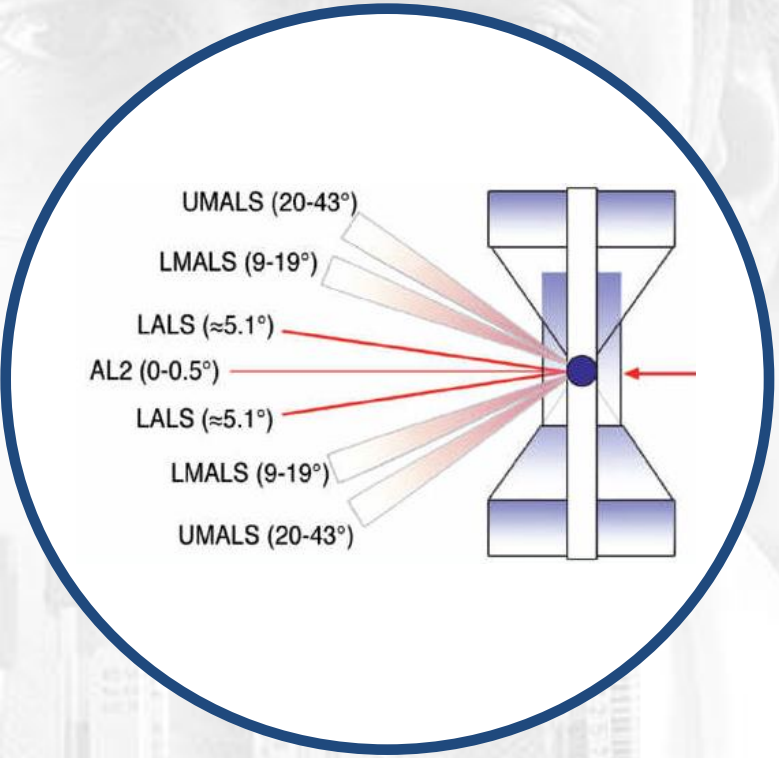
UniCel® DxH 800
Coulter ® Hücresel Analiz Sistemi

Nalan Sezer
Beckman Coulter
Ürün Uzmanı

Flow Sitometrik Dijital Morfoloji



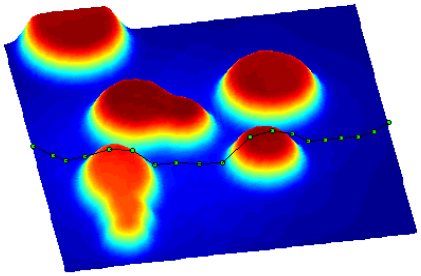
VCSn teknolojisi:

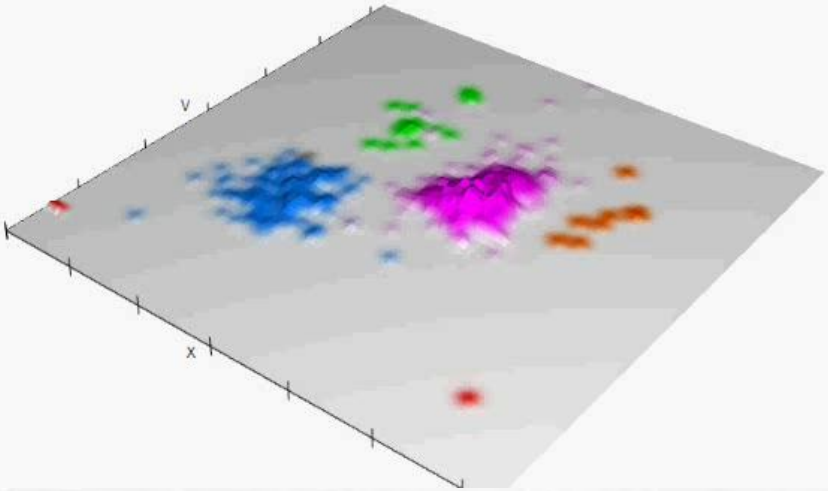
- **Volume**
- **Conductivity**
- **5 açılı lazer saçılımı**

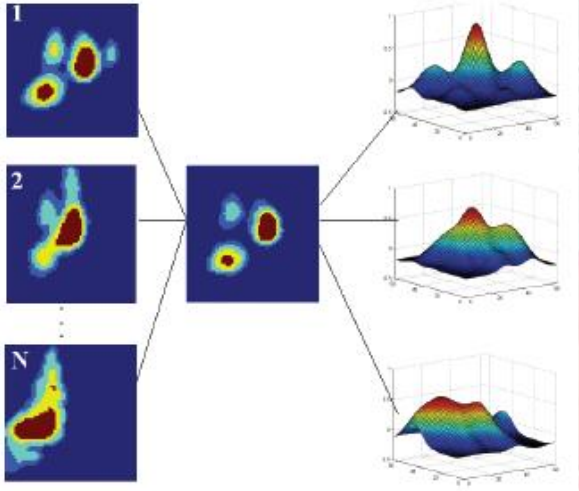
Hücre başına 29 ölçüm, 10 kat fazla veri

Formül lökosit sonuçları; hücre büyüklüğü, şekli ve morfolojisi hakkında ± 250,000 bilgiye dayanarak oluşturulur!

