

Verein für
Association pour le
Associazione per il



medizinische Qualitätskontrolle
contrôle de qualité médical
controllo di qualità medico

Report

Differential Blood Smear H3

MQ 2024-1

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



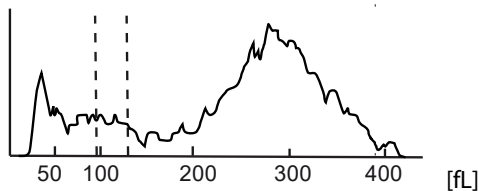
Findings MQ 2024-1 H3A

51 year old woman

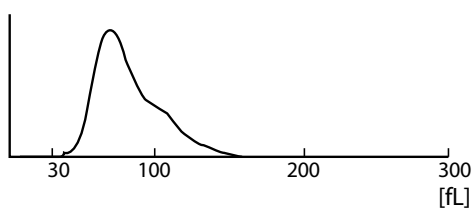
WBC :	2.4	L	10 ³ /μL	MCV :	84.7	μm ³
RBC :	4.03		10 ⁶ /μL	MCH :	28.8	pg
HGB :	11.06	L	g/dL	MCHC:	34.0	g/dL
HCT :	34.2	L	%	RDW :	15.4	H %
PLT :	69	L	10 ³ /μL	MPV :	8.5	μm ³
PCT :	0.059	L	%	PDW :	16.9	%

DIFF:				#LYM:	0.3	L	10 ³ /μL
%LYM:	14.6	L	%	#MON:	0.2	L	10 ³ /μL
%MON:	6.8		%	#GRA:	1.9		10 ³ /μL
%GRA:	78.6	H	%				

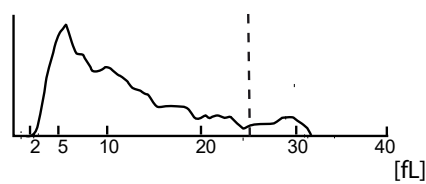
WBC



RBC



PLT



1.2 Sysmex XP300



Findings MQ 2024-1 H3A
51 year old woman

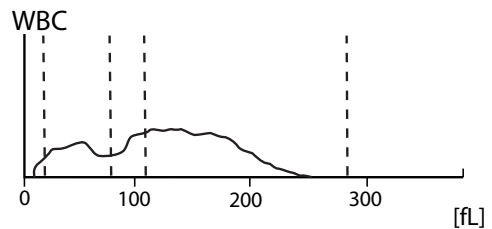
WBC	-	2.4	$10^3/\mu\text{L}$	
RBC	-	3.99	$10^6/\mu\text{L}$	
HGB	-	11.3	g/dL	
HCT	-	32.8	%	
MCV	-	82.2	fL	
MCH	-	28.3	pg	
MCHC	-	34.5	g/dL	
PLT	*	36	$10^3/\mu\text{L}$	
LYM%	-	13.0	%	
MXD%	-	8.1	%	
NEUT%	+	78.9	%	
LYM#	-	0.3	$10^3/\mu\text{L}$	
MXD#	-	0.2	$10^3/\mu\text{L}$	
NEUT#	-	1.9	$10^3/\mu\text{L}$	
RDW_SD		44.9	fL	
RDW_CV		14.8	%	
PDW		--	fL	
MPV		--	fL	
P_LCR		--	%	
PCT		--	%	

1.3 Zybio Z3 CRP

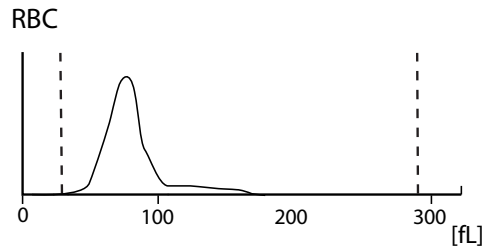


Findings MQ 2024-1 H3A 51 year old woman

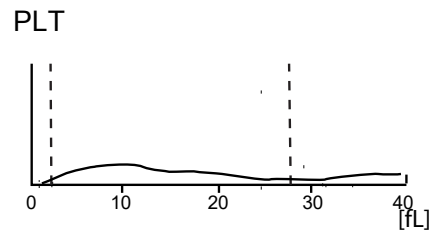
WBC	2.20	↓	10 ³ /μl	3.50-9.50
Lym#	0.53	↓	10 ³ /μl	1.10-3.20
Mid#	0.20		10 ³ /μl	0.10-3.20
Gran#	1.47	↓	10 ³ /μl	1.80-6.30
Lym%	24.0		%	20.0-50.0
Mid%	9.1		%	3.0-15.0
Gran%	66.9		%	40.0-75.0



RBC	3.95		10 ⁶ /μl	3.80-5.80
HGB	11.6		g/dl	11.5-17.5
HCT	31.9	↓	%	35.0-50.0
MCV	80.9	↓	fl	82.0-100.0
MCH	29.5		pg	27.0-34.0
MCHC	36.5	↑	g/dl	31.6-35.4



RDW-CV	15.5		%	11.5-16.0
RDW-SD	41.9		fL	35.0-56.0
PLT	36	↓	10 ³ /μl	125-350
MPV	11.8		fl	6.5-12.0
PDW	16.2		fL	9.0-17.0
PCT	0.042	↓	%	0.108-0.282
P-LCC	16	↓	10 ³ /μl	30-90
P-LCR	44.1		%	11.0-45.0



