

Bronson LabWire

Laboratory News and Analysis for Clinicians May 2023

Test Updates (obsolete tests)

TEG6 Platelet Mapping - ADP Only (LAB4748) is no longer available as of 4/2/2023.

Alternative Test: TEG6 Platelet Mapping ADP & AA (LAB4749)

Test Updates (name change)

The Coombs Test

To increase consistency and indicate in further detail what testing is being performed by Bronson Laboratories, the names of the coombs tests have been revised as shown in table below.

Order code	Old test name	New name
LAB3532	Direct coombs, complement	Direct coombs (DAT), complement
LAB274	Direct antiglobulin test	Direct coombs (DAT), polyspecific with reflex to IgG

Background

The "coombs" test, as it commonly referred to, is based on a test developed in the 1940s by Coombs, Mourant, and Race.² It goes by many names: direct antiglobulin test, DAT, coombs, direct coombs, and multiple other variations on the theme. This test detects *in vivo* coating of red cells with antibody or complement components. To prevent *in vitro* fixation of complement, samples tested by this method are collected in tubes that contain EDTA. The EDTA chelates the calcium that is needed for activation of c1 and complement fixation.¹ Most often, the initial coombs testing performed is "polyspecific" meaning it detects both antibody and complement fixation. If positive, polyspecific tests are followed up with "monospecific" tests that detect either antibody (IgG) or complement (C3) components, separately.

Diagnostic value in AIHA

Coombs testing is most often utilized to determine if a hemolytic anemia has an immune etiology.¹ It is important to note that there is a poor correlation between a positive coombs test and clinical hemolysis.⁴ Coombs testing is only a useful diagnostic tool for auto-immune hemolytic anemia (AIHA) in those patients that present with symptoms of hemolytic anemia. The probability that a patient with symptoms of hemolytic anemia and a positive DAT, has AIHA is 83%, but the probability that a patient with a positive DAT and no symptoms of hemolysis has AIHA is only 1.4%.³ Positive DATs are found in the blood donor pool at a frequency of 1:1000 to 1:14000 and in the general hospital population at a frequency of 1 to 14%.⁵

	WAIHA (Warm autoimmune hemolytic anemia)	CAS (Cold agglutinin syndrome)	Mixed- type AIHA	PCH (Paroxysmal cold hemoglobinuria)
DAT	IgG (20%) IgG+C3 (67%) C3 (13%)	C3 only	IgG+C3 C3	C3 only
Antibody type	IgG	IgM	IgG, IgM	IgG
Antibody specificity	Broadly reactive, multiple specificities reported	Usually, anti-I	Usually, unclear	Anti-P
Other notes	Majority of AIHA cases			Rarest form of DAT positive

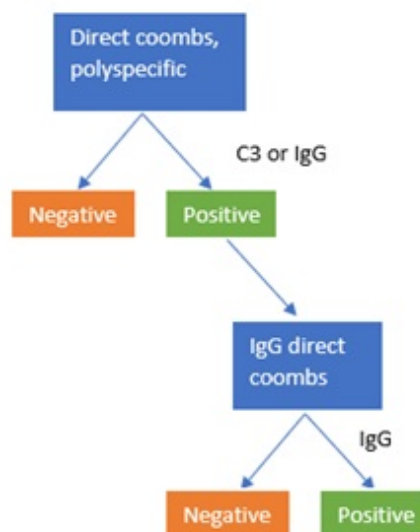
Bronson Laboratories

Bronson Blood Bank performs coombs testing as a routine part of many workups. The following workups include a form of coombs testing.

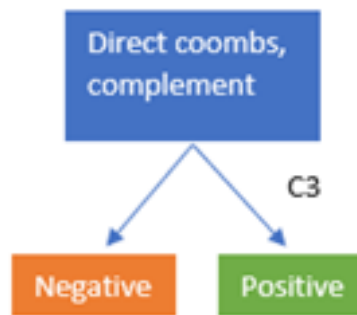
- **Cord Blood Workup** – includes a coombs IgG test to investigate Hemolytic Disease of the fetus and newborn (HDFN).
- **Transfusion Reaction Evaluation** – when indicated, includes coombs testing on pre- and post-transfusion samples including polyspecific, IgG, and complement coombs tests.
- **Antibody Identification** – when indicated, a coombs IgG is run to determine if there is an autoantibody.

