

Verein für
Association pour le
Associazione per il



medizinische Qualitätskontrolle
contrôle de qualité médical
controllo di qualità medico

Report

Differential Blood Smear H3

MQ 2024-2

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



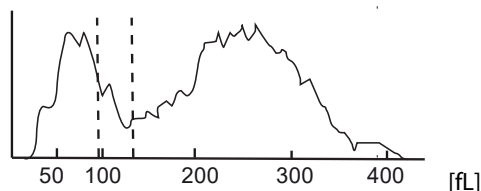
Findings MQ 2024-2 H3A

42 year old man

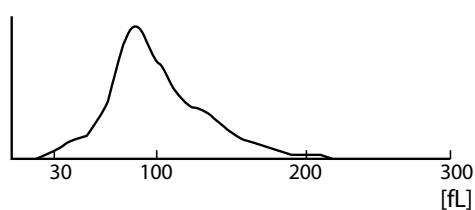
WBC :	4.5	$10^3/\mu\text{L}$	MCV :	100.1	H	μm^3
RBC :	2.71	L $10^6/\mu\text{L}$	MCH :	35.3	H	pg
HGB :	9.6	L g/dL	MCHC:	35.2		g/dL
HCT :	27.1	L %	RDW :	17.8	H	%
PLT :	118	L $10^3/\mu\text{L}$	MPV :	10.9		μm^3
PCT :	0.128	%	PDW :	25.0	H	%

DIFF:						
%LYM:	21.4	%	#LYM:	1.0	L	$10^3/\mu\text{L}$
%MON:	8.0	%	#MON:	0.4		$10^3/\mu\text{L}$
%GRA:	70.6	%	#GRA:	3.1		$10^3/\mu\text{L}$

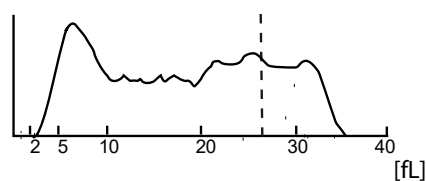
WBC



RBC



PLT

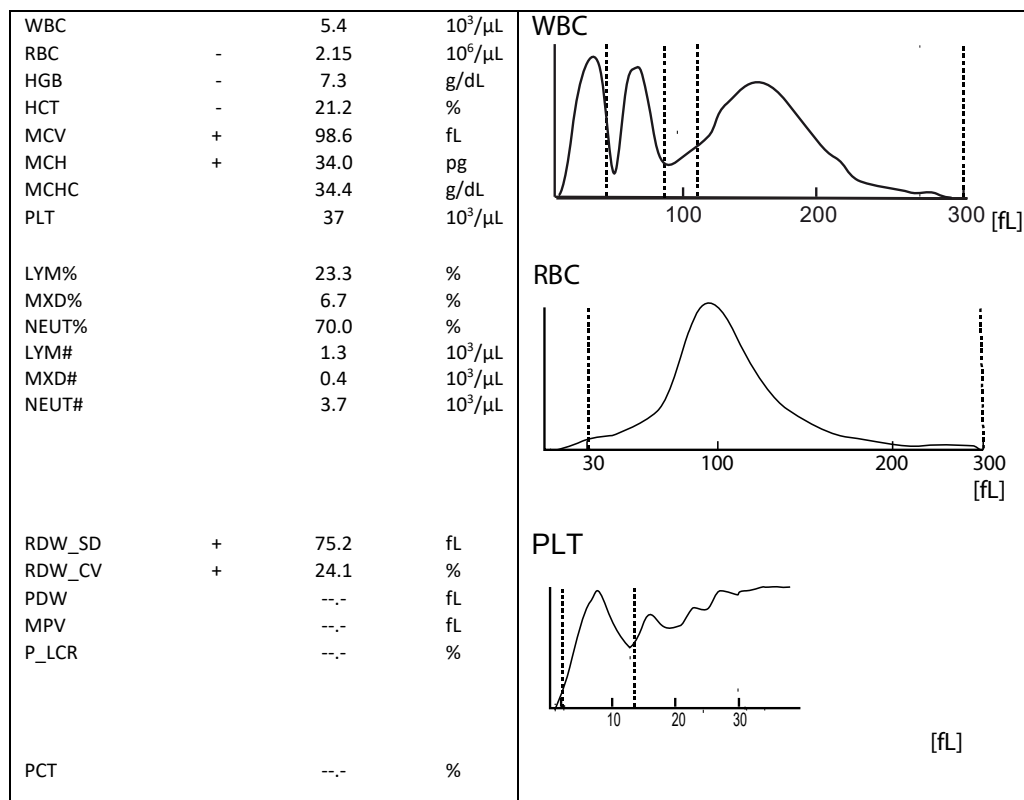


1.2 Sysmex XP300



Findings MQ 2024-2 H3A

42 year old man



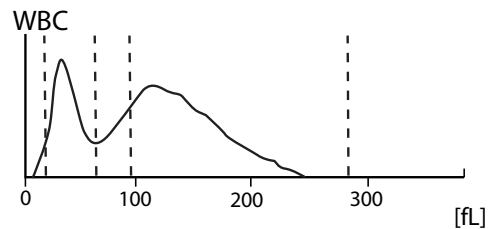
1.3 Zbio Z3 CRP



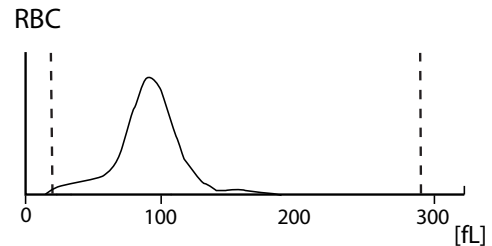
Findings MQ 2024-2 H3A

42 year old man

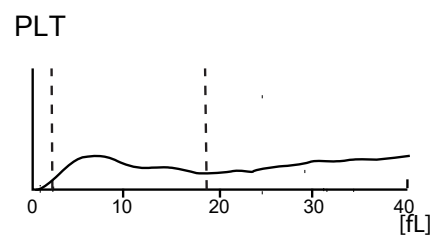
WBC	5.03	$10^3/\mu\text{l}$	3.50-9.50
Lym#	1.39	$10^3/\mu\text{l}$	1.10-3.20
Mid#	0.39	$10^3/\mu\text{l}$	0.10-3.20
Gran#	3.25	$10^3/\mu\text{l}$	1.80-6.30
Lym%	27.6	%	20.0-50.0
Mid%	7.7	%	3.0-15.0
Gran%	64.7	%	40.0-75.0



RBC	2.07	↓	$10^6/\mu\text{l}$	3.80-5.80
HGB	7.3	↓	g/dl	11.5-17.5
HCT	19.6	↓	%	35.0-50.0
MCV	94.9		fL	82.0-100.0
MCH	35.1	↑	pg	27.0-34.0
MCHC	37.0	↑	g/dl	31.6-35.4



RDW-CV	18.3	↑	%	11.5-16.0
RDW-SD	62.0	↑	fL	35.0-56.0
PLT	44	↓	$10^3/\mu\text{l}$	125-350
MPV	8.6		fL	6.5-12.0
PDW	15.7		fL	9.0-17.0
PCT	0.038	↓	%	0.108-0.282
P-LCC	7	↓	$10^3/\mu\text{l}$	30-90
P-LCR	14.7		%	11.0-45.0