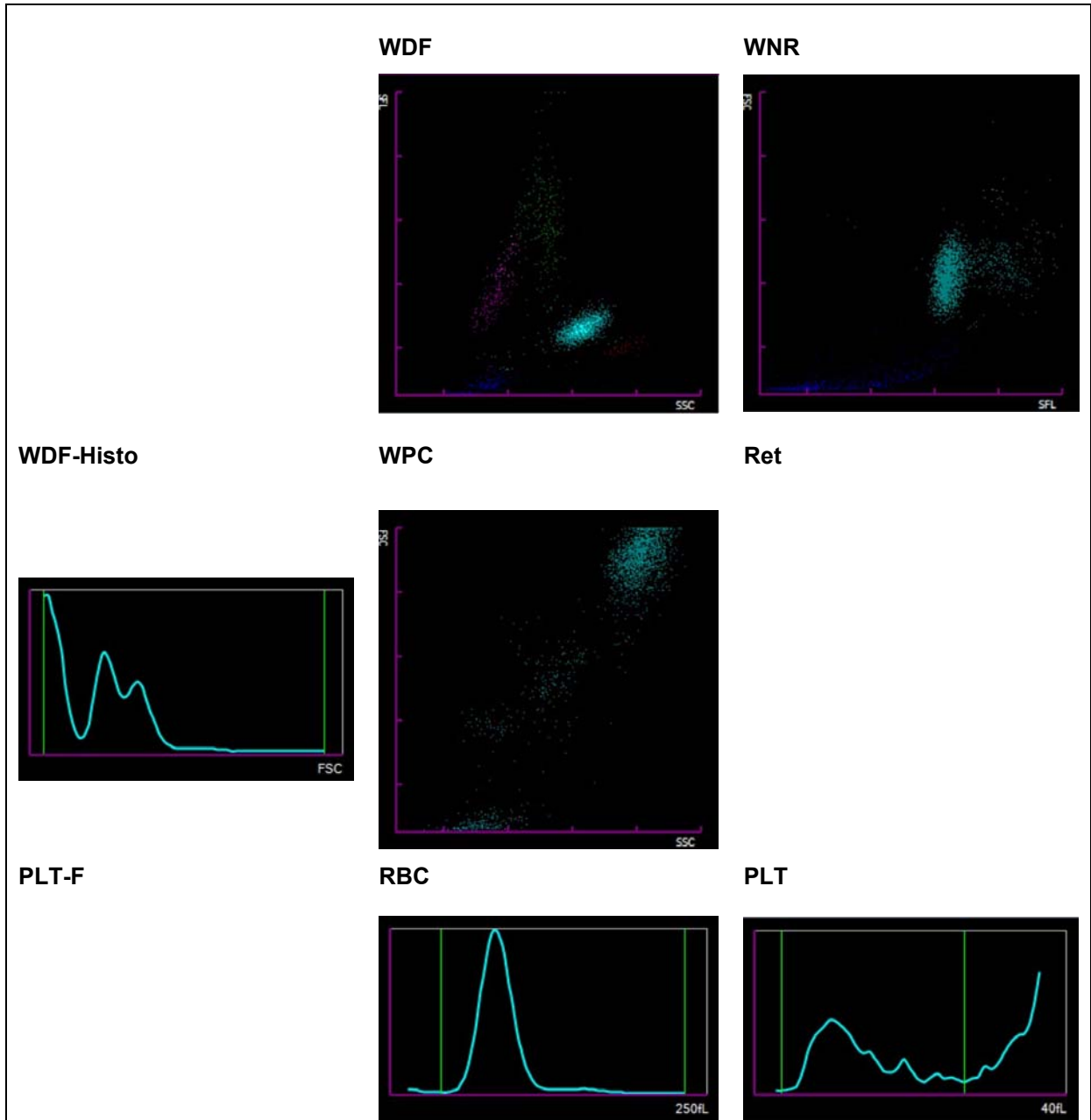
1.4 Sysmex XN-20



Findings MQ 2024-1 H3A 51 year old woman

Analysis		Result	Unit	Reference value
Blood Count				
<u>Hemoglobin</u>	*	106	g/l	117-153
<u>Hematocrit</u>	*	0.310	l/l	0.35-0.46
Erythrocytes	*	3.74	T/l	3.9-5.2
MCV		82.9	fl	80-100
MCH		28.3	pg	26-34
MCHC		342	g/l	310-360
Mikrocytes	*	15.0	%	11.0-14.8
<u>Thrombocytes</u>	*	38	G/l	143-400
<u>Leucocytes</u>	*	2.33	G/l	3.0-9.6
Leucocyte Differentiation				
Neutrophils		1.85	G/l	1.40 – 8.00
Monocytes		0.23	G/l	0.16 – 0.95
Eosinophils		0.04	G/l	0.00 – 0.70
Basophils		0.02	G/l	0.00-0.15
Lymphocytes	*	0.19	G/l	1.50 - 4.00
IG abs.		0.00	G/l	0.00 – 0.03
IG %		0.0	%	0.0 – 0.05
NRBC abs.		0.00	G/l	
NRBC		0.0	/100 Lc	

Findings HAD MQ 2024-1 H3A



1.5 Differential Blood Smear

Findings HAD MQ 2023-4 H3A

19 year old woman

Analysis	Result	Unit	Reference value
Neutrophils total	2.11	G/l	1.40-8.00
Monocytes	0.12	G/l	0.16-0.95
Eosinophils	0.023	G/l	0.00-0.70
Basophils	0.0	G/l	0.00-0.15
Lymphocytes	0.24	G/l	1.50-4.00
Neutrophils total	82.0	%	40.0-74.0
Neutrophils Band	59.5	%	0.0-20.0
Neutrophils Segmented	22.5	%	30.0-50.0
Monocytes	5.5	%	3.4-9.0
Eosinophils	1.0	%	0.0-7.0
Basophils	0.0	%	0.0-1.5
Lymphocytes	10.5	%	19.0-48.0
Plasmacells	1.0	%	0-0.5
Blasts	0	%	0
Promyelocytes	0	%	0
Myelocytes	0	%	0
Metamyelocytes	0	%	0
Nucleated Red Cells	0	%	0

Commentary

Malaria plasmodia detectable; infestation 5.6% Morphologically compatible with *P. falciparum* (fine rings with 1-2 nuclear bodies, few erythrocytes with double infestation. Many Accholee forms). Red blood count normochromic, slightly anisocytic with few microcytes. Clear poikilocytosis with many echinocytes and few acanthocytes as well as individual spherocytes.

Left shift; neutrophil granulocytes with slightly coarsened cytoplasmic granulation. Many with basophilic streaks. Lymphocytes slightly reactive, 1% plasma cells detectable.

Slight anisocytosis of the thrombocytes.

