

Syracuse University

College of Arts and Sciences

Forensic and National Security Sciences Institute

# *Rapid Identification of Semen Using STK Sperm Tracker Spray*

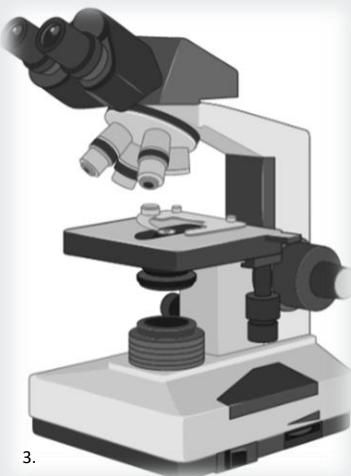
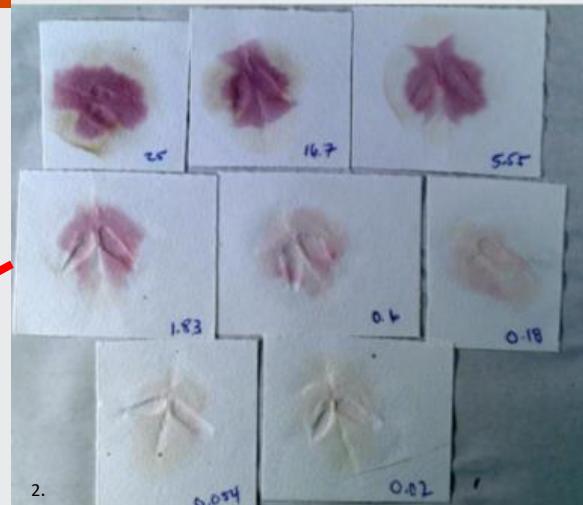
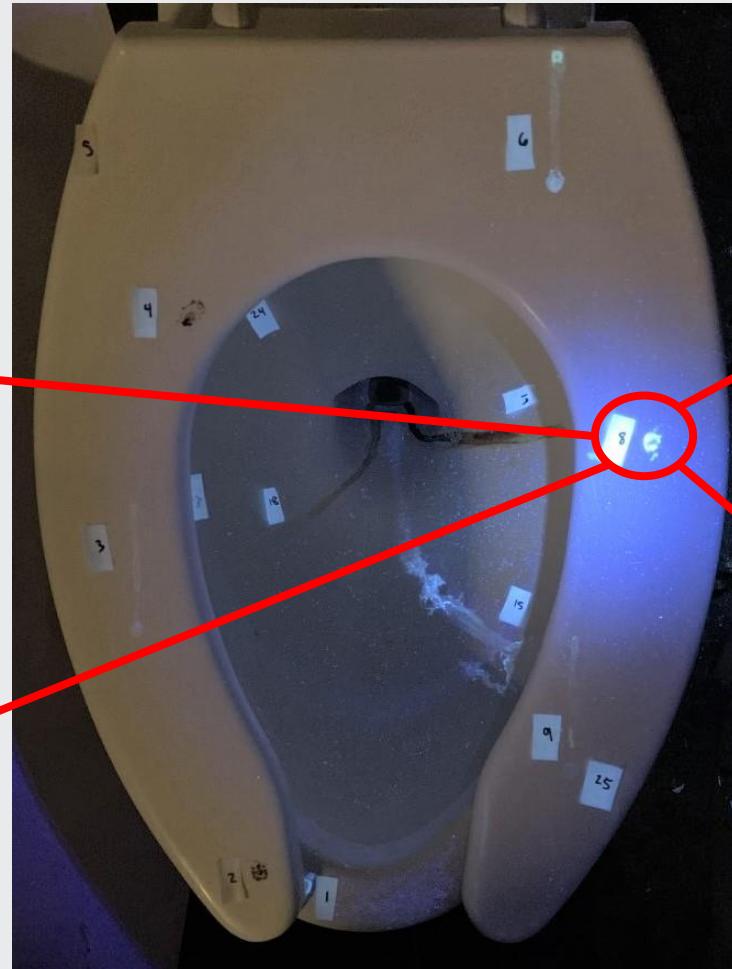
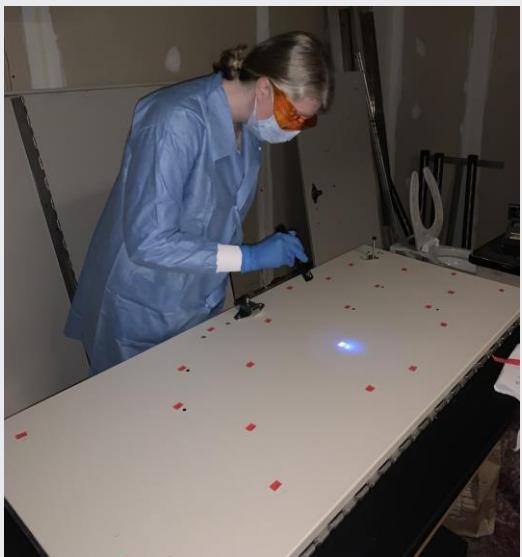
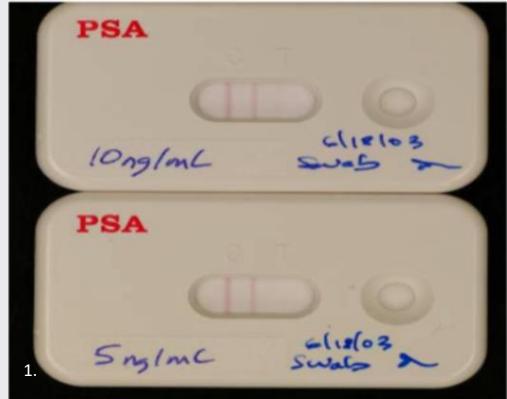
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Dr. Michael Marciano