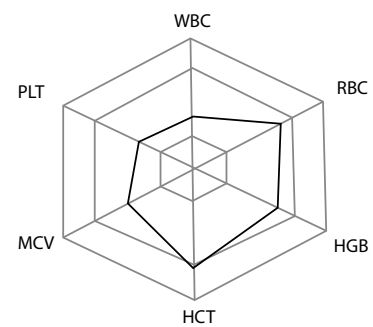
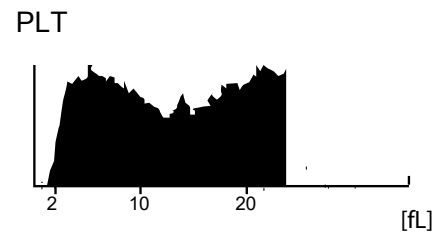
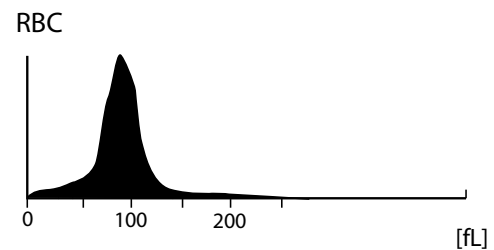
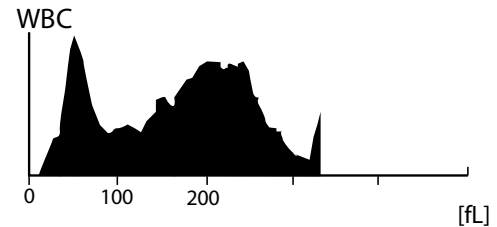


1.4 Celltac

Findings MQ 2024-2 H3A

42 year old man

WBC	5.28		$10^3/\mu\text{l}$
RBC	2.18	*	$10^6/\mu\text{l}$
HGB	7.32	L	g/dL
HCT	21.8	L	%
MCV	100.0		fL
MCH	33.6		Pg
MCHC	33.6		g/dL
PLT	70.1	*	$10^3/\mu\text{l}$
LY	1.08	L	[20.40 %]
MO	0.17		[3.12L %]
GR	4.03		[76.48H %]
RDW-CV	23.2	H	%
RDW-SD	92.8	H	fL
PCT	0.07	L	%
MPV	9.5		fL
PDW	19.5	H	%
P-LCR	50.6		%



1.5 Sysmex XN-20

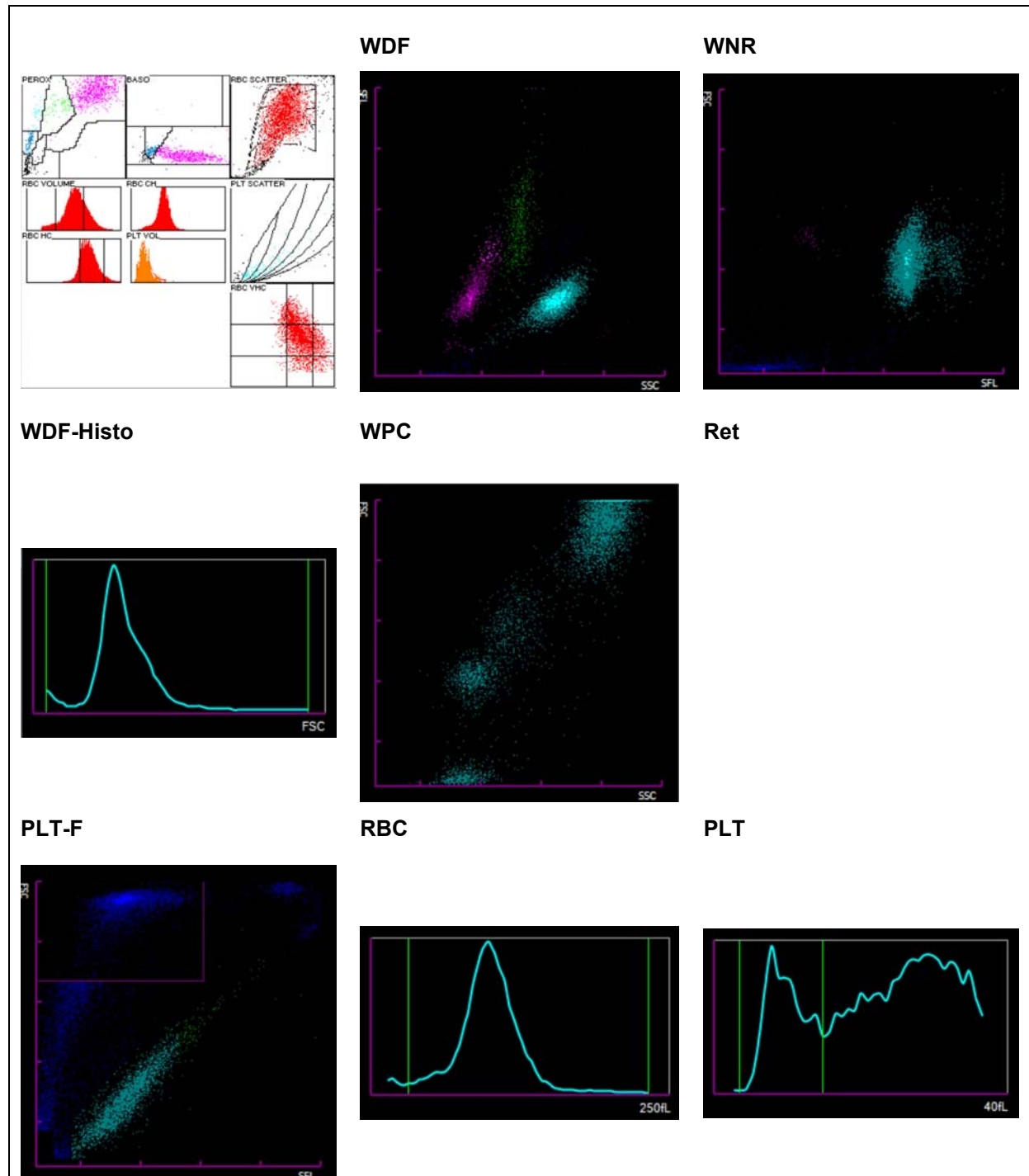


Findings MQ 2024-2 H3A

42 year old man

Analysis		Result	Unit	Reference value
Blood Count				
<u>Hemoglobin</u>	*	70	g/l	117-153
<u>Hematocrit</u>	*	0.204	l/l	0.35-0.46
Erythrocytes	*	2.07	T/l	3.9-5.2
MCV		98.6	fl	80-100
MCH		33.8	pg	26-34
MCHC		343	g/l	310-360
Mikrocytes	*	22.3	%	11.0-14.8
<u>Thrombocytes</u>	*	34	G/l	143-400
<u>Leucocytes</u>		5.84	G/l	3.0-9.6
Leucocyte Differentiation				
Neutrophils		4.07	G/l	1.40 – 8.00
Monocytes		0.48	G/l	0.16 – 0.95
Eosinophils		0.01	G/l	0.00 – 0.70
Basophils		0.01	G/l	0.00-0.15
Lymphocytes	*	1.23	G/l	1.50 - 4.00
IG abs.	*	0.04	G/l	0.00 – 0.03
IG %	*	0.07	%	0.0 – 0.05
NRBC abs.		0.04	G/l	
NRBC		0.7	/100 Lc	

