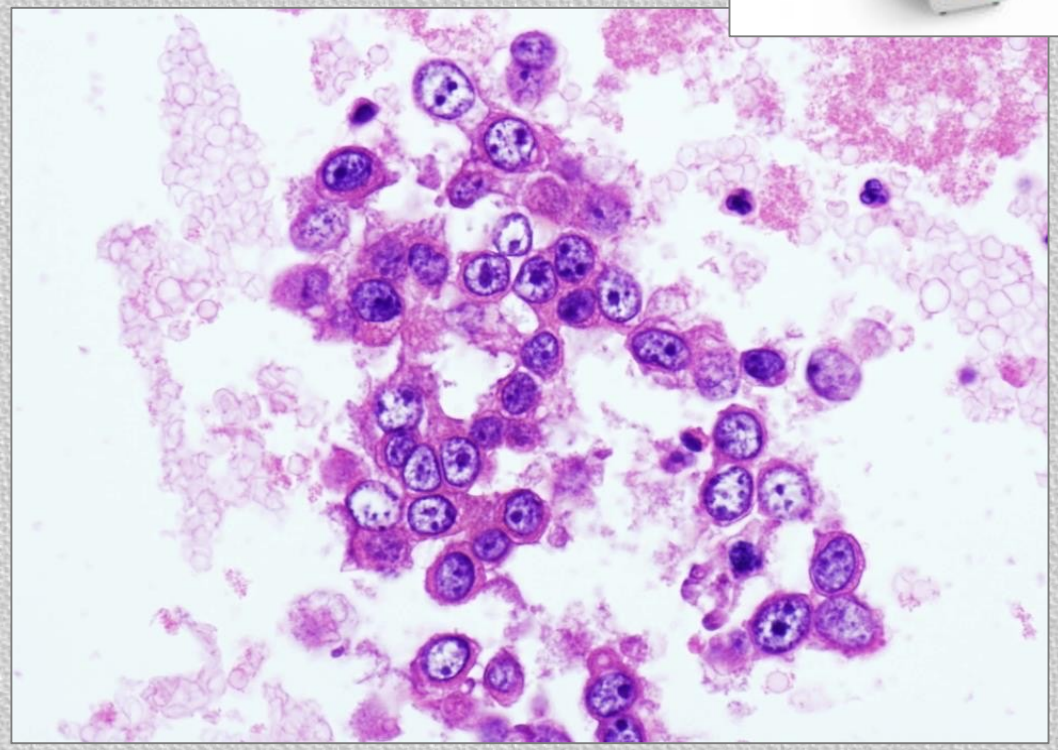
5.The Cellient Automated Cytoblock

- Cells are **concentrated** into a well in the cassette by **vacuum**
- Subsequent washes with **alcohol** and **xylene** to **fix** and **clear** the specimen.
- The cell button is then **infiltrated** with **paraffin** in the same cassette.
- The instrument can accommodate only one specimen block at a time, so high-volume labs may require multiple instruments.



Cellient automated cell block system

Cellient® Automated Cell Block



6.NextGen Celbloking

Nano

Nano NextGen CelBloking™

Cell block kit to process single scattered cell specimens and tissue fragments of **any cellularity**.