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

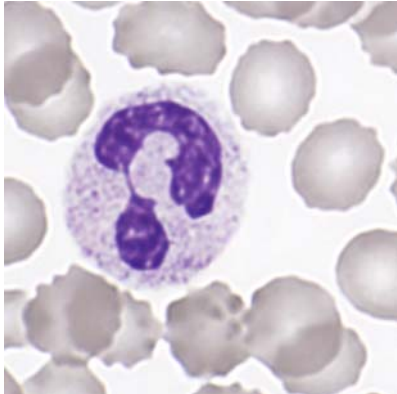


Abb 1. Neutrophile (Seg)

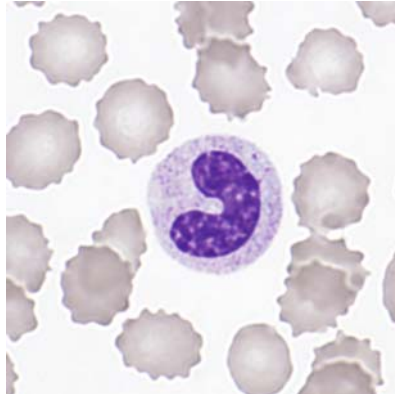


Abb 2. Neutrophile (Rod)

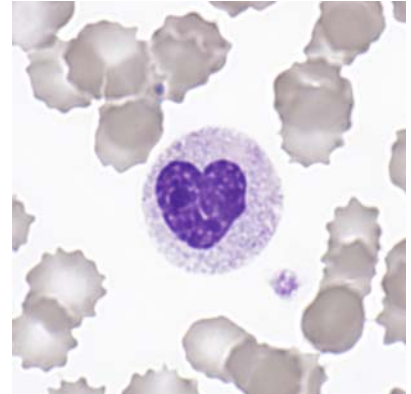


Abb 3. Neutrophile (Rod)

