Slide 016 was prepared from the peripheral blood obtained from a 59 year-old asymptomatic male. The complete blood cell count values, shown above, were within accepted reference intervals. The automated differential included 51.7% neutrophils and 34.0% lymphocytes. The three images above depict the types of cells present in the case, there were no significant findings reported by participants. Image 1 includes a segmented neutrophil and a reactive/atypical lymphocyte. The central 79 percentile for the participant range for reactive/atypical lymphocyte in this case was 1 -14 and the median count was four. Participants that reported no reactive/atypical lymphocytes and those that reported greater than fourteen should review the smear.
<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Range</th>
<th>Participant Median</th>
<th>Participant Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blast cell not classified</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Myeloblast/Promyelocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoblast/Prolymphocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Monoblast/Promonocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Erythroblast</td>
<td>0 - 3</td>
<td>0</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Lymphoma/Sezary cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Hairy cell</td>
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<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Myelocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Metamyelocyte</td>
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<tr>
<td>Band neutrophil</td>
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<tr>
<td>Segmented neutrophil</td>
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<td>53</td>
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<td>44 - 62</td>
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<td>Eosinophil</td>
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<td>3</td>
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<tr>
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<td>Lymphocyte</td>
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<td>Atypical lymphocyte</td>
<td>1 - 14</td>
<td>4</td>
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<tr>
<td>Monocyte</td>
<td>1 - 13</td>
<td>8</td>
<td>1 - 13</td>
</tr>
<tr>
<td>Plasma cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>NRBC / 100 WBC</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
</tbody>
</table>

**Erythrocyte Morphology**

<table>
<thead>
<tr>
<th>Erythrocyte Morphology</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anisocytosis</td>
<td>None (87%)</td>
<td>Slight (9%)</td>
</tr>
<tr>
<td>Poikilocytosis</td>
<td>None (92%)</td>
<td>Slight (3%)</td>
</tr>
<tr>
<td>Macrocytosis</td>
<td>None (80%)</td>
<td>Slight (5%)</td>
</tr>
<tr>
<td>Microcytosis</td>
<td>None (94%)</td>
<td>Slight (2%)</td>
</tr>
<tr>
<td>Hypochromia</td>
<td>None (97%)</td>
<td>Slight (3%)</td>
</tr>
<tr>
<td>Polychromasia</td>
<td>None (100%)</td>
<td>Slight (0%)</td>
</tr>
</tbody>
</table>

**Cell Classification or Finding**

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced number of platelets</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Increased number of platelets</td>
<td>Absent</td>
<td>Absent (95%)</td>
</tr>
<tr>
<td>Phagocytosis of platelet(s)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Bizarre or irregular platelets</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Clumped platelets</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Giant platelets</td>
<td>Absent</td>
<td>Absent (81%)</td>
</tr>
<tr>
<td>Platelet satellitosis</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Auer rods</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Dohle bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Hypersegmentation</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Pelger Huet anomaly</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Smudge / Basket cells</td>
<td>Absent</td>
<td>Absent (97%)</td>
</tr>
<tr>
<td>Toxic granulation</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Acanthocytes</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Basophilic stippling</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Blister cells (pre keratocytes)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Cabot rings</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Echinocytes (crenated/burr cells)</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Elliptocytes (ovalocytes)</td>
<td>Absent</td>
<td>Absent (98%)</td>
</tr>
<tr>
<td>Howell-Jolly bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Pappenheimer bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Red cell agglutinates</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Rourleaux</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Schistocytes</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Schuffner's granules</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Sickle cells (drepahocytes)</td>
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<tr>
<td>Spherocytes</td>
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<tr>
<td>Stomatocytes</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Target cells (codocytes)</td>
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<td>Absent (100%)</td>
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<tr>
<td>Tear drop cells (dacrocyes)</td>
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<td>Absent (100%)</td>
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<td>Bacteria</td>
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<td>Absent (100%)</td>
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<tr>
<td>Fungi/yeast</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Malaria/Babesiosis</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Stain precipitate</td>
<td>Absent</td>
<td>Absent (98%)</td>
</tr>
<tr>
<td>Phagocytosis of red cell(s)</td>
<td>Absent</td>
<td>Absent (100%)</td>
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</table>
Slide 017 was prepared from the peripheral blood obtained from a 54 year-old male. The diagnosis was unknown at the time of specimen collection. The complete blood cell count results, shown above, include increased white blood cell and platelet counts. The automated differential included eighty-nine percent neutrophils (participant median in this proficiency test was 87). Few immature white blood cells were reported by participants, the participant range for both myelocyte (Image 2) and metamyelocyte was 0 – 2. The platelet count was increased (546,000) as correctly identified by seventy-one percent of participants and giant platelets (Image 1) were present as reported by 54% of the participants. Additional findings reported by participating laboratories included Döhle bodies, hypersegmentation (Image 3), and elliptocytes. The majority of participants did not report the presence of these findings, further review of several quality control slides confirmed their presence in low volume.

