

Verein für
Association pour le
Associazione per il



medizinische Qualitätskontrolle
contrôle de qualité médical
controllo di qualità medico

Report

Differential Blood Smear H3

MQ 2014-1

Acknowledgements

The Mythic 18 analyzer was provided by the company Polymed. MQ employees conducted the measurements.

The ABX Micros CRP 200 instrument was provided to [sic: by] the company by Axonlabs. MQ employees conducted the measurements.

The findings of the KX21, XE-5000, ADVA 120 devices and of the microscopic blood counts were generated by the Zentrallabor des Medizinbereichs Diagnostik HAD der Klinik für Hämatologie des Universitätsspitals Zürich (Central Laboratory of Medical Diagnostic HAD of the University Hospital Zurich Hematology Clinic). The lab is ISO/IEC 17025 certified (STS 445). Dr. Jeroen Goede is the responsible manager; Prof. MG Manz, M.D., the clinic director.
www.haematologie.usz.ch

For information regarding all analyses offered by the University Hospital of Zurich, see: www.uzl.usz.ch

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1 Sample A

1.1 ABX Micros



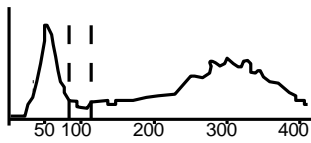
Findings MQ 2014-1 H3A

47 old man

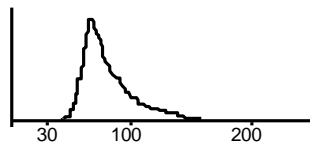
WBC :	4.8	10 ⁹ /L	MCV :	85.6	fL
RBC :	5.03	10 ¹² /L	MCH :	28.7	pg
HGB :	144	g/L	MCHC:	335	g/L
HCT :	.431	L/L	RDW :	14.7	%
PLT :	173	10 ⁹ /L	MPV :	7.3	fL
PCT :	.126	10 ⁻² L/L	PDW :	14.6	%

DI FF:					
%LYM:	21.4	%	#LYM:	1.0	L 10 ⁹ /L
%MON:	3.5	L %	#MON:	0.1	L 10 ⁹ /L
%GRA:	75.1	%	#GRA:	3.7	10 ⁹ /L

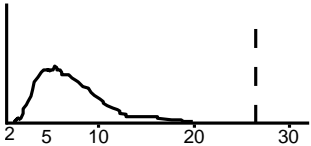
WBC



RBC



PLT



1.2 Mythic



Findings MQ 2014-1 H3A

47 old man

WBC	5.8	10 ⁹ /l	3.5 /	10.0	
LYM	1.3	10 ⁹ /l	1.2 /	3.2	
MON	0.3	10 ⁹ /l	0.1 /	1.0	
GRA	4.2	10 ⁹ /l	1.2 /	6.8	
LYM%	22.3	%	17.0 /	48.0	
MON%	5.4	%	2.0 /	10.0	
GRA%	72.3	%	43.0 /	76.0	
RBC	4.96	10 ¹² /l	4.00 /	5.70	
HGB	140	g/l	120 /	180	
HCT	0.420	l/l	0.360 /	0.540	
MCV	84.7	fl	80.0 /	100.0	
MCH	28.2	pg	26.0 /	34.0	
MCHC	333	g/l	310 /	365	
RDW	11.8	%	10.0 /	16.0	
PLT	198	10 ⁹ /l	150 /	400	
MPV	7.7	fl	7.0 /	11.0	
PCT	0.152	cl/l	0.100 /	0.500	
PDW	14.2	%	10.0 /	18.0	

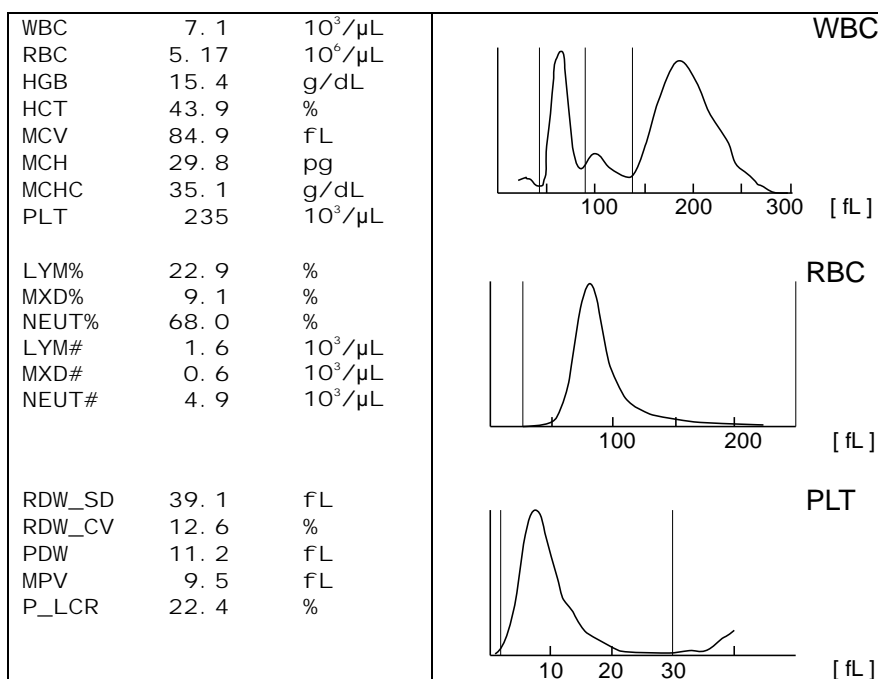
1.3 Sysmex KX21



Findings MQ 2014-1 H3A

47 old man

Analysis	Result	Unit	Reference Value
Blood count			
Hemoglobin	154	g/l	134-170
Hematocrit	0.439	l/l	0.400-0.500
Erythrocytes	5.17	T/l	4.2-5.7
MCV	84.9	fl	80-100
MCH	29.8	pg	26-34
MCHC	351	g/l	310-360
Thrombocytes	235	G/l	143-400
MXD	0.60	G/l	3 part Diff (Mono/Eos/Baso)
Leukocytes	7.1	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophiles	4.90	G/l	1.40-8.00
Lymphocytes	1.60	G/l	1.50-4.00



