

Verein für
Association pour le
Associazione per il



medizinische Qualitätskontrolle
contrôle de qualité médical
controllo di qualità medico

Report

Differential Blood Smear H3

MQ 2019-2

Acknowledgements

The Mythic 18 analyzer was provided by the company Polymed, the ABX Microsemi CRP analyzer by the company Axonlab and the XP-300 analyzer by the Firma Sysmex. MQ employees conducted the measurements.

The findings of the XE-5000 and ADVA 2120 devices and of the microscopic blood counts were generated by the Central Laboratory of Medical Diagnostic HAD of the University Hospital Zurich Hematology Clinic. The lab is ISO/IEC 17025 certified (STS 445). Dr. J-D. Studt 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 Microsemi CRP

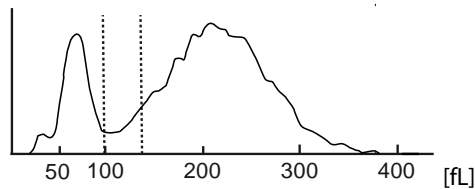


Findings MQ 2019-2 H3A 50 year old woman

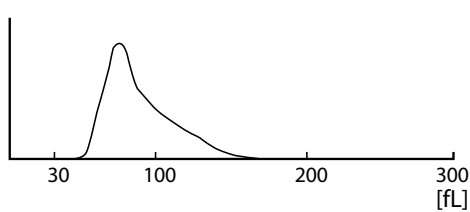
WBC :	13.4	H	10 ⁹ /L	MCV :	90.9	fL
RBC :	4.44		10 ¹² /L	MCH :	30.6	pg
HGB :	13.6		g/L	MCHC:	33.6	g/L
HCT :	40.4		L/L	RDW :	13.6	%
PLT :	230		10 ⁹ /L	MPV :	8.9	fL
PCT :	0.206		10 ⁻² L/L	PDW :	16.1	%

DIFF:					
%LYM:	19.5	%	#LYM:	2.6	10 ⁹ /L
%MON:	5.9	%	#MON:	0.8	10 ⁹ /L
%GRA:	74.6	%	#GRA:	10.0	10 ⁹ /L

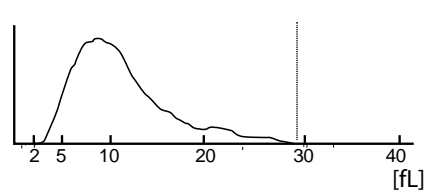
WBC



RBC



PLT

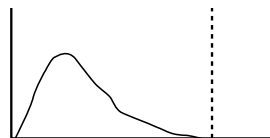
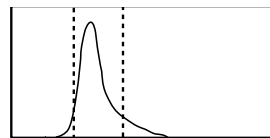
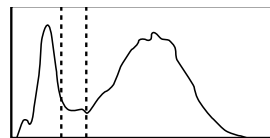


1.2 Mythic



Findings MQ 2019-2 H3A 50 year old woman

WBC	13.5	h	10 ⁹ /l	3.5 /	10.0
LYM	2.6		10 ⁹ /l	1.2 /	3.2
MON	0.9		10 ⁹ /l	0.1 /	1.0
GRA	10.1	H	10 ⁹ /l	1.2 /	6.8
LYM%	19.0		%	17.0 /	48.0
MON%	6.8		%	2.0 /	10.0
GRA%	74.7		%	43.0 /	76.0
RBC	4.61		10 ¹² /l	4.00 /	5.70
HGB	133		g/l	120 /	180
HCT	0.411		l/l	0.360 /	0.540
MCV	89.2		fl	80.0 /	100.0
MCH	28.9		pg	26.0 /	34.0
MCHC	324		g/l	310 /	365
RDW	11.9		%	10.0 /	16.0
PLT	207		10 ⁹ /l	150 /	400
MPV	10.1		fl	7.0 /	11.0
PCT	0.209		cl/l	0.100 /	0.500
PDW	14.7		%	10.0 /	18.0



FLAGS : LEUCOCYTOSIS GRANULOCYTOSIS

1.3 Sysmex XP300



Findings MQ 2019-2 H3A
50 year old woman

WBC	+	13.6	$10^3/\mu\text{L}$	<p>WBC</p>
RBC		4.55	$10^6/\mu\text{L}$	
HGB		13.8	g/L	
HCT		40.2	%	
MCV		88.4	fL	
MCH		30.3	pg	
MCHC		34.3	g/L	
PLT		211	$10^3/\mu\text{L}$	
LYM%	-	20.0	%	<p>RBC</p>
MXD%		5.9	%	
NEUT%	+	74.1	%	
LYM#		2.7	$10^3/\mu\text{L}$	
MXD#		0.8	$10^3/\mu\text{L}$	
NEUT#	+	10.1	$10^3/\mu\text{L}$	<p>PLT</p>
RDW_SD	+	47.1	fL	
RDW_CV		13.6	%	
PDW	+	15.5	fL	
MPV		11.4	fL	
P_LCR	+	36.4	%	
PCT		0.24	%	

