

Verein für
Association pour le
Associazione per il



medizinische Qualitätskontrolle
contrôle de qualité médical
controllo di qualità medico

Report

Differential Blood Smear H3

MQ 2023-4

Acknowledgements

The Zybio Z3 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 XN-20 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). Prof. Dr. med. Stefan Balabanov 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



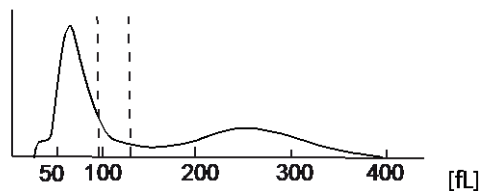
Findings MQ 2023-4 H3A

19 year old woman

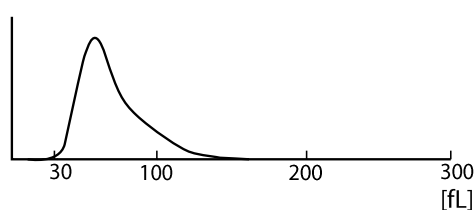
WBC :	10.0	$10^3/\mu\text{L}$	MCV :	69.2	L	μm^3
RBC :	4.43	$10^6/\mu\text{L}$	MCH :	21.7	L	pg
HGB :	9.6	L g/dL	MCHC:	31.4	L	g/dL
HCT :	30.7	L %	RDW :	16.8	H	%
PLT :	256	$10^3/\mu\text{L}$	MPV :	8.5		μm^3
PCT :	0.216	%	PDW :	21.7	H	%

DIFF:			#LYM:	4.7	H	$10^3/\mu\text{L}$
%LYM:	47.4	%	#MON:	0.9	H	$10^3/\mu\text{L}$
%MON:	8.8	%	#GRA:	4.4		$10^3/\mu\text{L}$
%GRA:	43.8	%				

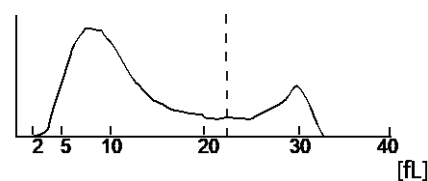
WBC



RBC



PLT



1.2 Sysmex XP300



Findings MQ 2023-4 H3A
19 year old woman

WBC	+	10.1	$10^3/\mu\text{L}$	WBC
RBC		4.42	$10^6/\mu\text{L}$	
HGB	-	9.4	g/dL	
HCT	-	30.7	%	
MCV	-	69.3	fL	
MCH	-	21.2	pg	
MCHC	-	30.6	g/dL	
PLT		244	$10^3/\mu\text{L}$	
LYM%	+	55.9	%	RBC
MXD%		7.0	%	
NEUT%	-	37.1	%	
LYM#	+	5.6	$10^3/\mu\text{L}$	
MXD#		0.7	$10^3/\mu\text{L}$	
NEUT#		3.8	$10^3/\mu\text{L}$	
RDW_SD	+	46.6	fL	PLT
RDW_CV	+	18.3	%	
PDW	+	14.9	fL	
MPV		10.5	fL	
P_LCR		31.9	%	
PCT		0.26	%	

