K071657

SUMMARY OF SAFETY AND EFFECTIVENESS

IDENTIFICATION INFORMATION

SUBMITTER'S INFORMATION

This summary of 510(k) safety and effectiveness is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.20.

SUBMITTER'S NAME AND ADDRESS: Meridian Bioscience, Inc.
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NOV 1 5 2007

DATE SUMMARY PREPARED: November 13, 2007

TRADE NAME: TRU FLU

COMMON NAME: Rapid, qualitative lateral-flow immunoassay for the detection of Influenza A and B antigens

CLASSIFICATION NAME: Antigen, CF (including CF control), influenza virus A, B, C

REGULATION: 866.3330

INTENDED USES:
The TRU FLU is a rapid, qualitative, lateral-flow immunochromatographic assay for detecting both influenza A and influenza B viral nucleoprotein antigens in human nasal wash, nasopharyngeal aspirate and nasal and nasopharyngeal swab samples from symptomatic patients. The test is not intendedf or the detection of influenza C viruses A negative test is presumptive and it is recommended these results be confirmed by cell culture. Negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other clinical management decisions.

PREDICATE DEVICES:
TRU FLU is a modification of, and is intended to detect the same analytes as, Immuno*Card* STAT! Flu A&B PLUS (K041626), Meridian Bioscience, Inc.
Binax NOW Influenza A&B, Inverness Medical (K062109)

BACKGROUND:
Influenza is a highly contagious, epidemic to pandemic acute viral respiratory disease caused by several genera of the *Orthomyxoviridae* family. Influenza virus A and Influenza virus B are the two genera most commonly associated with disease in humans. Influenza infection rates tend to be highest in pediatric populations, while serious complications from influenza disease are more common in the elderly. Clinical signs and symptoms begin after a 1-4 day incubation period and include cough, fever, myalgia and malaise. The clinical presentation of influenza can range from asymptomatic infection to fatal pneumonia. Influenza co-circulates with other respiratory pathogens; hence it is important to differentiate influenza from other respiratory diseases. Antiviral drugs in general have shown more significant clinical benefit when administered within 48 hours of the appearance of symptoms, which

obviates the need for the rapid detection of influenza. Not all antiviral drugs are effective against both influenza A and influenza B; therefore it is important to distinguish between the two.

Influenza A and B can be detected in human respiratory samples by a variety of methods including tissue culture, immunofluorescent assay and enzyme immunoassay. Tissue culture isolation remains the gold standard for the detection of influenza, yet the procedure can take 7 days to complete immunofluorescent antibody-based tests are moderately sensitive, yet highly dependent on specimen quality and preparation. The rapid detection of influenza using enzyme and microparticle-based immunoassays has become an important aspect of patient management in patients of all ages with acute respiratory disease due to influenza. The results of such tests are used to support data available from the patient's clinical evaluation and assist the physician in determining the course of action.

Type of test

TRU FLU is a rapid, single-use, qualitative lateral-flow immunoassay screening test.

Specimen type

The following specimens have been found compatible with TRU FLU.

1. Nasal wash
2. Nasopharyngeal aspirate
3. Nasopharyngeal swab
4. Nasal swab

Conditions for use

TRU FLU is designed for use by laboratory professionals under the normal environmental conditions. The assay, which is stored at 2-25 C when not in use, is brought to room temperature prior to use. Normal laboratory lighting, humidity and temperature do not affect the performance of the assay.

Contraindications

There are no contraindications associated with the use of this product.

Special instrument requirements

No instruments are used with this product.

Combination with other medical devices

No other medical devices are used in combination with this device.

Table 1. Comparison charts -- TRU FLU vs Prior Device Format vs Predicate Device

Characteristics	***TRU FLU***	***ImmunoCard STAT! Flu A&B PLUS (prior format)***	***Binax NOW Influenza (predicate)***
Device Type			
Technology	Single use, rapid, lateral flow immunoassay	Single use, rapid, lateral flow immunoassay	Single use, rapid, lateral flow immunoassay
In vitro diagnostic device	Yes	Yes	Yes
Control	Purchased separately	Purchased separately	Supplied with kit
Calibrator	No	No	No
Intended Use			
Detection of influenza A antigen	Yes	Yes	Yes
Detection of influenza B antigen	Yes	Yes	Yes
Screening test	No	No	No
Diagnostic test	Yes	Yes	Yes
Identification test	No	No	No
Monitoring therapy	No	No	No
Acceptable Samples			
Swab -- Nasal	Yes	Yes	No
Swab -- Nasopharyngeal	Yes	Yes	Yes
Wash -- Nasal	Yes	Yes	Yes
Wash – Nasopharyngeal	Yes	Yes	No
Aspirate -- Nasopharyngeal	Yes	Yes	No
Reagents/Components Provided			
Nitrocellulose test strip	Yes (attached to plastic holder/tube closure)	Yes (enclosed in plastic frame)	Yes (enclosed in cardboard frame)
Conjugate reagent	Yes (supplied as dried bead in Conjugate Tube)	Yes (supplied in conjugate pad attached to test strip)	Yes (supplied in conjugate pad attached to test strip)
Reading Guide	Yes (part of plastic holder/tube closure)	Yes (part of plastic frame)	Yes (part of cardboard frame)

