

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY**

A. 510(k) Number:

k071712

B. Purpose for Submission:

New device

C. Measurand:

Lactoferrin, fecal

D. Type of Test:

Lateral flow immunochromatographic assay

E. Applicant:

TechLab, Inc.

F. Proprietary and Established Names:

TechLab® LEUKO EZ VUE™

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
DEG Lactoferrin, antigen, antiserum, control	Class I	21 CFR 866.5570 Lactoferrin immunological test system	Immunology 82

H. Intended Use:

1. Intended use(s):

The LEUKO EZ VUE™ test is an immunochromatographic test for the qualitative detection of elevated levels of fecal lactoferrin, a marker for fecal leukocytes and an indicator of intestinal inflammation. The LEUKO EZ VUE™ test detects lactoferrin in liquid, semi-solid, and solid fecal specimens. A positive test result indicates an increased level of fecal lactoferrin and warrants additional testing.

2. Indication(s) for use:

Same as Intended Use

3. Special conditions for use statement(s):

For prescription use

4. Special instrument requirements:

Timer

I. Device Description:

The test kit consists of membrane cassettes, diluent, positive control, disposable plastic pipettes (flared section = 50 µL), and disposable sample preparation devices (tubes and filter tips).

J. Substantial Equivalence Information:

1. Predicate device name(s):

a. TechLab® LEUKO-TEST

b. Microscopy using methylene blue or Gram stain – exempt laboratory method

2. Predicate 510(k) number(s):
 - a. k931241
 - b. Not applicable
3. Comparison with predicate:

Similarities		
Item	Device	Predicate
	TechLab LEUKO EZ VUE	TechLab LEUKO-TEST
Intended Use	The detection of lactoferrin in fecal specimens	Same
Analyte measured	Fecal lactoferrin	Same
Capture antigen	Polyclonal rabbit anti-lactoferrin antibodies	Same
Test matrix	Stool	Same

Differences		
Item	Device	Predicate
Indications for Use	An indicator of intestinal inflammation	Not stated
Method	Lateral flow immunochromatography	Latex agglutination
Internal (procedural) control	Stripe containing mouse anti-IgG antibodies	Not applicable
Solid phase	Flow membrane cassette	Latex particles
Conjugate	Colloidal gold	Not applicable
Result interpretation	<u>Positive:</u> two red lines are visible: single red lines at both the test and the control portions of the Results Window <u>Negative:</u> no line at the test portion and a single red line at the control portion <u>Invalid:</u> control line is not present or if no lines appear on the completed membrane cassette	<u>Positive:</u> visible 1+ to 4+ agglutination <u>Negative:</u> no visible agglutination
Controls	Positive only	Positive and negative

Differences		
Item	Device	Predicate
	TechLab LEUKO EZ VUE	Laboratory microscopy
Intended use	The detection of	Detection of leukocytes

Differences		
Item	Device	Predicate
	lactoferrin in fecal specimens	in fecal smears
Method	Lateral flow immunochromatography	Manual microscopic observation of stained fecal smears to detect leukocytes
Stain for leukocyte detection and morphology	Not applicable	Methylene blue or Gram stain
Sample stability for the assay	Stable when stored as directed	Samples must be run within minutes as some enteric pathogens produce toxins that may lyse leukocytes and degrade lactoferrin

K. Standard/Guidance Document Referenced (if applicable):

“Statistical Guidance on Reporting Results from Studies Evaluating Diagnostic Tests: Draft Guidance for Industry and FDA Reviewers”; CLSI EP7-A, Interference Testing in Clinical Chemistry.

L. Test Principle:

The membrane cassette contains two stripes of immobilized antibodies. One stripe contains rabbit anti-lactoferrin conjugated directly to gold particles. The other, representing a control stripe, contains mouse anti-IgG antibodies. The diluted sample and gold conjugate migrate by capillary action when the sample is added to the well. If elevated lactoferrin is present in the sample, gold conjugate-lactoferrin complexes form and are captured by the immobilized anti-lactoferrin antibodies in the stripe. The lactoferrin-conjugate-antibody complexes appear as a single read line in the test portion of the Results Window. In the control stripe, conjugate binds to the immobilized anti-IgG antibodies, demonstrating correct migration of the sample and conjugate along the membrane. The conjugate-anti-IgG antibodies appear as a single read line in the control portion of the Results Window.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Intra-assay:

Nineteen human fecal specimens were analyzed a total of six times in the same assay run with a single lot of the test. The specimens included 6 samples with values close to the cut-off for positive/negative. For the analysis, a single 1:50 dilution of each fecal specimen was prepared in kit diluent as described in the package insert. All positive specimens remained positive and all negative specimens remained negative.

