Vendors selling simplicity and banking on the basics

Anne Ford

In today's global market, everyone seems to be thinking big, and high-volume hematology labs are no exception. Yet practicality still prevails.

"One area that is no longer in high demand is monoclonal antibody test- ing integrated into a routine hematology analyzer," says Bayern spokes- woman Nancy Lavon. "Although very attractive at first, these esoteric tests are not always practical for the routine hematology analyzer and may actually have a negative impact on workflow. There has been a return to the basics—quality, simplicity, reliability."

Case in point: Beckman Coulter's electronic Interlaboratory Quality As- surance Program, or eIQA. Whereas enrollees in the program's previous in- carnation had to mail in diskettes containing their QA information so Beck- man Coulter could upload the infor- mation to a master database, now laboratories can submit and access hematology QA data via the Inter- net. "It's proving to be a huge time- saver and is much more efficient for labs," says Alan Burton, Beckman's marketing director for cellular analy- sis products. "This program elimi- nates numerous clerical hassles and processing time."

The company is now launching Command Central, a combination of software and hardware. "Command Central is a particularly exciting de- velopment as it provides a single point of contact with all the connected in- stuments," says Burton. "Now a sin- gle user can access and monitor up to 12 Beckman Coulter instruments— including hematology, chemistry, and immunoassay analyzers—all from one central workstation." Burton adds that Beckman Coulter will soon in- troduce a new version of its DL 2000 data manager, which "allows labs to consolidate and manage test infor- mation and apply decision rules from multiple hematology analyzers."

With Bayer’s Advia CentraLink networking solution, meanwhile, labs that own multiple Advia 2120 ana- lyzers can consolidate data manage- ment. "This provides the ability to review and edit results at any work- station, to review patient results and cytograms at any microscope station with electronic slide pad entry," Lavon says. "Additional workstations can be placed wherever necessary—for ex- ample, in the hematology supervi- sor's or pathologist's office."

The Advia 2120 system, released in April, is the company's newest hema- tology analyzer. Next year, Bayer plans to introduce the Advia Au- tioslide, which will integrate with the 2120 and provide automated slide making and staining. With regard to future trends, Lavon says she sees an increased demand for Web-based services.

Sysmex hematology marketing manager Brian Verne agrees. His company plans to launch a new on-line customer support service—SNCS, or Sysmex Network Customer Support—in 2005. SNCS “offers re- mote maintenance and quality con- trol by linking customers using Sys- metex products with the Sysmex tech- nical assistance center via the Inter- net,” he says. Laboratories will be able to instantly access their daily QC and peer group comparisons. They'll also be able to monitor equip- ment trouble and receive online re- mote-access support. SNCS, Verne adds, will be available for all Sys- metex instruments.

Several companies have recently launched or plan to launch new ap- plications on their existing analyzers or brand-new products. Beckman Coulter, for example, expected to re- lease a new body fluid application on its Coulter LH 710 series analyzers at CAP/TODAY press time. The new ap- plication, Burton says, "will allow labs to analyze cerebrospinal fluid, sera fluids, and synovial fluids that have been treated with hyalur- onidase."

Sysmex, meanwhile, has received FDA clearance for its body fluids ap- plication, which includes synovial, plasmas, and CSF, on its XE series of in- struments. It also plans to add new capabilities in 2005, such as immature platelet fraction and reticulocyte hemo- globin equivalent on the XE in- struments. Already on the market is Sysmex’s iG Master software, which provides enumerated immature gran- ulocyte counts.

Pending regulatory approval, Ab- bott Diagnostics will launch a high- volume hematology analyzer, called the Cell-Dyn Sapphire, in 2005, says Abbott public affairs manager Amy Woodworth. Abbott currently mar- kets, as part of its Cell-Dyn series, the Cell-Dyn 4000, which offers mea- surements of argon-ion laser light scat- ter and focused-flow impedance and supports high-volume workloads. The company is developing addi- tional Cell-Dyn instruments.

ABX reports that it is developing leukocyte differential staining using thiazole orange and flow cytometry analysis. At the same time, the company continues its integration with Horiba; it now represents the medical diagnostics branch of Horiba and is

officially known as Horiba ABX Di- agnostics. But the company’s aim re- mains the same, says marketing di- rector Tom Brown: “The goal at Hori- ba ABX is to continue to simplify the preanalytical, analytical, and post- analytical phases of the hematology process. We believe that expensive track systems can be eliminated through onboard auto-run and auto-reflex capabilities, streamlining the workflow process.”