1.4 Sysmex XN-20

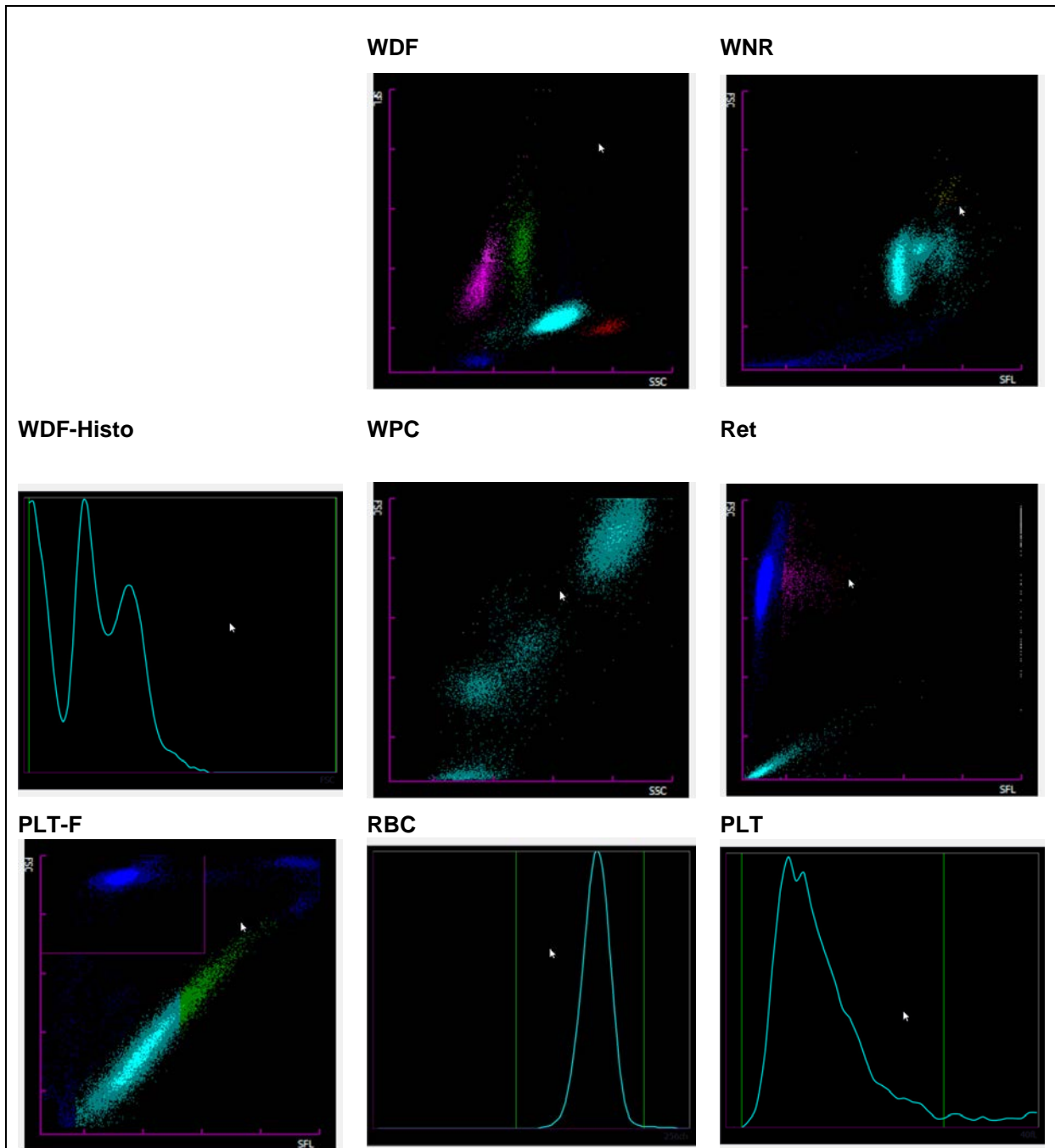


Findings MQ 2019-2 H3A

50 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
<u>Hemoglobin</u>	132	g/l	117-153
<u>Hematocrit</u>	0.393	l/l	0.35-0.46
Erythrocytes	4.46	T/l	3.9-5.2
MCV	88.1	fl	80-100
MCH	29.6	pg	26-34
MCHC	336	g/l	310-360
Mikrocytes	13.7	%	11.0-14.8
<u>Thrombocytes</u>	232	G/l	143-400
<u>Leucocytes</u>	13.78	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	9.88	G/l	1.40 – 8.00
Monocytes	0.89	G/l	0.16 – 0.95
Eosinophils	0.36	G/l	0.00 – 0.70
Basophils	0.06	G/l	0.00-0.15
Lymphocytes	2.59	G/l	1.50 - 4.00
IG abs.	0.07	G/l	0.00 – 0.03
IG %	0.5	%	0.0 – 0.05
NRBC abs.	0.00	G/l	
NRBC	0.0	/100 Lc	