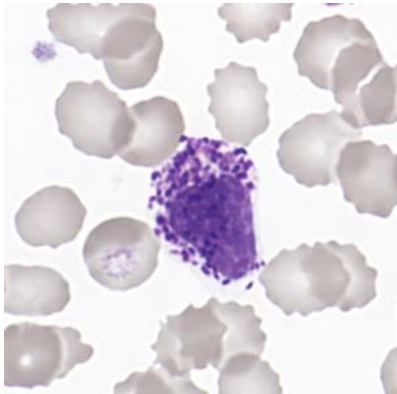


Abb 4. Basophile

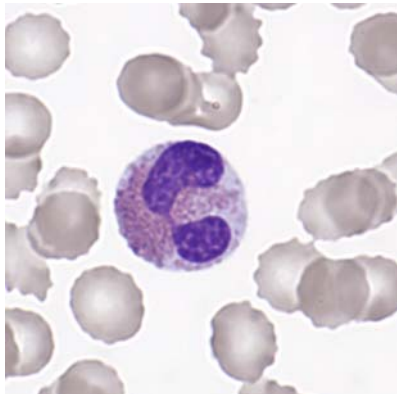


Abb 5. Eosinophile

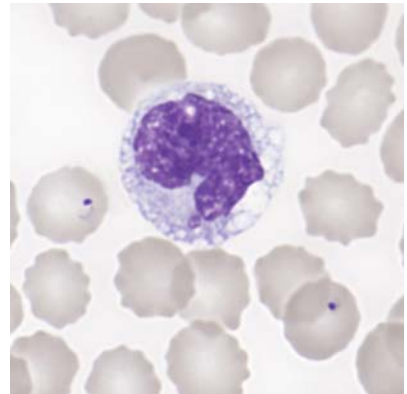


Abb 6. Monocyte

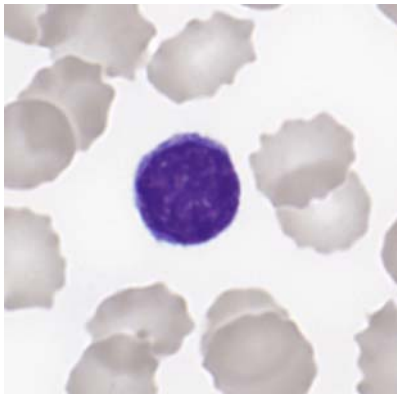


Abb 7. Lymphocyte

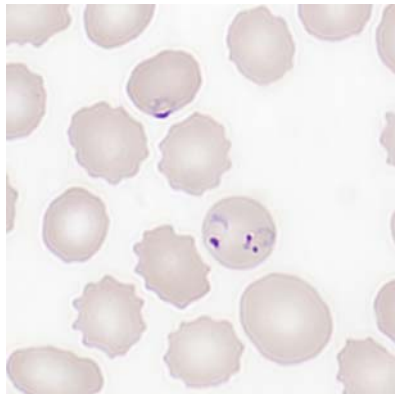


Abb 8. Plasmodia

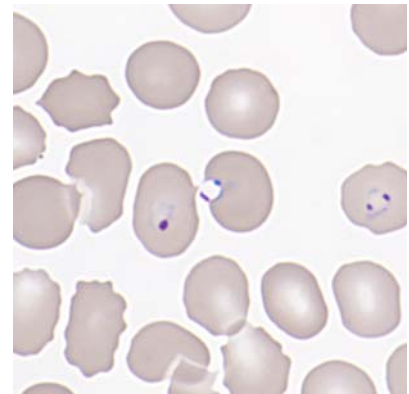


Abb 9. Plasmodia

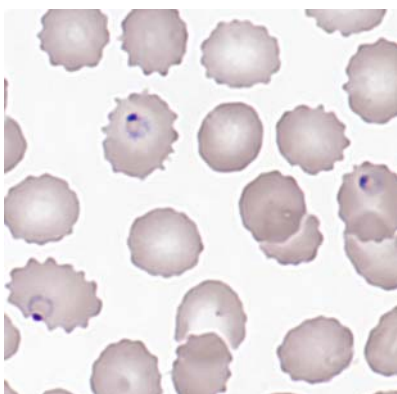


Abb 10. Ec, Plasmodia

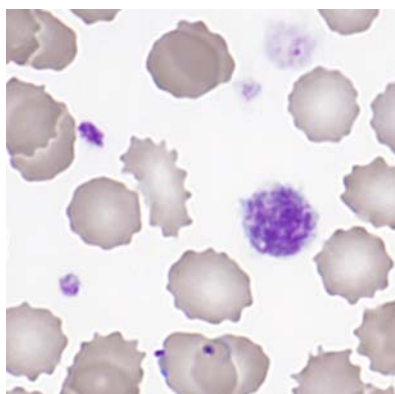


Abb 11. Platelets

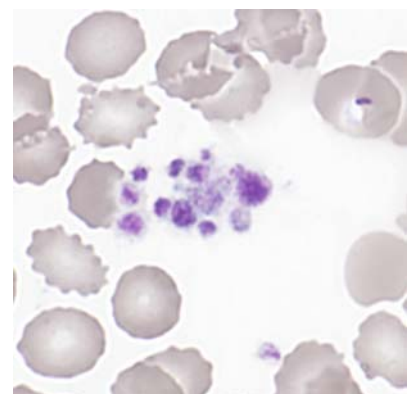


Abb 12. Platelet

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	4	11	24	57*	56	33	1
<i>Neutrophils Segmented.</i>		5	14	70	54*	33	4	6	1	1	
<i>Eosinophils</i>	32	152*	4								
<i>Basophile</i>	121*	66	1								
<i>Monocytes</i>	11	105	68*	4							
<i>Lymphocytes</i>	1	3	52	120*	10	2					
<i>Plasmacells</i>	174*	14*									
<i>Blasts</i>	185*	2	1								
<i>Promyelocytes</i>	183*	5									
<i>Myelocytes</i>	173*	14	1								
<i>Metamyelocyten</i>	155*	26	4	2	1						
<i>Erythrocytes Nucleated</i>	181*	5	1			1					
<i>Unknown</i>	182*	6									
<i>Smudge cells</i>	177*	6	4	1							

Evaluation H3-A

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	4			<i>Hypochromic Ec</i>	44	15	2
<i>Pelger-Huet Anomaly</i>	6	3	2	<i>Polychromatic Ec</i>	21	3	0
<i>Coarse Granulation</i>	65*	36	4	<i>Anisocytes</i>	100*	20	3
<i>Basophilic Stripping</i>	46*	9		<i>Mikrocytes</i>	46*	12	1
<i>Vacuoles</i>	72	21	6	<i>Makrocytes</i>	12	4	0
<i>Reaktive Lymphocytes</i>	44*	10		<i>Megalocytes</i>	3	0	0
<i>Atypical Lymphocytes</i>	3			<i>Poikilocytosis</i>	57	27*	8
<i>Others</i>	2	1		<i>Ovalocytes</i>	88	13	1
				<i>Target Cells</i>	5	1	0
				<i>Akanthocytes</i>	27	15	14
<i>Anisocytosis</i>	89*	30	2	<i>Echinocytes</i>	11	77*	50
<i>Megakaryocyte Nucleaus</i>	3	3	1	<i>Sickle Cells</i>	2		
<i>Granulation</i>	6	4		<i>Fragmentocytes</i>	8	3	
<i>Others</i>	9			<i>Spherocytes</i>	7	1	
				<i>Stomatocytes</i>	3		
				<i>Basophilic Stripping</i>	9		
				<i>Howell-Jolly Bodies</i>	6	4	1
				<i>Pappenheim Bodies</i>	1		
				<i>Others</i>	9	14	18

The blood count was from a patient with malaria. The parasitaemia was 5.6%. It was *P. falciparum*.

1.7 Qualab Codes

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

Code	Text	Number
28	Parasites	131
2	Neutrophils, left shift	119
31	Pathologic findings	96
30	Pathologic findings, refer to expert	64
4	Neutrophils, Toxic Changes	58
27	Erythrocytes, other	41
16	Poikilocytosis	39
17	Elliptocytes/Ovalocytes	30
5	Atypical lymphocytes, probably reactive	20
9	Macrothrombocytes	19
14	Hypochromic Erythrocytes	16
12	Microcytes	10
11	Thrombocytes, others	9
24	Howell-Jolly bodies	9
3	Pelger Hüet Anomaly	5
20	Fragmentocytes	4
8	Leucocytes other:	3
13	Macrocytes	3
15	Polychromatophilic Red Cells	3
22	Rouleaux	3
6	Atypical lymphocytes, probably neoplastic	2
10	Thrombocyte aggregates	2
29	Normal findings	2
1	Neutrophils, hypersegmentation of nucleus	1
19	Targetcells	1
21	Spherocytes	1
26	Teardrops	1
	Total	161

2 Sample B

2.1 ABX Microsemi CRP



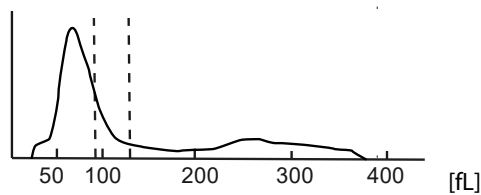
Findings MQ 2024-1 H3B

16 year old woman

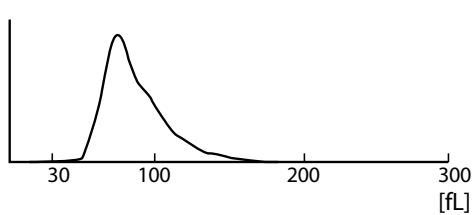
WBC :	7.8	10 ³ /μL	MCV :	89.1	μm ³
RBC :	4.67	10 ⁹ /μL	MCH :	29.9	pg
HGB :	13.9	g/dL	MCHC:	33.5	g/dL
HCT :	41.6	%	RDW :	13.1	%
PLT :	237	10 ³ /μL	MPV :	7.5	μm ³
PCT :	0.179	%	PDW :	15.5	%