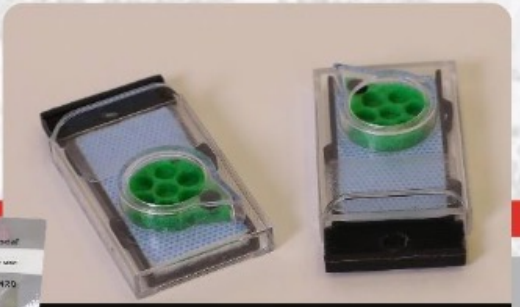
PATENT PENDING

Micro

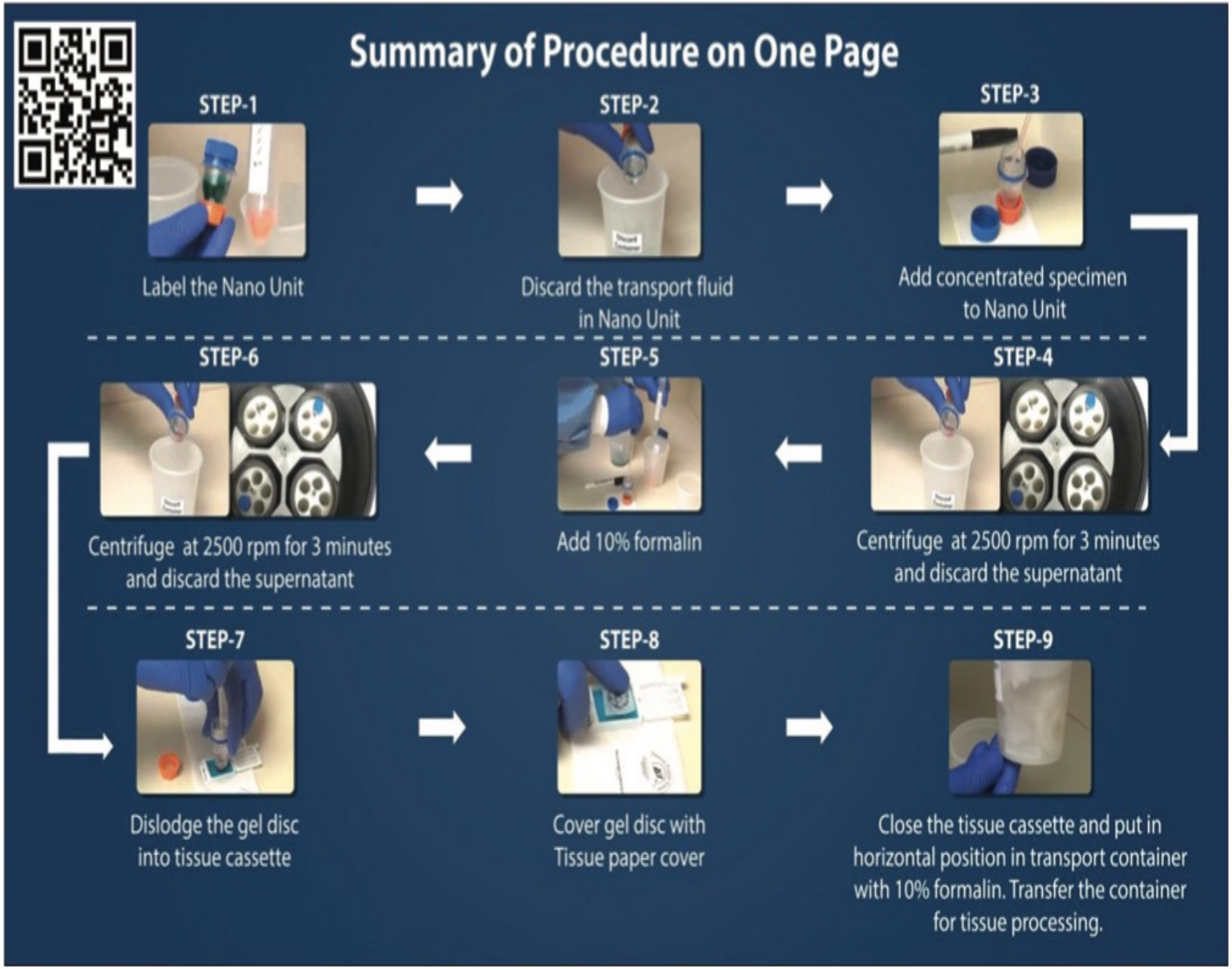
Micro NextGen CelBloking™

For cellular specimens (more than 1 ml concentrated specimen with Tissuecrit more than 50%)

