

Vyšetřované parametry na hematologických analyzátorech a mikroskopicky

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Parametry krevního obrazu

- **WBC** - leukocyty
White Blood Cells
(bílé krvinky)
 - **RBC** - erythrocyty
Red Blood Cells
(červené krvinky)
 - **HGB**
Hemoglobin
 - **HCT**
Hematocrit
 - **MCV**
Mean Cell Volume
(střední objem RBC)
 - **PLT** - trombocyty
Platelets
(krevní destičky)
 - **NRBC**
normoblasty
 - **RETI**
Reticulocyte
- Diferenciální rozpočet WBC**
- **NEU**
(neutrofil)
 - **LYM**
(lymfocyty)
 - **MONO**
(monocyty)
 - **BASO**
(basofily)
 - **NRBC**
- **MCH**
Mean Corpuscular HGB
 - **MCHC**
Mean Corpuscular HGB Concentracion
 - **RDW**
RBC distribution width
(distribuční šíře velikosti RBC)
 - **MPV**
Mean PLT Volume
(střední objem PLT)
 - **PCT**
Platelets crit (trombocrit)
 - **PDW**
PLT distribution width
(distribuční šíře velikosti PLT)
 - **IPF**
Immature PLT factor
 - **IRF**
Immature RETI factor

Parametry KO – pro klinické účely

- ***WBC** a ***DIF** ($10^9/L$, %)
- ***RBC** ($10^{12}/L$)
- ***HGB** (g/L)
- **MCV** (fL)
přímo (*) měřený nebo počítaný {HCT/RBC}
- **HCT** (L/L)
přímo (*) měřený nebo počítaný {RBCxMCV}
- **MCH** {HGB/RBC} (pg)
průměr celkového HGB na jeden erytrocyt
- **MCHC** {HGB/HCT} (g/L)
průměr koncentrace HGB na jeden erytrocyt
- **RDW** {z MCV} (%CV)
heterogenita velikosti RBC populace
- ***NRBC** ($10^9/L$, NRBC/100WBC)
- ***PLT** ($10^9/L$)
- ***MPV** (fL)
- **PCT** {PLTxMPV} (mL/L)
- **PDW** {z MPV}
heterogenita velikosti PLT populace
- ***RETI** ($10^9/L$, %)
- **IRF** (podíl)
{nezralé RETI/všechny RETI}
- **IPF** (podíl)
{nezralé PLT/všechny PLT}
- počet krevních buněk dle vybraných *CD znaků (speciální parametr)

Poznámka: * = přímo měřené parametry; ostatní parametry jsou počítané

Parametry KO – *pro laboratorní účely*

➤ WBC

- ✓ vitalita
- ✓ počet buněk predikujících přítomnost / nástup progenitorových buněk CD34+
- ✓ susp.počet: tyčí, nezralých granulocytů (IG), blastů, atypických LY
- ✓ suspektní patologická hlášení

➤ BF (*body fluid - tělní tekutiny*)

- ✓ počet WBC
PMN - polymorfonukleáry
MN - mononukleáry
- ✓ počet RBC

➤ PLT

- ✓ počet malých PLTs
- ✓ počet velkých PLTI
- ✓ suspektní patologická hlášení nebo sraženiny

➤ RBC

- ✓ podíl: mikrocytů, makrocytů
- ✓ podíl: hypochromních, hyperchromních RBC
- ✓ HDW (HGB distribution width) heterogenita HGB v RBC
- ✓ střední objem RETI
- ✓ střední množství HGB v RETI
- ✓ střední koncentrace HGB v RETI
- ✓ podíly různě vyzrálých RETI
- ✓ množství schistocytů (fragmentů RBC)
- ✓ suspektní patologická hlášení

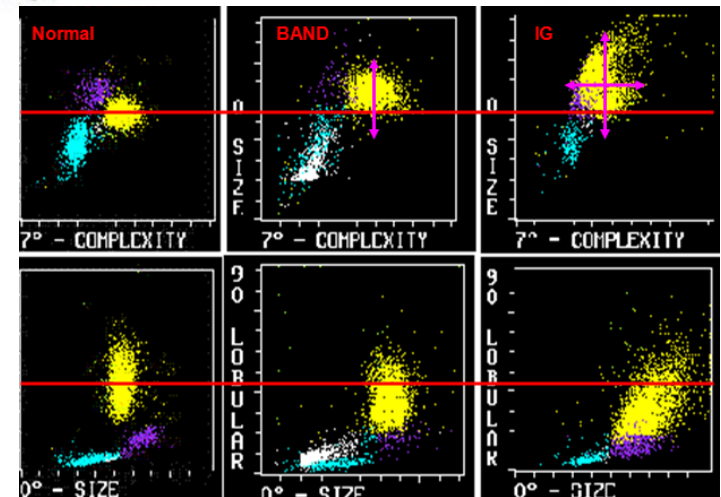
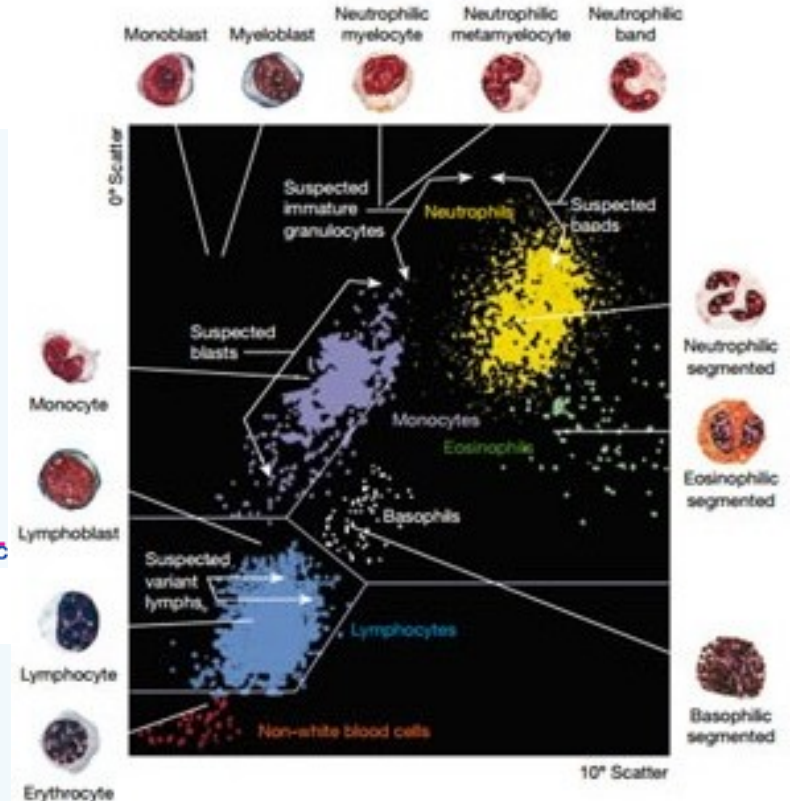
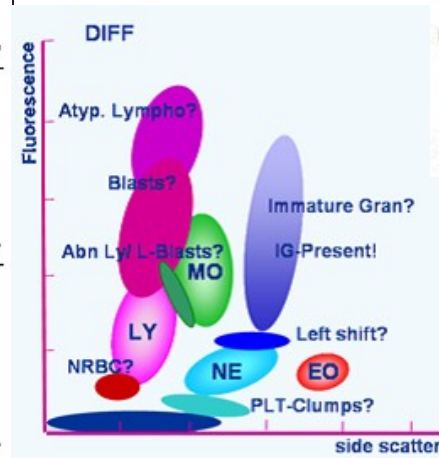
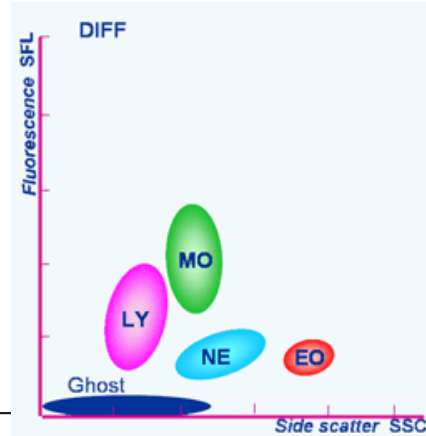
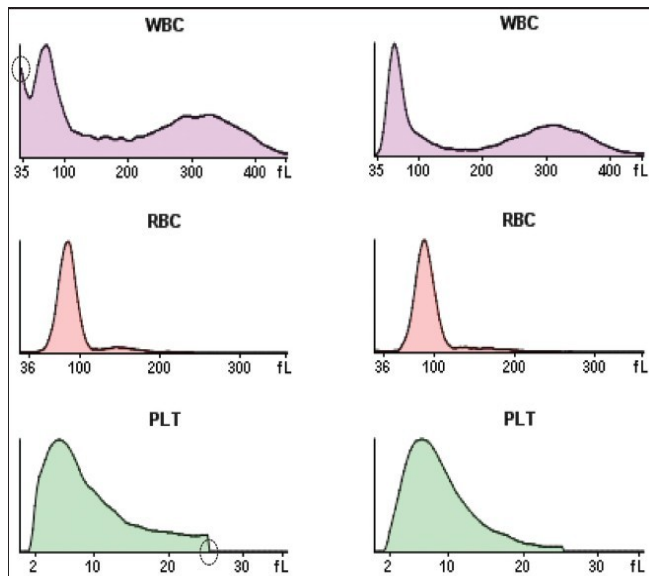
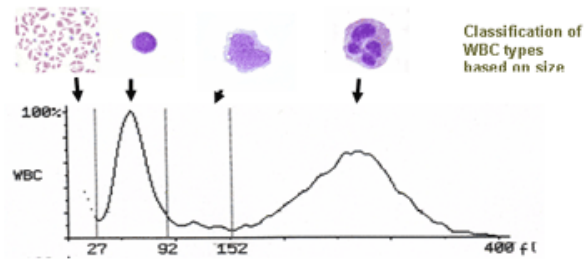
Referenční intervaly KO – pro dospělé

- **WBC**($10^9/l$) 4,0 - 10,0
- **DIF**
 - ✓ **NE** (%) 45 - 70
 - ✓ **TY** (%) 0 - 4
 - ✓ **LY** (%) 20 - 45
 - ✓ **MO** (%) 2 - 12
 - ✓ **EO** (%) 0 - 5
 - ✓ **BASO**(%) 0 - 2
 - ✓ **NRBC** – nepřítomny
- **RBC** ($10^{12}/L$)
 - ženy 3,8 - 5,4
 - muži 4,0 - 5,9
- **HGB** (g/L)
 - ženy 120 - 160
 - muži 130 - 176
- **HCT** (l/l)
 - ženy 0,35 - 0,46
 - muži 0,39 - 0,51
- **MCV** (fl) 84 - 96
- **PLT** ($10^9/l$) 150 - 350
- **MCH** (pg) 28 - 34
- **MCHC** (g/l) 320 - 370
- **RDW** (%CV) 10 - 15,2
- **MPV** (fl) 7,8 - 11,0
- **PCT** (ml/L) 1,21 - 3,5
- **PDW** (z MPV) 15.5 - 17.1
- **IPF** (%) 1,1 - 6,1
- **RETI** ($10^9/l$) 25 - 100
- **RETI** (%) 0,5 - 2,5
- **IRF** (l/l) < 0,3

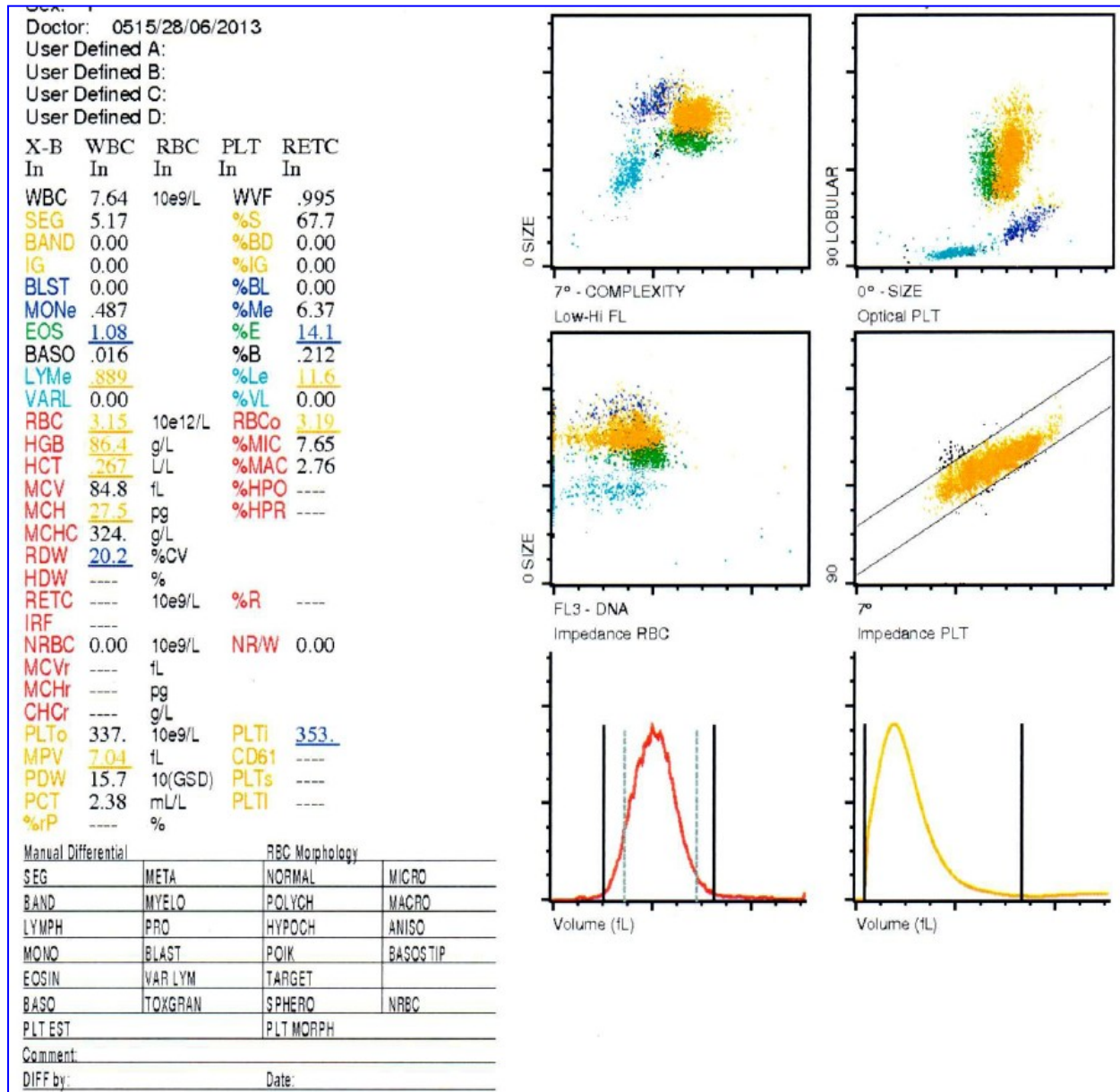
Životnost buněk v krevním oběhu

- *erythrocyty: 110 – 120 dní*
- *leukocyty: několik hodin až dnů, někdy i roky*
- *neutrofily: 6 – 7 hodin*
- *eozinofily: 7 – 14 dnů*
- *lymfocyty: záleží na typu jejich diferenciaci – až roky*
- *monocyty: 12 hodin až několik dní*
- *trombocyty: 9 – 12 dnů*