Table 1 Continued

Characteristics	***TRU FLU***	***ImmunoCard STAT! Flu A&B PLUS (prior format)***	***Binax NOW Influenza (predicate)***
Sample Diluent/Negative Control (external)	Yes	Yes	No
Internal procedural control	Yes	Yes	Yes
External positive control	No (Purchased separately -- FLU/RSV Positive Control, Catalogue 751110	No (Purchased separately -- FLU/RSV Positive Control, Catalogue 751110	Included in kit as dry swab.
Source of influenza A antibodies	Monoclonal M2110169, IVF8	Monoclonal M2110169, IVF8	Not known
Source of influenza B antibodies	Monoclonal 2/3, M2110171	Monoclonal 2/3, M2110171	Not known

Table 2 Comparison of TRU FLU method to predicate

*Comparison of assay steps**	*TRU FLU*	*ImmunoCard STAT! Flu A&B PLUS (prior format)*	*Binax NOW Influenza A&B (predicate)*
Technology	Lateral-flow, colloidal gold-based immunoassay	Lateral-flow, colloidal gold-based immunoassay	Lateral-flow immunochromatographic assay.
Test Reagents	1. Test Strip (nitrocellulose membrane with immobilized capture antibody). Top end is inserted into plastic frame or holder. 2. Conjugate Tube containing antibody-colloidal gold conjugate (lyophilized bead) 3. Sample Diluent/Negative Control External Positive Control (Flu/RSV Positive Control) sold separately as adjunct reagent.	1. Test Device (Test Card with nitrocellulose membrane with immobilized antibody, conjugate pad with colloidal gold, plastic frame with reading/reaction window and sample port 2. Sample Diluent/Negative Control External Positive Control (Flu/RSV Positive Control) sold separately as adjunct reagent.	1. Test Devices 2. Transfer pipettes 3. Positive Control Swab 4. Negative control Swab 5. Elution Solution Vials for Control Swabs
Specimen Type	1. Nasal wash 2. Nasopharyngeal aspirate 3. Nasal swabs 4. Nasopharyngeal swabs	1. Nasal wash 2. Nasopharyngeal aspirate 3. Nasal swabs 4. Nasopharyngeal swabs	1. Nasal Wash 2. Nasal aspirate 3. Nasopharyngeal swab
Equipment Required	No	No	No
Level of skill required	Complexity: Moderate	Complexity: Moderate	Complexity: CLIA Waived
Assay steps	1. Add 100 µL Sample Diluent to the Conjugate Tube. 2. Add 100 µL sample to the Conjugate Tube and mix. 3. Insert Test Strip to Conjugate Tube. 4. Press down on cap of Test Strip to seal Conjugate Tube. 5. Incubate 15 min., 20-25 C. 6. Read at end of incubation using guide on Cap-Carrier.	1. Add 4 drops Sample Diluent to a test tube 2. Add 150 µL sample and mix 3. Add 150 µL diluted specimen to Test Device. 4. Incubate 15 min., 20-25 C. 5. Read at end of incubation using guide at reaction window.	1. Aspirate sample with transfer pipette. 2. Add sample in drop-wise manner to sample pad. 3. Close cardboard cover and incubate 15 min at 20-25 C. 4. Read immediately at end of 15 minutes.
End point	Appearance of pink-red color at Test and/or Control lines	Appearance of pink-red color at Test and/or Control lines	Appearance of pink-purple color at Test and/or Control lines
Interpretation of test result	Flu A Positive = appearance of pink-red lines at Flu A test and control positions (indicates presence of Influenza A antigens) Flu B Positive = appearance of pink-red lines at Flu B test and control positions (indicates presence of Influenza B antigens) Negative = no test line color with pink-red control line (indicates absence of Influenza A or B antigens)	Flu A Positive = appearance of pink-red lines at Flu A test and control positions (indicates presence of Influenza A antigens) Flu B Positive = appearance of pink-red lines at Flu B test and control positions (indicates presence of Influenza B antigens) Negative = no test line color with pink-red control line (indicates absence of Influenza A or B antigens)	Flu A Positive = appearance of pink-purple lines at Flu A test and control positions (indicates presence of Influenza A antigens) Flu B Positive = appearance of pink-purple lines at Flu B test position and control positions (indicates presence of Influenza B antigens) Negative = no test line color with a pink-purple control line (indicates absence of influenza A or B antigens)

* Note: Differences are underlined to facilitate their detection.

