# CLS 426 Urinalysis Procedures

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**Dipstick Procedure:**

CLS 426 Urine and Body Fluid Analysis: Student Lab Rotation
Urinalysis Procedures
1. View the video: Dipstick Procedure (Part I and II)
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information and Sediment Pictures, Chemical Exam of Urine Videos, Dipstick: Entire Procedure Part I Part II

2. Use the following protocol when testing urine by the dipstick method

   a. Urine sample should be fresh, uncentrifuged and **well-mixed**: SIX to MIX
      Before dipping, make sure to:
      - Verify lids are tightly closed before inverting sample tube to mix.
      - Completely resuspend any precipitate found in bottom of tube.

   b. Remove one strip from bottle and replace cap so other strips remain chemically sound. Be sure to:
      - **Not touch reagent areas with your hands.**
      - **Not place reagent strip directly on counter top.**

   c. Completely immerse reagent areas of the strip in urine and remove immediately to avoid dissolving out reagents. Be sure to:
      - Immerse all reagent pads into the urine.
      - Note time of ‘dipping’.
      - **Gently** run the edge of the strip against the rim of the urine container while removing strip from urine to remove excess urine. Holding dipstick vertical, touch side of stick to a tissue, this too will help eliminate excess urine.

   d. Hold the strip horizontally to prevent possible mixing of chemicals from adjacent reagent areas.

   e. At the specified time interval, compare the test area to the corresponding color chart. Be sure to:
      - Hold strip close to color chart and match carefully, taking care to evaluate each test at the correct time interval.
      - **Not touch color chart with the contaminated dipstick.**

   f. Record your test results.
Color Determination of Urine Procedure:

1. View the video: Color
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information and Sediment Pictures, Physical Exam of Urine, Color

2. Use the following Color Guidelines when determining the urines color. Remember: urine must be **completely mixed** before performing the visual assessment.

   **Color Guidelines**
   - Pale (colorless, looks almost like water, no shade of yellow on white background)
   - Yellow (lots of variation seen with this color, most urine will be yellow)
   - Amber (yellow-orange-brown)
   - Red
   - Brown
   - Green
   - Orange
   - Other (indicate the color if not listed above)

3. Record your test results.

Clarity Determination of Urine Procedure:

1. View the video: Clarity
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information and Sediment Pictures, Physical Exam of Urine, Clarity

2. Use the following Transparency Guidelines when determining the urines clarity. Remember: urine must be **completely mixed** before performing the visual assessment.

   **Transparency Guidelines**
   - Clear: No visible particles seen, looks like water
   - Hazy: Some visible particles seen; can read newsprint **clearly** (most urine will be hazy)
   - Cloudy: Visible, dense particles; can read newsprint, but it is **blurred**
   - Turbid: Large, dense particles/sediment, falling out of solution, **cannot read newsprint**

3. Record your test results.

Specific Gravity Determination by Refractometer Procedure:
1. View the video: Refractometer-Specific Gravity
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information and Sediment Pictures, Physical Exam of Urine, Refractometer: Specific Gravity

2. Use the following procedure when determining the specific gravity of urine using the refractometer. Remember: urine must be **completely mixed** before performing this test.

   1. **Clean the Refractometer**
      A. Place a couple of drops of clean water between the glass surface and the plastic cover.
      B. Flip open the plastic cover.
      C. Wipe the glass surface and the plastic cover dry with a clean soft tissue.
      D. Close the plastic cover.

   2. Using a clean disposable transfer pipette, place a drop of well-mixed uncentrifuged urine between the clean, dry glass prism surface and the plastic cover.

   3. Direct the meter toward a light source so that light passes through the sample and the glass prism.

   4. Read the specific gravity from the scale at the sharp line of contrasting light and dark areas. Record results to the nearest 0.001 using the Urine Specific Gravity T/C scale. Using the urine T/C scale this specific gravity example reads as 1.034.

