

Introduction

- The ability to identify an unknown stain at the crime scene without having to wait for results from a laboratory can give important insights into crime scene
- Human Blood is the body fluid most commonly encountered at crime scenes
- On the spot identification of body fluids, such as blood and semen is often the key in a criminal investigation
- Most of the currently available tests for human blood detection targets **Haemoglobin** as a detector molecule

Problems with existing rapid blood detection kits (Haemoglobin targeted)

- **Cross reactivity with other human body fluids : Haemoglobin** also present in other body fluids (e.g. urine, stool, seminal fluid, vaginal fluid and saliva) in trace amounts can yield false positive test results ¹⁻⁴
- **Cross reactivity with few animal bloods :** Human and few animals like primates, ferrates carries common amino acid sequence in the alpha chain of **Haemoglobin**, due to which all haemoglobin targeted tests give positive result with few animal blood ¹⁻⁴
- **Exhibit a high dose hook effect (HDHE) that can produce false negative results :** If the amount of haemoglobin is high in the sample, free hemoglobin reaches fast and bind to test line, that prevents binding detector molecule to the test line, which leads to false negative results in spite of presence of human blood in the sample ¹⁻⁴

Innovation

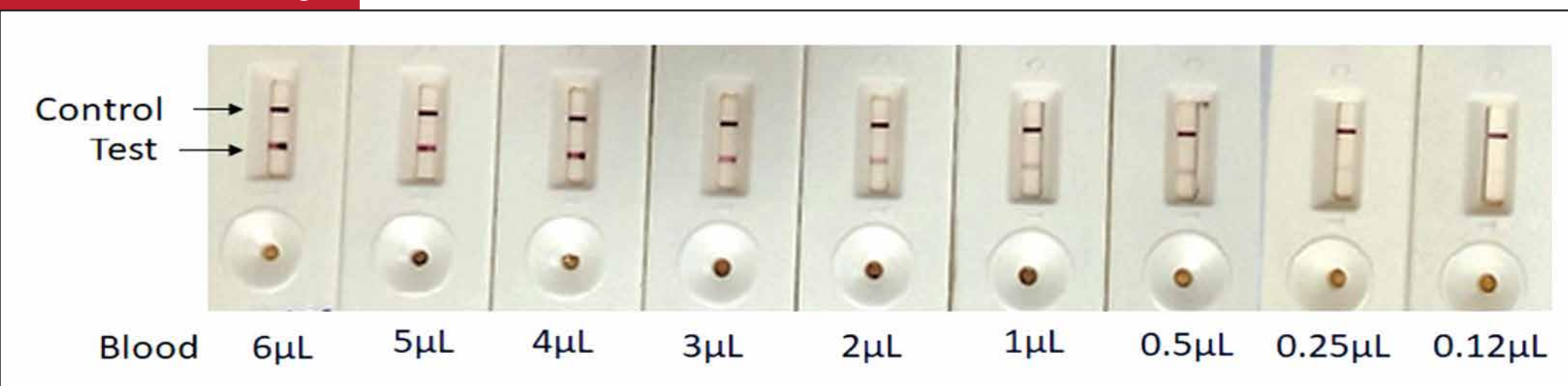
- To overcome this problems HiMedia has selected **HUMAN Erythrocyte cell Membrane antigen** which is exclusively specific to human blood
- Also, we have used **specificity and sensitivity enhancing conjugation and buffer technology** for accurate identification of human blood



HiMedia
MBLF002 Insta-LF™ Human Blood
Point-of-Care Detection Kit

Novelty

Sensitivity



The kit can detect less than 1.0 µl of human blood

Specificity



Animal Species tested: Chicken, Goat, Pig, Dog, Cat, Cow, Buffalo and Horse

**No cross reactivity identified with tested animal blood:
Indicates specific for Human blood**



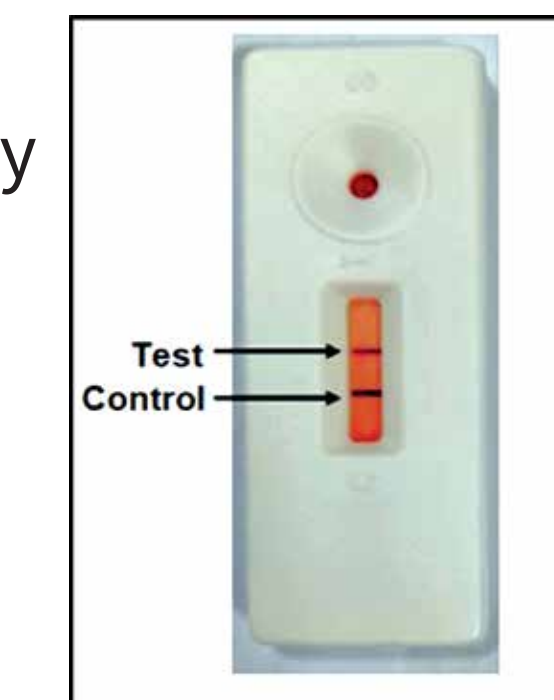
Body fluids tested: Saliva, urine, semen, breast milk and vaginal fluid