Üç Boyutlu Yüzey Plot Analizi

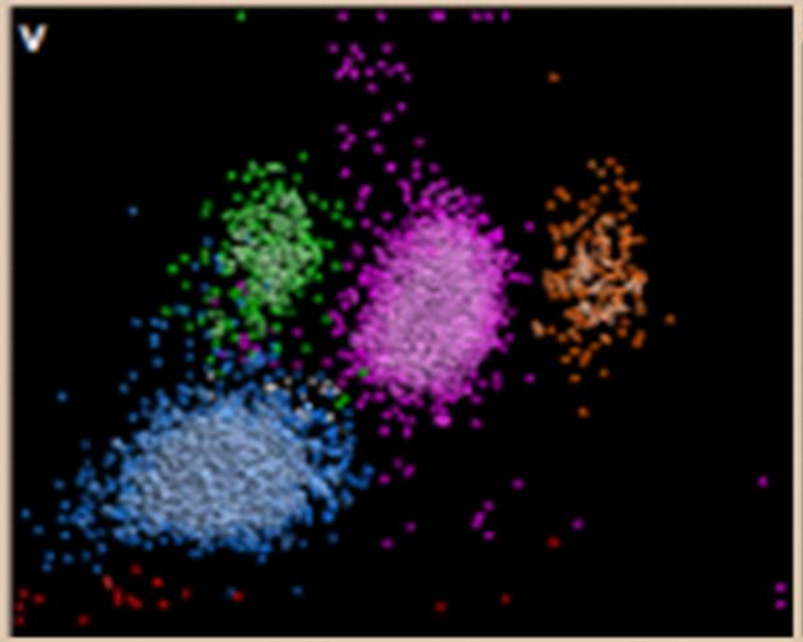






Yüzey Plot Analizi Anormal örneklerde üstün performans

Cell Population Data

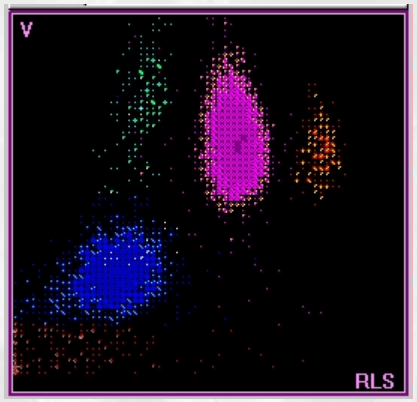


DIFF

28/10/2008 19:32:53				
Test	Result	Flags	Previous	Days
NE	56.3			
LY	36.7			
MO	3.9	L		
EO	2.5			
BA	0.6			
NE#	3.9			
LY#	2.6			
MO#	0.3			
EO#	0.2			
BA#	0.0			
NRBC	0.2			

	NE		LY		MO		EO	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
V	159	23.31	97	16.22	170	22.52	143	17.06
C	148	5.70	121	6.64	129	4.16	152	3.61
MALS	127	13.00	84	17.12	91	9.88	193	10.09
UMALS	134	11.85	88	18.53	105	10.04	210	10.13
LMALS	116	18.08	73	19.33	75	13.67	174	12.81
LALS	133	41.96	34	10.30	64	22.74	134	38.73
AL2	135	15.05	68	11.01	112	12.67	117	8.57