1.4 Sysmex XE-5000

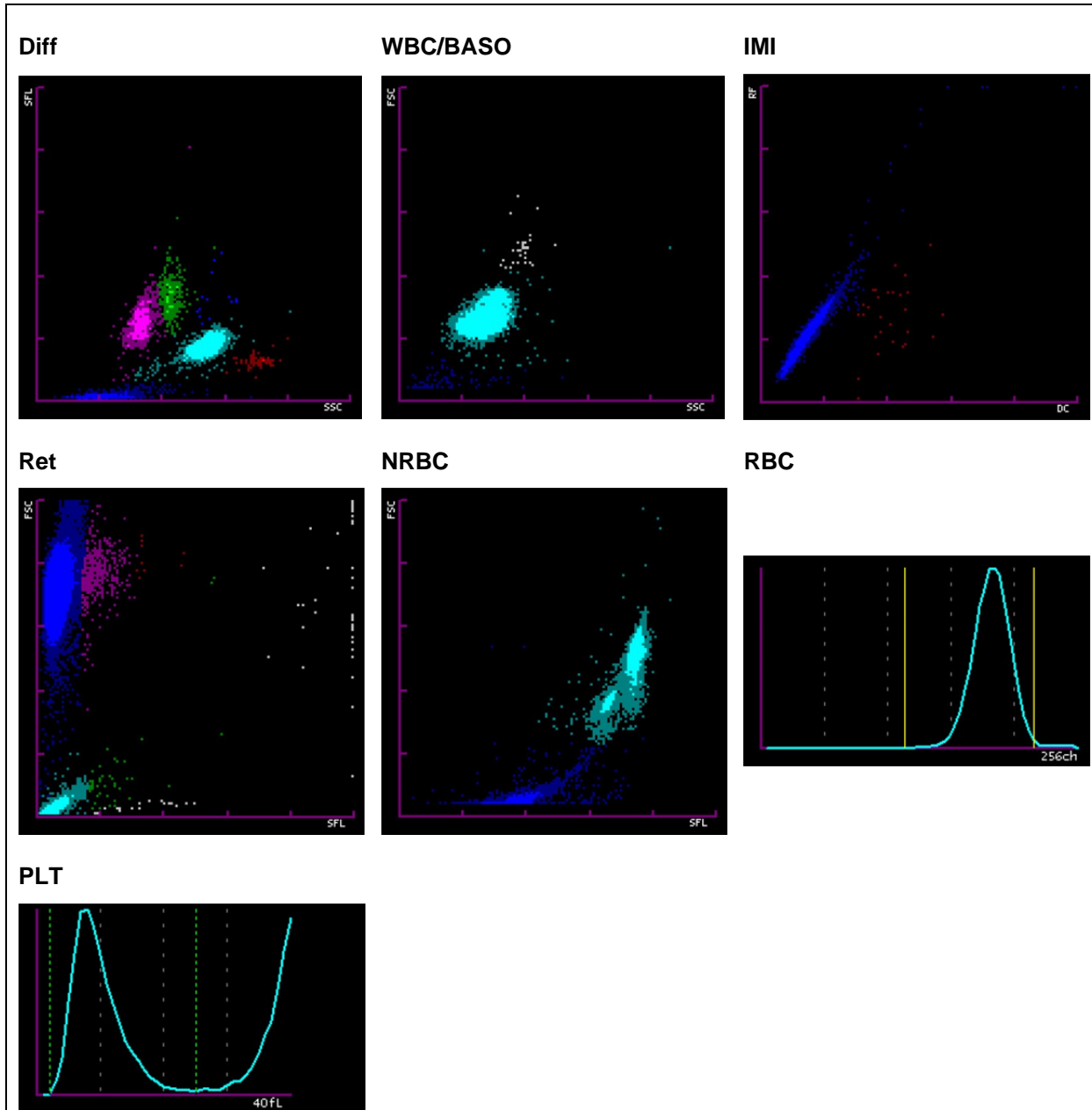


Findings MQ 2014-1 H3A

47 old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	156	g/l	134-170
Hematocrit	0.406	l/l	0.400-0.500
Erythrocytes	5.01	T/l	4.2-5.7
MCV	81.0	fl	80-100
MCH	31.1	pg	26-34
MCHC	* 384	g/l	310-360
Mikrocytes	210	%	0-2.0
Thrombocytes	210	G/l	143-400
Leucocytes	6.98	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	4.88	G/l	1.40-8.00
Monocytes	0.54	G/l	0.16-0.95
Eosinophils	0.11	G/l	0.00-0.70
Basophils	0.02	G/l	0.00-0.15
Lymphocytes	1.43	G/l	1.50-4.00
IG abs.	0.02	G/l	0.00-0.03
IG %	0.3	%	0.0-0.5
NRBC abs.	0.00	G/l	
NRBC	0.0	/100 Lc	