No cross reaction identified with other body fluid Indicates: Specific for Human blood

No high dose effect

High Dose hook effect: When antigens/analytes are present at very high concentrations, there is a possibility of high dose hook effect that causes false negative results

No high dose effect was observed in the developed kit



Old Blood stains

If blood stain is old, blood needs to extract by incubating in extraction buffer for 1 hour on shaker

The kit can detect blood from old stains*

Note : *At present we have data spanning eight months, and the study is still in progress.

Solution Provided

✗ Problem

Problems with existing rapid blood detection kits (Haemoglobin targeted)

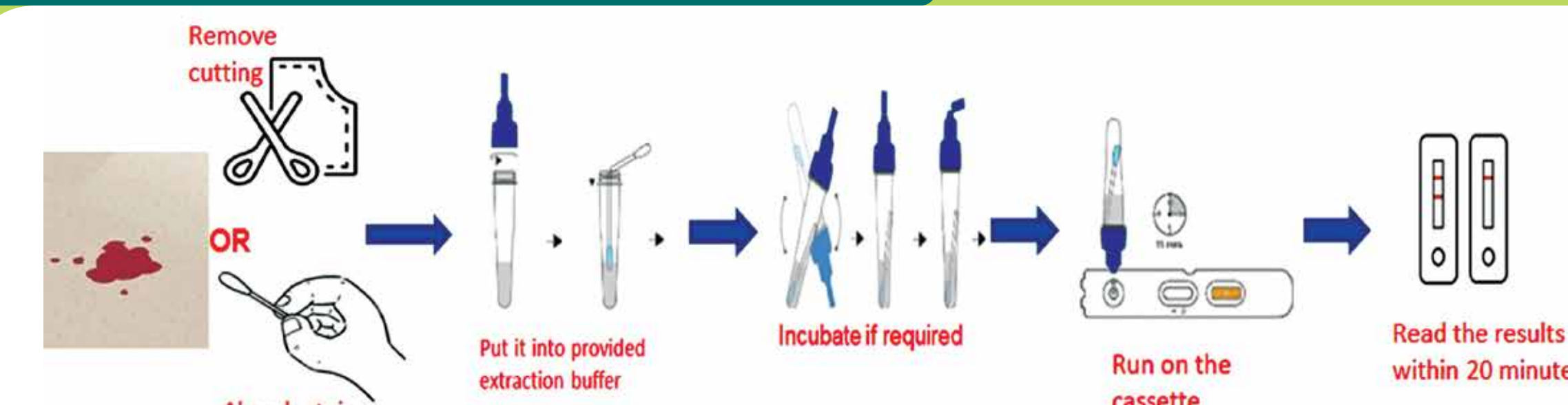
- ✗ Show cross reaction with few of animal blood
- ✗ Show cross reactivity with other human body fluids
- ✗ Exhibit a high dose hook effect (HDHE) that can produce false negative results from forensic samples.

✓ Solution

Solution provided by HiMedia's Insta-LF™ Human Blood Point Of Care Detection Kit

- ✓ No cross reactivity with animal blood
- ✓ No cross reactivity with other human body fluids
- ✓ Does not exhibit HDHE and therefore, greatly reduce the chances of false negative results.

Technical Feasibility



Scan QR code to watch the video on how to perform the assay

Conclusion

- HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit performs better than existing hemoglobin-based blood detection tests
- HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit can detect less than 1µl of human blood
- The high-dose hook effect that is responsible for false negative results with hemoglobin-based blood detection tests is not observed with HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit
- Old blood stains can be detected with HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit
- The test is easy to perform and can be performed directly on crime site
- Unlike hemoglobin-based tests, animal blood cross-reactivity, is not observed with HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit
- No cross reactivity with other body fluids observed with HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit
- These findings suggest that HiMedia's MBLF002 Human Blood Point-of-Care Detection Kit is a more reliable human blood detection test than hemoglobin-based strip tests or chemical reduction tests.

References

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4. D Hermon · 2003. The use of the Hexagon OBTI Test for Detection of Human Blood at crime scenes and on items of Evidence. https://www.bluestar-forensic.com/wp-content/uploads/2020/09/hexagon_obti_jfi.pdf