



# Understanding your Blood Tests

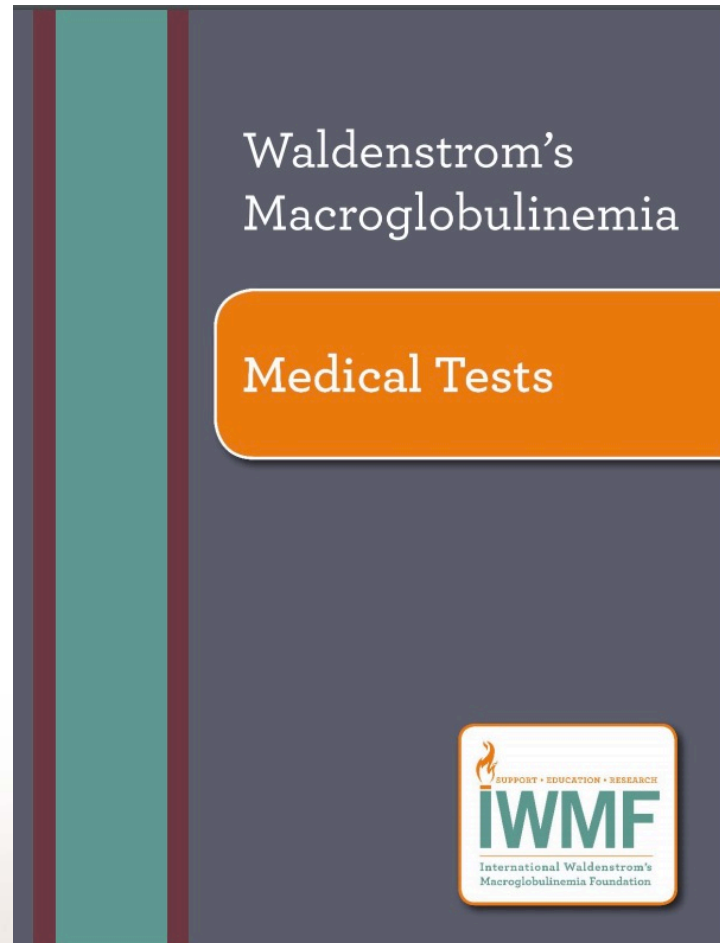
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# An Important Resource for Understanding Blood Tests in WM

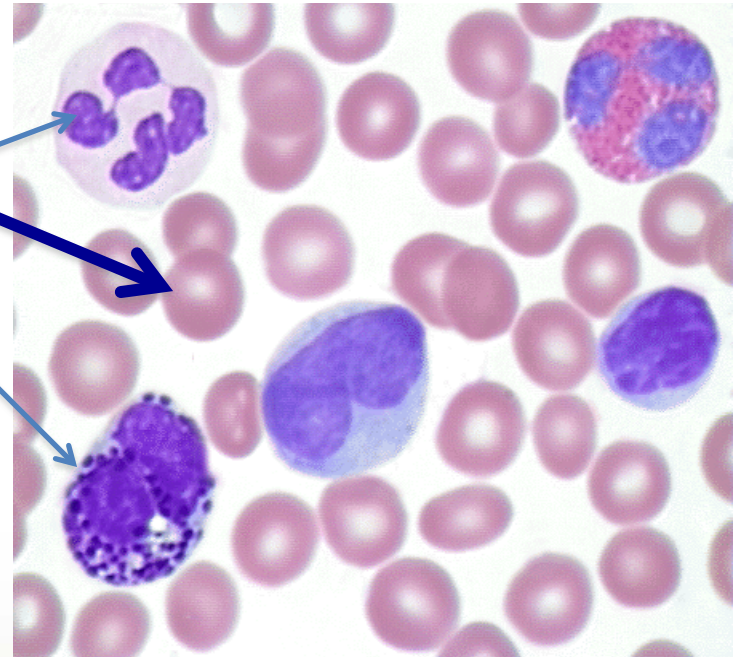


# How do we use blood tests in WM patients?

- ◆ To make a diagnosis- WM often suspected when there is anemia (low red blood cell count) or a very high level of protein in the body (elevated total protein)
- ◆ To follow the results of any treatment
- ◆ To monitor for unusual complications
- ◆ To explore complications of WM such as neuropathy, cold agglutinin disease and the like

# Complete blood count (CBC)

- ◆ Blood is made up of 3 kinds of cells suspended in a solution called plasma
- ◆ Red cells- carry oxygen
- ◆ White cells- fight infection
- ◆ Platelets- clot the blood
- ◆ Some special red cell tests help:
  - MCV (size of the cell)
  - Retic count (production rate of red cells)



# A CBC result

## Ordered Items

CBC/Diff Ambiguous Default; Comp. Metabolic Panel (14); Protein Electro.,S; Immunoglobulins A/G/M, Qn, Ser; Ambig Abbrev CMP14 Default; Venipuncture