Findings HAD MQ 2014-1 H3A



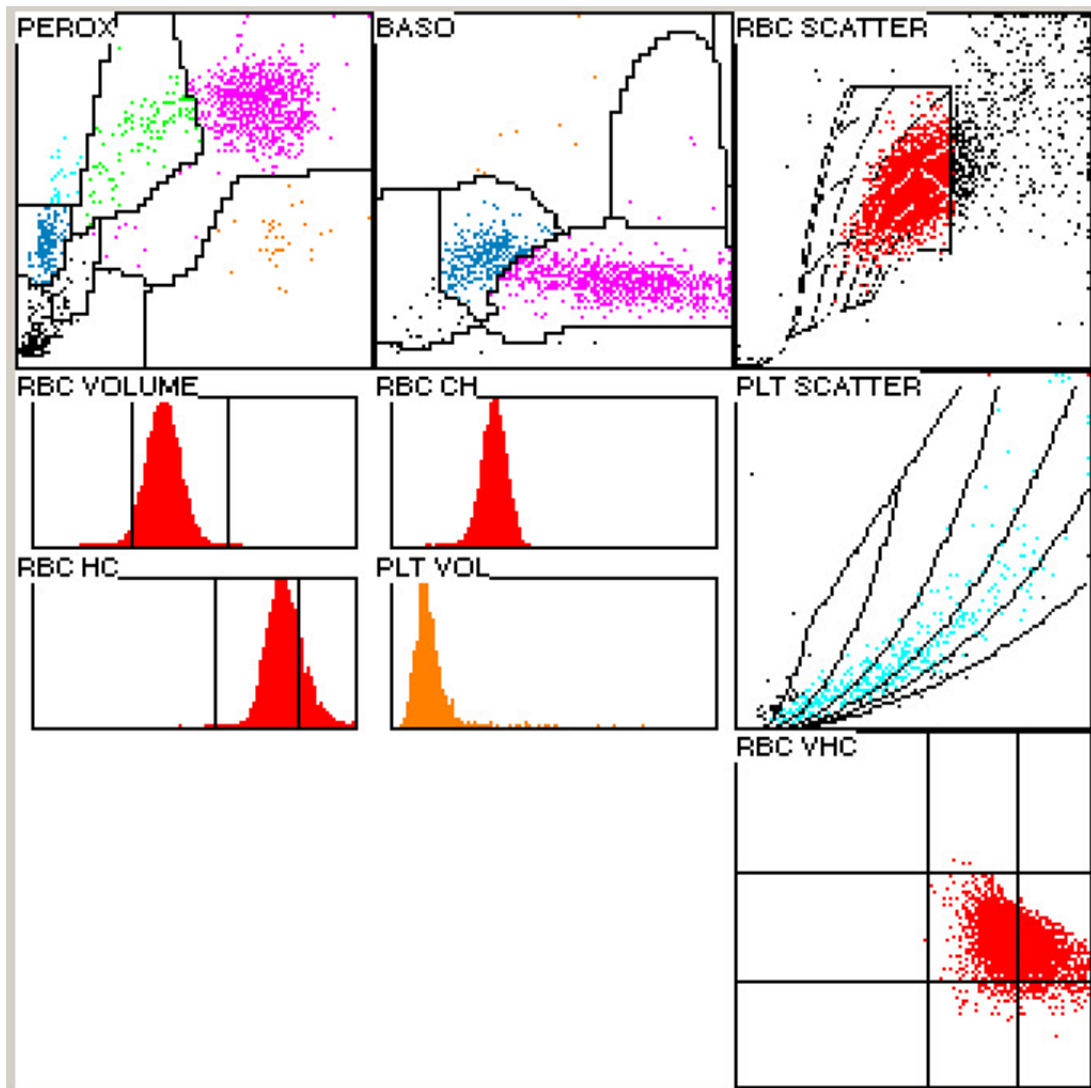
1.5 ADVIA 120



Findings MQ 2014-1 H3A

47 old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	125	g/l	134-170
Hematocrit	0.408	l/l	0.400-0.500
Erythrocytes	5.05	T/l	4.2-5.7
MCV	80.7	fl	80-100
MCH	30.1	pg	26-34
MCHC	* 373	g/l	310-360
Mikrocytes	2.0	%	0-2.0
Makrocytes	0	%	0-2.0
Hypochromic Ec	0	%	0-2.0
Hyerchromic Ec	* 19.6	%	0-2.0
Thrombocytes	211	G/l	143-400
Vd. L-SHIFT	0	+	Keine (0)
Leukocytes	7.73	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	5.56	G/l	1.40-8.00
Monocytes	0.43	G/l	0.16-0.95
Eosinophils	0.13	G/l	0.00-0.70
Basophils	0.03	G/l	0.00-0.15
Lymphocytes	1.47	G/l	1.50-4.00
LUC	1.4	%	0.0-4.0



1.6 Differential Blood Smear

Findings HAD MQ 2014-1 H3A

47 old man

Analysis	Result	Unit	Reference value
Neutrophils total	5.45	G/l	1.40-8.00
Monocytes	0.66	G/l	0.16-0.95
Eosinophils	0.12	G/l	0.00-0.70
Basophils	0.00	G/l	0.00-0.15
Lymphocytes	* 1.51	G/l	1.50-4.00
Neutrophils total	70.5	%	40.0-74.0
Neutrophils Band	9.0	%	0.0-20.0
Neutrophils Segmented	61.5	%	30.0-50.0
Monocytes	8.5	%	3.4-9.0
Eosinophils	1.5	%	0.0-7.0
Basophils	0.0	%	0.0-1.5
Lymphocytes	19.5	%	19.0-48.0
Plasmacells	0.0	%	0-0.5
Blasts	0.0	%	0
Promyelocytes	0.0	%	0
Myelocytes	0.0	%	0
Metamyelocytes	0.0	%	0
Nucleated Red Cells	0.0	/100 Lc	

Comment

The neutrophil granulocytes show fine cytoplasmic granulation. The lymphocytes are usually small with a small amount of cytoplasm, a few larger forms with wider and dark basophilic cytoplasm seams. Platelet are anisocytotic; giant platelets are rarely observed upon review. There is minor anisocytosis in the red blood cell count with few microcytes, minor poikilocytosis with multiple spherocytes. No erythrocytic inclusions. K. Schreiber / Dr. J. Goede