DEVICE DESCRIPTION AND TECHNOLOGICAL PRINCIPLES

Reagents

TRU FLU is distributed as a test kit that includes the following reagents:

1. **Test Strip:** A test strip attached to a plastic frame or holder enclosed in a foil pouch with desiccant. The test strip carries monoclonal anti-influenza A and influenza B capture antibodies* for the test. The holder is used to stopper the Conjugate Tube. The paddle portion of the holder indicates where test and control lines should appear.
2. **Conjugate Tube:** A capped plastic tube containing a conjugate bead. The tube is enclosed in a foil pouch. The conjugate consists of gold-conjugated anti-influenza A and anti-influenza B which serve as the detector antibodies.
3. **Sample Diluent/Negative Control:** A buffered protein solution provided in a plastic vial. Sodium azide (0.094%) added as a preservative. Use as supplied.
4. Plastic transfer pipettes with 50, 100, 200 and 300 µL volume marks.

Equipment needed to use the device

There is no equipment needed to use this device.

Interfering substances

Whole blood, at concentrations greater than 0.5% may interfere with the interpretation of test results.

Calibrators

There are no calibrators used with this device.

Controls

The assay includes an internal procedural control line that is used to determine if the test has been performed correctly, proper flow has occurred and that reagents were reactive at the time of use. A clean background around the test and control lines also serves as a procedural control. Control or test lies that are obscured by a heavy background color may invalidate the test and may be an indication of reagent deterioration, use of inappropriate sample or improper test performance.

Positive Control Reagent is supplied separately. It is used in parallel with Sample Diluent/Negative Control as external controls. These reagents also serve as indicators that the test was performed correctly, that the capture and detector antibodies were active at the time of use, and that the membrane supports proper sample flow.

Failure of the internal and external control to produce the expected results suggests the test was not performed correctly (ie, incorrect volume of reagents added; incorrect incubation temperature or times used or that reagents were not brought to room temperature prior to testing).

Technological principles

TRU FLU is a single use immunoassay that consists of a Conjugate Tube, a Test Strip, and Sample Diluent. The Conjugate Tube contains a lyophilized bead of colloidal gold-linked monoclonal antibodies to influenza A and influenza B (detector antibodies). The Test Strip carries a nitrocellulose membrane with dried capture antibodies at separate lines for influenza A and influenza B. The Test Strip holder caps the Conjugate Tube during testing and subsequent disposal to reduce exposure to potential pathogens.

The conjugate bead is first rehydrated in the Conjugate Tube with Sample Diluent, prior to the addition of patient specimen. The contents are mixed before the Test Strip is added. As the test is incubated at 20-25 C, influenza A or influenza B antigens, if present in the diluted sample, bind to the corresponding monoclonal antibody-colloidal gold conjugate as the sample moves up the Test Strip. The influenza A capture monoclonal antibody is bound to the Test Strip at the test-FLU A position of the device. When it binds the antigen-influenza A antibody-colloidal gold complex, it yields a visible pink-red line. Similarly, the influenza B capture monoclonal antibody bound to the assay membrane at the test-FLU B position will result in a pink-red line when it captures antigen-influenza B antibody-colloidal gold complexes. When no antigen is present, no complexes are formed and no pink-red line will appear at either the test FLU A or the test FLU B position of the Test Strip. An internal control line helps determine whether adequate flow has occurred through the Test Strip during a test run. A visible pink-red line at the Control position of the Test Strip should be present each time a specimen or control is tested. If no pink-red control line is seen, the test is considered invalid.

PERFORMANCE EVALUATION – CLINICAL/FIELD TRIALS

Study Objective

A clinical/field study was conducted to demonstrate that TRU FLU was substantially equivalent in performance to the standard reference method – tissue culture – and to the predicate device Binax NOW Influenza A&B (K062109) in a clinical laboratory setting using samples submitted for influenza testing.