The red blood cell count in this case is low and the mean corpuscular volume (MCV) is within acceptable limits suggestive of a normocytic anemia. Common causes of normocytic anemia with normal morphology include hemorrhage (blood loss), unstable hemoglobins, infections, and chronic disease. While not the definitive diagnosis in this case, anemia of chronic disease (ACD), also known as anemia of inflammatory response, is the second most common form of anemia second to iron-deficiency anemia.
<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Range</th>
<th>Participant Median</th>
<th>Participant Range</th>
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<tbody>
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<td>Blast cell not classified</td>
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<td>Myeloblast/ Promyelocyte</td>
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<td>Lymphoblast/ Prolymphocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Monoblast/ Promonocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Erythroblast</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoma/ Sezary cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Hairy cell</td>
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</tr>
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<td>0 - 2</td>
</tr>
<tr>
<td>Metamyelocyte</td>
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<td>0</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Band neutrophil</td>
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<td>Lymphocyte</td>
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<tr>
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<tr>
<td>Monocyte</td>
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<td>0 - 6</td>
</tr>
<tr>
<td>Plasma cell</td>
<td>0 - 0</td>
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<td>0 - 1</td>
</tr>
<tr>
<td>NRBC / 100 WBC</td>
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</table>

<table>
<thead>
<tr>
<th>Erythrocyte Morphology</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
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<tbody>
<tr>
<td>Anisocytosis</td>
<td>None</td>
<td>None (46%)</td>
</tr>
<tr>
<td>Polikilocytosis</td>
<td>None</td>
<td>None (67%)</td>
</tr>
<tr>
<td>Macrocytosis</td>
<td>None</td>
<td>None (86%)</td>
</tr>
<tr>
<td>Microcytosis</td>
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<td>None (66%)</td>
</tr>
<tr>
<td>Hypochromia</td>
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<td>None (21%)</td>
</tr>
<tr>
<td>Polychromasia</td>
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<td>None (63%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced number of platelets</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Increased number of platelets</td>
<td>Present</td>
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</tr>
<tr>
<td>Phagocytosis of platelets</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Bizarre or irregular platelets</td>
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<tr>
<td>Clumped platelets</td>
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</tr>
<tr>
<td>Giant platelets</td>
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</tr>
<tr>
<td>Platelet satellitosis</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Auer rods</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Dohle bodies</td>
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<td>Absent (93%)</td>
</tr>
<tr>
<td>Hypersegmentation</td>
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<td>Absent (89%)</td>
</tr>
<tr>
<td>Pelger-Huet anomaly</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Smudge / Basket cells</td>
<td>Absent</td>
<td>Absent (96%)</td>
</tr>
<tr>
<td>Toxic granulation</td>
<td>Absent</td>
<td>Absent (94%)</td>
</tr>
<tr>
<td>Acanthocytes</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Basophilic stippling</td>
<td>Absent</td>
<td>Absent (93%)</td>
</tr>
<tr>
<td>Blister cells (pre keratocytes)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Cabot rings</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Echinocytes (crenated/burr cells)</td>
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<td>Absent (74%)</td>
</tr>
<tr>
<td>Elliptocytes (ovalocytes)</td>
<td>Absent</td>
<td>Absent (89%)</td>
</tr>
<tr>
<td>Howell-Jolly bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Pappenheimer bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Red cell agglutinates</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Rouleaux</td>
<td>Absent</td>
<td>Absent (90%)</td>
</tr>
<tr>
<td>Schistocytes</td>
<td>Absent</td>
<td>Absent (88%)</td>
</tr>
<tr>
<td>Schuffner's granules</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Sickle cells (drepanocytes)</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Spherocytes</td>
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<td>Absent (93%)</td>
</tr>
<tr>
<td>Stomatocytes</td>
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<td>Absent (100%)</td>
</tr>
<tr>
<td>Target cells (codocytes)</td>
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</tr>
<tr>
<td>Tear drop cells (dacrocytes)</td>
<td>Absent</td>
<td>Absent (97%)</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Fungi/yeast</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Malaria/Babesiosis</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Stain precipitate</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Phagocytosis of red cell(s)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
</tbody>
</table>
SLIDE 018
35 year-old male
DIAGNOSIS: Sickle Cell Anemia