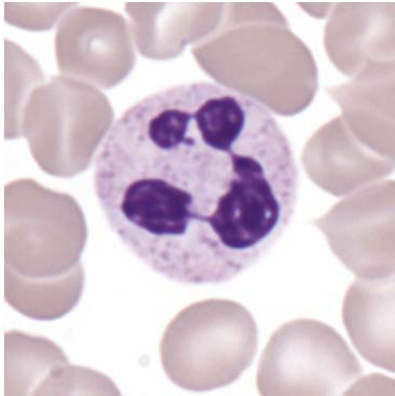


Abb 1. Neutrophil

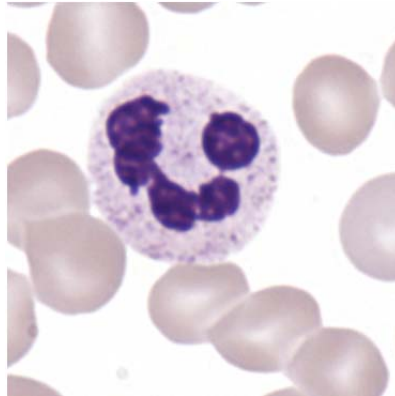


Abb 2. Neutrophil

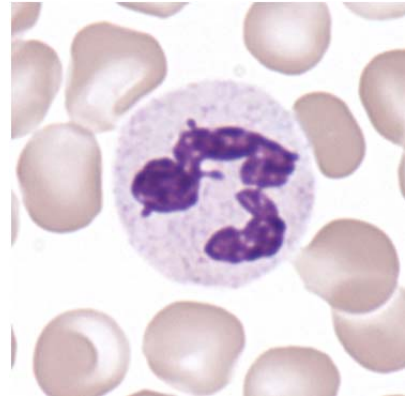


Abb 3. Neutrophil

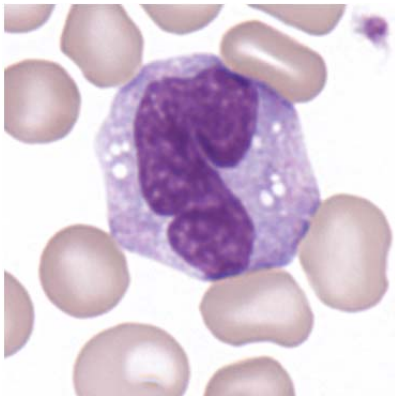


Abb 4. Monocyte

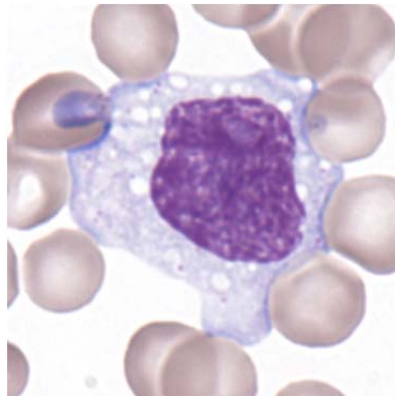


Abb 5. Monocyte

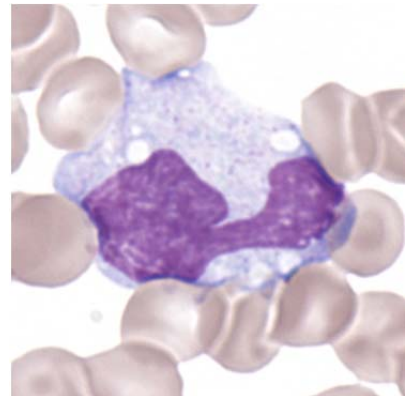


Abb 6. Monocyte

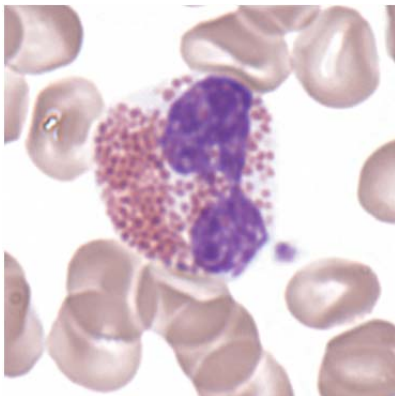


Abb 7. Eosinophil

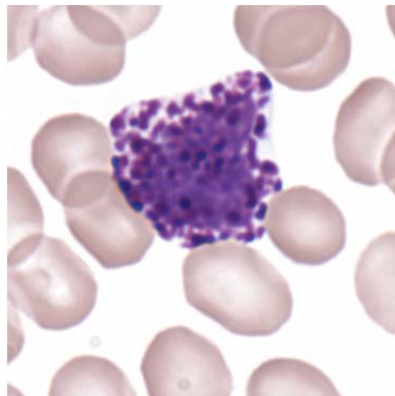


Abb 8. Basophil

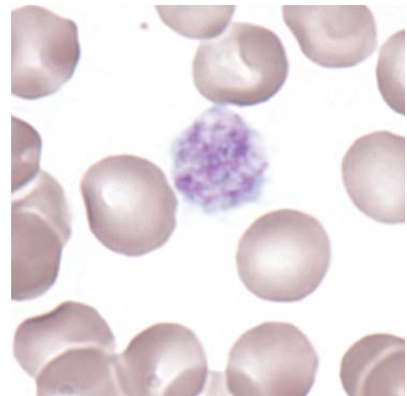


Abb 9. Thrombocyte

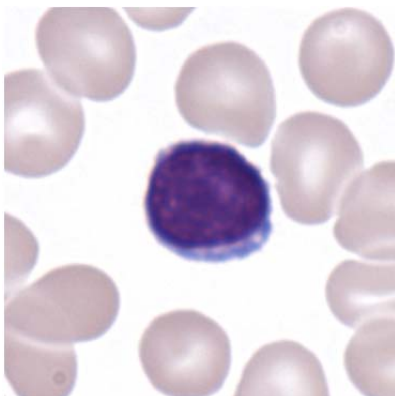


Abb 10. Lymphocyte

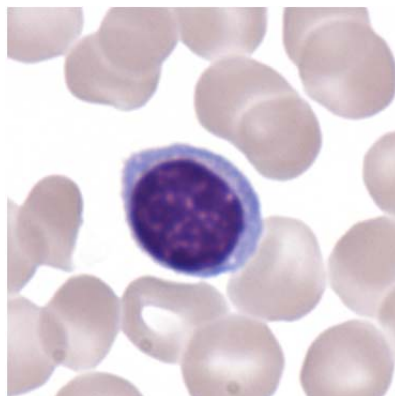


Abb 11. Lymphocyte

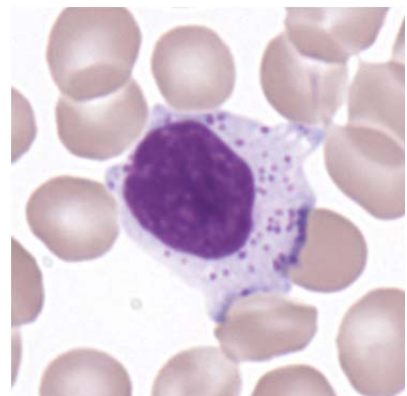


Abb 12. Lymphocyte (LGL)

1.7 Summary of participant results

Leukozyten Differenzierung H3-A

	0	1-4	5-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	>79
<i>Neutrophils Band</i>	6	87	130*	134	27	3	2		1		
<i>Neutrophils Segmented.</i>	2				1	6	40	125	192*	24	
<i>Eosinophils</i>	62	316*	12								
<i>Basophile</i>	257*	132	1								
<i>Monocytes</i>	16	136	218*	19		1					
<i>Lymphocytes</i>	1	1	3	83*	266	33	3				
<i>Plasmacells</i>	384*	2	1		2	1					
<i>Blasts</i>	387*	1	2								
<i>Promyelocytes</i>	389*	1									
<i>Myelocytes</i>	390*										
<i>Metamyelozyten</i>	388*	2									
<i>Erythrocytes Nucleated</i>	388*	2									
<i>Unknown</i>	387*	2	1								
<i>Smudge cells</i>	377*	11	2								

Evaluation H3-A

	<i>light</i>	<i>medium</i>	<i>strong</i>		<i>light</i>	<i>medium</i>	<i>strong</i>
<i>Hypersegmentation</i>	21	6	5	<i>Hypochromic Ec</i>	16	3	1
<i>Pelger-Hüet Anomaly</i>				<i>Polychromatic Ec</i>	20	2	
<i>Coarse Granulation</i>	34	3		<i>Anisocytes</i>	137*	8	
<i>Basophilic Stripling</i>	10	1		<i>Mikrocytes</i>	54*	1	
<i>Vacuoles</i>	29	3		<i>Makrocytes</i>	24		
<i>Reaktive Lymphocytes</i>	65	7	2	<i>Megalocytes</i>	2		
<i>Atypical Lymphocytes</i>	2			<i>Poikilocytosis</i>	75*	1	
<i>Others</i>	8	2	1	<i>Ovalocytes</i>	25	1	
				<i>Target Cells</i>	15	1	
				<i>Akanthocytes</i>	17		
<i>Anisocytosis</i>	65*	9	2	<i>Echinocytes</i>	13	1	
<i>Megakaryocyte Nucleaus</i>	9	2		<i>Sickle Cells</i>			
<i>Granulation</i>	10			<i>Fragmentocytes</i>	10	1	
<i>Others</i>				<i>Spherocytes</i>	5		
				<i>Stomatocytes</i>	10		1
				<i>Basophilic Stripling</i>	2		1
				<i>Howell-Jolly Bodies</i>	4		
				<i>Pappenheim Bodies</i>	1		
				<i>Others</i>	2	1	

1.8 Qualab Codes

Summary of the participant codes
(Bold printed: expected codes)

Code	Text	Anzahl
29	Normal Blood Smear	363
5	Lymphocytes, reactive	23
16	Poikilocytosis	19
26	Tear Drops	13
12	Mikrocytes	12
9	Thrombocytes, Giant	11
2	Left shift	7
4	Neutrophils, Toxic Changes	7
22	Rouleaux	7
1	Hypersegmented Neutrophils	6
13	Makrocytes	6
17	Elliptocytes/Ovalocytes	6
18	Stomatocytes	6
30	Pathologic findings, referred to expert	6
15	Polychromatophilic Red Cells	5
27	Erythrocytes, other:	5
8	Leukocytes, other:	3
10	Thombocytes aggregates	3
14	Hypochromic Erythrocytes	3
20	Fragmentocytes	2
3	Pelger-Hüet Anomaly	1
6	Lymphocytes, neoplastic	1
7	Auer Rods	1
11	Thrombocytes, other	1
19	Targetcells	1
24	Howell-Jolly Körperchen	1
25	Basophilic strippling	1
28	Parasites	1