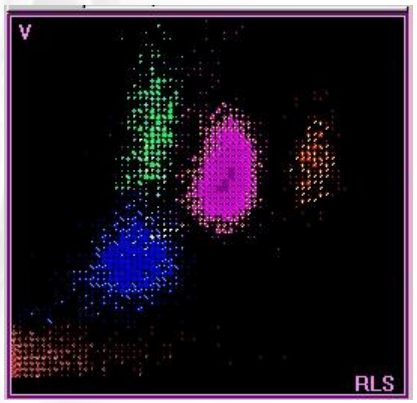
Vit B12 Eksikliği



MVNE 171.4

19.03.2008

Vit B12 = 32

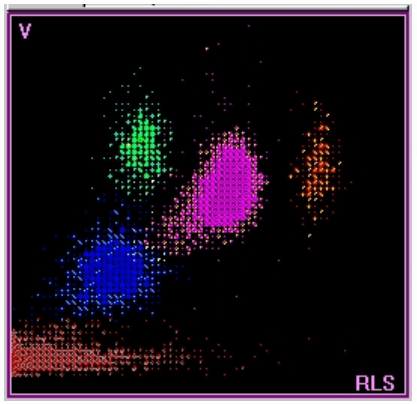


MVNE 150.3

03.04.2008

Vit B12 = 1139

2 hafta sonra



MVNE 139.4

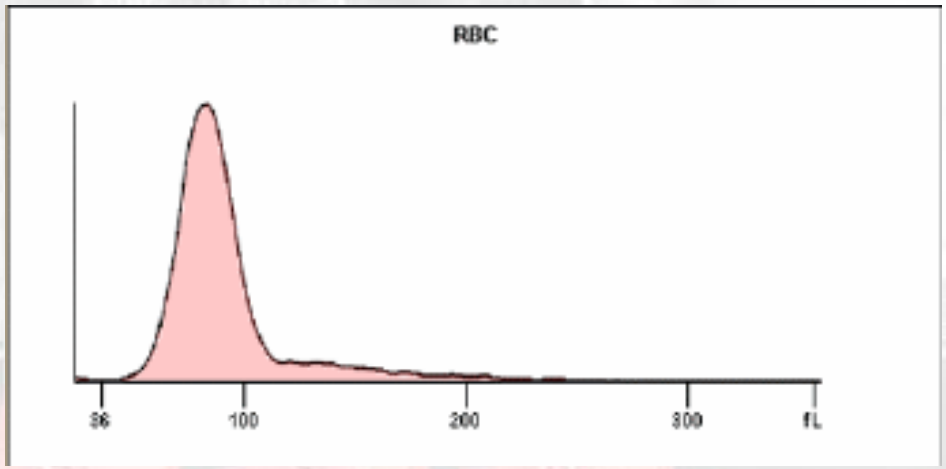
06.05.2008

Vit B12 = 421

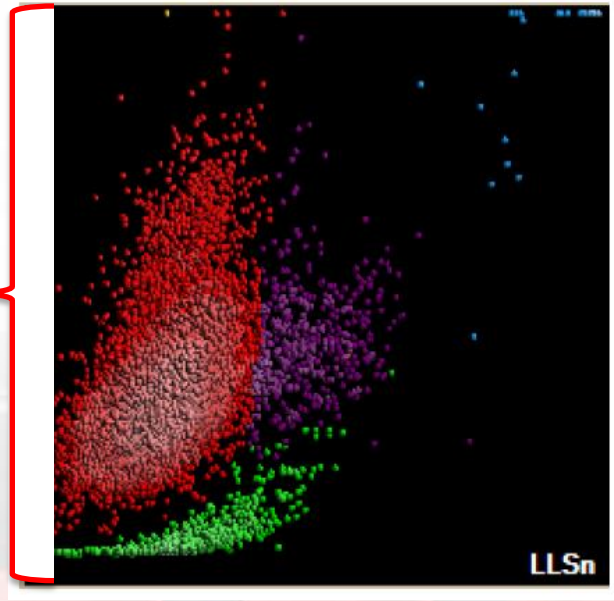
7 hafta sonra

MSCV ile sferosit tespiti

@MSCV	Derived from RET measurements in VCSn technology	**Mean Sphered Cell Volume** • Sphered red cells that are cleared of hemoglobin in preparation for Retic measurements • Expressed in fL



MSCV



RETIC

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Evaluation of mean sphered corpuscular volume for predicting hereditary spherocytosis

