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Area	Laboratory-Chemistry
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Protein in Urine (Multistix 10 SG) - Royal Oak

Document Type: Procedure

I. PURPOSE AND OBJECTIVE:

A. The Multistix test is based on the principle of protein-error of pH indicators. The reagent strip is impregnated with tetrabromphenol blue buffered to an acid pH of 3 so that color changes reflect only the presence and concentration of proteins. The testpad is yellow in the absence of protein, and procedures a color change from yellow-green through green-blue with increasing amounts of protein.

B. Proteinuria may be associated with normal renal function. Examples include transient proteinuria with emotional/physical stress, orthostatic proteinuria and presence of paraprotein. Renal diseases associated with glomerular or tubular damage also present with a range of protein concentrations in urine. Proteinuria of any type or amount warrant further investigation by the clinician.

C. This document describes the steps for this procedure to assist technologists.

II. SPECIMEN COLLECTION AND HANDLING:

Fresh, well-mixed, uncentrifuged urine. It is recommended that testing be done within one hour after voiding. Otherwise immediately refrigerate the specimen and return to room temperature before testing.

III. REAGENTS/SUPPLIES:

A. Siemens Multistix 10 SG (#2161)

B. 0.3% weight for weight (w/w) tetrabromphenol blue

C. 97.3% w/w buffer

D. 2.4% w/w nonreactive ingredients

IV. QUALITY CONTROL (QC):

A. Both Normal and Abnormal Kova-Trols are run and results are recorded:
    1. at the beginning of each shift;
    2. whenever a new lot number of reagent strips is opened;
    3. whenever troubleshooting warrants it

V. PROCEDURE:

A. Briefly dip the test area of the strip in fresh, **well-mixed** uncentrifuged urine.
B. While removing the strip, run the edge against the rim of the urine container to remove excess urine. Hold the strip in a horizontal position to prevent mixing of chemicals from adjacent reagent areas and/or contaminating the hands with urine.
    1. If reading visually, compare the **PROTEIN** reagent area to the corresponding Color Chart on the bottle label at **60 seconds**. Hold strip close to color blocks and match carefully.
    2. If reading instrumentally, follow directions given in the Clinitek Advantus procedure.

VI. REPORTABLE RANGE:

Multistix 10SG has a color comparison chart with **SIX** color blocks ranging from yellow to green-blue. These represent protein as negative or present in increasing amounts. To maintain consistency of reporting between visual and instrumental reads, blocks 5 and 6 will be combined so that results will be reported as follows:

Negative	Negative
Trace	15 mg/dL
1+	30 mg/dL
2+	100 mg/dL
3+	≥300 mg/dL

VII. REFERENCE RANGE:

Negative

VIII. SENSITIVITY:

A. 15-30 mg/dL
B. The reagent is more sensitive to **albumin** than to globulins, hemoglobin, Bence Jones protein and mucoproteins. A negative result does not rule out the presence of these other proteins.

IX. INTERPRETATION:

A. Positive dipstick results should be correlated for possible discrepancy with cast findings in the microscopic exam prior to releasing the Urinalysis report.

B. Normally no protein is detectable in urine by dipstick method, although a minute amount is excreted by the normal kidney. A color matching any block indicating a result greater then trace indicates significant proteinuria. For urine of high specific gravity, the test area may most closely match the 'Trace' color block even though only normal concentrations of protein are present. Clinical judgment is needed to evaluate the significance of trace results.

X. LIMITATIONS/INTERFERING SUBSTANCES:

A. High salt levels will lower results

B. False positive results may be obtained with excessive leaching of the acid buffer by excessive wetting of the test pad.

C. Refer to table below:

Test for Proteinuria	
Urine Constituents Affecting Protein Results	**Multistix 10 SG**
Urine turbidity	No effect
X-ray contrast media	No effect
Tolbutamide	No effect
Penicillin (massive doses)	No effect
Sulfisoxazole (Gantrisin)	No effect
Para-aminosalicylic acid in urines containing certain preservative agents	No effect
Highly buffered or alkaline urine (e.g. bacterial contamination of alkalizing medications)	May cause false positive
Quarternary Ammonium Salts (e.g. cleansing agents)	May cause false positive
Tolmetin Sodium (Tolectin)	No effect
Chlorhexidine	May cause false positive

XI. REFERENCES:

1. Multistix 10 SG. Miles, Inc. Diagnostics Division, Elkhart, IN 46515, rev. 04/99.
2. Henry, J.B. Clinical Diagnosis and Management by Laboratory Methods, 20th edition, Philadelphia, W.B. Saunders Co., 2001, pp. 373-376.
3. Hundley, J.M and Fleming, J.K., Urine Analysis American Society of Clinical Pathologists Workshop, Dearborn, MI., 1991.

Approval Signatures

Step Description	Approver	Date
Medical Director	Ann Marie Blenc: System Med Dir, Hematopath	2/1/2023
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