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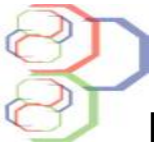

Pulsed High Voltage Discharge Technology for Killing Hepatitis C virus (HCV)

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ABSTRACT

Objective: Pulsed high voltage discharge technology is a newly developed method for knocking out viruses in blood using various electrohydraulic discharge reactors. The aim of this study was to investigate the effect of an electrohydraulic discharge treatment system on Hepatitis C virus (HCV).

Methodology and results: The electrohydraulic discharge (EHD) reactor consists of a high voltage point discharge electrode above the blood surface and a cylinderical ground copper electrode containing the blood (at the same time acts as the vessel reactor). The EHD can produce both arc discharge in gas and liquid phases. The high energy plasma arc produces a pressure shock wave, electromagnetic radiations, ozone and free radicals.

Virus assay has shown that the number of survivor viruses after treatment at 5.1 msec pulse discharge (N) = 620 Copy/ml versus the initial number of viable viruses in the control

sample before treatment (N_O) = 2000 Copy/ml which translates to log reduction of about 0.51. The decimal reduction time or time requried for a 1-log cycle reduction in the virus load is about 10 msec.

Conclusion and application of findings: Pulsed non-thermal plasma technology is a newly devloped method for effectively kill blood-borne viral diseases. By irradiating a patient blood outside the body cleaning it of infection, and then reintroducing it back to the patient, mortality associated with diseases like hepatitis C can be greatly reduced. This technology is environmentally friendly, as it does not invlove the introduction of toxic chemicals into the blood. Also, this method capable of treating large volumes of blood under static regime. Many of the process considered have not been examined in detail. Generally plasma and plasmaochemical processes accompanying electric discharge in the blood have received little study to date.

Key words: electrohydraulic, discharge, shock wave, plasma, free radicals, reactor