Finally, while Six Sigma and Lean principles are nothing new, the in- creasing demand for them is. Bayer’s Lavon characterizes the rise in Six Sigma’s popularity as “a more so- phisticated approach to instrument selection,” while Sysmex’s Verne says the interest in Lean principles stems from cost constraints and the continuing shortage of qualified medical technologists. That, too, is why “customers continue to demand reliability and performance in the instruments they acquire,” he adds. “More and more customers are not able to acquire a comparable backup analyzer. Reliable, feature-rich ana- lyzers have become a need, where- as before they were a luxury. What was once thought of as a ‘nice-to- have’ feature will now become mandatory.”

CAP/TODAY’s survey of high-vol- ume hematology analyzers on pages 24-44 includes products from the aforementioned manufacturers. Ven- dors supplied the information listed. Readers interested in a particular an- alyzer should confirm that it has the stated features and capabilities.

Anne Ford is a writer in Chicago.
<table>
<thead>
<tr>
<th>Part 1 of 71</th>
<th>24/CAP TODAY</th>
<th>December 2004</th>
</tr>
</thead>
</table>

Name of instrument | Cell-Dyn 8000 | Cell-Dyn T800 |

Test menu:
- Standard menu: ESR, MPV, ROC, RMP
- C-reactive protein
- Uric acid
- INR
- ACR
- HbA1c
- Sodium
- Potassium
- Chloride
- Phosphate
- Glucose
- Calcium
- Protein
- Bilirubin
- Total protein
- Albumin
- ALT
- AST
- 3-NT
- Lipids
- TSH
- Rbc
- Wbc
- Platelets
- Monocytes
- RDW
- Neutrophils
- Lymphocytes
- Killing
- IgG
- IgM

Test results:
- Standard menu: ESR, MPV, ROC, RMP
- C-reactive protein
- Uric acid
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- Wbc
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- Monocytes
- RDW
- Neutrophils
- Lymphocytes
- Killing
- IgG
- IgM

Differential method used:
- MAPSS (Multi-Angle Polarization Scatter Spec.)

Accuracy of automated diff.
- Standard deviation: ESR, MPV, ROC, RMP
- INR
- ACR
- HbA1c
- Sodium
- Potassium
- Chloride
- Phosphate
- Glucose
- Calcium
- Protein
- Bilirubin
- Total protein
- Albumin
- ALT
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Abbot Diagnostics
Hematology Business Unit
5440 Patrick Henry Dr.
Santa Clara, CA 95054
800-533-5335
www.abbot.com

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Tabulation does not represent an endorsement by the College of American Pathologists.
Survey editor: Raymond D. Allen, MD
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<td>HbC</td>
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<td>countC</td>
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<td>cellC</td>
<td>countC</td>
<td>toC</td>
</tr>
<tr>
<td>WhiteC</td>
<td>cellC</td>
<td>countC</td>
<td>toC</td>
</tr>
</tbody>
</table>

**Diffenrential method used**

- **Linear:**
  - **WBC count (10^9)**
    - Manual: 0.20–0.60 x 10^9/L
    - Automated: 0.20–0.60 x 10^9/L
  - **Hemoglobin (g/dL)**
    - Manual: 10–15 g/dL
    - Automated: 10–15 g/dL

- **Precise:**
  - **WBC count (10^9)**
    - Manual: ±10%
    - Automated: ±10%
  - **Hemoglobin (g/dL)**
    - Manual: ±10%
    - Automated: ±10%

- **Accuracy of automated diff. compared with manual diff., per NCCLS H-296**
  - **WBC**
    - Manual: 1.0–18 x 10^9/L
    - Automated: 1.5–18 x 10^9/L
  - **Platedt**
    - Manual: 2±2
    - Automated: 3±3

- **Interfering substances**
  - **WBC**
    - High (17 ± 5 g/dL), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)
  - **Platedt**
    - High (17 ± 5 x 10^9/L), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)
  - **Glucose**
    - High (17 ± 5 g/dL), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)

**Demonstrated parameters**

- **Accuracy of automated diff. compared with manual diff., per NCCLS H-296**
  - **WBC**
    - Manual: 1.0–18 x 10^9/L
    - Automated: 1.5–18 x 10^9/L
  - **Platedt**
    - Manual: 2±2
    - Automated: 3±3

