Introduction to SPERM HY-LITER™ for Forensic DNA Laboratories

Monoclonal Antibody-Based Fluorescent Detection of Human Sperm from Sexual Assault Evidence

SPERM HY-LITER™

Independent Forensics
DNA Testing & Technologies
Introduction to Independent Forensics

Forensic DNA laboratory

Accreditations: ISO 17025, NY-DOH, AABB, CLIA
Specialize in LCN / Trace Protocols
Profiles from < 0.1 ng

Products for Forensic Laboratories

Contract R & D

Laboratory personnel: MS and Ph.D. scientists

5,600 sq ft of combined laboratory and office space

Suburban Chicago – 18 minutes from O’Hare
– 30 minutes from The Loop
R & D contract from Federal Law Enforcement Agency

Lateral Flow Immunochromatographic Strip Tests

RSID™-SEMEN
RSID™-SALIVA
RSID™-BLOOD

Fluorescent Detection of Sperm from Sexual Assault evidence

SPERM HY-LITER™
SPERM TELLIGENCE™
SPERM HY-LITER™

Test Format: Microscopic Screening Method for Sperm

Antigen Detected: Human Sperm Heads

Antibodies: Mouse monoclonal

Labeling: Sperm: Alexa 488 / Nuclei: DAPI

Sensitivity: Single Human Sperm Head

Cross-reaction: None detected – Homo sapiens specific

Test Read-out: Visual

Preparation Time: 100 minutes – 10 minutes ‘hands-on’
**SPERM HY-LITER™**

Sexual Assault Smear Slide

'Magic' Hydrophobic Barrier Ring Marker

**Step 1:** Fix Permeabilize 10 min

**Step 2:** Sample Preparation 30 min

**Step 3:** Blocking Solution 30 min

**Step 4:** Sperm Staining 30 min

**Step 5:** Mounting Media 1 min

**Phase**

**DAPI**

**FITC**

Stained, Mounted Cover Slipped Slide

Independent Forensics
DNA Testing & Technologies
SPERM HY-LITER™ staining

Cell Type Specificity
Buccal Extract, Smear slide with Sperm

Phase Contrast

DAPI Filter

FITC Filter
**SPERM HY-LITER™** staining

Cell Type Specificity
Post-Coital Sample, Smear slide *with* Sperm

**Phase Contrast View**

**DAPI Filter**

**FITC Filter**
**SPERM HY-LITER™**

**Step 1:** Sample Preparation 30 min

**Step 2:** Fix Permeabilize 10 min

**Step 3:** Sample Preparation 30 min

**Step 4:** Blocking Solution 30 min

**Step 5:** Sperm Staining 30 min

**Step 6:** Mounting Media 1 min

**Two Position Masked Slide**

**Extract from Sexual Assault Evidence**

**Stained, Mounted Cover Slipped Slide**

**Independent Forensics**
DNA TESTING & TECHNOLOGIES
SPERM HY-LITER PLUS™ staining

Cell Type Specificity
Buccal, Urine & Blood extracts
*without* Sperm

Phase Contrast

DAPI Filter

FITC Filter
SPERM HY-LITER™ staining

Cell Type Specificity
Buccal, Urine & Blood extracts
with Sperm

Phase Contrast

DAPI Filter

FITC Filter
SPERM HY-LITER™ staining

Sensitivity & Specificity
Buccal, Urine & Blood Extracts
Down to a Single Sperm

Phase Contrast

DAPI Filter

FITC Filter
SPERM HY-LITER™ staining

Species Specificity
Animal Semen (various) *without* Human Semen

Phase Contrast

- DAPI Filter
- FITC Filter
SPERM HY-LITER™ staining

Species Specificity
Animal Semen (various)
with Human Semen

Phase Contrast

DAPI Filter

FITC Filter
First *Positive* Identification for Human Sperm

First *Specific* Identification for Human Sperm

Sensitivity down to a single sperm

Fully Compatible with Automated Methods

Scan slides at lower magnification: 100X or 200X
Ideal for *both* smear and extract slides

Does not obscure or destroy morphology, if present

Does not interfere with DNA extraction, PCR or DNA-STR analysis

Forty-one (41) installs, thirteen validations (13) and four (4) released for case work (as of 3/2010) and counting!)
Acknowledgements:

SPERM HY-LITER™

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Chicago

Liz Graffy, MS

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<th>Issue/Problem</th>
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<tr>
<td>Saliva</td>
<td>amylase activity</td>
<td>specificity</td>
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<tr>
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<td>KPIC / morphology</td>
<td>specificity / sensitivity</td>
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<td>Sperm</td>
<td>SPERM HY-LITER™ sperm head</td>
<td>Solved</td>
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