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NEAFS



# Forensic Identification of Semen



# STK Sperm Tracker Spray

- New presumptive test for human semen
  - Spray that increases fluorescence under ALS
- Specific to human acid phosphatase
- More efficient to cover a larger area
- Easy to use



# Overall Project Goal

- Compare the accuracy and precision of semen identification with STK Sperm Tracker Spray and ALS compared to the ALS in isolation
  - Timed efficiency comparison
- Determine the sensitivity of the spray
  - Dilution series- 1:10 & 1:20
- Test the specificity of the spray
  - Neat urine vs neat blood; and mixtures



# Alternative Light Sources

**Rofin Polilight Flare 2 uv**  
**365nm**



**UV Light Vilber VL-6.L**  
**365nm**



**Arrowhead LED**  
**455nm**



5.

4.

6.

# Methods

Three 50  $\mu$ L stains

- Neat semen
- 1:10
- 1:20
- Wiped semen
- Neat urine
- Neat blood
- Semen + blood
- Semen + urine

Total of 24 stains



**Person 1: deposits stains**



**Person 2:  
screen with ALS only**



**Person 3:  
sprays items + screen w/ ALS**

# Fluorescence Rating System

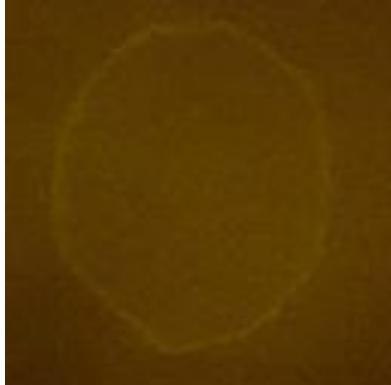
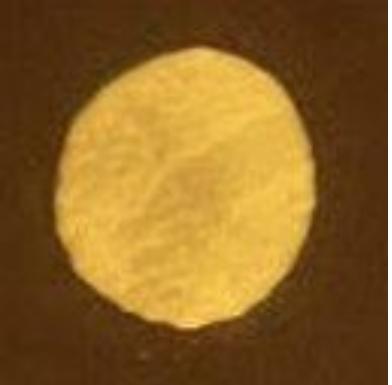
Rating	0 No fluorescence	1 Slight fluorescence	2 Moderate fluorescence	3 High fluorescence
Example				

Figure 1: Fluorescence Rating System

# Bathroom Stall Door - Stain Location

Stain	Color
Neat semen	Red
1:10	Orange
1:20	Yellow
Neat semen wiped	Black
Neat blood	Purple
Neat urine	Dark blue
Mix semen + blood	Light blue
Mix semen + urine	Brown

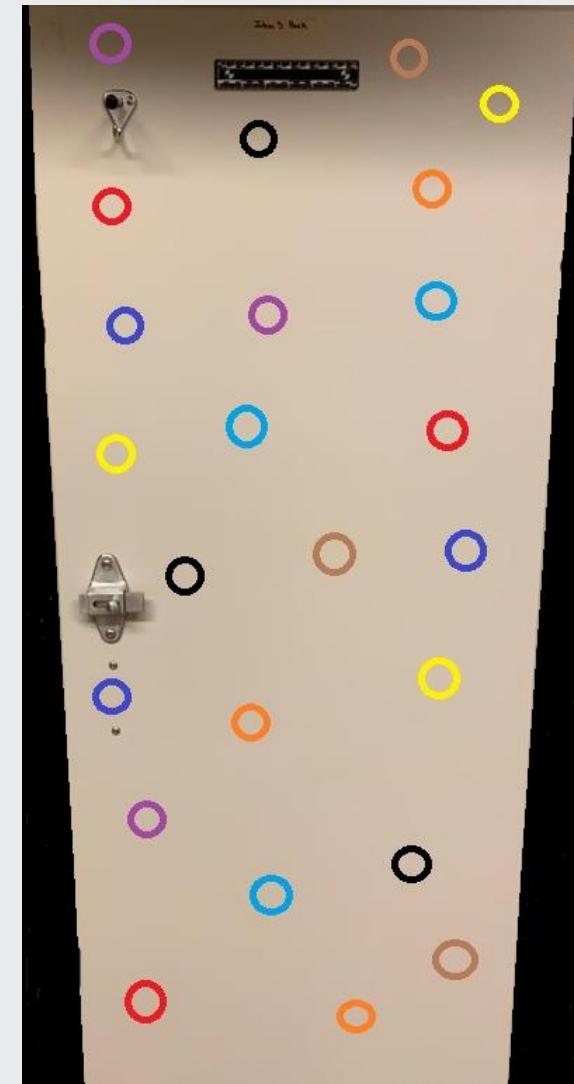


Figure 2: Color legend

# Sink- Stain Location

Stain	Color
Neat semen	Red
1:10	Orange
1:20	Yellow
Neat semen wiped	Black
Neat blood	Purple
Neat urine	Dark blue
Mix semen + blood	Light blue
Mix semen + urine	Brown