Grafické zobrazení analýzy krevních buněk - příklady



Numerické a grafické výsledky KO



Obecná pravidla při hodnocení KO

- respektovat princip a specifika (*např. linearitu a přesnost*) analýzy daného přístroje
- hodnotit:
 - ✓ numerické výsledky (*sledovat měřené a počítané parametry*)
 - ✓ grafické výsledky
 - ✓ hlášení analyzátoru
 - ✓ hodnotit KO jako celek - *nepřesné stanovení jedné složky ovlivní nepřesné stanovení jiné složky* → klinické důsledky
- zohledňovat klinická hlediska:
 - ✓ diagnóza
 - ✓ léčba
 - ✓ historie pacienta
 - ✓ vzhled vzorku (*hemolytický, ikterický, chylózní*)
 - ✓ správný odběr (*množství, typ zkumavky*)
- ❖ posuzovat následnou kontrolu mikroskopem

normální vzorek
s normálním HCT



patologický vzorek
WBC = $900 \times 10^9/L$



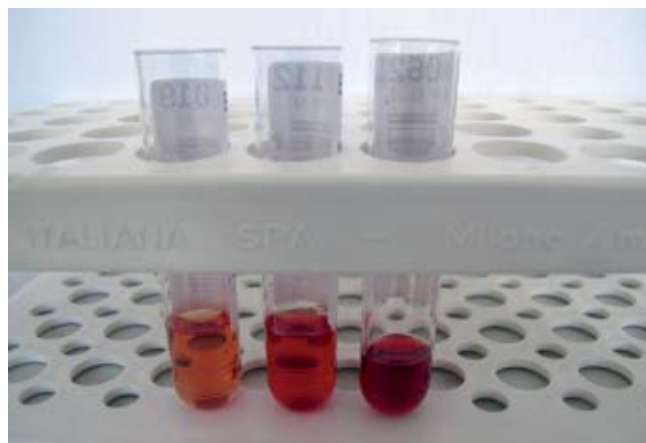
chylózní vzorek



ikterické vzorky a hemolytické vzorky

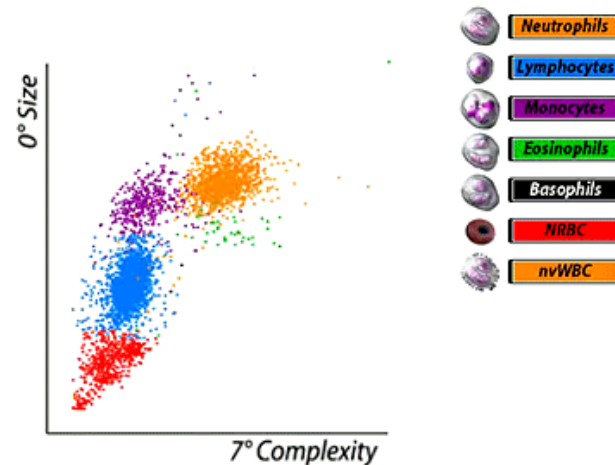
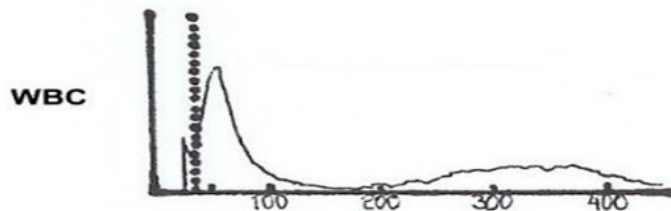


různé stupně hemolytických vzorků



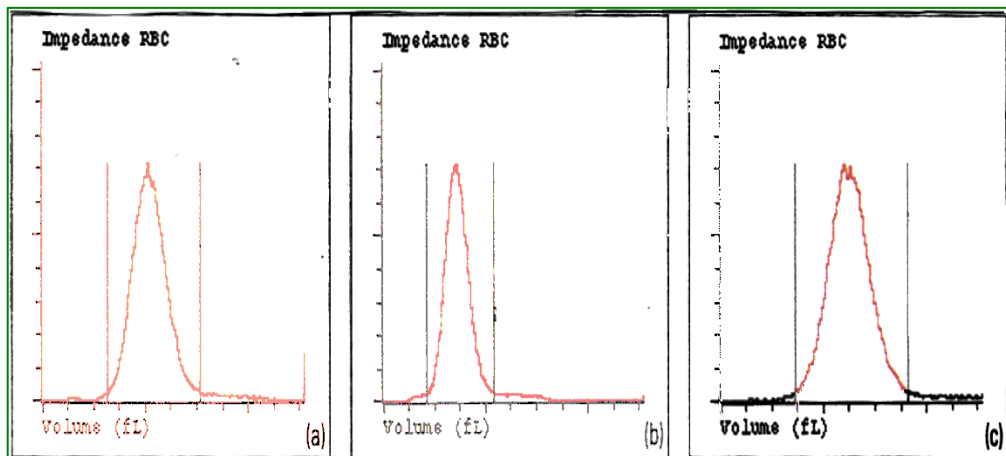
Hodnocení WBC

- počet WBC
- vyváženost rozpočtu v dif
- patologická hlášení
- ❖ interference - falešné navýšení počtu WBC způsobují :
 - ✓ NRBC (*jaderné buňky*)
 - ✓ rezistentní RBC (*nezlyzované erytrocyty v měřícím systému*)
 - ✓ holá jádra (*z křehkých rozbitých buněk*)
 - ✓ shluky nebo sraženiny PLT

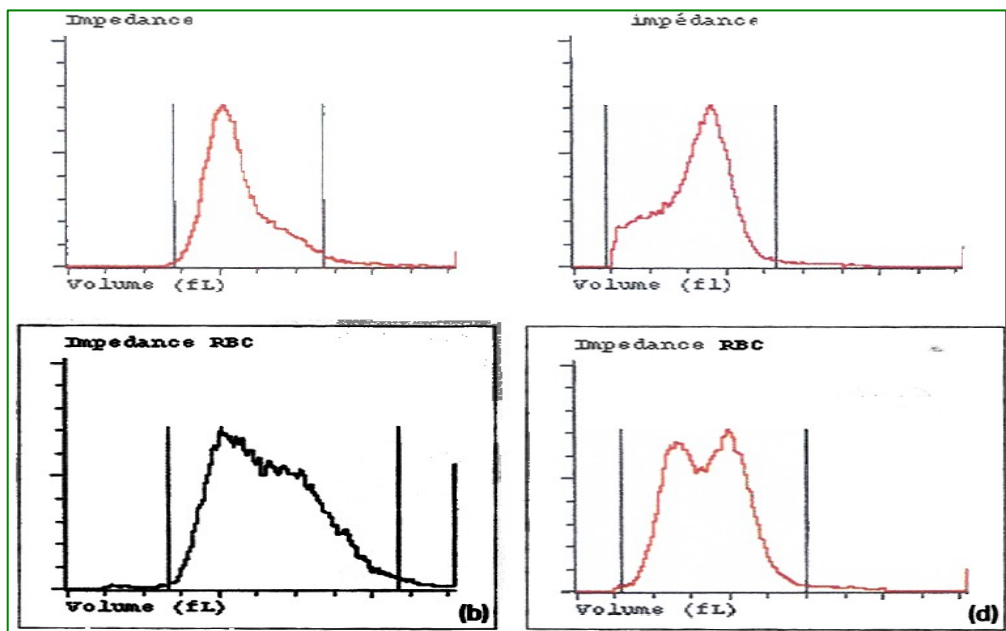


Hodnocení RBC

- parametry: RBC, HGB, HCT, MCV
 - ✓ přímo měřené hodnoty
 - ✓ nelze sledovat morfologii (*MCV je pouze střední objem všech RBC, neinformuje o rozložení celé populace*)
- parametry: MCH, MCHC, RDW + distribuční křivka (*šířka, vrcholy*)
 - ✓ počítané hodnoty z přímo měřených parametrů
 - ✓ základní přístrojové ukazatele morfologie
 - MCH, MCHC: normochromie, hypochromie, hyperchromie
 - RDW + křivka: isocytóza, anizocytóza (*homogenní, heterogenní populace RBC*)
- ❖ interference - chybné, nesouvisející výsledky pro měřené a počítané parametry RBC způsobují:
 - ✓ shluky nebo sraženiny PLT
 - ✓ aglutinace RBC (*např. chladové protilátky*)
 - ✓ extrémně vysoký počet WBC
 - ✓ hemolytický, ikterický, chylózní vzorek



Impedanční histogramy RBC- RDW normál
 (a) - normál (b) - mikrocyty (c) - makrocyty

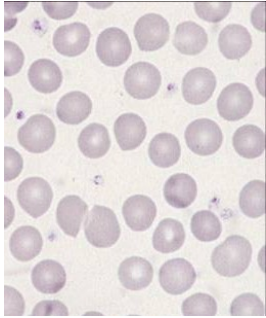


Impedanční histogramy RBC - RDW vysoké
 (a) - příměs makrocytů
 (b) - vysoký podíl makro
 (c) - masivně mikrocyty (*schistocyty*)
 (d) - mikrocyty + normocyty

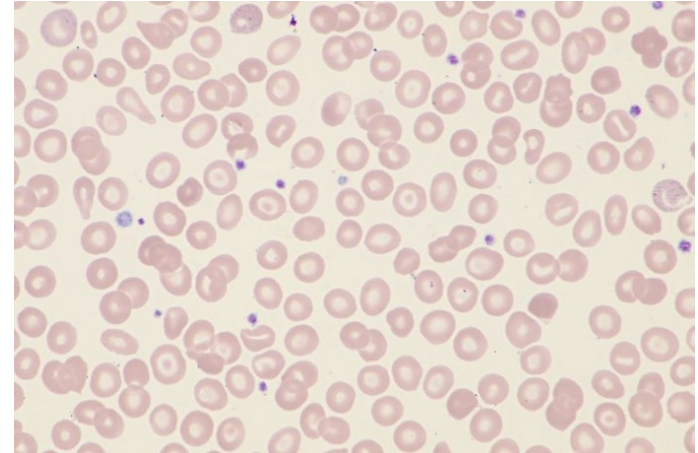
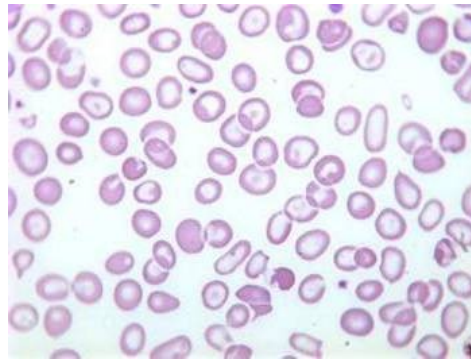
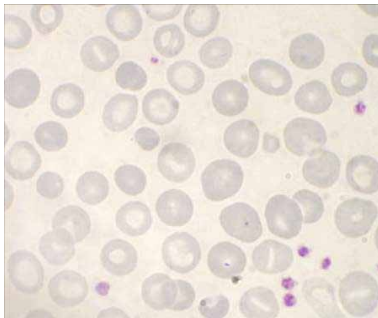
Morfologie RBC

http://www.sekk.cz/infoservis/2006_Morfologie_erytrocytu.pdf

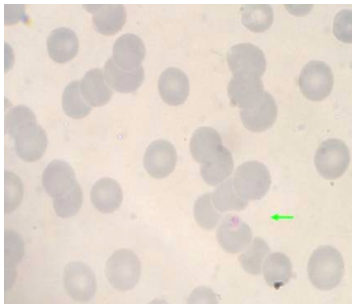
normocyty



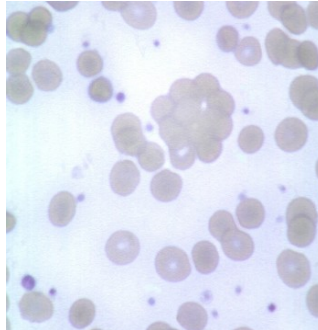
anizocytóza, anizochromie, tvarové odchylky RBC



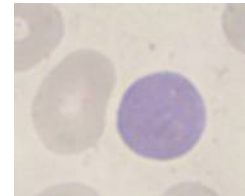
penízkovitění RBC



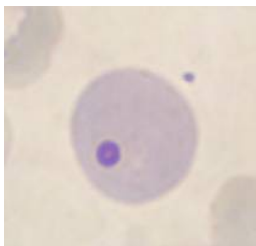
aglutinace RBC



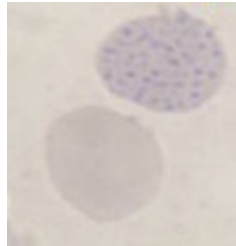
polychromázie



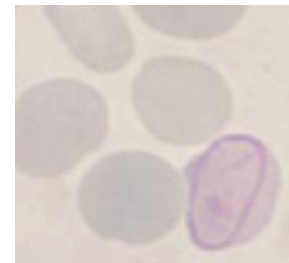
Howell-Jollyho tělísko



bazifilní tečkování

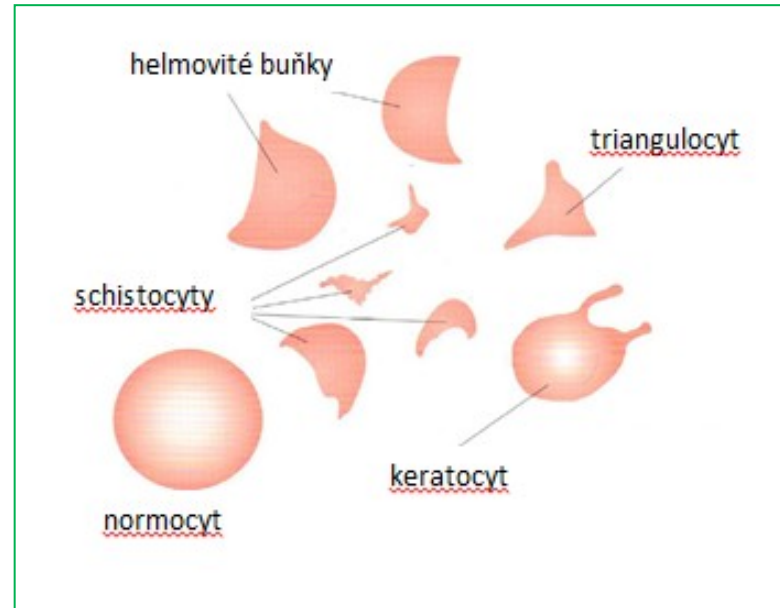
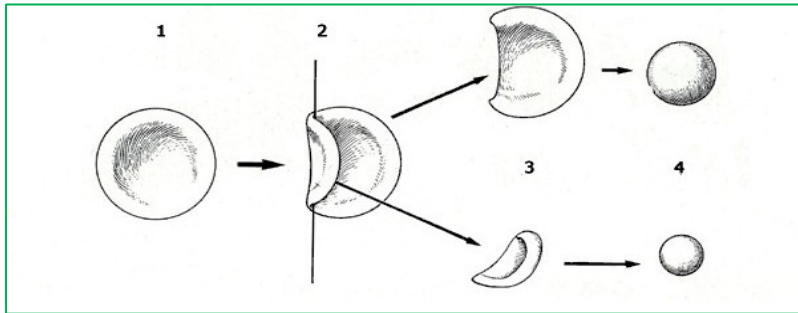


