



Advanced Testing in Metabolic Medicine

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PATIENT: Nebout, David

DOB: 3/10/1968

GENDER: M

LAB ID: 1511100084

DOCTOR: Gabe Allende

COLLECTED: 11/9/2015 08:20

RECEIVED: 11/10/2015 10:00

REPORTED: 11/19/2015 08:24

FASTING: Yes

DUPLICATE

CRP-hs

Ref. Range/Males 11/9/2015
08:20

CRP-Hs <=3.0 mg/L 1.2

Adrenals

Cortisol AM

Ref. Range/Males 11/9/2015
08:20

Cortisol AM 5.0-25.0 ug/dL 11.5

DHEA-S

Ref. Range/Males 11/9/2015
08:20

DHEA-S 80-560 ug/dL 153

Pregnenolone, MS

Ref. Range/Males 11/9/2015
08:20

Pregnenolone, <151 ng/dL <10
MS***

Blood Chemistry

Comprehensive Metabolic Panel

Ref. Range/Males 11/9/2015
08:20

Glucose 70-105 mg/dL L 64

Urea Nitrogen 7-25 mg/dL H 28

Creatinine 0.70-1.30 mg/dL 1.21

eGFR >=60 mL/min/1.73m2 64
Non-African

American
eGFR African >=60 mL/min/1.73m2 78
American

BUN/Creatinine Ratio 23
Ratio

Sodium 136-145 mEq/L L 135

Potassium 3.5-5.1 mEq/L H 5.6

Chloride 98-107 mEq/L 99

Carbon Dioxide 21-31 mEq/L 27

Blood Chemistry

Comprehensive Metabolic Panel (cont'd)

	Ref. Range/Males	11/9/2015 08:20
Calcium	8.6-10.3 mg/dL	9.9
Protein, Total	6.0-8.3 g/dL	7.5
Albumin	3.5-5.7 g/dL	4.8
Globulin	2.3-3.5 g/dL	2.7
Albumin/Globulin Ratio	1.7-2.2 Ratio	1.8
Bilirubin, Total	0.3-1.0 mg/dL	H 1.4
Alkaline Phosphatase	34-104 U/L	42
AST (SGOT)	13-39 U/L	H 50
ALT (SGPT)	7-52 U/L	H 93

Uric Acid

	Ref. Range/Males	11/9/2015 08:20
Uric Acid	4.4-7.6 mg/dL	L 4.3

Iron

	Ref. Range/Males	11/9/2015 08:20
Iron	50-212 ug/dL	H 287

Bone

Vitamin D

	Ref. Range/Males	11/9/2015 08:20
Vitamin D	ng/mL	42.7
11/10/15	15:48	Vitamin D Status Range: Deficiency < 20 ng/mL Insufficiency 20 - 30 ng/mL Sufficiency 30 - 100 ng/mL Toxicity > 100 ng/mL

Cardiovascular

Homocysteine

	Ref. Range/Males	11/9/2015 08:20
Homocysteine	3.7-13.9 umol/L	H 17.9

Lipoprotein (a)

Ref. Range/Males 11/9/2015
 08:20

Lipoprotein (a) 4.0-27.4 mg/dL L 3.7

Growth Hormones

IGF-1

Ref. Range/Males 11/9/2015
 08:20

IGF-1 94.0-252.0 ng/mL H 266.0

Health Screen

Hemoglobin A1C

Ref. Range/Males 11/9/2015
 08:20

Hemoglobin A1c 4.0-6.2 % Hgb A1c 5.1

Insulin

Ref. Range/Males 11/9/2015
 08:20

Insulin 0.0-29.1 uIU/mL 7.9

Ferritin

Ref. Range/Males 11/9/2015
 08:20

Ferritin 28-365 ng/mL 299

Folate

Ref. Range/Males 11/9/2015
 08:20

Folate >5.38 ng/mL 19.40

11/10/15

15:49

Folate Reference

Deficient 0.35 - 3.37

Indeterminate 3.38 - 5.38

Normal > 5.38

Hematology

CBC with Auto Diff

Ref. Range/Males 11/9/2015
 08:20

White Blood Cell Count 4.23-9.07 Thousand/uL 7.84

Red Blood Cell Count 4.63-6.08 Million/uL 5.65

Hemoglobin 13.7-17.5 g/dL H 18.6

Hematology

CBC with Auto Diff (cont'd)

	Ref. Range/Males	11/9/2015 08:20
Hematocrit	40.1-51.0 %	H 55.6
MCV	79.0-92.2 fL	H 98.4
MCH	25.7-32.2 pg	H 32.9
MCHC	32.3-36.5 g/dL	33.5
RDW	11.6-14.4 %	H 14.5
Platelet Count	163-337 Thousand/uL	186
Absolute Neutrophils	1.78-5.38 Thousand/uL	4.51
Absolute Lymphocytes	1.32-3.57 Thousand/uL	2.24
Absolute Monocytes	0.30-0.82 Thousand/uL	0.63
Absolute Eosinophils	0.04-0.54 Thousand/uL	0.38
Absolute Basophils	0.01-0.08 Thousand/uL	0.08
Neutrophils	34.0-67.9 %	57.6
Lymphocytes	21.8-53.1 %	28.6
Monocytes	5.3-12.2 %	8.0
Eosinophils	0.8-7.0 %	4.8
Basophils	0.2-1.2 %	1.0