Figure 2: Color legend

# Results

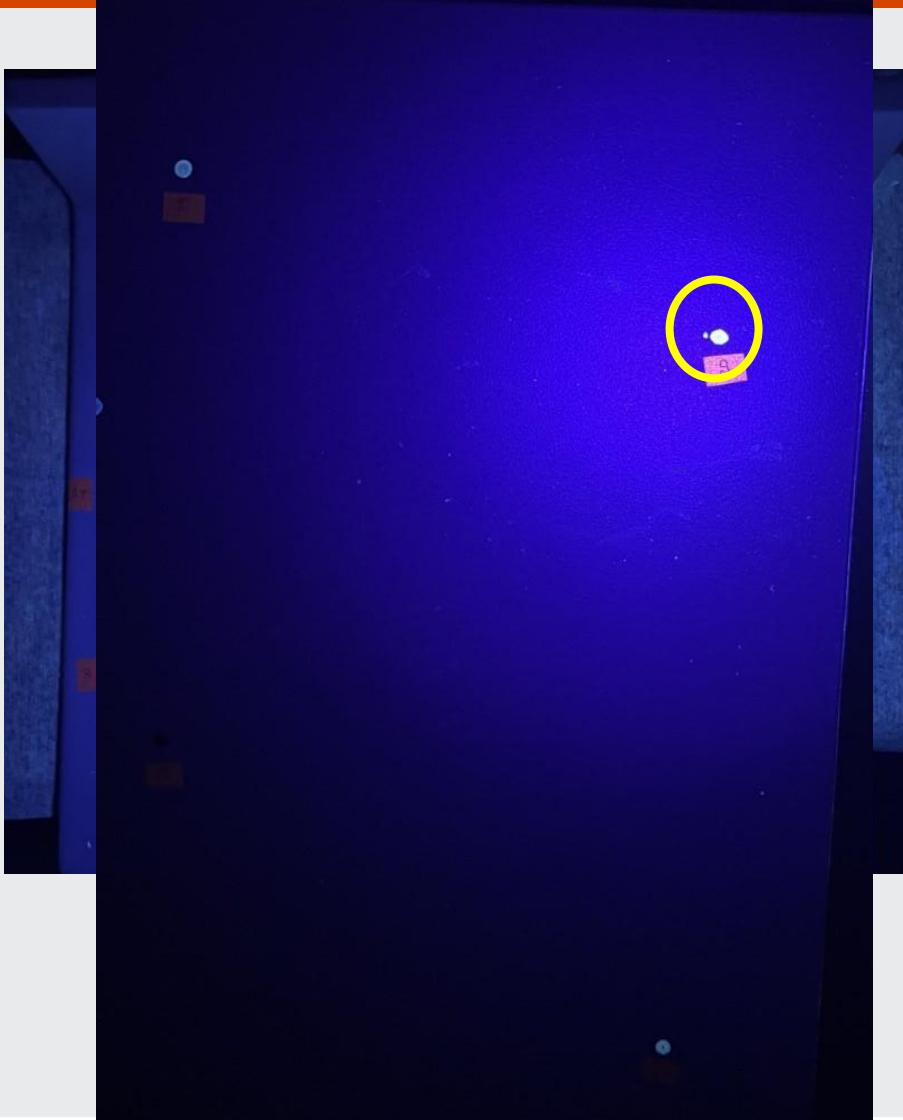
# Neat Semen



Item	Rofin 365nm ALS	Rofin 365nm + spray	Arrowhead 455nm ALS	Arrowhead 455nm ALS + Spray
Sink				
Divider				

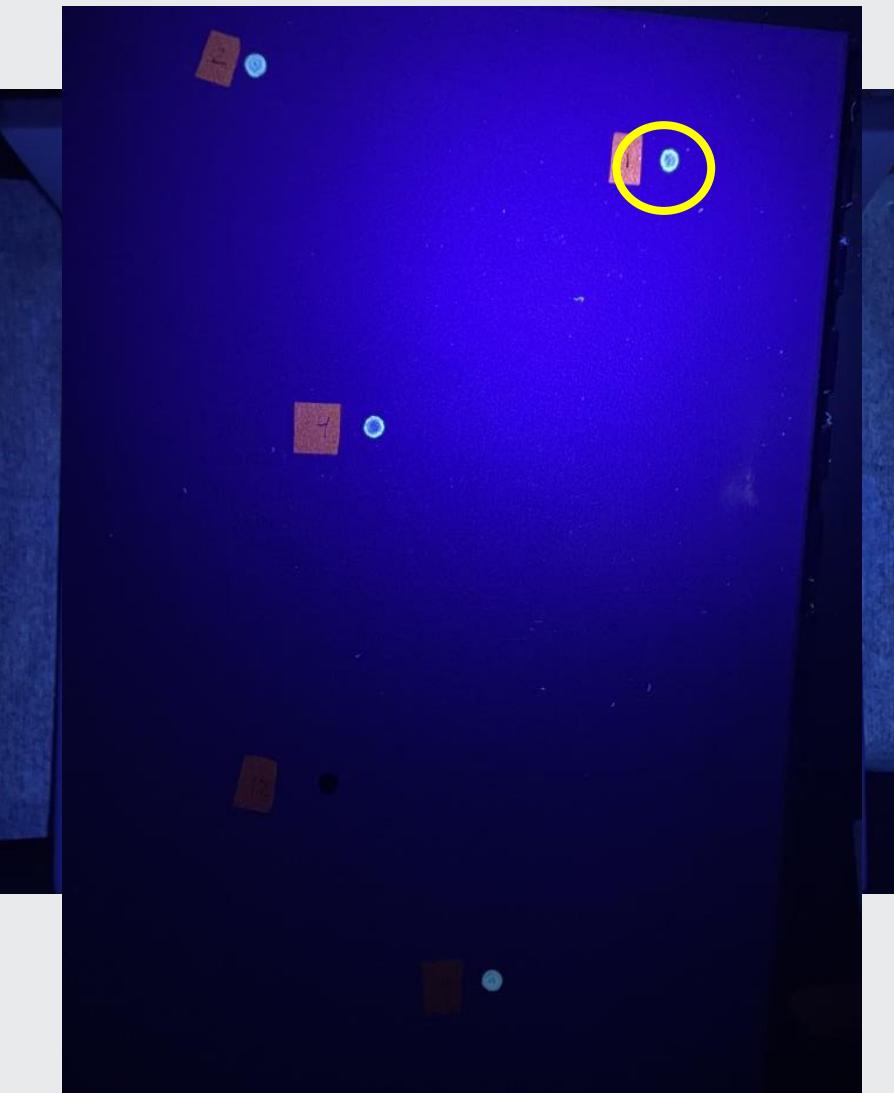
Figure 3: Neat semen stains from sink and divider

# 1:10 Semen Dilution



Item	Rofin 365nm ALS	Rofin 365nm + spray	Arrowhead 455nm ALS + Spray	Arrowhead 455nm ALS + Spray
Sink				
Divider				

Figure 4: 1:10 semen stains from sink and divider



Item	Rofin 365nm ALS	Rofin 365nm + spray	Arrowhead 455nm ALS	Arrowhead 455nm ALS + Spray
Sink				
Divider				