Findings HAD MQ 2019-2 H3A

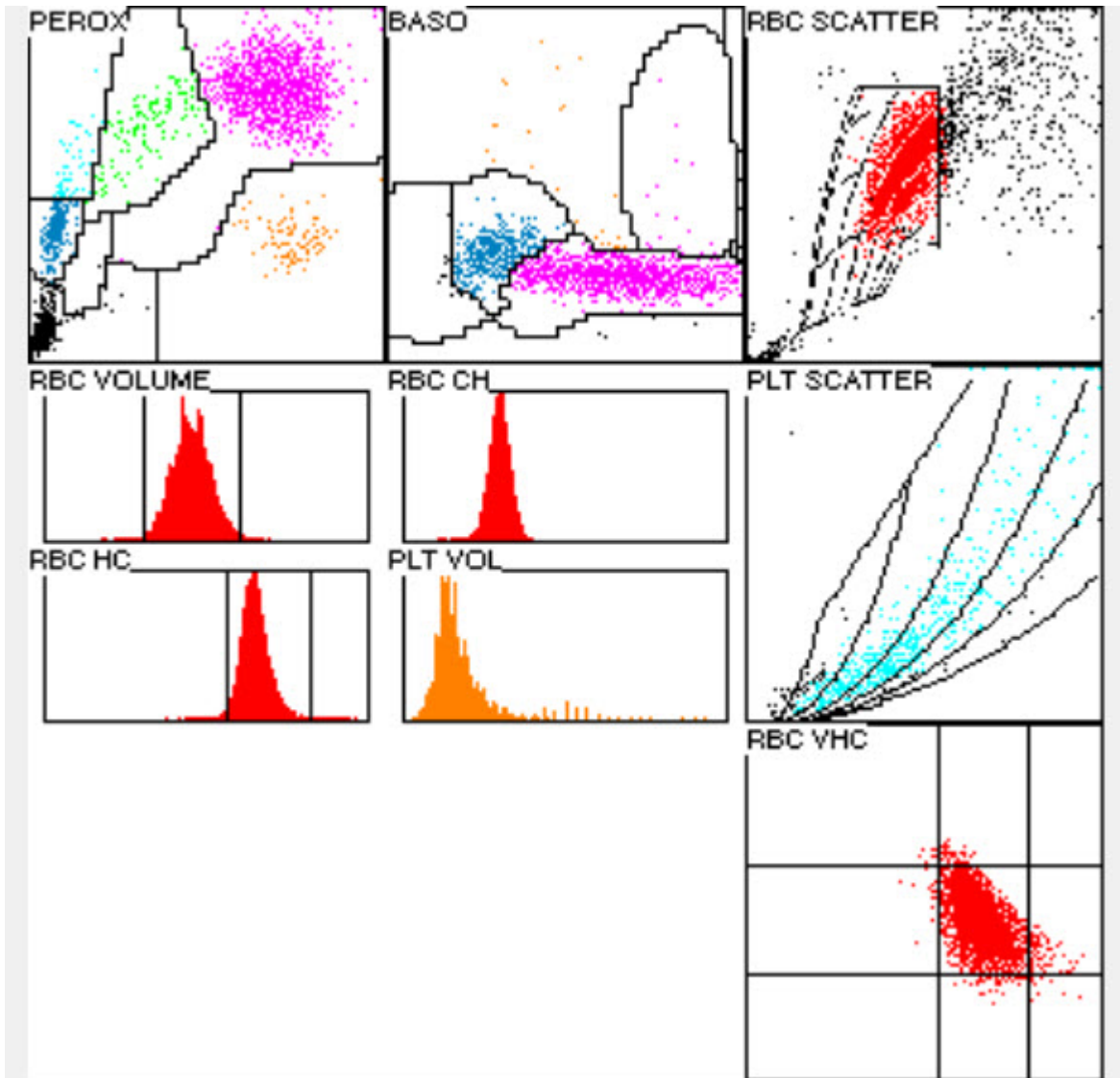


1.5 ADVIA 2120



Findings HAD MQ 2019-2 H3A 50 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
<u>Hemoglobin</u>	133	g/l	117-153
<u>Hematocrit</u>	0.401	l/l	0.35-0.46
Erythrocytes	4.43	T/l	3.9-5.2
MCV	90.6	fl	80-100
MCH	30.0	pg	26-34
MCHC	331	g/l	310-360
Mikrocytes	0.4	%	0-2.0
Macrocytes	0.5	%	0-2.0
Hypochromic Ec	1.0	%	0-2.0
Hyperchromic Ec	0.2	%	0-2.0
RDW	13.1	%	11.0-14.8
<u>Thrombocytes</u>	242	G/l	143-400
Vd. L-SHIFT	0	+	Keine (0)
<u>Leucocytes</u>	* 13.75	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	73.8	G/l	1.40-8.00
Monocytes	4.4	G/l	0.16-0.95
Eosinophils	2.6	G/l	0.00-0.70
Basophile	0.6	G/l	0.00-0.15
Lymphocytes	* 16.7	G/l	1.50-4.00
LUC	1.9	%	0.0-4.0



1.6 Differential Blood Smear

Findings HAD MQ 2019-2 H3A

50 year old woman

Analysis		Result	Unit	Reference value
Neutrophils total	*	9.63	G/l	1.40-8.00
Monocytes		0.34	G/l	0.16-0.95
Eosinophils		0.34	G/l	0.00-0.70
Basophils		0.00	G/l	0.00-0.15
Lymphocytes		3.44	G/l	1.50-4.00
Neutrophils total		70.0	%	40.0-74.0
Neutrophils Band		9.5	%	0.0-20.0
Neutrophils Segmented	*	60.5	%	30.0-50.0
Monocytes	*	2.5	%	3.4-9.0
Eosinophils		2.5	%	0.0-7.0
Basophils		0.0	%	0.0-1.5
Lymphocytes		25.0	%	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	%	

Commentary

Red blood cell count normochromic, normocytic. Neutrophilic granulocytes with fine cytoplasmic granulation. Lymphocytes polymorphic. Thrombocytes morphologically unremarkable.

Dr.J.-D. Studt/ Dr. S. Balabanov

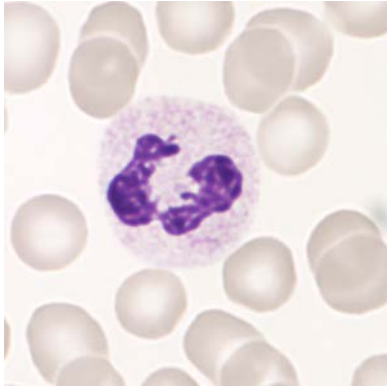


Abb 1. Neutrophile (Seg)

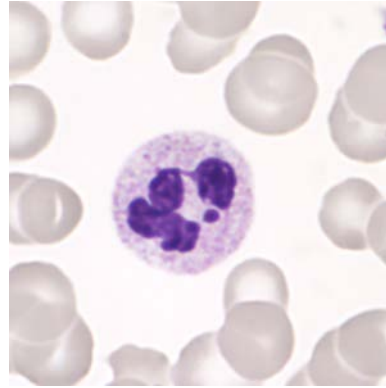


Abb 2. Neutrophile (seg)

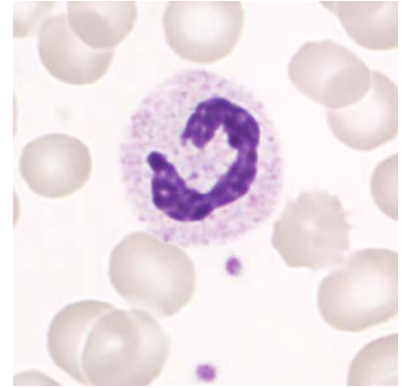


Abb 3. Neutrophile (band)