2 Sample B

2.1 ABX Micros



Findings MQ 2014-1 H3B

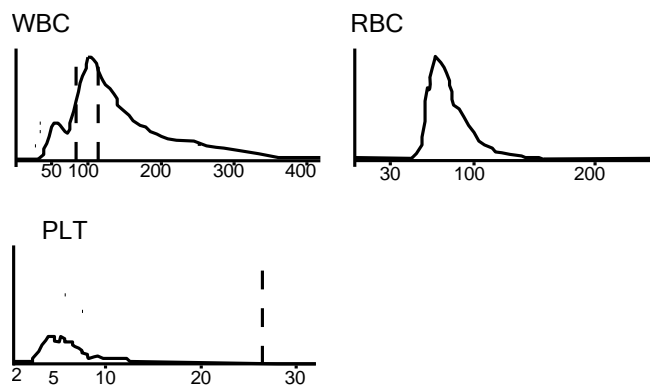
40 years old man

WBC :	18.0	H	$10^9/L$	MCV :	86.5	fL
RBC :	4.37		$10^{12}/L$	MCH :	30.6	pg
HGB :	133		g/L	MCHC:	353	g/L
HCT :	.378		L/L	RDW :	15.3	H %
PLT :	63	L	$10^9/L$	MPV :	7.0	fL
PCT :	.044	L	$10^{-2}L/L$	PDW :	10.4	%

WBC Fl ags : M2 G1 G2 G3

DIFF:

%LYM:	13.2	L	%	#LYM:	2.3	$10^9/L$
%MON:	25.2	H	%	#MON:	4.5	H $10^9/L$
%GRA:	61.6		%	#GRA:	11.2	H $10^9/L$



2.2 Mythic



Findings MQ 2014-1 H3B

40 years old man

WBC	17.7	H	10 ⁹ /l	3.5	/	10.0	
LYM	3.9	h	10 ⁹ /l	1.2	/	3.2	
MON	5.9	H	10 ⁹ /l	0.1	/	1.0	
GRA	7.9	H	10 ⁹ /l	1.2	/	6.8	
LYM%	21.9		%	17.0	/	48.0	
MON%	33.5	H	%	2.0	/	10.0	
GRA%	44.6		%	43.0	/	76.0	
RBC	4.24		10 ¹² /l	4.00	/	5.70	
HGB	127		g/l	120	/	180	
HCT	0.367		l/l	0.360	/	0.540	
MCV	86.6		fl	80.0	/	100.0	
MCH	30.0		pg	26.0	/	34.0	
MCHC	346		g/l	310	/	365	
RDW	13.1		%	10.0	/	16.0	
PLT	113	L	10 ⁹ /l	150	/	400	
MPV	7.2		fl	7.0	/	11.0	
PCT	0.081	I	cl/l	0.100	/	0.500	
PDW	12.1		%	10.0	/	18.0	

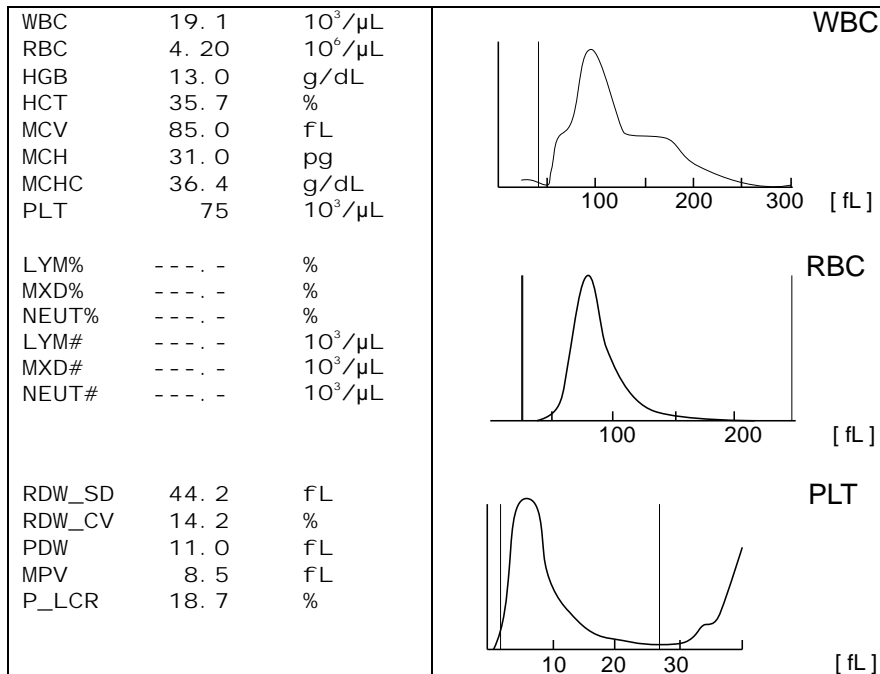
2.3 Sysmex KX21



Findings MQ 2014-1 H3B

40 years old man

Analysis	Result	Unit	Reference value
Blood count			
Hemoglobin	130	g/l	134-170
Hematocrit	0.357	l/l	0.400-0.500
Erythrocytes	4.20	T/l	4.2-5.7
MCV	85.0	fl	80-100
MCH	31.0	pg	26-34
MCHC	* 364	g/l	310-360
Thrombocytes	* 75	G/l	143-400
MXD	* 19.40	G/l	3.0-9.6



