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## Inactivation of human white blood cells in platelet products after Pathogen Reduction Technology (PRT) treatment in comparison to gamma irradiation

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Functional leukocytes in blood components may be responsible for a number of adverse transfusion effects, including transfusion-associated graft versus host disease (TA-GvHD), alloimmunization and alloimmune platelet refractoriness. Attempts to reduce these undesirable effects have included leukoreduction filters and gamma-irradiation. Studies have shown that exposure of platelet concentrates to riboflavin and light (Mirasol\* PRT) causes irreparable modifications of nucleic acids that result in inactivation of a wide range of pathogens as well as inhibition of the immunological responses mediated by leukocytes present in platelet concentrates.

The effect of the Mirasol PRT treatment of blood products on WBC function was tested and compared to gamma- irradiation. PRT treatment and gamma-irradiation reduced the ability of the T-cells to proliferate by similar degrees as evidenced by a  $\geq 6$  log reduction in the limiting dilution assay (LDA). After PRT treatment, but not after gamma-irradiation, WBCs were unable to present antigen and stimulate proliferation in allogeneic responder cells. PRT treatment resulted in a significantly reduced secretion of cytokines in response to LPS or anti-CD3/28. In contrast, cytokines released by gamma-irradiated WBCs were not significantly different than untreated controls. Xenogeneic GvHD in animals injected with PRT-treated WBCs was prevented, as evidenced by lack of GvHD development, human cell engraftment, antibody production, and increase in human cytokine. Finally, rat studies suggest that PRT treatment may reduce or eliminate alloantibody generation and alloantibody-mediated cardiac graft rejection, observed as a result of transfusion of leukocytes.

	Leukoreduction	Gamma irradiation (25 Gy)	Mirasol PRT
WBC viability	Residual amount of viable WCBs	> 5 log reduction	> 6 log reduction
Allo-immunization	Reduced but not prevented	Not prevented	Prevented in animal study
TA-GVHD	Not prevented	Prevented	Prevented in an animal study
Cytokine production	Still produced by residual WBCs	Cytokines still produced	Production prevented

Effect of Mirasol PRT in comparison with leukoreduction and gamma-irradiation

These in vitro results demonstrate that Mirasol PRT treatment is more effective than gamma irradiation at abrogating

## Biography

selected WBC immune functions.

Susanne Marschner obtained her Ph.D. in 1999 from University of Wurzburg, Germany in collaboration with the Department of Immunology at National Jewish Health. After working for 5 years as a Research Associate in the field of HIV-mediated immune dysfunction with focus on T-cell signaling, she worked at Proneuron, a company developing a novel cell therapy to treat spinal cord injuries. In 2006 she joined Terumo BCT (formerly Gambro BCT or Caridian BCT) as a Senior Scientist in the blood component business segment. Since 2012 she has been leading the Scientific Affairs group.

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