Investigation Plan

The test plan was designed to evaluate the performance of prospectively collected fresh and frozen samples from the 2006-7 season. Nine independent laboratories (in different geographic regions of the US) and the manufacturer participated in the study. Patient specimens, de-linked from identification information, were used. Trial sites were instructed to test samples in parallel by tissue culture (standard reference), TRU FLU and the predicate device, NOW Influenza A&B. Tissue culture (reference method) was performed by the site using the site's method.

Sample population and selection

The sample population used in this study included respiratory samples from patients of any age provided the samples had been submitted for influenza testing. Such samples were assumed to be from symptomatic patients. The sample types included nasal wash, nasopharyngeal aspirate and nasal and nasopharyngeal swabs.

Influence of other disease states

There are no known disease states that would have an influence on influenza test results other than infection with influenza A or B virus.

Patient exclusion criteria

Samples from asymptomatic patients were excluded from the trials. There were no exclusions based on patient age gender or other therapies.

Clinical trial test system

Clinical trial sites employed full production lots of TRU FLU test kits that were labeled for investigational use only. TRU FLU, the predicate device and record sheets were shipped to test sites throughout the study. Unused portions of the assays were returned to Meridian at the completion of the study. When not in use, test kits were stored according to the instructions in the provisional IFU.

Patient samples were prepared according the package inserts that accompanied the test and predicate device. Viral cultures were performed by each laboratory's established internal method. Three of the nine independent laboratories completed reproducibility studies prior to testing patient samples. Reproducibility studies are described later in this section. Clinical data was analyzed using Fisher's exact method and is presented in 2 x 2 tables.

Clinical study data

A total of 697 prospectively collected fresh and 63 frozen samples were tested. Tissue culture tests were performed on all frozen samples at the time of their collection. As shown in Table 3, 52% (366/697) of fresh samples were wash/aspirate samples and 46% (320/697) were swab samples. Sample type was not identified for the remaining 2% (11/697). All frozen samples were wash/asp. Table 4 identifies the age groups of the patients from whom fresh samples were collected during the study. 27% (185/697) of the fresh samples were from patients 22 years of age or older, 64% (447/697) from patients 12 years of age or less, and 8% (59/697) from children 13 years to 21 years of age. The age of patients submitting 6 samples was not recorded. Of the 63 frozen samples only, the majority (33/63 or 52%) were collected from patients aged 2 months to 2 years. The patient ages for the remaining frozen samples were 14% (9/63) for patients aged 1 month or less, 22% (14/63) patients aged 3-12 years, and 11% (7/63) patients aged 13-21 years. Tables 5a-b categorize patients by gender. Fifty three percent (367/697) of the fresh samples and 51% (32/63) frozen samples were from male patients, while 47% (325/697) fresh and 49% (31/63) frozen samples were from females. The gender of patients submitting 5 samples was not recorded. Neither patient age nor gender affected assay performance. The 2 x 2 tables that summarize test results for each site are given in Table 6. Table 7 stratifies the data by patient age.

Of the 697 prospective samples tested, 1 produced invalid results in tissue culture and was excluded from the calculations for either sensitivity or specificity (see Tables 6 and 7).

Table 3 Description of sample types evaluated in the clinical studies

	Specimen Type			
	Wash/NPA	Swab	Not Defined	Total
Clinical Site 1				
Total tested	50	0	0	50
Total fresh	50	0	0	50
Total frozen	0	0	0	0
Clinical Site 2				
Total tested	30	82	0	112
Total fresh	30	82	0	112
Total frozen	0	0	0	0
Clinical Site 3				
Total tested	63	7	0	70
Total fresh	0	7	0	7
Total frozen	63	0	0	63
Clinical Site 4				
Total tested	71	69	0	140
Total fresh	71	69	0	140
Total frozen	0	0	0	0
Clinical Site 8				
Total tested	18	0	0	18
Total fresh	18	0	0	18
Total frozen	0	0	0	0
Clinical Site 10				
Total tested	52	60	0	112
Total fresh	52	60	0	112
Total frozen	0	0	0	0
Clinical Site 11				
Total tested	90	2	11	103
Total fresh	90	2	11	103
Total frozen	0	0	0	0
Clinical Site 12				
Total tested	0	97	0	97
Total fresh	0	97	0	97
Total frozen	0	0	0	0
Clinical Site 13				
Total tested	49	3	0	52
Total fresh	49	3	0	52
Total frozen	0	0	0	0
Clinical Site 14				
Total tested	6	0	0	6
Total fresh	6	0	0	6
Total frozen	0	0	0	0
Clinical Site Totals				
Total tested	429	320	11	760
Total fresh	366	320	11	697
Total frozen	63	0	0	63