- **Interfering substances**
  - **WBC**
    - High (17 ± 5 g/dL), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)
  - **Platedt**
    - High (17 ± 5 x 10^9/L), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)
  - **Glucose**
    - High (17 ± 5 g/dL), high WBCs (20 ± 5 x 10^9/L), baseline WBCs (10–15 x 10^9/L)
<table>
<thead>
<tr>
<th>Name of instrument</th>
<th>Reper Diagnostics</th>
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<tbody>
<tr>
<td>555 White Piazza Rd.</td>
<td>080-431-1080</td>
</tr>
<tr>
<td>Tarrytown, NY 10591</td>
<td>e-mail: <a href="mailto:info@reper.com">info@reper.com</a></td>
</tr>
<tr>
<td>See related article, page 22</td>
<td><a href="http://www.reper.com">www.reper.com</a></td>
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### Tabulation Interface

<table>
<thead>
<tr>
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<tr>
<td>Standard name (SN)</td>
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<tr>
<td>NCI-TEXT</td>
<td>NCI-TEXT</td>
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<tr>
<td>System-specific code</td>
<td>System-specific code</td>
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<tr>
<td>Maintenance</td>
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<td>Acquisition program</td>
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</tr>
<tr>
<td>Dissemination features</td>
<td>Dissemination features</td>
</tr>
</tbody>
</table>

### Differential methods used

- **Linear:**
  - WBC count (WBC) count (WBC)
  - RBC count (RBC) count (RBC)
  - HLA (HLA) count (HLA)
- **Protein:**
  - WBC count (WBC) count (WBC)
  - RBC count (RBC) count (RBC)
- **Cellularity:**
  - Normal
  - Moderate
  - Severe

### Interfering substances

- **ISO:**
  - Normal
  - Moderate
  - Severe

### Validation and reporting

- **Interpreted by:**
  - Laboratory personnel
  - Pathologist
  - Clinical laboratory professional
- **Reporting format:**
  - Digital
  - Print
  - Both

### Additional features

- **Automated:**
  - Yes
  - No
- **Remote access:**
  - Yes
  - No
- **Referral:**
  - Yes
  - No
- **Quality control:**
  - Yes
  - No

### Equipment and supplies

- **Equipment:**
  - Microscopes
  - Microtitre plates
  - Pipettes
  - Microcentrifuges
  - Incubators
  - Ovens
- **Supplies:**
  - Tubes
  - Pipette tips
  - Filters
  - Reagents

### Laboratory standards

- **ISO 15189:**
  - Certified
  - Pending
  - Not applicable

### Legal and regulatory

- **Regulatory requirements:**
  - Yes
  - No
- **Compliance with regulations:**
  - Yes
  - No

### Conclusion

This laboratory utilizes advanced technologies to provide reliable and accurate results. Contact us for more information or to schedule an appointment.
### Differential method(s) used

**Cooler’s 3-0 biophysical flow cytometry with Accusort 580, Reaction Manager technologies:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Linearly</td>
<td>0.20–2.000</td>
</tr>
<tr>
<td>Precisely</td>
<td>0.00–1.000</td>
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**Cooler’s 3-0 VCS technology:**

<table>
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<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Linearity</td>
<td>0.00–1.000</td>
</tr>
<tr>
<td>Precision</td>
<td>0.00–1.000</td>
</tr>
</tbody>
</table>

### Interfering substances

- **MACR**
- **t-MACR**
- **t-MACR or t-tMACR**
- **IL-6**
- **IL-8**

### Interfering substances: differential

Not designated

### Additional features

- High-tripletpeak analysis and sorting

### Images and diagrams

No images or diagrams provided.
Tabulation

First year unit-installed in U.S. inhabitants
No. units installed in U.S. inhabitants per year

Text menu

Differential method(s)

App- and sex-specific reference range
Max. CBCs per lymphocyte, DMS & diph, per hr
Recommended average frequency of calls:
Tube sampling supported
Vaccination capability
Microscopic capability
Preparatory microscopic omission automatically or flags
procedures for aids blood

If other, indicate supported, per unit

LG interface formats supported
Information transferred on LG interface

System features

Interface avail. or planned to auto. specimen-handling system

Acquire barcode-reader placed on per GCIS standard A001

Time required for maintenance by lab personnel

Outreach maintenance records

Time from communication of problem to user

OMR can perform diagnostic via modem

Unprinted program based on cost-per-performed test

Distinguishable features

Part of 11
Beckman Coulter Inc. Martini M. Sci/Cellular Analysis Marketing mmedic@beckman.com
4001 Farm St. #200, Suite 200, San Jose, CA 95128
760-892-9871
www.bekman.com

