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A Monthly Newsletter Summarizing Important Advances in Transfusion

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Variant Creutzfeld-Jakob disease transmission through blood transfusion

James W. Ironside (National Creutzfeld-Jakob Disease Surveillance Unit, University of Edinburgh, Western General Hospital, Edinburgh, UK) and coworkers reported in July the discovery of a second case of transfusion-transmitted variant Creutzfeld-Jakob disease, the human form of mad cow disease. This result confirms that this infectious neurodegenerative ailment can be transmitted from one individual to another through transfusion of blood components. This finding will encourage public health authorities to enhance surveillance.

Peden, A. H., et al. (2004). **Preclinical vCJD after blood transfusion in a *PRNP* codon 129 heterozygous patient**. Lancet 364: 527-529.

Wilson, K. (Toronto General Hospital, University Health Network, Toronto, Ontario) and Ricketts, M. N. (2004). **Transfusion transmission of vCJD: a crisis avoided?** Lancet 364: 477-479.

Variant Creutzfeld-Jakob disease: Large-scale analysis of lymphoid tissues from surgical specimens

One of the hallmarks of variant Creutzfeld-Jakob disease is the accumulation of the infectious agent in lymphoid organs during the asymptomatic phase of the disease. The analysis by David A. Hilton et al. (Derriford Hospital, Plymouth, UK) of 12 674 lymphoid tissue samples from surgical removal of the appendix or tonsils performed in the UK since 1995 led to the identification of three samples that were positive for the infectious prion protein (PrP^{Sc}), the latter being a reliable marker of the infection. Extrapolating this figure to the population of the UK yields an estimated prevalence of 237 cases per million. This study underscores the importance of sustained vigilance programs by public health authorities.

Hilton, D. A., et al. (2004). **Prevalence of lymphoreticular prion protein accumulation in UK tissue samples**. J Pathol 203: 733-739.

Embryonic stem cells: A new source of hematopoietic cells?

An article published by Richard K. Burt's team (Northwestern University, Chicago, IL, USA) suggests another potential application of embryonic stem cells. Burt and coworkers were able to derive *in vitro* hematopoietic cells using mouse embryonic stem cells as starter culture. When injected into irradiated mice, the *in vitro*-derived hematopoietic cells allowed reconstitution of blood cell production in this animal model. This work is a relevant example of the many possible applications of embryonic stem cell research.

Burt, R. K., et al. (2004). **Embryonic stem cells as an alternate marrow donor source: engraftment without graft-versus-host disease**. J Exp Med 199: 895-904.

Long-term storage of platelet concentrates by lyophilization

Platelet concentrate storage time, currently limited to five days post-donation, complicates the management of the inventory and supply for this blood component. To overcome this logistic challenge, the team led by Willem F. Wolkers (University of California, Davis, CA, USA) optimized platelet lyophilization conditions. This process by which platelets are literally freeze-dried allows long-term storage of this fragile blood component. Following rehydration, platelet recovery is in the 80% range. The *in vitro* activity of rehydrate platelets is comparable to that of fresh platelets.

Wolkers, W. F., et al. (2003). **Towards a clinical application of freeze-dried human platelets**. Cell Preservation Technology 1: 175-188.

Contribution of platelets to immune defense mechanisms

The primary function of blood platelets is to plug lesions within blood vessels, thereby preventing hemorrhages. Recent studies suggest that this blood component also contributes to host defense against infections. An article by Julie Lekstrom-Himes (Millenium Pharmaceuticals, Cambridge, MA, USA) and coworkers supports this hypothesis, by demonstrating that activated platelets produce and release CD154, an important messenger protein of the immune system.

Czapiga, M., et al. (2004). **Platelets deliver costimulatory signals to antigen-presenting cells: a potential bridge between injury and immune activation**. Exp Hematol 32: 135-139.