Findings HAD MQ 2024-2 H3A



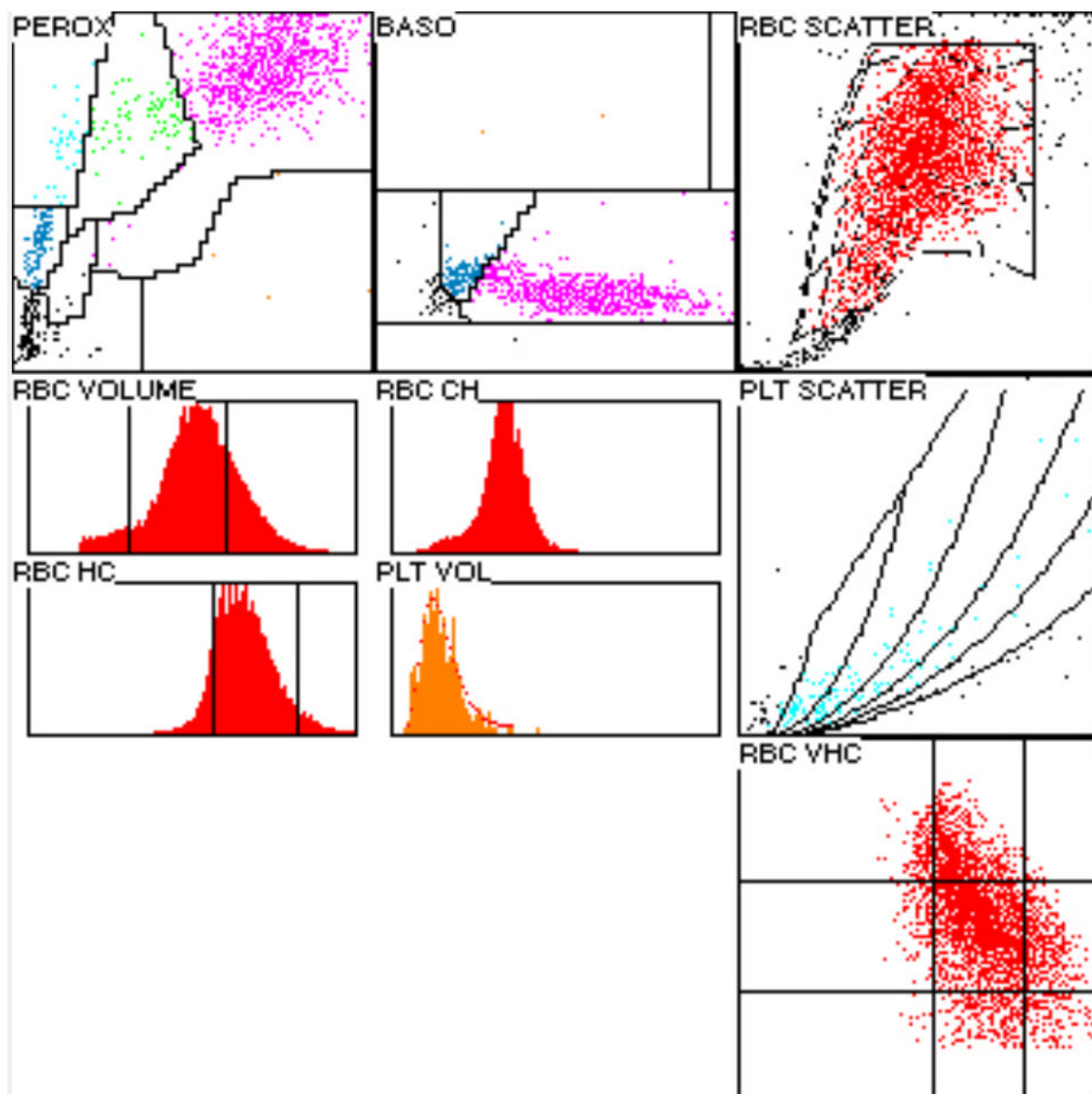
1.6 ADVIA 2120



Findings MQ 2024-2 H3B

42 year old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	37	g/l	117-153
Hematocrit	0.227	l/l	0.35-0.46
Erythrocytes	* 2.19	T/l	3.9-5.2
MCV	* 103.6	fl	80-100
MCH	33.2	pg	26-34
MCHC	320	g/l	310-360
Mikrocytes	* 6.0	%	0-2.0
Makrocytes	* 22.3	%	0-2.0
Hypochromic Ec	* 9.7	%	0-2.0
Hyerchromic Ec	* 4.3	%	0-2.0
RDW	* 24.1	%	11.0-0-14.8
Thrombocytes	42	G/l	143-400
Leukocytes	5.31	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	3.77	G/l	1.40-8.00
Monocytes	5.0	G/l	0.16-0.95
Eosinophils	0.3	G/l	0.00-0.70
Basophils	0.2	G/l	0.00-0.15
Lymphocytes	21.0	G/l	1.50-4.00
LUC	2.7	%	0.0-4.0