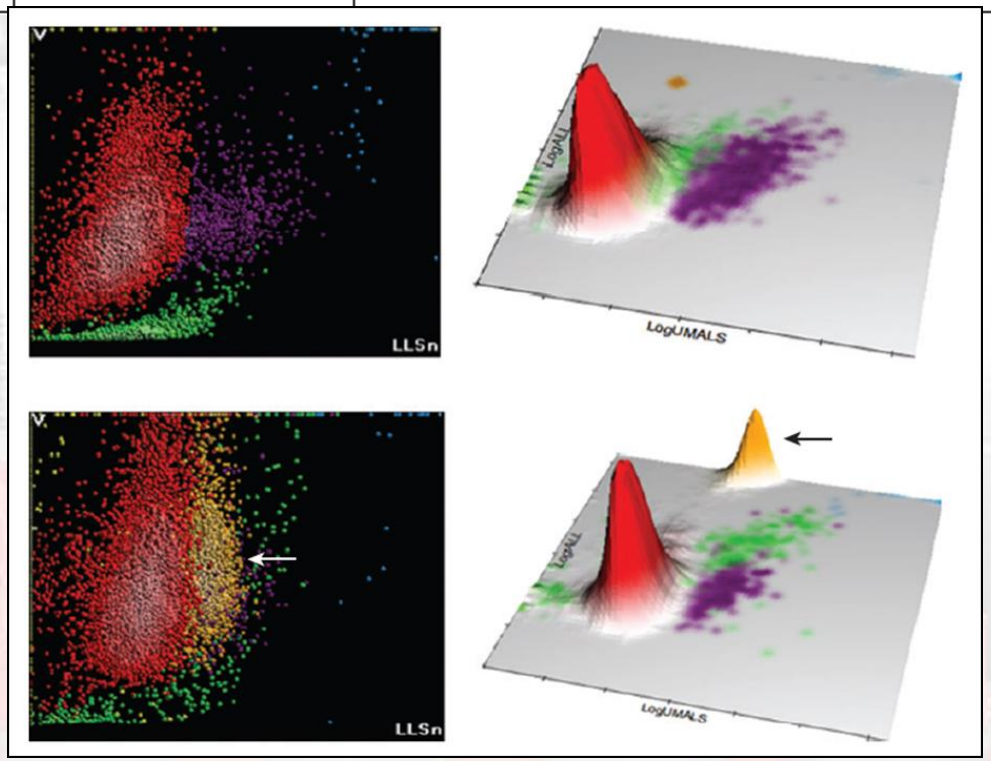
J. BROSÉUS, B. VISOMBLAIN, J. GUY, M. MAYNADIÉ, F. GIRODON

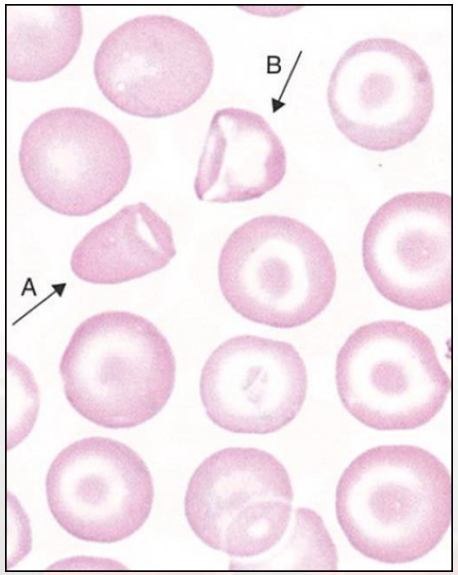
SUMMARY

Hereditary spherocytosis (HS) is a common red blood cell disorder. It has been shown that the mean sphered corpuscular volume (MSCV), an artificial volume, is always lower than the MCV in HS and also in some autoimmune haemolytic anaemia (AIHA). Our purpose was to assess the reliability of MSCV in routine practise, and its relevance in screening for HS. Comparison of MSCV and MCV was undertaken in a prospective study of 366 patients with anaemia. In addition, included were patients previously diagnosed to have HS ($n = 33$) or AIHA ($n = 16$). When MSCV was lower than MCV, a flow cytometric (FC) test for HS was performed. Delta (MCV–MSCV) values >9.6 fl were obtained for all HS patients. A wider spread of delta (MCV–MSCV) values was obtained for AIHA patients whose red cells gave FC test results negative for HS. In the ROC curve analysis, the determination of delta (MCV–MSCV) value has a 90.57% specificity and 100% sensitivity for HS. MSCV is a reliable automated parameter indicating possible HS. When a delta (MCV–MSCV) value is >9.6 fl, the FC test and the Coombs test are required in the differential diagnosis of HS and some AIHA.

UGC_Unghosted Cells

@UGC	Derived from RET measurements in VCSn technology	**Unghosted Red Cell Percent** • Red cells that are incompletely cleared of hemoglobin enumerated from the RET in VCSn technology • Expressed as a percentage of total RBC events
@UGC#	Derived from RET measurements in VCSn technology	**Unghosted Red Cell Absolute Number** • @UGC# = (@UGB * RBC)/100 • Expressed as N X 10^6 cells/µL





DE GRUYTER DOI 10.1515/cclm-2013-0676 — Clin Chem Lab Med 2014; 52(5): 693–699

Wonbae Lee, Jung-Ho Kim, In Kyung Sung, Sung Kyun Park, Seong Taek Oh, Hun-Hee Park, Yeon-Joon Park, Yonggoo Kim, Eun-Jee Oh, Myungshin Kim, Hae-Il Park and Kyungja Han*

Quantitative detection of target cells using unghosted cells (UGCs) of DxH 800 (Beckman Coulter)

Abstract

Background: In the Retic channel of DxH 800 (Beckman Coulter), the red blood cells (RBCs) resistant to hemoglobin clearing are counted as unghosted cells (UGCs). The aim of this study was to evaluate that the UGC is a surrogate marker for both the detection and counting of target cells.

