



## CAPILLUS™ HIV-1/HIV-2

Latex aggregation test device  
for the detection of antibodies  
to HIV-1/HIV-2 in human whole  
blood, serum or plasma.

**FOR INFORMATION USE ONLY  
Not to be used for performing the assay.  
Refer to insert accompanying kit**

### 1. Intended Use

The Trinity Biotech Capillus™ HIV-1/HIV-2 is a rapid qualitative assay for the detection of antibodies to Human Immunodeficiency Virus Type 1 (HIV-1) and / or Human Immunodeficiency Virus Type 2 (HIV-2) in human whole blood, serum or plasma. The Capillus™ HIV-1/HIV-2 is intended as an initial screening test in low volume testing facilities, in emergency situations and in areas where sophisticated equipment is not available. In addition, the test can be used as a supplemental assay in test algorithms.

### 2. Introduction

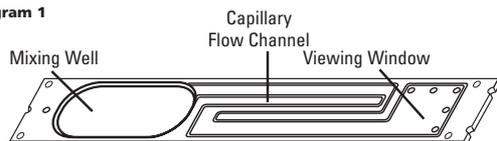
Available data indicates that the Acquired Immunodeficiency Syndrome (AIDS) is caused by a virus transmitted by sexual contact, by an infected mother to her foetus or child during the perinatal period, by exposure to blood including sharing contaminated needles and syringes and by certain blood products or other body fluids.<sup>(1-8)</sup>

Human Immunodeficiency Virus type-1 (HIV-1) has been isolated from patients with AIDS and from healthy persons at high risk for AIDS.<sup>(9-11)</sup> The incidence of antibodies specific for HIV-1 in AIDS patients is universal. In persons at increased risk for AIDS, the incidence is high. Human Immunodeficiency Virus type-2 (HIV-2) has been recognised as one of the causative agents for AIDS in West Africa, with isolated cases reported in Europe, Central Africa, Western United States, Canada and Brazil.

### 3. Principles of the Procedure

The majority antigens from the envelope proteins of HIV-1 and HIV-2 have been identified and cloned using recombinant DNA technology. These HIV-1 and HIV-2 proteins have been expressed and purified. The Trinity Biotech Capillus™ HIV-1/HIV-2 employs these two proteins bound to polystyrene latex beads to form the basis of a direct latex aggregation assay for the detection of antibodies to HIV-1 and / or HIV-2 in human whole blood, serum and plasma. The assay is performed on a patented capillary slide (the word 'slide' will be used from here forward when reference is made to the patented capillary slide). See **Diagram 1** below.

Diagram 1



The slide consists of a well area for mixing of latex reagent and sample. At one end of the mixing well, there is a capillary flow channel which leads to a viewing window. The latex reagent and test sample are mixed in the mixing well on the slide. The mixed reagents are drawn to the flow channel and the reagents begin to flow by capillary action towards the viewing window. Samples with HIV-1 and HIV-2 specific antibodies will cause the antigen coated latex to aggregate. The capillary flow enhances the binding of specific antibodies to the latex and hence promotes aggregation. The reaction is read visually when the latex solution reaches the viewing window. Aggregation in the viewing window should be considered as initially reactive. A smooth milky white appearance is considered non-reactive.

#### Materials Required

	20 Test Kit	100 Test Kit
<b>Latex Reagent:</b> Polystyrene beads coated with envelope recombinant proteins to HIV-1 and HIV-2, diluted in buffer containing 0.1 % Sodium azide as a preservative.	1 x 4.0 ml	2 x 6.3 ml
<b>Positive Control:</b> Inactivated human serum or plasma containing antibodies to HIV-1 and / or HIV-2; non-reactive for Hepatitis B surface antigen and Hepatitis C virus antibodies. Contains 0.1 % Sodium azide as preservative.	1 x 0.4 ml	1 x 0.4 ml
<b>Negative Control:</b> Normal human serum or plasma non-reactive for antibodies to HIV-1/HIV-2 and non-reactive for Hepatitis B surface antigen and Hepatitis C virus antibodies. Contains 0.1 % Sodium azide as a preservative.	1 x 0.4 ml	1 x 0.4 ml
<b>Slides:</b>	20	100
<b>Disposable Pipette Tips:</b>	20	100
<b>Pipette:</b>	1	1
<b>Interpretation Station:</b>	1	1
A black interpretation station that holds up to 10 slides. This card, or a surface with a black background, should be used when reading the latex aggregation reactions.		
<b>Package Insert:</b>	1	1

#### Material Required but not provided

Disposable gloves  
Biohazard discard bags  
Blood collection devices

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### 5. Storage Conditions

#### Stability during Storage

Although it is recommended that the Capillus™ product is held at 2-8°C for long term storage, stability studies have shown that the product can withstand short periods outside of 2-8°C conditions.

These stability studies have tested the product at 25°C for up to 4 weeks and no adverse effects on product performance were identified. Such testing confirms that the Capillus™ product may be shipped outside of 2-8°C conditions provided the product is not subject to undue long periods of extreme temperatures.