Legend: NPA = nasopharyngeal aspirate

Table 4 Categories of patients by age from which samples were collected for clinical studies

Patient Age	birth to 1 month	>1 month to 2 years	>2 years to 12 years	>12 years to 21 years	>21 years	Not Defined	Total
Clinical site 1							
Total tested fresh	2	10	24	13	1	0	50
Clinical site 2							
Total tested fresh	6	11	15	7	68	5	112
Clinical site 3							
Total tested fresh	0	1	3	0	3	0	7
Total tested frozen	9	33	14	7	0	0	63
Clinical site 4							
Total tested fresh	20	63	39	15	3	0	140
Clinical site 8							
Total tested fresh	0	1	1	1	15	0	18
Clinical site 10							
Total tested fresh	4	61	38	3	5	1	112
Clinical site 11							
Total tested fresh	11	50	24	13	5	0	103
Clinical site 12							
Total tested fresh	1	2	5	4	85	0	97
Clinical site 13							
Total tested fresh	4	38	7	3	0	0	52
Clinical site 14							
Total tested fresh	1	5	0	0	0	0	6
Clinical site Totals							
Total tested fresh	49	242	156	59	185	6	697
Total tested frozen	9	33	14	7	0	0	63
Total individual samples	58	275	170	66	185	6	760

Table 5a Classification of fresh samples based on patient gender

	Male	Female	Not defined	Total
Clinical site 1				
Total tested	21	29	0	50
Total TRU FLU A positive	1	3	0	4
Total TRU FLU B positive	2	6	0	8
Total TRU FLU negative	18	19	0	37
TRU FLU A & B Positive	0	1	0	1
Clinical site 2				
Total tested	58	49	5	112
Total TRU FLU A positive	25	22	0	47
Total TRU FLU B positive	0	0	4	4
Total TRU FLU negative	33	27	1	61
TRU FLU A & B Positive	0	0	0	0
Clinical site 3				
Total tested	4	3	0	7
Total TRU FLU A positive	0	0	0	0
Total TRU FLU B positive	0	1	0	1
Total TRU FLU negative	3	2	0	5
TRU FLU A & B Positive	1	0	0	1
Clinical site 4				
Total tested	76	64	0	140
Total TRU FLU A positive	16	13	0	29
Total TRU FLU B positive	3	5	0	8
Total TRU FLU negative	56	46	0	102
TRU FLU A & B Positive	1	0	0	1
Clinical site 8				
Total tested	14	4	0	18
Total TRU FLU A positive	0	0	0	0
Total TRU FLU B positive	0	0	0	0
Total TRU FLU negative	14	4	0	18
TRU FLU A & B Positive	0	0	0	0
Clinical site 10				
Total tested	60	52	0	112
Total TRU FLU A positive	12	13	0	25
Total TRU FLU B positive	13	9	0	22
Total TRU FLU negative	31	25	0	56
TRU FLU A & B Positive	4	5	0	9
Clinical site 11				
Total tested	55	48	0	103
Total TRU FLU A positive	5	5	0	10
Total TRU FLU B positive	1	1	0	2
Total TRU FLU negative	49	42	0	91
TRU FLU A & B Positive	0	0	0	0

Table 5a Continued

	Male	Female	Not defined	Total
Clinical site 12				
Total tested	44	53	0	97
Total TRU FLU A positive	9	4	0	13
Total TRU FLU B positive	0	3	0	3
Total TRU FLU negative	35	46	0	81
TRU FLU A & B Positive	0	0	0	0
Clinical site 13				
Total tested	33	19	0	52
Total TRU FLU A positive	5	1	0	6
Total TRU FLU B positive	0	2	0	2
Total TRU FLU negative	28	16	0	44
TRU FLU A & B Positive	0	0	0	0
Clinical site 14				
Total tested	2	4	0	6
Total TRU FLU A positive	2	2	0	4
Total TRU FLU B positive	0	0	0	0
Total TRU FLU negative	0	2	0	2
TRU FLU A & B Positive	0	0	0	0
Clinical site Totals				
Total tested	367	325	5	697
Total TRU FLU A positive	75	63	0	138
Total TRU FLU B positive	19	27	4	50
Total TRU FLU negative	267	229	1	497
TRU FLU A & B Positive	6	6	0	12

