November 9, 2020

Mesa Biotech, Inc.
Barbara Stevens
Regulatory Consultant
6190 Cornerstone Court, Suite 220
San Diego, California 92121

Re: K201269
Trade/Device Name: Accula Strep A Test
Regulation Number: 21 CFR 866.2680
Regulation Name: Streptococcus Spp. Nucleic Acid-Based Assay
Regulatory Class: Class II
Product Code: PGX
Dated: May 11, 2020
Received: May 12, 2020

Dear Barbara Stevens:

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. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database located at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. 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. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. 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 Part 801 and Part 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR

803) for devices or postmarketing safety reporting (21 CFR 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

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 https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Ribhi Shawar, Ph.D. (ABMM)
Chief, General Bacteriology and Antimicrobial
Susceptibility Branch
Division of Microbiology Devices
OHT7: Office of In Vitro Diagnostics
and Radiological Health
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

Section 5. 510(k) Summary of Safety and Effectiveness

This 510(k) summary of safety and effectiveness is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

The assigned 510(k) number is: _K201269_____

1. Sponsor/Applicant Name and Address

Company Name:	Mesa Biotech, Inc.
Address:	6190 Cornerstone Court, Suite 220
	San Diego, CA 92121
Telephone:	858-800-4929
Contact Person:	Barbara Stevens
	Regulatory Consultant
Date Summary Prepared:	05/11/2020

2. Device Name and Classification

Trade Name:	Accula™ Strep A Test
Classification of Device:	21 CFR 866.2680, *Streptococcus* spp. Nucleic-acid based assay
Product Code	PGX

3. Predicate Device

K141338, Roche cobas® Liat™ Strep A Test

4. Device Description

Operating Principle

The Accula™ Strep A Test is a semi-automated, colorimetric polymerase chain reaction (PCR) nucleic acid amplification test to qualitatively detect *Streptococcus pyogenes* (Group A β-hemolytic *Streptococcus*, Strep A) bacterial nucleic acid from unprocessed throat swabs that have not undergone prior nucleic acid extraction. The system integrates nucleic acid extraction, a novel Mesa Biotech PCR nucleic acid amplification technology named OscAR™, and hybridization-based visual detection into a completely self-contained and automated system. The Accula Strep A system consists of a small reusable Dock to drive the automated testing process, and a single-use disposable test cassette that contains all the enzymes and reagents.

Strep A Kit Contents

The Accula Strep A Test Kit contains all the materials needed to run a test, except for the Accula Dock, which is provided separately. The Accula Strep A Test Kit contains the following components.

- Sterile Swabs for throat swab collection (25)
- Accula Strep A Buffer (25)
- Accula Transfer Pipettes (25)
- Accula Strep A Test Cassettes (25)
- Strep A Positive Control Swab (1)
- Negative Control Swab (1)
- Instructions for Use
- Quick Reference Guide

5. Indications for Use

The Accula Strep A Test performed on the Accula Dock is a molecular *in vitro* diagnostic test utilizing polymerase chain reaction (PCR) and lateral flow technologies for the qualitative, visual detection of *Streptococcus pyogenes* (Group A β-hemolytic *Streptococcus*, Strep A) bacterial nucleic acid. It is intended to aid in the rapid diagnosis of Group A *Streptococcus* bacterial infections from throat swabs of patients with signs and symptoms of pharyngitis.

All negative test results should be confirmed by bacterial culture because negative results do not preclude infection with Group A *Streptococcus* and should not be used as the sole basis for treatment.

6. Comparison to Predicate Device

The following table provides a comparison of the characteristics of the Accula Strep A Test to the predicate device, the Roche cobas® Liat™ Strep A Test.

Item	510(k) Device: Mesa Biotech Accula Strep A Test	Predicate Device: Roche cobas® Liat™ Strep A Test (K141338)
Indications for Use	The Accula Strep A Test performed on the Accula Dock is a molecular *in vitro* diagnostic test utilizing polymerase chain reaction (PCR) and lateral flow technologies for the qualitative, visual detection of *Streptococcus pyogenes* (Group A β-hemolytic *Streptococcus*, Strep A) bacterial nucleic acid. It is intended to aid in the rapid diagnosis of Group A *Streptococcus*	The cobas® Strep A nucleic acid test for use on the cobas Liat System (cobas Strep A) is a qualitative *in vitro* diagnostic test for the detection of *Streptococcus pyogenes* (Group A β-hemolytic *Streptococcus*, Strep A) in throat swab specimens from patients with signs and symptoms of pharyngitis. The cobas Strep A assay utilizes nucleic acid purification and polymerase chain reaction (PCR)