Hormones

Estrone

	Ref. Range/Males	11/9/2015 08:20
Estrone	42.28-127.15 pg/mL	L 39.67

Estradiol

	Ref. Range/Males	11/9/2015 08:20
Enhanced Estradiol	<39.8 pg/mL	H 56.9

Progesterone

	Ref. Range/Males	11/9/2015 08:20
Progesterone	0.27-0.90 ng/mL	L <0.20

Total Testosterone

	Ref. Range/Males	11/9/2015 08:20
Total Testosterone	160-726 ng/dL	H 898

Free Testosterone

	Ref. Range/Males	11/9/2015 08:20
Free Testosterone	5.0-30.0 pg/mL	8.3

SHBG

	Ref. Range/Males	11/9/2015 08:20
Sex Hormone Binding Globulin (SHBG)	10-57 nmol/L	33

Dihydrotestosterone

	Ref. Range/Males	11/9/2015 08:20
Dihydrotestosterone	250-990 pg/mL	932

FSH

	Ref. Range/Males	11/9/2015 08:20
FSH	0.7-11.1 mIU/mL	L 0.2

LH

	Ref. Range/Males	11/9/2015 08:20
LH	0.8-7.6 mIU/mL	L <0.1

Lipids

Lipid Panel

	Ref. Range/Males	11/9/2015 08:20
Cholesterol, Total	<200 mg/dL	168
HDL Cholesterol	23-92 mg/dL	35
Triglycerides	<150 mg/dL	91
LDL Cholesterol, Direct	75-193 mg/dL	126
CHOL/HDL Ratio	<5.0 Ratio	4.8
Non HDL Cholesterol	mg/dL	133

Thyroid

TSH

	Ref. Range/Males	11/9/2015 08:20
TSH 3rd Generation	0.40-4.00 uIU/mL	1.66

Free T3

	Ref. Range/Males	11/9/2015 08:20
Free T3	1.8-4.2 pg/mL	4.0

Free T4

	Ref. Range/Males	11/9/2015 08:20
Free T4	0.89-1.76 ng/dL	1.29

Total T3

	Ref. Range/Males	11/9/2015 08:20
Total T3	84-172 ng/dL	118

Total T4

	Ref. Range/Males	11/9/2015 08:20
Total T4	4.5-12.5 ug/dL	5.8

Anti-Thyroglobulin Antibody

	Ref. Range/Males	11/9/2015 08:20
Anti-Thyroglobulin Antibody	0-40 IU/mL	<20

Anti-Thyroid Peroxidase Antibody

	Ref. Range/Males	11/9/2015 08:20
Anti-Thyroid Peroxidase Antibody	<35 IU/mL	10

Reverse T3, Serum

	Ref. Range/Males	11/9/2015 08:20
Reverse T3, Serum***	9.2-24.1 ng/dL	14.5

Tumor Markers

Total PSA

DUPLICATE

Tumor Markers

Total PSA (cont'd)

	Ref. Range/Males	11/9/2015 08:20
Total PSA	<=4.0 ng/mL	0.5

Free PSA

	Ref. Range/Males	11/9/2015 08:20
Free PSA	<0.70 ng/mL	0.19
% Free PSA	>25 % (calc)	38

11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for Iron.
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for Lipoprotein (a).
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for Uric Acid.
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for Hemoglobin A1c.
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for the Lipid Panel.
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for the Comprehensive Metabolic Panel.
11/10/15	15:07	PLEASE NOTE: Reference ranges have been changed for the Complete Blood Count and Differential.

The above results are for informational purposes only and are not to be construed as medical advice.


Please consult your healthcare practitioner for diagnosis and treatment.

Performance characteristics were determined by AML Diagnostics, Inc. for certain tests. Please refer to WWW.AMLDX.COM for the complete list.




* Test performed at Quest Diagnostics-Miami, 10200 Commerce Parkway, Miramar, FL 33025-3938

** Test performed at Clinical Pathology Laboratories Southeast Inc., 9200 Wall Street, Austin, TX 78754



















DUPLICATE

CRP-Hs	1.2		<=3.0	mg/L	N/A	
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Adrenals

TEST	RESULT	HIGH/LOW	RANGE	UNITS		
Cortisol AM	11.5		5.0-25.0	ug/dL	N/A	
DHEA-S	153		80-560	ug/dL	N/A	
Pregnenolone, MS***	<10		<151	ng/dL	N/A	

Blood Chemistry

TEST	RESULT	HIGH/LOW	RANGE	UNITS		
Glucose	64	L	70-105	mg/dL	N/A	
Urea Nitrogen	28	H	7-25	mg/dL	N/A	
Creatinine	1.21		0.70-1.30	mg/dL	N/A	
eGFR Non-African American	64		>=60	mL/min/1.73m2	N/A	
eGFR African American	78		>=60	mL/min/1.73m2	N/A	
BUN/Creatinine Ratio	23			Ratio	N/A	
Sodium	135	L	136-145	mEq/L	N/A	
Potassium	5.6	H	3.5-5.1	mEq/L	N/A	
Chloride	99		98-107	mEq/L	N/A	
Carbon Dioxide	27		21-31	mEq/L	N/A	
Calcium	9.9		8.6-10.3	mg/dL	N/A	
Protein, Total	7.5		6.0-8.3	g/dL	N/A	
Albumin	4.8		3.5-5.7	g/dL	N/A	
Globulin	2.7		2.3-3.5	g/dL	N/A	
Albumin/Globulin Ratio	1.8		1.7-2.2	Ratio	N/A	
Bilirubin, Total	1.4	H	0.3-1.0	mg/dL	N/A	
Alkaline Phosphatase	42		34-104	U/L	N/A	
AST (SGOT)	50	H	13-39	U/L	N/A	
ALT (SGPT)	93	H	7-52	U/L	N/A	
Uric Acid	4.3	L	4.4-7.6	mg/dL	N/A	
Iron	287	H	50-212	ug/dL	N/A	

