



# e-Network Forum

## CALIFORNIA BLOOD BANK SOCIETY

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### ***False-negative Results with PEG Red Cell Antibody Test - Due to Elevated Serum Globulins***

The following 'case' was recently submitted by a member to the e-Network for discussion: "This week a sample negative in the erythrocyte antibody screening (3-cells panel using PEG) **failed to create a positive reaction with Coombs control cells**. These are sensitized cells to check the quality of the Coombs reagent; they are added at the end of the test. Samples from other patients in the same run showed a normal (positive) reaction with the control cells. Repeating the test with freshly drawn material produced the same result. However, on repeating the antibody screening with addition of albumin, the Coombs control cells reacted normally (i.e., positive). We then analyzed the sample for **total protein and albumin** and found **91 g/L and 31 g/L respectively**. The patient had been admitted with a sodium concentration of 119 mmol/L, osmol 259 mosmol/kg, chloride 88 mmol/L, potassium 4.8 mmol/L and a general feeling of ill well-being (!). Now we have a request for protein electrophoresis (liver enzymes are normal). No further clinical details available. Has anyone seen similar cases?"

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The following very insightful responses were submitted to explain the serologic findings:

1. According to Gamma's product insert, **PEG will precipitate serum globulins**. If the precipitated globulins remain trapped in the red cell button, they will neutralize the anti-IgG and cause a false negative test. Gamma states that the **standard three washes may not be adequate** to remove all of the precipitated globulin. In some samples with very high levels as in multiple myeloma, a gel may even form and invalidate your test. This observation has been written up in Transfusion (1990-Vol 30, No. 2 pp154-157) and New York Blood Center has presented an abstract on this phenomenon at an AABB meeting.
2. Please read the package insert for the PEG reagent. PEG tends to precipitate protein, especially when protein levels are elevated. In such cases, additional washes are required to completely remove the protein. The reason PEG reagent does not work in transfusion services that use the Dac II is because that cell washer does not agitate between washes. Four washes with a Sorvall cell washer or manual washes are almost always effective. Sometimes, **depending on the protein level, 5 washes are necessary**.
3. To follow up on whether a similar case was seen with check cells failing to check and PEG used as the enhancement, yes we have seen a few cases in the last few years. My recollection is that the patients all exhibited abnormal protein values, and that other patients tested with the same vial of PEG had check cells that performed satisfactorily. Some of the patients had been on hyperalimentation. Our technique was to repeat testing in case it was a technique problem, and if there was still a check cell failure to go to LISS for enhancement. This phenomena was a transitory problem as the proteins values were unusual. Sometimes **washing the cells eight times** would allow the check cells to perform properly as well. We called this "PEG binding phenomenon" so that the technologists knew what had happened previously with testing on the patient's sample. I believe the first time we encountered this we talked to Gamma technical services to see if they had information about what was happening and how to perform satisfactory testing of this type of patient sample.

**ADDENDA** Feb. 15, 2001

4. The member who posed the problem case with PEG wishes to **thank the e-Network members** who commented on the interaction of high serum protein levels and PEG. Here is what that member had to say:

"The point we would like to make is that sometimes followup on unusual test reactions may lead to findings that were not suspected by the clinician. The patient himself is a whole being, not just a blood recipient only, or - on the other side - a provider of material for protein tests. In these times of specialisms and superspecialisms it should be realized that working across disciplines can have advantages. The electrophoresis of this patient showed a **band in the gamma region**, which on

immune fixation proved to be an igG lamda of 29 g/L. "

Please submit comments to the [e-Network Forum](#).



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**Ira A. Shulman, MD**  
CBBS e-Network Forum Editor & Moderator

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**Posted:** February 14, 2001

**Addenda:** Feb. 15, 2001