




ASK A SPECIALIST: ASK A PATHOLOGIST

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QUESTION

What is the difference between packed red blood cells that are called "CMV negative" and those that are called "CMV safe"?

ANSWER

Cytomegalovirus (CMV) infection may be transmitted through transfusion of cellular blood products (packed red blood cells and platelets). There are currently two main methods available to reduce transfusion-transmitted CMV. One option is to test individual blood donors for the presence of IgG and/or IgM antibodies against CMV at the time of donation, and to select blood products only from donors who test as negative (a "CMV negative" blood product). The disadvantage to this method is that it will not detect donors who are in the window period after acute CMV infection and have not yet had time to develop a detectable antibody response.

The second strategy to reduce CMV transmission is to provide leukocyte reduced ("CMV safe") blood products, in which the product is filtered to remove white blood cells. Since CMV generally resides within peripheral blood monocytes, filtering and removing white blood cells significantly reduces the risk of transmission even from CMV positive donors. The disadvantage of this method is that a small number of residual white blood cells will remain after filtration, so transmission may still occur if the donor has a high viral load at the time of donation.

A large study comparing leukocyte reduced versus CMV negative transfusions in bone marrow transplant recipients found no statistically significant difference in the rate of CMV transmission between the two groups.¹ Subsequent smaller studies have shown mixed results, with leukocyte reduction having either equivalent or slightly higher rates of CMV transmission compared to CMV negative products. The published failure rates for CMV negative or leukocyte reduced units range between 1-4% for both methods. However, many of these studies use an older, now obsolete filter technology for leukocyte reduction, so rates of CMV transmission may actually be much lower with current filtration technology.

There are additional benefits to leukocyte reduction, including a decreased risk of febrile transfusion reactions and a decreased risk of HLA immunization. Because of this, the majority of blood collection centers in the US now perform universal leukocyte reduction on all cellular blood products shortly after collection, and many hospitals are now providing only leukocyte reduced "CMV safe" blood products to all patients without needing a special order for this modification from the health care provider. Check with your hospital's blood bank to determine if they use universal leukocyte reduction for cellular blood products.

References

1. Bowden RA, Slichter SJ, Sayers M, et al. A comparison of filtered leukocyte-reduced and cytomegalovirus seronegative blood products for the prevention of transfusion-associated CMV infection after marrow transplant. *Blood*. 1995 86: 3598-3603.

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