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>WBC (10⁹/L)</td>
<td>16.8</td>
</tr>
<tr>
<td>RBC (10¹²/L)</td>
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</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
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</tr>
<tr>
<td>Hematocrit (%)</td>
<td>21.9</td>
</tr>
<tr>
<td>MCV (fL)</td>
<td>86.6</td>
</tr>
<tr>
<td>MCH (pg)</td>
<td>28.9</td>
</tr>
<tr>
<td>MCHC (g/dL)</td>
<td>33.3</td>
</tr>
<tr>
<td>RDW (%)</td>
<td>18.7</td>
</tr>
<tr>
<td>Platelet count (10⁹/L)</td>
<td>365</td>
</tr>
</tbody>
</table>

Slide 018 was prepared from the peripheral blood obtained from a 35 year-old male with sickle cell disease. The clinically significant findings in this case as reported by participants and as would be expected in such a case included sickle cells, Howell-Jolly bodies, target cells, and nucleated red blood cells (Images 2 & 3). Seventy-four participants (31%) did not report the presence of sickle cells and should review the case.

Also reported by participants were band neutrophils, metamyelocytes and myelocytes (Image 1). Erythrocyte morphological findings were expected and reported by participants. The findings included polychromasia as reported “slight” by sixty-five percent (154) of the participants, hypochromia as reported “moderate” by forty-two percent (100) of the participants. Both findings can be seen in the images above.
<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected</th>
<th>Participant Median</th>
<th>Participant Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blast cell not classified</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Myeloblast/Promyelocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoblast/Prolymphocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Monoblast/Promonocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Erythroblast</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoma/Sezary cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Hairy cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Myelocyte</td>
<td>0 - 1</td>
<td>0</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Metamyelocyte</td>
<td>0 - 1</td>
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<tr>
<td>Band neutrophil</td>
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<td>Segmented neutrophil</td>
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<td>46 - 65</td>
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<tr>
<td>*[Total neutrophils]</td>
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<tr>
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<td>4 - 15</td>
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<td>0 - 2</td>
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<td>Lymphocyte</td>
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<td>16 - 34</td>
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<tr>
<td>Atypical lymphocyte</td>
<td>0 - 3</td>
<td>0</td>
<td>0 - 3</td>
</tr>
<tr>
<td>Monocyte</td>
<td>1 - 12</td>
<td>8</td>
<td>1 - 12</td>
</tr>
<tr>
<td>Plasma cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>NRBC / 100 WBC</td>
<td>0 - 8</td>
<td>4</td>
<td>0 - 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Erythrocyte Morphology</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anisocytosis</td>
<td>Moderate None (4%) Slight (34%) Moderate (58%) Marked (3%)</td>
<td></td>
</tr>
<tr>
<td>Poikilocytosis</td>
<td>Moderate None (16%) Slight (34%) Moderate (44%) Marked (2%)</td>
<td></td>
</tr>
<tr>
<td>Macrocytosis</td>
<td>None None (48%) Slight (39%) Moderate (10%) Marked (0%)</td>
<td></td>
</tr>
<tr>
<td>Microcytosis</td>
<td>None None (54%) Slight (36%) Moderate (8%) Marked (0%)</td>
<td></td>
</tr>
<tr>
<td>Hypochromia</td>
<td>Moderate None (18%) Slight (34%) Moderate (42%) Marked (6%)</td>
<td></td>
</tr>
<tr>
<td>Polychromasia</td>
<td>Slight None (16%) Slight (65%) Moderate (18%) Marked (1%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced number of platelets</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Increased number of platelets</td>
<td>Absent</td>
<td>Absent(82%) Present(18%)</td>
</tr>
<tr>
<td>Phagocytosis of platelet(s)</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Bizarre or irregular platelets</td>
<td>Absent</td>
<td>Absent(98%) Present(2%)</td>
</tr>
<tr>
<td>Clumped platelets</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Giant platelets</td>
<td>Absent</td>
<td>Absent(58%) Present(42%)</td>
</tr>
<tr>
<td>Platelet satellitosis</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Auer rods</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Dohle bodies</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Hypersegmentation</td>
<td>Absent</td>
<td>Absent(96%) Present(4%)</td>
</tr>
<tr>
