Inactivation of Ebola virus and Middle East respiratory syndrome coronavirus in platelet concentrates and plasma by ultraviolet C light and methylene blue plus visible light, respectively

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BACKGROUND: Ebola virus (EBOV) and Middle East respiratory syndrome coronavirus (MERS-CoV) have been identified as potential threats to blood safety. This study investigated the efficacy of the THERAFLEX UV-Platelets and THERAFLEX MB-Plasma pathogen inactivation systems to inactivate EBOV and MERS-CoV in platelet concentrates (PCs) and plasma, respectively.

STUDY DESIGN AND METHODS: PCs and plasma were spiked with high titers of cell culture–derived EBOV and MERS-CoV, treated with various light doses of ultraviolet C (UVC; THERAFLEX UV-Platelets) or methylene blue (MB) plus visible light (MB/light; THERAFLEX MB-Plasma), and assessed for residual viral infectivity.

RESULTS: UVC reduced EBOV (≥4.5 log) and MERS-CoV (≥3.7 log) infectivity in PCs to the limit of detection, and MB/light decreased EBOV (≥4.6 log) and MERS-CoV (≥3.3 log) titers in plasma to nondetectable levels.

CONCLUSIONS: Both THERAFLEX UV-Platelets (UVC) and THERAFLEX MB-Plasma (MB/light) effectively reduce EBOV and MERS-CoV infectivity in platelets and plasma, respectively.

Middle East respiratory syndrome coronavirus (MERS-CoV) and Ebola virus (EBOV) are emerging infectious diseases that currently are not considered a high or moderate priority for blood transfusion safety and availability.[1,2] Most cases of MERS-CoV infection have arisen in the Middle East (particularly Saudi Arabia) and in the Republic of Korea,[3] but two documented cases were observed in travelers to the United States.[4] This suggests that MERS-CoV might continue to emerge in Western countries via transmission by persons traveling to or returning from affected areas. There is no evidence to date that MERS-CoV

ABBREVIATIONS: EBOV = Ebola virus; MB = methylene blue; MB/light = methylene blue in combination with visible light; MERS-CoV = Middle East respiratory syndrome coronavirus; PC(s) = platelet concentrate(s); PI = pathogen inactivation; RF = reduction factor; $TCID_{50}$ = 50% tissue culture infectious dose.

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This work was supported by the "Deutsche Forschungsgemeinschaft der Blutspendedienste des Deutschen Roten Kreuzes" and Macopharma S.A.S.

Received for publication March 1, 2018; revision received March 22, 2018; and accepted March 23, 2018.

doi:10.1111/trf.14652