1.7 Differential Blood Smear

Findings HAD MQ 2024-2 H3A

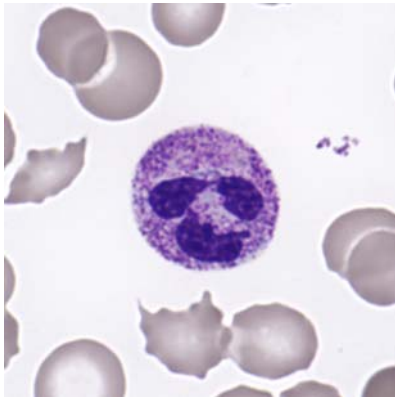
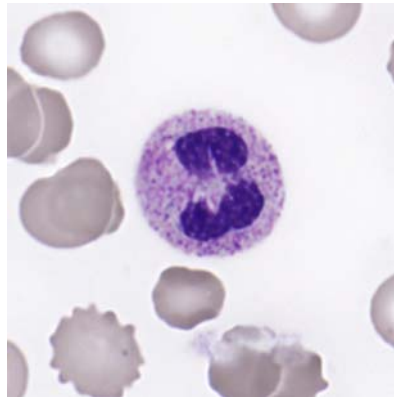
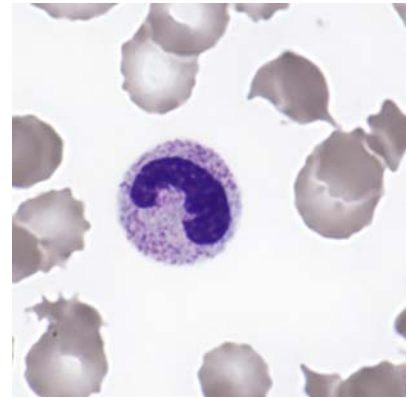
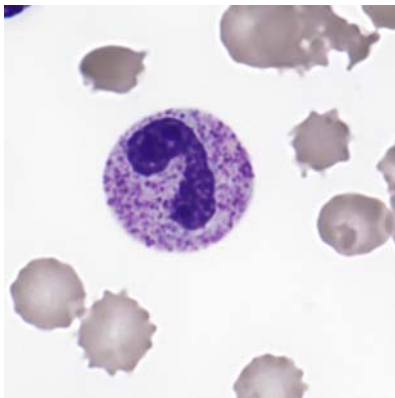
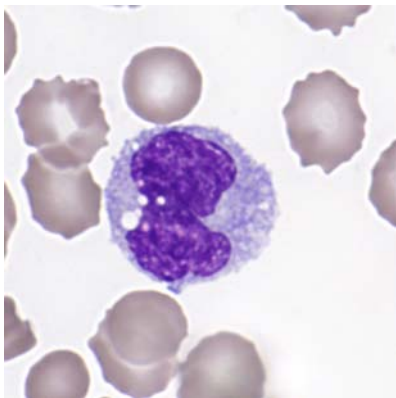
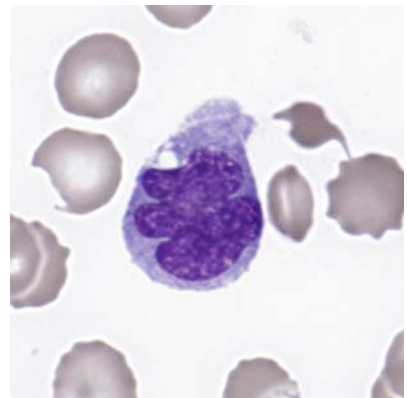
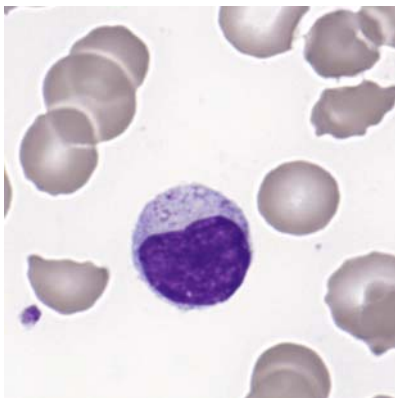
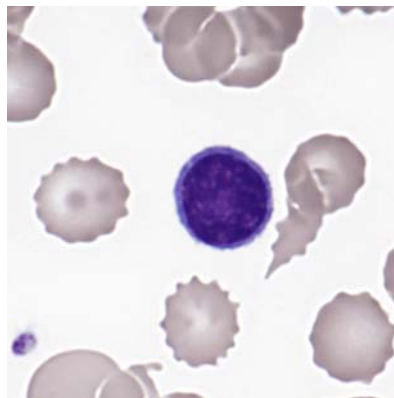
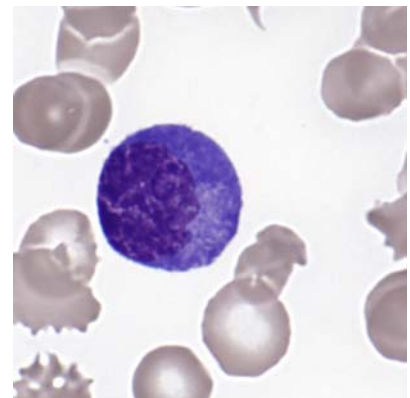
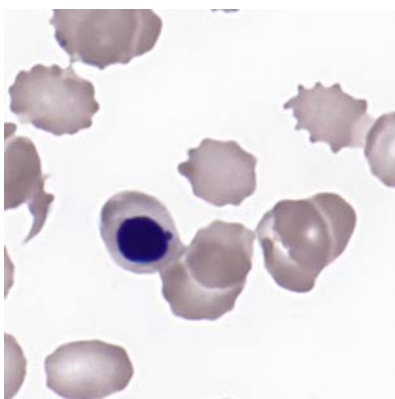
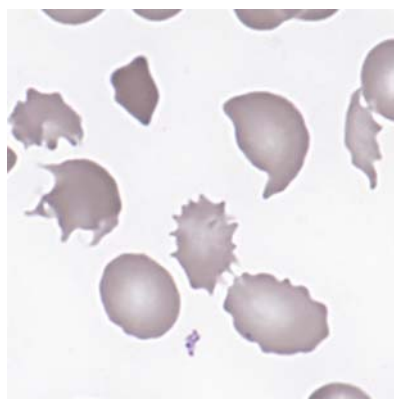
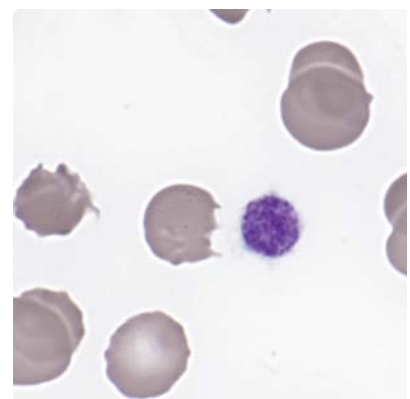
42 year old man

Analysis	Result	Unit	Reference value
Neutrophils total	Calculation	G/l	1.40-8.00
Monocytes	Not	G/l	0.16-0.95
Eosinophils	Possible	G/l	0.00-0.70
Basophils		G/l	0.00-0.15
Lymphocytes	25.5	G/l	1.50-4.00
Neutrophils total	69.0	%	40.0-74.0
Neutrophils Band	* 24.5	%	0.0-20.0
Neutrophils Segmented	44.5	%	30.0-50.0
Monocytes	5.5	%	3.4-9.0
Eosinophils	0.0	%	0.0-7.0
Basophils	0.0	%	0.0-1.5
Lymphocytes	25.5	%	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	%	0

Commentary

Anaemia; red blood count normochromic, few erythrocytes slightly hypochromic. Slight anisocytosis with few microcytes and few macrocytes. Pronounced poikilocytosis with many acanthocytes, few spherocytes, few target cells, few acanthocytes/spherocytes and 10-15 fragmentocytes per field of vision. Exudation of 2 erythroblasts per 100 leucocytes. Neutrophil granulocytes with coarsened cytoplasmic granulation, many with basophilic streaks. Few lymphocytes atypical, probably slightly reactive. Pronounced thrombocytopenia; slight anisocytosis of the platelets, many hypogranulated forms detectable.

A. Sopran

*Abb 1. Neutrophile (Seg)**Abb 2. Neutrophile (Seg)**Abb 3. Neutrophile (Rod)**Abb 4. Basophile**Abb 5. Eosinophile**Abb 6. Monocyte**Abb 7. Lymphocyte**Abb 8. Ec, Plasmodia**Abb 9. Plasmodia**Abb 10. Ec, Erythroblast**Abb 11. Platelets**Abb 12. Platelet*

1.8 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
Neutrophils Band			9	40	75*	34	19	6			
Neutrophils Segmented.			1	4	17	26	47*	63	23	2	
Eosinophils	143*	37	1	2							
Basophile	150*	33									
Monocytes	10	87	80*	5	1						
Lymphocytes		1	1	86	87*	8					
Plasmacells	182*	1									
Blasts	179*	2	1	1							
Promyelocytes	182*	1									
Myelocytes	173*	9	1								
Metamyelozyten	170*	13									
Erythrocytes Nucleated	96	87*									
Unknown	182*	1									
Smudge cells	166*	13	4								

Evaluation H3-A

	light	medium	strong		light	medium	strong
Hypersegmentation	1	2		Hypochromic Ec	44*	28	10
Pelger-Huet Anomaly	7			Polychromatic Ec	34	6	
Coarse Granulation	72*	72	20	Anisocytes	28*	77	51
Basophilic Stripling	64*	23	3	Mikrocytes	59*	33	5
Vacuoles	70	7		Makrocytes	48*	12	2
Reaktive Lymphocytes	41*	8	1	Megalocytes	3	3	1
Atypical Lymphocytes	1	1	1	Poikilocytosis	29	54*	48
Others	1			Ovalocytes	12	4	1
				Target Cells	79*	4	1
				Akanthocytes	50	61*	17
Anisocytosis	52*	16		Echinocytes	46	34	9
Megakaryocyte Nucleaus	5			Sickle Cells	7	4	
Granulation	14	3		Fragmentocytes	29	71*	54
Others	4		1	Spherocytes	57*	20	2
				Stomatocytes	5	1	1
				Basophilic Stripling	6	1	
				Howell-Jolly Bodies	45	3	
				Pappenheim Bodies	4	1	
				Others	2	1	2

The blood comes from a patient with disseminated intravascular coagulopathy (DIC) in the context of sepsis.