2.4 Sysmex XE-5000

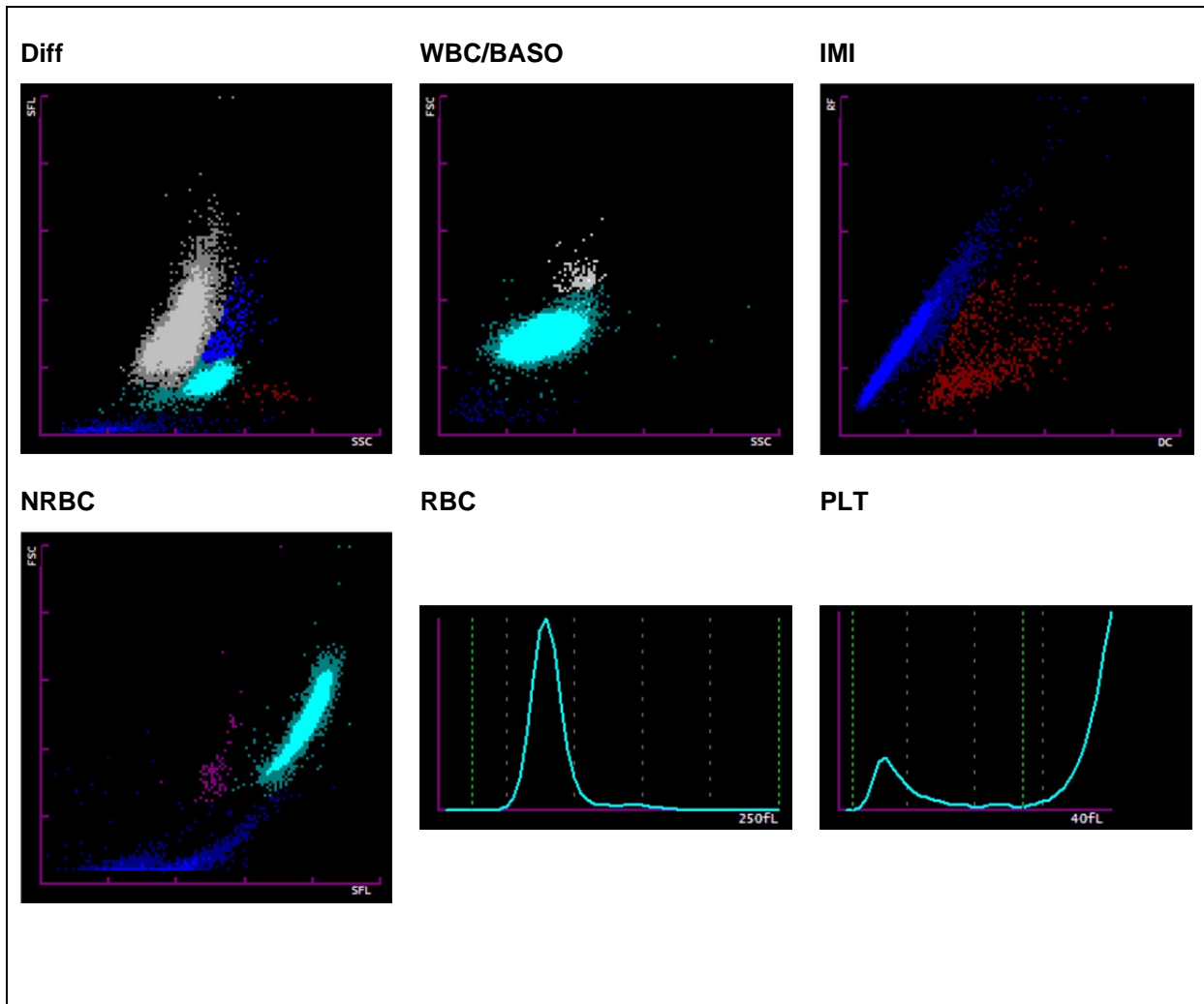


Findings MQ 2014-1 H3B

40 years old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	130	g/l	134-170
Hematocrit	0.353	l/l	0.400-0.500
Erythrocytes	4.34	T/l	4.2-5.7
MCV	81.3	fl	80-100
MCH	30.0	pg	26-34
MCHC	* 368	g/l	310-360
Thrombocytes	* 54	G/l	143-400
Leukocytes	* 20.45	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	nd	G/l	1.40-8.00
Monocytes	nd	G/l	0.16-0.95
Eosinophils	0.05	G/l	0.00-0.70
Basophils	0.10	G/l	0.00-0.15
Lymphocytes	nd	G/l	1.50-4.00
IG abs.	nd	G/l	0.00-0.03
IG %	nd	%	0.0-0.5
NRBC abs.	0.09	G/l	
NRBC	0.4	/100 Lc	