1.3 Sysmex XN-20

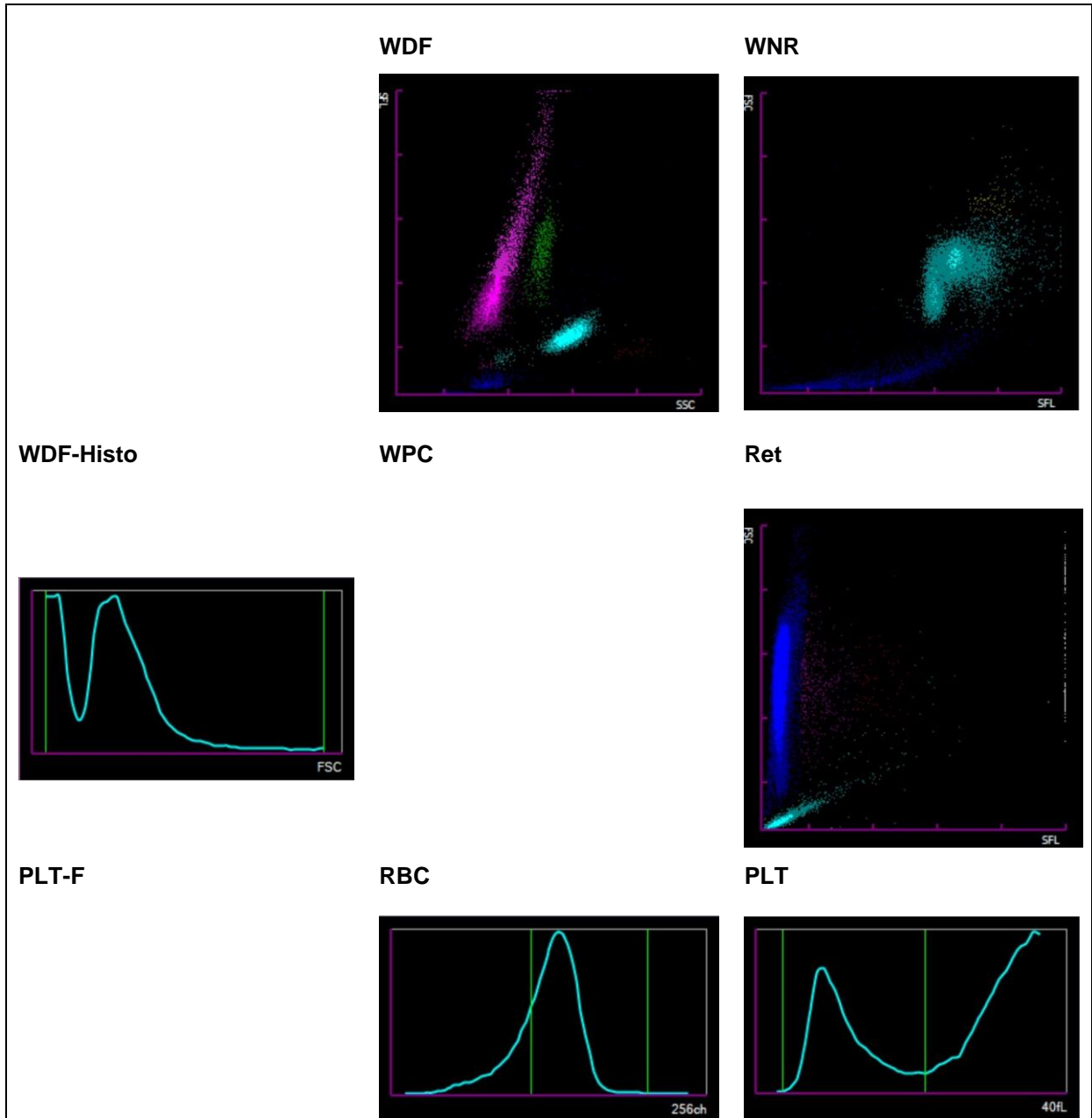


Findings MQ 2023-4 H3A

19 year old woman

Analysis		Result	Unit	Reference value
Blood Count				
<u>Hemoglobin</u>	*	94	g/l	117-153
<u>Hematocrit</u>	*	0.298	l/l	0.35-0.46
Erythrocytes		4.35	T/l	3.9-5.2
MCV	*	68.5	fl	80-100
MCH	*	21.6	pg	26-34
MCHC		315	g/l	310-360
Mikrocytes		18.1	%	11.0-14.8
<u>Thrombocytes</u>		239	G/l	143-400
<u>Leucocytes</u>	*	10.42	G/l	3.0-9.6
Leucocyte Differentiation				
Neutrophils		3.86	G/l	1.40 – 8.00
Monocytes		0.62	G/l	0.16 – 0.95
Eosinophils		0.03	G/l	0.00 – 0.70
Basophils		0.10	G/l	0.00-0.15
Lymphocytes	*	5.79	G/l	1.50 - 4.00
IG abs.		0.02	G/l	0.00 – 0.03
IG %		0.2	%	0.0 – 0.05
NRBC abs.		0.00	G/l	
NRBC		0.0	/100 Lc	

Findings HAD MQ 2023-4 H3A



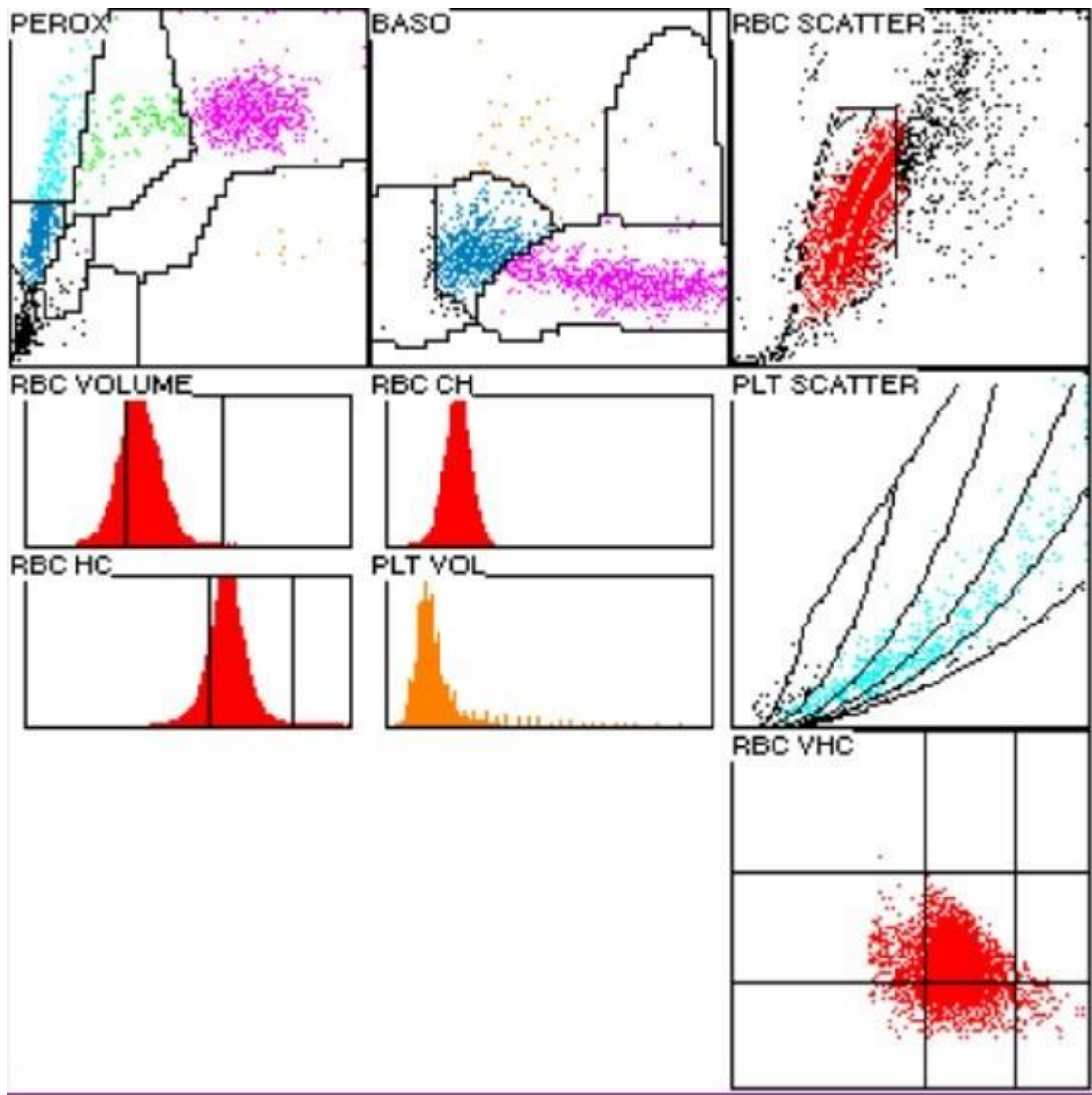
1.4 ADVIA 2120



Findings HAD MQ 2023-4 H3A

19 year old woman

Analysis		Result	Unit	Reference value
Blood Count				
<u>Hemoglobin</u>	*	93	g/l	117-153
<u>Hematocrit</u>	*	0.310	l/l	0.35-0.46
Erythrocytes		4.45	T/l	3.9-5.2
MCV	*	69.6	fl	80-100
MCH	*	20.9	pg	26-34
MCHC	*	300	g/l	310-360
Mikrocytes	*	21.6	%	0-2.0
Macrocytes		0	%	0-2.0
Hypochromic Ec	*	14.1	%	0-2.0
Hyperchromic Ec		0.4	%	0-2.0
RDW	*	17.8	%	11.0-14.8
<u>Thrombocytes</u>		223	G/l	143-400
Vd. L-SHIFT			+	Keine (0)
<u>Leucocytes</u>	*	9.92	G/l	3.0-9.6
Leucocyte Differentiation				
Neutrophils		3.89	G/l	1.40-8.00
Monocytes		0.42	G/l	0.16-0.95
Eosinophils		0.05	G/l	0.00-0.70
Basophile	*	0.17	G/l	0.00-0.15
Lymphocytes	*	4.61	G/l	1.50-4.00
LUC	*	7.8	%	0.0-4.0