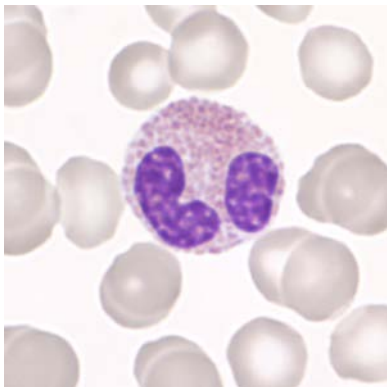


Abb 4. Eosinophile

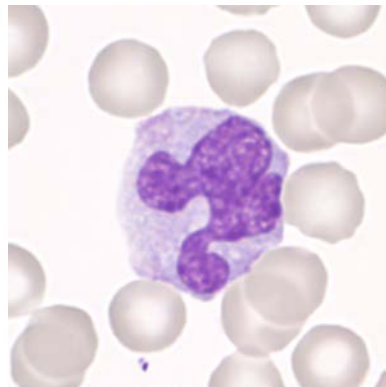


Abb 5. Monocyte

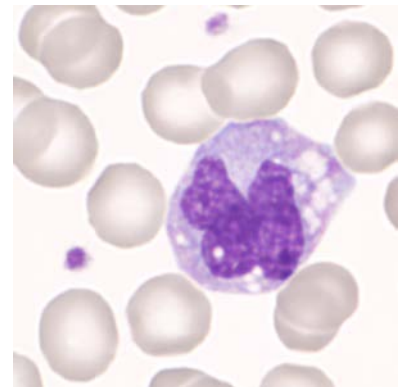


Abb 6. Monocyte

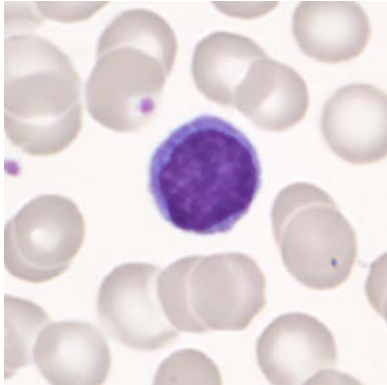


Abb 7. Lymphocyte

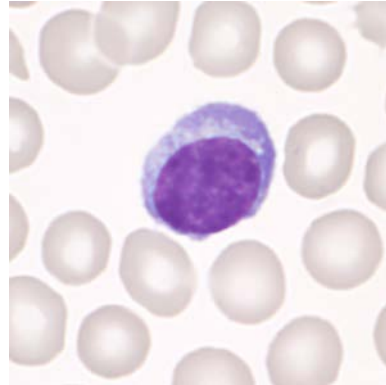


Abb 8. Lymphocyte

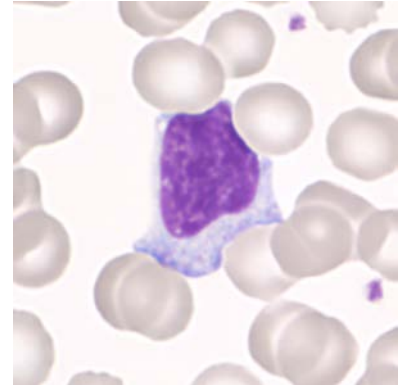


Abb 9. Lymphocyte

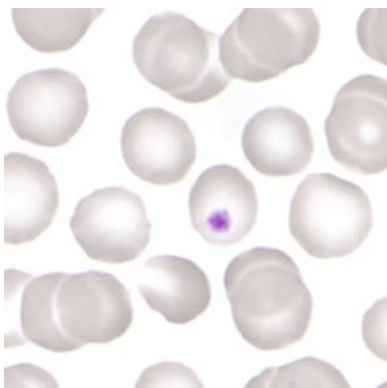


Abb 10. Platelet on erythrocyte

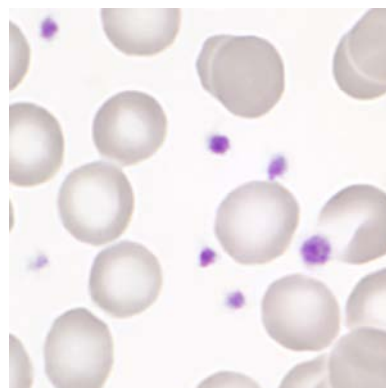


Abb 11. Platelets

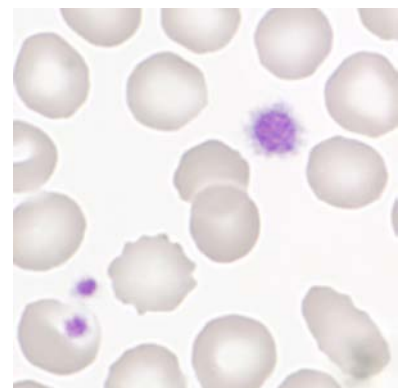


Abb 12. Platelets

1.7 Summary of participant results

Leukocyte Differenzial 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	29	69	101	30	16	2		4		6
<i>Neutrophils Segmented.</i>	2	1		3	3	4	30	80	110	24	2
<i>Eosinophils</i>	21	212	22					1		1	21
<i>Basophile</i>	150	105	2								150
<i>Monocytes</i>	6	126	123	2							6
<i>Lymphocytes</i>		2		114	137	3	1				
<i>Plasmacells</i>	249	6		1		1					249
<i>Blasts</i>	253	4									253
<i>Promyelocytes</i>	257	0									257
<i>Myelocytes</i>	254	3									254
<i>Metamyelozyten</i>	256	1									256
<i>Erythrocytes Nucleated</i>	255	2									255
<i>Unknown</i>	250	6	1								250
<i>Smudge cells</i>	239	15	3								239

Evaluation H3-A

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	24	4		<i>Hypochromic Ec</i>	31	6	1
<i>Pelger-Hüet Anomaly</i>	1			<i>Polychromatic Ec</i>	13		
<i>Coarse Granulation</i>	79	18	1	<i>Anisocytes</i>	94	14	2
<i>Basophilic Stripling</i>	11		1	<i>Mikrocytes</i>	36	4	1
<i>Vacuoles</i>	34	5		<i>Makrocytes</i>	24	2	1
<i>Reaktive Lymphocytes</i>	65	11	2	<i>Megalocytes</i>	1	1	
<i>Atypical Lymphocytes</i>	4	1	0	<i>Poikilocytosis</i>	26	3	
<i>Others</i>	3			<i>Ovalocytes</i>	22	2	
				<i>Target Cells</i>	24	6	
				<i>Akanthocytes</i>	14	1	
<i>Anisocytosis</i>	97	23	3	<i>Echinocytes</i>	32	8	1
<i>Megakaryocyte Nucleaus</i>	14	1		<i>Sickle Cells</i>			
<i>Granulation</i>	12	4		<i>Fragmentocytes</i>	5		
<i>Others</i>	1			<i>Spherocytes</i>	5	2	
				<i>Stomatocytes</i>	4		
				<i>Basophilic Stripling</i>	2	2	
				<i>Howell-Jolly Bodies</i>	5		
				<i>Pappenheim Bodies</i>	2		
				<i>Others</i>	3	2	

Commentary

The smear comes from a patient with acute infection of the respiratory tract.

1.8 Qualab Codes

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

Code	Text	Number
29	Normal findings	136
31	Pathologic findings	64
30	Pathologic findings, refer to expert	50
5	Atypical lymphocytes, probably reactive	42
4	Neutrophils, Toxic Changes	40
2	Neutrophils, left shift	32
9	Macrothrombocytes	24
12	Microcytes	16
27	Erythrocytes, other	16
22	Rouleaux	15
1	Neutrophils, hypersegmentation of nucleus	12
14	Hypochromic Erythrocytes	12
19	Targetcells	12
11	Thrombocytes, others	10
13	Macrocytes	10
16	Poikilocytosis	8
8	Leucocytes other:	7
15	Polychromatophilic Red Cells	7
26	Teardrops	6
10	Thrombocyte aggregates	4
17	Elliptocytes/Ovalocytes	3
21	Spherocytes	3
6	Atypical lymphocytes, probably neoplastic	2
18	Stomatocytes	2
24	Howell-Jolly bodies	2
25	Basophilic strippling	2
23	Erythrocytes agglutination	1
28	Parasites	1
99	Total	254

