# INTEREST OF HORIBA MEDICAL YUMIZEN® H1500/H2500 TECHNOLOGY IN PATIENTS WITH WBC-DIFF ABNORMALITIES DUE TO MALIGNANT BLOOD DISEASE OR CHEMOTHERAPY TREATMENT.

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## INTRODUCTION

The HORIBA Medical Yumizen® H1500/H2500 is a new automated hematology analyzer, generating complete blood counts with WBC (White Blood Cell) differential.
Most samples from patients with altered hematopoiesis trigger WBC-Diff flag because of poor ability of cell separation and need slide review by microscopy to confirm or infirm the WBC differential.
In this study we evaluated the flagging performance in the WBC differential of the Yumizen®H1500/H2500 in comparison with our routine analyzer HORIBA Medical Pentra Nexus in patients with pathology or treatment affecting hematopoiesis (under chemotherapy affecting hematology parameters or with onco-hematologic disorder).

## SAMPLES, MATERIAL & METHODES

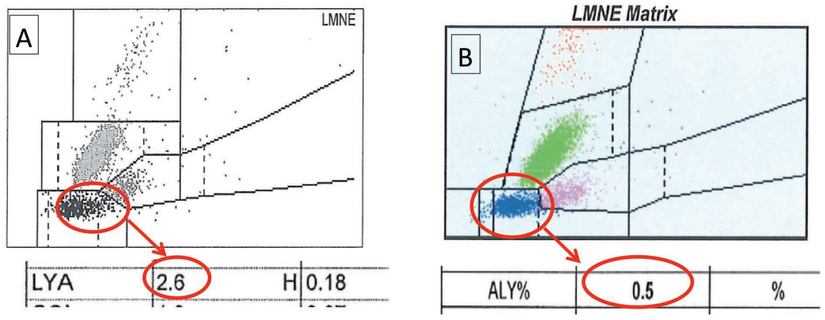
228 samples with slide reflex according to standard rules (ISLH and GFHC* rules) on the Pentra Nexus were systematically rerun within 4 hours on the Yumizen® H1500/H2500.
128 (56%) samples were from patients with chronic hematological disorder and 100 (44%) from patients under chemotherapy for solid tumor.
Differential counts were performed by optical microscopy and 10 colors flow cytometry. One single FCM tube (CD36-FITC, CD14-PE, CD13-ECD, HLA-DR-PC5.5, CD19-PC7, CD2-APC, CD71-AA700, CD16-AA750, CD294-PB, CD45-KO ) was systematically performed and analyzed on a Beckman-Coulter Navios cytometer to confirm differential and identify normal or abnormal cell populations (monocytes, abnormal lymphocytes, blast, immature granulocytes).
The WBC-diff identifies groups of cells (lymphocytes, neutrophils, monocytes, eosinophils) by definition of a lower discriminator and upper discriminator. Flags are generated when the distinction between groups of determined cells is difficult or impossible. On the Pentra Nexus discriminators are previously set on the analysis software, as on the Yumizen®H1500/H2500 discriminators are variable and determined by algorithm for each sample.
*French Group for Cell Hematology

## RESULTS

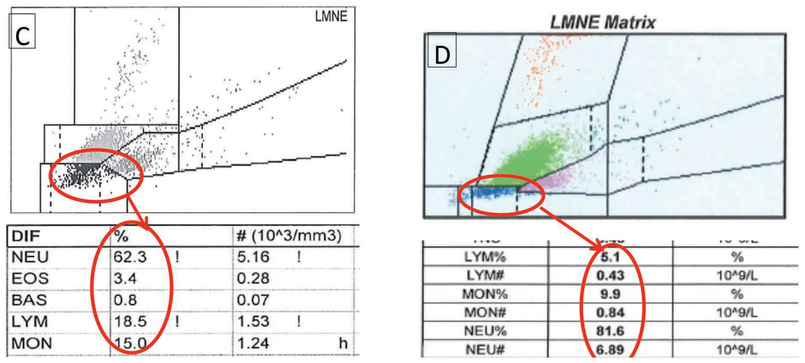
Table 1 : Comparison of **WBC-flag frequency** between the 2 analyzers

| | Pentra Nexus | Yumizen H1500/H2500 |
|---|---|---|
| **Total WBC-Diff flag** | **66,7%** | **47,6%** |
| Atypical lymphocytes | 7,9% | 4,8% |
| Lympho/neutrophils alone | 10,1% | 1,75% |
| Lympho/neutrophils with any other flag | 6,1 % | 5,3% |
| Abnormal neutrophils (alone) | 11,4% | 11,8% |
| Abnormal monocytes | 10,1% | 12,3% |
| NRBC | 8,3% | 3,1% |