1.5 Differential Blood Smear

Findings HAD MQ 2023-4 H3A

19 year old woman

Analysis	Result	Unit	Reference value
Neutrophils total	4.16	G/l	1.40-8.00
Monocytes	0.26	G/l	0.16-0.95
Eosinophils	0.312	G/l	0.00-0.70
Basophils	0.156	G/l	0.00-0.15
Lymphocytes	5.42	G/l	1.50-4.00
Neutrophils total	40.0	%	40.0-74.0
Neutrophils Band	7.5	%	0.0-20.0
Neutrophils Segmented	32.5	%	30.0-50.0
Monocytes	2.5	%	3.4-9.0
Eosinophils	3	%	0.0-7.0
Basophils	1.5	%	0.0-1.5
Lymphocytes	52.5	%	19.0-48.0
Plasmacells	0.5	%	0-0.5
Blasts	0	%	0
Promyelocytes	0	%	0
Myelocytes	0	%	0
Metamyelocytes	0	%	0
Nucleated Red Cells	0	%	0

Commentary

Absolute lymphocytosis; lymphocytes atypical, probably markedly reactive. 0.5% plasma cells detectable. Neutrophil granulocytes with fine cytoplasmic granulation. Anaemia; red blood count hypochromic, clearly anisocytic with very many microcytes. Slight poikilocytosis with many annulocytes, few acanthocytes and few target cells. Slight anisocytosis of the platelets, individual platelet clusters detectable on examination.

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

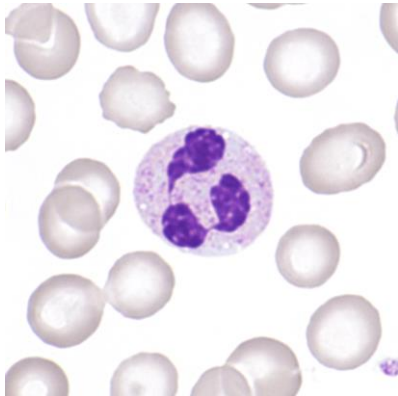


Abb 1. Neutrophile (Seg)

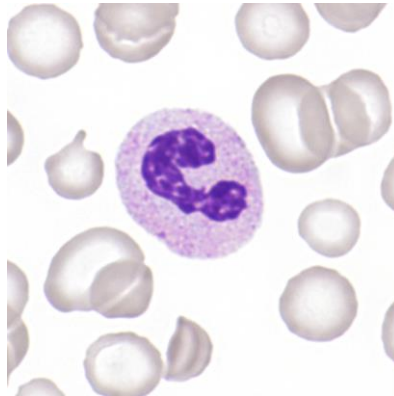


Abb 2. Neutrophile (Rod)