2 Sample B

2.1 ABX Microsemi CRP



Findings MQ 2019-2 H3B

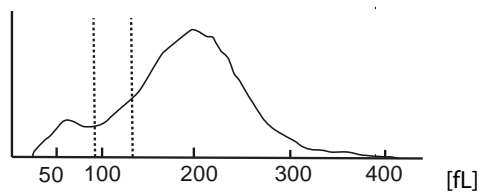
77 year old woman

WBC :	50.0	H	10 ⁹ /L	MCV :	91.4	fL
RBC :	3.96		10 ¹² /L	MCH :	31.1	pg
HGB :	12.3		g/L	MCHC:	34.1	g/L
HCT :	36.1		L/L	RDW :	15.0	%
PLT :	18	L	10 ⁹ /L	MPV :	7.5	fL
PCT :	0.013	L	10 ⁻² L/L	PDW :	10.8	%

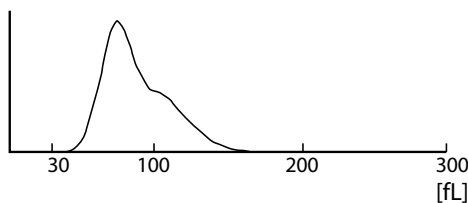
WBC FLAGS: G1

%LYM:	9.7	L	%	#LYM:	4.9	H	10 ⁹ /L
%MON:	9.3		%	#MON:	4.7	H	10 ⁹ /L
%GRA:	81.0	H	%	#GRA:	40.4	H	10 ⁹ /L

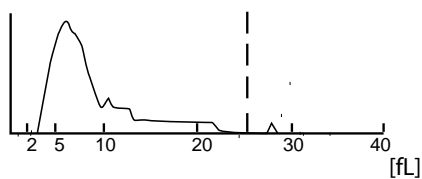
WBC



RBC



PLT



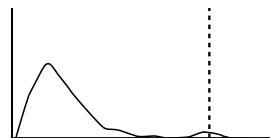
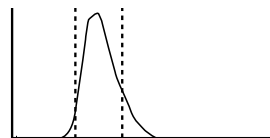
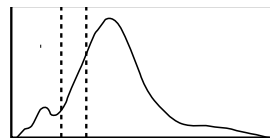
2.2 Mythic



Findings MQ 2019-2 H3B

77 year old woman

WBC	51.0	H	10 ⁹ /l	3.5	/	10.0
LYM	4.0	h	10 ⁹ /l	1.2	/	3.2
MON	6.4	H	10 ⁹ /l	0.1	/	1.0
GRA	40.6	H	10 ⁹ /l	1.2	/	6.8
LYM%	7.8	L	%	17.0	/	48.0
MON%	12.6	H	%	2.0	/	10.0
GRA%	79.6	h	%	43.0	/	76.0
RBC	3.92	l	10 ¹² /l	4.00	/	5.70
HGB	120		g/l	120	/	180
HCT	0.362		l/l	0.360	/	0.540
MCV	92.3		fl	80.0	/	100.0
MCH	30.6		pg	26.0	/	34.0
MCHC	331		g/l	310	/	365
RDW	15.6		%	10.0	/	16.0
PLT	49	L	10 ⁹ /l	150	/	400
MPV	8.4		fl	7.0	/	11.0
PCT	0.041	l	cl/l	0.100	/	0.500
PDW	11.8		%	10.0	/	18.0



FLAGS: FL2FL3FL4

LEUCOCYPTOSIS LYMPHOCYTOSIS NONOCYTOSIS GRANULOCYTOSIS THROMBOPENIA

2.3 Sysmex XP300



Findings MQ 2019-2 H3B
77 year old woman

WBC	+	54.1	$10^3/\mu\text{L}$	<p>WBC</p> <p>RBC</p> <p>PLT</p>
RBC	-	4.00	$10^6/\mu\text{L}$	
HGB		12.5	g/dL	
HCT		36.1	%	
MCV		90.3	fL	
MCH		31.3	pg	
MCHC		34.6	g/dL	
PLT	PL*	21	$10^3/\mu\text{L}$	
LYM%		--	%	
MXD%		--	%	
NEUT%		--	%	
LYM#		--	$10^3/\mu\text{L}$	
MXD#		--	$10^3/\mu\text{L}$	
NEUT#		--	$10^3/\mu\text{L}$	
RDW_SD	+	51.9	fL	
RDW_CV		15.3	%	
PDW		--	fL	
MPV		--	fL	
P_LCR		--	%	
PCT		-	%	