	bacterial infections from throat swabs of patients with signs and symptoms of pharyngitis. All negative test results should be confirmed by bacterial culture because negative results do not preclude infection with Group A *Streptococcus* and should not be used as the sole basis for treatment.	technology to detect *Streptococcus pyogenes* by targeting a segment of the *Streptococcus pyogenes* genome.
Product Code	PGX	PGX
Analyte	Group A *Streptococcus* (*S. pyogenes*)	Group A *Streptococcus* (*S. pyogenes*)
Strep A Target	Conserved region of Group A *Streptococcus* genome	Conserved region of Group A *Streptococcus* genome
Sample Type	Throat swab	Throat swab
Assay Results	Qualitative	Qualitative
Intended Users and Use Locations	Clinical lab and CLIA-waived sites	Clinical lab and CLIA-waived sites
Bacterial Lysis/DNA Extraction	Detergent and heat	Chaotrope and enzymatic digestion
Nucleic Acid Purification	No	Solid phase magnetic affinity capture
Reagent Format	Unitized, ready for use	Unitized, ready for use
Internal Control	Yes	Yes
Positive and Negative Control Swabs	Yes	Yes
Assay Technology	PCR amplification and visual identification of amplification products by hybridization to a test strip.	PCR nucleic acid amplification and detection of specific amplification products using molecular TaqMan (hydrolysis) probe-based PCR

		fluorescent probes.
Detection	Uses dyed microparticle conjugates to specifically detect and identify amplification reaction products. Visual interpretation of the presence or the absence of colored lines on a test strip.	Uses fluorescently-labeled Taqman probe to specifically identify amplified cDNA products. Optical detection of fluorescence
Instrument	Amplification controlled by the Accula Dock. No detection by the instrument.	Amplification and detection performed on the Liat instrument.

7. Performance Summary

Expected Values

A total of 654 specimens were tested in a prospective clinical study conducted at nine U.S sites from May 2019 to January 2020. The overall prevalence of *S. pyogenes* as determined by bacterial culture was 20.0% (131/654), and as determined by the Accula Strep A Test, the overall positivity rate was 21.3% (139/654). The positivity rate by age range of the subjects is shown below.

	Strep A Positivity Rate by Accula Strep A Test		
Age Group	**Number of Swab Specimens**	**Number of Strep A Positives**	**Strep A Positivity Rate**
≤ 5 Years	112	34	34/112 = 30.36%
6 to 21 Years	292	70	70/292 = 23.97%
22 to 59 Years	224	34	34/224 = 15.18%
≥ 60 Years	26	1	1/26 = 3.85%
Total	654	139	139/654 = 21.25%

Prospective Clinical Study:

Clinical performance characteristics of the Accula Strep A Test were evaluated in a multi-site prospective study from May 2019 to January 2020 in the U.S. A total of nine (9) investigational Point of Care sites participated in the study. To be enrolled in the study, patients had to be presenting at the participating study centers with symptoms of pharyngitis. Two throat swabs were collected from each subject using standard collection methods, a Copan FLOQ™ swab for the Accula testing and a second swab using the Copan eSwab™ Liquid Amies Collection System

for the reference testing. One throat swab was tested, following elution in 2.5 mL of Accula Strep A Buffer, on the Accula Strep A Test, according to product instructions. The other throat swab was collected with the eSwab system in accordance with the instructions from the reference laboratory and the test manufacturer and transported to the central laboratory for testing by Blood Agar Culture and an FDA-cleared molecular test. All specimens generating discrepant results between the Accula Strep A Test and Blood Agar Culture, or between Accula and the molecular comparator test, were tested with a second FDA-cleared molecular test.

A total of 669 subjects were enrolled in this study. Of those, 15 samples were unevaluable for the Accula v. culture comparison due to sample transport and storage issues, failure to comply with inclusion/exclusion criteria, protocol deviations, and invalid results with the Accula test. A total of 654 samples were considered evaluable for this analysis. The performance of the Accula Strep A Test compared to Blood Agar Culture is shown in the table below. Results of the discrepant evaluations against both molecular methods are shown in the footnotes.

