July 3, 2023

Meridian Bioscience, Inc.
Heather Planck
Senior Regulatory Affairs Specialist
3471 River Hills Drive
Cincinnati, Ohio 45244

Re: K230901
Trade/Device Name: Premier HpSA Flex (619096)
Regulation Number: 21 CFR 866.3110
Regulation Name: Campylobacter Fetus Serological Reagents
Regulatory Class: Class I, reserved
Product Code: LYR
Dated: March 31, 2023
Received: March 31, 2023

Dear Heather Planck:

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 -S

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

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 06/30/2023
See PRA Statement below.

510(k) Number *(if known)*
K230901

Device Name

Premier® HpSA® Flex

Indications for Use *(Describe)*

The Premier HpSA Flex enzyme immunoassay (EIA) is an in vitro qualitative procedure for the detection of Helicobacter pylori antigens in human stool. The test is intended for use with unpreserved stool specimens or preserved stool specimens in transport media. Test results are intended to aid in the diagnosis of H. pylori infection and to monitor response during and post- therapy in patients. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

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510(k) Summary

510(k) number: K230901 **Date of Preparation:** June 30, 2023

A. Submitter details

Name: Meridian Bioscience Inc.

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Cincinnati, OH 45244
USA

Telephone: (513) 991-5946

Contact Person: Heather Planck, Senior Regulatory Affairs Specialist
Heather.Planck@meridianbioscience.com

B. Device Details

Proprietary and Established Names:
Premier® HpSA® Flex

Regulatory Information:

Product Code	Classification	Regulation Section	Panel
LYR	**I**	21 CFR 866.3110 – *Campylobacter fetus* serological reagents	MI – Microbiology (83)

Predicate:
Premier® Platinum HpSA® PLUS

C. Device Description

Meridian Bioscience has modified its FDA-cleared PREMIER Platinum HpSA® PLUS assay (K182559), a qualitative, *in vitro* diagnostic test for the detection of *Helicobacter pylori* antigens present in unpreserved human stool specimens. This modification, to be marketed under new device trade name Premier HpSA® Flex upon FDA clearance, is the addition of a new specimen type claim to the intended use of the previously cleared device (K182559) whereby specimens may be preserved in Cary-Blair or Culture and Sensitivity (C&S) transport media.

PREMIER Platinum HpSA PLUS (K182559), as the predicate device for this submission, was a modification of the PREMIER Platinum HpSA PLUS device cleared under K053335 that included changes to the antibodies used in the microwells and conjugate reagent. Additional clearances of this device can be found under K983255 and K980076.

Reagents and Test Components:
The Premier HpSA Flex assay kit includes:

- Premier HpSA Flex Antibody Coated Microwells: Breakaway plastic wells coated with a plurality of murine monoclonal antibodies specific for *H. pylori.*
- Premier HpSA Flex Positive Control: pH 7.2, Inactivated *H. pylori* in 10 mM phosphate-buffered solution with 0.02% Thimerosal.
- Premier HpSA Flex Sample Diluent/Negative Control: pH 7.2, 10 mM phosphate-buffered solution with 0.02% Thimerosal.
- PREMIER 20X Wash Buffer I: pH 6.8, 180 mM phosphate-buffered solution with 0.2% Thimerosal. Diluted to 1X prior to use.
- Premier HpSA Flex Enzyme Conjugate: A plurality of murine monoclonal antibodies specific for *H. pylori,* conjugated to horseradish peroxidase in a pH 7.8, 50 mM Tris-buffered solution containing 0.02% Thimerosal.
- PREMIER Substrate I: a-buffered solution containing urea peroxide and tetramethylbenzidine. (pH 5.0)
- PREMIER Stop Solution I: 1M phosphoric acid.
- Transfer Pipettes
- Plate Sealers
- Wooden Applicator Sticks

D. Principle of Operation

The Premier HpSA Flex test is a microwell-based enzyme immunoassay that detects *H. pylori* antigens present in human stool specimens, either unpreserved or preserved in transport media. The test utilizes a plurality (mixture) of monoclonal anti-*H. pylori* capture antibodies adsorbed to microwells. Diluted patient samples and an enzyme conjugate reagent are added to the microwells and incubated for one hour at room temperature. A wash is performed to remove unbound material. Substrate is added and incubated for 10 minutes at room temperature. Color develops in the presence of bound enzyme. Stop solution is added and the results are interpreted visually or spectrophotometrically. No calculations are required, and the visual color change makes the interpretation of results objective and simple.

In addition, the HpSA test permits assessment of established or novel anti-*H. pylori* treatment during and post-therapy to monitor for treatment effectiveness, relapse, or eradication.

E. Measurand

Helicobacter pylori antigens

F. Intended Use / Indications for Use

The Premier HpSA Flex enzyme immunoassay (EIA) is an in vitro qualitative procedure for the detection of *Helicobacter pylori* antigens in human stool. The test is intended for use with unpreserved stool specimens or preserved stool specimens in transport media. Test results are intended to aid in the diagnosis of *H. pylori* infection and to monitor response during and post- therapy in patients. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy.

Special Conditions for use Statement(s): For prescription use only.

G. Technological characteristics of Device vs. Predicate

The technological characteristics of Premier® HpSA® Flex are identical to those of the predicate, Premier Platinum HpSA® PLUS (K182559) in respect of material, chemical composition, and energy

source, because the *Premier HpSA Flex modification did not introduce any technology, engineering, or material changes to the FDA-cleared device K182559.* The physical properties of the device were unchanged, including the labeled kit box, mode of packaging and labeling of components contained within the assembled kit, and the kit components (e.g., reagents, microwells, disposables). The device, upon FDA clearance of the modifications, receives new Premier HpSA Flex labeling.