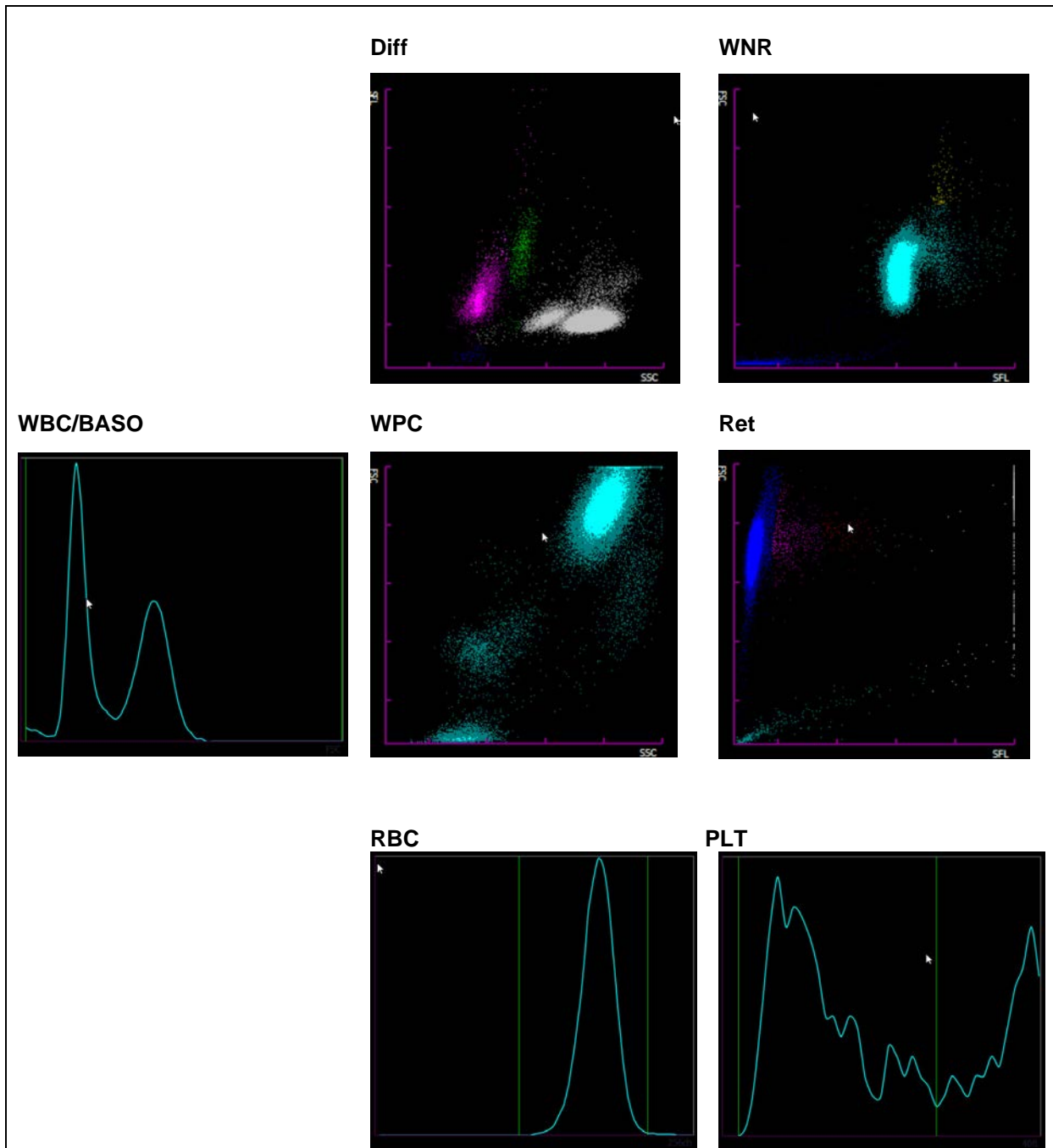
2.4 Sysmex XN-20



Findings MQ 2019-2 H3B 77 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	125	g/l	117-153
Hematocrit	0.378	l/l	0.35-0.46
Erythrocytes	4.10	T/l	3.9-5.2
MCV	92.3	fl	80-100
MCH	30.4	pg	26-34
MCHC	329	g/l	310-360
Thrombocytes	80	G/l	143-400
Leucocytes	51.77	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	6.07	G/l	1.40-8.00
Monocytes	0.75	G/l	0.16-0.95
Eosinophils	41.53	G/l	0.00-0.70
Basophils	0.08	G/l	0.00-0.15
Lymphocytes	3.06	G/l	1.50-4.00
IG abs.	0.21	G/l	0.00-0.03
IG %	0.4	%	0.0-0.5
NRBC abs.	0.00	G/l	
NRBC	0.0	/100 Lc	

Findings HAD MQ 2019-2 H3B



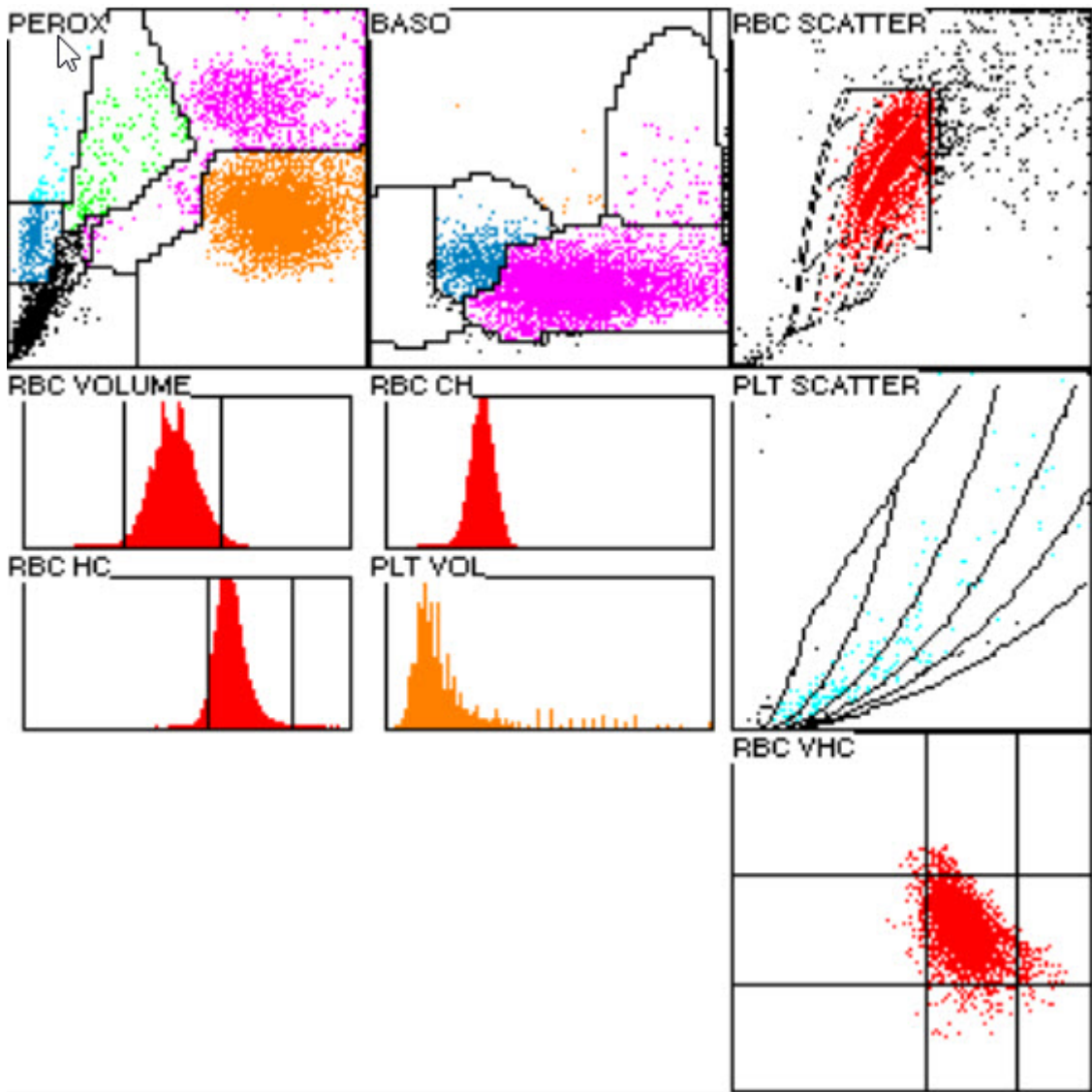
2.5 ADVIA 2120



Findings HAD MQ 2019-2 H3B

77 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	135	g/l	117-153
Hematocrit	0.415	l/l	0.35-0.46
Erythrocytes	4.43	T/l	3.9-5.2
MCV	93.7	fl	80-100
MCH	30.6	pg	26-34
MCHC	326	g/l	310-360
Mikrocytes	0.6	%	0-2.0
Makrocytes	* 2.2	%	0-2.0
Hypochromic Ec	* 7.4	%	0-2.0
Hyerchromic Ec	0.3	%	0-2.0
RDW	14.6	%	11.0-0-14.8
Thrombocytes	* 130	G/l	143-400
Leukocytes	* 51.03		G/l
Leucocytes Differentiation			
Neutrophils	6.23	G/l	1.40-8.00
Monocytes	0.39	G/l	0.16-0.95
Eosinophils	* 41.54	G/l	0.00-0.70
Basophils	0.14	G/l	0.00-0.15
Lymphocytes	2.49	G/l	1.50-4.00
LUC	0.25	%	0.0-4.0