Table 5b Classification of frozen samples based on patient gender

	Male	Female	Not defined	Total
Clinical site 1				
Total tested	32	31	0	63
Total TRU FLU A positive	13	7	0	20
Total TRU FLU B positive	0	1	0	1
Total TRU FLU negative	19	23	0	42
Total invalid**	0	0	0	0

Table 6 Summary of TRU FLU results vs tissue culture – data stratified by site and sample type

TRU FLU Influenza A- Data stratified by site and sample type

Site ID	Positive Samples				Negative Samples		
Fresh Wash/Aspirate	TRU A /Culture	% Sensitivity	95% CI		TRU A /Culture	% Specificity	95% CI
1	4/4	100%	39.8 – 100%		45/46	97.8%	88.5 – 99.9%
2	13/15	86.7%	59.5 – 98.3%		13/15	86.7%	59.5 – 98.3%
4	2/3	66.7%	9.4 – 99.2%		58/68	85.3%	74.6 – 92.7%
8	0/0	N/A	N/A		18/18	100%	81.5 – 100%
10	8/9	88.9%	51.8 – 99.7%		34/43	79.1%	64.0 – 90.0%
11	2/3	66.7%	9.4 – 99.2%		78/86	90.7%	82.5 – 95.9%
13	1/1	100%	N/A		43/48	89.6%	77.3 – 96.5%
14	4/4	100%	39.8 – 100%		2/2	100%	15.8 – 100%
TOTAL	34/39	87.2%	72.6 – 95.7%		291/326	89.3%	85.9 – 92.6%
Site ID	Positive Samples				Negative Samples		
Fresh Swab	TRU A /Culture	% Sensitivity	95% CI		TRUA /Culture	% Specificity	95% CI
2	31/34	91.2%	76.3 – 98.1%		47/48	97.9%	88.9 – 99.9%
3	0/0	N/A	N/A		6/7	85.7%	42.1 – 99.6%
4	13/18	72.2%	46.5 – 90.3%		46/51	90.2%	78.6 – 96.7%
10	6/7	85.7%	42.1 – 99.6%		42/53	79.2%	65.9 – 89.2%
11	0/0	N/A	N/A		2/2	100%	15.8 – 100%
12	13/14	92.9%	66.1 – 99.8%		83/83	100%	95.7 – 100%
13	0/0	N/A	N/A		3/3	100%	29.2 – 100%
TOTAL	63/73	86.3%	76.3 – 93.2%		229/247	92.7%	88.7 – 95.6%

Site ID	Positive Samples				Negative Samples		
Frozen Wash/Aspirate	TRU A /Culture	% Sensitivity	95% CI		TRU A /Culture	% Specificity	95% CI
3	17/20	85.0%	62.1 - 96.8%		40/43	93.0%	80.9 - 98.5%

Table 6 Cont'd.

TRU FLU Influenza B - Data stratified by site and sample type

Site ID	Positive Samples				Negative Samples		
Fresh Wash/Aspirate	TRU B/Culture	% Sensitivity	95% CI		TRU B/Culture	% Specificity	95% CI
1	8/11	72.7%	39.0 – 94.0%		38/39	97.4%	86.5 – 99.9%
2	0/0	N/A	N/A		30/30	100%	88.4 – 100%
4	2/4	50.0%	6.8 – 93.2%		67/67	100%	94.6 – 100%
8	0/1	0%	N/A		17/17	100%	80.5 – 100%
10	7/9	77.8%	40.0 – 97.2%		42/43	97.7%	87.7 – 99.9%
11	2/6	33.3%	4.3 – 77.7%		83/83	100%	95.7 – 100%
13	2/2	100%	15.8 – 100%		47/47	100%	92.5 – 100%
14	0/0	N/A	N/A		6/6	100%	54.1 – 100%
TOTAL	21/33	63.6%	45.1 - 79.6%		330/332	99.4%	97.8 - 99.9%

Table Continued – TRU FLU Influenza B - Data stratified by site and sample type

Site ID	Positive Samples				Negative Samples		
Fresh Swab	TRU B/Culture	% Sensitivity	95% CI		TRU B/Culture	% Specificity	95% CI
2	3/3	100%	29.2 – 100%		78/79	98.7%	93.1 – 100%
3	2/4	50.0%	6.8 – 93.2%		3/3	100%	29.2 – 100%
4	7/19	36.8%	16.3 – 61.6%		50/50	100%	92.9 – 100%
10	23/34	67.6%	49.5 – 82.6%		26/26	100%	86.8 – 100%
11	0/0	N/A	N/A		2/2	100%	15.8 – 100%
12	3/5	60.0%	14.7 – 94.7%		92/92	100%	96.1 – 100%
13	0/0	N/A	N/A		3/3	100%	29.2 – 100%
TOTAL	38/65	58.5%	45.6 - 70.6%		254/255	99.6%	97.8 - 100%
Site ID	Positive Samples				Negative Samples		
Frozen Wash/Aspirate	TRU B/Culture	% Sensitivity	95% CI		TRU B/Culture	% Specificity	95% CI
3	1/2	50.0%	1.3 - 98.7%		61/61	100.0%	94.1 - 100%