Providers can also order stand-alone coombs testing when investigating whether hemolytic anemia is of immune origin. The test ordered should be selected based on which type of immune hemolytic anemia is suspected. The two tests offered by the Bronson Methodist Hospital Blood Bank are described in the figures below.

Direct coombs (DAT), polyspecific with reflex to IgG – includes a polyspecific coombs test that detects the presence of either or both complement and IgG. If it is positive, a coombs IgG test will be reflexed. This should be ordered if WAIHA or Mixed-type AIHA is suspected.



Direct coombs (DAT), complement – includes a coombs complement test. This test should be ordered if PCH or CAS is suspected.



References

1. AABB Technical Manual, 20th ed, 2020.
2. Coombs, R. R. A., Mourant, A. E., & Race, R. R. (1945). A new test for the detection of weak and "incomplete" Rh agglutinins. *British journal of experimental pathology*, 26(4), 255.
3. Kaplan H.S., Garratty G. (1985). Predictive value of direct antiglobulin test results. *Diagn Med*, 8, 29-33.
4. Meulenbroek, E. M., Wouters, D., & Zeerleder, S. S. (2015). Lyse or not to lyse: Clinical significance of red blood cell autoantibodies. *Blood Reviews*, 29(6), 369-376.
5. Petz LD, Garratty G. (2004). Immune hemolytic anemias. 2nd ed. Philadelphia: Churchill-Livingstone.

Lab Stewardship Tip

Reducing Use of Antibiotics in Asymptomatic Bacteriuria

Bronson Healthcare group is striving to reduce the use of antibiotics in asymptomatic bacteriuria. This effort is driven by Choosing Wisely campaign and the BCBSM Value Partnership to align with best practice recommendations while improving quality and reducing cost. It is important for providers to understand Bronson's test menu for urinalysis (URCH), urine with reflex microscopy (UA), and urinalysis with microscopy and reflex to culture if indicated (UAIFF) tests and how to interpret the results.

- Urinalysis includes 12 important chemical tests that assess the patient's renal and metabolic function
- Urine microscopy adds an assessment for formed elements in urine, including red blood cells (hematuria), white blood cells (pyuria), epithelial cells, hyaline casts, and some bacteria
- Urine culture includes a semiquantitative culture of urine for aerobic bacteria, with identification and susceptibility testing of uropathogens

Did you know? If you are interested in assessing your patient's renal function and your patient does not have symptoms of a urinary tract infection you should order urinalysis (URCH) or urine with reflex microscopy (UA) and not a urinalysis with microscopy and reflex to culture if indicated (UAIFF).

The UAIFF order also reflexes to urine culture with moderate greater leukocyte esterase, positive nitrite, >9 WBCs/HPF, or 2+ or greater bacteria. The UAIFF order may be needed for patients with clinical signs or symptoms concerning for UTI. Symptoms associated with UTI include: urinary frequency, urgency, and dysuria in a patient without a catheter, fever >38°C, rigors, costovertebral angle tenderness/ flank pain/ suprapubic pain, acute hematuria, altered mental status with leukocytosis >10K and or hypotension <90 (suggesting sepsis), and increase spasticity or autonomic dysreflexia in spinal cord patients.

It is very important to educate patients on "clean" urine collection. Studies show that patient education regarding collection of clean catch midstream urine samples reduces contamination by urogenital flora. In clean catch samples, there are fewer epithelial cells and normal urogenital bacteria identified on urine microscopy resulting in a decrease in reflex to unnecessary culture. If the patient is unable to void, straight catheterization is an acceptable specimen.

Proper test selection and collection method (clean catch midstream) is important for cost to

Bronson system and the patient and minimizes unnecessary culturing and work-up of urogenital commensals. Costs associated with urine tests performed in the lab are listed below:

Urinalysis:	\$20
Microscopic:	\$37.90
Culture:	\$39.29
Bacterial identification:	\$51.31 each