DUPLICATE

Bone

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Vitamin D	42.7			ng/mL	N/A

Reference Range Details

Vitamin D Status Range:
 Deficiency < 20 ng/mL
 Insufficiency 20 - 30 ng/mL
 Sufficiency 30 - 100 ng/mL
 Toxicity > 100 ng/mL

Cardiovascular

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Homocysteine	17.9	H	3.7-13.9	umol/L	N/A
Lipoprotein (a)	3.7	L	4.0-27.4	mg/dL	N/A



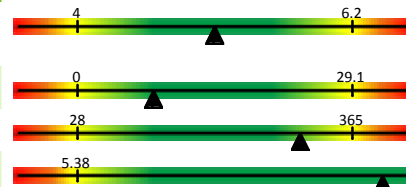
Growth Hormones

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
IGF-1	266.0	H	94.0-252.0	ng/mL	N/A



Health Screen

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Hemoglobin A1c %	5.1		4.0-6.2	% Hgb A1c	N/A
Insulin	7.9		0.0-29.1	uIU/mL	N/A
Ferritin	299		28-365	ng/mL	N/A
Folate	19.40		>5.38	ng/mL	N/A

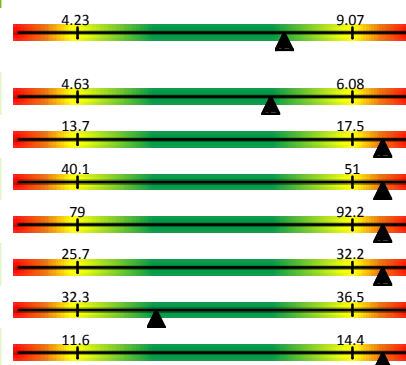


Reference Range Details

Folate Reference
 Deficient 0.35 - 3.37
 Indeterminate 3.38 - 5.38
 Normal > 5.38

Hematology

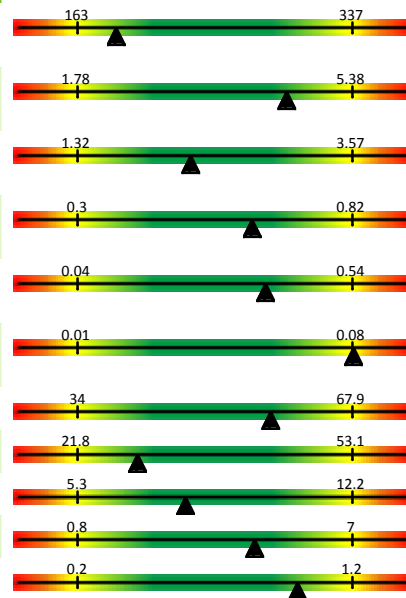
TEST	RESULT	HIGH/LOW	RANGE	UNITS	
White Blood Cell Count	7.84		4.23-9.07	Thousand/uL	N/A
Red Blood Cell Count	5.65		4.63-6.08	Million/uL	N/A
Hemoglobin	18.6	H	13.7-17.5	g/dL	N/A
Hematocrit	55.6	H	40.1-51.0	%	N/A
MCV	98.4	H	79.0-92.2	fL	N/A
MCH	32.9	H	25.7-32.2	pg	N/A
MCHC	33.5		32.3-36.5	g/dL	N/A
RDW	14.5	H	11.6-14.4	%	N/A



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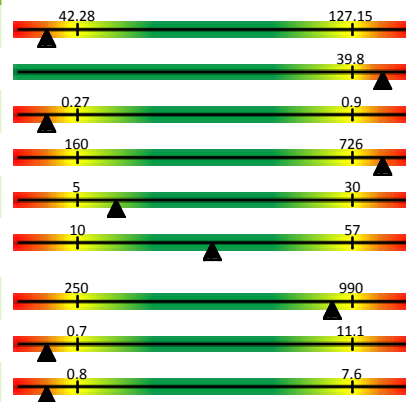
Hematology

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Platelet Count	186		163-337	Thousand/uL	N/A
Absolute Neutrophils	4.51		1.78-5.38	Thousand/uL	N/A
Absolute Lymphocytes	2.24		1.32-3.57	Thousand/uL	N/A
Absolute Monocytes	0.63		0.30-0.82	Thousand/uL	N/A
Absolute Eosinophils	0.38		0.04-0.54	Thousand/uL	N/A
Absolute Basophils	0.08		0.01-0.08	Thousand/uL	N/A
Neutrophils	57.6		34.0-67.9	%	N/A
Lymphocytes	28.6		21.8-53.1	%	N/A
Monocytes	8.0		5.3-12.2	%	N/A
Eosinophils	4.8		0.8-7.0	%	N/A
Basophils	1.0		0.2-1.2	%	N/A



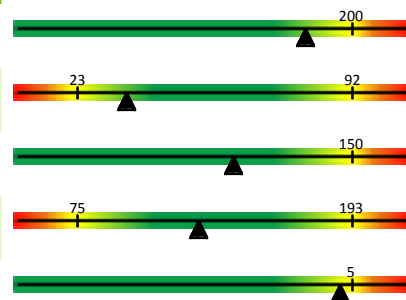
Hormones

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Estrone	39.67	L	42.28-127.15	pg/mL	N/A
Enhanced Estradiol	56.9	H	<39.8	pg/mL	N/A
Progesterone	<0.20	L	0.27-0.90	ng/mL	N/A
Total Testosterone	898	H	160-726	ng/dL	N/A
Free Testosterone	8.3		5.0-30.0	pg/mL	N/A
Sex Hormone Binding Globulin (SHBG)	33		10-57	nmol/L	N/A
Dihydrotestosterone	932		250-990	pg/mL	N/A
FSH	0.2	L	0.7-11.1	mIU/mL	N/A
LH	<0.1	L	0.8-7.6	mIU/mL	N/A



