Daratumumab is a human CD38-directed monoclonal antibody and is FDA approved for the treatment of multiple myeloma, but may be used for other disorders. However, CD38 protein is also expressed on red blood cells (RBCs). Thus, the presence of Daratumumab in patient plasma interferes with blood bank antibody screening and crossmatch, as the anti-CD38 will bind to the antibody screening cells and donor RBCs used for testing. Patients may also present with a weakly positive direct antiglobulin test (DAT).

Daratumumab typically does not interfere with ABO and Rh typing.

Observation

Plasma from patients treated with Daratumumab reacts with all RBCs (panagglutinin) but with a non-reactive autologous control, appearing to detect an antibody to a high prevalence antigen by the indirect antiglobulin test (IAT; also known as the antibody screen or panel). Positive reactivity will mask underlying alloantibodies preventing timely provision of blood for transfusion and putting the patient at risk for a transfusion reaction. The antibody reactivity is not readily removed by adsorption. Daratumumab can be detected for up to 6 months after the drug is discontinued. Thus, compatibility with donor RBCs cannot be demonstrated by serologic testing.

Recommendations for Physicians and Hospital Blood Bank Staff

- Prior to initiating Daratumumab therapy, obtain a sample for antibody screening and extended antigen phenotyping/genotyping.
  - The purpose is to detect pre-existing atypical antibodies and to determine which antigens the patient lacks.
  - Genotyping is recommended to provide information for clinically important blood groups for which phenotyping is not possible (Dombrock, Kp/Js, Lu).
- Always inform the blood bank when the patient has received Daratumumab.
- Plan ahead when possible for transfusions, as turn-around time will increase because special testing procedures (below) will be needed to rule out the presence of clinically significant antibodies.
- Transfusion services may wish to provide extended antigen matched RBCs with or without performing extensive antibody identification. Each transfusion service should have a policy for:
  - Frequency of antibody screening to rule out underlying alloantibodies.
  - Extent of prophylactic antigen-matching.

Antibody Screening to Rule Out Underlying Alloantibodies

For samples referred to NYBC Laboratory for Immunohematology and Genomics, testing will be guided by the patient’s extended antigen profile, previous transfusion, pregnancy and antibody history.

1. CD38 is sensitive to treatment with DTT (dithiothreitol) and trypsin (protease) and test red cells treated with these can be used for antibody identification. Some clinically significant antigens, most notably Kell system and Dom brock, will be destroyed by DTT and antibodies to these (as well as to the less common Yt, Lu, LW, In) would be missed. Trypsin treated cells can be used to detect antibodies to Kell, Yt, and LW.
2. When additional rule-outs are needed, RBCs known to have no (or greatly reduced CD38), will be tested and include [In(Lu)] type Lu(a−b−) and/or antigen typed cord RBCs.

FOR MORE INFORMATION, PLEASE CONTACT:
NYBC Laboratory of Immunohematology and Genomics: 718.752.4771
Additional information is provided by the drug company: