



National Neutrophil Laboratory

The American Red Cross National Neutrophil Laboratory (NNL) is a worldwide leader in neutrophil testing. Our Neutrophil Laboratory is one of the few facilities in the United States that perform a combination of the granulocyte immunofluorescence test (GIFT) and granulocyte agglutination test (GAT) for detecting HNA antibodies.

Additionally, NNL is one of a few neutrophil laboratories to routinely offer a monoclonal antibody immobilization of neutrophil antigen (MAINA) assay, the recommended testing of neutrophil antibodies in children with a presumptive autoimmune neutropenia diagnosis. The laboratory includes extremely rare donor cells in our neutrophil panel that assists in the detection of HNA-2, HNA-3a, HNA-3b, HNA-4a, HNA-4b, HNA-5a and Fc γ RIIIb (CD16) antibodies.

In collaboration with other testing facilities, our neutrophil testing laboratory serves patients ranging from infants, pregnant women, transfusion patients, and conditions such as drug-induced neutropenia and TRALI cases. The Red Cross is also a founding member of the ISBT Working Party on Granulocyte Immunobiology, and participates in the International Granulocyte Immunology Workshop consortium.

Indications

The presence of antibodies directed toward neutrophil results in their destruction and leads to a clinical condition known as neutropenia. Neutropenia is defined as an abnormally low concentration of neutrophils. Neutrophils are the most abundant white blood cells found in the bloodstream and are essential in fighting off bacterial and fungal infections. Antibodies to neutrophil antigens can be found in the blood of multi-transfused individuals, donors, patients with autoimmune disease, and women following pregnancy, causing transfusion reactions. These tests can aid in the clinical diagnosis of the following disorders:

- **Transfusion-related acute lung injury (TRALI):** TRALI is a pulmonary syndrome associated with transfusion that usually develops within 6 hours after the transfusion of any blood component. Often severe and potentially life-threatening, it is one of the most frequent causes of transfusion-associated mortality in the United States.* TRALI has been associated with the activation of neutrophils located in the pulmonary capillary vasculature due to the passive transfer of leukocyte antibodies found in transfused blood components, or on rare occasions leukocyte antibodies in the recipient. In cases of suspected TRALI, testing of plasma from implicated donors and recipients is critical.

- **Alloimmune neonatal neutropenia (ANN):** ANN is an uncommon condition where a newborn may present with bacterial infection(s) due to neutropenia in which destruction of neutrophils occurred by maternal alloantibodies to specific human neutrophil antigens (HNAs).
- **Autoimmune neutropenia (AIN):** AIN is a disorder most common in infants and young children where the body makes IgG antibodies directed against neutrophil antigens which results in neutrophil clearance. When neutropenia is the only blood abnormality detected, it is also known as primary autoimmune neutropenia.
- **Drug-induced neutropenia:** Patients may become neutropenic during or soon after drug therapy, and it can be mild, moderate or severe. Drugs known to be involved in immune-mediated neutropenia include antibiotics, analgesics, antiarrhythmics, antimalarials, and antithyroid medications.

Description

The lab follows the ISBT Working Party on Granulocyte Biology guidelines for detecting HNA antibodies, specifically a combination of the granulocyte agglutination test (GAT) and granulocyte immunofluorescence test (GIFT), and is one of only a few laboratories to offer the monoclonal antibody immobilization of neutrophil antigen assay (MAINA) which can distinguish neutrophil antibodies from HLA antibodies.

Test Methods

- Granulocyte agglutination test (GAT)
- Granulocyte immunofluorescence test (GIFT)
- Monoclonal antibody immobilization of neutrophil antigens (MAINA)
- Neutrophil antigen typing

*Citations available upon request.