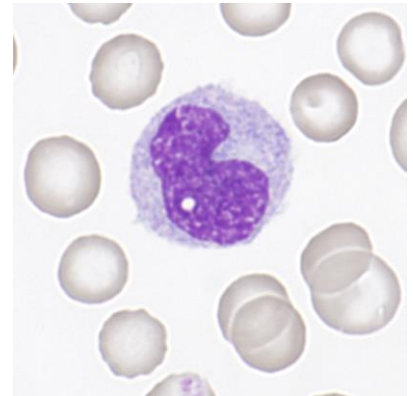


Abb 3. Monocyte

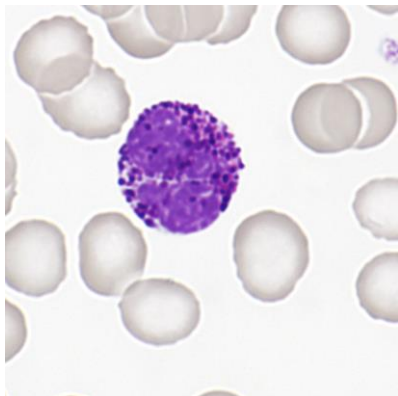


Abb 4. Basophile

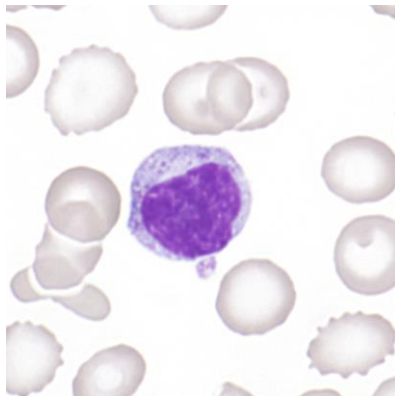


Abb 5. Lymphocyte

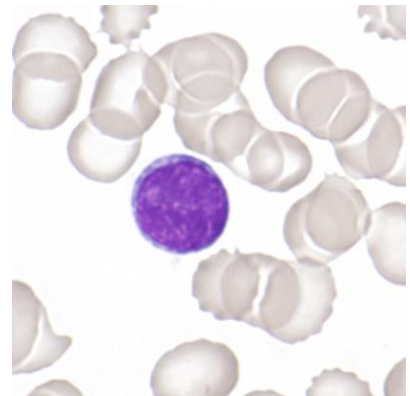


Abb 6. Lymphocyte

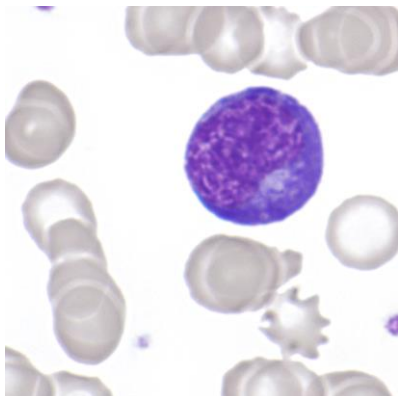


Abb 7. reactive Lymphocyte

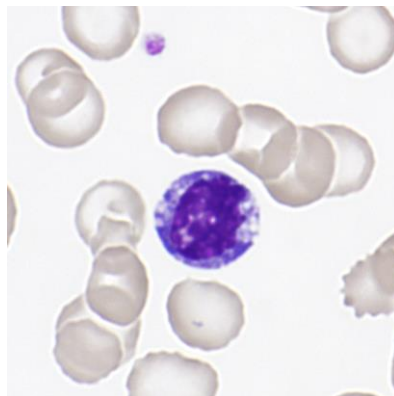


Abb 8. Degradation form

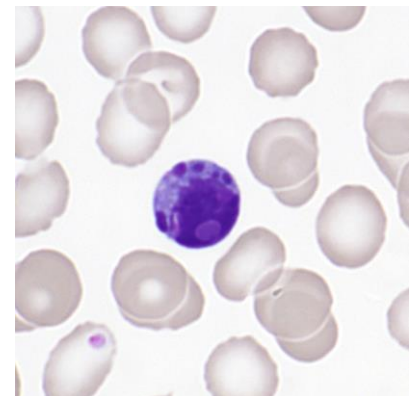


Abb 9. Degradation form

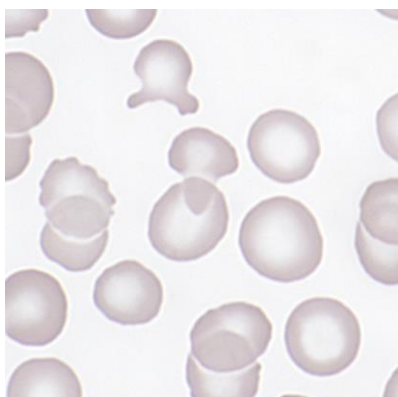


Abb 10. Erythrocytes

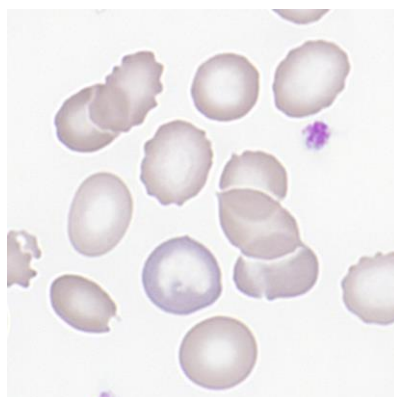


Abb 11. Erythrocytes

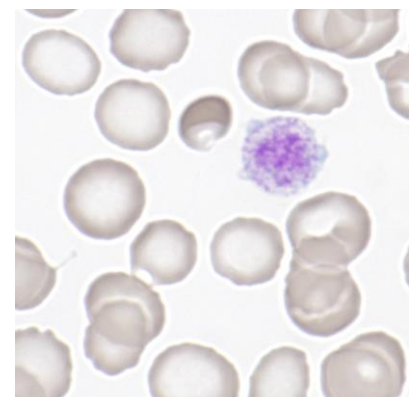


Abb 12. Giant Platelet

1.6 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>	2	15	53*	82	11	2					
<i>Neutrophils Segmented.</i>		1	1	16	54	77*	16				
<i>Eosinophils</i>	110	54*		1							
<i>Basophile</i>	78	87*									
<i>Monocytes</i>	12	99*	43	10				1			
<i>Lymphocytes</i>	1				3	9	47*	88	13	4	
<i>Plasmacells</i>	148*	15	2								
<i>Blasts</i>	158*	4		2				1			
<i>Promyelocytes</i>	164*	1									
<i>Myelocytes</i>	160*	4				1					
<i>Metamyelocyten</i>	159*	5	1								
<i>Erythrocytes Nucleated</i>	126*	17	12	8	2						
<i>Unknown</i>	151	6	5*	2	1						
<i>Smudge cells</i>	144*	10	11								

Evaluation H3-A

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	2			<i>Hypochromic Ec</i>	39*	81	20
<i>Pelger-Huet Anomaly</i>				<i>Polychromatic Ec</i>	28	3	
<i>Coarse Granulation</i>	23	3		<i>Anisocytes</i>	59	54*	6
<i>Basophilic Stripling</i>	4			<i>Mikrocytes</i>	41	46*	7
<i>Vacuoles</i>	21	6		<i>Makrocytes</i>	10	4	
<i>Reaktive Lymphocytes</i>	41	60*	12	<i>Megalocytes</i>	2	1	
<i>Atypical Lymphocytes</i>	10*	10	3	<i>Poikilocytosis</i>	69*	31	4
<i>Others</i>	3	2		<i>Ovalocytes</i>	69	9	0
				<i>Target Cells</i>	63*	43	5
				<i>Akanthocytes</i>	38*	8	
<i>Anisocytosis</i>	74	22		<i>Echinocytes</i>	39	25	4
<i>Megakaryocyte Nucleaus</i>	7	1		<i>Sickle Cells</i>	2		
<i>Granulation</i>	13*	2		<i>Fragmentocytes</i>	35	2	
<i>Others</i>	3			<i>Spherocytes</i>	2		
				<i>Stomatocytes</i>	6		
				<i>Basophilic Stripling</i>	1		
				<i>Howell-Jolly Bodies</i>	2		
				<i>Pappenheim Bodies</i>			
				<i>Others</i>	7	1	

The blood count was from a patient with suspected EBV tonsillitis.

1.7 Qualab Codes

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

Code	Text	Number
14	Hypochromic Erythrocytes	107
5	Atypical lymphocytes, probably reactive	106
30	Pathologic findings, refer to expert	90
12	Microcytes	71
19	Targetcells	66
31	Pathologic findings	58
16	Poikilocytosis	40
17	Elliptocytes/Ovalocytes	18
6	Atypical lymphocytes, probably neoplastic	14
27	Erythrocytes, other	14
22	Rouleaux	13
20	Fragmentocytes	11
4	Neutrophils, Toxic Changes	10
9	Macrothrombocytes	9
15	Polychromatophilic Red Cells	7
8	Leucocytes other:	6
29	Normal findings	6
18	Stomatocytes	4
11	Thrombocytes, others	3
26	Teardrops	3
1	Neutrophils, hypersegmentation of nucleus	1
2	Neutrophils, left shift	1
13	Macrocytes	1
99	Total	164

2 Sample B

2.1 ABX Microsemi CRP



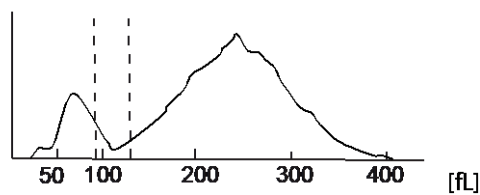
Findings MQ 2023-4 H3B

60 year old woman

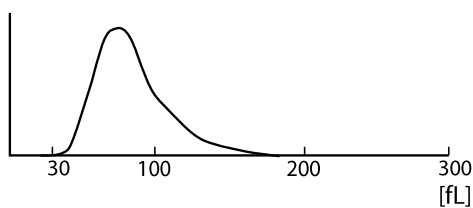
WBC :	6.1	$10^3/\mu\text{L}$	MCV :	84.3	μm^3
RBC :	4.15	$10^6/\mu\text{L}$	MCH :	27.7	pg
HGB :	11.5	L g/dL	MCHC:	32.9	g/dL
HCT :	34.9	L %	RDW :	18.7	H %
PLT :	291	$10^3/\mu\text{L}$	MPV :	7.3	μm^3
PCT :	0.214	%	PDW :	16.7	%

DIFF:					
%LYM:	13.2	L %	#LYM:	0.8	L $10^3/\mu\text{L}$
%MON:	4.2	%	#MON:	0.3	$10^3/\mu\text{L}$
%GRA:	82.6	H %	#GRA:	5.0	$10^3/\mu\text{L}$