Accula Strep A Test Performance against Reference Culture

Mesa Biotech Accula™ Strep A Test	Blood Agar Culture		
	Positive	Negative	Total
Positive	126	13[a]	139
Negative	5[b]	510	515
Total	131	523	654
Sensitivity:	96.2% (126/131) (95% CI:91.4%-98.4%)		
Specificity:	97.5% (510/523) (95% CI:95.8%-98.5%)		
Accuracy:	97.2% (636/654) (95% CI:95.7%-98.3%)		
NPV:	99% (510/515) (95% CI:97.7%-99.6%)		
NPV (at 30% Prevalence):	98.3%		

[a]Strep A was detected in 7/13 False Positives specimens using the **discrepant evaluation molecular method**

[b]Strep A was not detected in 2/5 False Negative specimens using the **discrepant evaluation molecular method**

In addition, the Accula Strep A Test results were compared with an FDA-clear molecular comparative method. For this analysis, 21 of the samples from the 669 enrolled subjects were unevaluable due to sample transport and storage issues, failure to comply with inclusion/exclusion criteria, protocol deviations, invalid results with the molecular comparator method, and invalid results with the Accula test. A total of 648 samples were considered evaluable for this analysis. The performance of the Accula Strep A Test compared to the FDA-cleared molecular method are shown in the table below. Results of the discrepant evaluation against the discrepant analysis molecular method are shown in the footnotes.

Accula™ Strep A Test Strep A Performance Against the Molecular Comparator

Mesa Biotech Accula™ Strep A Test	Molecular Comparator		
	Positive	Negative	Total
Positive	137	1[a]	138
Negative	9[b]	501	510
Total	146	502	648

PPA (Positive Percent Agreement):	93.8% (137/146) (95% CI:88.7%-96.7%)
NPA (Negative Percent Agreement):	99.8% (501/502) (95% CI:98.9%-100%)

[a] Strep A was detected in 0/1 False Positives specimens using the **discrepant evaluation molecular method**

[b] Strep A was not detected in 5/9 False Negative specimens using the **discrepant evaluation molecular method**

Reproducibility/Near-Cutoff Study

The Reproducibility study was performed to demonstrate the reproducibility of the Accula Strep A Test with contrived throat swabs, including samples at analyte concentrations near the assay cutoff, at three CLIA waived sites that also participated in the clinical study. The objective of the study was to demonstrate reproducibility of the assay in the hands of multiple users at multiple sites over multiple non-consecutive days.

The test panel consisted of three samples at varying Strep A concentrations, two of which are at or near the assay cutoff. Each positive sample was prepared by spiking the *Streptococcus pyogenes* strain BAA-946 into clinical matrix. The targeted concentration for the Low Positive Sample was 1x LoD and for the Moderate Positive Sample was 2x LoD. The Negative Sample contained no Strep A.

Samples were blinded and coded and were provided to testing operators in a random fashion. Testing was performed with triplicate swab preparations, by two operators per site, on five non-consecutive days over a period of two weeks, concurrently with the clinical study.

Results are reported as percent agreement: observed result/expected result x 100. No significant differences were observed within run, between runs, between operators or between sites. Agreement by site is summarized in the table below.

Site to Site Reproducibility: Percent Agreement and Total Counts (Observed/Expected)

	Site						
	1		2		3		Overall
Sample Type	Percent Agreement	Count	Percent Agreement	Count	Percent Agreement	Count	Percent Agreement (95% CI)
Low Positive	96.7%	29/30	100.0%	30/30	100.0%	30/30	98.9% (89/90) (94.0%-99.8%)
Moderate Positive	96.7%	29/30	100.0%	30/30	96.6%	28/29	97.8% (87/89) (92.2%-99.4%)
Negative	100.0%	30/30	100.0%	30/30	93.3%	28/30	97.8% (88/90) (92.3%-99.4%)

Limit of Detection

Two Strep A strains were tested at multiple analyte levels until the LoD was determined (the level at which at least 19/20 results are positive). Bacteria were serially diluted into a pooled negative clinical matrix and spiked onto a swab for each replicate to create the contrived test samples. Confirmatory testing was performed in replicates of twenty (20) on multiple days. The results are summarized in the table below.