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	LAB
<b>CBC/Diff Ambiguous Default</b>					
<b>WBC</b>	<b>2.3</b>	<b>Alert</b>	x10E3/uL	3.4 - 10.8	01
RBC	3.67	Low	x10E6/uL	3.77 - 5.28	01
Hemoglobin	10.8	Low	g/dL	11.1 - 15.9	01
Hematocrit	33.0	Low	%	34.0 - 46.6	01
MCV	90		fL	79 - 97	01
MCH	29.4		pg	26.6 - 33.0	01
MCHC	32.7		g/dL	31.5 - 35.7	01
RDW	18.4	High	%	12.3 - 15.4	01
Platelets	172		x10E3/uL	150 - 379	01
Neutrophils	54		%		01
Lymphs	32		%		01
Monocytes	12		%		01
Eos	2		%		01
Basos	0		%		01
<b>Neutrophils (Absolute)</b>	<b>1.2</b>	<b>Low</b>	x10E3/uL	1.4 - 7.0	01
Lymphs (Absolute)	0.7		x10E3/uL	0.7 - 3.1	01
Monocytes (Absolute)	0.3		x10E3/uL	0.1 - 0.9	01
Eos (Absolute)	0.1		x10E3/uL	0.0 - 0.4	01
Baso (Absolute)	0.0		x10E3/uL	0.0 - 0.2	01
Immature Granulocytes	0		%		01
Immature Grans (Abs)	0.0		x10E3/uL	0.0 - 0.1	01

These measure red blood cells

“ANC”

→ Neutrophils (Absolute)

# Chemistry profile

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- ◆ Many bits of information available
- ◆ Kidney function (creatinine)
- ◆ Calcium level
- ◆ Liver blood tests
- ◆ Measurement of electrolytes such as potassium
  
- ◆ The basic chemistry test provides general information about WM
  - ◆ For more information, more specific tests must be ordered

# A real chemistry result

## Ordered Items

CMP14+3AC+Mg; CBC With Differential/Platelet; Protein Electro.,S; Immunofixation, Serum; Free K+L Lt Chains,Qn,S; Venipuncture

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	LAB
<b>CMP14+3AC+Mg</b>					
Glucose, Serum	95		mg/dL	65 - 99	01
BUN	17		mg/dL	8 - 27	01
<b>Creatinine, Serum</b>	<b>1.01</b>	<b>High</b>	mg/dL	0.57 - 1.00	01
eGFR If NonAfrican Am	60		mL/min/1.73	>59	
eGFR If African Am	69		mL/min/1.73	>59	
BUN/Creatinine Ratio	17			12 - 28	
Sodium, Serum	135		mmol/L	134 - 144	01
Potassium, Serum	4.4		mmol/L	3.5 - 5.2	01
Chloride, Serum	96		mmol/L	96 - 106	01
Carbon Dioxide, Total	21		mmol/L	18 - 28	01
Calcium, Serum	9.8		mg/dL	8.7 - 10.3	01
Phosphorus, Serum	2.7		mg/dL	2.5 - 4.5	01
Magnesium, Serum	1.8		mg/dL	1.6 - 2.3	01
<b>Protein, Total, Serum</b>	<b>9.0</b>	<b>High</b>	g/dL	6.0 - 8.5	01
Albumin, Serum	4.2		g/dL	3.6 - 4.8	01
<b>Globulin, Total</b>	<b>4.8</b>	<b>High</b>	g/dL	1.5 - 4.5	
<b>A/G Ratio</b>	<b>0.9</b>	<b>Low</b>		1.2 - 2.2	
Bilirubin, Total	0.6		mg/dL	0.0 - 1.2	01
Alkaline Phosphatase, S	46		IU/L	39 - 117	01
LDH	171		IU/L	119 - 226	01
AST (SGOT)	22		IU/L	0 - 40	01
ALT (SGPT)	7		IU/L	0 - 32	01
GGT	11		IU/L	0 - 60	01

IgM level is included in the total protein result



# Tests important for WM

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- ◆ Measurement of the IgM protein
  - IgM level
  - M spike
- ◆ Serum viscosity (how thick the blood is)
  - Have to order specifically
  - Higher level = thicker
  - Even if the test says the blood is too viscous, there may be NO symptoms!