Cabotovy prstence



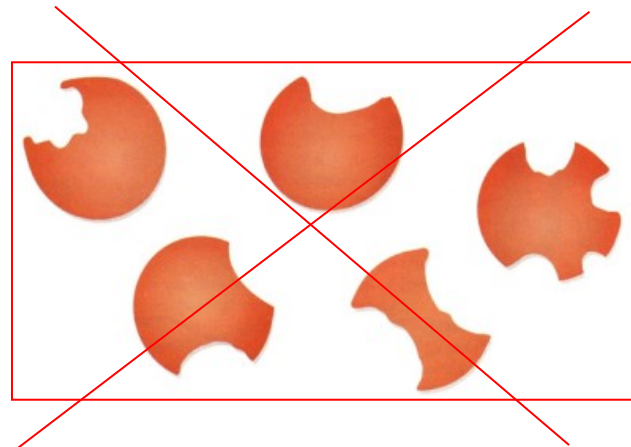
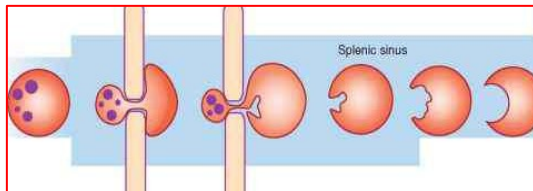
Schistocyty (tvarové odchytky)

mechanismus vzniku



ANO

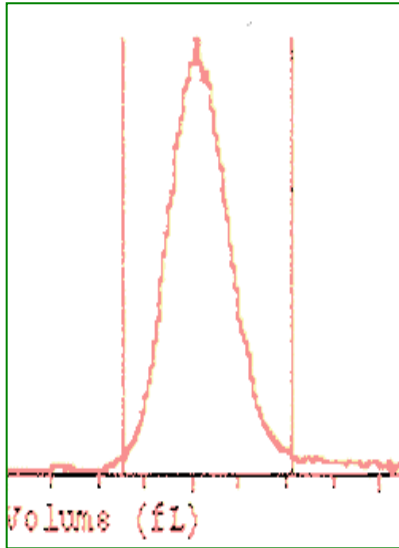
Bite cells
(„vykousnuté“ buňky)



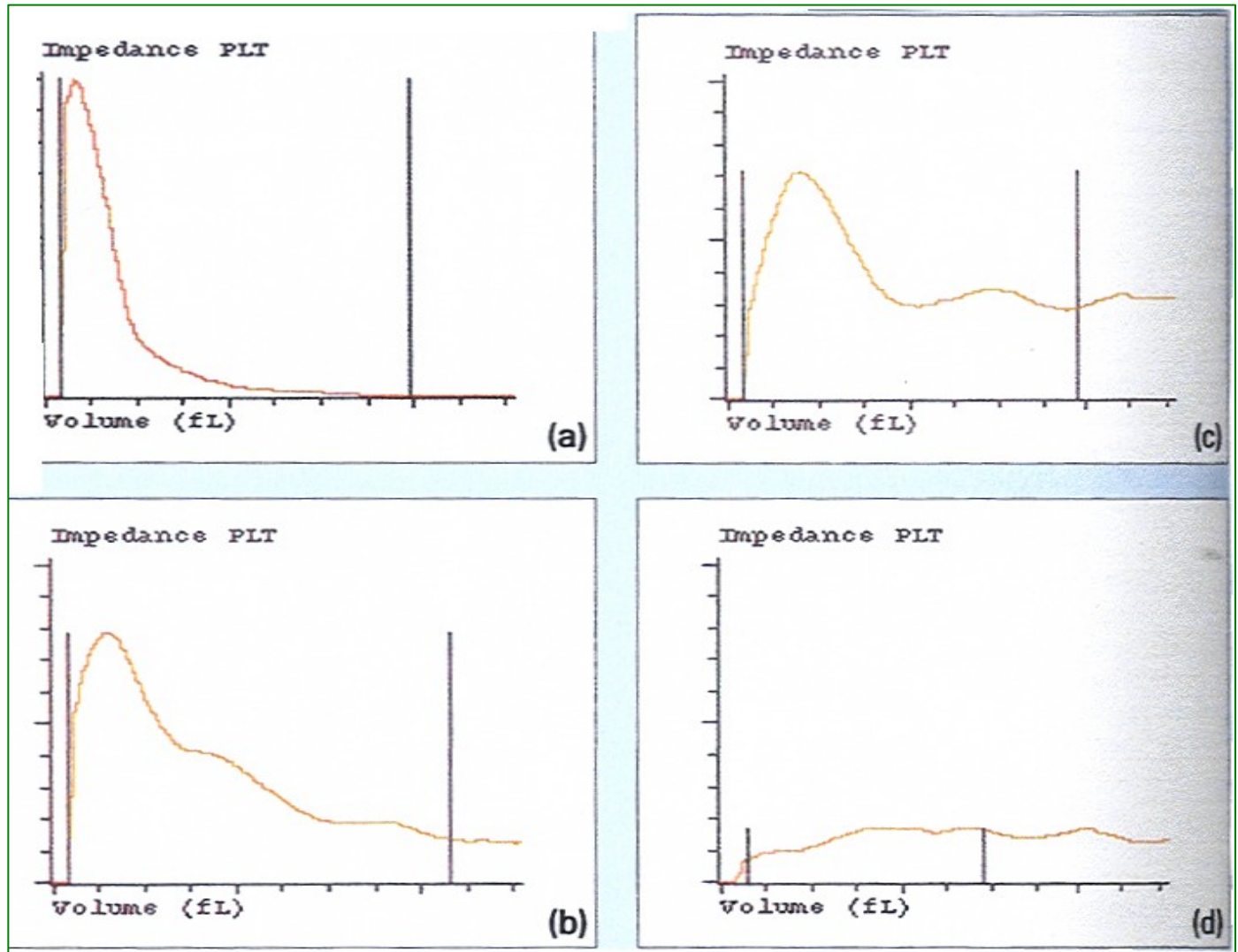
NE

Hodnocení PLT

- parametry: PLT, MPV
 - ✓ přímo měřené hodnoty
 - ✓ nelze sledovat morfologii (*MPV je pouze střední objem všech PLT, neinformuje o rozložení celé populace*)
- parametry: PDW + distribuční křivky (*šířka, rozložení, umístění na ose*)
 - ✓ počítané hodnoty z přímo naměřených parametrů
 - ✓ základní přístrojové ukazatele morfologie
 - isocytóza, anizocytóza (*homogenní, heterogenní populace PLT*)
 - netrombocytární elementy
- ❖ interference způsobují:
 - ✓ chybné snížení počtu PLT: (*SW vyloučí buňky z populace*)
 - makro/gigantické PLT
 - sraženiny
 - shluky při falešná trombocytopenie (*reakce na K2EDTA, satelitóza*)
 - ✓ chybné zvýšení počtu PLT: (*SW zařadí buňky do populace*)
 - mikro RBC
 - buněčné/nebuněčné fragmenty
 - netrombocytární příměsy (*makromolekuly proteinů, kontaminace reagensů*)
- ❖ kontrola/ověření počtu PLT:
 - ✓ jinou metodou než byla primární analýza
 - opticky nebo impedančně
 - imunologicky s antigenem CD 61
 - ✓ mikroskopicky
 - ✓ analýza vzorku s jiným protisrážlivým činidlem - s kationtem Mg^{2+} nebo Ca^{2+}



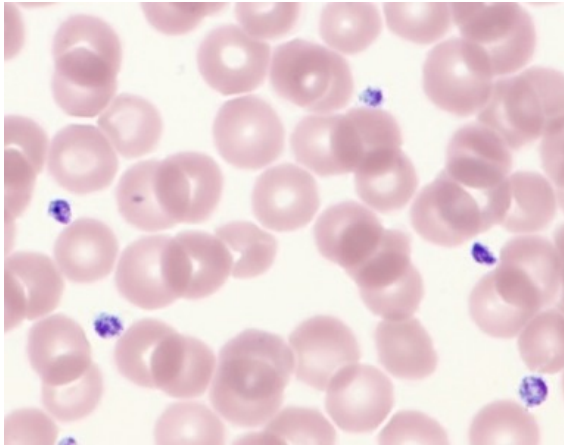
Impedanční histogram normál



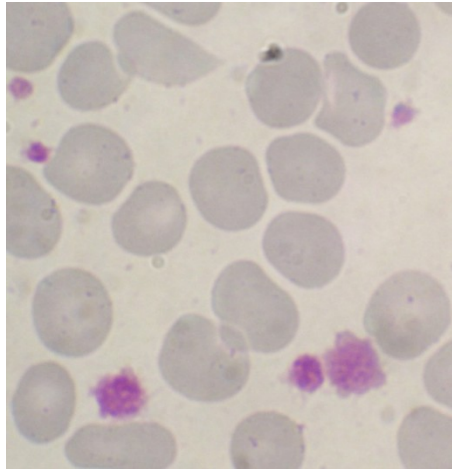
Impedanční histogramy PLT
 (a) - dolní intrference (b-d) - horní/dolní interference

Morfologie PLT

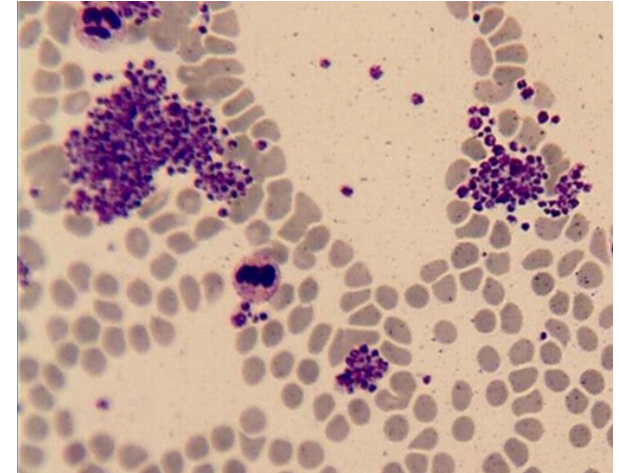
fyziologické PLT



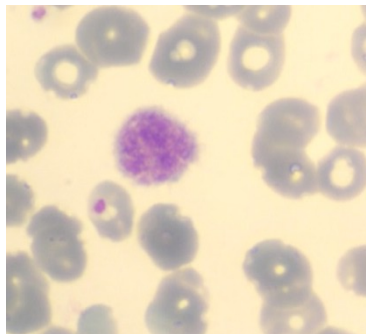
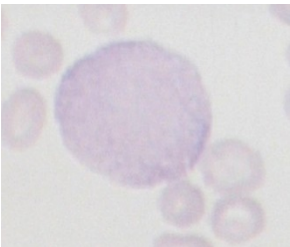
anizocytóza PLT



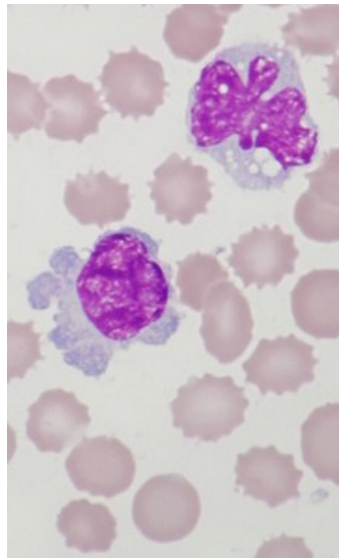
sraženiny, shluky PLT



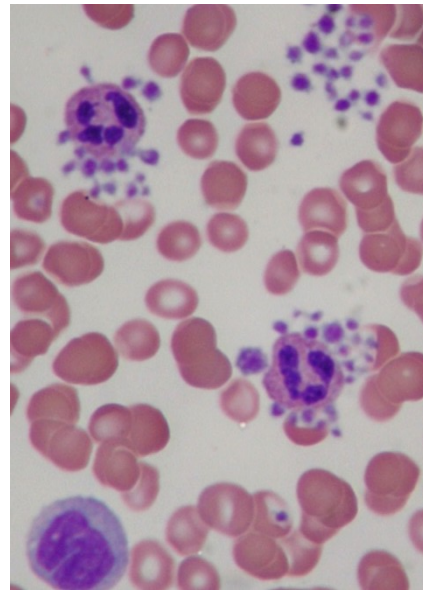
makro, gigantické PLT



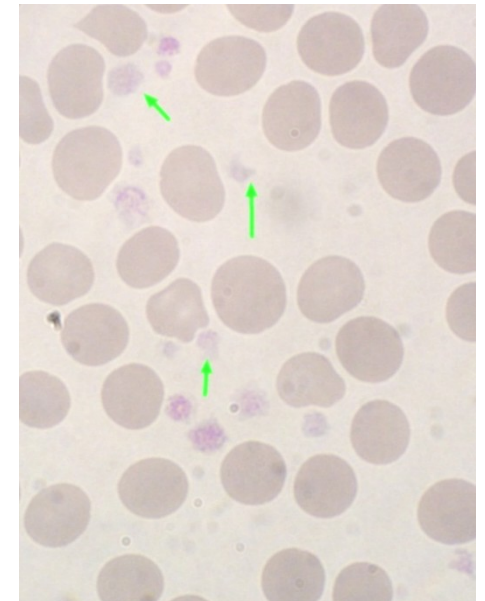
fragmenty PLT



satelitóza PLT

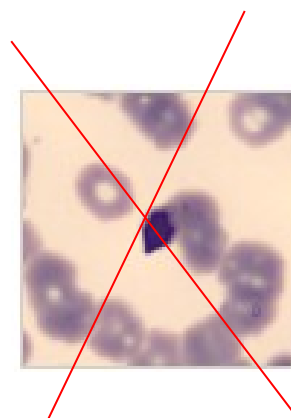
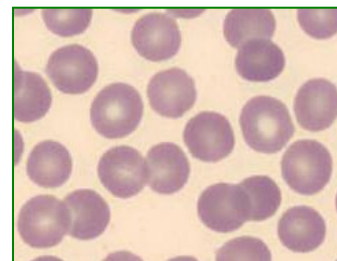
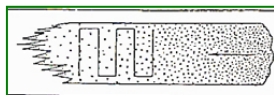


hypogranulární PLT



Vyšetřované parametry a pravidla při mikroskopickém hodnocení preparátů

- hodnotit komplexně celý nátěr (WBC, RBC, PLT)
- v rovnoměrně rozetřeném místě
- zvětšení:
 - ✓ 1000x (morfologie buněk)
 - ✓ 200x (přehledný náhled na preparát)
- hodnotit buňky v kontextu s celým nátěrem
- hodnotit nátěr periferní krve v souvislosti s přístrojovým KO a historií pacienta
- minimální běžný počet hodnocených buněk:
 - ✓ periferní krev: 100 leukocytů a evt. nalezený počet NRBC/100 leukocytů
 - ✓ kostní dřeň: 500 jaderných elementů
- subpopulace WBC v krvi i KD se uvádí v %



