EFFECTS OF NONOXYNOL-9 EXPOSURE ON BIOLOGICAL EVIDENCE FROM A CONDOM

Lauren Stewart, and Ismail M. Sebetan
Forensic Sciences Program, National University, La Jolla, CA

Dealing with forensic biological evidence associated with use of condoms has been increased and, as a result, preservation of this valuable evidence has prompted the investigation of condom lubricants and spermicides for potential degradation of biological samples. Integrity of samples can be inferred by the ability to amplify short tandem repeats (STRs) on the Y chromosome. Y chromosome STRs are male-specific and are polymorphic in the number of times a sequence motif is repeated. As a result, Y chromosome STRs provide a great power of discrimination among individuals. It is important to prove that lubricants and spermicides from condoms do not decrease the accuracy of DNA profiles, and therefore, do not undermine the validity of such evidence in court.

The goal of this study is to demonstrate to the forensic community that biological evidence obtained from a condom is not compromised by exposure to lubricants and spermicides. In addition, use of the rate at which nonoxynol-9 degrades the sperm cells membrane as a mean to assess the time of incident will be discussed.

Semen samples were incubated at room temperature and at 37° C for up to three days in the presence the spermicide nonoxynol-9. Untreated samples were also investigated for comparison. Samples were harvested for DNA, which served as a template for PCR and capillary electrophoesis. PCR targets included DYS 456, DYS 389I, DYS 390, DYS 389II, DYS 458, DYS19, DYS 385a/b, DYS 393 DYS 391, DYS 439, DYS635, DYS 392, YGATA H4, DYS 437, DYS 438, and DYS 448. For studying rate of degradation of the sperm cell membrane, Semen samples were incubated in condoms in the presence and absence of nonoxynol-9. Nonoxynol-9 (N-9) is classified as a nonionic surfactant and interacts with lipoproteins of cell membranes. Through a time course, samples were perserved using an electolyte-free, three-layer discontinuous Percoll Gradient and stained with propidium iodine (PI). Cells were sorted on the Guava PCA cell sorter and the percentage of PI negative cells (viable cells) and the percentage of PI positive cells (non-viable cells) were calculated.

The result of our study on the effects of nonoxynol-9 on DNA extracted from the biological evidence found in the condom will be discussed. In addition, the result of our investigation on the use of the rate at which nonoxynol-9 degrades the sperm cell membrane as a mean to assess the time of incident will also be discussed.