Lipids

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Cholesterol, Total	168		<200	mg/dL	N/A
HDL Cholesterol	35		23-92	mg/dL	N/A
Triglycerides	91		<150	mg/dL	N/A
LDL Cholesterol, Direct	126		75-193	mg/dL	N/A
CHOL/HDLC Ratio	4.8		<5.0	Ratio	N/A



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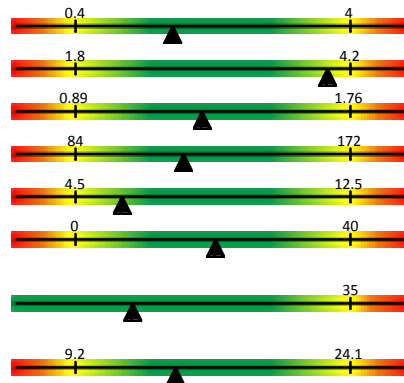
Lipids

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Non HDL Cholesterol	133			mg/dL	N/A



Thyroid

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
TSH 3rd Generation	1.66		0.40-4.00	uIU/mL	N/A
Free T3	4.0		1.8-4.2	pg/mL	N/A
Free T4	1.29		0.89-1.76	ng/dL	N/A
Total T3	118		84-172	ng/dL	N/A
Total T4	5.8		4.5-12.5	ug/dL	N/A
Anti-Thyroglobulin Antibody	<20		0-40	IU/mL	N/A
Anti-Thyroid Peroxidase Antibody	10		<35	IU/mL	N/A
Reverse T3, Serum***	14.5		9.2-24.1	ng/dL	N/A



Tumor Markers

TEST	RESULT	HIGH/LOW	RANGE	UNITS	
Total PSA	0.5		<=4.0	ng/mL	N/A
Free PSA	0.19		<0.70	ng/mL	N/A
% Free PSA	38		>25	% (calc)	N/A



11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for Iron.

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for Lipoprotein (a).

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for Uric Acid.

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for Hemoglobin A1c.

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for the Lipid Panel.

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for the Comprehensive Metabolic Panel.

11/10/15 15:07 PLEASE NOTE: Reference ranges have been changed for the Complete Blood Count and Differential.

CRP-hs

- C-reactive protein is produced by the liver. The level of CRP rises when there is inflammation throughout the body.
- <1.0 Lower relative cardiovascular risk.
- 1.0-3.0 Average relative cardiovascular risk.
- >3.0 High relative cardiovascular risk.

Cortisol AM

- Cortisol is a steroid hormone, known as a glucocorticoid, made in the cortex of the adrenal glands and then released into the blood which transports it through the body. Almost every cell contains receptors for cortisol and therefore, cortisol has many different actions depending on which cells it is acting upon. These effects include controlling the body's blood sugar levels and thus regulating metabolism, acting as an anti-inflammatory, influencing memory formation, controlling salt and water balance, influencing blood pressure and helping development of the fetus.

DHEA-S

- DHEA-S, testosterone, and several other androgens are used to evaluate adrenal function and to distinguish androgen-secreting conditions that are caused by the adrenal glands from those that originate in the ovaries or testes. DHEAS can be measured to help diagnose tumors in the cortex of the adrenal gland (adrenocortical tumors), adrenal cancers, and congenital adrenal hyperplasia or adult-onset adrenal hyperplasia and to separate these conditions from ovarian tumors and cancers. When DHEA-S is low it is suggestive of the need for supplementation. Low DHEA-S levels may indicate the presence of adrenal gland dysfunction or low output from the pituitary gland. When DHEA-S is elevated, it is suggestive of supplementation; consider reviewing dose if evidence of adverse signs and/or symptoms.

Pregnenolone, MS

- The adrenal glands use cholesterol to make pregnenolone, an essential precursor hormone, which is then converted into steroid hormones such as estrogen, progesterone, testosterone and cortisol. Highly concentrated in the brain, it functions as an important neurotransmitter.

Comprehensive

- Glucose is one of the few chemical constituents of the blood that can change rapidly in its concentration. Although many diseases can cause a change in glucose metabolism, the most frequent cause of an increased blood glucose level is diabetes mellitus. Other causes of elevated glucose levels include traumatic brain injury, febrile disease, certain liver diseases, ingestion of a heavy metal, and overactivity of the adrenal, pituitary and thyroid glands, which can produce hormones that increase blood glucose levels. Certain conditions can cause a decreased blood glucose level. These include liver disease in which the metabolism of glycogen is impaired and results in an increased concentration of insulin in the blood.
- The blood urea nitrogen (BUN) test measures the amount of urea nitrogen in the blood. Urea is produced in the liver when protein is broken into its component parts (amino acids) and metabolized. This process produces ammonia, which is then converted into the less toxic waste product urea. Most diseases or conditions that affect the kidneys or liver have the potential to affect the amount of urea present in the blood. If increased amounts of urea are produced by the liver or decreased amounts are excreted by the kidneys, then urea concentrations will rise. If significant liver damage or disease inhibits the production of urea, then BUN concentrations may fall.
- Creatinine in the blood results from the metabolism of creatine in the muscles of the body. Creatinine is filtered by the kidney and is not reabsorbed under normal circumstances. The serum creatinine concentration is relatively constant. The constancy of concentration and excretion makes creatinine a good measure of renal function.
- A normal BUN-to-Creatinine ratio is between 10 to 1 and 20 to 1.
- Sodium is important in maintaining the osmotic pressure and in electrolyte balance. Sodium is associated with the levels of chloride and bicarbonate ions, and because of this it has a major role in maintaining the acid-base balance of the body cells. Low sodium levels are found in a variety of conditions. Some of these conditions include severe polyuria (as in diabetes insipidus), metabolic acidosis (as in diabetic acidosis), Addison's disease (inadequate supply of adrenocortical hormones), diarrhea, and some renal tubular diseases. Increased sodium levels are found in Cushing's syndrome (hyperactivity of the adrenal cortex), severe dehydration, certain types of brain injury, and diabetic coma after insulin and after excess treatment with sodium salts.
- Potassium has an important influence on the muscle activity of the heart. High serum potassium levels are generally seen in cases of oliguria, anuria, urinary obstruction, kidney failure, and renal tubular acidosis. Low serum potassium levels can be caused by prolonged diarrhea or vomiting, or from inadequate intake of dietary potassium. Even in potassium deficiency, the kidney continues to excrete potassium.