Methods: In total, 1181 samples including 22 from iron deficiency anemia (IDA) patients, 95 from jaundice, 2 from sickle cell anemia, 3 from thalassemia, 1 cord blood, and 269 from normal controls were analyzed. Slides were prepared from all samples except normal controls and target cells were counted for correlation analysis of target cell counts to UGCs.

Results: The normal control samples showed 0.01% (0%–0.01%) UGCs, and the reference range was set at ≤0.02%. The IDA samples showed 0.015% (0.01%–0.03%) UGC count and 0.05% (0%–0.2%) target cell count. The jaundice samples showed 0.98% (0.1%–5.36%) UGC count, and 1.4% (0.1%–7.0%) target cell count. The two sickle cell anemia samples showed 0.41% and 3.74% UGC counts and 0.4% and 11.5% target cell counts. A cord blood sample showed 0.01% UGCs and 0% target cells. The three thalassemia samples showed 0.01%, 1.99%, and 7.82% UGC counts and 0%, 1.4%, and 15.5% target cell counts. The samples showing poikilocytosis other than target cells showed normal UGC count (≤0.02%). The positive predictive value of UGCs was 58.2% (124/213) and the negative predictive value was 96.8% (674/696). The UGC counts were well correlated to the manual target cell counts ($r=0.944$, $p=0.000$).

Conclusions: This study demonstrates for the first time in the literature that a hematological parameter obtained automatically every time a reticulocyte counting is performed can be used to both screen for the presence of target cells and reliably quantify them.

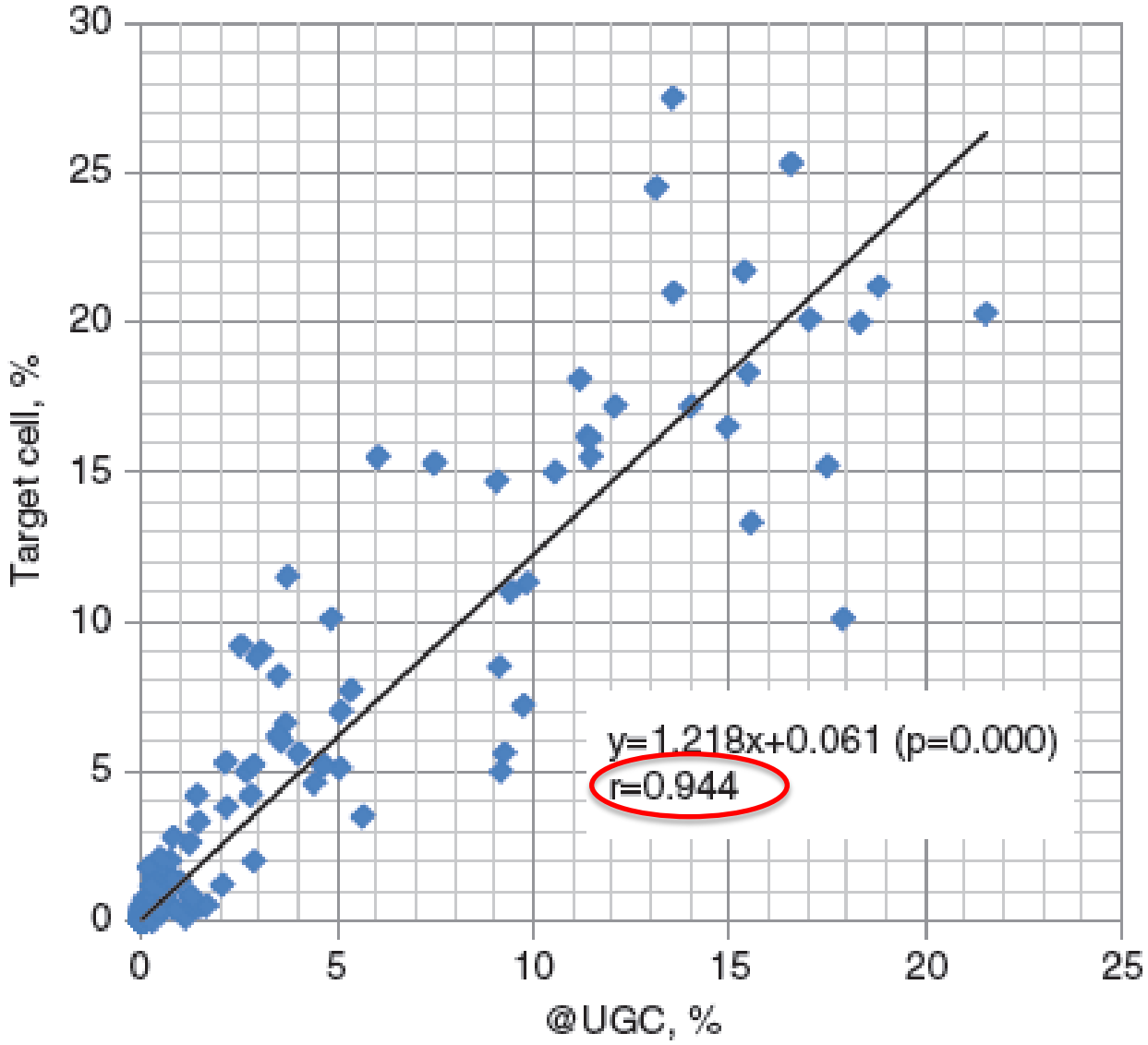
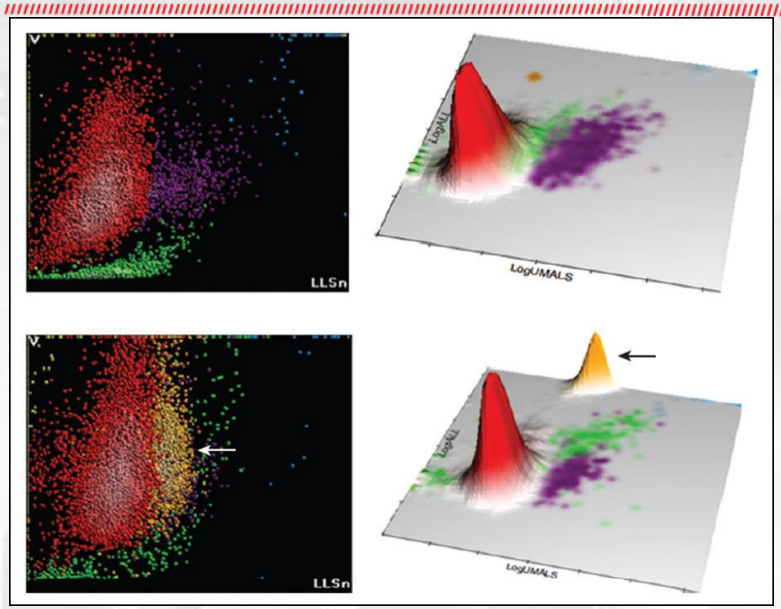