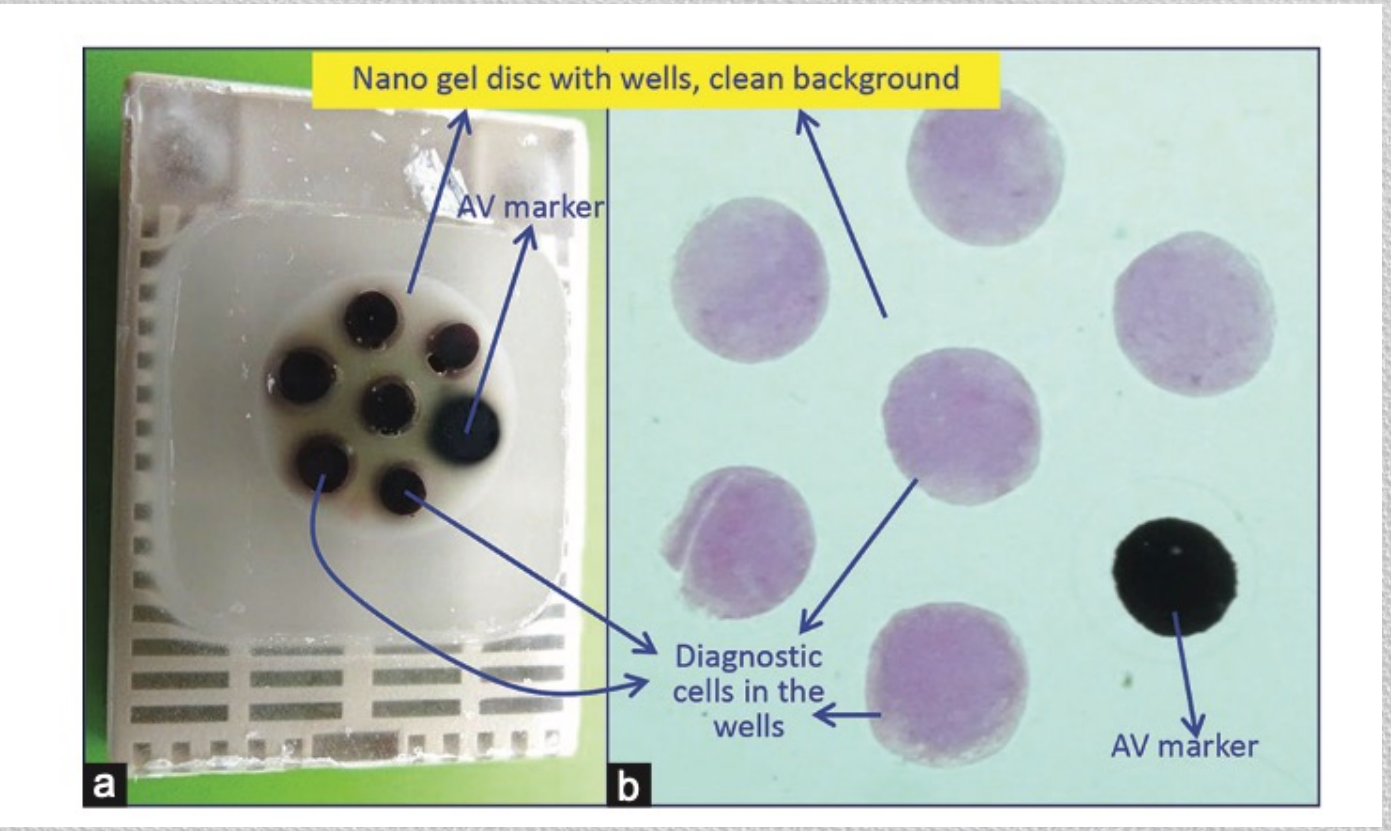
PATENT PENDING



Summary of cell-block preparation protocol for Nano NextGen CelBloking

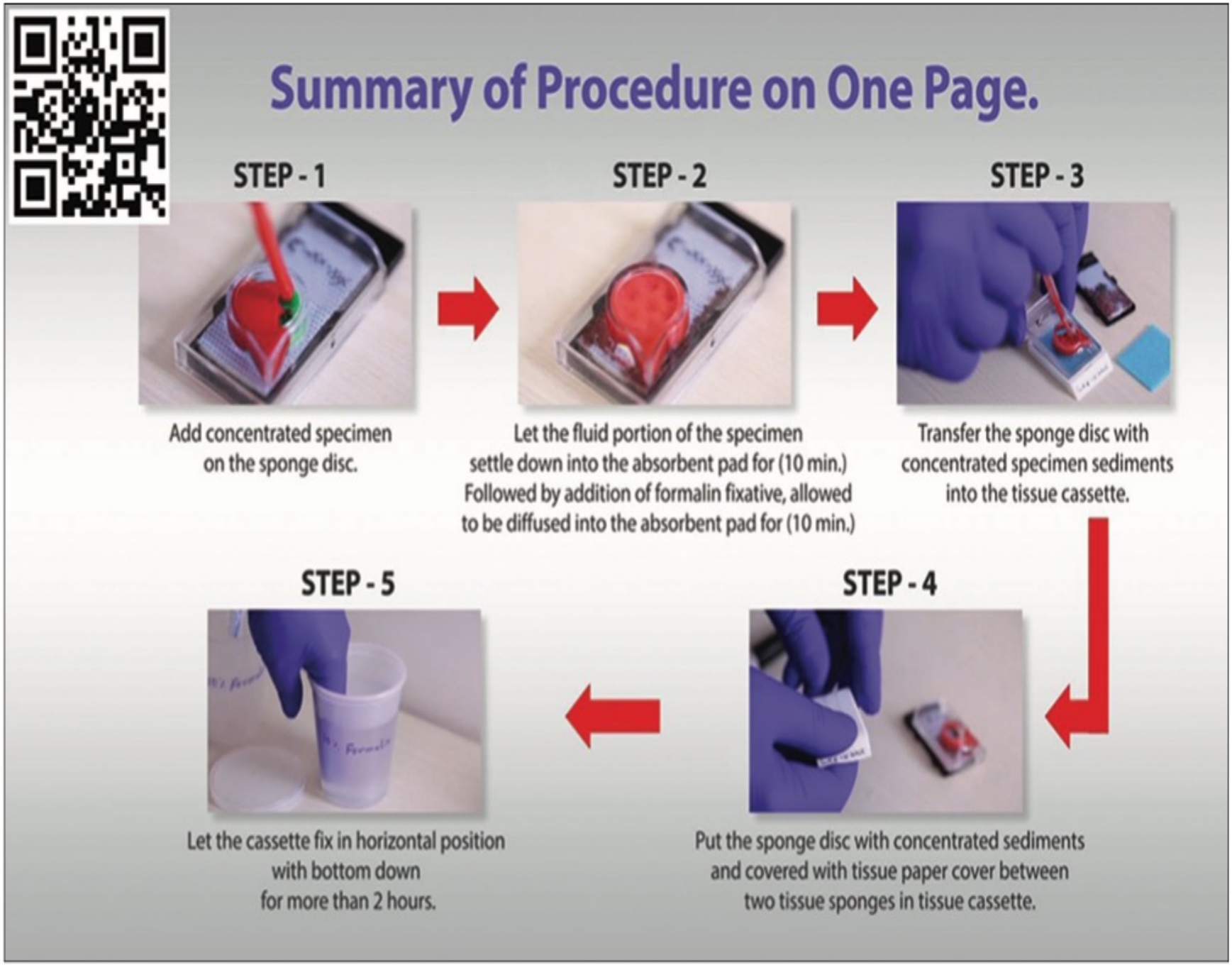


Nano NextGen CelBloking



(a) Final paraffin block; (b) Scanning power view of HE-stained section of cell-block prepared with Nano NextGen CelBlokingTM kit.

Summary of cell-block preparation protocol for Micro NextGen CelBloking



Cell block Fixation

- **Formalin fixation**

Formalin has been used to fix CBs from FNA

The Cellient system uses methanol as a fixative.

Cell block Fixation

- **Nathan alcohol formalin substitute (NAFS) fixation**

ACB technique using an ethanol–formalin fixative (**nine parts of 100% ethanol and one part of 40% formaldehyde**), has been used to obtain good cytological details with less toxicity.

- **Microwave fixation** - Microwave fixation can expedite the overall process of CB preparation and can **reduce** the turnaround time(**TAT**) significantly.

Advantages of cell block

✓Slides are more readily interpretable by histopathologists.

✓Availability of a block facilitates more sections.