Report HAD MQ 2014-1 H3B



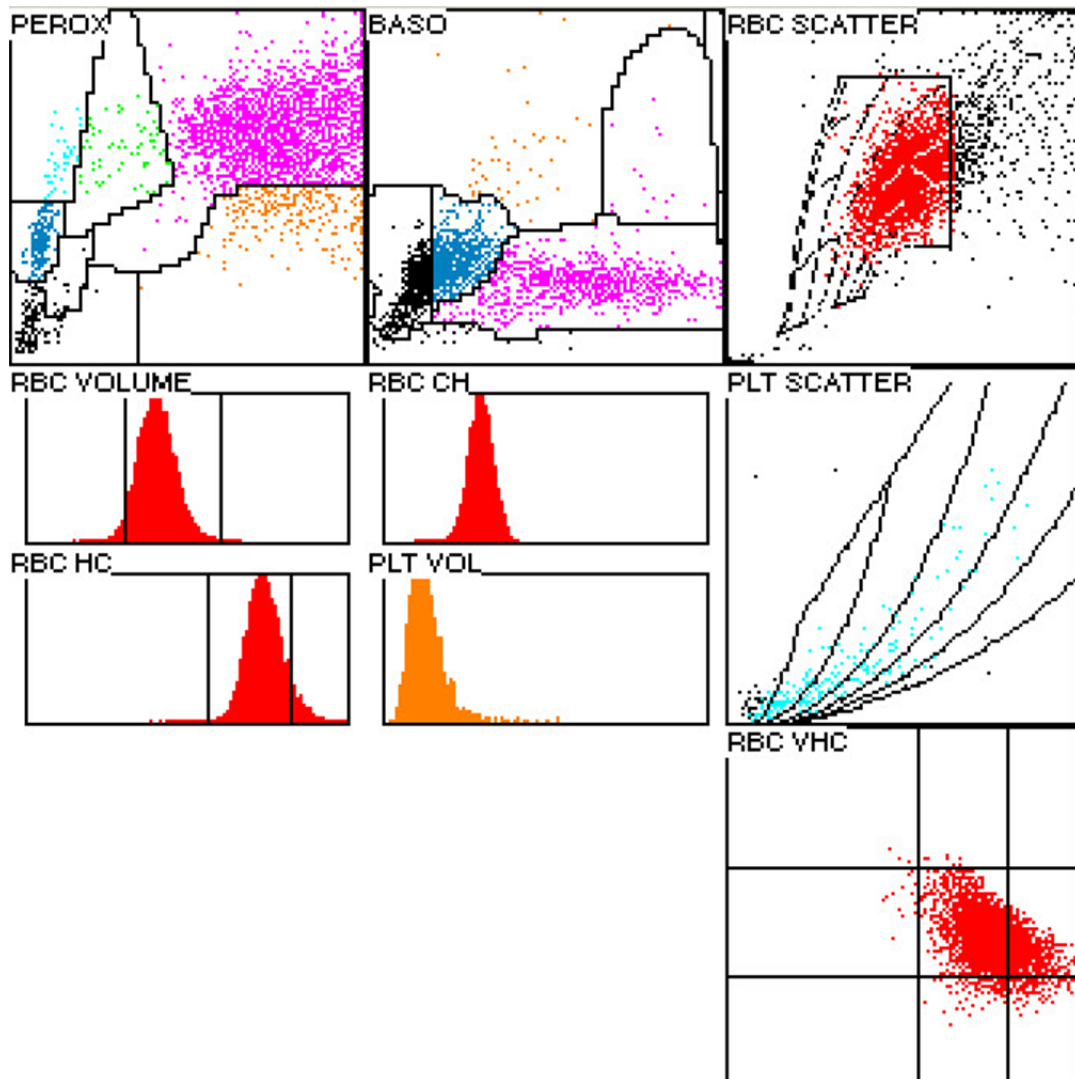
2.5 ADVIA 120



Findings MQ 2014-1 H3B

40 years old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	127	g/l	134-170
Hematocrit	0.351	l/l	0.400-0.500
Erythrocytes	4.34	T/l	4.2-5.7
MCV	80.8	fl	80-100
MCH	29.4	pg	26-34
MCHC	* 363	g/l	310-360
Mikrocytes	* 2.9	%	0-2.0
Makrocytes	0.1	%	0-2.0
Hypochromic Ec	0.2	%	0-2.0
Hyerchromic Ec	* 7.8	%	0-2.0
Thrombocytes	* 84	G/l	143-400
Vd. L-SHIFT	0	+	Keine (0)
Leukocytes	20.34	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	* 16.78	G/l	1.40-8.00
Monocytes	0.27	G/l	0.16-0.95
Eosinophils	* 1.32	G/l	0.00-0.70
Basophils	* 0.19	G/l	0.00-0.15
Lymphocytes	1.60	G/l	1.50-4.00
LUC	0.8	%	0.0-4.0



2.6 Differential Blood Smear

Findings HAD MQ 2014-1 H3B

40 years old man

Analysis	Result	Unit	Reference value
Neutrophils total	5.01	G/l	1.40-8.00
Monocytes	0.61	G/l	0.16-0.95
Eosinophils	0.00	G/l	0.00-0.70
Basophils	0.00	G/l	0.00-0.15
Lymphocytes	1.53	G/l	1.50-4.00
Neutrophils total	* 24.5	%	40.0-74.0
Neutrophils Band	5.0	%	0.0-20.0
Neutrophils Segmented	* 19.5	%	30.0-50.0
Monocytes	* 3.0	%	3.4-9.0
Eosinophils	0.0	%	0.0-7.0
Basophils	0.0	%	0.0-1.5
Lymphocytes	* 7.5	%	19.0-48.0
Plasmacells	0.0	%	0-0.5
Blasts	* 8.0	%	0
Promyelocytes	* 54.0	%	0
Myelocytes	* 2.0	%	0
Metamyelocytes	* 1.0	%	0
Nucleated Red Cells	0.5	/100 Lc	

Commentary

Migration of 54% atypical promyelocytes and 8.0% blasts. The promyelocytic are abnormal, the chromatin is granular to fine, often a distinct nucleolus, with round, partly indented nucleus is seen, also some with saddle-shaped nucleus, upon review rarely cleaved. The cytoplasm is partly hyper-granulated, upon review several cells with plump singular Auer rods.

Neutrophils have a fine cytoplasmic granulation.

Thrombocytopenia; platelet anisocytosis is minor, upon review rarely nongranular forms. The red blood count is normochromic and normocytic, minor polychromasia, minor poikilocytosis with few ovalocytes and acanthocytes, rarely dakryocytes upon review. No erythrocytic inclusions. K. Schreiber / Dr. J. Goede