Figure 4 Correlation of UGC count to the target cell count in all cases except normal controls (n=907).

UGC_Unghosted Cells



Cell Population Data @

	RETIC		NON-RETIC		UGC	
	Mean	SD	Mean	SD	Mean	SD
V	75	22.97	45	16.99	138	75.44
C	71	18.55	69	17.72	58	40.93
MALS	135	27.81	50	18.50	95	37.15
UMALS	141	26.11	57	17.67	93	25.93
LMALS	128	31.44	39	19.48	94	52.23
LALS	128	28.28	54	20.60	171	76.71
AL2	166	30.08	104	23.77	246	15.11

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Evaluation of the new red cell parameters on Beckman Coulter DxH800 in distinguishing iron deficiency anaemia from thalassaemia trait

E. H. Y. NG, J. H. W. LEUNG, Y. S. LAU, E. S. K. MA

SUMMARY

Introduction: The new red blood cell (RBC) parameters such as reticulocyte haemoglobin content and percentage of hypochromic red cells or equivalent, although useful in the laboratory assessment of iron deficiency anaemia (IDA), are confounded by thalassaemia trait (TT). We aim to evaluate the new red cell parameters on the Beckman Coulter DxH800 in distinguishing between IDA and TT.

Methods: A total of 246 normal subjects, 102 patients with IDA and 115 subjects with TT were accrued for the study. The parameters studied were red blood cell size factor (RSF), low haemoglobin density (LHD%), microcytic anaemia factor (MAF), standard deviation of conductivity of the nonreticulocyte population (SD-C-NRET) and unghosted cell (UGC). Comparison between groups was performed by Student's *t*-test, and the diagnostic performance was determined by receiver operating characteristic (ROC) curve analysis.

