JUL - 1 2011

**Luminex.**



## 510(k) SUMMARY

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of 21 CFR 807.92.

**510(k) Number:** k103776

**Submission Type:** Traditional 510(k), New Device

**Measurand:** A panel of viruses including: Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, and Adenovirus

**Type of Test:** Qualitative nucleic acid multiplex test

**Applicant:** Luminex Molecular Diagnostics Inc., Toronto, Ontario, Canada

**Proprietary and Established Names:** xTAG® Respiratory Viral Panel FAST (RVP FAST)

**Regulatory Information:**

| *Product Code* | *Classification* | *Regulation Section* | *Review Panel* |
|---|---|---|---|
| OCC, OEM, OEP | Class II | 21 CFR 866.3980 Respiratory viral panel multiplex nucleic acid assay | Microbiology (83) |

**Intended Use:**

The xTAG® Respiratory Viral Panel Fast (RVP FAST) is a qualitative nucleic acid multiplex test intended for the simultaneous detection and identification of multiple respiratory virus nucleic acids in nasopharyngeal swabs from individuals suspected of respiratory tract infections. The following virus types and subtypes are identified using RVP FAST: Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, and Adenovirus. The detection and identification of specific viral nucleic acids from individuals exhibiting signs and symptoms of respiratory infection aids in the diagnosis of respiratory viral infection if used in conjunction with other clinical and epidemiological information.

Negative results do not preclude respiratory viral infection and should not be used as the sole basis for diagnosis, treatment or other management decisions. Positive results do not rule out bacterial infection or co-infection with other organisms. The agent detected may not be the definite cause of disease. The use of additional laboratory testing (e.g. bacterial and viral culture, immunofluorescence, and radiography) and clinical presentation must be taken into consideration in order to obtain the final diagnosis of respiratory infection.

Due to the genetic similarity between human Rhinovirus and Enterovirus, the RVP FAST primers for the detection of rhinovirus cross react with enterovirus. A rhinovirus reactive result should be confirmed by an alternate method (e.g. cell culture).

Performance characteristics for Influenza A Virus were established when Influenza A/H3 and A/H1 were the predominant Influenza A viruses in circulation. When other Influenza A viruses are emerging, performance characteristics may vary. If infection with a novel Influenza A virus is suspected based on current clinical and epidemiological screening criteria recommended by public health authorities, specimens should be collected with appropriate infection control precautions for novel virulent Influenza viruses and sent to a state or local health department for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens.

Indication(s) for use: Same as intended use.

Special instrument requirements: Luminex 100 or 200 instrument with IS or xPONENT software

**Device Description:**
RVP FAST is a PCR-based system for detecting the presence / absence of viral DNA / RNA in clinical specimens. The oligonucleotide primer / probe components of the RVP FAST have been designed to specifically target unique regions in the RNA / DNA of each molecular species listed in the intended use. Amplified products are then sorted and analyzed on the Luminex 100 or 200 instrument, which generates signals based on the acquisition of spectrofluorometric data. The raw signals are median fluorescence intensities (MFI) which are acquired in a Luminex Output.csv file that is subsequently analyzed by the xTAG Data Analysis Software (TDAS RVP FAST) to establish the presence or absence of all viral types / subtypes for which a Luminex microsphere population has been dedicated. The RVP FAST reagent components are described below.

| |
|---|
| xTAG RVP Fast Primer Mix |
| xTAG RVP Fast Bead Mix |
| xTAG OneStep Enzyme Mix |
| xTAG OneStep Buffer, 5X |
| xTAG dNTP Mix |
| xTAG RNase-Free Water |
| xTAG Reporter Buffer |
| xTAG Streptavidin, R-Phycoerythrin G15 |
| xTAG MS2 |
| xTAG Bacteriophage Lambda DNA |
| xTAG TDAS RVP FAST (US) software |

**Substantial Equivalence Information:**

a. Predicate device name(s): xTAG Respiratory Viral Panel

b. Predicate 510(k) number(s): k063765, k081843, k091667

c. Comparison with predicate:
The following tables compare the xTAG Respiratory Viral Panel FAST with the xTAG Respiratory Viral Panel (k063765, k081843, k091667). The first table shows similarities between the new device and the predicate, while the second table shows the differences.