Accula Strep A Limit of Detection

Strep A Strain	LoD Level[1]
BAA-946	75 CFU/mL
ATCC 19615	10 CFU/mL

[1] Final concentration of organisms after 10 µL of bacterial dilution is spiked onto swab and eluted in 2.5 mL Strep A Buffer (assuming 100% recovery of bacteria).

Analytical Reactivity

Inclusivity verification was evaluated for the Accula Strep A Test at Mesa Biotech. The panel consisted of four (4) additional Strep A strains that were not included in the LoD study. Each strain was tested in triplicate at concentrations of approximately 1.5x LoD and 3.0x LoD. Test results are summarized in the table below. All strains were detected at the levels tested.

Inclusivity Results by Strain

Strep A Strain	1.5X LoD Concentration	Percent Detection (# Positive/3)	3.0X LoD Concentration	Percent Detection (# Positive/3)
ATCC 10403	112.5 CFU/mL	100% (3/3)	225 CFU/mL	100% (3/3)
ATCC 21548	112.5 CFU/mL	66.67% (2/3)	225 CFU/mL	100% (3/3)
ATCC 700294	112.5 CFU/mL	100% (3/3)	225 CFU/mL	100% (3/3)
ATCC 700497	112.5 CFU/mL	100% (3/3)	225 CFU/mL	100% (3/3)

The Analytical Specificity (Cross-Reactivity)

Cross-reactivity was evaluated by testing 47 potentially cross-reacting organisms with the Accula Strep A Test. Each organism was diluted in a clinical matrix, both in the absence and in the presence of 3x LoD Strep A, and tested in triplicate. The organisms, concentrations, and test results are shown in the tables below. All 47 organisms gave negative results when tested in the absence of 3x LoD Strep A. None of the 47 organisms interfered with the detection of Strep A when tested in the presence of 3x LoD Strep A.

Testing of Potential Cross-Reactive Organisms in the Absence of Strep A

Organism Key #	Organism Name	Test Level	Test Results (# of Strep A Pos /3)
1	Adenovirus Type 1	1.00E+06 TCID50/mL	0/3
2	Arcanobacterium haemolyticum	2.00E+07 CFU/ml	0/3
3	Bacillus cereus	1.00E+06 CFU/ml	0/3
4	Bordetella pertussis	2.00E+06 CFU/ml	0/3
5	Burkholderia cepacia	2.00E+07 CFU/ml	0/3

Organism Key #	Organism Name	Test Level	Test Results (# of Strep A Pos /3)
6	Campylobacter rectus	1.00E+06 CFU/ml	0/3
7	Candida albicans	2.00E+06 CFU/ml	0/3
8	Corynebacterium diphtheriae	5.00E+06 CFU/ml	0/3
9	Enterococcus faecalis	2.00E+06 CFU/ml	0/3
10	Escherichia coli	2.00E+07 CFU/ml	0/3
11	Fusobacterium necrophorum	1.00E+06 CFU/ml	0/3
12	Haemophilus influenzae	1.00E+06 CFU/ml	0/3
13	Human Influenza virus A****	1.00E+06 TCID50/mL	0/3
14	Human Influenza virus B	1.00E+06 TCID50/mL	0/3
15	Human metapneumovirus	1.00E+06 TCID50/mL	0/3
16	Klebsiella pneumoniae	2.00E+07 CFU/ml	0/3
17	Lactobacillus acidophilus	2.00E+06 CFU/ml	0/3
18	Lactococcus lactis	2.00E+07 CFU/ml	0/3
19	Legionella longbeachae	1.00E+07 CFU/ml	0/3
20	Moraxella catarrhalis	1.00E+06 CFU/ml	0/3
21	Mycoplasma pneumoniae	1.00E+06 CCU/ml	0/3
22	Neisseria gonorrhoeae	3.00E+06 CFU/ml	0/3
23	Parainfluenza Type 3	1.00E+06 TCID50/mL	0/3
24	Parvimonas micra (Peptostreptococcus micros)	1.50E+06 CFU/ml	0/3
25	Prevotella oralis (Bacteroides oralis)	1.00E+06 CFU/ml	0/3
26	Pseudomonas aeruginosa	1.00E+06 CFU/ml	0/3
27	Respiratory syncytial virus Type B	1.00E+06 TCID50/mL	0/3
28	Rhinovirus	1.00E+06 TCID50/mL	0/3
29	Saccharomyces cerevisiae	2.00E+06 CFU/ml	0/3
30	Staphylococcus epidermidis	5.00E+07 CFU/ml	0/3
31	Stenotrophomonas maltophilia	5.00E+07 CFU/ml	0/3
32	Streptococcus agalactiae	2.00E+06 CFU/ml	0/3
33	Streptococcus anginosus	2.00E+06 CFU/ml	0/3
34	Streptococcus bovis	5.00E+06 CFU/ml	0/3
35	Streptococcus canis	2.00E+07 CFU/ml	0/3
36	Streptococcus constellatus subsp. Pharyngis	3.00E+06 CFU/ml	0/3
37	Streptococcus dysgalactiae subsp. Equisimilis	1.00E+06 CFU/ml	0/3
38	Streptococcus gallolyticus	2.00E+06 CFU/ml	0/3
39	Streptococcus intermedius	2.00E+06 CFU/ml	0/3
40	Streptococcus mitis	2.00E+06 CFU/ml	0/3