Results: Both the LHD% and RSF were significantly higher in IDA than TT, whereas MAF and SD-C-NRET were significantly lower. The SD-C-NRET showed the best diagnostic performance as a single parameter. A formula, [(RBC + Hb) × (HCT + SD-C-NRET)]/RDW-SD, was devised to distinguish between IDA and TT. With a cut-off value of 23, the area under the curve (AUC) was 0.995 (95% CI of 0.99–1.00), the sensitivity was 97%, and the specificity was 99.1%.

Conclusions: The new RBC parameters on Beckman Coulter DxH800 provide useful information in distinguishing between IDA and TT, which is important for clinical decision-making and for streamlining laboratory testing. A new formula is devised that performs better than other discriminant functions in the literature.

%LHD ve RSF

@LHD	Calculated	**Low Hemoglobin Density** • $@LHD = \sqrt{1-\left(\frac{1}{1+e^{(d*(q-MCHC))}}\right)}*100$ • Where d and Q are constants • Uses the corrected MCHC, when appropriate • Expressed as a percentage

@RSF	Calculated	**Red Blood Cell Size Factor** • Characterizes the red cell size • $@RSF = \sqrt{(MRV*MCV}$

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Low hemoglobin density potential marker of iron availability

E. URRECHAGA*, M. UNCETA†, L. BORQUE‡, J. F. ESCANERO‡

SUMMARY

Introduction: Low hemoglobin density (LHD%) is a new parameter provided by Beckman-Coulter derived from the mean cell hemoglobin concentration, using the mathematical sigmoid transformation

$$\mathrm{LHD\%} = 100 * \sqrt{1 - (1/(1 + e^{1.8(30 - \mathrm{MCHC})}))}.$$

This study investigated the reliability of LHD% for the assessment of iron status in the presence of inflammation.

Methods: Healthy subjects ($n = 90$) and patients with iron deficiency (IDA, $n = 110$), chronic kidney disease (CKD, $n = 65$) and anemia of chronic disease (ACD, $n = 85$; 24 were iron deficient and 61 were iron sufficient) were analyzed on a LH 780 analyzer (Beckman Coulter Inc., Miami, FL, USA).

Independent samples U test and receiver operating characteristic (ROC) curve analysis were applied. To determine the concordance between LHD% and soluble transferrin receptor (sTrR) Cohen's κ index was calculated.

Results: LHD % values showed no statistical difference in patients with IDA and patients with ACD accompanied with IDA ($P = 0.6427$); LHD% values in these patients were significantly different ($P < 0.0001$) compared with the iron-sufficient patients with ACD.

ROC analysis for LHD% in the detection of iron deficiency showed the following: area under curve 0.903; cut off 5.5%, sensitivity 88.6%, specificity 76.9%; κ index, 0.65.

Conclusion: LHD% is a reliable parameter for the detection of iron deficiency in patients with anemia in the presence of inflammation.

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Low hemoglobin density potential marker of iron availability

E. URRECHAGA*, M. UNCETA†, L. BORQUE‡, J. F. ESCANERO‡

	Healthy	CKD	IDA	ACD	ACD/IDA	ACD/Iron replete
n	90	65	110	85	24	61
RBC (10^{12}/L)	4.95 (0.37)	3.8 (0.46)	4.4 (0.52)	3.81(0.7)	3.6 (0.75)	3.9 (0.55)
Hb (g/L)	151 (9)	114 (13)	98 (10.6)	107 (14)	105 (13)	108 (14)
MCV (fL)	90.9 (2.9)	94.9 (5.9)	75.8 (3.7)	89.7 (8.1)	88.7 (9.6)	90.1 (6.6)
MCH (pg)	30.5 (0.9)	30.2 (2)	21.5 (1.4)	28.4 (3.6)	26.2 (3.7)	29.3 (2.4)
MCHC (g/L)	335 (9)	324 (12)	317 (9.2)	327 (14)	318 (15)	331 (12)
LHD%	2.3 (0.9–4.1)	8.9 (4.0–12.6)	22.3 (5.5–54.0)	14.2 (4.5–68.9)	24.1 (5.1–68.9)	10.5 (4.5–14.0)
Fe (µmol/L)	17.1 (2.3)	11.5 (5.4)	5.1 (3.5)	9.9 (9)	10.9 (9.5)	9.4 (4.3)
Transf (g/L)	2.46 (0.3)	1.63 (0.36)	2.78 (0.28)	2.0 (0.55)	1.88 (0.52)	2.08 (0.62)
Ferr (µg/L)	103 (54)	404 (237)	22 (37)	263 (305)	336 (320)	232 (260)
Sat (%)	28 (5.9)	28 (14)	9 (6)	20 (16)	23 (18)	19 (10)
sTfR (nmol/L)	15.1 (2)	18.4 (4.1)	41.6 (15.5)	20.3 (6.6)	30.8 (8.3)	17.9 (6.1)

ACD, anemia of chronic disease; CKD, chronic kidney disease; IDA, iron deficiency anemia; RBC, red blood cells; Hb, hemoglobin; MCV, mean cell volume; MCH, mean cell hemoglobin; MCHC, mean cell hemoglobin concentration; LHD%, low hemoglobin density; Transf, transferrin; Ferr, ferritin; Sat, % transferrin saturation; sTfR, soluble transferrin receptor.

