

# Laboratory Technical Bulletin: Hemolysis Interference

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Hemolysis occurs when red blood cells become damaged or destroyed. Red blood cells, also known as erythrocytes, contain hemoglobin molecules which are released during hemolysis. Once a blood specimen is hemolyzed, the hemoglobin molecules within the red blood cells are released causing the serum or plasma to have a pink to red color. A noticeable red color occurs when the released hemoglobin in the serum or plasma exceeds 20mg/dL.

Certain medical conditions can result in blood hemolysis such as hemolytic anemia, liver disease or a transfusion reaction. However, most hemolysis occurs because of procedural errors during the pre-analytical phase of specimen collection, processing and transport.

## **Common pre-analytical causes of hemolysis:**

1. Residual alcohol at the skin puncture site
2. Excessive or aggressive mixing of the specimen in the tube after collection
3. Drawing blood through a hematoma from a vein with a hematoma
4. Using a large volume tube with a small diameter needle or in a weak vein
5. Obtaining blood during IV starts
6. Aggressively drawing blood in a syringe from arterial lines or patient ports

In the clinical laboratory, many of our assay's involve spectrophotometry, a method of measuring how a specimen absorbs light as a function of its color (wavelength). Therefore, visibly hemolyzed serum or plasma specimens can often interfere with test results. Excessive hemoglobin can also cause a chemical interference in some clinical tests. The standard for rejecting hemolyzed specimens is specified by the manufacturer and validated by the testing laboratory.

True hemolysis that happens in vivo may help diagnose a clinical condition of a patient. However, hemolysis that occurs from pre-analytical errors can be detrimental to the quality of the patient specimen and test results. Hemolysis of a blood specimen can erroneously elevate ammonia, liver enzymes, cardiac markers, iron, magnesium, phosphorus, and potassium. Hemolysis can also cause falsely decreased levels of total bilirubin and direct bilirubin.

## **How to prevent hemolyzed samples:**

1. After cleansing the venipuncture site, allow to air dry before collection.
2. Never draw blood through a hematoma.
3. If using a syringe, avoid drawing the plunger with excessive force.
4. Discontinue "sluggish" draws.
5. Avoid using large volume tubes with small gauge needle openings.
6. Avoid tourniquet restriction for longer than 1 minute.
7. Avoid vigorously shaking tubes, gently mix 3-5 times for proper mixing.
8. Avoid obtaining blood from an IV start.

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**Submitted by:** Ali Gabali MD PHD, Medical Director, McLaren Medical Laboratory  
Victoria Coleman, System Manager Chemistry