

# Urine Strip False Positive or Negative Causes

## PROTEIN

### False Positive

**Alkaline urine:** False positives occur rarely in highly buffered or alkaline urine samples as the citrate buffer is overcome, resulting in a shift in pH. Titration of the sample to a more neutral pH and retesting could be done to overcome this problem, but is not routinely performed. The sulfosalicylic acid precipitation test (see "protein SSA ") used to be performed as an alternative, however several studies have shown that the urine dipstick measurement of protein is reasonably accurate in most urines, even those that are alkaline, and the SSA reaction is no longer a necessary part of routine urinalysis.

**Contact time:** Leaching of the citrate buffer occurs if the urine remains in contact with the pad for a long time.

**Detergents:** Quaternary ammonium compounds and chlorhexidine can result in false positives.

### False Negative

**Bence-Jones proteinuria:** A positive SSA protein reaction, with a negative or weak dipstick protein reaction, in a human can be a high index of suspicion for multiple myeloma, is suggestive of the presence of free light chains in the urine

## GLUCOSE

### False Positive

**High pH:** The presence of hydrogen peroxide, bacterial peroxidases (e.g. cystitis), hypochlorite and chlorine will produce false positive reactions.

**Presence of:** Formaldehyde

**Past 90 day Stability**

### False Negative

**Low pH:** High concentrations of ascorbic acid inhibit the reaction

## KETONES

### False Positive

**Drugs:** Some drugs, including glucocorticoids (steroid hormones used to increase glucose metabolism) Vitamin C, Valporic Acid, Levopoda aka Sinemet

**Dehydration** (high Specific Gravity)

### False Negative

Most urine testing kits detect aceto-acetate, not the predominant ketone beta-hydroxybutyrate. It is possible for the test to be negative with high levels of beta-hydroxybutyrate and then, as ketoacidosis improves and ketone levels fall, the urine test becomes positive (to aceto-acetate).

**Read strip after 2 minutes**

## BILIRUBIN

### False Positive

Examples of **medications** that produce false positive dipstick and negative Ictotest results include rifampin, phenazopyridium (Pyridium), and nonsteroidal antiinflammatory agents (etodolac, mefenamic acid and flufenamic acid).

### False Negative

**Bilirubin crystals:** In some samples, bilirubin crystals may be identified in the urine (indicating bilirubinuria), however the dipstick reaction for bilirubin is negative. The reason for this is unknown, however the crystals may not solubilize sufficiently to react with the dipstick in these cases, resulting in a false negative reaction.

**Aged urine samples:** Conjugated bilirubin hydrolyzes to unconjugated bilirubin if left at room temperature.

**Exposure to UV light:** UV light converts bilirubin to biliverdin, resulting in false negative reactions.

**Ascorbic acid:** High concentrations of vitamin C inhibit the reaction.

## UROBILINOGEN

### False Positive

**Medication:** such as para-aminosalicylic acid, antipyrine, chlorpromazine, phenazopyridine, phenothiazine, sulfadiazine, and sulfonamide.

**Dark Urine:** Pigmented urine can interfere with detection of urobilinogen.

### False Negative

**Nitrite:** High nitrite concentrations can cause false negative reactions.

# Urine Strip False Positive or Negative Causes

## BLOOD

### False Positive

**Bacteria:** contaminated urine specimens may contain sufficient peroxidase activity to produce a false positive reaction. False positive reactions can also be caused by vegetable peroxidase.

Any situation that causes red cell hemolysis will give a positive dipstick and negative microscopic result.

### Myoglobin

**Oxidizing agents** - bleach, detergent, iodine

**Betadine**

### False Negative

**Exposure:** Dipsticks exposed to air (long periods of time)

**Sedimentation:** RBCs settle out & urine not mixed (if urine is centrifuged prior to testing)

Ascorbic acid (high concentration)

**Protein:** Very high protein

**Low pH:** Urine pH <5.1

**Nitrite:** High nitrite from UTI

## LEUKOCYTES (WBC)

### False Positive

**Drugs:** imipenem, meropenem, and clavulanic acid can cause false positive leukocyte esterase reactions.

**Lysed granulocytes:** may produce apparent discrepancies between positive dipstick results and negative microscopic examinations.

**Other sources of esterase:** eosinophils, Trichomonas, or epithelial cells in vaginal fluid may give false positive results.

**High pH:** Oxidizing agents such as bleach or colored substances can produce false positives.

### False Negative

**Low pH/Vitamin C:** albumin or other proteins (>500mg/dL), glucose (>3000 mg/dL), or ketones

**Dehydration:** Urine with high specific gravity can cause a false negative reaction because enzyme is not as readily released from crenated white blood cells

**Pyuria:** These samples should be examined microscopically so as not to miss clinically significant pyuria.

**Clumping:** WBC clumping may prevent dispersion of leukocyte esterase and cause a false negative result.

**Exposure:** Outdated or deteriorated dipsticks are another cause of false-negative results.

**Drugs:** Doxycycline, gentamicin and some cephalosporins reduce the reactivity of leukocyte esterase and produce false negative results.

## NITRITE

### False Positive

**Storage/Dark Urine:** False positive results can be caused by colored substances in the urine (e.g. phenazopyridine) and prolonged specimen storage at room temperature that allows proliferation of contaminating bacteria. **If urinalysis cannot be done within two hours after collection, specimens should be refrigerated to prevent bacterial growth.**

### False Negative

**Certain Bacteria:** False-negative nitrite results can occur even in the presence of significant bacteriuria due to a number of possible factors.

**A)** The causative organisms may lack the reductase enzyme needed to convert nitrate to nitrite. For example, both yeast and gram positive bacteria are reductase negative.

**B)** Significant bacteriuria may cause nitrite may be further reduced to nitrogen

**Sick Patients:** Malnourished patients and patients receiving intravenous feeding may have insufficient dietary nitrate to promote the chemical reaction.

**Time before last urination:** The duration of urine retention in the bladder may be too short (< 4 hours) to facilitate nitrate reduction.

**Low pH:** High concentrations of ascorbic acid or urobilinogen can inhibit the chemical reaction.

**Exposure:** Of course, outdated or deteriorated dipsticks can also yield false-negatives.

## ASCORBIC ACID EFFECTS ON URINE!!!

An oral dose of 100 mg of vitamin C caused falsely negative dipstick tests for blood, glucose and leukocyte esterase in urine samples tested within 4 hours of ingestion. Vitamin C consumption is a likely cause of discrepancies between urine dipstick and microscopic analysis.