Hodnocení morfologie

WBC

- velikost buněk: malé, střední, velké
- charakteristika jádra: holá jádra, poměr jádra k cytoplazmě, jaderný chromatin, jadérka (*přítomnost, nepřítomnost, počet, velikost*), členitost a tvar jádra (*hypo-, hypersegmentace NE*), velikost jádra
- charakteristika cytoplazmy: granulace, bez granulace, specifická (*NE, EO, BA*), nespecifická, toxická granulace, barevný odstín cytoplazmy, vakuolizace, barevné inkluze, Auerovy tyče, okraje cytoplazmy (*členité, hladké, vlasaté*)

RBC

- velikost buněk (*MCV, RDW, distribuční křivka*)
- odchylky:
 - ✓ barevné (*MCH, MCHC*)
 - ✓ tvarové, inkluze, shluky
- jaderné buňky

PLT

- velikost (*MPV, PDW, distribuční křivka*)
- granulace, hypogranulace
- shluky, satelitóza
- fragmenty (*RBC, WBC*)
- MGK, holá jádra MGK

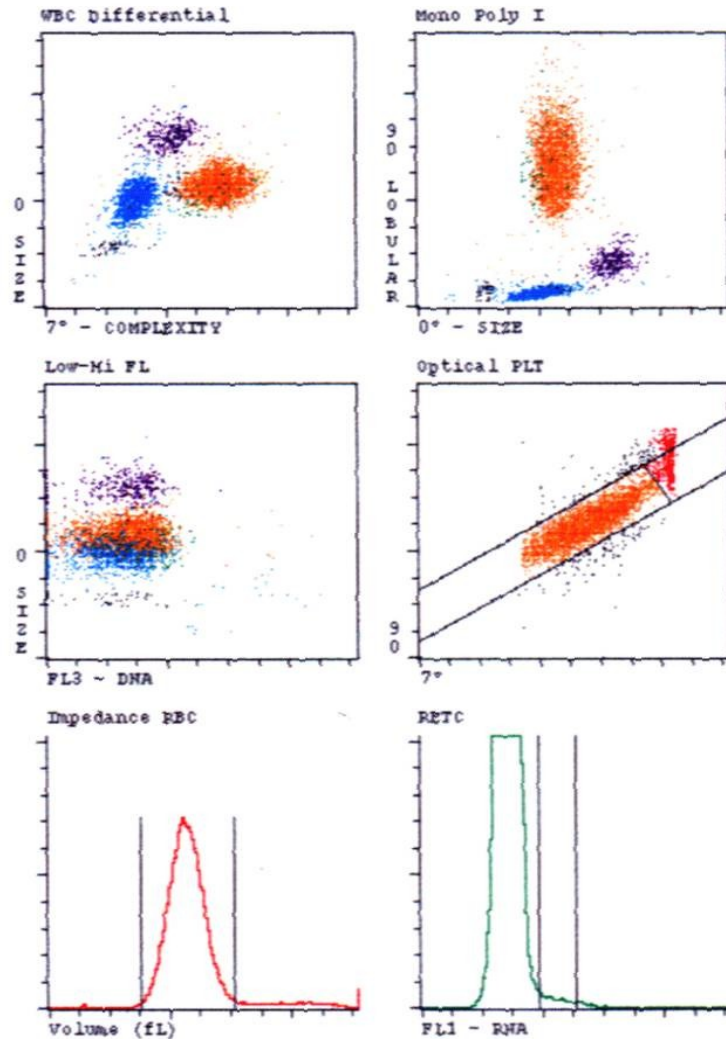
***Příklady přístrojové analýzy krevního obrazu
a diferenciálního rozpočtu WBC***

Normální vzorek

Sequence #: 703 Autoloader r38t06
 Patient/Human
 Specimen ID: 020003255
 Name:

Test Selection: CBC+RETC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 04.10.99 13:34

X-B In	WBC In	RBC In	PLT In	RETC In
WBC	7.88 10e9/L	WVF	.992	
SEG	4.73	%S	60.1	
BAND	0.00	%BD	0.00	
IG	0.00	%IG	0.00	
BLST	0.00	%BL	0.00	
MONe	.483	%Me	6.12	
EOS	.186	%E	2.37	
BASO	.051	%B	.641	
LYMe	2.43	%Le	30.8	
VARL	0.00	%VL	0.00	
RBC	5.22 10e12/L	RBCo	5.12	
HGB	9.38 mmol/L			
HCT	49.0 %			
MCV	93.9 fL			
MCH	1.80 fmo1			
MCHC	19.2 mmol/L			
RDW	12.4 %CV			
RETC	71.7 10e9/L	%R	1.38	
IRF	.221			
NRBC	0.00 10e9/L	NR/W	0.00	
PLTo	229. 10e9/L	PLTi	239.	
MPV	9.59 fL	CD61	----	
PDW	16.7 10(GSD)	PLTs	----	
PCT	2.19 mL/L	PLTl	----	

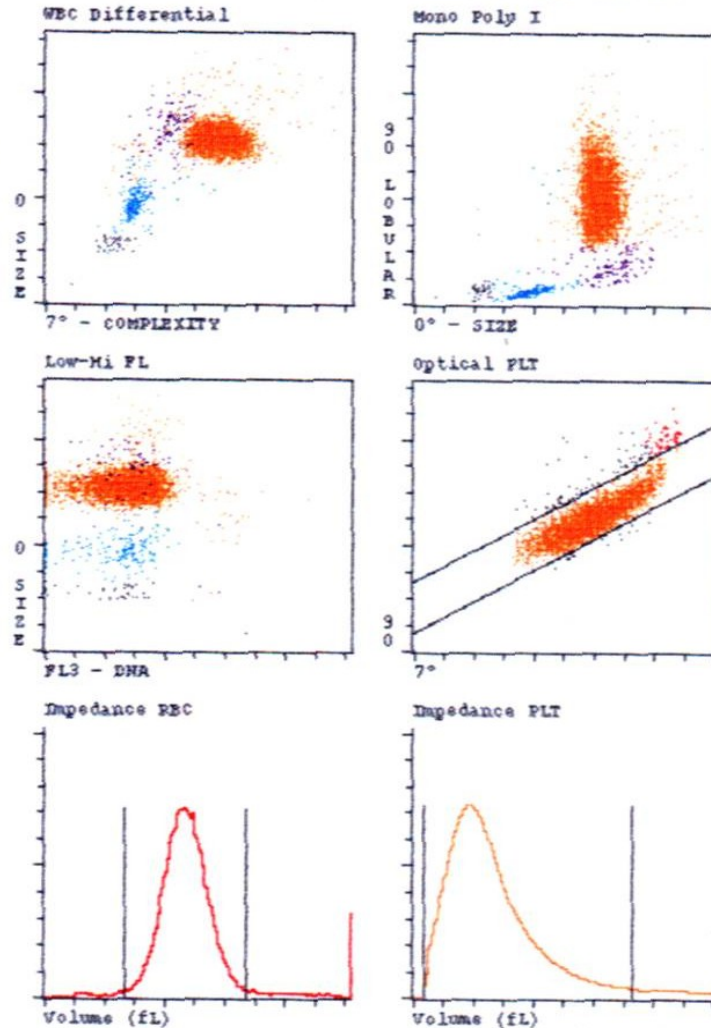


Infekce

Sequence #: 7967 Autoloader r04t02
 Patient/Human
 Specimen ID: 031273
 Name:

Test Selection: CBC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 30.04.99 08:58

X-B In	WBC 1 Out	RBC In	PLT In	RETC In	
WBC	31.0 10e9/L	WVF	.990		
SEG	17.8	%S	57.5		
BAND	9.14	%BD	29.5	BAND	.83
IG	2.06	%IG	6.65	IG	.81
BLST	0.00	%BL	0.00		
MONe	.637	%Me	2.06		
EOS	.043	%E	.139		
BASO	0.00	%B	0.00		
LYMe	1.29	%Le	4.16		
VARL	0.00	%VL	0.00		
RBC	3.39 10e12/L	RBCo	3.45		
HGB	6.49 mmol/L				
HCT	33.2 %				
MCV	98.0 fL				
MCH	1.91 fmo1				
MCHC	19.5 mmol/L				
RDW	15.3 %CV				
RETC	----	%R	----		
IRF	----				
NRBC	0.00 10e3/uL	NR/W	0.00		
PLTo	305. 10e9/L	PLTi	305.		
MPV	9.00 fL				
PDW	14.7 10(GSD)				
PCT	2.74 mL/L				



Starý vzorek

equence #: 1448 Autoloader r93t08
 specimen Type/SubType: Patient/Human
 specimen ID: JJ5312
 name:

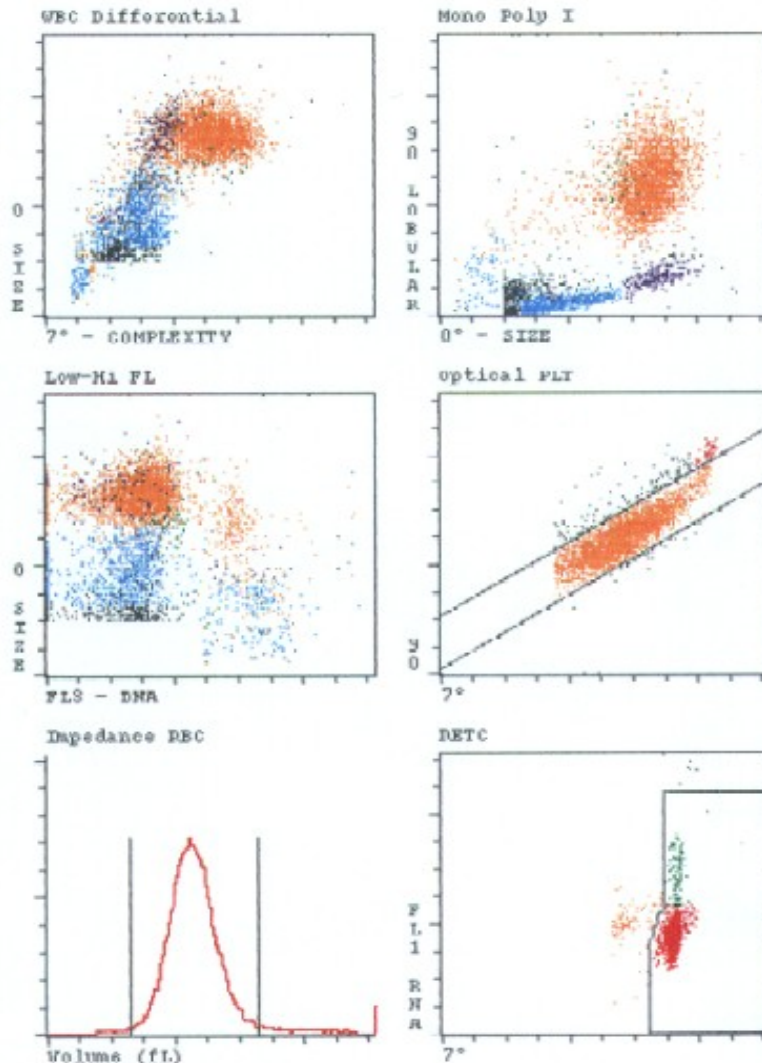
Test Selection: CBC+RETC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 28/10/98 17:16

BC	8.30	10e3/uL	WVF	.890	nvWBC	
EG	3.39		%S	40.8		
AND	2.11		%BD	25.4	BAND	.55
G	.551		%IG	6.64	IG	.69
LST	0.00		%BL	0.00		
ONE	.489		%Me	5.89		
OS	.105		%E	1.26		
ASO	.017		%B	.204		
YMe	1.65		%Le	19.8		
ARL	0.00		%VL	0.00		

BC	3.19	10e6/uL	RBCc	3.34	
GB	9.82	g/dL			
CT	30.3	%			
CV	95.0	fL			
CH	30.8	pg			
CHC	32.4	g/dL			
DW	15.6	%			
ETC	60.6s	10e3/uL	%R	1.90s	IR
RF	.490				
RBC	0.00	10e3/uL	NR/W	0.00	

PLT	361.	10e3/uL	PLTi	329.	
IPV	10.9	fL			
PDW	15.3	10(GSD)			
PCT	.395	%			

WBC Differential		RBC Morphology	
EG	:META	:NORMAL	:MICRO
AND	:MYELO	:POLYCH	:MACRO
LYMPH	:PRD	:HYPOCH	:ANISO
MONO	:BLAST	:POIK	:BASOSTIP
OSIN	:VAR_LYM	:TARGET	:
ASO	:TOXGRAN	:SPHERO	:NRBC



Satelitůza trombocytů

Sequence #: 9427 Open Tube
 Specimen Type/SubType: Patient/Human
 Specimen ID: gruyters
 Name:

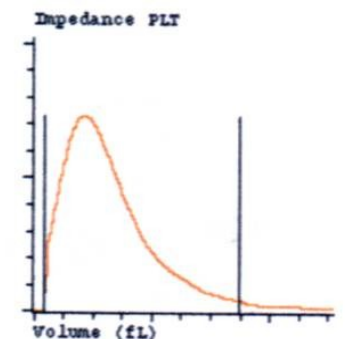
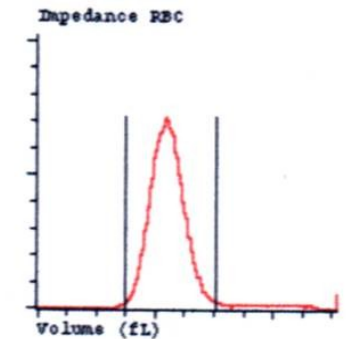
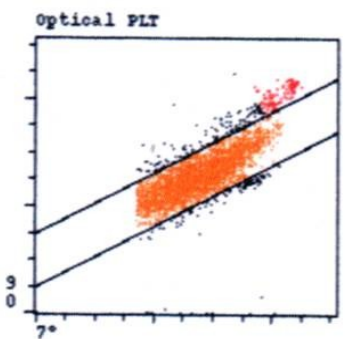
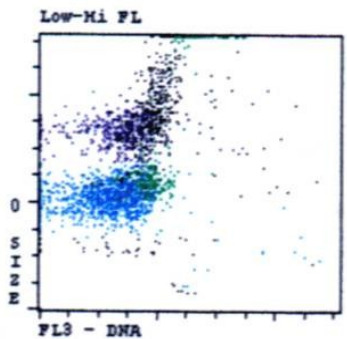
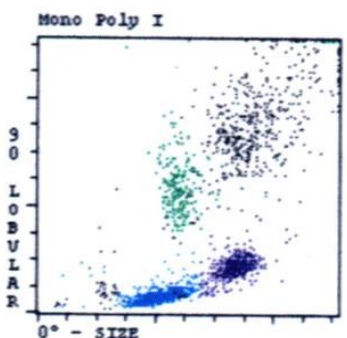
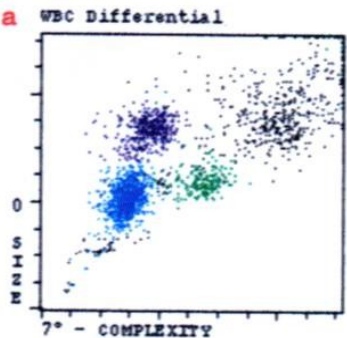
Test Selection: CBC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 26/01/99 17:44

***InvalidData**

WBC	3.20*10e9/L	WVF	.954*
NEU	0.00*	%N	0.00*
LYM	2.00*	%L	62.6*
MONO	.663*	%M	20.7*
EOS	.512*	%E	16.0*
BASO	.023*	%B	.732*

VARLYM .50

RBC	5.00	10e12/L	RBCo	4.84
HGB	9.50	mmol/L		
HCT	.455	L/L		
MCV	91.0	fL		
MCH	1.90	fmol		
MCHC	20.9	mmol/L		
RDW	12.4	%CV		
RETC	----	10e9/L	%R	----
IRF	----			
NRBC	0.00*10e9/L	NR/W	0.00*	
PLT	156.	10e9/L	PLTi	162.
MPV	8.48	fL		
PDW	16.9	10(GSD)		
PCT	1.32	mL/L		



Monoblasty

Sequence #: 2830 Open Tube
 Specimen Type/SubType: Patient/Human
 Specimen ID:
 Name:

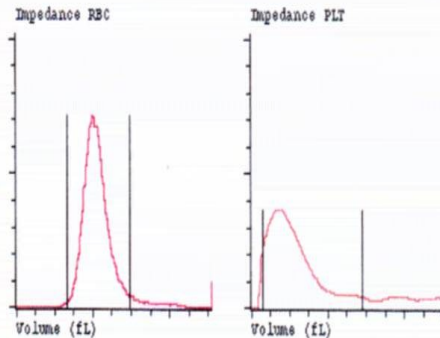
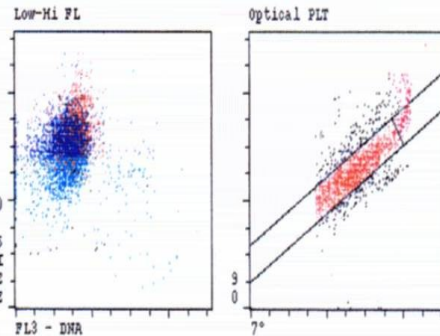
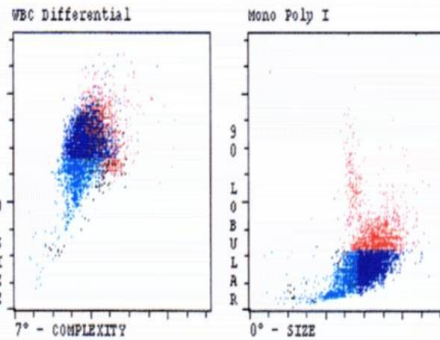
Test Selection: CBC
 Param Set(from Chart Page): 1
 Limit Set: 1
 Run Date/Time: 03/06/98 10:13

***InvalidData**

WBC	15.0	10e9/L	WVF	.977
NEU	3.25s	%N	21.7s	
LYM	3.19*	%L	21.3*	
MONO	8.36*	%M	55.9*	
BOS	.024	%E	.159	
BASO	.136	%B	.906	
BAND	.52			
IG	.59			
BLAST	.99			

RBC	3.63	10e12/L	RBCo	3.70
HGB	6.91	mmol/L		
HCT	.308	L/L		
MCV	84.9	fL		
MCH	1.90	fmoI		
MCHC	22.4	mmol/L		
RDW	14.5	%CV		
RETc	----	10e9/L	%R	----
IRF	----			
NRBC	0.00	10e9/L	NR/W	0.00

PLT	25.9	10e9/L	PLTi	36.1
MPV	8.93	fL		
PDW	18.9	10(GSD)		
PCT	.231	mL/L		



Mononukleóza

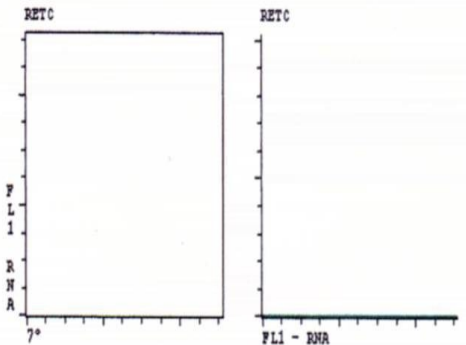
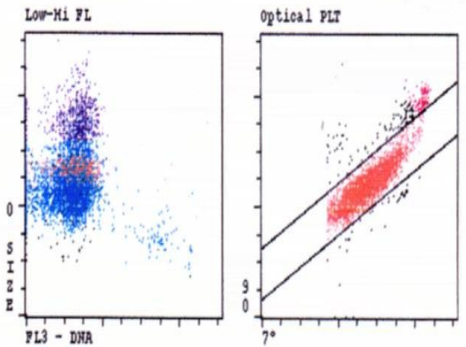
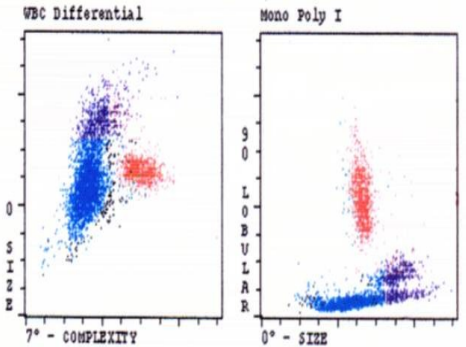
Sequence #: 3556 Autoloader
 Specimen Type/SubType: Patient/Human
 Specimen ID: 05374
 Name:

Test Selection: CBC
 Param Set(from Chart Page): 1
 Limit Set: 1
 Run Date/Time: 08/09/97 14:33

WBC	16.9	10e9/L	WVF	.983
SEG	4.21	%S	24.9	
BAND	0.00	%BD	0.00	
IG	0.00	%IG	0.00	
BLST	1.11	%BL	6.52	BLAST .77
MONe	.703	%Me	4.15	
BOS	.097	%E	.570	
BASO	.056	%B	.333	
LYMe	10.5	%Le	62.0	FP?
VARL	.258	%VL	1.52	VARLYM .90

RBC	5.36	10e12/L	RBCo	5.11
HGB	9.40	mmol/L		
HCT	.460	L/L		
MCV	85.9	fL		
MCH	1.76	fmoI		
MCHC	20.4	mmol/L		
RDW	15.5	%CV		
RETc	----	10e9/L	%R	----
IRF	----			
NRBC	0.00s	10e9/L	NR/W	0.00s

PLT	248.	10e9/L	PLTi	241.
MPV	8.34	fL		
PDW	18.0	10(GSD)		
PCT	2.07	mL/L		



Chronická lymfatická leukémie

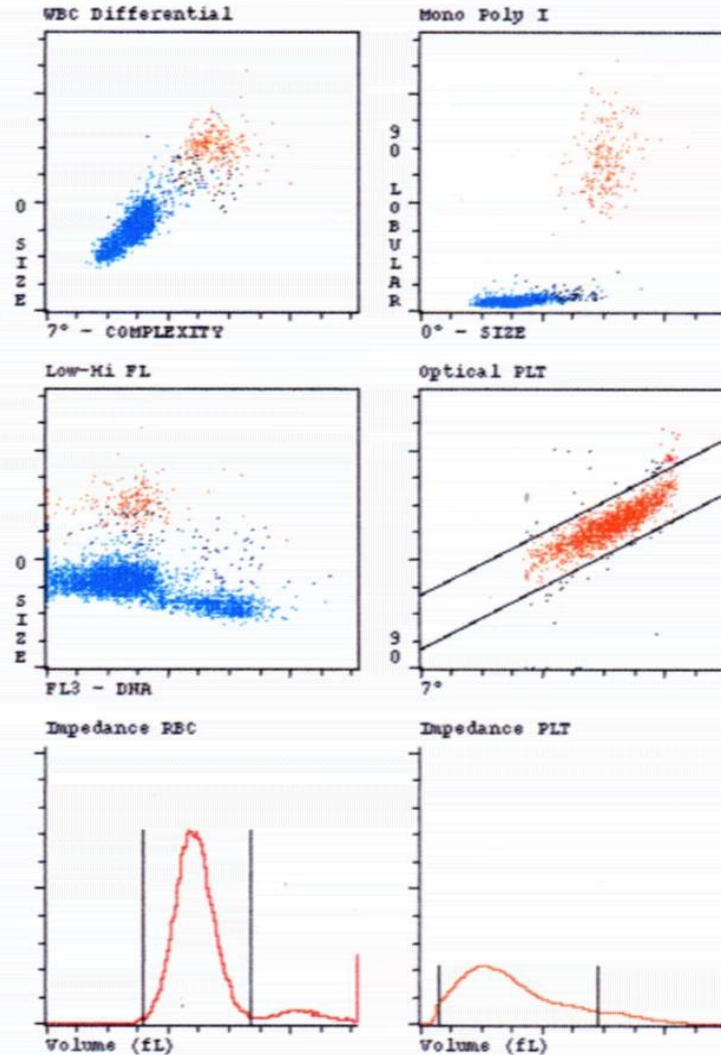
Sequence #: 3706 Autoloader r08t02
 Patient/Human
 Specimen ID: 990914696018
 Name:

Test Selection: CBC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 22/09/99 13:20

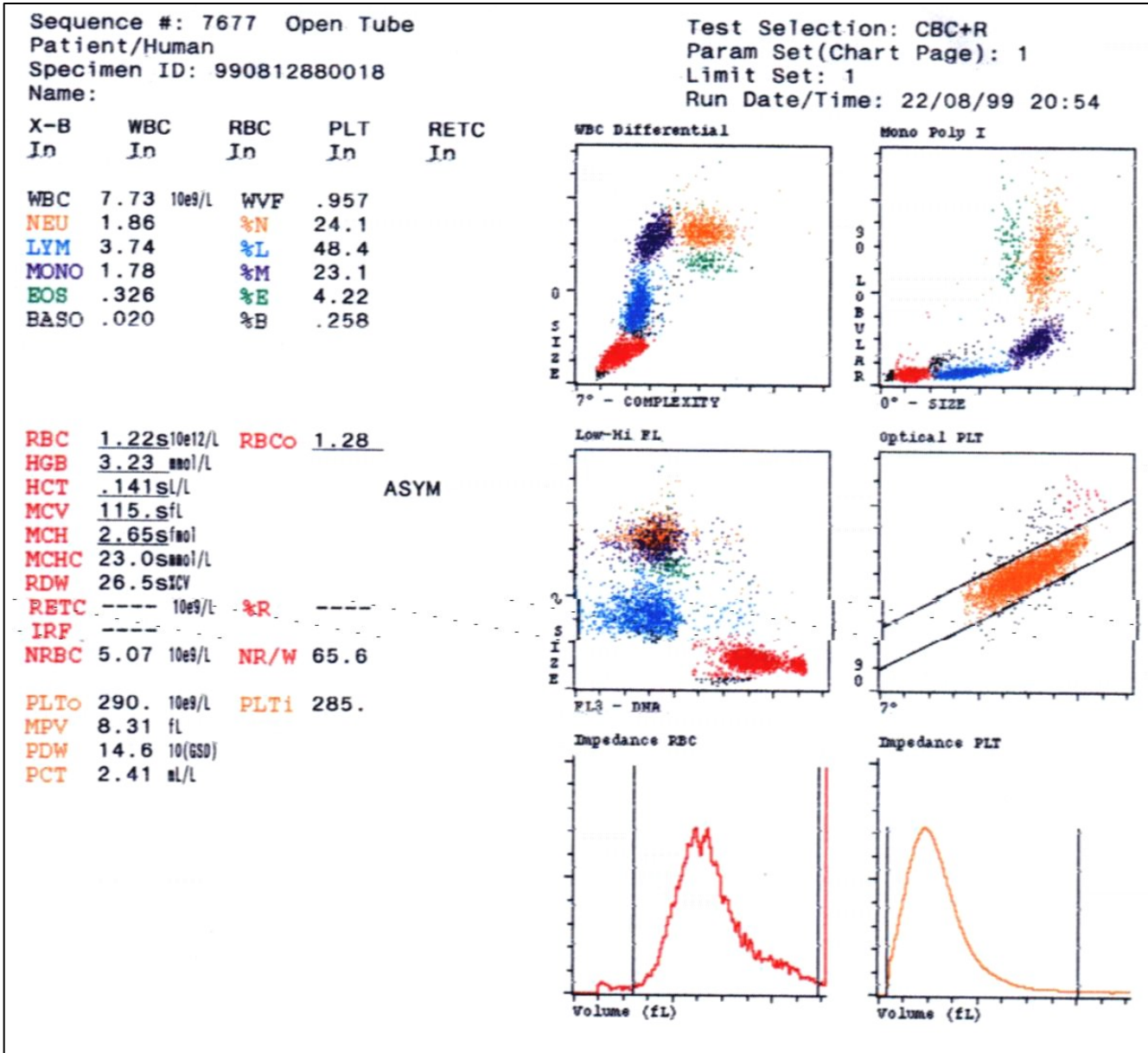
X-B	WBC	RBC	PLT	RETC
In	2 Out	In	In	In
WBC	207.10e9/L	WVF	.843	nvWBC
NEU	8.76	%N	4.24	
LYM	195.5	%L	94.35	
MONO	1.62	%M	.782	
EOS	0.00	%E	0.00	
BASO	1.34	%B	.647	