- Chloride has a couple main functions in the body. First, it is important in determining the osmotic pressure, which is essential in maintaining the acid-base balance. Chloride also plays an important role in the buffering action when oxygen and carbon dioxide exchange takes place in the red cells. Low serum or plasma chloride levels may be seen in chronic pyelonephritis, diabetic acidosis, renal failure, or prolonged vomiting. High serum or plasma concentrations of chloride are seen in dehydration, excessive treatment with or dietary intake of chloride ions, or in conditions that cause decreased renal blood flow, such as congestive heart failure.
- CO₂ is carbon dioxide. This test measures the amount of carbon dioxide in the liquid part of your blood, called the serum. Lower than normal levels can be seen in Addison's disease, diarrhea, ethylene glycol poisoning, ketoacidosis, kidney disease, lactic acidosis, metabolic acidosis, methanol poisoning, and salicylate toxicity (such as aspirin overdose). Elevated levels can be caused by breathing disorders, Cushing syndrome, hyperaldosteronism, and vomiting.
- A blood calcium test is used to screen for, diagnose, and monitor a range of conditions relating to the bones, heart, nerves, kidneys, and teeth. Calcium is often measured as part of a routine health screening. Monitoring may also be necessary when someone is being treated for abnormal calcium levels to evaluate the effectiveness of treatments such as calcium or vitamin D supplements. Low calcium levels may be seen in conditions such as kidney disease or kidney failure. Low blood protein levels, especially a low level of albumin can cause a decrease in calcium, which can result from liver disease or malnutrition, both of which may result from alcoholism or other illnesses. Other causes for decreased calcium levels are underactive parathyroid gland, inherited resistance to the effects of parathyroid hormone, deficiency in dietary calcium, decreased levels of vitamin D, magnesium deficiency, increased levels of phosphorus, and acute inflammation of the pancreas (pancreatitis). The more common causes of an increased blood calcium level are an increase in parathyroid gland function and cancer when it spreads to the bones. Some other causes of increased blood calcium levels are hyperthyroidism, tuberculosis, prolonged immobilization, excess vitamin D intake, thiazide diuretics (often used to treat high blood pressure and edema), kidney transplant, and HIV/AIDS.
- Total protein measurements can reflect nutritional status and can be used to screen for and help diagnose kidney or liver disease. If total protein is abnormal, further testing must be performed to identify which specific protein is abnormally low or high so that a specific diagnosis can be made. A low total protein level can suggest a liver disorder, a kidney disorder, or a disorder in which protein is not digested or absorbed properly. Low levels may be seen in severe malnutrition and with conditions that cause malabsorption, such as celiac disease or inflammatory bowel disease (IBD). A high total protein level may be seen with chronic inflammation or infections such as viral hepatitis or HIV. It also may be associated with bone marrow disorders such as multiple myeloma.
- Albumin is a protein made by the liver. It makes up about 60% of the total protein in the blood and plays many roles. It keeps fluid from leaking out of blood vessels, nourishes tissues, and transports hormones, vitamins, drugs, and ions like calcium throughout the body. The concentration of albumin in the blood is a reflection of liver function and of nutritional status.
- Generally, there is slightly more Albumin present than Globulin. A normal A/G ratio is slightly over 1. A low ratio may be indicative of overproduction of Globulin or underproduction of Albumin. A higher ratio may be caused by underproduction of immunoglobulins.
- Bilirubin is an orange-yellow pigment, a waste product primarily produced by the normal breakdown of heme, a substance found mainly in the protein hemoglobin in red blood cells (RBCs). It is ultimately processed by the liver to allow its elimination from the body. In adults and older children, bilirubin is measured to diagnose and/or monitor liver diseases, such as cirrhosis, hepatitis, or gallstones. It is also used to evaluate people with sickle cell disease or other causes of hemolytic anemia who may have episodes when excessive red blood cell destruction takes place, increasing bilirubin levels.
- Alkaline phosphatase (ALP) is an enzyme found in several tissues throughout the body, including liver, bone, kidney, bowel (intestine), and in the placenta of women who are pregnant. However, the highest concentrations of ALP are present in the cells that comprise the bone and liver. In the liver, it is found on the edges of cells that join to form bile ducts - tiny tubes that drain bile from the liver to the bowels - where it is needed to help digest fat in the diet.
- Aspartate aminotransferase (AST) is an enzyme found in cells throughout the body but mostly in the heart and liver, and to a lesser extent in the kidneys and muscles. In healthy individuals, levels of AST in the blood are low. When liver or muscle cells are injured, they release AST into the blood. This makes AST a useful test for detecting liver damage.
- Alanine aminotransferase (ALT) is an enzyme found mostly in the cells of the liver and kidney; much smaller amounts of it are also found in the heart and muscles. In healthy individuals, ALT levels in the blood are low. When the liver is damaged, ALT is released into the blood stream, usually before more obvious symptoms of liver damage occur, such as jaundice. This makes ALT a useful test for detecting liver damage.