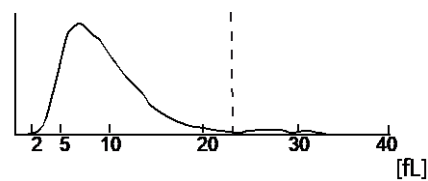
WBC



RBC



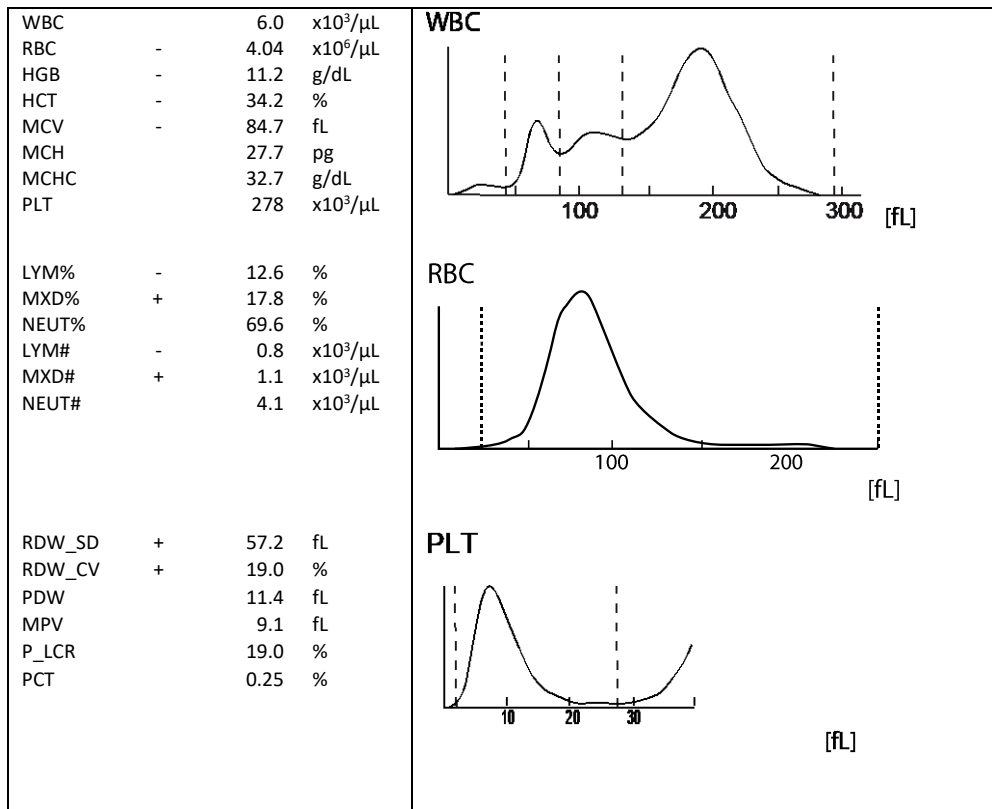
PLT



2.2 Sysmex XP300



Findings MQ 2023-4 H3B 60 year old woman



2.3 Zybio Z3 CRP



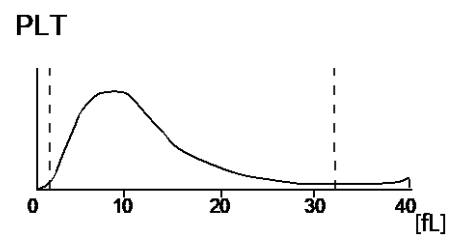
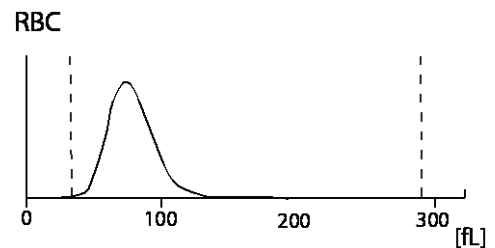
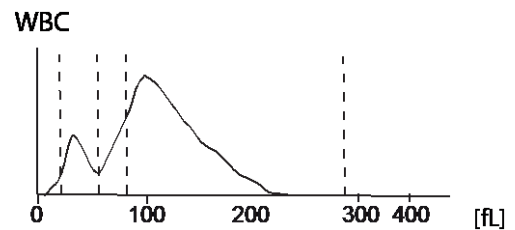
Findings MQ 2023-4 H3B

60 year old woman

WBC	5.55		10 ³ /μl	3.50-9.50
Lym#	0.85	↓	10 ³ /μl	1.10-3.20
Mid#	0.38		10 ³ /μl	0.10-3.20
Gran#	4.32		10 ³ /μl	1.80-6.30
Lym%	15.4	↓	%	20.0-50.0
Mid%	6.8		%	3.0-15.0
Gran%	77.8	↑	%	40.0-75.0

RBC	3.98		10 ⁶ /μl	3.80-5.80
HGB	11.6		g/dl	11.5-17.5
HCT	32.5	↓	%	35.0-50.0
MCV	81.5	↓	fl	82.0-100.0
MCH	29.1		pg	27.0-34.0
MCHC	35.7	↑	g/dl	31.6-35.4

RDW-CV	19.8	↑	%	11.5-16.0
RDW-SD	55.0		fL	35.0-56.0
PLT	259		10 ³ /μl	125-350
MPV	9.5		fl	6.5-12.0
PDW	16.0		fL	9.0-17.0
PCT	0.246		%	0.108-0.282
P-LCC	56		10 ³ /μl	30-90
P-LCR	21.5		%	11.0-45.0