Table 7 Data stratified by age of patient and sample type

TRU FLU Influenza A - Data stratified by age of patient and sample type

Age Group	Positive Samples			Negative Samples		
Fresh Wash/Aspirate	TRU A/Culture	% Sensitivity	95% CI	TRU A/Culture	% Specificity	95% CI
≤1 month	4/4	100.0%	39.8 – 100%	28/33	84.8%	68.1 – 94.9%
>1 month – 2yrs	16/19	84.2%	60.4 – 96.6%	146/168	86.9%	81.8 – 92.0%
3 – 12 years	5/5	100.0%	47.8 – 100%	62/68	91.2%	81.8 – 96.7%
13 – 21 years	3/4	75.0%	19.4 – 99.4%	31/32	96.9%	83.8 – 99.9%
>21 years	6/7	85.7%	42.1 – 99.6%	24/24	100.0%	85.8 – 100%
Not Determined	0/0	N/A	N/A	0/1	0.0%	N/A
Age Group	**Positive Samples**			**Negative Samples**		
Fresh Swab	**TRU A/Culture**	**% Sensitivity**	**95% CI**	**TRU A/Culture**	**% Specificity**	**95% CI**
≤1 month	1/1	100.0%	N/A	9/9	100.0%	66.4 – 100%
>1 month – 2yrs	9/11	81.8%	48.2 – 97.7%	36/42	85.7%	71.5 – 94.6%
3 – 12 years	16/20	80.0%	56.3 – 94.3%	52/58	89.7%	78.8 – 96.1%
13 – 21 years	2/4	50.0%	6.8 – 93.2%	14/18	77.8%	52.4 – 93.6%
>21 years	35/37	94.6%	81.8 – 99.3%	113/115	98.3%	93.9 – 99.8%
Not Determined	0/0	N/A	N/A	5/5	100.0%	47.8 – 100%

TRU FLU Influenza B - Data stratified by age of patient and sample type

Age Group	Positive Samples			Negative Samples		
Fresh Wash/Aspirate	TRU B/Culture	% Sensitivity	95% CI	TRU B/Culture	% Specificity	95% CI
≤1 month	0/0	N/A	N/A	37/37	100.0%	90.5 – 100%
>1 month – 2yrs	6/8	75.0%	34.9 – 96.8%	178/179	99.4%	96.9 - 100%
3 – 12 years	8/14	57.1%	28.9 – 82.3%	58/59	98.3%	90.9 – 100%
13 – 21 years	6/8	75.0%	34.9 – 96.8%	28/28	100.0%	87.7 – 100%
>21 years	1/3	33.3%	0.8 – 90.6%	28/28	100.0%	87.7 – 100%
Not Determined	0/0	N/A	N/A	1/1	100.0%	N/A
Age Group	**Positive Samples**			**Negative Samples**		
Fresh Swab	**TRU B/Culture**	**% Sensitivity**	**95% CI**	**TRU B/Culture**	**% Specificity**	**95% CI**
≤1 month	1/1	100.0%	N/A	9/9	100.0%	66.4 – 100%
>1 month – 2yrs	9/11	81.8%	48.2 – 97.7%	42/42	100.0%	91.6 – 100%
3 – 12 years	20/39	51.3%	34.8 – 67.6%	39/39	100.0%	91.0 – 100%
13 – 21 years	1/4	25.0%	0.6 – 80.6%	18/18	100.0%	81.5 – 100%
>21 years	4/7	57.1%	18.4 – 90.1%	145/145	100.0%	97.5 – 100%
Not Determined	3/3	100.0%	29.2 – 100%	1/2	50.0%	1.3 - 98.7%

Prevalence of the infection

The positivity rate for each laboratory will be dependent on several factors including the method of specimen collection, the handling and transportation of the specimen, the time of year, and the prevalence of influenza A or B at the time of testing. US influenza A rates (as reported by the US Centers for Disease Control) during the 2006-7 period of TRU FLU clinical trials ranged from 4% in the months of October/November 2006 to a peak of 40% in February 2007. The influenza B positivity rate peaked at approximately 8% during March/April 2007. The influenza A positivity rates at the clinical trial sites (based on tissue culture) averaged 14% in the month of February and 10% in March. Influenza B rates varied from 11% to 18% during the same time. The prevalence of Influenza A and B antigens in individuals showing signs and symptoms, as determined by the TRU FLU Assay is summarized in Table 8.