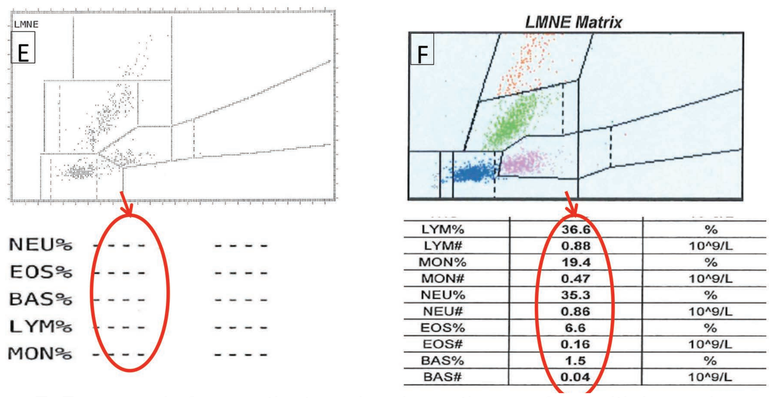
Figure 1 : Representative examples of **better cell separation** by the Yumizen®H1500/H2500 matrix algorithm (B, D, F) compared to the Pentra Nexus (A, C, E):




A, B : sample from patient with B non Hodgkin lymphoma




C, D : sample from patient under chemotherapy for liver carcinoma




E, F : : sample from patient under chemotherapy for multiple myeloma

Figure 2 : FCM confirms that **monocyte separation is more accurate on the Yumizen® H1500/ H2500** (C, D) as compared to Pentra Nexus (A,B)

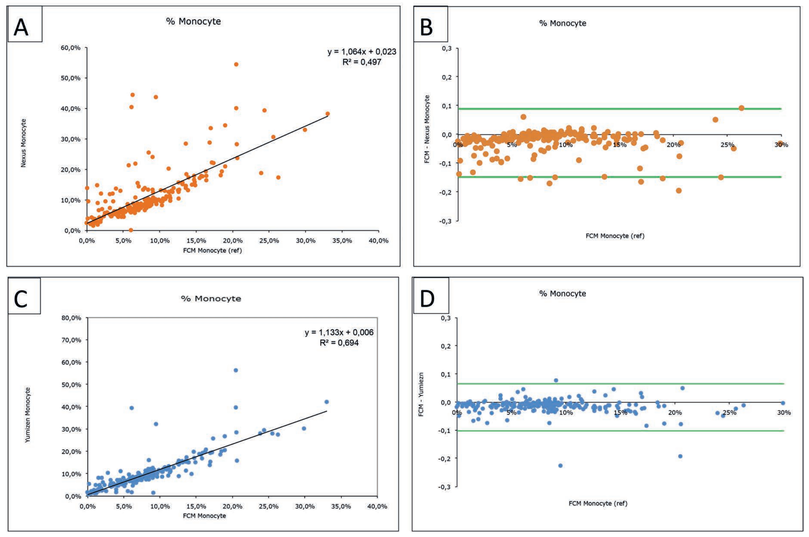
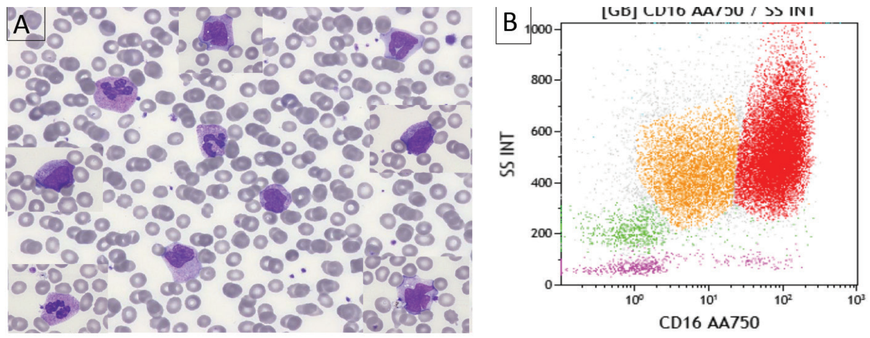



Figure 3 and table 3: typical slide of post chemotherapy altered hematopoietic cells (A), identification of cells by FCM (red = mature neutrophils, orange = immature granulocytes, green = monocytes, pink = lymphocytes) (B) and comparison of cell classification (table 3)




| | Nexus | Yumizen | FCM | Manual |
|---|---|---|---|---|
| Monocytes | 11,9% | 5,2% | 3,2% | 2% |
| IMG | 22,2% | 28,7% | 26,1% | 27% |

Table 2 : Comparison of flagging performance between the 2 analyzers

| | Pentra Nexus | Yumizen H1500/H2500 |
|---|---|---|
| **False positive*** | **36,8%** | **25,2%** |
| Specificity | 53,3% | 69,3% |
| Precision | 63,2% | 74,8% |

* False positive = flag triggering slide review but no change in WBC-diff result

## CONCLUSION

Our study focused on WBC-flag triggering slide review by microscopy in patients with altered hematopoiesis. Overall, the Yumizen®H1500/H2500 analyzer demonstrated improvement of WBC-diff analysis and reliability as compared to our routine analyzer Pentra Nexus, a better precision and a significant decrease (-21%) for unnecessary morphology reviewing by microscopy, saving significant time in our laboratory.