


# Inactivation of three emerging viruses – severe acute respiratory syndrome coronavirus, Crimean–Congo haemorrhagic fever virus and Nipah virus – in platelet concentrates by ultraviolet C light and in plasma by methylene blue plus visible light

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## Vox Sanguinis

**Background** Emerging viruses like severe acute respiratory syndrome coronavirus (SARS-CoV), Crimean–Congo haemorrhagic fever virus (CCHFV) and Nipah virus (NiV) have been identified to pose a potential threat to transfusion safety. In this study, the ability of the THERAFLEX UV-Platelets and THERAFLEX MB-Plasma pathogen inactivation systems to inactivate these viruses in platelet concentrates and plasma, respectively, was investigated.

**Materials and methods** Blood products were spiked with SARS-CoV, CCHFV or NiV, and then treated with increasing doses of UVC light (THERAFLEX UV-Platelets) or with methylene blue (MB) plus increasing doses of visible light (MB/light; THERAFLEX MB-Plasma). Samples were taken before and after treatment with each illumination dose and tested for residual infectivity.

**Results** Treatment with half to three-fourths of the full UVC dose (0.2 J/cm<sup>2</sup>) reduced the infectivity of SARS-CoV ( $\geq 3.4$  log), CCHFV ( $\geq 2.2$  log) and NiV ( $\geq 4.3$  log) to the limit of detection (LOD) in platelet concentrates, and treatment with MB and a fourth of the full light dose (120 J/cm<sup>2</sup>) decreased that of SARS-CoV ( $\geq 3.1$  log), CCHFV ( $\geq 3.2$  log) and NiV ( $\geq 2.7$  log) to the LOD in plasma.

**Conclusion** Our study demonstrates that both THERAFLEX UV-Platelets (UVC) and THERAFLEX MB-Plasma (MB/light) effectively reduce the infectivity of SARS-CoV, CCHFV and NiV in platelet concentrates and plasma, respectively.

**Key words:** ultraviolet light, methylene blue, pathogen inactivation, plasma, platelet concentrates.

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## Introduction

There is a large group of emerging viruses known to be occasionally transmitted by blood or to have properties

suggesting their transmissibility by this route. These pathogens include severe acute respiratory syndrome coronavirus (SARS-CoV), Crimean–Congo haemorrhagic fever virus (CCHFV) and Nipah virus (NiV), which have been identified by the World Health Organization (WHO) as major infectious threats with the potential to cause a global pandemic [1–3].

There are different pathogen inactivation techniques that have been developed to reduce or eliminate the

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