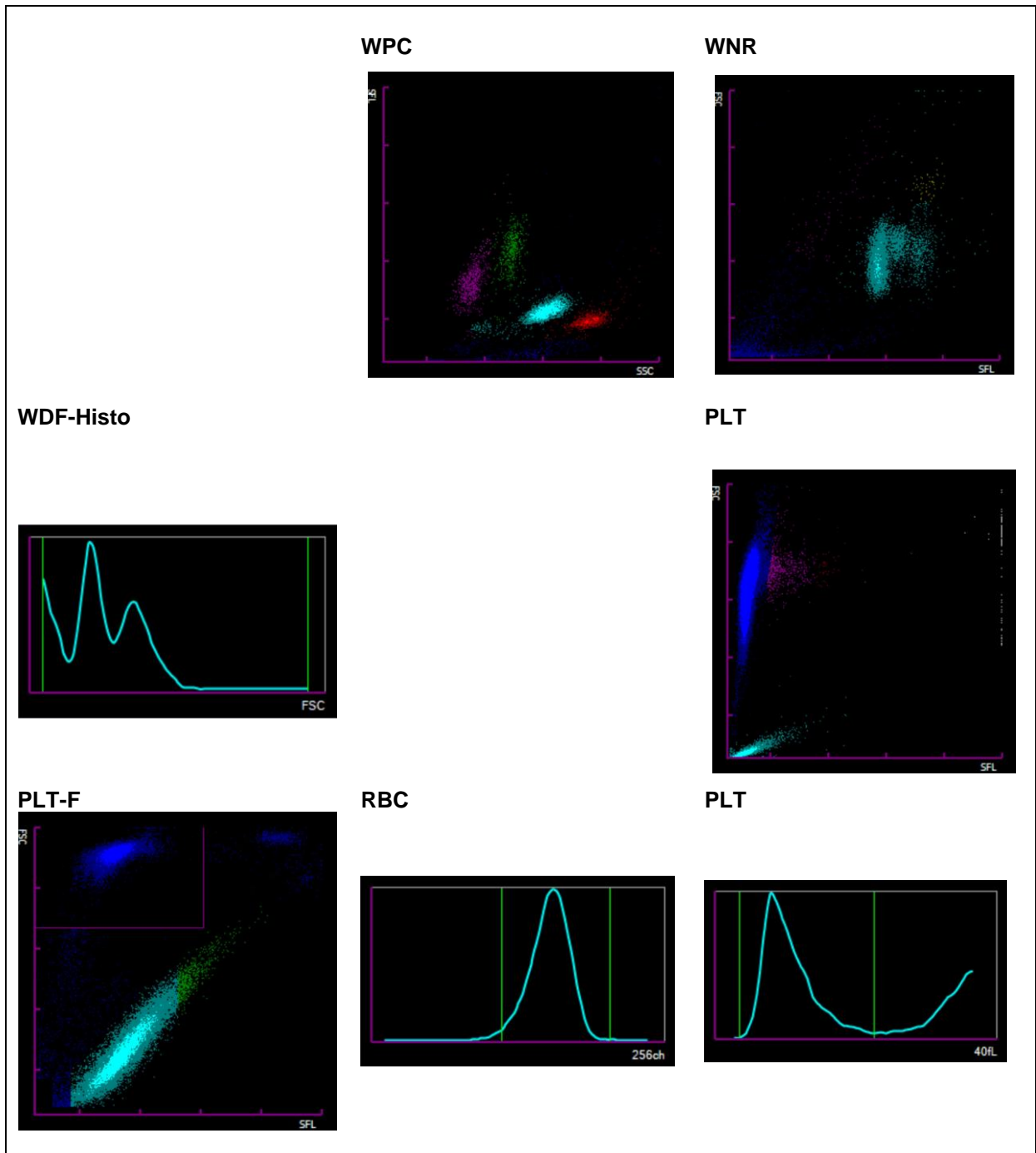
2.4 Sysmex XN-20



Findings HAD MQ 2023-4 H3B 60 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	112	g/l	117-153
Hematocrit	0.345	l/l	0.35-0.46
Erythrocytes	4.22	T/l	3.9-5.2
MCV	81.8	fl	80-100
MCH	26.5	pg	26-34
MCHC	325	g/l	310-360
Thrombocytes	300	G/l	143-400
Leucocytes	5.94	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	3.74	G/l	1.40-8.00
Monocytes	0.51	G/l	0.16-0.95
Eosinophils	* 0.99	G/l	0.00-0.70
Basophils	0.06	G/l	0.00-0.15
Lymphocytes	* 0.61	G/l	1.50-4.00
IG abs.	0.03	G/l	0.00-0.03
IG %	0.5	%	0.0-0.5
NRBC abs.	0.10	G/l	
NRBC	1.7	/100 Lc	