*Table 1: Similarities between New Device and Predicate*

| Item | New Device (Ref. No. to be determined) xTAG RVP FAST | Predicate (k063765, k081483, k091667) xTAG RVP |
|---|---|---|
| Manufacturer | Luminex Molecular Diagnostics | Luminex Molecular Diagnostics |
| Specimen Types | Nasopharyngeal swabs | Nasopharyngeal swabs |
| Amplification Method | Multiplex end point RT-PCR | Multiplex end point RT-PCR |
| Test Format | Multiplex bead-based universal array sorting on Luminex 100/200 instrument | Multiplex bead-based universal array sorting on Luminex 100/200 instrument |
| Detection Method | Fluorescence based | Fluorescence based |
| Quality Control | Internal Control (E. coli phage MS2), Run Control (bacteriophage Lambda DNA), rotating analyte control and negative controls | Internal Control (E. coli phage MS2) and Run Control (bacteriophage Lambda DNA), rotating analyte control and negative controls |
| Results | Qualitative | Qualitative |
| Instrument | LX100 or LX200 | LX100 or LX200 |

*Table 2: Differences between New Device and Predicate*

| Item | New Device (k103776) xTAG RVP FAST | Predicate (k063765, k081483, k091667) xTAG RVP |
|---|---|---|
| Intended Use | The xTAG® Respiratory Viral Panel Fast (RVP FAST) is a qualitative nucleic acid multiplex test intended for the simultaneous detection and identification of multiple respiratory virus nucleic acids in nasopharyngeal swabs from individuals suspected of respiratory tract infections. The following virus types and subtypes are identified using RVP FAST: Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, and Adenovirus. The detection and identification of specific viral nucleic | The xTAG® Respiratory Viral Panel (RVP) is a qualitative nucleic acid multiplex test intended for the simultaneous detection and identification of multiple respiratory virus nucleic acids in nasopharyngeal swabs from individuals suspected of respiratory tract infections. The following virus types and subtypes are identified using RVP: Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus subtype A, Respiratory Syncytial Virus subtype B, Parainfluenza 1, Parainfluenza 2, and Parainfluenza 3 virus, Human |

| | | |
|---|---|---|
| | acids from individuals exhibiting signs and symptoms of respiratory infection aids in the diagnosis of respiratory viral infection if used in conjunction with other clinical and epidemiological information.<br><br>Negative results do not preclude respiratory viral infection and should not be used as the sole basis for diagnosis, treatment or other management decisions. Positive results do not rule out bacterial infection or co-infection with other organisms. The agent detected may not be the definite cause of disease. The use of additional laboratory testing (e.g. bacterial and viral culture, immunofluorescence, and radiography) and clinical presentation must be taken into consideration in order to obtain the final diagnosis of respiratory infection.<br><br>Due to the genetic similarity between human Rhinovirus and Enterovirus, the RVP FAST primers for the detection of rhinovirus cross react with enterovirus. A rhinovirus reactive result should be confirmed by an alternate method (e.g. cell culture).<br><br>Performance characteristics for Influenza A Virus were established when Influenza A/H3 and A/H1 were the predominant Influenza A viruses in circulation. When other Influenza A viruses are emerging, performance characteristics may vary. If infection with a novel Influenza A virus is suspected based on current clinical and epidemiological screening criteria recommended by public health authorities, specimens should be collected with appropriate infection control precautions for novel virulent Influenza viruses and sent to a state or local health departments for testing. Viral culture should not be attempted in these | Metapneumovirus, Rhinovirus, and Adenovirus. The detection and identification of specific viral nucleic acids from individuals exhibiting signs and symptoms of respiratory infection aids in the diagnosis of respiratory viral infection if used in conjunction with other clinical and laboratory findings. It is recommended that specimens found to be negative for Influenza B, Respiratory Syncytial Virus subtype A and B, Parainfluenza 1, Parainfluenza 2, Parainfluenza 3 and Adenovirus, after examination using RVP be confirmed by cell culture. Negative results do not preclude respiratory virus infection and should not be used as the sole basis for diagnosis, treatment or other management decisions. Positive results do not rule out bacterial infection, or co-infection with other viruses. The agent detected may not be the definite cause of disease. The use of additional laboratory testing (e.g. bacterial culture, immunofluorescence, radiography) and clinical presentation must be taken into consideration in order to obtain the final diagnosis of respiratory viral infection. Due to seasonal prevalence, performance characteristics for Influenza A/H1 were established primarily with retrospective specimens. The RVP assay cannot adequately detect Adenovirus species C, or serotypes 7a and 41. The RVP primers for detection of rhinovirus cross-react with enterovirus. A rhinovirus reactive result should be confirmed by an alternate method (e.g. cell culture). Performance characteristics for Influenza A Virus were established when Influenza A/H3 and A/H1 were the predominant Influenza A viruses in circulation. When other Influenza A viruses are emerging, performance characteristics may vary. If infections with a novel Influenza A virus is suspected based on current clinical and epidemiological screening criteria |