<td>Pelger Huet anomaly</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Smudge / Basket cells</td>
<td>Absent</td>
<td>Absent(98%) Present(2%)</td>
</tr>
<tr>
<td>Toxic granulation</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Acanthocytes</td>
<td>Absent</td>
<td>Absent(97%) Present(3%)</td>
</tr>
<tr>
<td>Basophilic stippling</td>
<td>Absent</td>
<td>Absent(74%) Present(26%)</td>
</tr>
<tr>
<td>Blister cells (pre keratocytes)</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Cabot rings</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Echinocytes (crenated/burr cells)</td>
<td>Absent</td>
<td>Absent(97%) Present(3%)</td>
</tr>
<tr>
<td>Elliptocytes (ovalocytes)</td>
<td>Present</td>
<td>Absent(32%) Present(68%)</td>
</tr>
<tr>
<td>Howell-Jolly bodies</td>
<td>Present</td>
<td>Absent(38%) Present(62%)</td>
</tr>
<tr>
<td>Pappenheimer bodies</td>
<td>Absent</td>
<td>Absent(76%) Present(24%)</td>
</tr>
<tr>
<td>Red cell agglutinates</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Rouleaux</td>
<td>Absent</td>
<td>Absent(96%) Present(4%)</td>
</tr>
<tr>
<td>Schistocytes</td>
<td>Absent</td>
<td>Absent(58%) Present(42%)</td>
</tr>
<tr>
<td>Schuffner's granules</td>
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<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Sickle cells (drepanocytes)</td>
<td>Present</td>
<td>Absent(31%) Present(69%)</td>
</tr>
<tr>
<td>Spherocytes</td>
<td>Absent</td>
<td>Absent(88%) Present(12%)</td>
</tr>
<tr>
<td>Stomatocytes</td>
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<td>Absent(93%) Present(7%)</td>
</tr>
<tr>
<td>Target cells (codocytes)</td>
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<tr>
<td>Tear drop cells (dacrocyes)</td>
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<td>Absent(90%) Present(10%)</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Fungi/yeast</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Malaria/Babesiosis</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Stain precipitate</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Phagocytosis of red cell(s)</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
</tbody>
</table>
Slide 019 was prepared from the peripheral blood obtained from a 65 year-old asymptomatic male. No clinically significant findings were reported by the majority of participants with the exception of giant platelets, reported present by forty-two percent (100) of the participating laboratories. The widely accepted definition of a giant platelet is one that is greater in size than that of a normal red blood cell. There were many large platelets present in this case and few giant platelets as shown in images two and three above. Giant platelets are associated with many disease conditions including myelodysplastic syndromes, leukemia, splenectomy, severe leukemoid reaction and rare inherited conditions including May-Hegglin anomaly and Bernard-Soulier syndrome.
<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Range</th>
<th>Participant Median</th>
<th>Participant Range</th>
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</thead>
<tbody>
<tr>
<td>Blast cell not classified</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
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<tr>
<td>Myeloblast/Promyelocyte</td>
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<td>0 - 0</td>
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<tr>
<td>Lymphoblast/Prolymphocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Monoblast/Promonocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Erythroblast</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoma/Sezary cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Hairy cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Myelocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Metamyelocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
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<tr>
<td>Band neutrophil</td>
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<td>0 - 2</td>
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<tr>
<td>Segmented neutrophil</td>
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<td>57</td>
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<td>49 - 67</td>
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<td>48 - 68</td>
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<td>0 - 5</td>
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<tr>
<td>Monoocyte</td>
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<td>8</td>
<td>1 - 13</td>
</tr>
<tr>
<td>Plasma cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>NRBC / 100 WBC</td>
<td>0 - 0</td>
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<td>0 - 0</td>
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### Erythrocyte Morphology