1.9 Qualab Codes

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

Code	Text	Number
20	Fragmentocytes	128
4	Neutrophils, Toxic Changes	100
30	Pathologic findings, refer to expert	87
16	Poikilocytosis	71
31	Pathologic findings	67
2	Neutrophils, left shift	57
21	Spherocytes	36
27	Erythrocytes, other	28
14	Hypochromic Erythrocytes	27
5	Atypical lymphocytes, probably reactive	22
12	Microcytes	16
24	Howell-Jolly bodies	13
11	Thrombocytes, others	10
19	Targetcells	9
15	Polychromatophilic Red Cells	8
13	Macrocytes	7
9	Macrothrombocytes	5
17	Elliptocytes/Ovalocytes	5
3	Pelger Hüet Anomaly	3
22	Rouleaux	3
6	Atypical lymphocytes, probably neoplastic	2
29	Normal findings	2
1	Neutrophils, hypersegmentation of nucleus	1
10	Thrombocyte aggregates	1
25	Basophilic strippling	1
26	Teardrops	1
28	Parasites	1
99	Total	157

2 Sample B

2.1 ABX Microsemi CRP



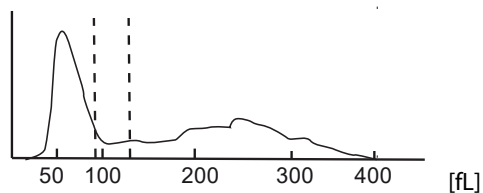
Findings MQ 2024-2 H3B

50 year old man

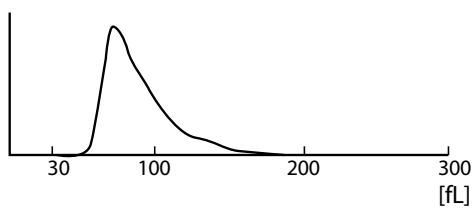
WBC :	5.6	$10^3/\mu\text{L}$	MCV :	89.1	μm^3
RBC :	5.08	$10^6/\mu\text{L}$	MCH :	29.9	pg
HGB :	15.2	g/dL	MCHC:	33.5	g/dL
HCT :	45.3	%	RDW :	12.7	%
PLT :	209	$10^3/\mu\text{L}$	MPV :	7.8	μm^3
PCT :	0.162	%	PDW :	15.3	%

DIFF:					
%LYM:	40.2	%	#LYM:	2.2	$10^3/\mu\text{L}$
%MON:	6.6	%	#MON:	0.4	$10^3/\mu\text{L}$
%GRA:	53.2	%	#GRA:	3.0	$10^3/\mu\text{L}$

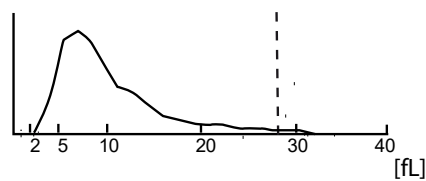
WBC



RBC



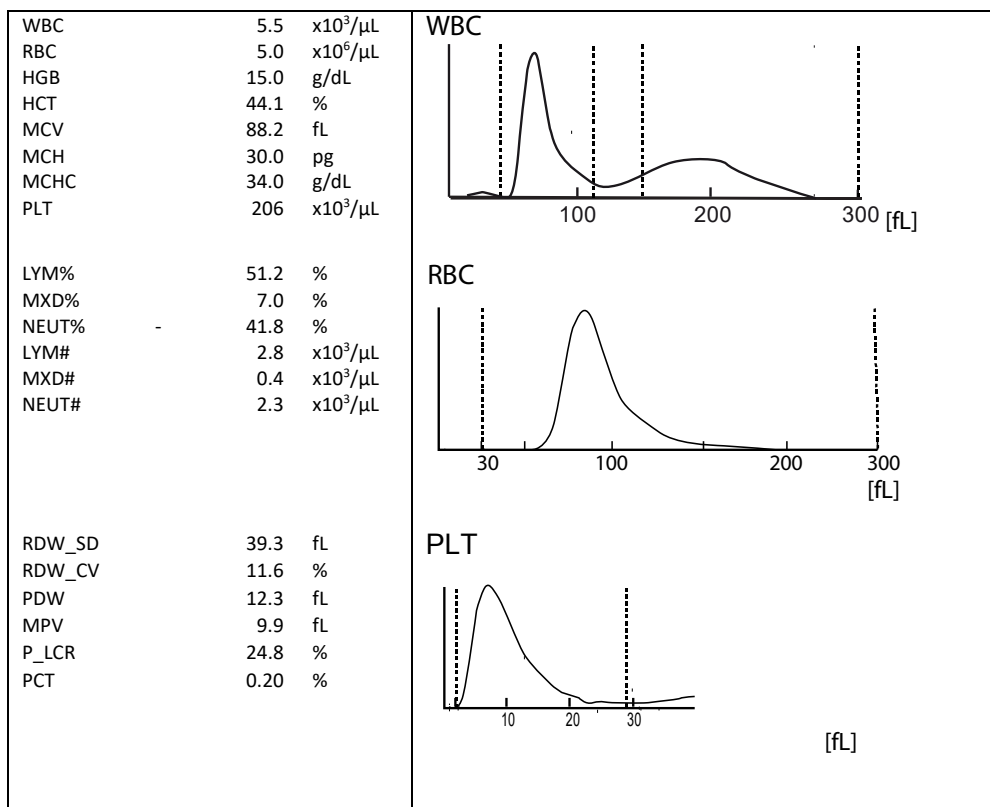
PLT



2.2 Sysmex XP300



Findings MQ 2024-2 H3B 50 year old man



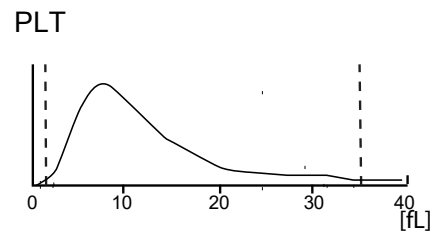
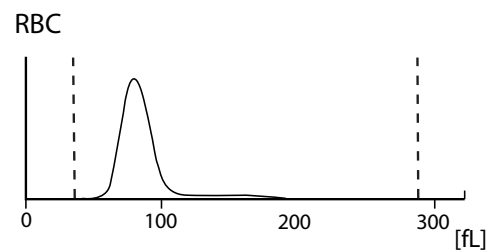
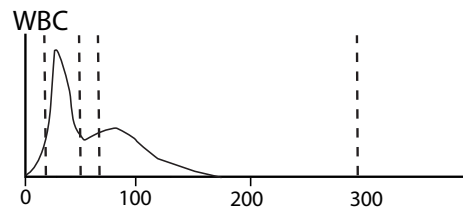
2.3 Zybio Z3 CRP



Findings MQ 2024-2 H3B

50 year old man

WBC	5.01	$10^3/\mu\text{l}$	3.50-9.50
Lym#	2.32	$10^3/\mu\text{l}$	1.10-3.20
Mid#	0.32	$10^3/\mu\text{l}$	0.10-3.20
Gran#	2.37	$10^3/\mu\text{l}$	1.80-6.30
Lym%	46.4	%	20.0-50.0
Mid%	6.3	%	3.0-15.0
Gran%	47.3	%	40.0-75.0
RBC	4.86	$10^6/\mu\text{l}$	3.80-5.80
HGB	15.8	g/dl	11.5-17.5
HCT	42.8	%	35.0-50.0
MCV	88.1	fL	82.0-100.0
MCH	32.5	pg	27.0-34.0
MCHC	36.9	↑ g/dl	31.6-35.4
RDW-CV	12.5	%	11.5-16.0
RDW-SD	37.3	fL	35.0-56.0
PLT	206	$10^3/\mu\text{l}$	125-350
MPV	10.1	fL	6.5-12.0
PDW	16.1	fL	9.0-17.0
PCT	0.208	%	0.108-0.282
P-LCC	52	$10^3/\mu\text{l}$	30-90
P-LCR	25.3	%	11.0-45.0