Uric Acid

- Uric Acid is a chemical created when the body breaks down substances called purines. Purines are found in some foods and drinks such as liver, anchovies, mackerel, dried beans, peas and beer. Most uric acid dissolves in blood and travels to the kidneys, where it is excreted in urine. Therapeutic target for gout patients: <6.0 mg/dL

Iron

- Iron is an essential nutrient to maintain life. It is needed in small quantities to help form normal red blood cells (RBCs) and is a critical part of hemoglobin, the protein in RBCs that binds oxygen in the lungs and releases it as blood circulates to other parts of the body.

Vitamin D

- The main role of vitamin D is to help regulate blood levels of calcium, phosphorus, and (to a lesser extent) magnesium. Vitamin D is vital for the growth and health of bone; without it, bones will be soft, malformed, and unable to repair themselves normally, resulting in diseases called rickets in children and osteomalacia in adults. Vitamin D has also been shown to influence the growth and differentiation of many other tissues and to help regulate the immune system.

Homocysteine

- Homocysteine is a common amino acid (one of the building blocks that make up proteins) found in the blood and is acquired mostly from eating meat. High levels of homocysteine are related to the early development of heart and blood vessel disease.

Lipoprotein (a)

- Lp(a) is a lipoprotein that is similar to low-density lipoprotein (LDL) in that it contains a single ApoB protein along with cholesterol and other lipids. Like LDL, its presence is considered a risk factor for cardiovascular disease. High levels of lipoproteins can increase the risk of heart disease.

IGF-1

- The insulin-like growth factor-1 (IGF-1) test is an indirect measure of the average amount of growth hormone (GH) being produced by the body. IGF-1 and GH are polypeptide hormones, small proteins that are vital for normal bone and tissue growth and development. IGF-1 is produced by the liver and skeletal muscle as well as many other tissues in response to GH stimulation. IGF-1 mediates many of the actions of GH, stimulating the growth of bones and other tissues and promoting the production of lean muscle mass. IGF-1 mirrors GH excesses and deficiencies, but its level is stable throughout the day, making it a useful indicator of average GH levels.
NOTE: Reference ranges have been changed for IGF-1.

Hemoglobin A1C

- Hemoglobin A1C is the predominant form of glycated hemoglobin. A1C is produced on a daily basis and slowly cleared from the blood as older RBCs die and younger RBCs (with non-glycated hemoglobin) take their place.

Insulin

- Insulin is a hormone originating in the beta cells of the pancreas and serving as a principal regulator for the storage and production of carbohydrates. Its secretion is normally stimulated by increases in the amount of glucose in circulation. This leads to higher insulin levels and more rapid tissue assimilation of glucose – followed by a decline in the insulin level as the glucose level subsides.

Ferritin

- Ferritin is a protein found inside cells that stores iron so the body can use it later. The amount of ferritin in your blood (serum ferritin level) is directly related to the amount of iron stored in the body.

Folate

- Folic acid (Folate), along with vitamin B12, is important for formation of red blood cells. Folate along with other B vitamins are also vital for nerve function. Folate is essential for the formation of DNA (genetic material) within every body cell. This allows normal replication of cells.

CBC with Auto Diff

- White Blood Cells are nucleated and are a part of the defense mechanism of the body. White cells use the bloodstream primarily for transportation to their place of function in the body tissues. Normally, there are five types of leukocytes found in the blood: lymphocytes, neutrophils, monocytes, eosinophils, and basophils.
- The main function of the red blood cells are to carry oxygen to the cells of the body. The oxygen is transported in a chemical combination with hemoglobin. The concentration of hemoglobin in the blood is a measure of its capacity to carry oxygen, which all cells are dependent for energy and life.
- Hemoglobin synthesis starts in the bone marrow with the production of red blood cells. The iron-containing portion (heme) of the molecule combines with the protein portion (globin) and forms an activated form of hemoglobin that is ready to transport oxygen. When the hemoglobin value is below normal, it is suggestive of anemia. In this condition, the red blood cells may be deficient in number, deficient in total hemoglobin content per unit of blood volume, or both. An increase in hemoglobin, can be seen in polycythemia and newborn infants, and is usually a result of an increase in the number of red blood cells.
- Hematocrit is the measurement of the volume of packed red blood cells. This test gives useful information about the red blood cells, which may be correlated with the number of red blood cells and their hemoglobin content. Hematocrit is used in evaluating and classifying the various types of anemias according to red cell indices.
- MCV is one of three red cell indices. The MCV indicates whether the red blood cells will appear small (microcytic), normal (normocytic), or large (macrocytic). In macrocytic anemias the MCV may be markedly elevated. In microcytic anemia with iron deficiency, the MCV can be as low as 60 to 70 fL.
- The MCH is the content (weight) of hemoglobin in the average red cell. MCH may be as high as 50pg in macrocytic anemias or as low as 20pg or less in hypochromic microcytic anemias.
- The MCHC is the average hemoglobin concentration in a given volume of packed red cells. This measurement tells what percentage of a red cell is hemoglobin. MCHC values below 32g/dL indicate hypochromasia. The MCHC typically increases only in spherocytosis. In other anemias it is decreased or normal.
- RDW (red cell distribution width) is a measurement of the degree of anisocytosis present, or the degree of red cell size variation in a blood sample.
- Platelets function in the coagulation of the blood and are therefore associated with the bleeding and clotting mechanism of the body. A low platelet count may be associated with a generalized bleeding tendency and a prolonged bleeding time. A higher platelet count may be associated with a tendency toward the formation of blood clots.
- Granulocytes or Neutrophils exist in the peripheral blood for about 10 hours once they have been released from the bone marrow. They move back and forth between the circulating blood and the walls of the blood vessels, where they accumulate. They also leave the blood and enter the tissues, where they are utilized to fight bacterial infections, and are then destroyed or eliminated from the body by the excretory system (intestinal tract, urine, lungs, or saliva). Some causes of an elevated Granulocyte/Neutrophil % are acute bacterial infections and also some infections caused by viruses and fungi, inflammation, tissue death (necrosis) caused by trauma, major surgery, heart attack, or burns, physiological (stress, rigorous exercise), pregnancy (last trimester or during labor), chronic leukemia (e.g., myelogenous leukemia). Causes for a decreased count may include myelodysplastic syndrome, severe or overwhelming infection (e.g., sepsis-neutrophils are used up), autoimmune disorder, chemotherapy, cancer that spreads to the bone marrow, or aplastic anemia.
- Lymphocytes are white blood cells that normally make up about 25% of the total white blood cell count but can vary widely. Lymphocytes occur in two forms: B cells, which produce antibodies in response to infection and T cells, which recognize foreign substances and process them for removal. Increased Lymphocytes can be caused by acute viral infections, certain bacterial infections such as pertussis (whooping cough) or tuberculosis (TB), lymphocytic leukemia and lymphoma. Decreased Lymphocytes can be caused by autoimmune disorders (e.g., lupus, rheumatoid arthritis), infections such as HIV, TB, hepatitis, or influenza, bone marrow damage from chemotherapy or radiation, and immune deficiency.