If users are concerned that the product performance may have been compromised during transit they are advised to test the kit positive and negative controls as described under section 6 of this pack insert. Store all reagents at 2-8°C upon receipt. Bring to room temperature (18-25°C) before use. Return reagents to refrigerator (2-8°C) when not in use.

### 6. Quality Control

The Positive and Negative Controls should be run at least once per test day. The Positive Control should give a positive (+) aggregation reaction. The Negative Control should give a negative (-) aggregation reaction. Deterioration of reactivity of the Positive Control may be seen on prolonged storage at temperatures above 25°C. If either the Positive or Negative Control does not give the proper result after repeat testing, the kit should not be used.

### 7. Specimen Collection and Storage

Trinity Biotech Capillus™ HIV-1/HIV-2 assay is designed to be used with human serum, plasma or whole blood samples.

#### Whole Blood:

Blood droplets **should not** be dropped directly from the fingertip onto the device as the droplet size may vary. Whole blood specimens should be used within ten minutes of collection for optimum performance. If a specimen has started to clot, do not remix before testing. In such instances, the clear serum should be pipetted off the clotted specimen and used for analysis.

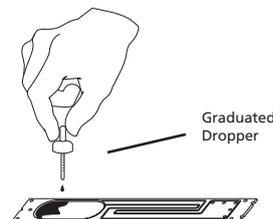
Heparin and EDTA have been used successfully as anticoagulants with the Trinity Biotech Capillus™ HIV-1/HIV-2 test. Anticoagulated whole blood may be kept for up to three days at 2-8°C though separation of the plasma component by centrifugation is recommended.

#### Serum or Plasma:

Serum or plasma may be kept for up to three days at 2-8°C. Samples should be frozen at -20°C for longer storage. The possible adverse effects of long term freezer storage on sample reactivity have not been characterised. Avoid repeated freezing and thawing of samples. Serum or plasma is obtained by venipuncture and then centrifugation.

1. Do not use heat inactivated samples.
2. Allow reagents and patient samples to reach room temperature (18-25°C) before use.
3. Record patient sample identification number.
4. Place up to 10 slides on the interpretation station.
5. Mix the latex reagent well by gently agitating the bottle to ensure that the latex suspension is homogeneous. Avoid foaming of the latex reagent. Also draw latex up and down a few times with the graduated dropper to ensure good mixing before latex is dispensed onto the slide.
6. Draw the latex reagent to the calibration mark (120 µl volume approx). Avoid drawing up air bubbles. Dispense the reagent onto the slide at the edge of the mixing well furthest away from the capillary channel. Contact of the graduated dropper with the slide should be avoided when dispensing the reagent. See **Diagram 2** below.

Diagram 2



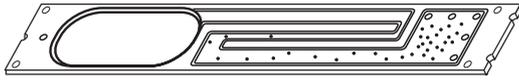
Note: If the latex begins travelling down the slide before sample addition, discard slide and start again.

7. Using the precalibrated pipette, attach a fresh disposable pipette tip provided in the kit and retrieve the test sample or control (10 µl volume).
8. Dispense the sample directly into the latex solution. Using the pipette, mix the sample and the latex by pumping the mixture in and out of the tip three times and stir in a circular motion at least five (5) times.  
Note: Effective mixing of sample in the latex is critical to ensure reproducible and accurate test results.
9. Continue to use the pipette tip to move the well mixed sample and latex solution to the opening of the channel until the capillary flow begins.
10. Allow the latex mixture to flow through the entire capillary channel and into the viewing window before interpreting the result. This will require approximately 3-7 minutes.

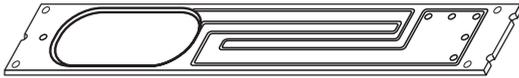
## 9. Interpretation of Test Results

Observe viewing window for aggregation. Samples demonstrating any latex aggregation should be considered initially reactive (**Diagram 3**). Samples showing no aggregation should be interpreted as non-reactive (**Diagram 4**). Record results on data sheet. Any reactive sample should be retested in duplicate with this test and / or with a supplemental test e.g. another product from the Trinity Biotech SeroCard™ or UniGold™ HIV range.