VARLYM .80

RBC	3.80	10e12/L	RBCo	3.79
HGB	7.31	mmol/L		
HCT	.376	L/L		
MCV	98.9	fL		
MCH	1.92	fmol		
MCHC	19.5	mmol/L		
RDW	12.9	%CV		
RETC	----	10e9/L	%R	----
IRF	----			
NRBC	0.00	10e9/L	NR/W	0.00
PLTo	47.8	10e9/L	PLTi	42.9
MPV	9.81	fL		
PDW	17.0	10(GSD)		
PCT	.469	mL/L		



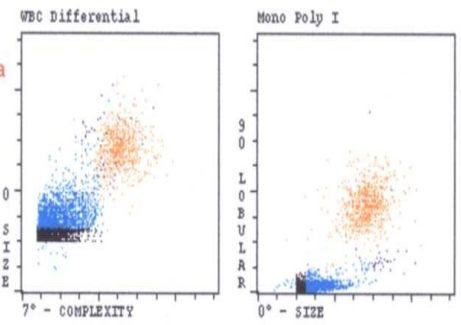
NRBC ve vorku



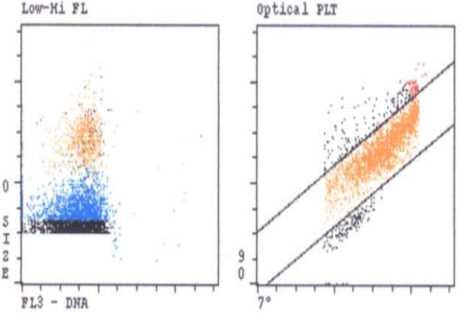
Vzorek po dialýze

Sequence #: 4453 AutoLoader r91t07
 Patient/Human
 Specimen ID: JX6223
 Name:
 Test Selection: CBC+RETC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 29/06/00 12:08

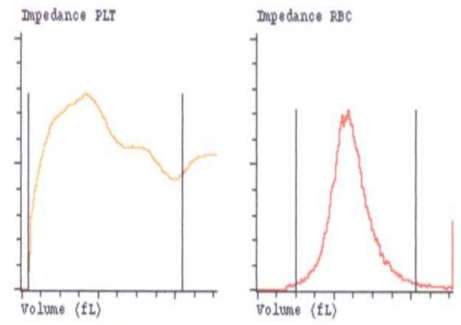
X-B In	WBC In	RBC -	PLT In	RETC In
WBC	15.0*10e9/L	WVF	.990*	
NEU	5.78*	%N	38.5*	
LYM	9.00*	%L	59.9*	
MONO	.214*	%M	1.43*	
EOS	.022*	%E	.149*	
BASO	0.00*	%B	0.00*	



RBC	3.78s10e12/L	RBCc	3.85
HGB	8.08 mmol/L		rstRBC
HCT	.395 L/L		
MCV	104. fL		
MCH	2.13 fmoL		
MCHC	20.5 mmol/L		
RDW	21.9 %CV		
RETC	95.3s10e9/L	%R	2.52s
IRF	.335		IR
NRBC	0.00*10e9/L	NR/W	0.00*



PLTo	76.9 10e9/L	PLTi	90.3
MPV	16.6*fL	CD61	----
PDW	39.8*10(GSD)	PLTs	----
PCT	1.28*uL/L	PLTl	----



Manual Differential	'RBC Morphology		
SEG	'META	'NORMAL	'MICRO
BAND	'WYELD	'POLYCH	'MACRO
LYMPH	'PRO	'HYPOCH	'ANISO
MONO	'BLAST	'POIK	'BASOSTIP
EOSIN	'VAR LYW	'TARGET	
BASO	'TOXGRAN	'SPHERO	'NRBC
PLT_EST	'PLT MORPH		

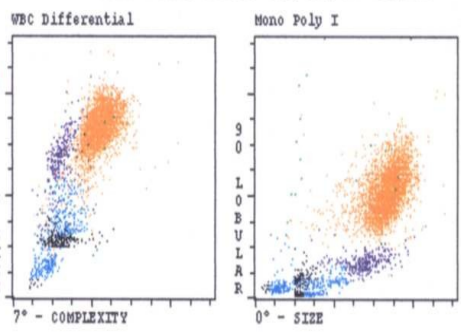
Comment:
 DIFF by: _____ Date: _____

WBC Count Rate Violation
 Resistant RBC Interference with WBC results
 Unable to Find Clear Separation Between WBC Subpopulations
 Lower, Upper, or Lower and Upper Region Interference in PLTi Histogram
 Lower, Upper, or Lower and Upper Region Interference in PLTi Histogram

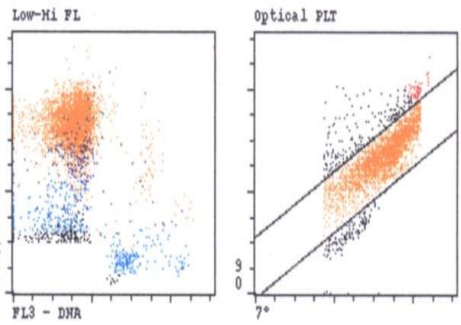
Po odstranění rstRBC

Sequence #: 4472 AutoLoader r94t09
 Patient/Human
 Specimen ID: JX6223
 Name:
 Test Selection: CBC+R
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 29/06/00 12:56

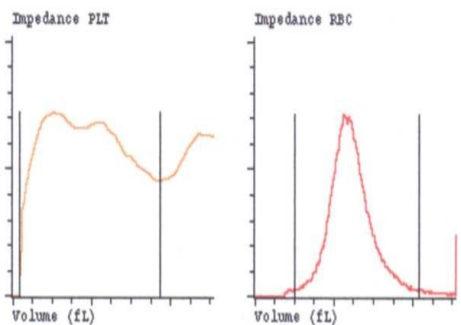
X-B In	WBC In	RBC -	PLT In	RETC In
WBC	6.47 10e9/L	WVF	.945	
NEU	5.55	%N	85.7	
LYM	.531	%L	8.21 FP?	
MONO	.364	%M	5.63	
EOS	.028	%E	.437	
BASO	.001	%B	.015	



RBC	3.74 10e12/L	RBCc	3.78
HGB	7.96 mmol/L		
HCT	.388 L/L		
MCV	104. fL		
MCH	2.13 fmoL		
MCHC	20.5 mmol/L		
RDW	21.9 %CV		
RETC	---- 10e9/L	%R	----
IRF	----		
NRBC	0.00s10e9/L	NR/W	0.00s



PLTo	75.2 10e9/L	PLTi	81.3
MPV	13.2*fL	CD61	----
PDW	19.7*10(GSD)	PLTs	----
PCT	.992*uL/L	PLTl	----



Manual Differential	'RBC Morphology		
SEG	'META	'NORMAL	'MICRO
BAND	'WYELD	'POLYCH	'MACRO
LYMPH	'PRO	'HYPOCH	'ANISO
MONO	'BLAST	'POIK	'BASOSTIP
EOSIN	'VAR LYW	'TARGET	
BASO	'TOXGRAN	'SPHERO	'NRBC
PLT_EST	'PLT MORPH		

Comment:
 DIFF by: _____ Date: _____

Lower, Upper, or Lower and Upper Region Interference in PLTi Histogram
 Lower, Upper, or Lower and Upper Region Interference in PLTi Histogram

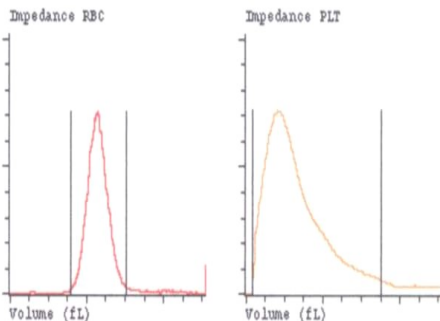
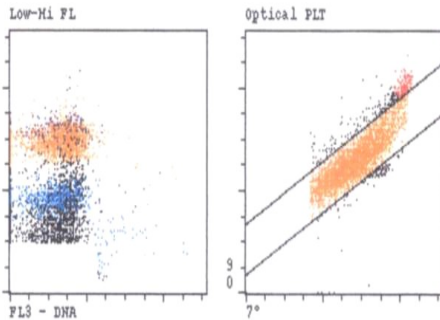
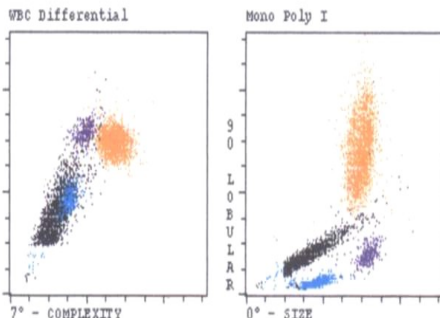
Reakce na EDTA

Sequence #: 8950 Auto-loader r06t03
 Patient/Human
 Specimen ID: 030074152
 Name: KATINKA JOHA PETERSEN

Test Selection: CBC
 Param Set (Chart Page): 1
 Limit Set: 1
 Run Date/Time: 02.05.00 09:47

X-B In	WBC In	RBC In	PLT In	RETc In
WBC	14.8	10e9/L	WVF	.985
SEG	9.64	%S	%ED	64.9
BAND	0.00	%BD	%IG	0.00
IG	0.00	%BL	%Me	0.00*
BLST	0.00*	%E	%B	8.54*
MONe	1.27*	%L	%M	0.109
EOS	.016	%BAND	%E	2.93*
BASO	.010	%Le	%B	0.00*BAND
LYMe	3.92*	%VL		
VARL	0.00*			

*InvalidData



Unable to Find Clear Separation Between WBC Subpopulations
 Significant Number of Cells Removed from WBC Differential Analysis
 Interference with PLT Results Due to PLT Clumping

RBC	3.56	10e12/L	RBCo	3.59
HGB	7.09	mmol/L		
HCT	33.0	%		
MCV	92.8	fL		
MCH	1.99	fmol		
MCHC	21.5	mmol/L		
RDW	11.3	%CV		
RETc	----	10e9/L	%R	----
IRF	----			
NRBC	0.00s	10e9/L	NR/W	0.00s
PLTo	132.	*10e9/L	PLTi	140.*PltClmp
MPV	8.99	*fL	CD61	----
PDW	15.2	*10(GSD)	PLTs	----
PCT	1.18	*mL/L	PLT1	----

Manual Differential	'RBC Morphology		
SEG	'META	'NORMAL	'MICRO
BAND	'MYELO	'POLYCH	'MACRO
LYMPH	'PRO	'HYPOCH	'ANISO
MONO	'BLAST	'POIK	'BASOSTIP
EOSIN	'VAR LYM	'TARGET	
BASO	'TOXGRAN	'SPHERO	'NRBC
PLT EST		'PLT MORPH	

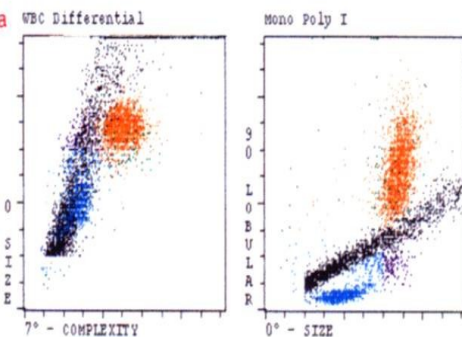
Comment:

Sequence #: 2568
 Specimen Type/SubType: Patient/Human
 Specimen ID: IA5285
 Name:

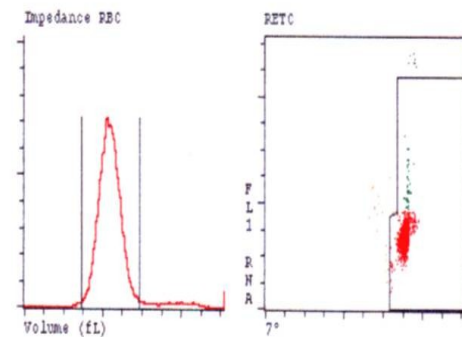
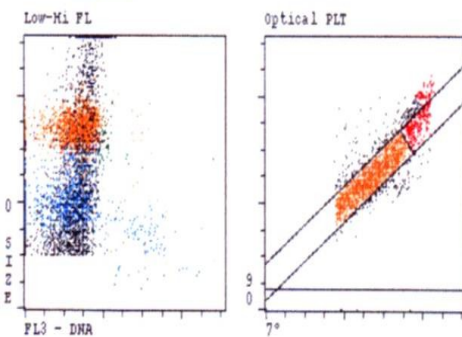
Test Selection: CBC+RETc
 Param Set (from Chart Page): 1
 Limit Set: 1
 Run Date/Time: 22/01/97 12:17

Invalid Data

WBC	6.46*10e9/L	WVF	.961*
NEU	4.14*	%N	64.1*
LYM	1.87*	%L	29.0*
MONO	.257*	%M	3.98*
EOS	.189*	%E	2.93*
BASO	0.00*	%B	0.00*BAND



RBC	5.19	10e12/L	RBCo	5.28
HGB	15.7	g/dL		
HCT	.454	L/L		
MCV	87.5	fL		
MCH	30.2	pg		
MCHC	34.6	g/dL		
RDW	12.1	%		
RETc	43.6	10e9/L	%R	.840
IRF	.232			
NRBC	0.00*10e3/uL		NR/W	0.00*
PLT	45.2*10e9/L		PLTi	49.6*PltClmp
MPV	10.5*fL			
PDW	16.8*10(GSD)			
PCT	.476*mL/L			



ALL a fragmenty cytoplazmy

Sequence #: 2699 Autoloader r38t02
 Patient/Human
 Specimen ID: 000213479091
 Name:

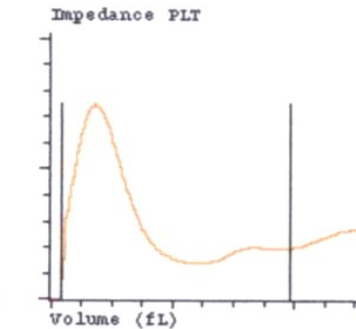
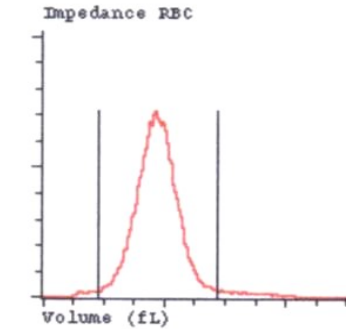
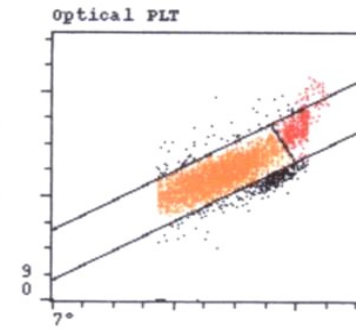
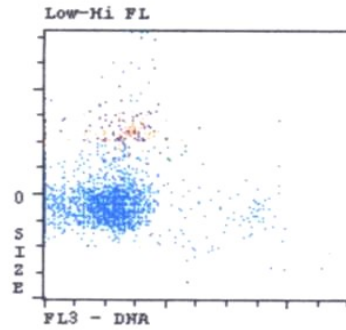
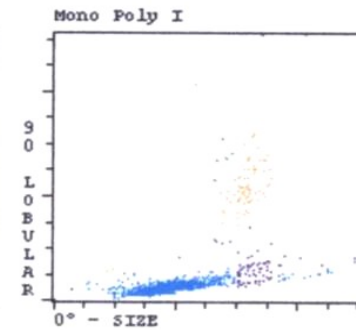
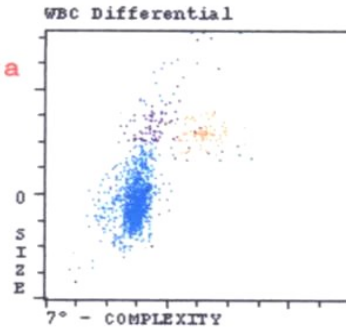
Test Selection: CBC
 Param Set(Chart Page): 1
 Limit Set: 1
 Run Date/Time: 21/02/00 08:57