Organism Key #	Organism Name	Test Level	Test Results (# of Strep A Pos /3)
41	Streptococcus mutans	2.00E+07 CFU/ml	0/3
42	Streptococcus oralis	2.00E+06 CFU/ml	0/3
43	Streptococcus pneumonia	2.00E+06 CFU/ml	0/3
44	Streptococcus salivarius	2.00E+06 CFU/ml	0/3
45	Streptococcus sanguinus	2.00E+06 CFU/ml	0/3
46	Treponema denticola	2.00E+06 CFU/ml	0/3
47	Veillonella parvula	2.00E+07 CFU/ml	0/3

Testing of Potential Cross-Reactive Organisms in the Presence of 3x LoD Strep A

Organism Key #	Organism Name	Test Level	Test Results (# of Strep A Pos /3)
1	Adenovirus Type 1	1.00E+06 TCID50/mL	3/3
2	Arcanobacterium haemolyticum	2.00E+07 CFU/ml	3/3
3	Bacillus cereus	1.00E+06 CFU/ml	3/3
4	Bordetella pertussis	2.00E+06 CFU/ml	3/3
5	Burkholderia cepacia	2.00E+07 CFU/ml	3/3
6	Campylobacter rectus	1.00E+06 CFU/ml	3/3
7	Candida albicans	2.00E+06 CFU/ml	3/3
8	Corynebacterium diphtheriae	5.00E+06 CFU/ml	3/3
9	Enterococcus faecalis	2.00E+06 CFU/ml	3/3
10	Escherichia coli [1]	1.00E+07 CFU/ml	3/3
11	Fusobacterium necrophorum	1.00E+06 CFU/ml	3/3
12	Haemophilus influenzae	1.00E+06 CFU/ml	3/3
13	Human Influenza virus A	1.00E+06 TCID50/mL	3/3
14	Human Influenza virus B	1.00E+06 TCID50/mL	3/3
15	Human metapneumovirus	1.00E+06 TCID50/mL	3/3
16	Klebsiella pneumoniae	2.00E+07 CFU/ml	3/3
17	Lactobacillus acidophilus	2.00E+06 CFU/ml	3/3
18	Lactococcus lactis	2.00E+07 CFU/ml	3/3
19	Legionella longbeachae	1.00E+07 CFU/ml	3/3
20	Moraxella catarrhalis	1.00E+06 CFU/ml	3/3
21	Mycoplasma pneumoniae	1.00E+06 CCU/ml	3/3
22	Neisseria gonorrhoeae	3.00E+06 CFU/ml	3/3
23	Parainfluenza Type 3	1.00E+06 TCID50/mL	3/3
24	Parvimonas micra (Peptostreptococcus micros)	1.50E+06 CFU/ml	3/3
25	Prevotella oralis (Bacteroides oralis)	1.00E+06 CFU/ml	3/3
26	Pseudomonas aeruginosa	1.00E+06 CFU/ml	3/3