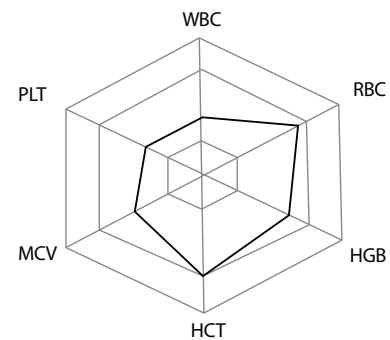
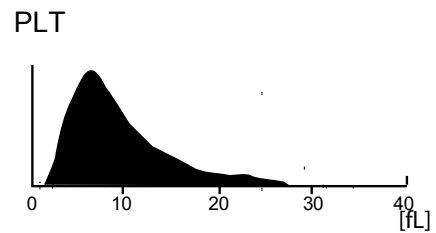
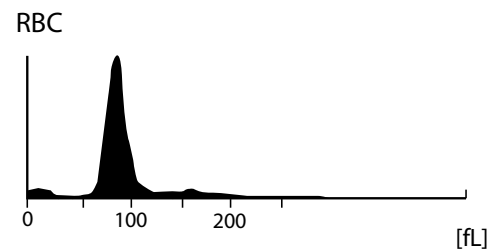
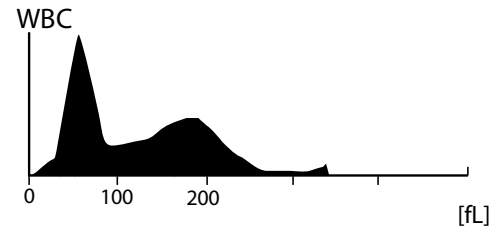


2.4 Celltac

Findings MQ 2024-2 H3B

50 year old man

WBC	5.28		$10^3/\mu\text{l}$
RBC	2.18	*	$10^6/\mu\text{l}$
HGB	7.32	L	g/dL
HCT	21.8	L	%
MCV	100.0		fL
MCH	33.6		Pg
MCHC	33.6		g/dL
PLT	70.1	*	$10^3/\mu\text{l}$
LY	1.08	L	[20.40 %]
MO	0.17		[3.12L %]
GR	4.03		[76.48H %]
RDW-CV	23.2	H	%
RDW-SD	92.8	H	fL
PCT	0.07	L	%
MPV	9.5		fL
PDW	19.5	H	%
P-LCR	50.6		%



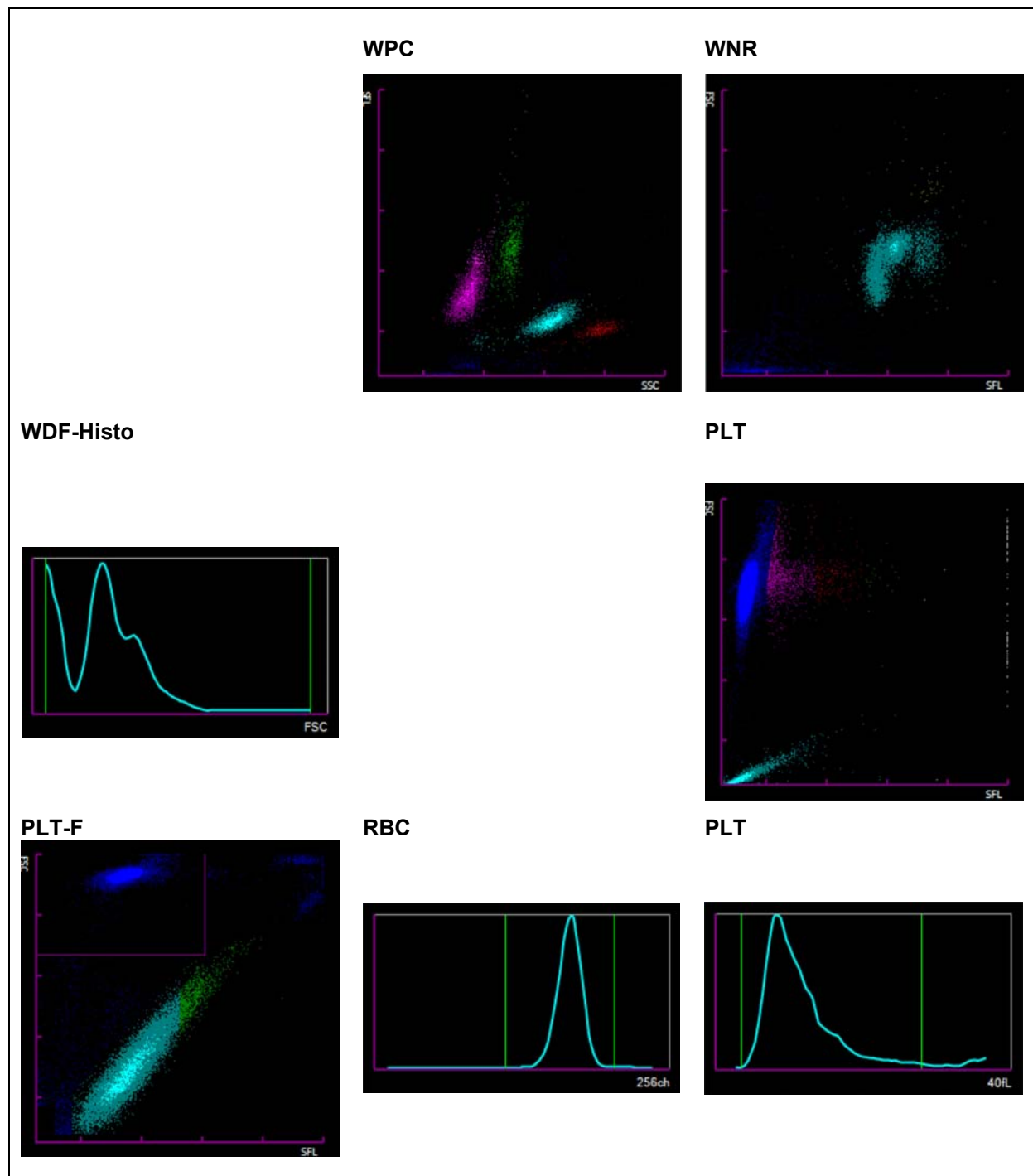
2.5 Sysmex XN-20



Findings MQ 2024-2 H3B 50 year old man

Analysis	Result	Unit	Reference value	
Blood Count				
Hemoglobin	152	g/l	117-153	
Hematocrit	0.428	l/l	0.35-0.46	
Erythrocytes	5.03	T/l	3.9-5.2	
MCV	85.1	fl	80-100	
MCH	30.2	pg	26-34	
MCHC	355	g/l	310-360	
Thrombocytes	225	G/l	143-400	
Leucocytes	5.52	G/l	3.0-9.6	
Leucocyte Differentiation				
Neutrophils	2.21	G/l	1.40-8.00	
Monocytes	0.57	G/l	0.16-0.95	
Eosinophils	0.36	G/l	0.00-0.70	
Basophils	0.04	G/l	0.00-0.15	
Lymphocytes	2.30	G/l	1.50-4.00	
IG abs.	*	0.04	G/l	0.00-0.03
IG %	*	0.7	%	0.0-0.5
NRBC abs.		0.02	G/l	
NRBC		0.4	/100 Lc	