<table>
<thead>
<tr>
<th>Erythrocyte Morphology</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anisocytosis</td>
<td>None</td>
<td>None (82%)</td>
</tr>
<tr>
<td>Poikilocytosis</td>
<td>None</td>
<td>None (90%)</td>
</tr>
<tr>
<td>Macrocytosis</td>
<td>None</td>
<td>None (91%)</td>
</tr>
<tr>
<td>Microcytosis</td>
<td>None</td>
<td>None (89%)</td>
</tr>
<tr>
<td>Hypochromia</td>
<td>None</td>
<td>None (97%)</td>
</tr>
<tr>
<td>Polychromasia</td>
<td>None</td>
<td>None (90%)</td>
</tr>
</tbody>
</table>

### Cell Classification or Finding

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced number of platelets</td>
<td>Absent</td>
<td>Absent (94%)</td>
</tr>
<tr>
<td>Increased number of platelets</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Phagocytosis of platelet(s)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Bizarre or irregular platelets</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Giant platelets</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Platelet satellitosis</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Auer rods</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Dohle bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Hypersegmentation</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Pelger Huet anomaly</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Smudge / Basket cells</td>
<td>Absent</td>
<td>Absent (96%)</td>
</tr>
<tr>
<td>Toxic granulation</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Acanthocytes</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Basophilic stippling</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Blister cells (pre keratocytes)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Cabot rings</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Echinocytes (crenated/burr cells)</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Elliptocytes (ovalocytes)</td>
<td>Absent</td>
<td>Absent (96%)</td>
</tr>
<tr>
<td>Howell-Jolly bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Pappenheimer bodies</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Red cell agglutinates</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Rouleaux</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Schistocytes</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Schuffner's granules</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Sickle cells (drepanocytes)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Spherocytes</td>
<td>Absent</td>
<td>Absent (98%)</td>
</tr>
<tr>
<td>Stomatocytes</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Target cells (codocytes)</td>
<td>Absent</td>
<td>Absent (99%)</td>
</tr>
<tr>
<td>Tear drop cells (dacrocytes)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Bacteria</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Fungus/yeast</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Malaria/Babesiosis</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
<tr>
<td>Stain precipitate</td>
<td>Absent</td>
<td>Absent (98%)</td>
</tr>
<tr>
<td>Phagocytosis of red cell(s)</td>
<td>Absent</td>
<td>Absent (100%)</td>
</tr>
</tbody>
</table>
SLIDE 020
46 year-old male
DIAGNOSIS: Acute Myelogenous Leukemia (AML)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>WBC (10^9/L)</td>
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<td>RBC (10^12/L)</td>
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<td>Hemoglobin (g/dL)</td>
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<tr>
<td>Hematocrit (%)</td>
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<tr>
<td>MCV (fL)</td>
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<tr>
<td>MCH (pg)</td>
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<tr>
<td>MCHC (g/dL)</td>
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</tr>
<tr>
<td>RDW (%)</td>
<td>15.2</td>
</tr>
<tr>
<td>Platelet count (10^9/L)</td>
<td>533</td>
</tr>
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</table>

Slide 020 was prepared from the peripheral blood obtained from a 46 year-old male with a history of acute myelogenous leukemia (AML). The automated differential results included 63% segmented neutrophils, 12% lymphocytes, 4% metamyelocytes, and 3% abnormal white blood cells. The participant median from this proficiency test for both myelocyte and metamyelocyte was two and the median count for band neutrophil was four. Image 2 shows the immature cell forms of the myeloid cell lineage present in this case and supports the identification of the rare blast cells (Image 1) present as myeloblasts as reported by the majority of the participants. There were very few participants that identified lymphoblast (3 participants), monoblast (2 participants), lymphoma cell (1 participant), and plasma cell (3 participants) present and should review the case.