✓Concentrated in a small area of the slide so examination less time consuming

✓Special stains mucicarmine, congo stain, melanin etc

✓Stains for immunocytochemistry

✓Stains for For microorganisms esp fungi and bacteria

✓Pattern and architectural recognition of tumor possible

✓No necessity of biopsy

✓Storage of cell blocks is easier than unstained slides

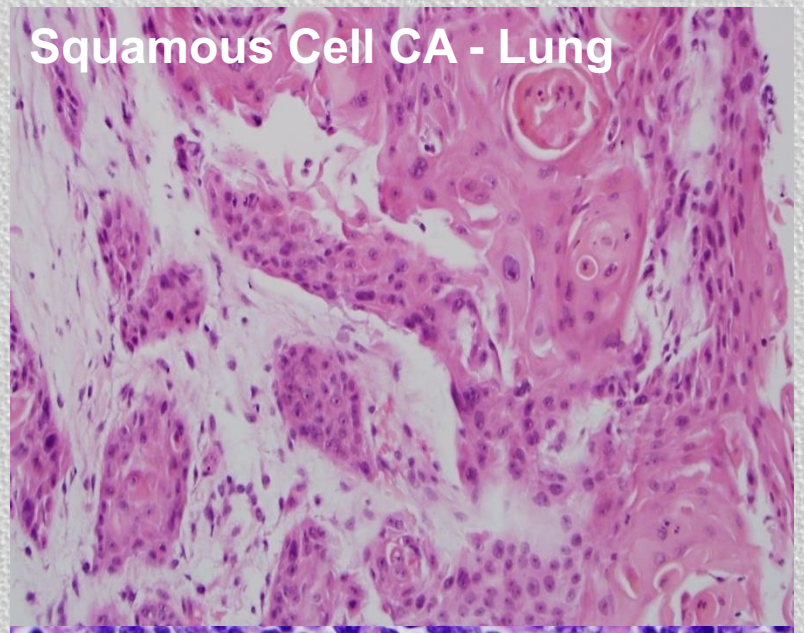
Disadvantages

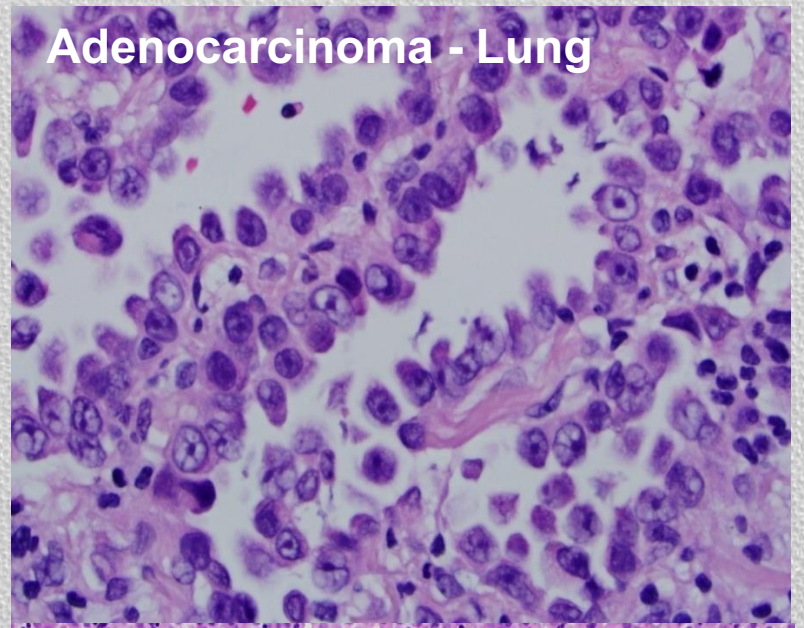
Compared to routine smears takes longer time