Printer ABD Diagnostics Inc.
Troy Brown
Goodwill 235 Group Inc.
3400 Balboa
Irving, CA 92662
888-983-3001 ext. 535
www.abbdi.com
## Tabulation

<table>
<thead>
<tr>
<th>Test text</th>
<th>Tabulation</th>
<th>Test method used</th>
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</thead>
<tbody>
<tr>
<td>Test name</td>
<td>- Charlize</td>
<td>Cytochemistry, focused flow impedance, light absorbance</td>
</tr>
<tr>
<td>Test name</td>
<td>- SHC</td>
<td>DNA technology combining cytochemistry, focused flow impedance &amp; light absorbance of measurement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Linear</th>
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<tbody>
<tr>
<td>Precision:</td>
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<tr>
<td>Accuracy of manual diff. compared with manual diff. per NCCLS H-26A</td>
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<td>0-1200</td>
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</table>

<table>
<thead>
<tr>
<th>Interfering substances</th>
<th>- MHBC, PI-changes/iso-resistant RHBCs</th>
<th>- MHBC, PI-changes, iso-resistant RHBCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interfering substances</td>
<td>- cold agglutinins</td>
<td>- cold agglutinins</td>
</tr>
<tr>
<td>Interfering substances</td>
<td>- NCI</td>
<td>- NCI</td>
</tr>
</tbody>
</table>

### App- and sex-specific reference ranges

| Age and sex-specific reference ranges | yes | yes |

### Microscope availability

| Microscope availability | yes | yes |

### Test results

| Test results | yes | yes |

### Patient data for later comparison

| Patient data for later comparison | yes | yes |

### Microscope availability

| Microscope availability | yes | yes |

### Test results

| Test results | yes | yes |

### Laboratory priorities

| Laboratory priorities | yes | yes |

### Test results

| Test results | yes | yes |

### Microcontroller display

| Microcontroller display | yes | yes |

### Selection of desired specimen

| Selection of desired specimen | yes | yes |

### LD interface

| LD interface | proprietary, ASTM 1324 & 1326, IHT, ESR 998 | proprietary, ASTM 1324 & 1326, IHT, ESR 998 |

### LDRM codes transmitted with results

| LDRM codes transmitted with results | yes | yes |

### Raw data on readout

| Raw data on readout | yes | yes |

### Test results

| Test results | yes | yes |

### Distinguishing features

| Distinguishing features | hydrogen peroxide-resistant rhbc, extropeptidolysin |

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*Publication does not represent an endorsement by the College of American Pathologists.*
### Test Menu

**Laboratory**
- CBC, RBC, Hct, Hgb, MCV, MCH, MCHC, WBC, plt, metabolic, electrolytes, lipids, amylase, lipase, U/P ratio

**Specialties**
- Pathology

**Ferrous**
- Hepatitis B, Hepatitis C, HAV, HIV, syphilis, gonorrhea, chlamydia

**Other**
- Microbiology

### Differential and Other

**Blood Chemistry**
- Serum electrolytes (K+, Na+, Ca++, P, inorganic, glucose, lipids, lipoproteins, proteins, urea, uric acid, creatinine, LDH, ALT, AST, alkaline phosphatase, bilirubin, total protein, albumin, globulin, serum iron, iron-binding capacity)

**Urinalysis**
- Sediment examination, urine culture, urinalysis, creatinine, protein, glucose, ketones, leukocyte esterase, nitrite, pH, 

### Data Collation

**Printed Reports**
- Date, result, qualitative result, qualitative level, reagent lot number, reagent expiration date, specimen identification number, patient identification number, patient name, patient address, patient phone number, physician name, physician specialty, physician office address, physician office phone number, physician service address, physician service phone number, physician service name, physician service specialty, physician service office address, physician service office phone number, physician service office name, physician service office specialty

### Access to Information

**Availability**
- 24-hour service

**Billing Information**
- Medicare, Medicaid, private, cash, check, credit card

### Patient Privacy

**Confidentiality**
- The Laboratory provides confidential testing services to all patients, and all information is kept confidential.

### Additional Information

**Reference Ranges**
- **Male**: 14-80 years
- **Female**: 14-80 years

**Sample Volume**
- CBC: 0.1-0.5 mL
- Urinalysis: 0.5-1.0 mL

**Preservation**
- Blood: Ambient temperature
- Urine: Ambient temperature

**Test Information**
- Result validity: 24 hours

### Quality Assurance

**Validation**
- Results are validated by comparison with established reference ranges and by participation in external quality assurance programs.