Organism Key #	Organism Name	Test Level	Test Results (# of Strep A Pos /3)
27	Respiratory syncytial virus Type B	1.00E+06 TCID50/mL	3/3
28	Rhinovirus [2]	5.00E+05 TCID50/mL	3/3
29	Saccharomyces cerevisiae	2.00E+06 CFU/ml	3/3
30	Staphylococcus epidermidis	5.00E+07 CFU/ml	3/3
31	Stenotrophomonas maltophilia	5.00E+07 CFU/ml	3/3
32	Streptococcus agalactiae	2.00E+06 CFU/ml	3/3
33	Streptococcus anginosus	2.00E+06 CFU/ml	3/3
34	Streptococcus bovis	5.00E+06 CFU/ml	3/3
35	Streptococcus canis	2.00E+07 CFU/ml	3/3
36	Streptococcus constellatus subsp. pharyngis	3.00E+06 CFU/ml	3/3
37	Streptococcus dysgalactiae subsp. equisimilis	1.00E+06 CFU/ml	3/3
38	Streptococcus gallolyticus	2.00E+06 CFU/ml	3/3
39	Streptococcus intermedius	2.00E+06 CFU/ml	3/3
40	Streptococcus mitis	2.00E+06 CFU/ml	3/3
41	Streptococcus mutans	2.00E+07 CFU/ml	3/3
42	Streptococcus oralis	2.00E+06 CFU/ml	3/3
43	Streptococcus pneumonia	2.00E+06 CFU/ml	3/3
44	Streptococcus salivarius	2.00E+06 CFU/ml	3/3
45	Streptococcus sanguinus	2.00E+06 CFU/ml	3/3
46	Treponema denticola	2.00E+06 CFU/ml	3/3
47	Veillonella parvula	2.00E+07 CFU/ml	3/3

[1] *Escherichia coli* was originally tested at 2 x 10^7 CFU/mL and gave 2/3 positive results in the presence of Strep A. No cross-reactivity was observed at 1 x 10^7 CFU/mL.
[2] Rhinovirus was tested at 1 x 10^6 TCID50/mL and gave the expected 3/3 in the presence of Strep A. However, the visually graded maximum line intensity of "3" was not observed. No interference with line intensity was observed at a concentration of 5 x 10^5 TCID50/mL.

Interfering Substances

To assess substances with the potential to interfere with the performance of the Accula Strep A Test, samples with and without Strep A were tested in replicates of three (3) with each interfering substance at "worst case" concentrations, in addition to a "no interferent" control sample. Positive Strep A contrived samples were prepared by spiking the Strep A strain BAA-946 into a clinical throat swab matrix. The Negative sample was the clinical throat swab matrix alone. Any potential interferents that showed inhibition in the Accula Strep A Test were diluted and re-tested at a lower concentration. The table below summarizes the interferents tested, the highest concentration that showed no inhibition, the samples tested and the test results.

Effect of Potentially Interfering Substances on Accula Strep A Test Performance

Potential Interferent	Active Ingredient	Final Concentration	Target	% Agreement with Expected Results
Blood (Human) [1]	NA	50% (v/v)	Strep A	100% (3/3)
		12.5% (v/v)	IC	100% (3/3)
Chloroseptic Max	Phenol 1.5%, Glycerin 33%	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Cold&Flu Relief Cough Syrup	Acetaminophen 21.7 mg/mL, Dextromethorphan 0.67 mg/mL, Guaifenesin 13.3 mg/mL, Phenylephrine 0.33 mg/mL	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Listerine Cool Mint Antiseptic Mouth Wash	Eucalyptol 0.092%, Menthol 0.042%, Methyl Salicylate 0.060%, Thymol 0.064%	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Cepacol (throat lozenge)	Benzocaine, Menthol	0.3% Benzocaine (w/v), 0.046% Menthol (w/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Sucrets	Dyclonine Hydrochloride, Menthol	0.06% Dyclonine Hydrochloride (w/v), 0.12% Menthol (w/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Crest Pro Health Fluoride Toothpaste	Stannous Fluoride 0.454% (0.14% W/V Fluoride Ion)	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Halls Triple Soothing Cough Drops*	Eucalyptus Oil	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Advil Liqui-Gels	Ibuprofen	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Miralax	Polyethylene Glycol	30.4% (w/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Tums Extra Strength [2]	Calcium Carbonate	20 mg/mL	Strep A	100% (3/3)
		30 mg/mL	IC	100% (3/3)
Food Dye	N/A	100% (v/v)	Strep A	100% (3/3)
			IC	100% (3/3)
Whole Milk (Dairy) [3]	N/A	12.50% (v/v)	Strep A	100% (3/3)
		50.00% (v/v)	IC	100% (3/3)
Orange Juice [4]	N/A	50% (v/v)	Strep A	100% (3/3)
		100% (v/v)	IC	100% (3/3)
Penicillin G	Penicillin G Sodium Salt	100 mg/mL	Strep A	100% (3/3)
			IC	100% (3/3)