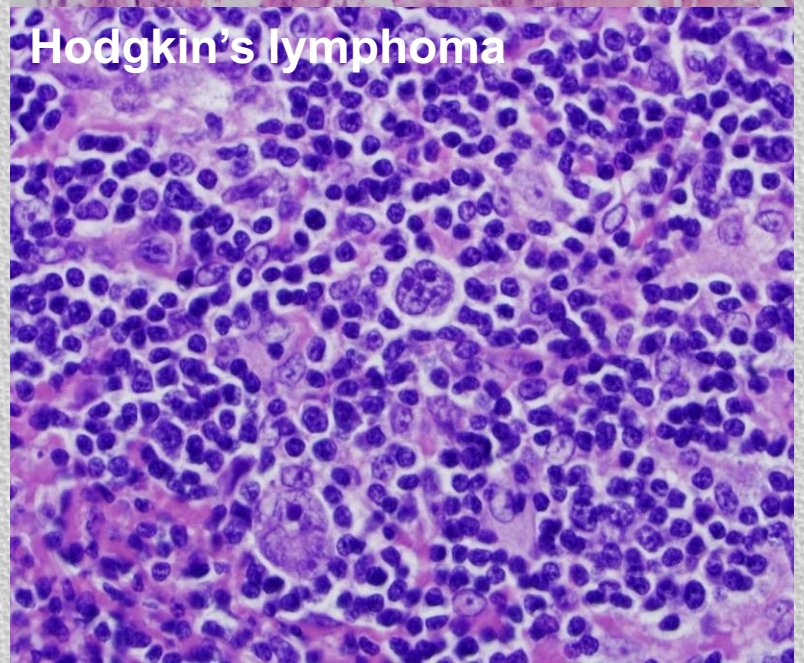
Sparse cellularity

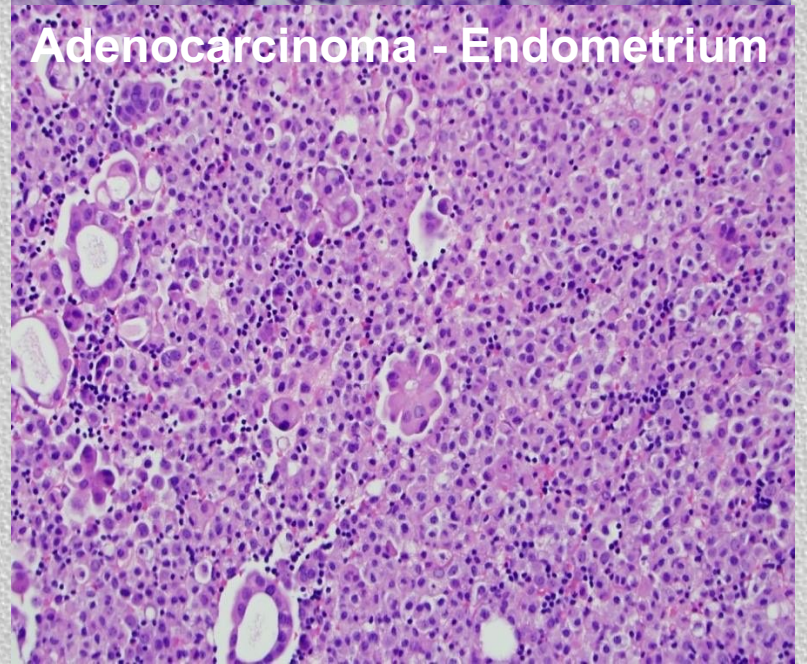
Distortion artifacts

Cell Block Technique









Speciel instructions for Quality Assurance

- Cell blocks cut at 8µm
- If IHC needs to be performed, it is noted on the QC sheet so the appropriate number of sections can be cut and ready for IHC stains.
- Two cytotechnology lab technologists check the cassette for proper labeling and quality Assurance.
- Cell block placed in formalin for at least six hours, documented on requisition with a time stamp.

Useful links

Collodion Bag Cell Block

https://youtu.be/nfR17d5-boI

Nano NextGen CelBloking

https://youtu.be/y29SS1NwO_8

Micro NextGen CelBloking

https://youtu.be/TRW5Vswy6J8

THAK YOU

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Modern Techniques in Cytopathology, Bui, Marilyn M. (Tampa, FL) Pantanowitz, Liron (Pittsburgh, PA),2020Springer

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Cytology: Diagnostic Principles and Clinical Correlates 5th Edition. Cytology: Diagnostic Principles and Clinical Correlates 5th Edition. Elsevier