DIFF:					
%LYM:	51.8	H	%	#LYM:	4.0 H 10 ³ /μL
%MON:	13.7	H	%	#MON:	1.1 H 10 ³ /μL
%GRA:	34.5	L	%	#GRA:	2.7 10 ³ /μL

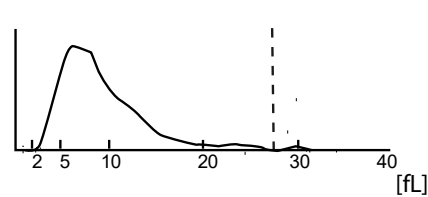
WBC



RBC



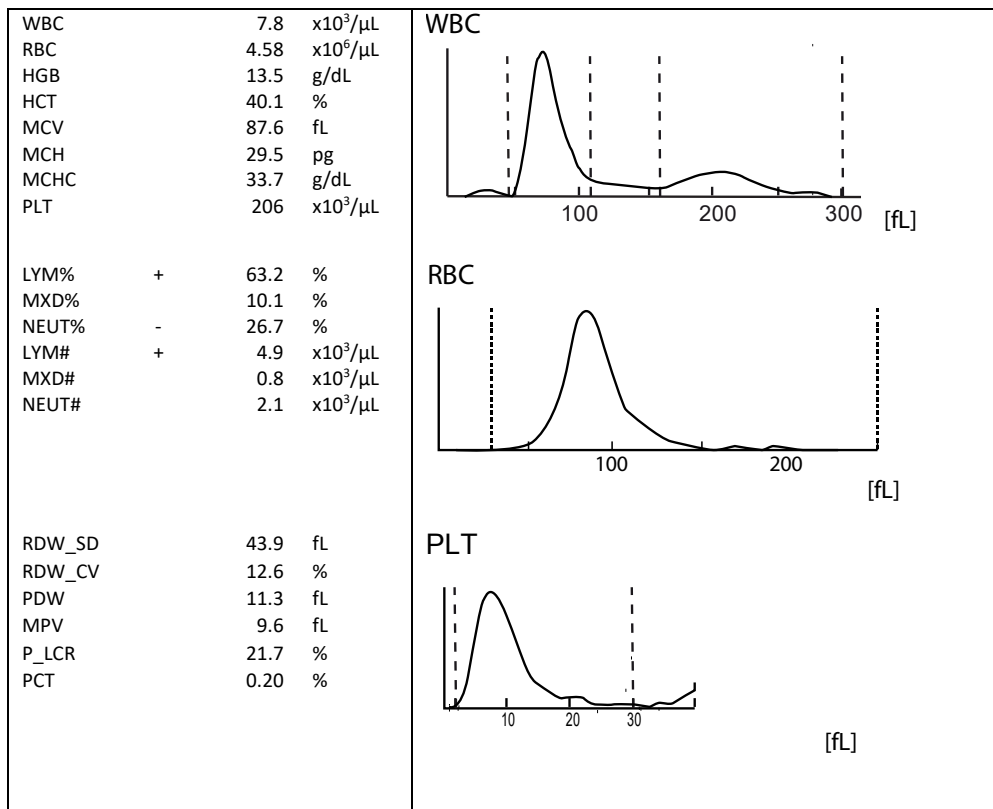
PLT



2.2 Sysmex XP300



Findings MQ 2024-1 H3B 16 year old woman



2.3 Zybio Z3 CRP

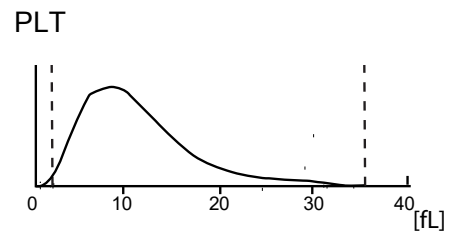
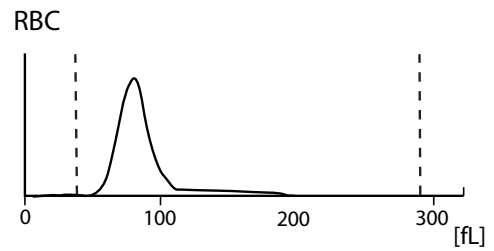
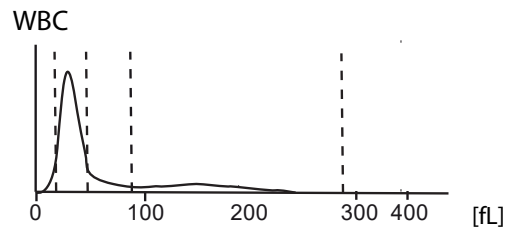


Findings MQ 2024-1 H3B 16 year old woman

WBC	7.00		10 ³ /μl	3.50-9.50
Lym#	4.42	↑	10 ³ /μl	1.10-3.20
Mid#	0.53		10 ³ /μl	0.10-3.20
Gran#	2.05		10 ³ /μl	1.80-6.30
Lym%	63.2	↑	%	20.0-50.0
Mid%	7.6		%	3.0-15.0
Gran%	29.2	↓	%	40.0-75.0

RBC	4.60		10 ⁶ /μl	3.80-5.80
HGB	14.1		g/dl	11.5-17.5
HCT	39.9		%	35.0-50.0
MCV	86.7		fl	82.0-100.0
MCH	30.7		pg	27.0-34.0
MCHC	35.4		g/dl	31.6-35.4

RDW-CV	13.4		%	11.5-16.0
RDW-SD	39.0		fL	35.0-56.0
PLT	191		10 ³ /μl	125-350
MPV	9.7		fl	6.5-12.0
PDW	16.2		fL	9.0-17.0
PCT	0.186		%	0.108-0.282
P-LCC	43		10 ³ /μl	30-90
P-LCR	22.7		%	11.0-45.0