Figure 5: 1:20 semen stains from sink and divider

# Stain Type

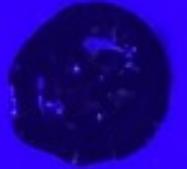
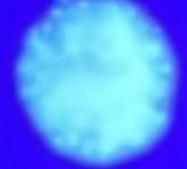
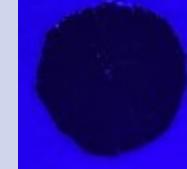
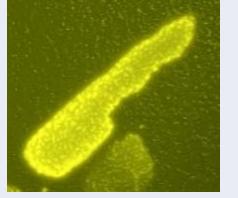
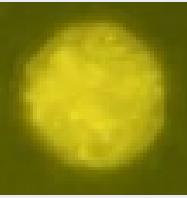
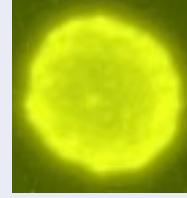
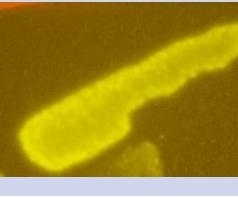
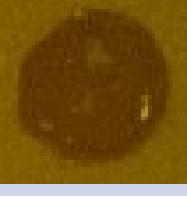
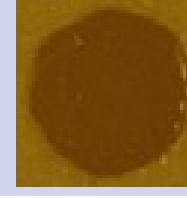
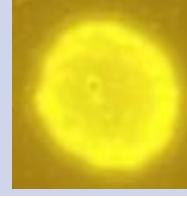
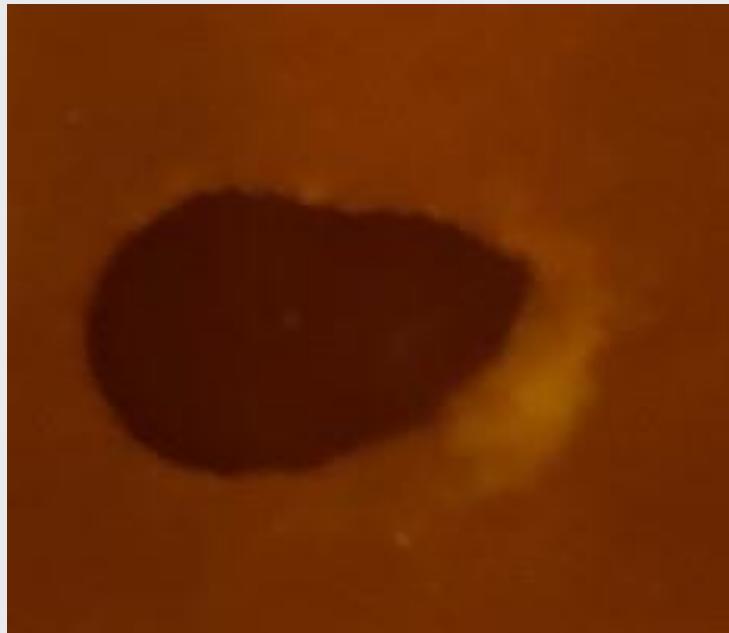
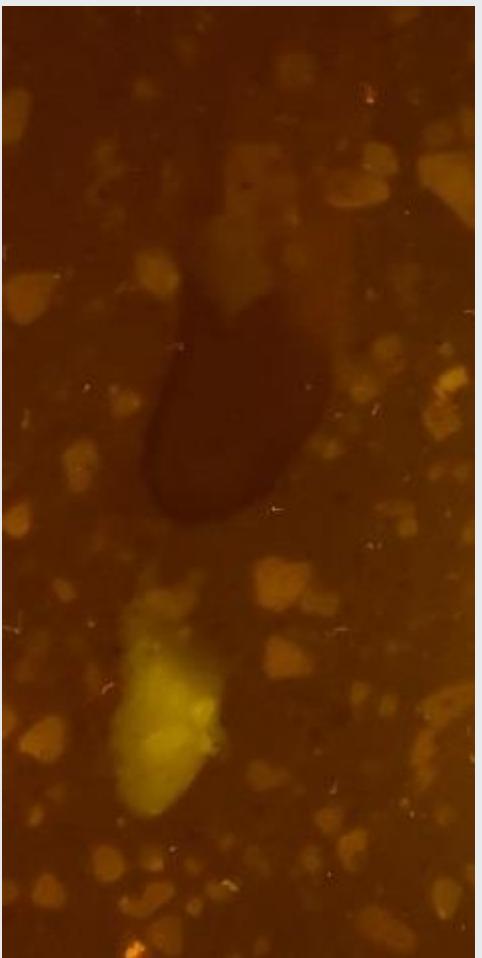
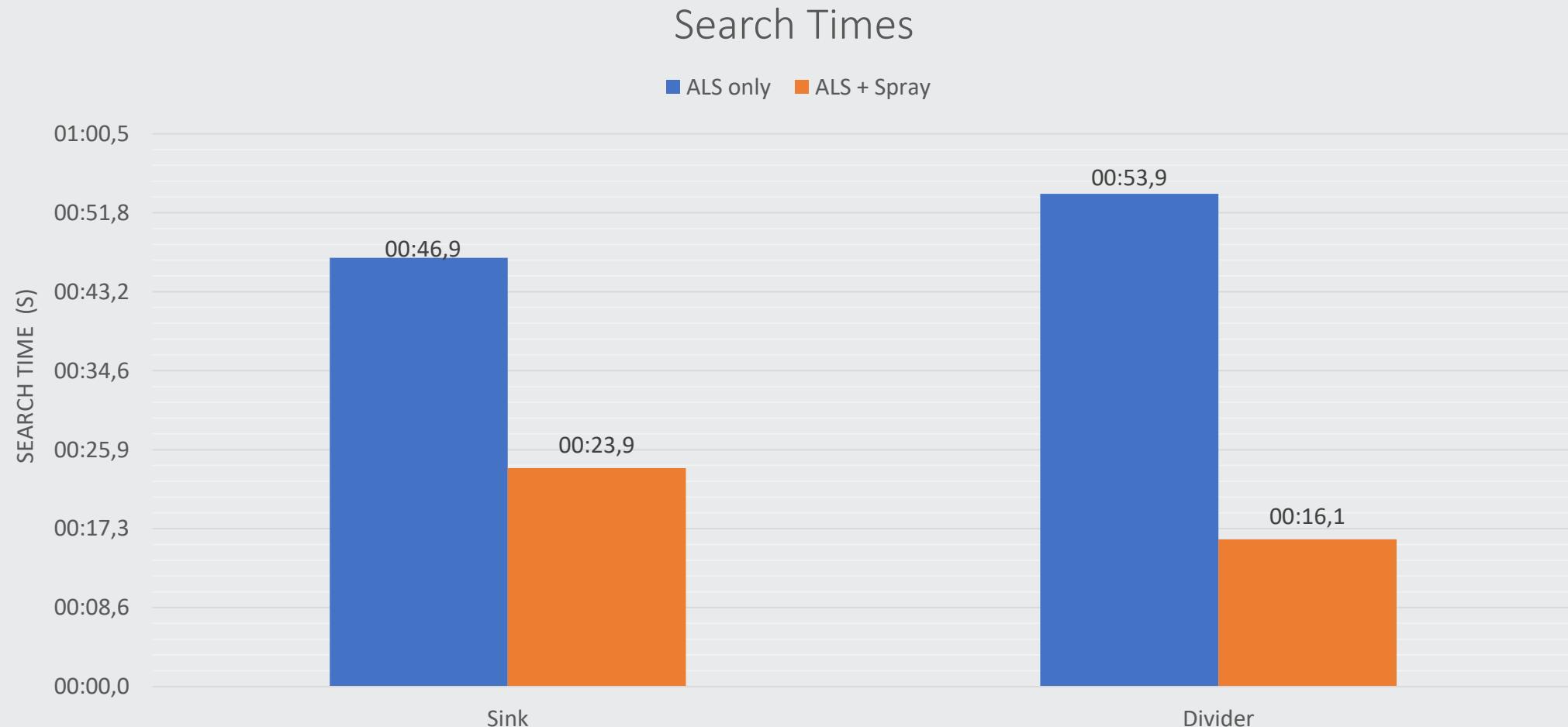
ALS	Wiped Semen	Neat Blood	Neat Urine	Semen + Blood	Semen + Urine
Rofin 365nm ALS					
Rofin 365nm ALS + Spray					
Arrowhead 455nm ALS					
Arrowhead 455nm ALS + Spray					