X-B In	WBC 2 Out	RBC In	PLT In	RETC In
WBC	3.36 10e9/L	WVF	.956	*InvalidData
NEU	.133	%N	3.95	
LYM	3.08s	%L	91.7s	
MONO	.136s	%M	4.05s	
EOS	.010	%E	.296	
BASO	0.00	%B	0.00	

BLAST .73
 VARLYM .60

RBC	3.74 10e12/L	RBC _o	3.78
HGB	5.81 mmol/L		
HCT	.287 L/L		
MCV	76.6 fL		
MCH	1.55 fmol		
MCHC	20.3 mmol/L		
RDW	17.9 %CV		
RETC	----- 10e9/L	%R	-----
IRF	-----		
NRBC	0.00 10e9/L	NR/W	0.00

PLT _o	81.5*10e9/L	PLT _i	131.*
MPV	5.41*fL	CD61	-----
PDW	15.1*10(GSD)	PLT _s	-----
PCT	.441*mL/L	PLT _l	-----



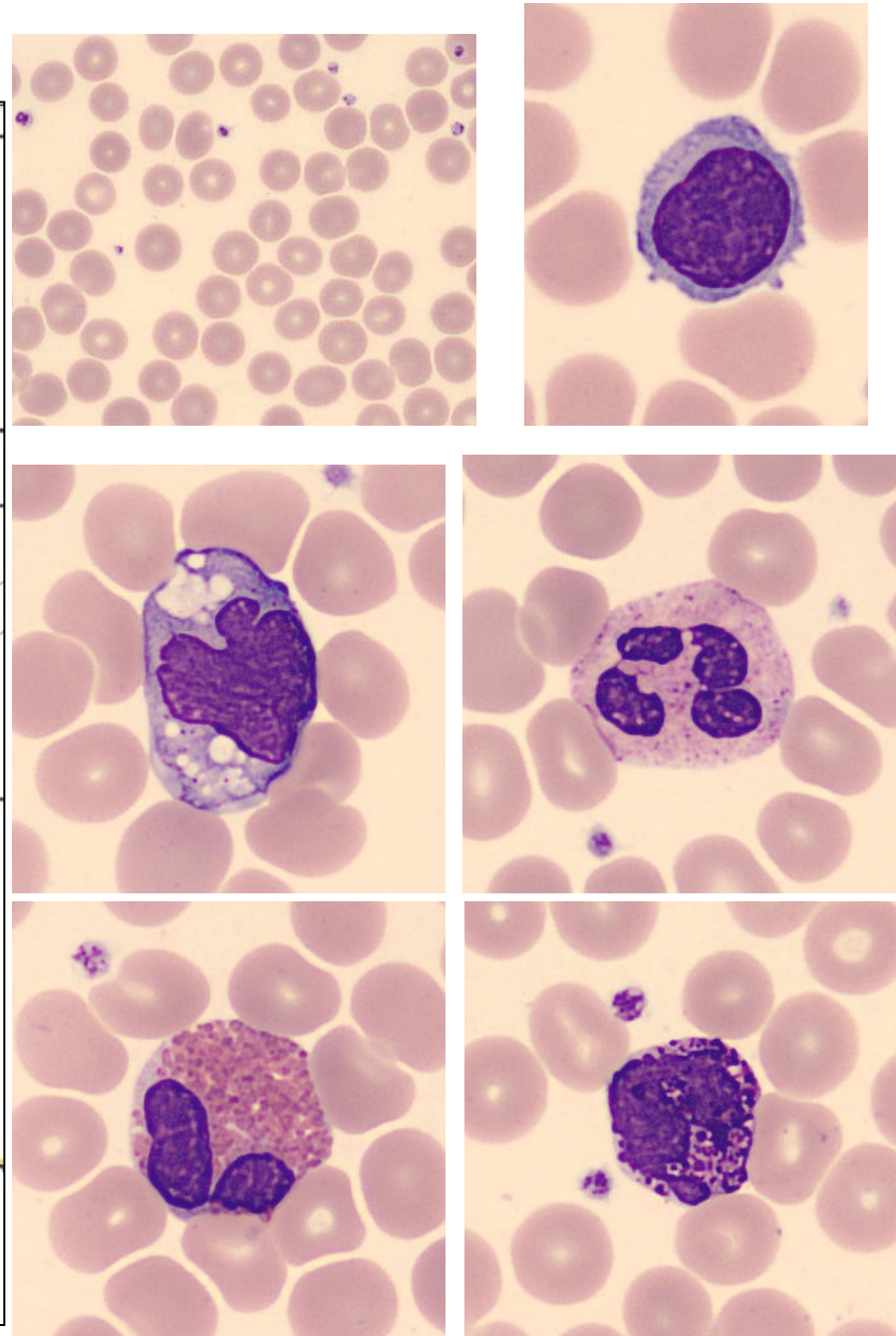
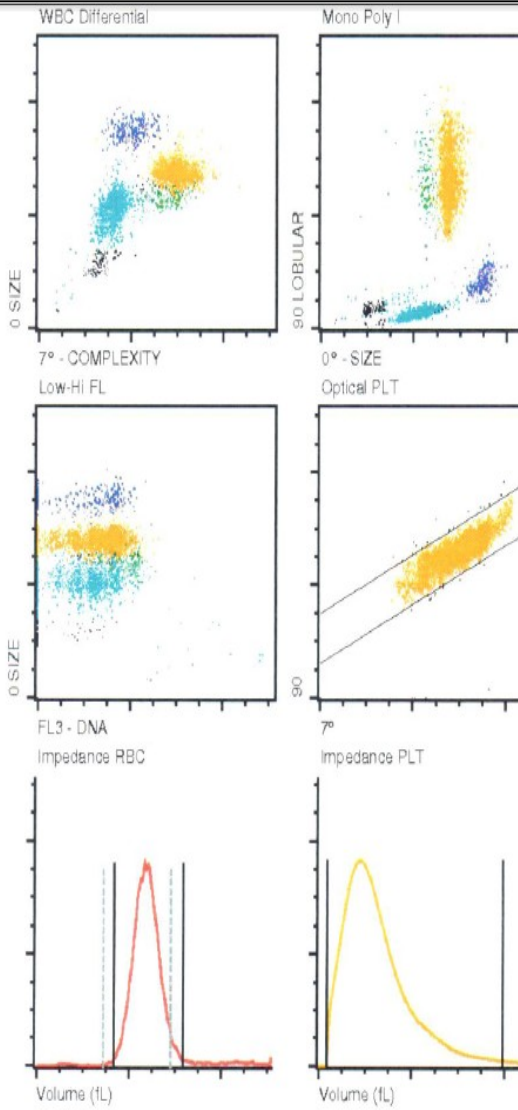
Lower, Upper, or Lower and Upper Region Interference in PLTi Histogram
 PIC/POC Delta

Fyziologický vzorek

Sex: F
 Doctor: 0717/27/06/2013
 User Defined A:
 User Defined B:
 User Defined C:
 User Defined D:

X-B In	WBC In	RBC In	PLT In	RETC In	WVF	%S	%BD	%IG	%BL	%Me	%E	%B	%Le	%VL	RBCo	%MIC	%MAC	%HPO	%HPR	NRWC	NRW	PLTI	CD61	PLTs	PLTI	
WBC	7.36	10e9/L			.991										4.22	.661	3.87	---	---	0.00	0.00	308.	---	---	---	
SEG	3.97																									
BAND	0.00																									
IG	0.00																									
BLST	0.00																									
MONe	.450																									
EOS	.299																									
BASO	.023																									
LYMe	2.61																									
VARL	0.00																									
RBC	4.13	10e12/L																								
HGB	138.	g/L																								
HCT	.406	L/L																								
MCV	<u>98.4</u>	fL																								
MCH	33.5	pg																								
MCHC	341.	g/L																								
RDW	11.4	%CV																								
HDW	---	%																								
RETC	---	10e9/L																								
IRF	---																									
MPV	8.03	fL																								
PDW	15.8	10(GSD)																								
PCT	2.56	mL/L																								
%tP	---	%																								

Manual Differential	RBC Morphology			
SEG	META	NORMAL	MICRO	
BAND	MYELO	POLYCH	MACRO	
LYMPH	PRO	HYPoch	ANISO	
MONO	BLAST	POIK	BASOSTIP.	
EOSIN	VAR LYM	TARGET		
BASO	TOXGRAN	SPHERO	NRBC	
PLT EST		PLT MORPH		



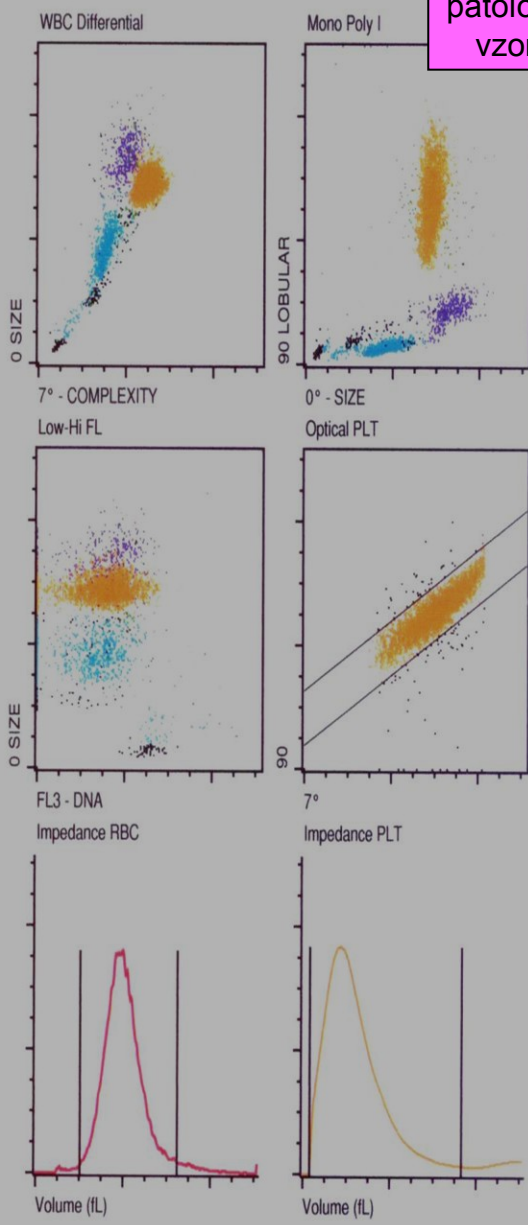
DOB: 03/21/80
 Sex: F
 Doctor: 0776/31/05/2010
 User Defined A:
 User Defined B:
 User Defined C:
 User Defined D:

X-B In	WBC In	RBC In	PLT In	RETC Out
WBC	7.41	10e9/L	WVF	.964
SEG	5.16		%S	69.7
BAND	0.00		%BD	0.00
IG	0.00		%IG	0.00
BLST	0.00		%BL	0.00
MONe	.716		%Me	9.67
EOS	.173		%E	2.34
BASO	.031		%B	.420
LYMe	1.32		%Le	17.9
VARL	0.00		%VL	0.00

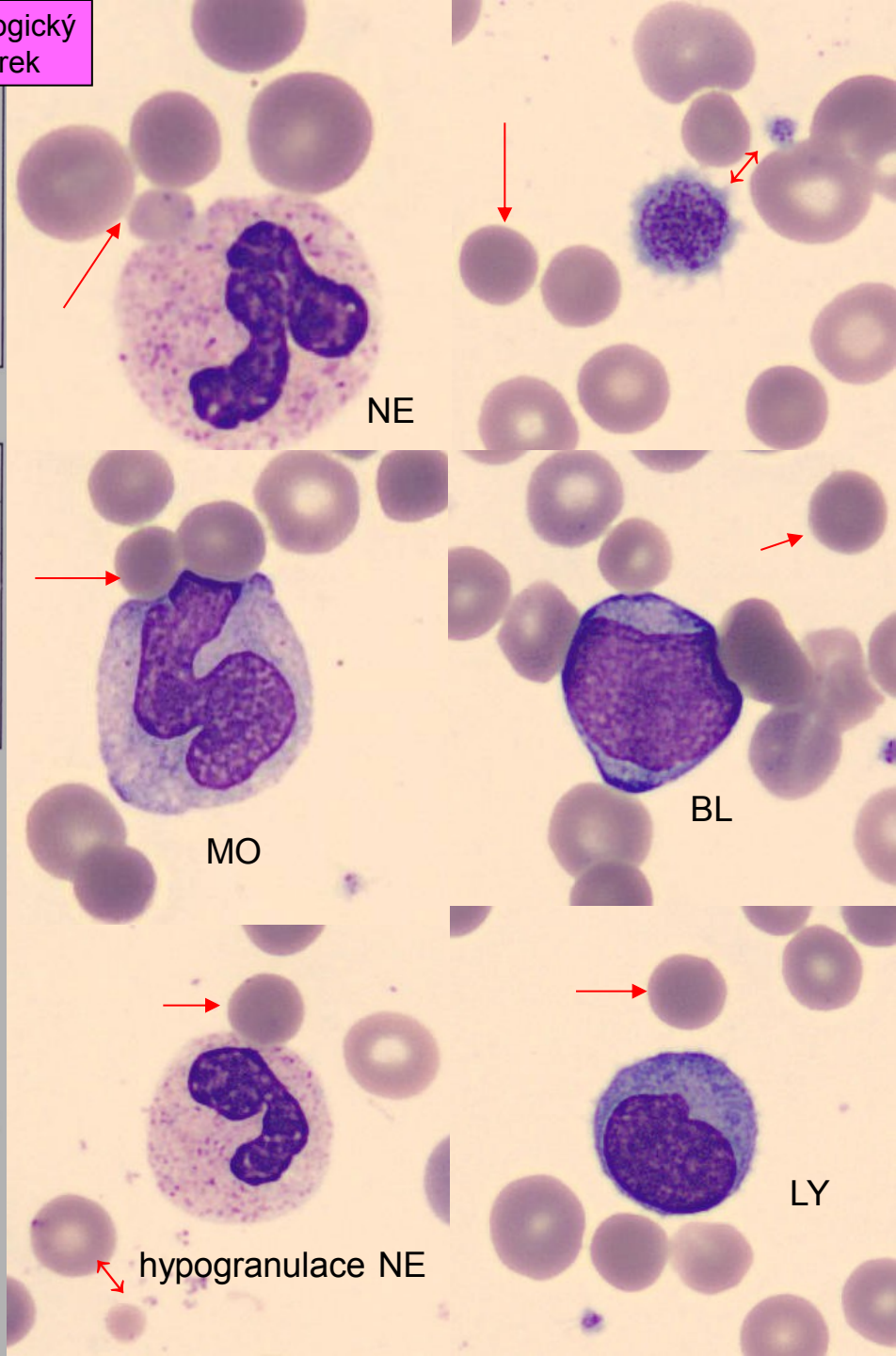
FP?