2.4 Sysmex XN-20

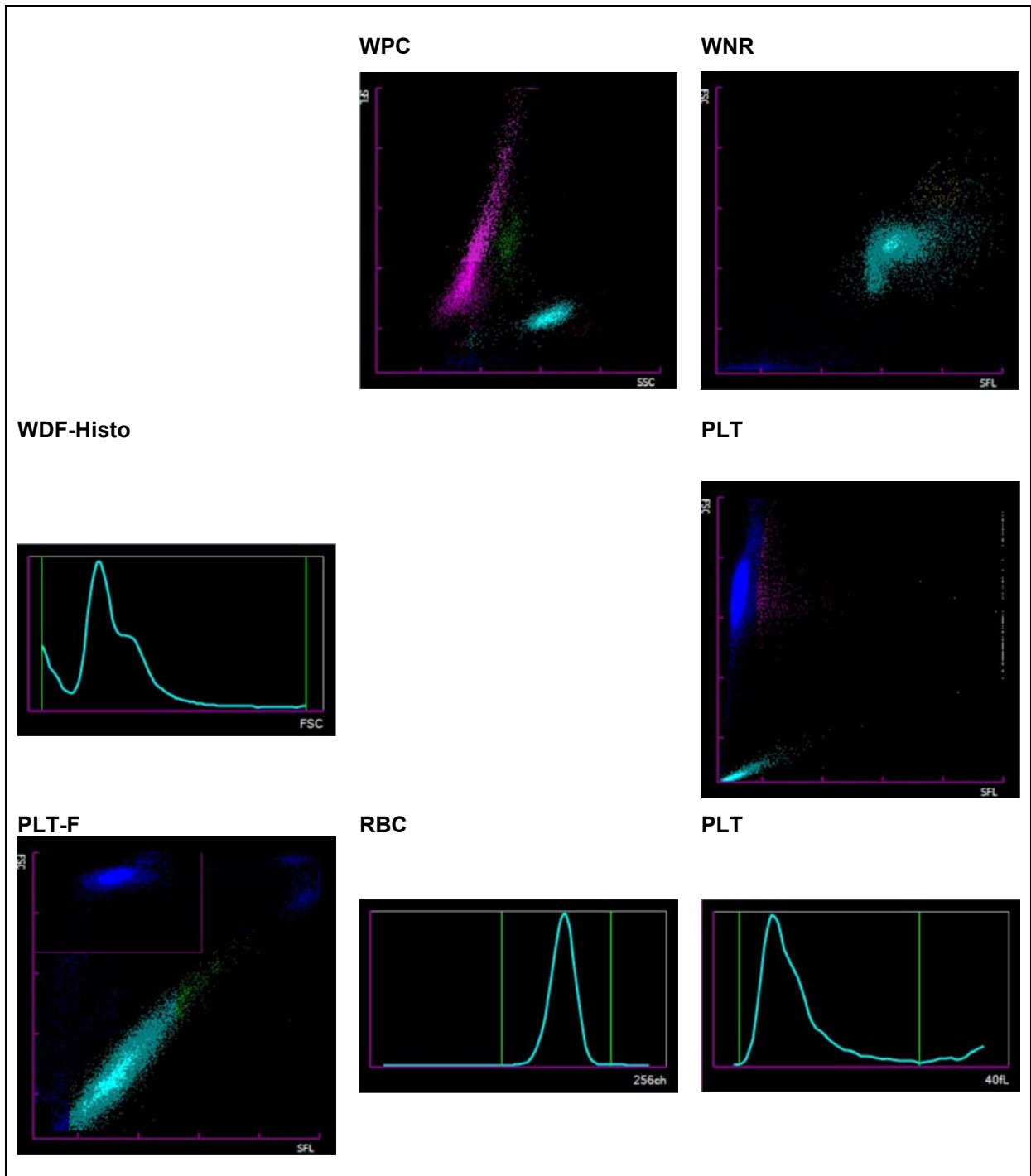


Findings MQ 2024-1 H3B

16 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	139	g/l	117-153
Hematocrit	0.400	l/l	0.35-0.46
Erythrocytes	4.68	T/l	3.9-5.2
MCV	85.5	fl	80-100
MCH	29.7	pg	26-34
MCHC	348	g/l	310-360
Thrombocytes	198	G/l	143-400
Leucocytes	8.01	G/l	3.0-9.6
Leucocyte Differentiation			
Neutrophils	2.13	G/l	1.40-8.00
Monocytes	0.38	G/l	0.16-0.95
Eosinophils	0.02	G/l	0.00-0.70
Basophils	0.12	G/l	0.00-0.15
Lymphocytes	* 5.35	G/l	1.50-4.00
IG abs.	0.01	G/l	0.00-0.03
IG %	0.1	%	0.0-0.5
NRBC abs.	0.00	G/l	
NRBC	0.0	/100 Lc	