# WM labs- to track the disease

## Ordered Items

Protein Electro.,S; Immunoglobulins A/G/M, Qn, Ser; Ca+PTH Intact; Free K+L Lt Chains,Qn,S; Viscosity, Serum; Vitamin D, 25-Hydroxy

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	LAB
<b>Protein Electro.,S</b>					
Protein, Total	9.0	High	g/dL	6.0 - 8.5	01
Albumin	4.2		g/dL	2.9 - 4.4	02
Alpha-1-Globulin	0.3		g/dL	0.0 - 0.4	02
Alpha-2-Globulin	0.9		g/dL	0.4 - 1.0	02
Beta Globulin	1.2		g/dL	0.7 - 1.3	02
Gamma Globulin	2.4	High	g/dL	0.4 - 1.8	02
M-Spike	1.8	High	g/dL	Not Observed	02
Globulin, Total	4.8	High	g/dL	2.2 - 3.9	
A/G Ratio	0.9			0.7 - 1.7	
Please note: Protein electrophoresis scan will follow via computer, mail, or courier delivery.					02
PDF	.				02
<b>Immunoglobulins A/G/M, Qn, Ser</b>					
Immunoglobulin G, Qn, Serum	666	Low	mg/dL	700 - 1600	01
Immunoglobulin A, Qn, Serum	8	Low	mg/dL	90 - 386	01
Result confirmed on concentration.					
Immunoglobulin M, Qn, Serum	2849	High	mg/dL	20 - 172	01
Results confirmed on dilution.					

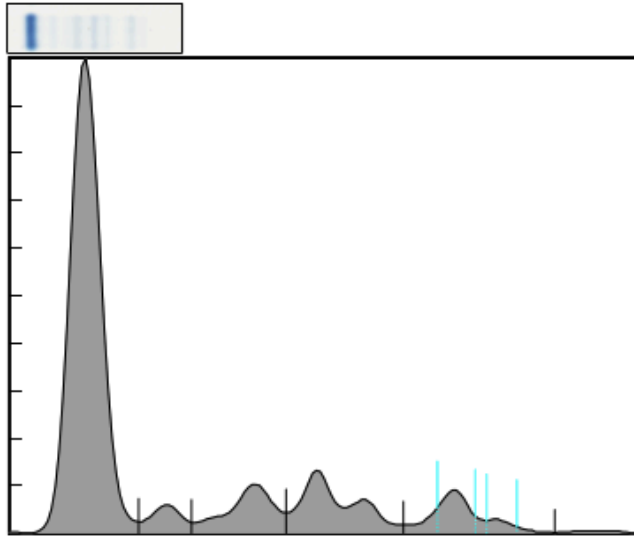
# A real ( pretty normal) SPEP

SPE 1192 Gel T81667 Sample 13 05/06/2018 17:26:18:12



12488122770

QS #751328102



Fraction	%	g/dl	g/dl Range	
Albumin	65.1	3.6	2.9 to	4.4
Alpha 1	3.8	0.2	0.0 to	0.4
Alpha 2	9.5	0.5	0.4 to	1.0
Beta	13.2	0.7	0.7 to	1.3
Gamma	8.4	0.5	0.4 to	1.8
Total Protein		5.5-	6.0 to	8.5
M-Spike		%	g/dl	
Gamma (1)	4.4	0.2		
Gamma (2)	1.1	0.1		



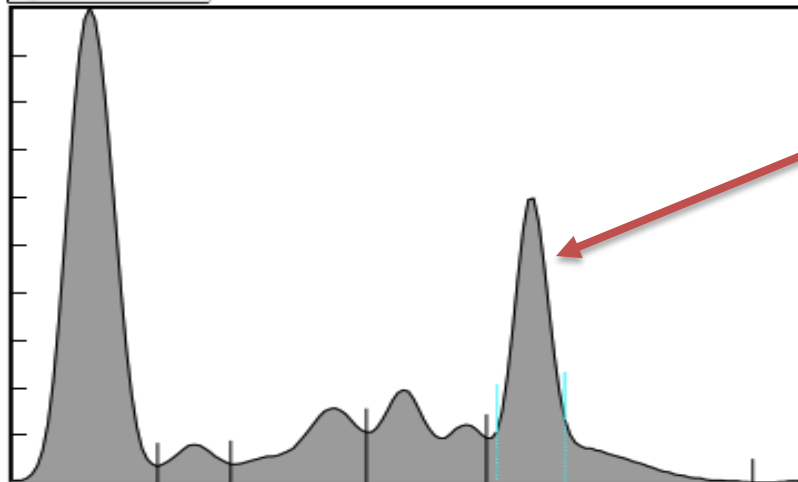
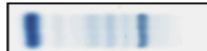
# SPEP- abnormal with M spike

SPE 1192 Gel T81618 Sample 80 04/30/2018 10:40:53:79



11788132140

QS #751328102



This is the M spike

Fraction	%	g/dl	g/dl Range	
Albumin	46.2	4.2	2.9 to	4.4
Alpha 1	3.6	0.3	0.0 to	0.4
Alpha 2	10.5	0.9	0.4 to	1.0
Beta	13.0	1.2	0.7 to	1.3
Gamma	26.8	2.4+	0.4 to	1.8
Total Protein		9.0+	6.0 to	8.5
M-Spike		%	g/dl	
Gamma	20.3	1.8		



# Other important tests

- ◆ Cryoglobulins
- ◆ Cold agglutinins
- ◆ some tests to look for a rare complication known as amyloid
- ◆ Special tests if there is too much bleeding (rare- a hemophiliac like condition known as von Willebrand's)
- ◆ Neuropathy tests- anti MAG or GM1