IDENTIFICATION OF SPERMATOZOA FROM CHALLENGED SAMPLES

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An integral aspect of a sexual assault case is to detect spermatozoa. However, it is often difficult to detect these cells particularly when semen has been exposed to detrimental environmental conditions.

This research project has two objectives: the first to identify human spermatozoa from challenged samples and the second to compare the results of fluorescent staining of human spermatozoa with that of the commonly used acidophilic and basophilic stains. Normally, in forensic laboratories Kernechtrot-Picroindigocarmine (KPIC) stain, commonly known as the Christmas Tree stain, is used to identify spermatozoa. A more recent technology from Independent Forensics known as SPERM HY-LITER™ contains reagents capable of staining the spermatozoa heads with a fluorescently labeled monoclonal antibody. Since sophisticated fluorescent microscopy along with computer software is not available to all crime laboratories, this research was conducted with a microscope attached to a source of fluorescence.

The detection of human spermatozoa from environmentally challenged samples using KPIC and fluorescence microscopy was performed by preparing several simulated evidence samples. Different concentrations of human semen containing spermatozoa were deposited on various substrates including fabrics of different colors and compositions, and on soil, leaf, condoms etc. Fabric pieces containing semen were washed in hot water, with or without detergent, using a commercial washing machine. A measured amount of semen was also mixed with other body fluids such as blood and saliva from male and female donors. Each sample was extracted and each extract was divided into two slides. Extract deposited on one slide was stained with reagents in SPERM HY-LITER™ kit, while the other was stained with the KPIC stain. Slides stained with KPIC were examined with a regular microscope. Spermatozoa stained with reagents in the SPERM HY-LITER™ kit were identified with a regular microscope attached to a fluorescent source.

The results of this study indicate that the SPERM HY-LITER™ kit can detect human spermatozoa from a mixture of body fluids, from washed stains and is more sensitive than the standard KPIC stain. Spermatozoa heads were detected from almost all of the environmentally challenged samples using fluorescence staining. The results of the research indicated that fluorescent detection technique is more sensitive than the KPIC staining of spermatozoa, particularly when the evidence samples are challenged.