Findings HAD MQ 2024-1 H3B

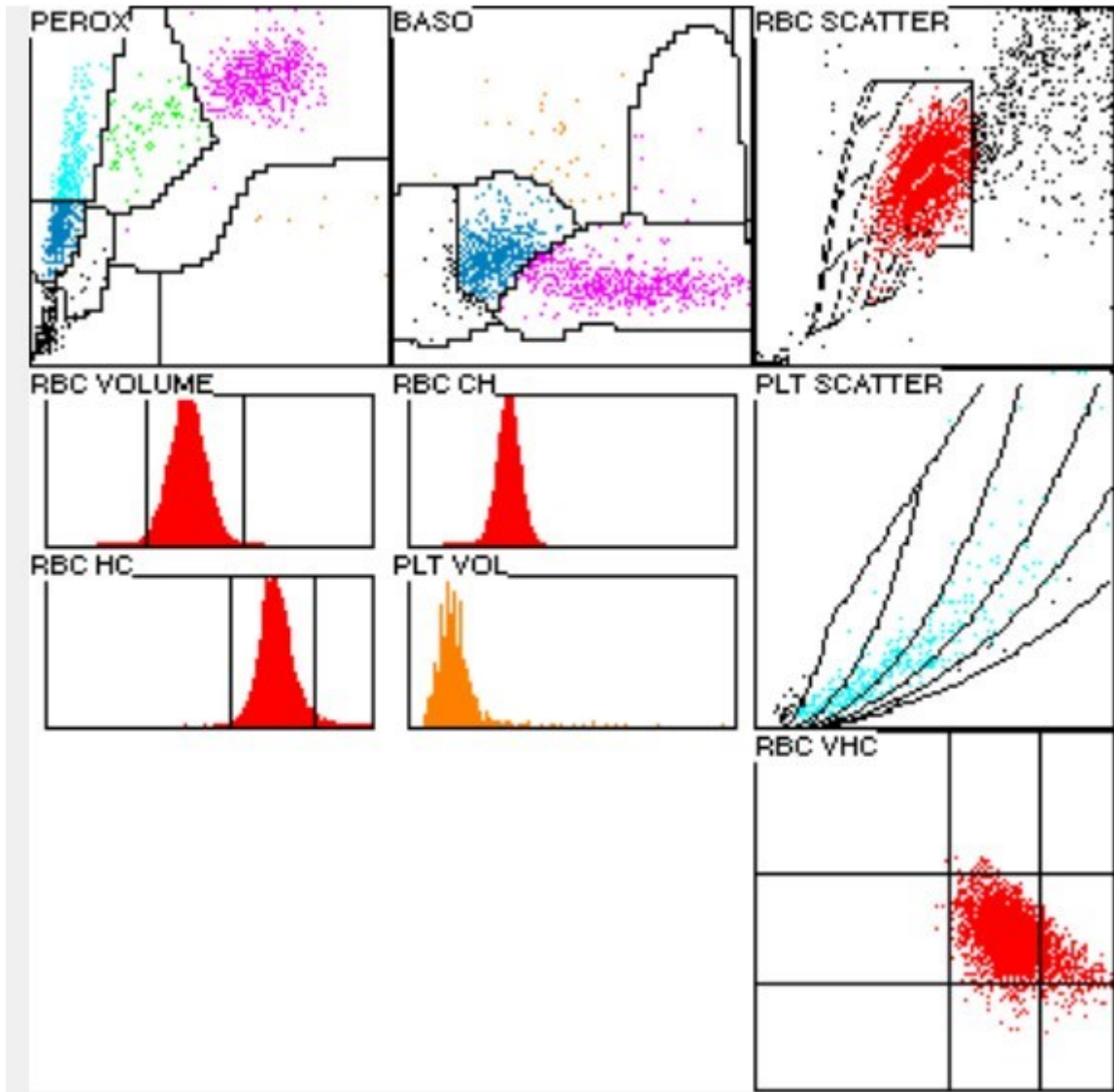


2.5 ADVIA 2120



Findings MQ 2024-1 H3B 16 year old woman

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	144	g/l	117-153
Hematocrit	0.416	l/l	0.35-0.46
Erythrocytes	4.82	T/l	3.9-5.2
MCV	86.3	fl	80-100
MCH	29.8	pg	26-34
MCHC	346	g/l	310-360
Mikrocytes	1.0	%	0-2.0
Makrocytes	0.1	%	0-2.0
Hypochromic Ec	0.2	%	0-2.0
Hyerchromic Ec	* 2.6	%	0-2.0
RDW	12.9	%	11.0-0-14.8
Thrombocytes	174	G/l	143-400
Leukocytes	7.76	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	2.13	G/l	1.40-8.00
Monocytes	0.28	G/l	0.16-0.95
Eosinophils	0.03	G/l	0.00-0.70
Basophils	0.14	G/l	0.00-0.15
Lymphocytes	3.75	G/l	1.50-4.00
LUC	* 1.42	%	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		G/l	1.40-8.00
Monocytes		G/l	0.16-0.95
Eosinophils	Calculation not possible	G/l	0.00-0.70
Basophils		G/l	0.00-0.15
Lymphocytes		G/l	1.50-4.00
Erythroblasts	0.0	/100 Lc	
Neutrophils total	* 29.5	%	40.0-74.0
Neutrophils Band	12.0	%	0.0-20.0
Neutrophils Segmented	* 17.5	%	30.0-50.0
Monocytes	* 2.5	%	3.4-9.0
Eosinophils	0.0	%	0.0-7.0
Basophils	0.0	%	0.0-1.5
Lymphocytes	* 68.0	%	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
Others/ damaged cells	0.0	%	0

Commentary

coarsened cytoplasmic granulation, a few with fine basophilic streaks. Absolute lymphocytosis; lymphocytes atypical, clearly reactive, few with marked reactive changes; platelets morphologically unremarkable.

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

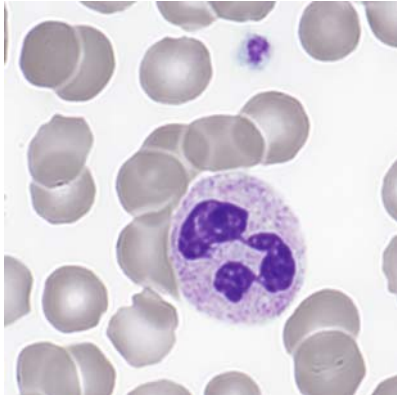


Abb 1. Neutrophil (Seg)

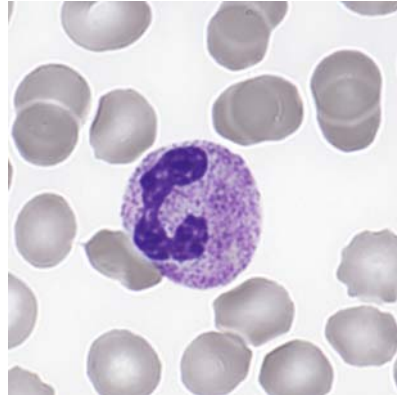


Abb 2. Neutrophil (Seg)

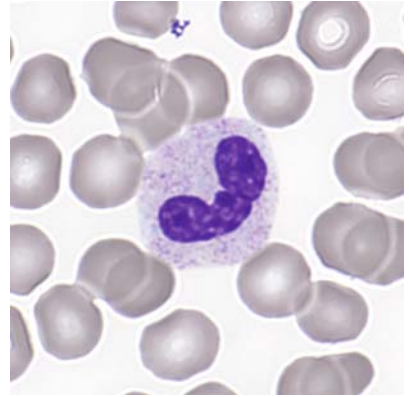


Abb 3. Neutrophil (Rod)

