

# AXO Science's Evaluation of STK Skin for Deployment in Clinical Forensic Medical Practice

## INTRODUCTION

A crucial aim of forensic medical examinations in sexual assault cases is the detection and recovery of semen stains on the victim's skin, enabling genetic identification of the perpetrator.

While Alternate Light Source (ALS) is often used as an adjunct to enhance semen visibility, it lacks specificity. Therefore, there is a pressing need for a novel detection technique that is simple, rapid and reliable, to enhance semen detection in support of more effective forensic medical examinations.

“Non-toxic, reliable and specific, STK Skin is the essential solution for forensic experts.”

STK® Sperm Tracker



The authors declare that they have no conflict of interest that could be perceived as influencing the results presented in this poster. All products used in this study were commercially procured. Names of commercial manufacturers are included solely for documentation purposes should not be construed as an endorsement of these products by HTX.



# OBJECTIVES

STK Skin was evaluated for its:



Sensitivity with various dilutions of semen



Effect when semen is covered by another fluid



Specificity with body and non-body fluids



Compatibility with downstream analysis

Detection capabilities of other 365nm UV-ALS were assessed alongside the recommended UV-ALS (VILBER VL-6.L).



▲ **Figure 1.** (Left to Right) VILBER VL-6.L (VB), Refin Forensic Polilight® Flare +2 (PL), foster+freeman® Crime-lite® X (CLX) and Crime-lite® AUTO (CLA). PL is utilised for crime scene investigations by the Forensics Division in the Singapore Police Force.

# METHODS

## General procedure:



▲ **Figure 2.** Steps taken from skin spotting to semen detection with STK Skin.

## Detection under different lighting conditions:

### Ambient Light + UV 365nm



Without STK Skin



With STK Skin

▲ **Figure 3.** Contrast of semen stain without and with STK Skin.

Semen stains could be distinctly visualized using STK Skin in both ambient and low light conditions.

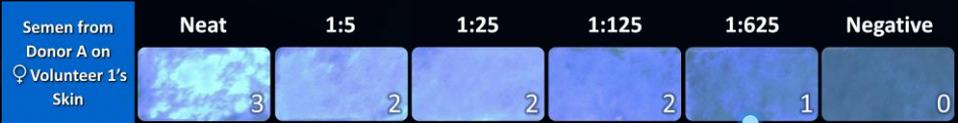
# RESULTS

A fluorescence rating system ranging from 0 to 3 was created to visually appraise the results.

Fluorescence Grading System			
None	Weak	Moderate	Strong
0	1	2	3

▲ **Figure 4.** A rating system created with semen dilutions illuminated with VB.

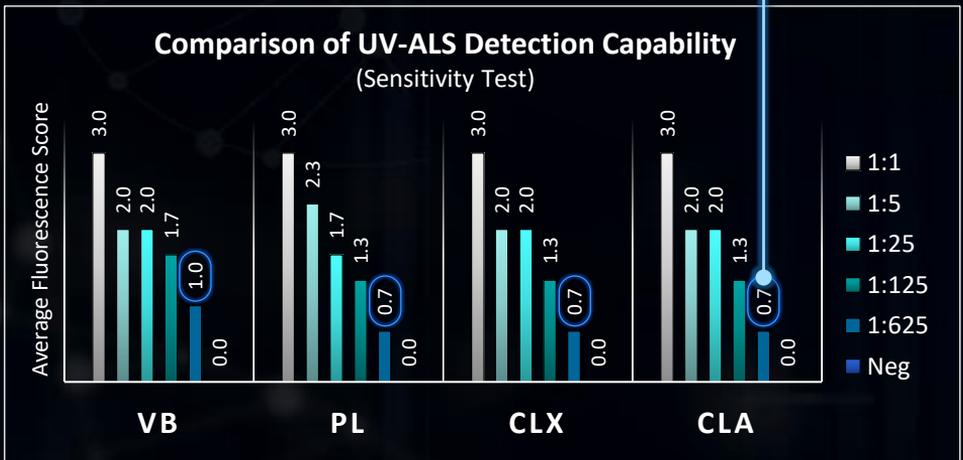
## Sensitivity with semen dilutions:



▲ **Figure 5.** Effect of STK Skin on 5 dilutions illuminated with VB ( $n = 3$ ).

Note: Donor C# is a male individual who had undergone vasectomy.

**Sensitive detection up to 1:625 dilution.**



▲ **Figure 6.** Comparable detection capabilities of the 4 UV-ALS.

## Specificity with body and non-body fluids:

▶ **Figure 7.** Effect of STK Skin on 6 body fluids and 4 non-body fluids.



**Minimal false positives with specific detection.**

## Effect when semen is covered by another fluid:

◀ **Figure 8.** Effect of STK Skin when semen is covered by other fluids.



**Effective detection even when semen is covered by another fluid.**

# RESULTS

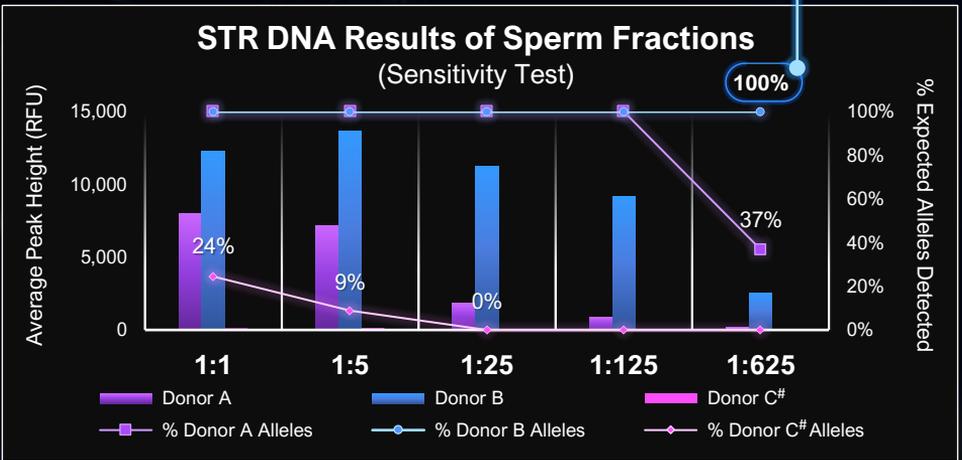
## Compatibility with downstream analysis:

Does not interfere with RSID™-Semen and STR analysis.



▲ **Figure 9.** Downstream semen confirmatory and STR DNA workflow of the laboratory.

Reportable DNA profiles obtainable up to 1:625 dilution of sperm fractions.



▲ **Figure 10.** Average peak heights and percentages of expected alleles detected ( $n = 3$ ) from sperm fractions of differentially extraction semen dilution swabs (sensitivity study).

Note: Vasectomised Donor C# was identified from epithelial fraction of neat semen sample.

# CONCLUSION

STK Skin is a rapid and sensitive tool that can be used in Forensic Medical Examinations to specifically screen for semen on the victim's skin, aiding in the validation of his/her account of the sexual assault and providing valuable context for the case.