Findings HAD MQ 2024-2 H3B

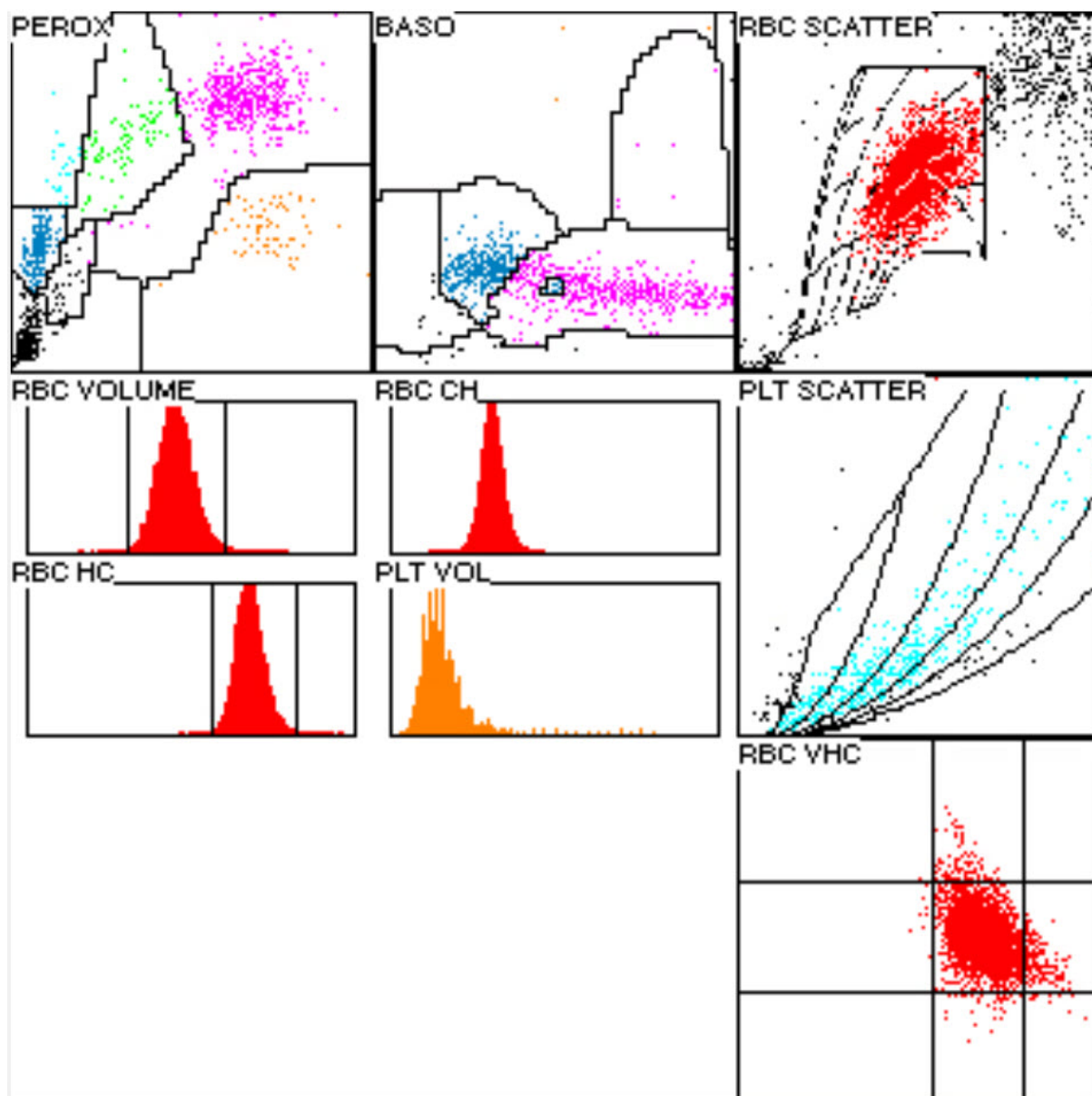


2.6 ADVIA 2120



Findings MQ 2024-2 H3B 50 year old man

Analysis	Result	Unit	Reference value
Blood Count			
Hemoglobin	154	g/l	117-153
Hematocrit	0.461	l/l	0.35-0.46
Erythrocytes	5.09	T/l	3.9-5.2
MCV	90.5	fl	80-100
MCH	30.2	pg	26-34
MCHC	334	g/l	310-360
Mikrocytes	0.3	%	0-2.0
Makrocytes	0.9	%	0-2.0
Hypochromic Ec	0.2	%	0-2.0
Hyerchromic Ec	0.6	%	0-2.0
RDW	12.7	%	11.0-0-14.8
Thrombocytes	205	G/l	143-400
Leukocytes	5.15	G/l	3.0-9.6
Leucocytes Differentiation			
Neutrophils	2.20	G/l	1.40-8.00
Monocytes	0.43	G/l	0.16-0.95
Eosinophils	0.32	G/l	0.00-0.70
Basophils	0.02	G/l	0.00-0.15
Lymphocytes	2.05	G/l	1.50-4.00
LUC	0.13	%	0.0-4.0



