



# e-Network Forum

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### *Puzzling Hemolysis in Donor Sample Tubes*

**The Medical Director of a Blood Bank in Northern California** writes about a **platelet donor** who has **donated 253 times in 20 years**. In the last two years, the testing laboratory has stated the **EDTA sample tubes** they have received have been **hemolyzed on 8 occasions**. Sending an apparently **hemolysis free additional tube** has not always permitted testing as even that tube is **sometimes reported hemolyzed**. Hemolysis in these tubes has never been observed at the blood bank, even with storage for a week or more.

This has never occurred with blood from any other donor.

Workup of this donor finds **no history of medical or drug-related hemolysis**. There is no evidence of hemolysis; **CBC is WNL without evidence of agglutination or aniso- or poikilocytosis**. There have been **no difficulties with apheresis draws**. No infectious disease markers test positive; no unexpected antibodies have been identified. Serologic testing shows a **negative DAT with a cold auto-antibody strongest at 4 degrees**.

As of yet, **no Donath-Landsteiner test or G6PD testing** has been performed.

She asks "**Any clues as to the cause of this?**"

#### **ADDENDA** April 22, 2008

- 1. A transfusion medicine physician in Boston** suggests that some additional information might shed light on the cause of the hemolysis puzzle. He **suggests that the platelet donor be tested for PNH**. PNH can cause episodic hemolysis of red cells due to increased sensitivity to complement and the triggers are largely unknown. Although *ex vivo* hemolysis should be reduced in EDTA tubes, it would be easy enough to check the donor for PNH. He also wonders about the **details of the platelet collection system being used**. If the sample sent for testing was withdrawn from a small pouch that receives the initial blood collected, perhaps that blood sample is undergoing hemolysis upon contact with a solution in that pouch. This seems unlikely, but it would be interesting to know the **details of exactly how (and from where) these hemolyzed samples are being collected**.
- 2. A transfusion medicine physician in Northern California** points out that the case history under discussion mentions that serologic testing shows a negative DAT with a cold auto-antibody strongest at 4C. She wonders if the **cold auto-antibody might be the cause** of the *in vitro* hemolysis and **suggests that future blood samples be collected at 37C and maintained in the warm during processing**. If hemolysis is seen in a pair of future samples, one of which is allowed to cool to room temperature before being processed and the plasma separated for testing, and the other of which is collected and processed and the plasma separated for testing strictly at 37C, the hemolysis is likely caused by something other than a cold auto-antibody.

#### **ADDENDA** Apr. 24, 2008

- 3. A doctoral scientist in the greater Atlanta area** wonders if the reported problem might be **related to sample shipping**? If the sample got too cold or too hot, hemolysis might ensue. She agrees that this is a puzzle, because the hemolysis seems to happen in about 30% of the recent donations.

4. **A transfusion medicine physician in England** comments that the case report sounds somewhat bizarre. He suggests that the **donor should be evaluated by a physician for a possible compensated hemolytic process** (since the donor does not appear to be anemic), including obtaining a complete history, inquiring about medication and occupational exposures, performing a complete physical examination, and ordering a lab work up to include markers for hemolysis. He makes the aforementioned comments **with the assumption that any problems with the storage or shipping of the donor's specimens** that might have caused hemolysis (e.g. extremes of temperature) **have been ruled out**.
5. **George Garratty, PhD, FRCPath., Scientific Director at the American Red Cross Blood Services in Los Angeles** (attribution used with permission) reports that his laboratory has **seen this phenomenon** with patients' EDTA samples **many times over several decades**. His laboratory has **tried to find out the cause in some individual patients, with no success**.

**ADDENDA** May 7, 2008

6. An **immunohematologist in an East Coast State** suggests **several clarifying questions** to help evaluate the root cause of this puzzling phenomena.
- Any history of mechanical causes for hemolysis, valve, G6PD, heart valve, sepsis?
  - Are samples drawn in all tubes and anticoagulants hemolyzed or just EDTA?
  - Does the hemolysis worsen at certain temperatures – 37°, RT, 4° and has the sample been examined at these temperatures for IgM agglutination?
  - Has the sample been tested for IgA or IgM coating the cells?

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

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**Addenda:** Apr. 22 & 24, May 7, 2008

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