### Technical Description

**Automation**
- The laboratory is equipped with state-of-the-art automated analyzers for accurate and consistent testing.

### Laboratory Billing

**Billing Code**
- CPT codes

### Laboratory Compliance

**Regulatory Compliance**
- The laboratory is fully compliant with all applicable federal, state, and local regulations.

### Laboratory Policies

**Safety**
- The laboratory follows strict safety protocols to ensure the safety of all patients and staff.

### Laboratory Manuals

**Manuals**
- Procedure manuals, quality control manuals, patient care manuals, and other relevant manuals are available upon request.

### Laboratory Personnel

**Staff**
- The laboratory is staffed by experienced and highly trained professionals.

### Laboratory Awards

**Awards**
- The laboratory has received multiple awards for excellence in patient care and quality assurance.

### Laboratory Address

**Address**
- 123 Main St, Anytown, USA

### Laboratory Phone Number

**Phone Number**
- (555) 123-4567

### Laboratory Fax Number

**Fax Number**
- (555) 123-4567

### Laboratory Website

**Website**
- www.lab.com
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<tr>
<th>Test-method</th>
<th>Test panel</th>
<th>Notes</th>
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<tr>
<td><strong>Charitable</strong></td>
<td>standard menu: Hoffmann, MIS, OVA, HPR, HPR, OVA, MIS</td>
<td>none</td>
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<tr>
<td><strong>Protein</strong></td>
<td>PE clamp, BBC agglut., isotropic, NAB ABN, ABC, ABC, ABC, ABC</td>
<td>PE clamp, HIM, ABC, ABC, ABC, ABC, ABC</td>
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<tr>
<td><strong>Reagent</strong></td>
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<td>PE clamp, HIM, ABC, ABC, ABC, ABC, ABC</td>
</tr>
<tr>
<td><strong>Lab</strong></td>
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<td>PE clamp, HIM, ABC, ABC, ABC, ABC, ABC</td>
</tr>
</tbody>
</table>

**Diagnostic features**

- **Clinical features**
- **Laboratory features**
- **Immunological features**
- **Molecular features**
- **Pathological features**
- **Radiological features**
- **Other features**

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</tr>
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</tr>
<tr>
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**Diagnostic features**

- **Clinical features**
- **Laboratory features**
- **Immunological features**
- **Molecular features**
- **Pathological features**
- **Radiological features**
- **Other features**

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**Diagnostic features**

- **Clinical features**
- **Laboratory features**
- **Immunological features**
- **Molecular features**
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**Diagnostic features**

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<tr>
<td>Test name</td>
<td>Normal range</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>CBC</strong></td>
<td>RBC: 4.5–5.5</td>
</tr>
<tr>
<td><strong>Hb</strong></td>
<td>13.5–17.0</td>
</tr>
<tr>
<td><strong>WBC</strong></td>
<td>4.0–11.0</td>
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**Notes:**
- All tests were performed on a hematology analyzer.
- Results were compared to the manufacturer's specified normal ranges.
- All samples were collected in ethylenediaminetetraacetic acid (EDTA) tubes.

**Additional Observations:**
- Platelet count was within normal limits.
- Hemoglobin concentration was within normal limits.
- Leukocyte count was within normal limits.

**Recommendations:**
- No further testing is required.
- Follow-up testing will be performed in 6 months.

---

**Hematology Panel:**
- Complete Blood Count (CBC)
- Hemoglobin (Hb)
- Hematocrit (HCT)
- Complete Blood Count with Differential (CBCwD)
- White Blood Cell Count (WBC)
- Differential white blood cell count
- Red Blood Cell Count (RBC)
- Platelet Count (PLT)
- Mean Corpuscular Volume (MCV)
- Mean Corpuscular Hemoglobin (MCH)
- Mean Corpuscular Hemoglobin Concentration (MCHC)
- Erythrocyte Sedimentation Rate (ESR)
- Blood Film Examination

**Blood Bank Testing:**
- ABO/Rh Blood Grouping
- Crossmatch
- Coagulation Tests
- Viral Markers

**Other Tests Available:**
- Liver Function Tests
- Renal Function Tests
- Lipid Panel

**References:**
- American Society of Hematology
- American Association of Blood Banks
- American Academy of Clinical Chemistry

**Further Information:**
- For more detailed information, please refer to the accompanying hematology reference manual.

---

**Hematology Report:**
- Date: 01/15/2023
- Specimen: Blood Sample
- Test Results: Normal

---

**Pathology Report:**
- Date: 01/16/2023
- Specimen: Biopsy Sample
- Histological Findings: Normal

---

**Conclusion:**
- The patient's laboratory results are within normal limits.
- No further action is required at this time.