2.6 Differential Blood Smear

Findings MQ 2019-2 H3B

77 year old woman

Analysis	Result	Unit	Reference value
Leucocytes Differentiation			
Neutrophils total	5.10	G/l	1.40-8.00
Monocytes	0.51	G/l	0.16-0.95
Eosinophils	* 41.59	G/l	0.00-0.70
Basophils	0.00	G/l	0.00-0.15
Lymphocytes	3.83	G/l	1.50-4.00
Neutrophils total	* 10.0	%	40.0-74.0
Neutrophils Band	1.0	%	0.0-20.0
Neutrophils Segmented	* 9.0	%	30.0-50.0
Monocytes	* 1.0	%	3.4-9.0
Eosinophils	* 81.5	%	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	0.0	%	0
Promyelocytes	0.0	%	0
Myelocytes	0.0	%	0
Metamyelocytes	0.0	%	0
Others/ damaged cells	0.0	%	0

Commentary

Absolute eosinophilia; eosinophilic granulocytes morphologically conspicuous with nuclear and granulation dysmorphisms: many with agranular zones, few with 3-4 nuclear segments and few with multiple cytoplasmic vacuoles. Neutrophile granulocytes with fine cytoplasmic granulation, many with pyknosis of the nucleus. Lymphocytes polymorphic. The thrombocytes frequently lie in heaps, the measured number of thrombocytes is falsely low (pseudo reduction of the thrombocytes with ETDA). Red blood cell count slightly hypochromic, normocytic.

K. Schreiber / PD. Dr. St. Balabanov

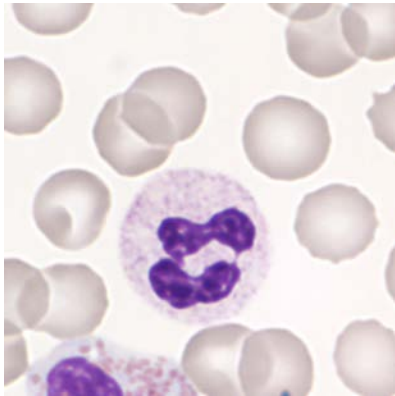


Abb 1. Neutrophil (Seg)

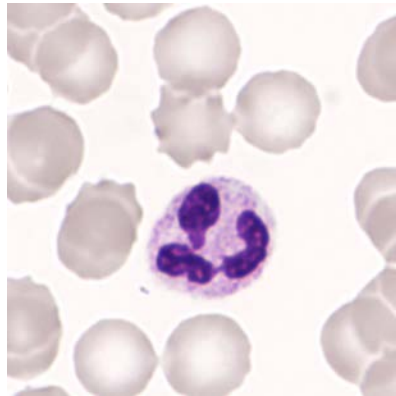


Abb 2. Neutrophil (Seg)