Inter-assay:

Twenty human fecal specimens were analyzed once a day using separate

specimen dilutions done fresh each day during a 3-day period using a single lot of the test. The specimens included 6 samples close to the assay cut-off. All positive specimens remained positive and all negative specimens remained negative.

b. *Linearity/assay reportable range:*

Not applicable

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

TechLab does not claim that any assay components are traceable to a standard reference material. The expiration date of the kit is assigned based on the shortest expiration date of any of the components. Expiration dating was set at 9 months. Stability testing is still being evaluated and may be extended.

d. *Detection limit/analytical sensitivity:*

The analytical sensitivity was determined using serial twofold dilutions of highly purified human lactoferrin. Dilutions were tested on 3 kit lots. For all 3 lots, the test was consistently positive at a concentration of 128 ng/mL lactoferrin and negative at a concentration of 64 ng/mL.

e. *Analytical specificity:*

Cross-reactivity:

Various intestinal organisms were examined for cross-reactivity. For the analysis, broth cultures mixed 1:50 with 1X diluent were evaluated. Broth cultures at log phase containing $\geq 10^8$ bacteria per mL were used. No cross-reactivity was observed with any of the following organisms:

<i>Acinetobacter lwoffii</i>	<i>Clostridium novyi</i> (types A,B,C)
<i>Aeromonas hydrophila</i>	<i>Clostridium perfringens</i> (types A,B,C,D,E)
<i>Bacillus cereus</i>	<i>Clostridium septicum</i>
<i>Bacillus subtilis</i>	<i>Clostridium sporogenes</i>
<i>Bacteroides distasonis</i>	<i>Clostridium tetani</i>
<i>Bacteroides eggertii</i>	<i>Enterococcus faecalis</i>
<i>Bacteroides fragilis</i>	<i>Eubacterium aerofaciens</i>
<i>Bacteroides ovatus</i>	<i>Escherichia coli</i>
<i>Bacteroides stercoris</i>	<i>Fusobacterium prausnitzii</i>
<i>Bacteroides thetaiotaomicron</i>	<i>Klebsiella pneumoniae</i>
<i>Bacteroides uniformis</i>	<i>Pseudomonas aeruginosa</i>
<i>Bacteroides vulgatus</i>	<i>Pseudomonas vulgaris</i>
<i>Bifidobacterium adolescentis</i>	<i>Peptostreptococcus anaerobius</i>
<i>Bifidobacterium longum</i>	<i>Salmonella choleraesuis</i>
<i>Campylobacter jejuni</i>	<i>Salmonella enteritidis</i>
<i>Candida albicans</i>	<i>Salmonella typhi</i>
<i>Candida krusei</i>	<i>Salmonella typhimurium</i>
<i>Candida tropicalis</i>	<i>Shigella dysenteriae</i>
<i>Clostridium bifermens</i>	<i>Shigella flexneri</i>
<i>Clostridium chauvoei</i>	<i>Shigella sonnei</i>
<i>Clostridium difficile</i>	<i>Staphylococcus aureus</i>
<i>Clostridium haemolyticum</i>	<i>Vibrio parahaemolyticus</i>
<i>Clostridium histolyticum</i>	<i>Yersinia enterocolitica</i>
Adenovirus type 1 (ATCC #VR-1)	Coxsackievirus B2 (VR-29)
Adenovirus type 2 (ATCC #VR-846)	Coxsackievirus B2 (VR-30)
Adenovirus type 3 (ATCC #VR-3)	Coxsackievirus B2 (VR-184)
Adenovirus type 5 (ATCC #VR-5)	Coxsackievirus B2 (VR-185)
Adenovirus type 40 (ATCC #VR-931)	Echovirus 18 (VR-48)
Human coronavirus (ATCC #VR-740)	Echovirus 33 (VR-582)
Enterovirus type 70 (VR-836)	Enterovirus type 70 (VR-784)

Interfering substances:

Two positive and 2 negative samples were spiked with potentially interfering substances and 7 replicates of each were tested. The substances had no effect

on test results when present in feces in the concentrations indicated:

Substance	Concentration
Mucin	5% w/v
Serum containing lipid (fecal fats)	5% v/v
Mylanta [®]	5% v/v
Pepto-Bismol [®]	5% v/v
Imodium [®]	5% v/v
Kaopectate [®]	5% v/v
Bilirubin	5% w/v
Hemoglobin	10 mg/g feces

f. Assay cut-off:

Specimens with values ≥ 128 ng/mL should show a positive result with the test. Results are reported as positive or negative.

2. Comparison studies:

a. Method comparison with predicate device:

Correlation to the predicate was made by testing 375 samples.

		LEUKO-TEST		
		+	-	Total
LEUKO EZ VUE	+	98	55	153
	-	7	215	222
	Total	105	270	375

95% Confidence
Intervals

Positive percent agreement	93% (98/105)	86% - 97%
Negative percent agreement	80% (215/270)	74% - 84%
Overall agreement	83% (313/375)	80% - 86%

b. Matrix comparison:

Both assays test fecal specimens.

3. Clinical studies:

a. Clinical Sensitivity:

Not done

b. Clinical specificity:

Not done

c. Other clinical supportive data (when a. and b. are not applicable):

Not applicable

4. Clinical cut-off:

See assay cut-off

5. Expected values/Reference range:

The expected result in the normal population is negative (below the assay cut-off).

The prevalence of a positive test result using the LEUKO EZ VUE test in clinical investigations ranged between 27% - 53%. The prevalence will vary from

location to location and hospitals may experience rates lower or higher than those observed at the sites used in the studies. The prevalence will vary depending on the incidence of outbreaks due to various enteropathies.

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.