Potential Interferent	Active Ingredient	Final Concentration	Target	% Agreement with Expected Results
Cephalexin	Cephalexin	25 mg/mL	Strep A	100% (3/3)
			IC	100% (3/3)
Mucin, Type II (from porcine stomach)	Purified mucin protein	50 mg/mL	Strep A	100% (3/3)
		100 mg/mL	IC	100% (3/3)
Tobramycin (antibacterial)	Tobramycin	75 mg/mL	Strep A	100% (3/3)
			IC	100% (3/3)
Amoxicillin	Amoxicillin	100 mg/mL	Strep A	100% (3/3)
			IC	100% (3/3)
No interferent	N/A	N/A	Strep A	100% (3/3)
			IC	100% (3/3)

IC: Internal Control, for negative samples

*Eucalyptus oil, an active ingredient in Halls cough drops, was used in place of Halls Triple Soothing Cough Drops.

[1] Human blood showed inhibition at 100% concentration for Strep A detection in the positive sample, but no inhibition at 50% concentration. Human blood showed inhibition at 100%, 50% and 25% concentrations for IC detection in the negative sample, but no inhibition at 12.5% concentration.

[2] Tums was initially tested with a solution of 1.5 g/mL (1 Tum dissolved into 2.5 mL of Strep A Buffer). This inhibited all reactions. The Strep A Positive sample was inhibited when tested with an additional 8x and 32x dilution. No inhibition was observed at a concentration of 20 mg/mL for the Strep A Positive sample. The Negative Strep A sample showed inhibition when tested with an additional 8x dilution. No inhibition was observed at a concentration of 30 mg/mL for the Strep A Negative sample.

[3] Milk showed inhibition at 100%, 50% and 25% concentrations for Strep A detection in the positive sample, but no inhibition at 12.5% concentration. Milk showed inhibition at the 100% concentration for IC detection in the negative sample, but no inhibition at 50% concentration.

[4] Orange juice showed inhibition at 100% concentration for detection of Strep A in the positive sample, but no inhibition at 50%.

CLIA Waiver Studies

Comparison with a Reference Method:

The performance of the Accula Strep A Test was evaluated at nine Point of Care sites by non-laboratory personnel in a prospective clinical study from May 2019 to January 2020 in the U.S. Throat swabs were collected from patients with symptoms of pharyngitis and were tested with the Accula Strep A Test, the Blood Agar Culture reference method, and an FDA-cleared molecular comparator method. All specimens generating discrepant results were evaluated using a second molecular comparative method.

The comparison with culture showed a sensitivity of 96.2% (95% confidence interval: 91.4%-98.4%) and a specificity of 97.5% (95% CI: 95.8%-98.5%). The comparison with the molecular comparator method showed Positive Percent Agreement of 93.8% (95% CI: 88.7%-96.7%) and Negative Percent Agreement of 99.8% (95% CI: 98.9%-100%). The study demonstrates that non-laboratory personnel in an intended use environment can obtain results with the Accula Strep A test equivalent to results for the comparator methods.

Test Performance near the Assay Cutoff

Three CLIA-waived sites that participated in the prospective clinical study also participated in the Reproducibility Study. Two non-laboratory operators per site tested contrived throat swab samples at and above the assay cutoff, in addition to a negative sample, on five non-consecutive days. Results showed good agreement of observed test results with expected results. For the Low Positive sample (1x LoD), agreement was 98.9% (95% CI: 94.0%-99.8%). For the Moderate Positive sample (2x LoD), agreement was 97.8% (95% CI: 92.2%-99.4%). For the Negative sample, agreement was 97.8% (95% CI: 92.3%-99.4%).

The study demonstrates that non-laboratory personnel in CLIA waived settings can achieve accurate results when testing samples at or near the assay cutoff.

8. Conclusion

The information presented in this Premarket Notification demonstrates that the performance of the Accula Strep A Test is substantially equivalent in intended use, technological characteristics, and performance to the predicate device, thereby supporting 510(k) clearance.