RBC	2.60	10e12/L	RBCo	2.54
HGB	79.9	g/L		
HCT	20.7	L/L		
MCV	79.7	fL		
MCH	30.8	pg		
MCHC	38.6	g/L		
RDW	19.8	%CV		
RETC	730	10e9/L	%R	28.1
IRF	.448			
NRBC	0.00s	10e9/L	NRW	0.00s

PLTo	215	10e9/L	PLTi	246
MPV	8.38	fL	CD61	---
PDW	15.4	10(GSD)	PLTs	---
PCT	1.80	mL/L	PLTI	---

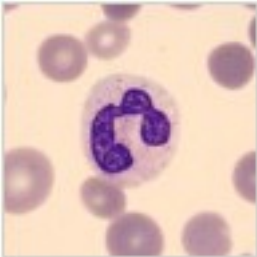


patologický vzorek

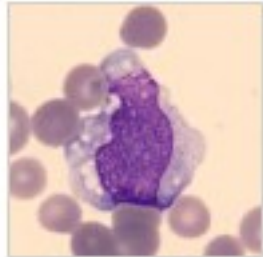


anizo ery
 sférocyty
 anizo, makro PLT

patologický vzorek



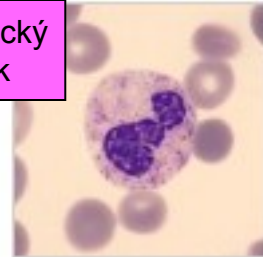
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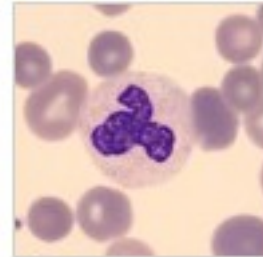
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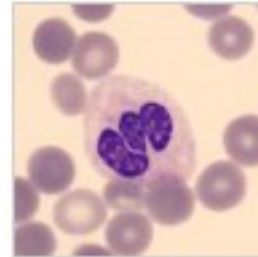
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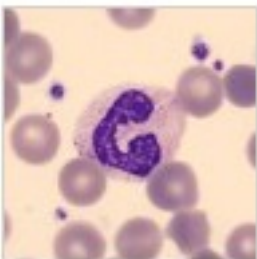
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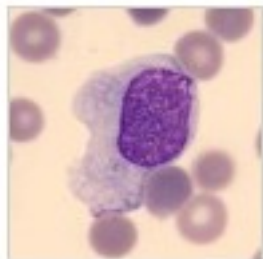
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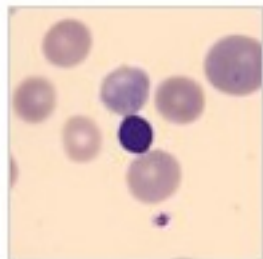
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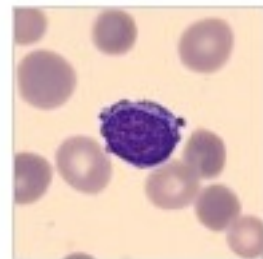
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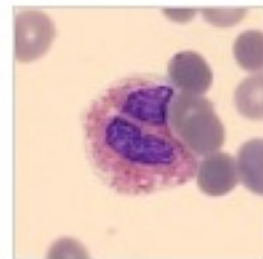
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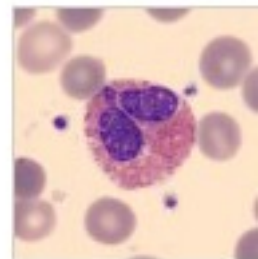
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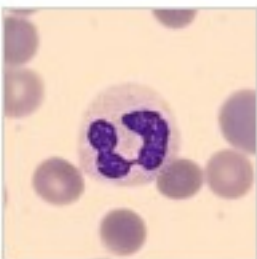
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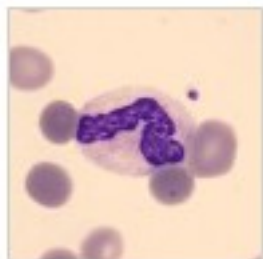
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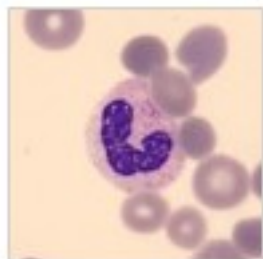
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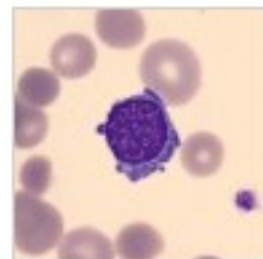
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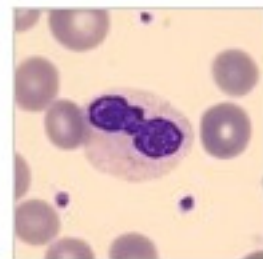
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A00776V5AB_045



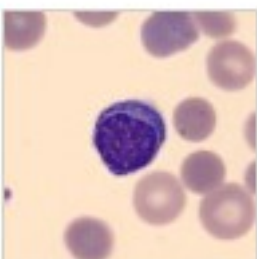
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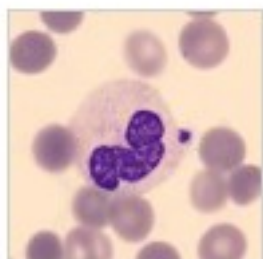
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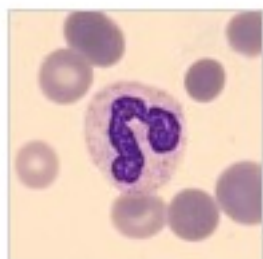
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A00776V5AB_049



A00776V5AB_050



A00776V5AB_051



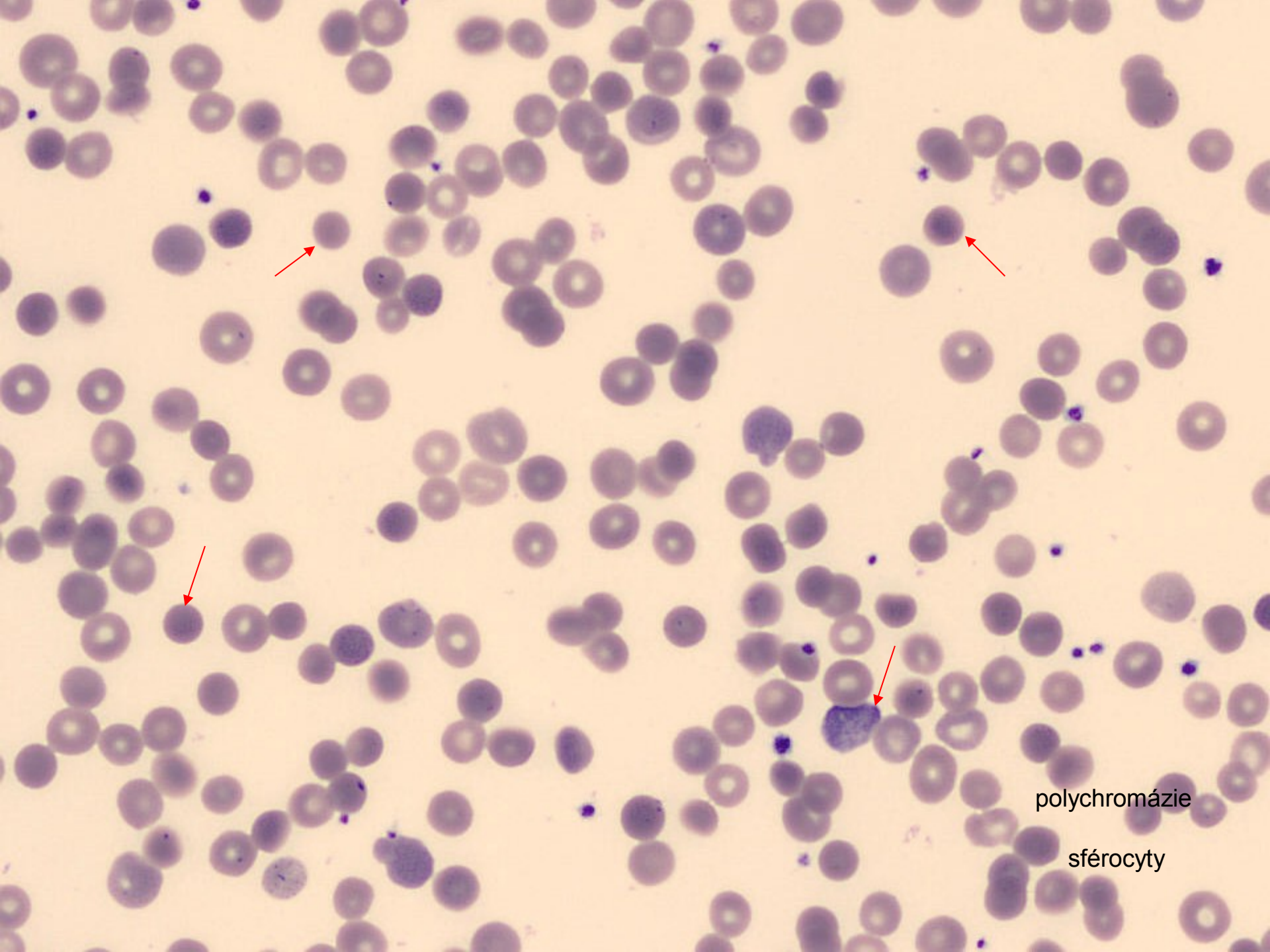
A00776V5AB_052



A00776V5AB_053



A00776V5AB_054



polychromázie

sférocyty

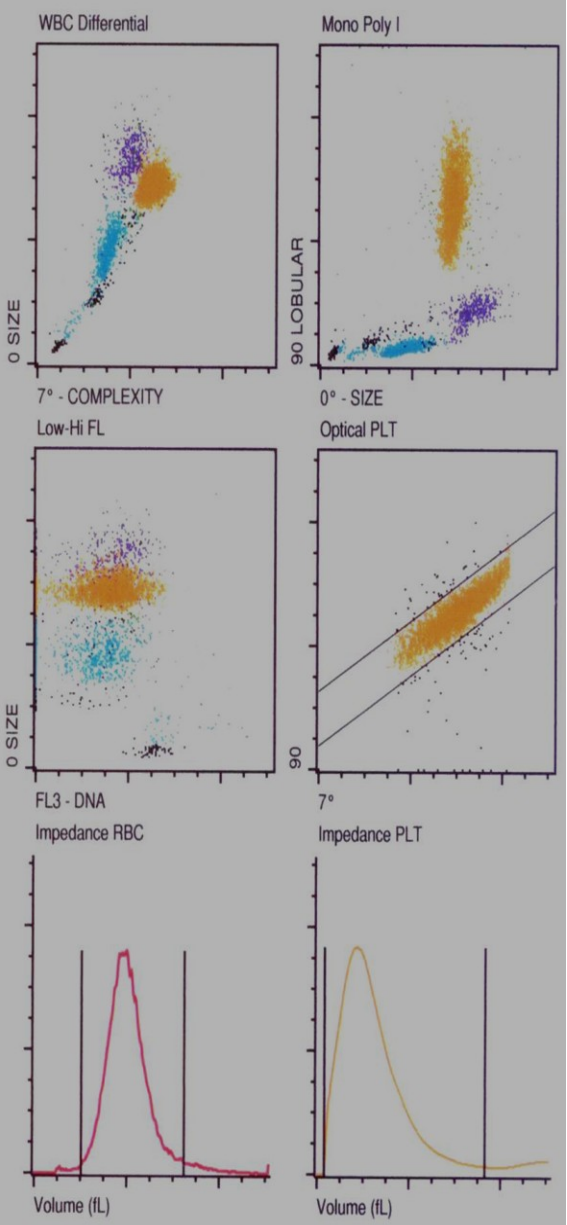
DOB: 03/21/80
 Sex: F
 Doctor: 0776/31/05/2010
 User Defined A:
 User Defined B:
 User Defined C:
 User Defined D:

X-B In	WBC In	RBC In	PLT In	RETC I Out
WBC	7.41	10e9/L	WVF	.964
SEG	5.16		%S	69.7
BAND	0.00		%BD	0.00
IG	0.00		%IG	0.00
BLST	0.00		%BL	0.00
MONe	.716		%Me	9.67
EOS	.173		%E	2.34
BASO	.031		%B	.420
LYMe	1.32		%Le	17.9
VARL	0.00		%VL	0.00

FP?

RBC	2.60	10e12/L	RBCo	2.54
HGB	79.9	g/L		
HCT	207	L/L		
MCV	79.7	fL		
MCH	30.8	pg		
MCHC	386.	g/L		
RDW	19.8	%CV		
RETC	730.	10e9/L	%R	28.1
IRF	448			
NRBC	0.00s	10e9/L	NR/W	0.00s
PLTo	215.	10e9/L	PLTi	246.
MPV	8.38	fL	CD61	----
PDW	15.4	10(GSD)	PLTs	----
PCT	1.80	mL/L	PLTI	----

Manual Differential	RBC Morphology		
SEG 68	META 1	NORMAL	MICRO ✓
BAND 1	MYELO	POLYCH ✓	MACRO ✓
LYMPH 20	PRO	HYPOCH	ANISO ✓
MONO 4	BLAST 1	POIK	BASOSTIP
EOSIN 3	VAR LYM	TARGET	<i>sk. nocyty</i>
BASO 1	TOXGRAN	SPHERO	NRBC
PLT EST <i>aniso</i>	PLT MORPH		
Comment: <i>hypogranuloc. neu</i>			
DIFF by:	Date:		



patologický vzorek

- žena, 30 roků
- ambulantní pacientka
- diagnóza: dědičná sférocyóza