- **Monocytes** are white blood cells. Their function is the ingestion of bacteria and other foreign particles. Increased Monocytes can be caused by chronic infections such as tuberculosis and fungal infections, infection within the heart (bacterial endocarditis), collagen vascular diseases (e.g., lupus, scleroderma, rheumatoid arthritis, vasculitis), inflammatory bowel disease, myelogenous leukemia, chronic myelomonocytic leukemia, juvenile myelomonocytic leukemia. Repeated low counts can indicate: bone marrow damage or failure, or hairy-cell leukemia.
- **Eosinophils** are a white blood cell that make up about 3% of the circulating white blood cells. An increase in eosinophils are associated with a wide variety of conditions, but especially with allergic reactions, drug reactions, parasitic infections, Hodgkin's disease, and myeloproliferative diseases. A decrease in eosinophils, is seen with hyperadrenalism.
- **Basophils** are white blood cells that normally constitute only 0.5% of the total circulating white blood cells. An increase in the number of basophils is associated with chronic myelogenous leukemia. It is also sometimes seen in allergic reactions, myeloid metaplasia, polycythemia vera, chronic hemolytic anemia, and after a splenectomy procedure. A decrease in basophils is usually not medically significant.

Estrone

- **Estrone (E1)** is produced by the ovaries as well as by adipose tissue and the adrenal glands. It has much weaker biological activity than estradiol. Elevated levels are suggestive of supplementation or abnormal estrogen metabolism. Assess the Estrogen quotient. If this is <1, then suggest the use of indole-3-carbinol and check serum TSH levels.
 When estrone is elevated for a male, this is suggestive of aromatization of androgens to estrogens.

Estradiol

- **Estradiol (E2)** is the strongest of the three naturally-produced estrogens and the main estrogen found in women. As a steroid hormone, it has many functions, although it mainly acts to mature and maintain the female reproductive system. A natural boost in estradiol levels during the menstrual cycle causes an egg to mature and be released, as well as thickening the uterus lining so that the egg can implant if it becomes fertilized. Estradiol also promotes development of breast tissue and increases bone and cartilage thickness. In premenopausal women, estradiol is mostly made by the ovaries. Estradiol levels vary throughout the monthly menstrual cycle, being highest at ovulation and lowest at menstruation. Estradiol levels in women reduce slowly with age, with a large decrease occurring at the menopause. Estradiol is also produced by men. It is made in the same pathway as testosterone. However, estradiol levels are much lower than in women. In both sexes, estradiol is also made in much smaller amounts by fat tissue, the brain and the walls of the blood vessels. When the estradiol level is elevated for a male, it is suggestive of aromatization of androgens to estrogens.

Progesterone

- **Progesterone** is a steroid hormone that plays a major role and has many functions for both men and women. Progesterone is responsible for regulating blood sugar, building bones, converting fat into energy, regulating thyroid hormone production and rebooting libido. Symptoms of low progesterone can be reduced bone density, reduced libido, low mood, increased stress levels and depression.

Total Testosterone

- **Testosterone** is the major androgenic hormone, which is responsible for many of the physical characteristics specific to adult males. It plays a key role in reproduction and the maintenance of bone and muscle strength. In females, its main role is as an estrogen precursor. In both genders, it also exerts anabolic effects and influences behavior. Testosterone levels are usually higher in the morning and fall after that. In premenopausal women, the ovaries are the main source of testosterone with minor contributions by the adrenals and peripheral tissues. After menopause, ovarian testosterone production is significantly diminished. Testosterone production in testes and ovaries is regulated via pituitary-gonadal feedback involving luteinizing hormone (LH) and, to a lesser degree, inhibins and activins. In women, the ovaries and adrenal glands produce testosterone. The majority of testosterone produced in the ovary is converted to the principle female sex hormone, estradiol.
 In men, testosterone is secreted by the testicular Leydig cells and, to a minor extent, by the adrenal cortex. Most circulating testosterone is bound to sex hormone-binding globulin (SHBG). A lesser fraction is albumin bound and a small proportion exists as free hormone. In men, testosterone signals the body to make new blood cells, ensures that muscles and bones stay strong during and after puberty and enhances libido both in men and women.

Free Testosterone

- In women, the ovaries and adrenal glands produce testosterone. The majority of testosterone produced in the ovary is converted to the principle female sex hormone, estradiol. Most circulating testosterone is bound to sex hormone binding globulin (SHBG). A lesser fraction is albumin bound and a small proportion exists as free hormone. Free testosterone is testosterone that is not bound to SHBG, thereby readily available for tissue uptake.
- In men, testosterone is secreted by the testicular Leydig cells and, to a minor extent, by the adrenal cortex. Testosterone signals the body to make new blood cells, ensures that muscles and bones stay strong during and after puberty and enhances libido both in men and women.