| | | |
|---|---|---|
| | cases unless a BSL 3+ facility is available to receive and culture specimens. | recommended by public health authorities, specimens should be collected with appropriate infection control precautions for novel virulent Influenza viruses and sent to a state or local health department for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens. |
| Targets Reported | Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, and Adenovirus | Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, Adenovirus, Parainfluenza 1, Parainfluenza 2 and Parainfluenza 3 |
| Sample Preparation | Biomérieux NucliSENS® EasyMag® | QIAGEN QIAamp MiniElute, Biomérieux NucliSENS® EasyMag®, and Biomérieux MiniMag™ |
| Amplification Enzyme | xTAG® OneStep Enzyme Mix | xTAG® OneStep Enzyme Mix and ancillary reagent TaKaRa Taq™ Hot Start |
| Primer Mixes | One primer mix (PCR and TSPE combined) | Two primer mixes (1 for PCR and 1 for TSPE) |
| Software | xTAG Data Analysis Software RVP FAST (US) | xTAG Data Analysis Software RVP (US) |

**Standards/Guidance Documents referenced (if applicable):**

*Table 3: Guidance Documents*

| | Title | Date |
|---|---|---|
| 1 | Class II Special Controls Guidance: Respiratory Viral Panel Multiplex Nucleic Acid Assay | Oct. 9, 2009 |
| 2 | Class II Special Control Guidance Document: Testing for Detection and Differentiation of Influenza A Virus Subtypes Using Multiplex Assays | Oct. 9, 2009 |
| 3 | Guidance (Draft) for Establishing the Performance Characteristics of In Vitro Diagnostic Devices for the Detection or Detection and Differentiation of Influenza Viruses | Feb. 15, 2008 |
| 4 | Guidance for In Vitro Diagnostic Devices to Detect Influenza A Viruses: Labeling and Regulatory Path | May 1, 2007 |
| 5 | Class II Special Controls Guidance: Reagents for Detection of Specific Novel Influenza A Viruses | Mar. 22, 2006 |
| 6 | Class II Special Control Guidance Document: "Testing for Human Metapneumovirus (hMPV) Using Nucleic Acid Assays" | Oct. 9, 2009 |
| 7 | Guidance for the Content of Premarket Submissions for Software Contained in Medical Devices | May 11, 2005 |
| 8 | Guidance document for Format for Traditional and Abbreviated 510(k)s | Aug. 12, 2005 |

*Table 4: Standards*

| | Standards No. | Recognition Number (FDA) | Standards Title | Date |
|---|---|---|---|---|
| 1 | MM13-A | 7-191 | Collection, Transport, Preparation and Storage of Specimens | 03/18/2009 |
| 2 | EP15-A2 | 7-153 | User Verification of Performance for Precision and Trueness (2nd edition) | 09/09/2008 |
| 3 | EP05-A2 | 7-110 | Evaluation of Precision Performance of Quantitative measurement Methods (2nd ed.) | 10/31/2005 |
| 4 | EP07-A2 | 7-127 | Interference Testing in Clinical Chemistry (2nd edition) | 05/21/2007 |
| 5 | EP12-A2 | 7-152 | User Protocol for Evaluation f Qualitative Test Performance (2nd edition) | 09/09/2008 |
| 6 | EP17-A | 7-194 | Protocol for Determination of Limits of Detection and Limits of Quantitation | 03/18/2009 |
| 7 | EP14-A2 | 7-128 and 7-143 | Evaluation of Matrix Effects (2nd edition) | 06/01/2004 |
| 8 | MM03-A2 | 7-132 | Molecular Diagnostic Methods for Infectious Diseases (2nd edition) | 09/09/2008 |

