

## **USE OF AUTOMATED MAGNETIC LEVITATION TECHNOLOGY FOR ANALYSIS OF COMPLEX SAMPLES IN SEXUAL ASSAULT FORENSICS**

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Magnetic levitation is a new technology that is capable of label-free separation of cells based on their relative cell densities and magnetic properties. Here we demonstrate the separation of epithelial cells from sperm and blood from mock forensic swabs and cell mixtures, using magnetic levitation as implemented on the LeviCell Platform being developed by LevitasBio. This separation method has positive implications for rapid testing of sexual assault kits thereby addressing the DNA mixture problem. Exploiting the relative density difference between epithelial and non-epithelial cells, we were able to separate and collect epithelial cells and highly-enriched sperm cells from single swabs in less than 30min. We also demonstrated the compatibility of the collected cells for downstream PCR analysis using Quantifiler Duo and Innogenomics HY-Quant kits that are commonly used in forensic laboratories. Thus, our technology offers a simple, rapid, automated, and cost-effective platform for complete separation of epithelial cells from sperm to address the DNA backlog problem faced by forensic labs.