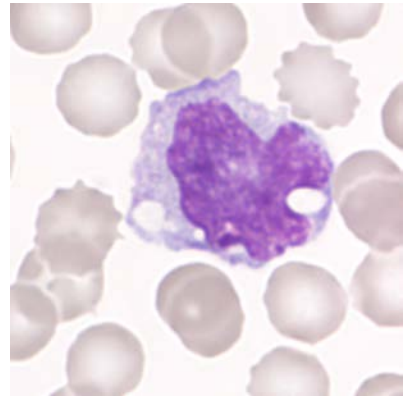


Abb 3. Monocyte

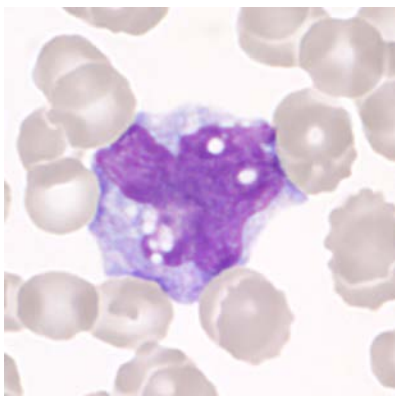


Abb 4. Monocyte

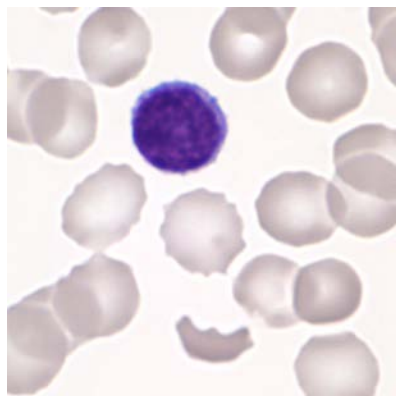


Abb 5. Lymphocyte

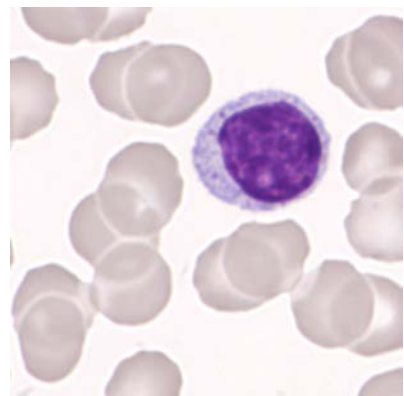


Abb 6. Lymphocyte

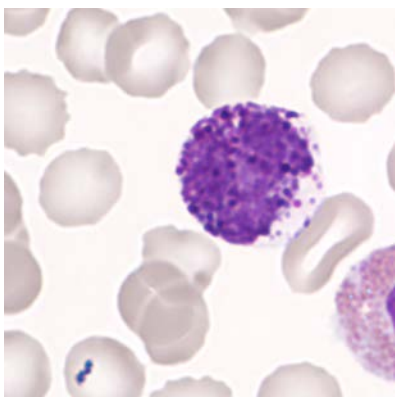


Abb 7. Basophile

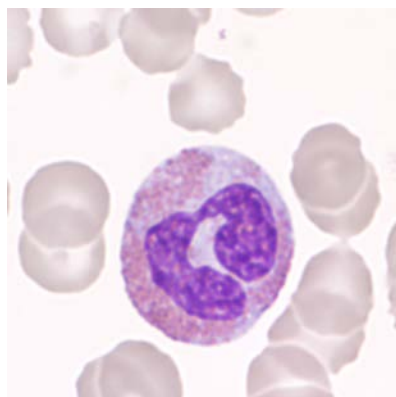


Abb 8. Eosinophil

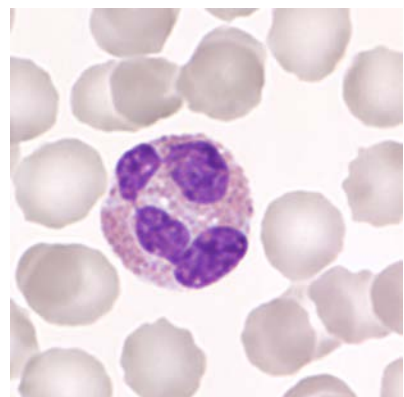


Abb 9. Eosinophil

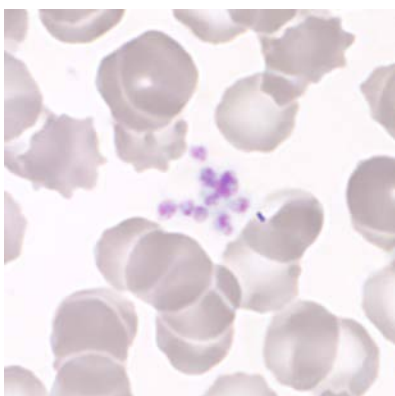


Abb 10. Platelets

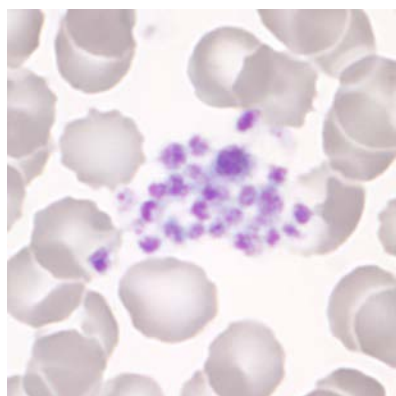


Abb 11. Platelets

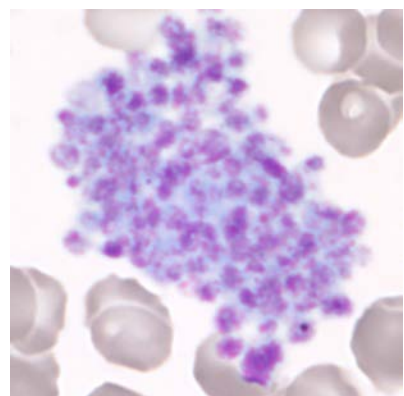


Abb 12. Platelets

2.7 Summary of participant results

Leukocyte Differential 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>	111	92	15	14	8	7	6			1	
<i>Neutrophils Segmented.</i>	5	37	129	25	2	4	3	9	8	10	22
<i>Eosinophils</i>	43	12	5		2	1				29	162
<i>Basophile</i>	240	14									
<i>Monocytes</i>	89	162	2	1							
<i>Lymphocytes</i>	4	19	172	55	2		1				1
<i>Plasmacells</i>	246	5	2		1						
<i>Blasts</i>	252	2									
<i>Promyelocytes</i>	252	2									
<i>Myelocytes</i>	249	3		1	1						
<i>Metamyelocyten</i>	249	2	1	1			1				
<i>Erythrocytes Nucleated</i>	251	3									
<i>Unknown</i>	247	4		1							2
<i>Smudge cells</i>	232	13	6	3							

Evaluation H3-B

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	7	9	5	<i>Hypochromic Ec</i>	29	8	
<i>Pelger-Hüet Anomaly</i>	8		4	<i>Polychromatic Ec</i>	50	1	
<i>Coarse Granulation</i>	31	26	17	<i>Anisocytes</i>	92	23	2
<i>Basophilic Stripling</i>	7	5		<i>Mikrocytes</i>	40	5	
<i>Vacuoles</i>	32	22	7	<i>Makrocytes</i>	24	3	
<i>Atypical Lymph, reactive</i>	26	6	2	<i>Megalocytes</i>	4		
<i>Atypical Lymph, neoplastic</i>	3	2		<i>Poikilocytosis</i>	61	14	4
<i>Others</i>	1		4	<i>Ovalocytes</i>	26	2	
				<i>Target Cells</i>	35	5	
				<i>Akanthocytes</i>	39	14	7
<i>Anisocytosis</i>	43	17	3	<i>Echinocytes</i>	53	58	14
<i>Megakaryocyte Nucleaus</i>	3	3	1	<i>Sickle Cells</i>			
<i>Granulation</i>	10	6	4	<i>Fragmentocytes</i>	27	2	1
<i>Others</i>	4	6	7	<i>Spherocytes</i>	10		1
				<i>Stomatocytes</i>	3	1	1
				<i>Basophilic Stripling</i>	2	1	
				<i>Howell-Jolly Bodies</i>	3		
				<i>Pappenheim Bodies</i>			
				<i>Others</i>	2	2	2

Commentary

The smear comes from a patient with a hypereosinophilia with unknown cause.

2.8 Qualab Codes

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

Code	Text	Number
30	Pathologic findings, refer to expert	185
10	Thrombocyte aggregates	102
8	Leucocytes other:	71
31	Pathologic findings	61
4	Neutrophils, Toxic Changes	41
27	Erythrocytes, other	37
16	Poikilocytosis	32
5	Atypical lymphocytes, probably reactive	20
20	Fragmentocytes	18
11	Thrombocytes, others	17
15	Polychromatophilic Red Cells	15
1	Neutrophils, hypersegmentation of nucleus	14
12	Microcytes	14
2	Neutrophils, left shift	12
14	Hypochromic Erythrocytes	12
19	Targetcells	12
22	Rouleaux	12
13	Macrocytes	8
3	Pelger Huet Anomaly	6
17	Elliptocytes/Ovalocytes	6
6	Atypical lymphocytes, probably neoplastic	3
9	Macrothrombocytes	3
21	Spherocytes	3
26	Teardrops	3
23	Erythrocytes agglutination	2
28	Parasites	2
29	Normal findings	2
24	Howell-Jolly bodies	1
25	Basophilic strippling	1
99	Total	250