**Diagram 3: Reactive**



**Diagram 4: Non-Reactive**



## 10. Limitations

- The Capillus™ HIV-1/HIV-2 detects antibodies to both HIV-1 and HIV-2. The test will not discriminate between antibodies to HIV-1 and HIV-2.
- Insufficient data is available to interpret tests performed on other body specimens, pooled blood or processed plasma, and products made from such pools; testing of these pooled specimens is not recommended.
- Immunosuppressed or immunocompromised individuals may not produce antibodies after infection with HIV-1 or HIV-2; thus negative results with any antibody detection kit may not be reliable for these patients.
- Infants may not produce antibodies or they may passively receive them from an infected mother. Therefore, great care is necessary to interpret their positive or negative test results in relation to HIV-1 and / or HIV-2 infection.
- Capillus™ HIV-1/HIV-2 detects circulating antibodies to HIV-1 and HIV-2, thus, is useful in screening blood and plasma donated for transfusion and further manufacture, in evaluating patients with signs of symptoms of AIDS and in establishing infection in an asymptomatic carrier. For most uses, it is recommended that repeatedly reactive specimens be investigated by an alternative assay or supplemental test. A person who has antibodies to HIV-1 and / or HIV-2 is presumed to be infected with the virus and appropriate counselling and medical evaluation should be offered. Such an evaluation should be considered an important part of HIV antibody testing and should include test result confirmation on a freshly drawn sample. AIDS and AIDS-related conditions are clinical syndromes and their diagnosis can only be established clinically. Testing with Capillus™ HIV-1/HIV-2 alone cannot be used to diagnose AIDS, even if the recommended investigation of reactive specimens suggests a high probability that the antibody to HIV-1 or HIV-2 is present. A negative result at any point in the investigation of individual subjects does not preclude the possibility of exposure to or infection with HIV-1 or HIV-2.
- Do not use heat-inactivated samples.
- For *in vitro* diagnostic use only.
- The Capillus™ HIV-1/HIV-2 tests should be performed by appropriately qualified and trained personnel.

## 11. Performance Evaluation

Prior to the introduction of the Capillus™ assay, clinical trials indicated an assay sensitivity of 100% with a specificity of 99.7%. Since its introduction, the Capillus™ assay has been subject to a wide range of evaluations and studies to determine the quality of its performance and to consider appropriate applications for the system. These studies have shown that the Capillus™ assay regularly offers excellent sensitivity and specificity data with corresponding high predictive positive and negative value. **Table 1** below illustrates summaries of the many performance evaluations undertaken by the Trinity Biotech Capillus™ assay.

**Table 1:** Summary of Performance Evaluation of the Capillus™ assay.

Study Centre	Sample Origin	Sample Type	No. of Samples	% Sensitivity	% Specificity	Reference
CDC/ NCID	Honduras					
	High prevalence	NS	756	99.6	99.8	NP
	Low prevalence	NS	1001	100	100	
CDC/ USAID	Uganda	Plasma	510	100	99.5	12
PHLS	UK	Serum	664	100	99.7 (a)	NP
Unidad De Virologia Hospital	Argentina	Serum	140	100	98.5	13
		Plasma	52	100	98.5	
		Whole blood	52	100	98.5	
SAIMR	S. Africa	Serum	612	99.3	99.7	NP, 14
		Whole blood	501	100	99.7	
ORSTOM	Nigeria	Serum	2300	100	99.9 (b)	NP
Swedish Institute for Infectious disease control	West Africa and Sweden	Serum	246	100	99.2	NP
		Whole blood	53	100	NS	
WHO	Africa, Europe S. America, Asia	Serum	600	100	99.6	NP
Tropical Disease research centre	Zambia	Serum	202 *	100	100	NP, 15
		Plasma				
		Whole blood				
UVRL	Uganda	Plasma	211	100	99.3	NP
University of Zimbabwe Medical School	Zimbabwe	Serum	1267	97.8	99.7	16
		Plasma	188	96.6	100	
		Whole blood	141	95.7	100 (c)	

## Notes:

NS - Not specified

NP - Not published. This data is available from Trinity Biotech on request.

\* - Sample type not indicated.

(a) - Positive samples included HIV-1 positive, HIV-2 positive and co-infections. Negative samples contained potentially interfering substances.

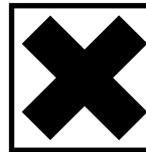
(b) - Positive samples included HIV-1 sub-type O samples.

(c) - Testing conducted in a field environment.

## 12. Warnings and Precautions

- Kit contents and patient samples should always be handled as if they are capable of transmitting infection. Neither the Positive nor the Negative Controls have detectable Hepatitis B surface antigen or Hepatitis C virus antibodies. The Positive Control has been heated to 56°C for 30 minutes for inactivation. Because no known test method can offer complete assurance that products derived from human blood are pathogen free, all materials of human origin should be handled as if they were potentially infectious.
- Do not pipette by mouth.
- Do not mix reagents from different lots.
- Do not use the kit past its expiration date.
- Do not smoke, eat or drink in areas in which specimens are handled.
- Slides are for single use only. Do not use slides if they appear broken or damaged.
- If either the Positive or Negative control does not give the proper result after repeat testing, the kit should not be used.
- Wear disposable gloves when handling specimens or controls and thoroughly wash hands afterwards.
- Avoid microbial contamination of reagents when removing aliquots from reagent bottles.
- Avoid splashing or forming aerosols.
- Use a separate pipette tip for each sample and control.
- When not in use, store all reagents at 2-8°C.

## 13. Risk and Safety



### Sodium azide

Positive Control, Negative Control and Latex Reagent contain 0.1% Sodium azide (EINECS 247-852-1)

R22: Harmful if swallowed

R32: Contact with acids liberates very toxic gas

S36: Wear suitable protective clothing

Prepared in accordance with requirements for EEC label EINECS 247-852-1

X<sub>n</sub>

## 14. References

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