CELL BLOCKS AND IHC IN CYTOPATHOLOGY

Donna K. Russell, MEd,CT(ASCP)HT
UR Medicine, Rochester, NY
Identity Verification

- Proper ID on both specimen and requisition
- Date and time collected
- Unique identifier
- Specimen source
- Submitting physician signature

Must match patient to specimen
Specimen Adequacy Assessment

- Know when to reject the specimen (improper labeling)

Universal Precautions

- Treat all samples as infectious
- Always PPE when handling specimens
Specimen Handling

Gross Description

- Volume (45 mL)
- Transparency (cloudy)
- Color (amber)
- Extras (brush tip identified)
Sample Preparation Techniques

- Direct smears
- Liquid based preparation
  - ThinPrep™ or SurePath™
- Cytospins
- Cell blocks
Thin Prep Non-Gyn Preparation

1. Collection

2. Concentrate by Centrifugation

3. Pour Off Supernatant and Resuspend Cell Pellet

4. Add an Appropriate Amount of Specimen to the PreservCyt Solution Vial

5. Run on ThinPrep™ 2000 Processor Using Sequence 2 or ThinPrep™ 5000 Processor Using sequence Non-Gyn
Sure Path Non-Gyn Preparation

1. Combine into one 50ml tube

2. Automated sample transfer, centrifugation, aspiration and decanting for cytology preparation.

3. Run on the BD Totalys™ SlidePrep
Cell Block

- Introduced in 1896 using colloidin embedding medium
- Accepted in 1940s
- CB techniques have evolved
- Basic protocol similar in all techniques
Application

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

- Serous effusions
- Pelvic/abdominal washes
- Fine needle aspirations
- Liquid based specimens

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

Cell block prepared for IHC and molecular studies
<table>
<thead>
<tr>
<th>Cell Block Technique</th>
<th>Clot and Scrape</th>
<th>Cell Block Pellet Alcohol Fixation</th>
<th>Cell Block Pellet Formalin Fixation</th>
<th>Plasma Thrombin Method</th>
<th>Colloidin Method</th>
<th>Cellient™ Automated System</th>
<th>Histogel/Agar Method</th>
<th>Thermo Shandon™ Cytoblock™ System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
<td>Inexpensive</td>
<td>Inexpensive, easy and rapid method, good for FNAS of any type and fluids</td>
<td>Inexpensive, easy and rapid method, good for FNAS of any type and fluids</td>
<td>Simple, low cost, clean background for ancillary studies, suitable for FNAS of any type and fluids</td>
<td>Good cellular yield, great for cells with scant cellularity</td>
<td>Great for small/scanty samples, crisp architecture, fully automated processing, Consistent results, no cross contamination</td>
<td>Concentration of cells in Histogel for an adequate sample, good cellular preservation</td>
<td>Good cellular yield due to cell suspensions, good for small/scanty samples, eliminates the need for tissue wrapping and loss of scanty samples</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Does not work well with small samples, crush artifact is common, variable cellularity</td>
<td>Cellular yield variable, Limited data on IHC due to alcohol fixation</td>
<td>Cellular yield variable, Optimal results for IHC and molecular studies</td>
<td>Cross contamination from plasma and thrombin, uneven concentration of cells</td>
<td>Time consuming method of preparation, toxic ether fumes for storage</td>
<td>Time consuming method of preparation – 45 minutes for each cell block preparation, expensive, training of Histology for cutting thin blocks, limited data on IHC due to alcohol fixation</td>
<td>Tedious process – Histogel has to be converted to liquid state</td>
<td>Time consuming method of preparation, cost of kit for preparation of cell blocks</td>
</tr>
</tbody>
</table>
Plasma Thrombin Technique

- Cell block prepared by adding cell button to plasma and thrombin

- Cell material collects in clot
Agar or Other Gelatin Techniques

- Concentrated sediment supported in Agar or Histogel
- Cell pellet formed then processed in paraffin
Collodion Bag Technique

- Concentrated sediment supported in Agar or Histogel
- Cell pellet formed then processed in paraffin
Tissue Clot Technique

• Allow clot to form in lumen of needle tip

• Clot transferred to formalin

• Prevents loss of diagnostic material
Cellient® Automated Cell Block Preparation
Shandon™ Cytoblock™ Method

Uses cytocentrifugation to concentrate cells in cytospin

Kit of cell block cassettes and reagents
Sedimentation Cell Block Technique

Squamous Cell CA - Lung

Hodgkin's lymphoma

Adenocarcinoma - Lung

Adenocarcinoma - Endometrium
Protocol

- Transfer material to centrifuge tube
- Spin down to achieve a concentrated cell button
- Centrifuge set at 2400 rpm for five minutes
- Pour off supernatant
- Add buffered formalin
Protocol

• Let material set in tube; 30-60 minutes

• Remove hardened cell button with a metal spatula

• The button placed on histology tissue paper that has been moistened with buffered formalin
Special Instructions; QA

- Cell blocks cut at 8μm

- If IHC needs to be performed it is noted on the QC sheet so appropriate number of sections can be cut and ready for IHC stains

- Cassette is checked by two cytotechnology lab technologists for proper labeling – Quality Assurance

- Cell block placed in formalin for at least six hours, documented on requisition with time stamp
Pap Test:

Thin Prep, Papanicolaou stain

Cell block, Hematoxylin and Eosin stain
Urine; bladder washing:

Thin Prep: Papanicolaou stain

Cell block: Hemotoxylin & Eosin stain
Cell Block Unknowns
Questions?