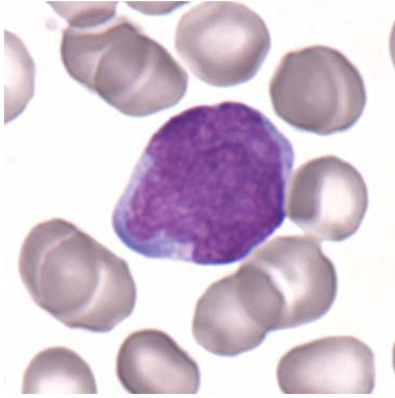


Abb 1. Blast



Abb 2. Promyelocyte

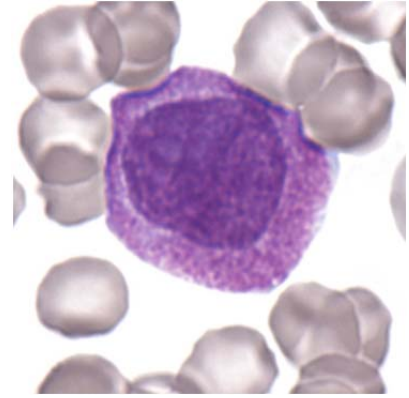


Abb 3. Promyelocyte,
hypergranular

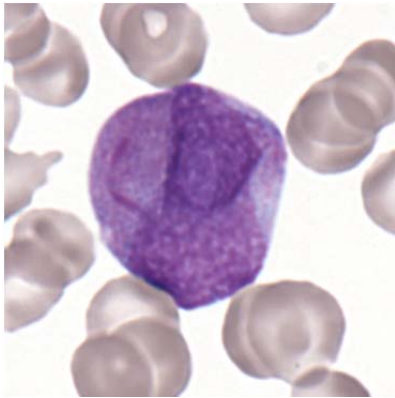


Abb 4. Promyelocyte, with Auer
rods

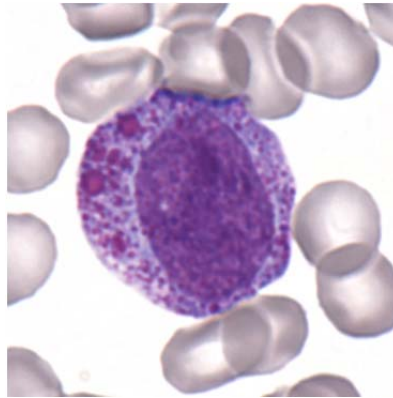


Abb 5. Promyelocyte

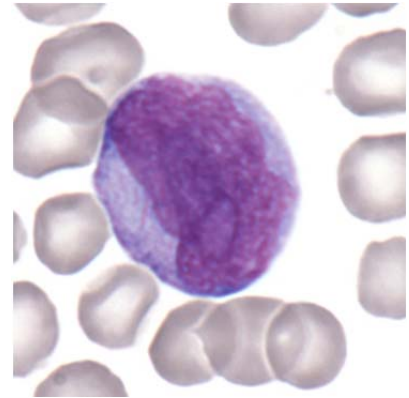


Abb 6. Promyelocyte, with Auer
rods

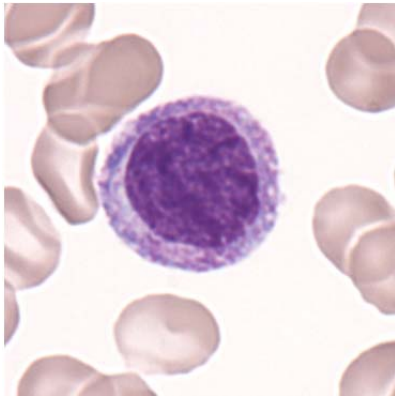


Abb 7. Myelocyte

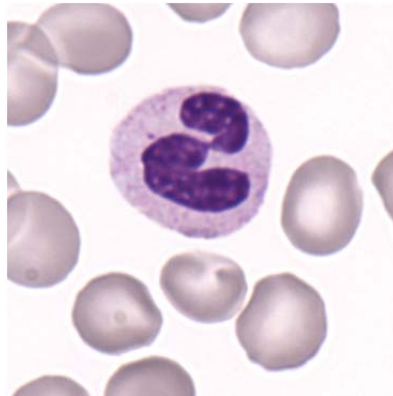


Abb 8. Neutrophil

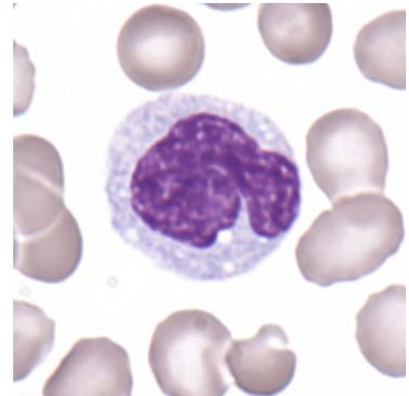


Abb 9. Monocyte

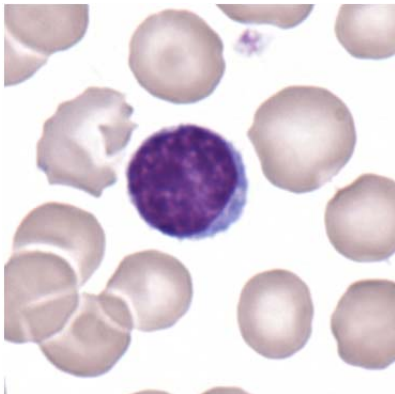


Abb 10. Lymphocyte

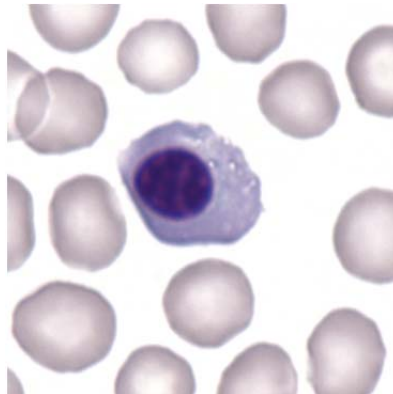


Abb 11. Erythrocyte, Nucleated

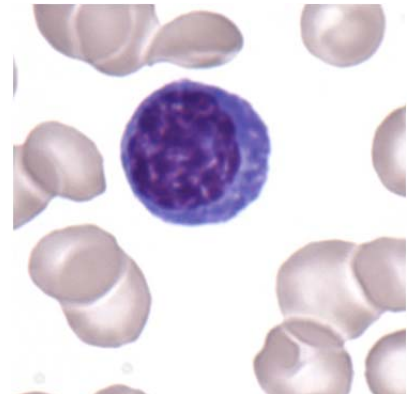


Abb 12. Erythrocyte, Nucleated

2.7 Summary of participant results

Leucocyte differentiation H3-B

	<1	1-4	5-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	>79
<i>Neutrophils Band</i>	1	58	164*	150	13	1	2				
<i>Neutrophils Segmented.</i>	1		18	158*	186	25		1			
<i>Eosinophils</i>	287*	101	1								
<i>Basophile</i>	340*	47	1	1							
<i>Monocytes</i>	112	214*	32	14	7	5	1	3		1	
<i>Lymphocytes</i>	2	11	103*	157	33	20	5	11	20	21	6
<i>Plasmacells</i>	361*	17	4	4		1		1	1		
<i>Blasts</i>	149	13	21*	34	38	43	33	31	24	3	
<i>Promyelocytes</i>	201	28	35	54	25	19	11	9*	7		
<i>Myelocytes</i>	186	71*	41	33	18	8	7	9	16		
<i>Metamyelozyten</i>	268	94*	14	11	2						
<i>Erythrocytes Nucleated</i>	257*	130	1	1							
<i>Unknown</i>	357*	8	3	3	2	4	2	3	5	2	
<i>Smudge cells</i>	339*	30	11	7	1		1				

Evaluation H3-B

	<i>light</i>	<i>medium</i>	<i>strong</i>		<i>light</i>	<i>medium</i>	<i>strong</i>
<i>Hypersegmentation</i>	13	8	2	<i>Hypochromic Ec</i>	63	30	1
<i>Pelger-Hüet Anomaly</i>	4			<i>Polychromatic Ec</i>	140*	53	4
<i>Coarse Granulation</i>	52	30	2	<i>Anisocytes</i>	156	107	8
<i>Basophilic Stripling</i>	20	6	2	<i>Mikrocytes</i>	110	40	2
<i>Vacuoles</i>	55	15	3	<i>Makrocytes</i>	73	7	
<i>Reaktive Lymphocytes</i>	30	23	38	<i>Megalocytes</i>	12	1	
<i>Atypical Lymphocytes</i>	2	3	3	<i>Poikilocytosis</i>	141*	32	3
<i>Others</i>	12	19	18	<i>Ovalocytes</i>	78*	6	
				<i>Target Cells</i>	30	2	
				<i>Akanthocytes</i>	52*	8	1
<i>Anisocytosis</i>	97*	35	9	<i>Echinocytes</i>	41	8	
<i>Megakaryocyte Nucleaus</i>	19	2		<i>Sickle Cells</i>	2	1	
<i>Granulation</i>	21	9	2	<i>Fragmentocytes</i>	39	3	
<i>Others</i>				<i>Spherocytes</i>	16	5	
				<i>Stomatocytes</i>	9	1	
				<i>Basophilic Stripling</i>	42	4	
				<i>Howell-Jolly Bodies</i>	12	2	1
				<i>Pappenheim Bodies</i>	1		
				<i>Others</i>	9	1	

2.8 Qualab Codes

Summary of the participant codes
(Bold printed: expected codes)

Code	Text	Number
30	Pathologic findings, referend to expert	372
15	Polychromatic erythrocytes	94
7	Auer Rods	69
5	Lymphocytes, reactive	65
12	Mikrocytes	65
16	Poikilocytosis	62
8	Leucocytes, other:	61
6	Lymphocytes, neoplastic	57
14	Hypochromic Erythrocytes	41
9	Thrombocytes, giant	40
2	Left Shift	30
11	Thrombocytes, other	29
4	Neutrophils, toxic changes	25
25	Basophilic Strippling	25
26	Teardrops	25
13	Makrocytes	22
27	Erythrocytes, other	21
22	Rouleaux	15
20	Fragmentocytes	14
17	Elliptocytes/Ovalocytes	13
19	Targetcells	10
21	Spherocytes/Mikrospherocytes	6
24	Howell-Jolly Bodies	6
1	Neutrophils, hypersegmentation	5
18	Stomatocytes	2
3	Pelger-Hüet Anomaly	1
10	Thrombocytes, aggregates	1