   5. Wipe the glass surface with a soft tissue to remove the urine; clean the Refractometer as you did in step one.

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**Protein Determination by Sulfosalicylic Acid method:**
1. View the video: Sulfosalicylic Acid (SSA).
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information
   and Sediment Pictures, Chemical Exam of Urine Videos, SSA

2. Determine the amount of protein present in the urine sample using the sulfosalicylic acid (SSA) method.
   
   A. Using a clean disposable transfer pipette, place 2 mls of centrifuged urine into a clean glass 10cc test tube.
   
   B. Add 8 drops of SSA reagent to the urine and mix well.
   
   C. Compare the turbidity of the sample to the turbidity of prepared standards and record results.

**Reducing Substances Determination by Clinitest©:**

1. View the video: Clinitest
   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information
   and Sediment Pictures, Chemical Exam of Urine Videos, Clinitest

2. Use the following Clinitest procedure when determining the amount of reducing substance present in urine.
   
   A. Using a clean disposable transfer pipette, place 5 drops of well-mixed, uncentrifuged urine into a clean glass 10cc test tube.
   
   B. Using a clean disposable transfer pipette, add 10 drops of clean d-H2O to the urine in the test tube. Mix well by gently shaking the contents of the test tube.
   
   C. Drop one Clinitest reagent tablet into the test tube and observe the reaction for completion (i.e.: observe when the boiling stops). Do not touch the reagent tablet with your fingers.

   CAUTION: The reaction mixture gets very hot; do not touch the bottom area of the test tube. Use glass test tubes only.

   D. Wait 15 seconds after boiling has stopped, and then gently shake contents of tube to mix, and immediately compare the color of the reaction mixture to the Clinitest 5 drop method color chart. Record your test results.

**Ketone Determination by Acetest©:**

1. View the video: Acetest
2. Use the following Acetest procedure when determining ketones in urine or serum. Remember: the urine sample must be **completely mixed** before performing this test.

   A. Remove one acetest tablet from bottle for each test sample with forceps. Replace the cap immediately.
   
   B. Place the tablet on a clean white piece of paper, tissue or filter paper.
   
   C. Using a disposable transfer pipette, place one drop of specimen directly on top of tablet.
   
   D. Wait for 30 seconds for urine or 2 minutes for serum samples, and then compare the color of the tablet to the manufacturers color chart.
   
   E. If no color develops, this indicates a negative test. Report result as negative. If a purple color develops this indicates a positive test. Record your test result as small, moderate, or large based on the color chart. Any color (red, pink, tan or yellow) other then purple should be disregarded.

**Bilirubin Determination by Ictotest©:**

1. View the video: Ictotest

   Located in Blackboard: Under Day 1 Assignments, Laboratory Procedure Information and Sediment Pictures, Chemical Exam of Urine Videos, Ictotest

2. Use the following Ictotest procedure when determining the amount of bilirubin present in a **well-mixed, uncentrifuged** urine sample.

   A. Place the absorbent test mat ‘bumply’ side up on a clean paper towel.
   
   B. Using a clean disposable transfer pipette, place 10 drops of well-mixed, uncentrifuged urine onto the absorbent test mat. Try to place the drops one on top of the other.
   
   C. Using clean forceps, remove one Ictotest reagent tablet and place the tablet in the center of the moistened area. Recap the bottle promptly.
   
   D. Using a clean disposable transfer pipette, place one drop of water onto the tablet. **Wait 5 seconds**, then place a second drop of water onto the tablet, so that the water runs off the tablet onto the mat.
   
   E. **Wait 60 seconds**, then compare the color of the mat around the tablet to the Ictotest color chart. Record your test results.

**Chronological Steps in Performing a Complete Urinalysis**

Modified for Student Lab Rotation

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CLS 426 Urine and Body Fluid Analysis: Student Lab Rotation
Urinalysis Procedures
1. View the video: Making Wet Mount Slide and Using Kova® Slides
   Located in Blackboard: Under Day 2 Assignments, Microscopic Procedures, Making Wet
   Mount Slide and Using Kova® Slides Videos

2. You will have the following for each labeled urine specimen:
   a. A large test tube containing ~ 12 ml of urine
   b. A small test tube containing ~1.0 ml of urine sediment

3. Write the patient name, age, sex, hospital number, accession number, date and time of
   specimen collection, and type of urine collection technique. Check specimen labeling on
   both tubes for accuracy and completeness.

