B10 Recovery of DNA From Human Blood Bound in Unique Substrates

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The goal of this presentation is to present the use of materials in addition to the materials being used now to gather blood samples from crime scenes, and consider new materials as sources of evidence and/or identification.

This presentation will impact the forensic community and/or humanity by demonstrating a new method for obtaining and storing bio- logical evidence.

There have been two developments in the field of battlefield medicine, hemostatic agents made of unique materials. One of these is the QuikClot® hemostatic agent, made of zeolite, a silicate made from equal parts silicon tetroxide (SiO4) and aluminum tetroxide (AlO4). The other is the Hemcon® hemostatic agent, made from chitosan, a starch found in the shells of shrimp; the chitosan is extracted using a proprietary process.

The mechanisms of hemostasis by the two agents differ, in that QuikClot® adsorbs the liquid from the blood, which is an exothermic reaction; this effect on the hemostatic reaction is unknown (Alam, *et al.,* 974-973, 2004). The Hemcon® agent uses the positive electrical charge of the chitosan molecules to attract the red blood cells to it, forming a clot in an extremely short time period, stopping profuse bleeding and allowing the body's natural healing processes to take hold.

It is proposed to use these two agents in a study to determine the efficacy of recovery of human DNA from blood bound in these two unique substrates. There are 4 areas of interest in this study; the first would be attempted recovery of "naked" DNA immediately after introducing it to the materials. The second would be introduction of human blood samples (whole blood) to the materials, where first would take place the removal of the bound blood, using various chemical methods, and secondly the attempted recovery of DNA from this blood. The third area of interest would be to store the materials in a -20° freezer for periods of 6 months to 1 year, and attempt recovery of DNA. The fourth area of interest would be to store the materials at room temperature for the same amount of time as the -20° freezer portion of the study and attempt recovery. These last two areas of interest are to simulate the "real-world" situation of a backlog of DNA samples to be extracted and analyzed, and to determine the efficacy of using such material for long-term storage of blood samples for DNA recovery.

It is felt the application of this study has potential for demonstrating a new method of recovering blood at crime scenes for later analysis which would reduce the possibility of exposure to bloodborne pathogens by crime scene and law enforcement personnel. Additionally, there is the potential of using these agents as a means for obtaining DNA samples of suspects, who might use such products in an attempt to "self-treat" wounds received in violent encounters with law enforcement officers in order to avoid situ- ations where the suspects put themselves at risk for detection and arrest, *i.e.*, arriving at a hospital emergency room, seeking treatment for gunshot wounds.

References:

Alam, *et al***.** **"**Application of a Zeolite Hemostatic Agent Achieves 100% Survival in a Lethal Model of Complex Groin Injury in Swine." *Journal of Trauma-Injury Infection & Critical Care*. 56(5): 974-983, May 2004.

Substrate, Recovery, Blood

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