Clinically significant findings correctly identified by the majority of the participants included increased number of platelets, polychromasia (Image 3), and giant platelets. Additional noteworthy findings reported by participants included toxic granulation, reported present by thirty-four percent (80) of the participants and basophilic stippling reported by twenty-nine percent (69) of the participating laboratories.
<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Range</th>
<th>Participant Median</th>
<th>Participant Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blast cell not classified</td>
<td>0 - 5</td>
<td>1</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Myeloblast/Promyelocyte</td>
<td>0 - 5</td>
<td>0</td>
<td>0 - 5</td>
</tr>
<tr>
<td><em>[Myeloblasts + Blasts not classified]</em></td>
<td>0 - 5</td>
<td>2</td>
<td>0 - 5</td>
</tr>
<tr>
<td>Lymphoblast/Prolymphocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Monoblast/Promonocyte</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Erythroblast</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Lymphoma/Sezary cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Hairy cell</td>
<td>0 - 0</td>
<td>0</td>
<td>0 - 0</td>
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<tr>
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<td>0 - 6</td>
<td>2</td>
<td>0 - 6</td>
</tr>
<tr>
<td>Metamyelocyte</td>
<td>0 - 5</td>
<td>2</td>
<td>0 - 6</td>
</tr>
<tr>
<td>Band neutrophil</td>
<td>0 - 10</td>
<td>4</td>
<td>0 - 10</td>
</tr>
<tr>
<td>Segmented neutrophil</td>
<td>45 - 67</td>
<td>55</td>
<td>44 - 68</td>
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<tr>
<td><em>[Total neutrophils]</em></td>
<td>48 - 69</td>
<td>59</td>
<td>48 - 69</td>
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<td>Eosinophil</td>
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<tr>
<td>Basophil</td>
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<td>0</td>
<td>0 - 2</td>
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<td>Lymphocyte</td>
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<td>11 - 30</td>
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<tr>
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<td>0 - 7</td>
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<tr>
<td>Monocyte</td>
<td>4 - 20</td>
<td>11</td>
<td>2 - 20</td>
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<td>Plasma cell</td>
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<td>0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>NRBC / 100 WBC</td>
<td>0 - 3</td>
<td>0</td>
<td>0 - 3</td>
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</table>

### Erythrocyte Morphology

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anisocytosis</td>
<td>Slight</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Poikilocytosis</td>
<td>None</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Macrocytosis</td>
<td>None</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Microcytosis</td>
<td>None</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Hypochromia</td>
<td>None</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Polychromasia</td>
<td>Slight</td>
<td>Absent(100%) Present(0%)</td>
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</table>

### Cell Classification or Finding

<table>
<thead>
<tr>
<th>Cell Classification or Finding</th>
<th>Expected Result</th>
<th>Participant Results</th>
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</thead>
<tbody>
<tr>
<td>Reduced number of platelets</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Increased number of platelets</td>
<td>Present</td>
<td>Absent(30%) Present(70%)</td>
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<tr>
<td>Phagocytosis of platelet(s)</td>
<td>Absent</td>
<td>Absent(100%) Present(0%)</td>
</tr>
<tr>
<td>Clumped platelets</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Giant platelets</td>
<td>Absent</td>
<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Platelet satellitosis</td>
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</tr>
<tr>
<td>Auer rods</td>
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</tr>
<tr>
<td>Dohle bodies</td>
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</tr>
<tr>
<td>Hypersegmentation</td>
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</tr>
<tr>
<td>Pelger Huet anomaly</td>
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</tr>
<tr>
<td>Smudge / Basket cells</td>
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<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Toxic granulation</td>
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<td>Absent(66%) Present(34%)</td>
</tr>
<tr>
<td>Acanthocytes</td>
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</tr>
<tr>
<td>Basophilic stippling</td>
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<td>Absent(71%) Present(29%)</td>
</tr>
<tr>
<td>Blister cells (pre keratocytes)</td>
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</tr>
<tr>
<td>Cabot rings</td>
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</tr>
<tr>
<td>Echinocytes (crenated/burr cells)</td>
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<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Elliptocytes (ovalocytes)</td>
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<td>Absent(99%) Present(1%)</td>
</tr>
<tr>
<td>Howell-Jolly bodies</td>
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<tr>
<td>Pappenheimer bodies</td>
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</tr>
<tr>
<td>Red cell agglutinates</td>
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<tr>
<td>Rouleaux</td>
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<tr>
<td>Schistocytes</td>
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<td>Schuffner's granules</td>
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<td>Sickle cells (drepanocytes)</td>
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<tr>
<td>Spherocytes</td>
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<td>Absent(94%) Present(6%)</td>
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<td>Target cells (codocytes)</td>
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<td>Absent(97%) Present(3%)</td>
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<td>Tear drop cells (dacrocyes)</td>
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<tr>
<td>Fungi/yeast</td>
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<td>Malaria/Babesiosis</td>
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<td>Stain precipitate</td>
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<tr>
<td>Phagocytosis of red cell(s)</td>
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<td>Absent(100%) Present(0%)</td>
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