

Inactivation of Pathogens in Blood Products Using Visible Light

Technology Summary

Contamination of the blood supply with bacteria, viruses, and parasites is a major public health concern. While donor selection and screening of blood products for transfusion-transmitted pathogens (TTPs) has drastically reduced the incidence of transfusion-transmitted infections (TTIs), risks still remain. The emergence of new TTPs that affect the blood supply compounds the risk further. There remains a genuine need to reduce TTPs associated with both current and emerging infectious diseases (EIDs). Pathogen reduction technology (PRTs) that uses physical and chemical means to reduce TTPs in transfusable blood products offer a powerful approach for addressing blood-borne EIDs. However, the physical and chemical treatment of blood products creates new challenges in terms of preserving an optimal level of the blood product function. For example, treatment of blood with ultraviolet (UV) light or chemicals can damage blood cells and impede their functions. Additionally, chemicals, such as photosensitizers, need to be removed from treated blood products prior to transfusion.

This novel PRT uses visible light alone, without the use of chemicals/photosensitizers, to inactivate TTPs in plasma and platelet concentrates derived from whole blood. This PRT consists of an apparatus and a methodology for reducing pathogens in blood products. Unlike other PRTs, this technology reduces TTPs in blood plasma and platelet concentrates without the use of UV light, photosensitizers, or chemicals that can reduce the performance of blood components. This PRT has demonstrated the ability to significantly reduce the bacterial load (CFU) of *S. aureus*, *S. epidermidis*, and *E coli* in plasma. Furthermore, it was shown to significantly reduce the virucidal activity (PFU) of Feline Calicivirus in plasma. This PRT provides a simple and affordable solution for efficiently reducing pathogens in blood components with the potential for use in any setting including remote regions of the world.

Potential Commercial Applications

- Reduction of pathogens in blood products
- Potential for use in hospitals, clinics, and remote regions

Competitive Advantages

- Reduces pathogens in blood products without using UV light or chemical treatments
- Cost-effective way to reduce pathogens in blood products
- Provides a simple PRT for middle to low income countries
- Portable and easy to use

Development Stage: prototype, proof of concept studies

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Publications:

“A new proof of concept in viral inactivation: virucidal activity of 405 nm light against feline calicivirus as a model for norovirus decontamination” *Food Environ Virol* 2017;9(159): PMID: [28040848](#)

“A new proof of concept in bacterial reduction: antimicrobial action of violet-blue light (405nm) in ex-vivo stored plasma” *J Blood Transfus* 2016;2016:2920514: PMID: [27774337](#)

Intellectual Property:

U.S. Nonprovisional Application: 15/765,424, filed 04.02.2018

European Patent Application: EP20160784311, filed 04.30.2018

Product Area: Antimicrobials, bacterial infectious disease

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