SHBG

- Sex hormone binding globulin is a protein that is produced by the liver and binds tightly to testosterone, dihydrotestosterone (DHT), and estradiol (an estrogen). In this bound state, it transports them in the blood as a biologically inactive form. The amount of SHBG in circulation is affected by age and sex, by decreased or increased testosterone or estrogen production, and can be affected by certain diseases and conditions such as liver disease, hyperthyroidism or hypothyroidism, and obesity.

Dihydrotestosterone

- DHT Female Reference Ranges:
Premenopausal: 24-368 pg/mL
Postmenopausal: 10-181 pg/mL

Dihydrotestosterone is a hormone that stimulates the development of male characteristics (an androgen). It is made through the conversion of testosterone. Almost 10% of the testosterone produced by an adult each day is converted by the testes and prostate (in men), the ovaries (in women), the skin and other parts of the body to dihydrotestosterone.

FSH

- Follicle-stimulating hormone (FSH) is made by the pituitary gland in the brain. Control of FSH production is a complex system involving hormones produced by the gonads (ovaries or testes), the pituitary, and the hypothalamus. These hormone levels are important for both male and female reproduction. In men, FSH stimulates the testes to produce sperm, just as in women FSH stimulates the ovaries to produce eggs.

LH

- Luteinizing hormone (LH) is produced by the pituitary gland in the brain. Control of LH production is a complex system involving hormones produced by the gonads (ovaries or testes), the pituitary, and the hypothalamus.

Lipid Panel

- Total Cholesterol:
<200mg/dL: Desirable
200-239mg/dL: Borderline High
>=240mg/dL: High
- High-density lipoprotein (HDL cholesterol) is one of the classes of lipoproteins that carry cholesterol in the blood. HDL consists primarily of protein with a small amount of cholesterol. It is considered to be beneficial because it removes excess cholesterol from tissues and carries it to the liver for disposal. Hence, HDL cholesterol is often termed "good" cholesterol.
- Triglycerides are a form of fat and a major source of energy for the body. Most triglycerides are found in fat (adipose) tissue, but some circulate in the blood to provide fuel for muscles to work. After you eat, increased levels of triglycerides are found in the blood as your body converts the energy you don't need right away into fat. Triglycerides move via the blood from the gut to adipose tissues for storage.
<150mg/dL: Normal
150-199mg/dL: Borderline High
200-499mg/dL: High
>=500: Very High

- ≥ 20 years: Target for non-HDL cholesterol is 30 mg/dL higher than LDL cholesterol target.

TSH

- Thyroid-stimulating hormone is produced by the pituitary gland. It prompts the thyroid gland to make and release thyroid hormones into the blood. TSH causes the thyroid gland to make two hormones: triiodothyronine(T3) and thyroxine(T4). T3 and T4 help control your body's metabolism.

Free T3

- T3 is the active form of the thyroid hormone thyroxine. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and the maintenance of bones.

Free T4

- Thyroxine is the main hormone secreted into the bloodstream by the thyroid gland. It is inactive and most of it is converted to an active form called triiodothyronine by organs such as the liver and kidneys. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and maintenance of bones.

Total T3

- T3 is the active form of the thyroid hormone thyroxine. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and the maintenance of bones.

Total T4

- Thyroxine (T4) is the main hormone secreted into the bloodstream by the thyroid gland. It is inactive and most of it is converted to an active form called triiodothyronine by organs such as the liver and kidneys. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and maintenance of bones.

Anti-Thyroglobulin

- The test for anti-thyroglobulin antibody helps detect possible thyroid problems. Antithyroglobulin antibodies can lead to the destruction of the thyroid gland. These antibodies are more likely to appear after thyroid gland swelling (inflammation) or injury.

Anti-Thyroid Peroxidase

- The test for anti-thyroid peroxidase antibody (anti-TPO) is used as an aid in the diagnosis of thyroid autoimmune disorders. Moderately increased levels of thyroperoxidase (TPO) antibodies may be found in patients with nonthyroid autoimmune disease such as pernicious anemia, type I diabetes, or other disorders that activate the immune system.

Reverse T3, Serum

- Reverse T3 is a non-functioning form of the active hormone triiodothyronine (T3). In the tissues, T4 normally converts to T3. However, other hormones such as cortisol may inhibit this conversion, producing reverse T3 (rT3).

Total PSA

- Prostate-specific antigen, or PSA, is a protein produced by cells of the prostate gland. A traditional PSA test measures the levels of prostate-specific antigen in the blood. Cancerous cells in the prostate cause the gland to produce more prostate-specific antigen, which is the reason that high levels are associated with prostate cancer.

Free PSA

- Free PSA results are only valid when the total PSA is in the range of 4 to 10 ng/mL.

DUPLICATE

• PSA was performed using the Siemens Immulite 2000 Immunoassay method. Values obtained from different assay methods cannot be used interchangeably. PSA levels, regardless of value, should not be interpreted as absolute evidence of the presence or absence of disease.

The above results are for informational purposes only and are not to be construed as medical advice.

Please consult your healthcare practitioner for diagnosis and treatment.

Performance characteristics were determined by AML Diagnostics, Inc. for certain tests. Please refer to WWW.AMLDX.COM for the complete list.

* Test performed at Quest Diagnostics-Miami, 10200 Commerce Parkway, Miramar, FL 33025-3938

** Test performed at Clinical Pathology Laboratories Southeast Inc., 9200 Wall Street, Austin, TX 78754