Findings HAD MQ 2023-4 H3B



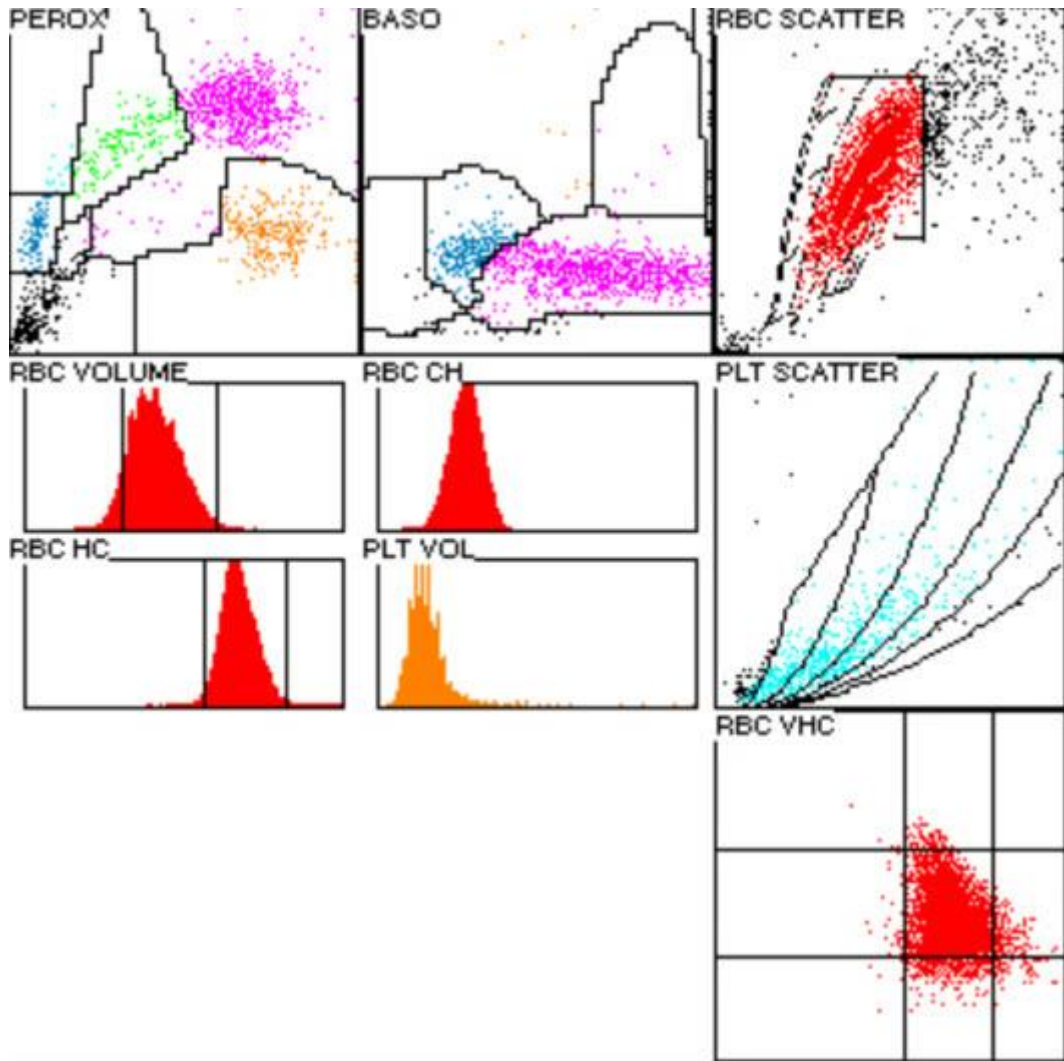
2.5 ADVIA 2120



Findings HAD MQ 2023-4 H3B

60 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	114	g/l	117-153
Hematocrit	0.346	l/l	0.35-0.46
Erythrocytes	4.24	T/l	3.9-5.2
MCV	81.6	fl	80-100
MCH	26.9	pg	26-34
MCHC	330	g/l	310-360
Mikrocytes	* 6.7	%	0-2.0
Makrocytes	0.6	%	0-2.0
Hypochromic Ec	1.3	%	0-2.0
Hyerchromic Ec	0.9	%	0-2.0
RDW	* 18.9	%	11.0-0-14.8
Thrombocytes	278	G/l	143-400
Leukocytes	6.45	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	4.05	G/l	1.40-8.00
Monocytes	0.54	G/l	0.16-0.95
Eosinophils	* 0.98	G/l	0.00-0.70
Basophils	0.05	G/l	0.00-0.15
Lymphocytes	* 0.77	G/l	1.50-4.00
LUC	0.06	%	0.0-4.0



2.6 Differential Blood Smear

Findings HAD MQ 2023-4 H3B

60 year old man

Analysis	Result	Unit	Reference value
Leucocytes Differentiation			
Neutrophils total	4.10	G/l	1.40-8.00
Monocytes	0.42	G/l	0.16-0.95
Eosinophils	* 1.10	G/l	0.00-0.70
Basophils	0.06	G/l	0.00-0.15
Lymphocytes	* 0.77	G/l	1.50-4.00
Neutrophils total	0.0	%	40.0-74.0
Neutrophils Band	63.5	%	0.0-20.0
Neutrophils Segmented	9.5	%	30.0-50.0
Monocytes	* 54.0	%	3.4-9.0
Eosinophils	6.5	%	0.0-7.0
Basophils	* 17.0	%	0.0-1.5
Lymphocytes	1.0	%	19.0-48.0
Plasmacells	* 12.0	%	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

Red blood count normochromic, slightly anisocytic with few microcytes. Clear poikilocytosis with few ovalocytes and many echinocytes. Individual tear forms can be seen on examination. Neutrophil granulocytes with fine cytoplasmic granulation. Many eosinophils morphologically conspicuous: few with 3 or more nuclear segments, few with degranulated zones in the cytoplasm. Few lymphocytes atypical, probably slightly reactive. Slight anisocytosis of the thrombocytes, many hypogranulated forms detectable.

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

ALT

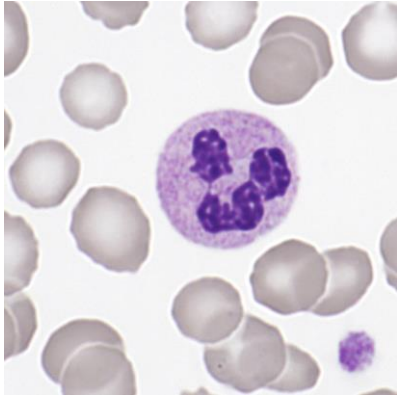


Abb 1. Neutrophil (Seg)

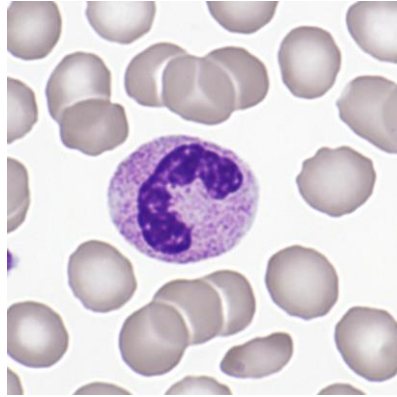


Abb 2. Neutrophil (Rod)