**Test Principle:**
RVP FAST incorporates multiplex Reverse-Transcriptase Polymerase Chain Reaction (RT-PCR) with Luminex's proprietary Universal Tag sorting system on the Luminex® platform. The assay also detects an internal control (*E. coli* phage MS2) which should be added to each sample prior to extraction, and a run control (bacteriophage Lambda DNA) which should be added as a separate RT-PCR reaction in each run performed.

For each sample, viral extract (RNA or DNA) is amplified in a single multiplex RT-PCR reaction. For each of the viruses/subtypes or internal control present in the sample, PCR amplimers are produced.

The RT-PCR product is then added to a hybridization/detection reaction containing the universal array (Bead Mix) and the Streptavidin-R-Phycoerythrin reporter. Each Luminex bead population detects a specific viral target or assay control through a highly specific anti-tag/tag hybridization. Following the incubation of the RT-PCR products with the bead mix and reporter, the hybridization/detection reactions are then sorted and read on the Luminex instrument. Signal (median fluorescence intensity, MFI) is generated for each bead population (viral target or assay control). These fluorescence values are then analyzed to establish the presence or absence of viral targets and/or controls in each sample tested.

All viruses are identified in a single multiplex reaction. The data generated by the xMAP instrument is analyzed by the xTAG Data Analysis Software RVP Fast (TDAS RVP FAST) to provide a qualitative summary report on which viruses are present in the sample, if any.

**Performance Characteristics:**

Analytical Performance:

**Precision/Reproducibility:**

The site-to-site reproducibility (single analyte targets) study was conducted at three independent sites. Each of two operators performed fifteen separate EasyMag extraction runs and five xTAG RVP FAST runs on non-consecutive days for each of the 8 targets in the assay. For each target, at each dilution, there were 90 data points: 3 sites x 2 operator / site x 5 xTAG runs / operator x 3 replicates (EasyMag extraction runs).

Site-to-site reproducibility for dual-analyte targets was investigated by two operators employing the bioMerieux NucliSENS® EasyMag extraction kit and the RVP FAST test at three independent sites. Each operator conducted 5 separate extractions and runs, on non-consecutive days. There were a total of 30 replicates for each sample type: (3 sites) x (2 operators/site) x (5 runs/operator) = 30 runs. Four different clinically relevant co-infections were represented by the dual-analyte samples.

RVP FAST was reproducible across all sites, operators and targets.

**Limit of Detection (LoD):**

The LoD was determined for each of the following viral analyte targets from simulated samples arranged in a dilution series from a high titre stock: Flu A H1, Flu A H3, Flu B, Adenovirus, RSV (A and B subtypes), Rhinovirus, and hMPV (subtypes A1, A2, B1 and B2). For each reference strain, the LoD is provided in Column 3 of the following table in $TCID_{50}$/mL.

*Table 5: Summary Limit of Detection (LoD) for RVP FAST analytes*

| Analyte | Strain ID | $TCID_{50}$/mL (corresponding to the estimated LoD) |
|---|---|---|
| Adenovirus | Type 1 Strain Adenoid 71<br>DHI 20-4740010 (original ATCC VR-1) | $3.9 \times 10^{2}$ |
| Flu A H1 | A/Solomon Islands/3/2006 (NML) | $7.6 \times 10^{-1}$ |
| Flu A H3 | A/Victoria/3/75<br>DHI 20-4710010 (original ATCC VR-822) | 1.8 (matrix)<br>3.6 (H3) |
| Flu B | Influenza B/Malaysia/2506/04<br>(PHL) | $2.9 \times 10^{-2}$ |
| Rhinovirus | FO 1-3774, Type 54 | $1.4 \times 10^{-2}$ |

| | | |
|---|---|---|
| | ATCC 1164 | |
| hMPV | University of Iowa, Dept. Public Health. (hMPV sublineage A1, Isolate # 16, Iowa, January 2003) | $3.4 \times 10^{-1}$ |
| | CAN97-83 (hMPV sublineage A2, CDC isolate 26583) | $1.3 \times 10^{1}$ |
| | University of Iowa, Dept. Public Health. (hMPV sublineage B1, Isolate #5, Iowa) | 1.1 |
| | University of Iowa, Dept. Public Health. (hMPV sublineage B2, Isolated October, 2003, Cusco, Peru) | 1.2 |
| RSV | RSV A Long strain ATCC VR-26 | 1.8 |
| | RSV B Wash/18537/62 DHI 20-4730010 (original ATCC VR-1401) | $1.6 \times 10^{-2}$ |