2.7 Differential Blood Smear

Findings HAD MQ 2024-2 H3B

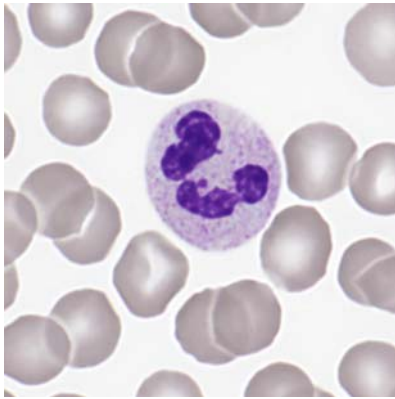
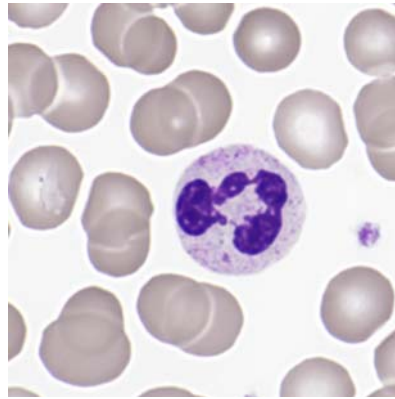
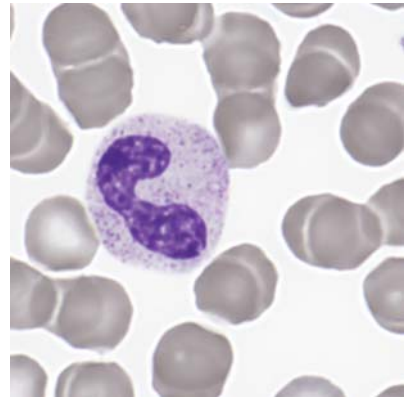
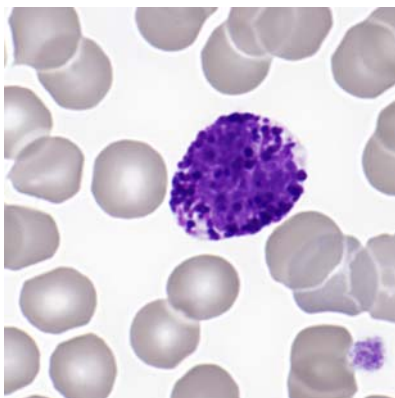
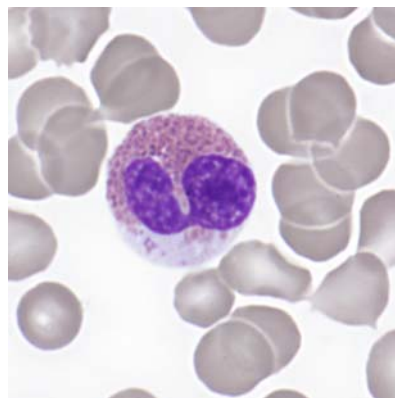
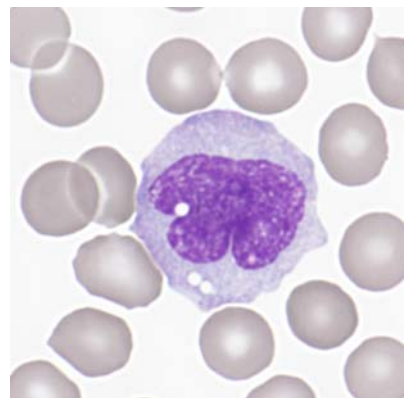
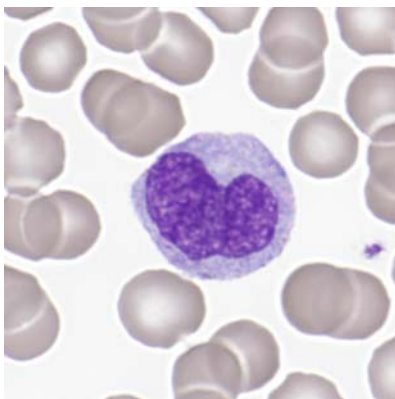
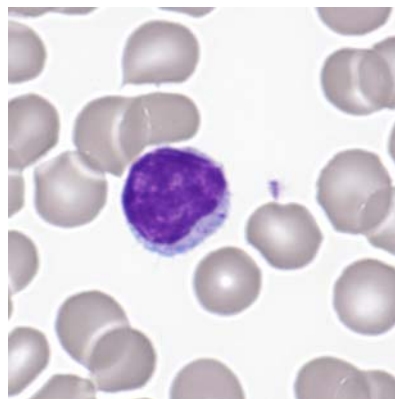
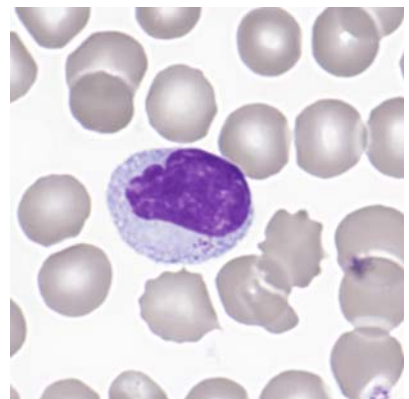
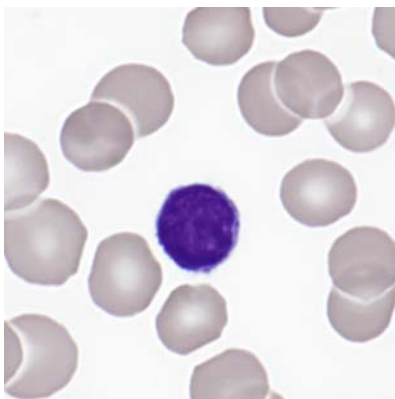
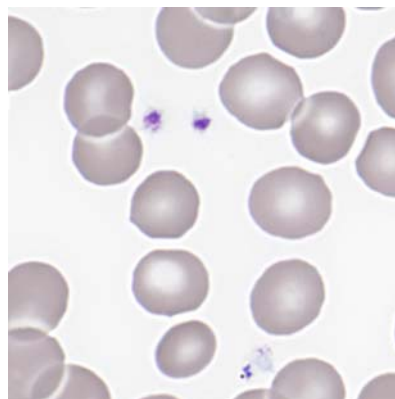
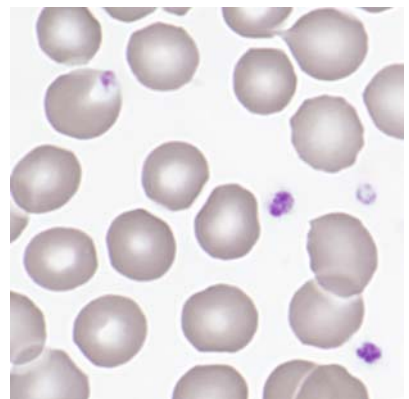
50 year old man

Analysis	Result	Unit	Reference value
Leucocytes Differentiation			
Neutrophils total	2.09	G/l	1.40-8.00
Monocytes	0.62	G/l	0.16-0.95
Eosinophils	0.23	G/l	0.00-0.70
Basophils	0.03	G/l	0.00-0.15
Lymphocytes	2.19	G/l	1.50-4.00
Erythroblasts	0.0	/100 Lc	
Neutrophils total	40.5	%	40.0-74.0
Neutrophils Band	5.0	%	0.0-20.0
Neutrophils Segmented	35.5	%	30.0-50.0
Monocytes	* 12.0	%	3.4-9.0
Eosinophils	4.5	%	0.0-7.0
Basophils	0.5	%	0.0-1.5
Lymphocytes	42.5	%	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

Red blood count normochromic, normocytic. Neutrophil granulocytes with fine cytoplasmic granulation. Lymphocytes atypical, probably slightly reactive. Approx. 15% of the lymphocytes with nuclear notching. Slight anisocytosis of the thrombocytes.

A. Sopran

*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*

2.8 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>	6	70	74*	29	3						
<i>Neutrophils Segmented.</i>			1	3	29	127*	22				
<i>Eosinophils</i>	2	52	126*	2							
<i>Basophile</i>	91*	91									
<i>Monocytes</i>	1	27	122*	31			1				
<i>Lymphocytes</i>	1				1	16	122*	40	1	1	
<i>Plasmacells</i>	180*	2									
<i>Blasts</i>	181*	1									
<i>Promyelocytes</i>	180*	2									
<i>Myelocytes</i>	179*	3									
<i>Metamyelozyten</i>	179*	3									
<i>Erythrocytes Nucleated</i>	181*	1									
<i>Unknown</i>	180*	2									
<i>Smudge cells</i>	168*	11	2	1							

Evaluation H3-B

	light	medium	strong		light	medium	strong
<i>Hypersegmentation</i>	2			<i>Hypochromic Ec</i>	2	2	
<i>Pelger-Hüet Anomaly</i>	1			<i>Polychromatic Ec</i>	6		
<i>Coarse Granulation</i>	11	1		<i>Anisocytes</i>	76	11	
<i>Basophilic Stripling</i>	1			<i>Mikrocytes</i>	38	3	
<i>Vacuoles</i>	5	2		<i>Makrocytes</i>	8	2	
<i>Atypical Lymph, reactive</i>	49*	12		<i>Megalocytes</i>		1	
<i>Atypical Lymph, neoplastic</i>	5	3	1	<i>Poikilocytosis</i>	37	3	
<i>Others</i>	4			<i>Ovalocytes</i>	30	1	
				<i>Target Cells</i>			
				<i>Akanthocytes</i>	17	1	
<i>Anisocytosis</i>	64*	12	1	<i>Echinocytes</i>	15	2	
<i>Megakaryocyte Nucleaus</i>	1	1		<i>Sickle Cells</i>	1		
<i>Granulation</i>	8	2	1	<i>Fragmentocytes</i>	3		
<i>Others</i>	3			<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 came from a healthy person. Some lymphocytes were reactively altered, which is why we assessed the "pathological" indication as correct.

2.9 Qualab Codes

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

Code	Text	Number
29	Normal findings	104
5	Atypical lymphocytes, probably reactive	53
30	Pathologic findings, refer to expert	45
31	Pathologic findings	22
8	Leucocytes other:	13
9	Macrothrombocytes	10
11	Thrombocytes, others	10
12	Microcytes	10
16	Poikilocytosis	10
13	Macrocytes	8
18	Stomatocytes	7
22	Rouleaux	7
6	Atypical lymphocytes, probably neoplastic	6
15	Polychromatophilic Red Cells	5
17	Elliptocytes/Ovalocytes	4
21	Spherocytes	4
27	Erythrocytes, other	4
10	Thrombocyte aggregates	3
26	Teardrops	3
3	Pelger Hüet Anomaly	2
4	Neutrophils, Toxic Changes	2
14	Hypochromic Erythrocytes	2
24	Howell-Jolly bodies	2
20	Fragmentocytes	1
99	Total	155