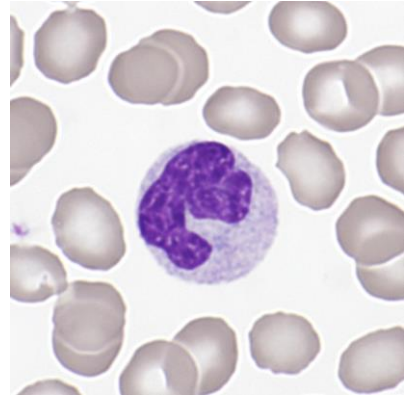


Abb 3. Monocyte

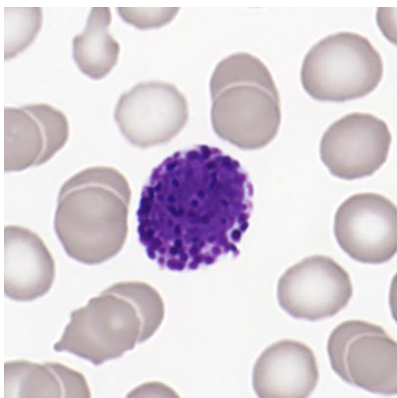


Abb 4. Basophile

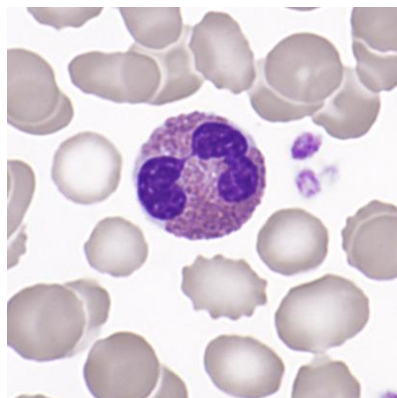


Abb 5. Eoshinophile

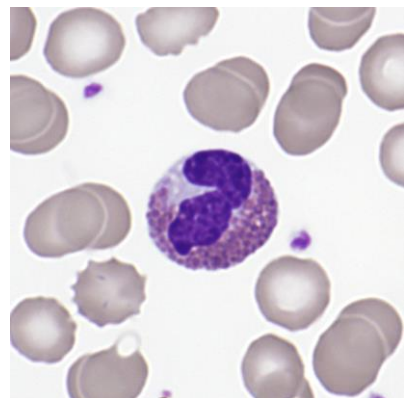


Abb 6. Eoshinophile

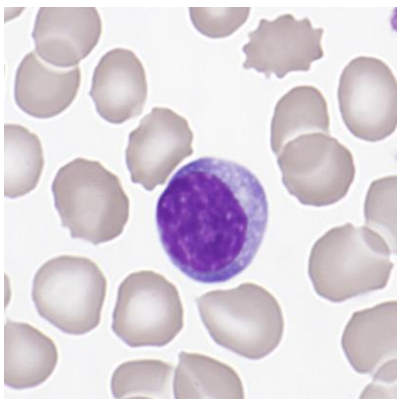


Abb 7. Lymphocyte

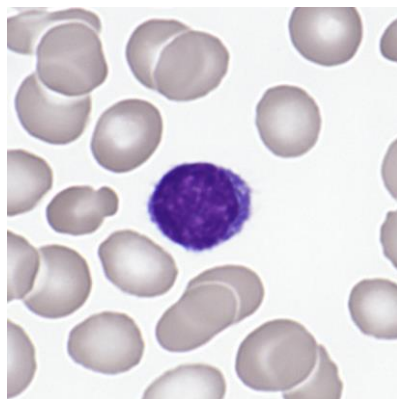


Abb 8. Lymphocyte

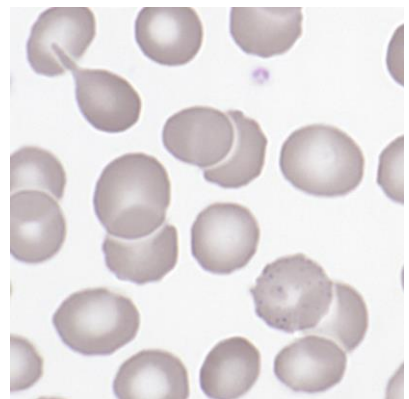


Abb 9. Erythrocytes

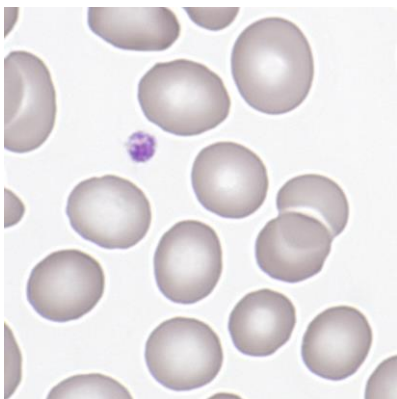


Abb 10. Erythrocytes

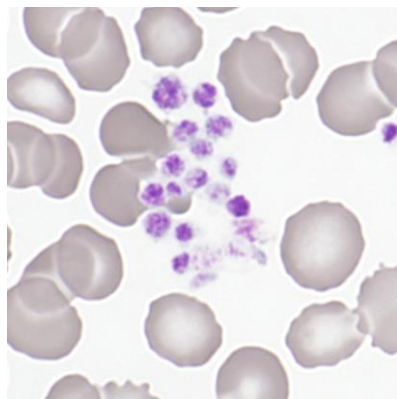


Abb 11. Platelets

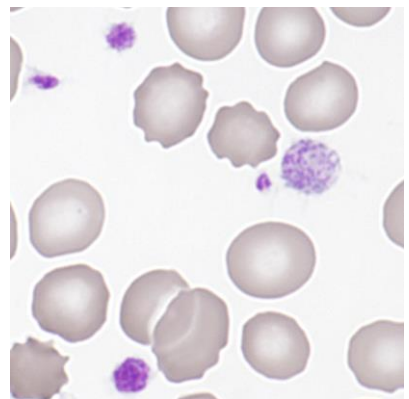


Abb 12. Platelets

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>	4	26	51*	61	17	4	2				
<i>Neutrophils Segmented.</i>			1		4	7	26	88	36*	2	1
<i>Eosinophils</i>	3	5	12	139*	6						
<i>Basophile</i>	31	132*	2								
<i>Monocytes</i>	9	82	73*	1							
<i>Lymphocytes</i>	1		10	135*	17			2			
<i>Plasmacells</i>	164*	1									
<i>Blasts</i>	164*	1									
<i>Promyelocytes</i>	165*	0									
<i>Myelocytes</i>	165*	0									
<i>Metamyelozyten</i>	161*	4									
<i>Erythrocytes Nucleated</i>	164*	1									
<i>Unknown</i>	164*	1									
<i>Smudge cells</i>	155*	8	2								

Evaluation H3-B

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	8	6		<i>Hypochromic Ec</i>	36	3	
<i>Pelger-Hüet Anomaly</i>	1			<i>Polychromatic Ec</i>	7	1	
<i>Coarse Granulation</i>	64*	20	3	<i>Anisocytes</i>	88*	31	1
<i>Basophilic Stripling</i>	10			<i>Mikrocytes</i>	56*	9	
<i>Vacuoles</i>	13	1		<i>Makrocytes</i>	20	3	
<i>Atypical Lymph, reactive</i>	15*	3		<i>Megalocytes</i>	1	1	
<i>Atypical Lymph, neoplastic</i>	2*			<i>Poikilocytosis</i>	86	14*	2
<i>Others</i>	2	1		<i>Ovalocytes</i>	78*	14	
				<i>Target Cells</i>	5	2	
				<i>Akanthocytes</i>	34*	3	
<i>Anisocytosis</i>	54	8	1	<i>Echinocytes</i>	44	11*	1
<i>Megakaryocyte Nucleaus</i>	6			<i>Sickle Cells</i>			
<i>Granulation</i>	8	2		<i>Fragmentocytes</i>	11		
<i>Others</i>	6			<i>Spherocytes</i>	5*	1	
				<i>Stomatocytes</i>	3	1	
				<i>Basophilic Stripling</i>	6		
				<i>Howell-Jolly Bodies</i>	2		
				<i>Pappenheim Bodies</i>			
				<i>Others</i>	7		

The blood count was from a patient with eosinophilia.

2.8 Qualab Codes

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

Code	Text	Number
31	Pathologic findings	83
16	Poikilocytosis	61
30	Pathologic findings, refer to expert	50
17	Elliptocytes/Ovalocytes	49
4	Neutrophils, Toxic Changes	43
8	Leucocytes other:	40
12	Microcytes	38
27	Erythrocytes, other	24
26	Teardrops	20
14	Hypochromic Erythrocytes	19
29	Normal findings	17
2	Neutrophils, left shift	13
5	Atypical lymphocytes, probably reactive	9
13	Macrocytes	9
9	Macrothrombocytes	7
20	Fragmentocytes	7
11	Thrombocytes, others	6
1	Neutrophils, hypersegmentation of nucleus	5
10	Thrombocyte aggregates	5
15	Polychromatophilic Red Cells	5
19	Targetcells	5
22	Rouleaux	4
25	Basophilic strippling	3
21	Spherocytes	2
3	Pelger Hüet Anomaly	1
18	Stomatocytes	1
99	Total	163