**Carryover Contamination Limit of Blank (LoB):**
This study was conducted using water blanks (DNase and RNase free distilled water) and replicate aliquots of a solution of purified viral nucleic acid (RSV B; *Wash/18537/62DHI 20-4730010; original ATCC VR-1401)*) prepared from a High Positive (HP) titre simulated sample in a checkerboard manner. This titre was selected to fall far above the assay cut-off, so that positive calls would be obtained 100% of the time and to experimentally maximize the potential for 'cross contamination'. RSV B was selected as the high titre analyte for the study, since it is commonly observed in clinical specimens at a high titre (Chidgey and Broadley, 2005)[1]. This titre was selected to fall far above the assay cut-off, so that positive calls would be obtained 100% of the time. The high titer purified viral nucleic acid replicates were tested to assess the probability of carryover contamination in adjacent wells containing water blanks. This study consisted of 6 identical runs tested over six (6) different days each performed by one operator, using a single kit lot and equipment set. The mean MFI of the High Positive RSV B specimen used in the carry-over part of this evaluation was 10,860. No carryover contamination with RSV B was observed as the MFI values obtained in the blank positions was not significantly greater than the LoB in one or more blank position on the checkerboard plate layout. LoB was set as equal to the 95$^{th}$ percentile of the observed MFI distribution generated from NEGATIVE calls for each analyte target in uncontaminated blanks and replicates of the high titre intact viral organisms

[1] Chidgey, Sharon M.; Broadley, Kenneth J (2005). Respiratory syncytial virus infections: characteristics and treatment. Journal of Pharmacy and Pharmacology, 57/11:1371-1382.

*Table 6a: Limit of Blank per analyte in xTAG RVP FAST*

| Analyte (Virus) | # Calls Included | | Limit of Blank |
|---|---|---|---|
| | # Calls Included | # Calls Excluded | 95th Percentile of MFI distribution |
| Flu A | 576 | 0 | 75 |
| H1 | 576 | 0 | 80 |
| H3 | 576 | 0 | 76.125 |
| Flu B | 576 | 0 | 115.625 |
| RSV (probe 1) | 576 | 0 | 75.125 |
| RSV (probe 2) | 288* | 0 | 82.825 |
| Adenovirus | 576 | 0 | 79 |
| hMPV | 576 | 0 | 71.125 |
| Rhinovirus | 576 | 0 | 74.5 |

*Since the target selected for HP is RSV (probe 2) the LoB for this target was calculated based on the total number of blank samples for the plate (whereas for all other targets, the LoB is calculated from all samples on the plate).

**Analytical Specificity (Interference and Cross-Reactivity):**

A total of 26 potentially cross-reactive pathogens (bacterial and viral) were assessed in replicates with RVP FAST. Each replicate underwent a single EasyMag (bioMerieux NucliSENS®) extraction prior to testing. These bacterial and viral pathogens did not cross-react or interfere with any viral target probed by RVP FAST.

*Table 7: Bacterial pathogens assessed as potential cross-reactive species in the RVP-FAST Assay*

| Bacterial (n=20) | |
|---|---|
| Bordetella pertussis | Legionella pneumophilia |
| Chlamydia pneumoniae | Neisseria meningitides |
| Haemophillus influenzae | Staphylococcus aureus |
| Pseudomonas aeruginosa | Staphylococcus epidermidis |
| Streptococcus pneumoniae | Streptococcus Group B |
| Moraxella cartarrhalis | Acinetobacter baumanii (calcoaceticus) |
| Mycobacterium intracellulare | Streptococcus pyogenes |
| Mycoplasma bovis (substitute for M. tuberculosis) | Mycobacterium avium |
| Mycoplasma pneumoniae | Serratia marcescens |
| Klebsiella pneumoniae | Escherichia coli |