4. Perform the following on the large test tube containing ~ 12 ml of urine
   a. Thoroughly mix the room-temperature urine by complete inversion several (6)
      times.
   b. Perform physical examination of urine to include color and clarity. Record
      results on worksheet
   c. Perform chemical examination of urine using reagent strip. Record all results on
      worksheet at the appropriate time intervals.
   d. Perform Clinitest if patient is 2 years old or younger. Record result on worksheet.
   e. Perform Ictotest if reagent strip bilirubin is positive or color of urine is amber.
      Record result on worksheet.

5. Perform the following on the small test tube containing ~ 1.0 ml of urine sediment
   a. Gently mix sediment until the sediment is completely resuspended in solution.
   b. Place one standard size drop of mixed sediment onto a clean KOVA slide.
   c. Using the 10x (low power) objective, examine all edges and a MINIMUM of 10
      representative fields in the interior of the slide for the presence of squamous
      epithelial cells, casts and mucus. Quantitate these elements as an average/lpf.
   d. Using the 40x (high power) objective, examine a MINIMUM of 10
      representative fields in the interior area of the slide for the presence of
      transitional and renal epithelial cells, RBCs, WBCs, bacteria, crystals, yeast, etc.
      Use the worksheet for proper terminology and enumeration scale used for
      reporting: some elements are reported as an average/hpf, while others are reported
      as present. If there is uneven distribution of cellular/non-cellular components,
      replate the slide using well mixed sediment.

6. Correlate the microscopic findings with the physical and chemical examination results. If
   there are discrepancies, can they be explained? When in doubt, repeat the testing.

7. Double-check your work. Is the worksheet/reporting form filled out completely? Be
   proud of your work and always sign the form with your name (accrediting requirement).

How to Use the Microscope
Modified for Student Lab Rotation
1. View the video: Using a Microscope (complete video), Basics, Focusing, and Low
Refractive Index Specimens
Located in Blackboard: Under Day 2 Assignments, Using a Microscope
Procedures, Using a Microscope Videos

2. Always carefully carry the microscope using both hands, with one hand under the
microscope. Place microscope on level, vibration-free surface.

3. Plug the microscope into a power source; make sure the cord is not left dangling over
the counter where it could be accidentally pulled off the counter.

4. Turn on the light source.

5. To view a urine wet-mount (always use a cover-slip or a standardized system):
   a. Always begin with the low power objective in place and the stage all the way down.
   b. Place slide onto stage and position slide over central opening in stage over the
      light source.
   c. Slowly bring stage up to its upper most position.
   d. Condenser should be slightly lowered only when looking for casts (you will need
to adjust this for maximum viewing).
   e. While looking through the eyepiece, slowly lower the stage using the coarse
      adjustment knob until you see the object to be viewed. Use the fine adjustment
      knob to optimally view the fine detail of the object.
   f. Scan the slide enumerating squamous epithelial cells, casts and mucus. Scan NO
      LESS than 10-12 representative fields, most along the periphery of the slide.

      When you find an object that you want to study in better detail, move the object to
      the center of the slide and put the high power objective into place. The object
      should be in the field of view and may need small adjustments using the fine
      adjustment knob to view optimally.

      After identification, put the low power objective back into place and move the
      object back to its original position.
   g. Place the high power objective in place and adjust the condenser if needed. Scan
      NO LESS than 10-12 representative fields in the central area of the slide
      enumerating RBC, WBC, epithelial cells (transitional, renal tubular) and bacteria.
      Make note of the presence of crystals, free fat droplets, oval fat bodies, sperm,
yeast, mycelial elements, and trichomonads.