Figure 6: Wiped semen, neat semen, neat urine, semen + blood, and semen + urine

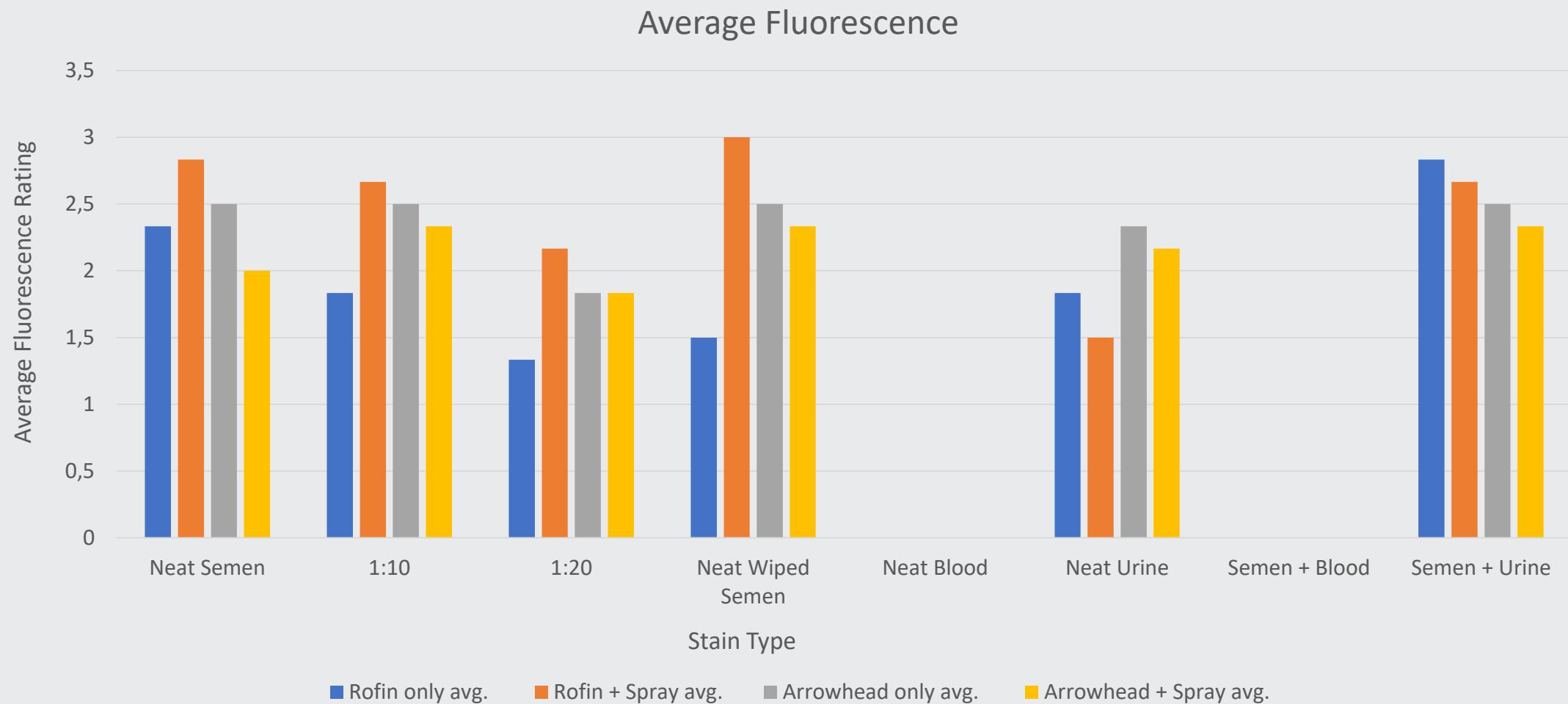
# Semen + Blood - Observation



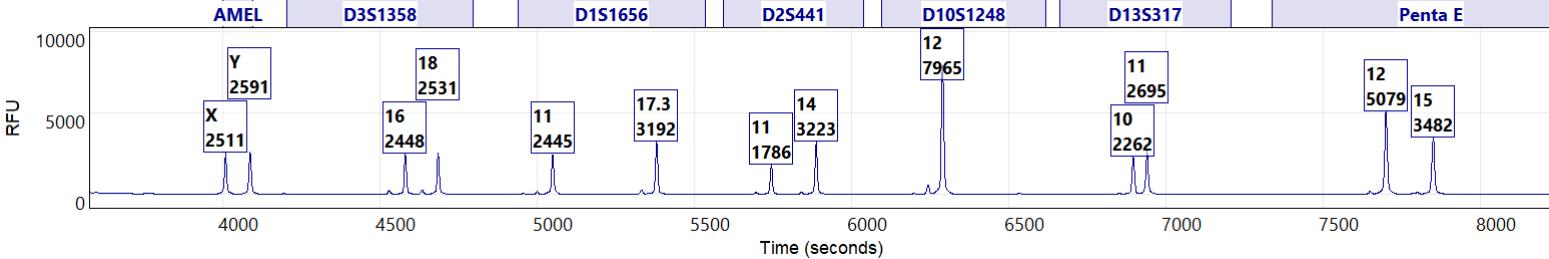
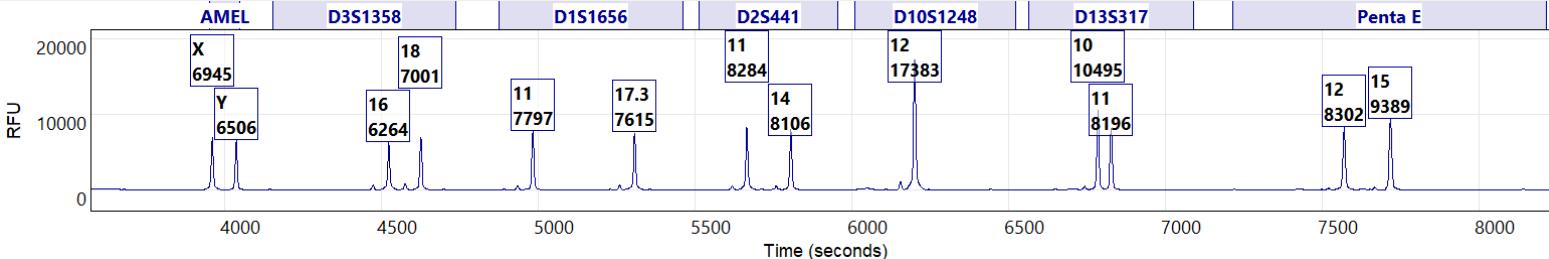
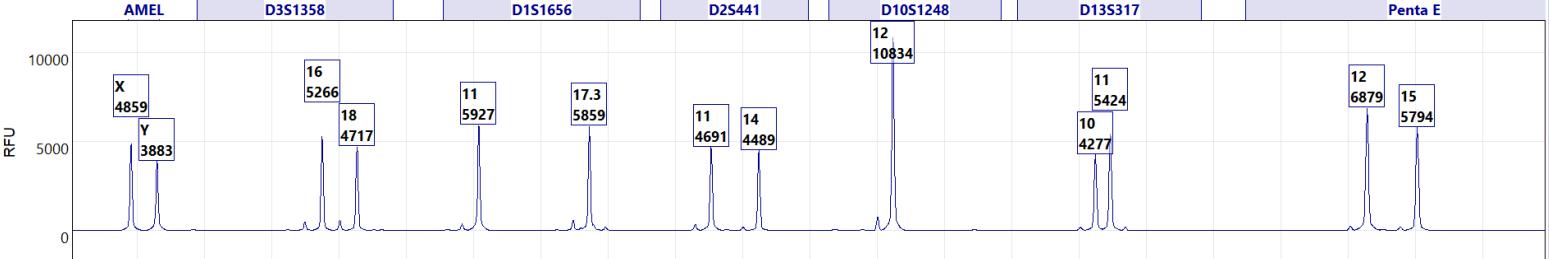
# Screening Time Results



# Comparing Fluorescence



# DNA Results

Sample	% of Alleles Detected	Mean Peak Heights	Blue Channel
Control Semen	100%	$2376 \pm 1874.2$ RFU	 <p>AMER Y 2591 X 2511 D3S1358 18 2531 16 2448 D1S1656 11 2445 17.3 3192 D2S441 11 1786 14 3223 D10S1248 12 7965 D13S317 11 2695 10 2262 Penta E 12 5079 15 3482</p>
Neat Semen + Spray	100%	$6376 \pm 888.6$ RFU	 <p>AMER X 6945 Y 6506 D3S1358 18 7001 16 6264 D1S1656 11 7797 17.3 7615 D2S441 11 8284 14 8106 D10S1248 12 17383 D13S317 10 10495 11 8196 Penta E 12 8302 15 9389</p>
1:10 Semen + Spray	100%	$3589 \pm 1355.6$ RFU	 <p>AMER X 4859 Y 3883 D3S1358 16 5266 18 4717 D1S1656 11 5927 17.3 5859 D2S441 11 4691 14 4489 D10S1248 12 10834 D13S317 10 4277 11 5424 Penta E 12 6879 15 5794</p> <p>(Time, RFU)=(4863, 10556)</p>

# Conclusions

- Noticeable increase in fluorescence especially in dilutions
- Dramatic decrease in screen time with STK Spray
- Fluorescence of stains was dependent on ALS
- STK Spray does not inhibit the ability to attain profiles

# References

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# Questions?

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