*Table 8: Viral pathogens assessed as potential cross-reactive species in the RVP-FAST Assay*

| Viral (n=6) | |
|---|---|
| Herpes simplex virus Type 1 | Mumps |
| Cytomegalovirus | Rubeola (Measles) |
| Varicella-zoster virus | Epstein Barr virus |

A total of 14 combinations of analyte and potential interferent were assessed in replicate with RVP FAST. Each replicate underwent a single EasyMag (bioMerieux NucliSENS®) extraction prior to testing. These potential interfering agents were tested in the presence of targets meant to be detected by RVP FAST.

*Table 9: Combinations of Analytes & Interferents tested in the interference branch.*

| Target analyte | Potential interferent |
|---|---|
| RSV | Streptococcus pneumoniae |
| | Bordetella pertussis |
| | Haemophilus influenzae |
| | CMV |
| Adenovirus | Bordetella pertussis |
| | CMV |
| | Chlamydia pneumoniae |
| Influenza A (H3) | Streptococcus pneumoniae |
| | Staphylococcus aureus |
| | Bordetella pertusis |
| | Chlamydia pneumoniae |
| Rhinovirus | Streptococcus pneumoniae |
| | Mycoplasma pneumoniae |
| | Haemophilus influenzae |

These substances did not cross-react or interfere with any viral target probed by RVP FAST.

**Comparison Studies:**

Clinical Studies:

*a. Clinical Sensitivity and Specificity:*

The purpose of this multi-site study was to establish the clinical accuracy of the RVP FAST assay to detect the assay targets Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus (RSV), Human Metapneumovirus (hMPV), Rhinovirus, and Adenovirus in clinical specimens, across three independent sites.

Specimens tested included left-over, fresh and frozen, nasopharyngeal swabs (NPS) prospectively collected during the 2007/2008 and 2008/2009 flu seasons (i.e. all-comers accrued at enrolled clinical sites). All clinical specimens were analyzed fresh, as per the clinical laboratory routine

algorithm or as ordered by the referring physician, using Direct Fluorescent Antibody Test (DFA) and/or viral culture for the following targets: Influenza A, Influenza B, RSV, and Adenovirus. Well characterized RT-PCR amplification followed by bidirectional sequencing was used as the comparator method for Influenza A subtyping, hMPV and Rhinovirus. To the extent possible, amplification primers used in comparator methods targeted regions distinct from those targeted by the RVP FAST Assay primers.

RVP FAST was performed on a total of 1191 prospectively collected clinical specimens that had been extracted from the fresh or frozen states were included in the performance calculations. Total extracted nucleic acid material was stored at -70°C.

*Table 10: xTAG® RVP FAST Sensitivity / Specificity per Target (Combined Data set)*

| Virus (Analyte) | Sensitivity | | Lower-Bound 95%CI for Sensitivity | Specificity | | Lower-Bound 95% CI for Specificity |
|---|---|---|---|---|---|---|
| | TP / (TP+FN) | percent | | TN/ (TN+FP) | percent | |
| Human Influenza A | 129/137 | 94.2% | 88.8% | 989/1036 | 95.5% | 94.0% |
| H1 | 52/54 | 96.3% | 87.3% | 1116/1137 | 98.2% | 97.2% |
| H3 | 74/77 | 96.1% | 89.0% | 1090/1114 | 97.8% | 96.8% |
| Human Influenza B | 50/53 | 94.3% | 84.3% | 1107/1120 | 98.8% | 98.0% |
| RSV | 110/121 | 90.9% | 84.3% | 1028/1052 | 97.7% | 96.6% |
| Rhinovirus | 43/45 | 95.6% | 84.9% | 1047/1132 | 92.5% | 90.8% |
| Adenovirus | 12/14 | 85.7% | 57.2% | 1151/1159 | 99.3% | 98.6% |
| Metapneumovirus | 35/36 | 97.2% | 85.5% | 1121/1133 | 98.9% | 98.2% |

*b. Other clinical supportive data.*

Since Adenovirus does not show seasonality, the prospective sample set was supplemented with 34 banked, pre-selected, positive clinical specimens collected at selected sites and tested by RVP FAST. All pre-selected specimens were frozen clinical samples which had originally been tested in the fresh-state using culture. The percent positive agreement of the test compared to the reference method was 97.06% (95% lower bound confidence interval of 86.47% - 99.93%).