The values of LHD% are median (range); the remaining parameters are reported as mean (standard deviation).

Iron deficiency was defined by a sTfR > 21 nmol/L.

Clinical utility of the new beckman-coulter parameter red blood cell size factor in the study of erithropoiesis

E. URRECHAGA

SUMMARY

CHr has been used as a diagnostic tool, together with biochemical markers, to distinguish IDA from ACD, and is incorporated to NKF-K/DOQI guidelines for the monitoring of rHuEPO therapy. The measurement of CHr has been restricted to the analysers of a single manufacturer, Siemens. Red blood cell size factor (RSf) is a new parameter provided by Beckman-Coulter which joins together the volume of erythrocytes and the volume of reticulocytes

$$\mathrm{RSf} = \sqrt{\mathrm{MCV} \times \mathrm{MRV}}$$

The aims of the study were to establish the values of RSf in normal population and in different types of anemia to investigate its clinical usefulness in the study of erythropoiesis and its correlation with CHr. Samples from 449 patients (learning group) were run sequentially on both LH 750 (Beckman-Coulter) and Advia 2120 (Siemens) analysers. Good correlation between CHr and RSf was observed, $r^2 = 0.85$. Receiver operating characteristic curve analysis for RSf and the diagnosis of restricted erythropoiesis

Cut off	87.7 fl
AUC	0.983
Sensitivity	99.4%
Specificity	90.6%

The diagnostic usefulness of RSf was evaluated on a validation group which included 220 consecutive patients with anemia. This study shows a very good level of agreement between RSf and CHr. Both are suitable parameters for the study of erythropoiesis.

Clinical utility of the new beckman-coulter parameter red blood cell size factor in the study of erithropoiesis

E. URRECHAGA

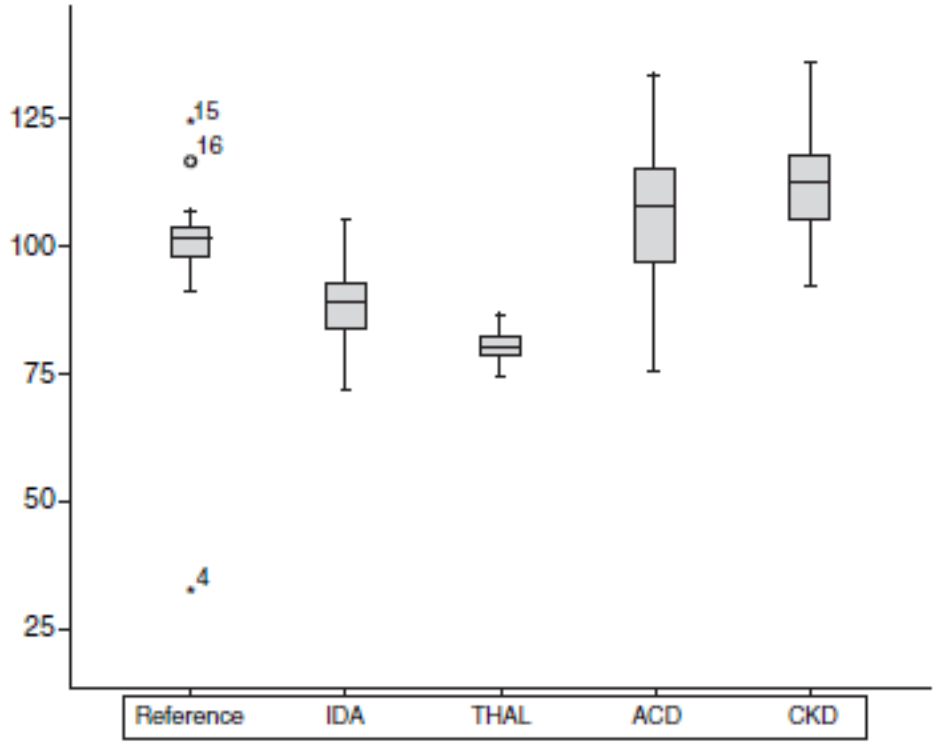

Figure 3. Box and whisker plot showing red blood cell size factor (RSf) distribution in the different groups of the learning set of patients.


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