A comparison of Sysmex UF-5000 flow cytometer and Fuchs-Rosenthal chamber in urine sediment analysis

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Urine analysis is a basic test in the clinical laboratory.

Urine sediment analysis is a part of urine analysis that gives laboratory professionals valuable information.

Since manual examination is the gold standard for analysis it is time consuming and work-intensive procedure.

To compare the performance of Sysmex UF-5000 flow cytometer with the manual Fuchs-Rosenthal chamber in terms of urine sediment analysis.
A total of 127 fresh urine samples from outpatient clinics are analyzed.

We used Sysmex UF-5000 flow cytometer for urine analysis and Fuchs-Rosenthal chamber for urine sediment analysis.
Materials and Methods-2

Collection of urine samples

Examination of urine sediment microscopically by 2 well trained personnel

Performing the examination of sediment by flow cytometer

Method comparison between manual microscopy and flow cytometer
We compared two methods by using Passing-Bablok regression analysis, Pearson correlation coefficient (r) and Bland-Altman bias plot.

Statistical analysis was performed using Analyse-it software version 3.80 (Analyse-it Software, Ltd., Leeds, UK), CLSI Statis-Pro software version 3.0.
Results

- A good correlation was observed between manual and automated white blood cell (WBC) counts in all urine samples.
  \( r = 0.988; y = 1.162x + 0.489; n = 127 \).

- UF-5000 demonstrated a significant proportional overestimation with Passing–Bablok regression (95% CI slope: 1.110 to 1.226).

- For red blood cell (RBC) counts, correlation between UF-5000 and the counting chamber was observed in all samples
  \( r = 0.966; y = 1.1x + 0.75 \).
Table 1. The comparison of WBC and RBC counts obtained with UF-5000 and the reference counting chamber

<table>
<thead>
<tr>
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<th>Passing-Bablok regression</th>
<th>Bland-Altman difference plot</th>
<th>95% Limits of agreement (mean bias ±1.96 SD)</th>
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<tbody>
<tr>
<td></td>
<td>r value</td>
<td>Slope (95% CI)</td>
<td>Intercept (95% CI)</td>
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<tr>
<td>WBC</td>
<td></td>
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<tr>
<td>All Sample (n=127)</td>
<td>0.988</td>
<td>1.162 (1.110 - 1.226)</td>
<td>0.4890 (-0.1069 to 1.0000)</td>
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<tr>
<td>WBC &lt;20 × 10⁶ /L (n=71)</td>
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<tr>
<td>RBC</td>
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<tr>
<td>All Sample (n=126)</td>
<td>0.966</td>
<td>1.1 (1.038 to 1.180)</td>
<td>0.75 (- 0.1 to 1.25)</td>
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<td>RBC &lt;20 × 10⁶ /L (n=77)</td>
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Results-4
Conclusion

- This study showed us that urine analysis with flow cytometers is a very promising area.
- Automation is getting more commonly used in clinical laboratories in the world.
- It is likely to replace the manual microscopy and thus reduce the workload and also time and energy needed in laboratories.

References:
3. CEP evidence review CEP 10030 automated urine screening systems; 2010.