An additional 77 clinical specimens (NP swabs) confirmed positive for Novel 2009/H1N1 (swine flu) by the CDC real-time PCR test were tested by RVP FAST. Of these, seventy-five (75) were Flu A unsubtypeable (97.40%, LB 95% CI 90.93%), two (2) specimens were Flu A H1 by RVP FAST (2.60%). None were negative for Flu A. In addition, none of the confirmed Flu A H1 or Flu A H3 clinical specimens in the clinical data set were unsubtypeable for Influenza A by RVP FAST.

**Clinical Cut-off:** Not applicable.

**Expected values/ reference range:** Not applicable.

**Conclusion:** The information submitted in this premarket notification demonstrates that the device is equivalent to the predicate device.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Silver Spring, MD 20993

Luminex Molecular Diagnostics, Inc.
c/o Ms. Lubna Syed
Director, Regulatory Affairs
439 University Avenue, Suite 900
Toronto, Ontario MSG 1Y8
Canada

JUL - 1 2011

Re: K103776
Trade/Device Name: xTAG® Respiratory Viral Panel FAST (RSP FAST)
Regulation Number: 21 CFR 866.3980
Regulation Name: Respiratory viral panel multiplex nucleic acid assay
Regulatory Class: Class II
Product Code: OCC, OEM, OEP
Dated: June 3, 2011
Received: June 10, 2011

Dear Ms. Syed

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 class II (Special Controls), 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.

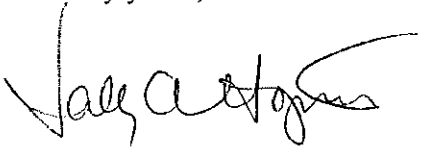
Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR 803); 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 Parts 801 and 809), please contact the Office of *In Vitro* Diagnostic Device Evaluation and Safety at (301) 796-5450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

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 (301) 796-7100 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

510(k) Number (if known): k103776

Device Name: xTAG® RVP FAST

The xTAG® Respiratory Viral Panel Fast (RVP FAST) is a qualitative nucleic acid multiplex test intended for the simultaneous detection and identification of multiple respiratory virus nucleic acids in nasopharyngeal swabs from individuals suspected of respiratory tract infections. The following virus types and subtypes are identified using RVP FAST: Influenza A, Influenza A subtype H1, Influenza A subtype H3, Influenza B, Respiratory Syncytial Virus, Human Metapneumovirus, Rhinovirus, and Adenovirus. The detection and identification of specific viral nucleic acids from individuals exhibiting signs and symptoms of respiratory infection aids in the diagnosis of respiratory viral infection if used in conjunction with other clinical and epidemiological information.

Negative results do not preclude respiratory viral infection and should not be used as the sole basis for diagnosis, treatment or other management decisions. Positive results do not rule out bacterial infection, or co-infection with other organisms. The agent detected may not be the definite cause of disease. The use of additional laboratory testing (e.g., bacterial and viral culture, immunofluorescence, and radiography) and clinical presentation must be taken into consideration in order to obtain the final diagnosis of respiratory infection.

Due to the genetic similarity between human Rhinovirus and Enterovirus, the RVP FAST primers for the detection of rhinovirus cross-react with enterovirus. A rhinovirus reactive result should be confirmed by an alternate method (e.g., cell culture).

Performance characteristics for Influenza A Virus were established when Influenza A/H3 and A/H1 were the predominant Influenza A viruses in circulation. When other Influenza A viruses are emerging, performance characteristics may vary. If infection with a novel Influenza A virus is suspected based on current clinical and epidemiological screening criteria recommended by public health authorities, specimens should be collected with appropriate infection control precautions for novel virulent Influenza viruses and sent to a state or local health department for testing. Viral culture should not be attempted in these cases unless a BSL 3+ facility is available to receive and culture specimens.

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

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Division Sign-Off

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) k103776