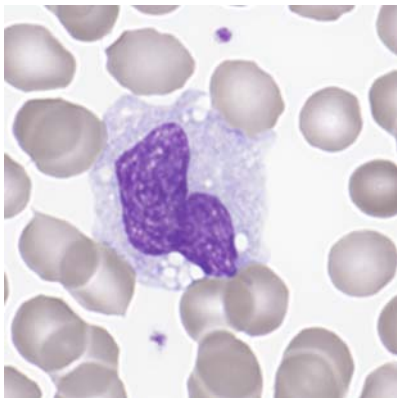


Abb 4. Monocyte

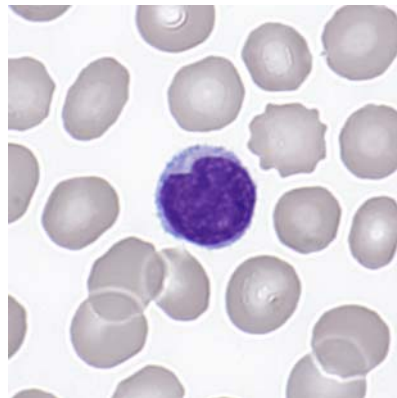


Abb 5. Lymphocyte

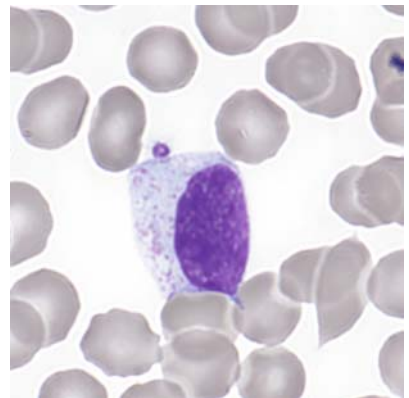


Abb 6. Lymphocyte

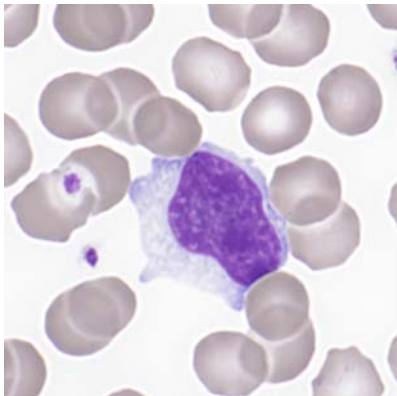


Abb 7. Lymphocyte

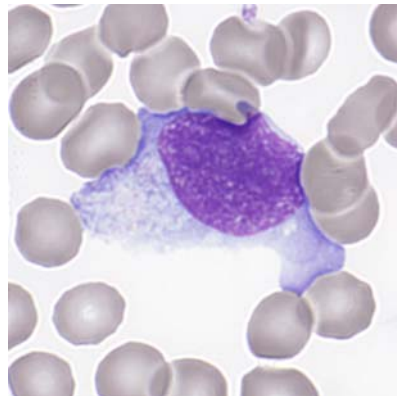


Abb 8. Lymphocyte

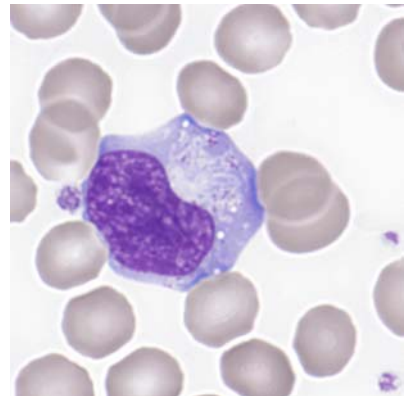


Abb 9. Lymphocyte

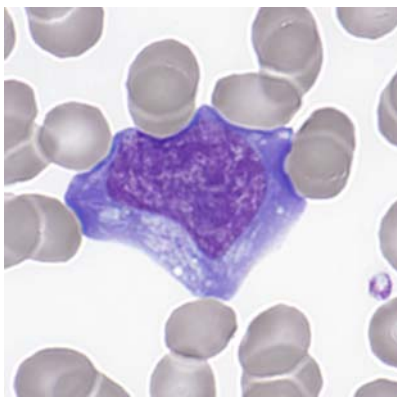


Abb 10. Lymphocyte

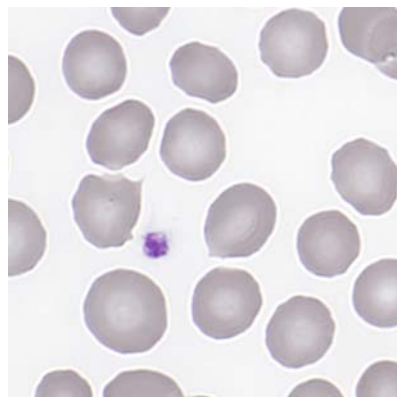


Abb 11. Platelets

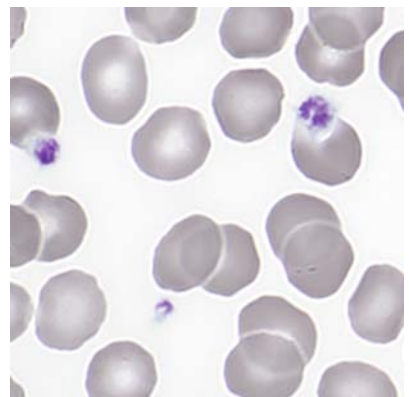


Abb 12. Platelets

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>	1	6	15	84*	67	13	1				
<i>Neutrophils Segmented.</i>	2	12	26	105*	33	8	1				
<i>Eosinophils</i>	133*	54									
<i>Basophile</i>	117*	70									
<i>Monocytes</i>	8	103*	61	9	3	1	2				
<i>Lymphocytes</i>				2	4	6	12	48	110*	5	
<i>Plasmacells</i>	178*	9									
<i>Blasts</i>	179*	3	4				1				
<i>Promyelocytes</i>	184*	2			1						
<i>Myelocytes</i>	182*	3	1				1				
<i>Metamyelozyten</i>	179*	7	1								
<i>Erythrocytes Nucleated</i>	184*	2				1					
<i>Unknown</i>	180*	3	1	1	2						
<i>Smudge cells</i>	163*	8	8	8							

Evaluation H3-B

	<i>light</i>	<i>medium</i>	<i>strong</i>		<i>light</i>	<i>medium</i>	<i>strong</i>
<i>Hypersegmentation</i>	1			<i>Hypochromic Ec</i>	2	2	
<i>Pelger-Huet Anomaly</i>	1			<i>Polychromatic Ec</i>	6		
<i>Coarse Granulation</i>	54*	15		<i>Anisocytes</i>	76	11	
<i>Basophilic Stripling</i>	11*	1		<i>Mikrocytes</i>	38	3	
<i>Vacuoles</i>	27	2		<i>Makrocytes</i>	8	2	
<i>Atypical Lymph, reactive</i>	12	57	80*	<i>Megalocytes</i>		1	
<i>Atypical Lymph, neoplastic</i>	4	9	3	<i>Poikilocytosis</i>	37	3	
<i>Others</i>		1	2	<i>Ovalocytes</i>	30	1	
				<i>Target Cells</i>			
				<i>Akanthocytes</i>	17	1	
<i>Anisocytosis</i>	57	5	1	<i>Echinocytes</i>	15	2	
<i>Megakaryocyte Nucleaus</i>	3	2		<i>Sickle Cells</i>	1		
<i>Granulation</i>	6			<i>Fragmentocytes</i>	3		
<i>Others</i>	1			<i>Spherocytes</i>	3		
				<i>Stomatocytes</i>	1		
				<i>Basophilic Stripling</i>			
				<i>Howell-Jolly Bodies</i>	1		
				<i>Pappenheim Bodies</i>			
				<i>Others</i>	1		

The blood sample came from a patient who was suffering from an acute EBV infection. The same blood was also used for sample B20.

2.8 Qualab Codes

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

Code	Text	Number
5	Atypical lymphocytes, probably reactive	154
31	Pathologic findings	103
30	Pathologic findings, refer to expert	54
2	Neutrophils, left shift	32
4	Neutrophils, Toxic Changes	24
12	Microcytes	19
17	Elliptocytes/Ovalocytes	15
16	Poikilocytosis	12
6	Atypical lymphocytes, probably neoplastic	10
27	Erythrocytes, other	9
9	Macrothrombocytes	8
26	Teardrops	7
29	Normal findings	7
8	Leucocytes other:	6
11	Thrombocytes, others	6
22	Rouleaux	4
13	Macrocytes	3
14	Hypochromic Erythrocytes	3
15	Polychromatophilic Red Cells	3
18	Stomatocytes	1
19	Targetcells	1
20	Fragmentocytes	1
24	Howell-Jolly bodies	1
99	Total	159