Table 8: Prevalence of Influenza A and B antigens by patient age and sex as determined by TRU FLU

		TRU FLU Influenza A Data distributed by gender and age of patient			TRU FLU Influenza B Data distributed by gender and age of patient		
Gender	**n**	**TRU FLU A Positive**	**TRU FLU A Negative**	**Prevalence**	**TRU FLU B Positive**	**TRU FLU B Negative**	**Prevalence**
Female	319	69	250	21.6%	33	286	10.3%
Male	361	81	280	22.4%	25	336	6.9%
Unknown	5	0	5	0.0%	4	1	80.0%
Total	685	**150**	535	21.9%	**62**	623	10.0%
Age (years)	**n**	**TRU FLU A Positive**	**TRU FLU A Negative**	**Prevalence**	**TRU FLU B Positive**	**TRU FLU B Negative**	**Prevalence**
< 2	287	63	224	22.0%	17	270	5.9%
3 - 21	209	43	166	20.6%	36	173	17.2%
> 21	183	43	140	23.5%	5	178	2.7%
Unknown	6	1	5	16.7%	4	2	66.7%
Total	**685**	150	**535**	**21.9%**	62	**623**	**10.0%**

Reproducibility

Assay precision, intra-assay variability and inter-assay variability were assessed with a reference panel prepared from pools of negative samples spiked with specific virus. The reproducibility panel consisted of high positive (n = 2), low negative (n = 1), and low positive (n = 4) and high negative specimens (n =4). The latter were prepared near the assay limit of sensitivity. Each reference specimen was coded to prevent its identification during testing. Each was evaluated twice per day for three consecutive days by three different laboratories. The results of reproducibility evaluations are shown in Table 9 below. Calculations of inter and intra assay variability are given in Table 10.

High negative samples (viral load just below LOD) produced weakly positive results in 8 out of 72 high negative replicate tests performed with the samples prepared near the cutoff. It is expected that high negative samples tested at the cut-off will produce weakly positive results 50% of the time. (See EP12-A, User protocol for evaluation of qualitative performance; approved guideline; NCCLS/CLSI, Vol. 22, no.14, 2002.) Low positive samples (viral load just above LOD) produced 1 negative reaction out of 72 replicate results. The high positive and low negative samples produced the correct results 100% of the time.

CONCLUSIONS

TRU FLU can be used reliably for the rapid detection of influenza A or B antigens in the sample types defined in product labeling

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
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NOV 15 2007

Susan Rolih
Vice President, RA/QA
Meridian Bioscience, Inc.
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Cincinnati, OH 45244

Re: k071657
Trade/Device Name: TRU FLU
Regulation Number: 21 CFR 866.3330
Regulation Name: Influenza Virus Serological Reagents
Regulatory Class: Class I
Product Code: GNX
Dated: November 2, 2007
Received: November 2, 2007

Dear Ms. Rolih:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of In Vitro Diagnostic Device Evaluation and Safety at 240-276-0450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). For questions regarding postmarket surveillance, please contact CDRH's Office of Surveillance and Biometric's (OSB's) Division of Postmarket Surveillance at 240-276-3474. For questions regarding the reporting of device adverse events (Medical Device Reporting (MDR)), please contact the Division of Surveillance Systems at 240-276-3464. You may obtain other general information on your responsibilities under the Act from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (240) 276-3150 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

Sally A. Hojvat, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

INDICATIONS FOR USE STATEMENT
TRU FLU

510(K) Number: K071657

TRU FLU is a rapid, qualitative, lateral-flow immunochromatographic assay for detecting both influenza A and influenza B viral nucleoprotein antigens in human nasal wash, nasopharyngeal aspirate and nasal and nasopharyngeal swab samples in symptomatic patients. This test is not intended for the detection of influenza C viruses. A negative test is presumptive and it is recommended these results be confirmed by cell culture. Negative results do not preclude influenza virus infection and should not be used as the sole basis for treatment or other clinical management decisions.

Prescription Use ___X___ (Part 21 CFR 801 Subpart D) AND/OR Over-The-Counter Use _____ (21 CFR 807 Subpart C)

Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Division Sign-Off

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) K071657