---

**Follow-Up:**
- Repeat CBC in 6 months.
- Monitor for any new symptoms or changes in health.

---

**Additional Testing:**
- Consider referral to a hematologist for further evaluation.
- Order genetic testing for hemoglobinopathies.

---

**Phlebotomy:**
- Specimen collection: Blood sample
- Sampling site: Antecubital vein
- Method: Venipuncture

---

**Transport and Storage:**
- Store at room temperature.
- Transport in a cold chain.

---

**Informed Consent:**
- Patient has signed consent for the above-mentioned tests.

---

**Billing Information:**
- Test code: LAB-1001
- Fee: $50.00

---

**Supplementary Materials:**
- Laboratory protocol
- Quality control data
- Patient record

---

**Author:**
- Dr. John Doe

---

**Organization:**
- ABC Hospital Laboratory

---

**Disclaimer:**
- The information provided is for educational purposes only.
- Results are subject to interpretation by a licensed healthcare provider.

---

**Contact Information:**
- Laboratory Manager: 555-555-5555
- Medical Director: 555-555-5555

---

**References:**
- American Society of Hematology
- American Association of Blood Banks
- American Academy of Clinical Chemistry

---

**Further Reading:**
- Hematology: Basic Principles and Practice
- Clinical Laboratory Medicine
- Laboratory Science: Principles and Practice
### Name of instrument

**Tableau**

**Option*  |  Tableau software and veterinary software*  |  FSA cleared tests not clinically reviewed
---|---|---
**Tests not available but submitted for clearance**  |  none  |  none
**Tests in development**  |  none  |  none
**Tests unique to stander**  |  ---  |  ---

**Diagnostic method(s) used**

| Linearity  | Fluorescent flow cytometry  | Fluorescent flow cytometry
| --- | --- | ---
| **WBC cohort (%)**, **RBC cohort (%)**  | 0.0−1.0  | 0.0−1.0  |
| **Hemoglobin (g/dL)**, **Hematocrit (%)**  | 3.5−14.0  | 3.5−14.0  |
| **Absolute WBC count**  | 1−15 × 10^9/L  | 1−15 × 10^9/L  |

**Accuracy of automated diff. compared with manual diff.**

| Interfering substances  |  <0.5% ± 0.1%  |  <0.5% ± 0.1%  |
| **WBC**  |  cold agglutin, PM, aggs, cryoglobulin, lysis-resistant RBCs  |  cold agglutin, PM, aggs, cryoglobulin, lysis-resistant RBCs  |
| **RBC**  |  cold agglutin, severe megalocytosis, frag, RBCs, hyposklerot (≥ 100,000/L)  |  cold agglutin, severe megalocytosis, frag, RBCs, hyposklerot (≥ 100,000/L)  |
| **Other**  |  pseudohyper-IgM, PM, aggs, lysis-resistant megakaryocytes  |  pseudohyper-IgM, PM, aggs, lysis-resistant megakaryocytes  |

**Age- and sex-specific reference ranges**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reference</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WBC</strong></td>
<td>0.5−15 × 10^9/L</td>
<td>0.5−15 × 10^9/L</td>
</tr>
<tr>
<td><strong>RBC</strong></td>
<td>4.0−10 × 10^12/L</td>
<td>4.0−10 × 10^12/L</td>
</tr>
</tbody>
</table>

**Archives patient data for later comparison**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Yes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient-specific archiving</td>
<td>Yes</td>
<td>Yes</td>
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</table>

**Additional features**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Instrument to instrument comparison with the use of QC data</strong></td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td><strong>Histologic image and QC data printed as 1 report</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Sensible results can be received and retransmitted</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Sensible data can be formatted for reporting or report transmission</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Performable tasks</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Tags and alerts for follow-up, confirm, testing, or review</strong></td>
<td>Yes</td>
<td>Yes</td>
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**Distinguishing features**

- Remote diagnostics; online QC; random access; fluorescent optical plates; discrete testing; nucleic acid testing; randomized chartable report forms
- Remote diagnostics; online QC; random access; discrete testing; nucleic acid testing; randomized chartable report forms