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ENDOCRINOLOGY

Blood Chemistry: Kidneys

Dr. Ritamarie Loscalzo


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Kidney Panel

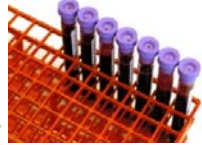
- **Blood Urea Nitrogen (BUN):** By-product of protein metabolism eliminated through the kidneys.
- **Creatinine:** A muscle breakdown product used as an indicator of kidney function.
- **Uric Acid:** Another by-product of protein metabolism eliminated through the kidneys.
- **BUN/Creatinine:** Ratio calculated by dividing the BUN by the Creatinine.
- **Glomerular Filtration (eGFR):** Provides an assessment of the filtering capacity of the kidney.



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Blood Urea Nitrogen (BUN)


High	Low
<ul style="list-style-type: none">• Low stomach acid• Electrolyte depletion• Dehydration• Kidney disease• Heart attack	<ul style="list-style-type: none">• Malabsorption – i.e. Celiac and gluten intolerance• Low stomach acid• Steroid use• Malnutrition• Liver or kidney disease



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Creatinine


High	Low
<ul style="list-style-type: none">• Dehydration• Enlarged prostate• Kidney disease• Muscle	<ul style="list-style-type: none">• Low stomach acid or inadequate protein• Pregnancy• Severe liver disease• Muscle wasting



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Uric Acid

High	Low
<ul style="list-style-type: none">• Gout Deficiency of B6 & Magnesium• Insulin resistance• Diabetes• Starvation	<ul style="list-style-type: none">• B12 deficiency• Folate deficiency• Molybdenum deficiency



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Kidney Panel Case

Uric Acid, serum (Female)	mg/dL	1.8	7.0	3.2	5.5	5.9	5.1
Uric Acid, serum (Male)	mg/dL	1.8	7.0	3.7	6.0		
BUN	mg/dL	8.0	28.0	13.0	18.0	7	11
Creatinine, serum	mg/dL	0.5	1.2	0.7	1.1	0.7	0.78
eGFR	mL/min/1.73	59.0	-	59.0	-	>53	>53
eGFR (African American)	mL/min/1.73	59.0	-	59.0	-	>53	>53
BUN/Creatinine Ratio	-	8.0	27.0	8.0	27.0	10	14

❖ Values below functional range in BUN, slightly lower creatinine and uric acid may be fine in vegans and vegetarians but can be indicative of malabsorption and/or low stomach acid.

❖ Look for other evidence in metabolic assessment and abnormal in blood minerals.

❖ High values indicate impaired kidney function or increased tissue breakdown.

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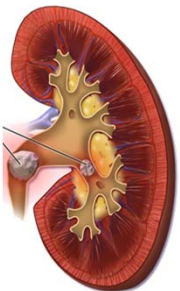
Kidney Dysfunction Case

CATEGORIES	Units	LAB RANGE	IDEAL RANGE	DATE
Lab Markers				Results
Uric acid, serum (female)	mg/dL	1.8 7.0	3.2 5.5	8
Uric acid, serum (male)	mg/dL	1.8 7.0	3.7 6.0	
Blood urea nitrogen (BUN), serum	mg/dL	8.0 28.0	13.0 18.0	29
Creatinine, serum	mg/dL	0.5 1.2	0.7 1.1	0.5
Estimated glomerular filtration rate (eGFR), serum	mL/min/1.73 m ²	59.0 -	59.0 -	59
Estimated glomerular filtration rate (eGFR) (African American), serum	mL/min/1.73 m ²	59.0 -	59.0 -	59
BUN/Creatinine Ratio	-	8.0 27.0	8.0 27.0	58
Phosphorus, serum	mg/dL	2.3 4.8	3.5 4.0	5
Protein, total, serum	g/dL	6.2 8.3	6.9 7.4	7
Albumin, serum	g/dL	3.8 5.0	4.0 5.0	4.3
Globulin, total, serum	g/dL	2.0 3.8	2.4 2.8	2.5
Lactate dehydrogenase (LDH), serum	U/L	89.0 215.0	140.0 180.0	220
Aspartate aminotransferase (AST) (SGOT), serum	U/L	1.0 45.0	10.0 26.0	50

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Kidney Marker Patterns: Renal Dysfunction

- ✓ BUN: +
- ✓ Creatinine: -
- ✓ BUN/Creatinine Ratio: +
- ✓ Phosphorus: +
- ✓ LDH: +
- ✓ SGOT: +
- ✓ Uric Acid: +



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Kidney Marker Patterns: Muscle Wasting

- ✓ Creatinine: +
- ✓ SGOT: + or normal
- ✓ SGPT: + or normal
- ✓ LDH: + or normal
- ✓ CPK: + or normal
- ✓ LDH: Isoenzyme #4 and #5 +
 - LDH-4: Kidney
 - LDH-5: Skeletal muscle and liver
- ✓ CPK: Isoenzyme CK:MM +



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Kidney Marker Patterns: Edema

- ✓ BUN: +
- ✓ Sodium: -
- ✓ Albumin: -



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