H. Comparison of device with the predicate

	Modified Device: Premier HpSA Flex	**Predicate device: PREMIER Platinum HpSA PLUS**
Intended Use / Indications for Use	The Premier HpSA Flex enzyme immunoassay (EIA) is an *in vitro* qualitative procedure for the detection of *Helicobacter pylori* antigens in human stool. The test is intended for use with unpreserved stool specimens or *preserved stool specimens in transport media*. Test results are intended to aid in the diagnosis of *H. pylori* infection and to monitor response during and post-therapy in patients. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy	The PREMIER Platinum HpSA PLUS is an *in vitro* diagnostic procedure for the detection of *Helicobacter pylori* antigens in human stool. Test results are intended to aid in the diagnosis of *H. pylori* infection and to monitor response during and post-therapy in patients. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy.
General Device Characteristic Similarities		
Measured analyte	*Helicobacter pylori* antigens	Same
Antibody / Technology / Assay format	Monoclonal / Enzyme immunoassay (EIA) / Microwell-based	Same
Type of Test	Qualitative	Same
Controls	Positive and negative controls included in the kit	Same
Reagent storage	Refrigerated (2–8ºC)	Same
Reagent and components	Antibody Coated Microwells; Positive Control; Sample Diluent / Negative Control; Premier 20X Buffer I; Enzyme Conjugate; Premier Substrate I; Premier Stop Solution 1; Transfer pipettes; Microwell strip sealer; Wooden stick applicators	Same
Result interpretation	Visual or spectrophotometric	Same
General Device Characteristic Differences		
Device & Predicate Device(s):	Device: K230901	Predicate: K182559
Addition of specimen type	Unpreserved stool specimens and *stool specimens preserved in Cary-Blair or C&S transport media*.	Unpreserved (raw) stool specimens

I. Performance Characteristics

1. Analytical Performance

a. Limit of Detection (LoD) / Analytical Sensitivity:

Analytical sensitivity studies were performed to determine the analytical limit of detection (LoD) of quantified *H. pylori* antigen diluted in human stool matrix that has been preserved in Cary-Blair and C&S transport media for the modified Premier HpSA Flex assay. Three lots of the Premier HpSA Flex assay were evaluated. For each kit lot, an LoD was established and confirmed in separate studies for each transport media (Cary-Blair and C&S). The LoD was defined as the lowest concentration of the target analyte that produced positive results ≥ 95% of the time.

The LoD value determined for the modified Premier HpSA Flex assay detected in stool specimens preserved in Cary-Blair or C&S transport media was determined to be 12 ng/mL. The previously established LoD using unpreserved (raw) stool was 4.66 ng/mL.

Further, the equivalence between Cary Blair and C&S transport media was assessed at LoD and below LoD antigen concentrations, and both transport media were determined to be equivalent for the preservation of specimens intended to be used with the Premier HpSA Flex assay.

b. Precision/Reproducibility:

The reproducibility of the Premier HpSA Flex assay was determined by testing preserved contrived stool samples across three independent laboratories. Samples were created with *H. pylori* antigen spiked into pooled negative stool matrix at high negative, low positive, and moderate positive concentrations, along with a true negative sample. Ten panels consisting of 12 blinded samples were provided to each of the three laboratories for a total of 360 samples. Testing was conducted at each laboratory over 5 different days. Each day two separate operators each tested a separate panel while alternating between kit lots. Testing included three different kit lots (2 lots per site). In addition, positive and negative controls were run when each panel was tested.

For preserved stool samples, the overall agreement between the Premier HpSA Flex assay result and the expected assay result was 100.0% (95% CI: 98.9–100.0%). Reproducibility studies with unpreserved stool samples were previously evaluated under K182559.

c. Linearity/Reportable range:

Not applicable

d. Traceability, Stability, Expected Values (Controls, Calibrators, or Methods):

Preserved specimen storage stability:
The specimen stability claims include storage of up to 120 hours at either refrigerated temperature (2–8 C) or room temperature (19–27 C), or for up to 14 days frozen (−20 C and/or −80 C) for clinical stool specimens preserved in Cary-Blair or C&S transport media prior to testing with the Premier HpSA Flex assay.

Freeze/Thaw:
The specimen freeze/thaw stability claims for clinical stool specimens preserved in Cary-Blair or C&S transport media include freezing and thawing specimens for up to two (2) freeze/thaw

cycles when specimens are stored frozen (≤ -20 C) prior to testing with the Premier HpSA Flex assay.

e. Analytical Specificity/Interference:

Interference testing was performed in the presence of chemical and biological substances introduced directly into contrived *H. pylori* low positive and negative preserved human stool samples. Substances and their respective test concentrations evaluated are listed below. Interference was not observed with the Premier HpSA Flex assay for any of the substances evaluated at their respective test concentrations. The same chemical or biological substances were previously evaluated for interference with the predicate assay (K182559).

Substance (Active Ingredient(s))	Target Concentration (per 500 µL of Patient Stool)
TUMS	10 mg/500 µL
Mylanta (per 10 mL: Aluminum hydroxide 800 mg, Magnesium hydroxide 800 mg, Simethicone 80 mg)	11.5 mg/500 µL
Pepto-Bismol (Bismuth subsalicylate 525 mg/30 mL)	0.44 mg/500 µL
Tagamet (Cimetidine 200 mg/tablet)	1 mg/500 µL
Prilosec OTC (Omeprazole 20 mg/tablet)	1 mg/500 µL
Barium Sulfate	25 mg/500 µL
Whole Blood	250 µL/500 µL
Leukocytes (White Blood Cells)	250 µL/500 µL
Mucin	17 mg/500 µL
Hemoglobin	62.5 mg/500 µL
Stearic Acid (fecal fat)	5.3 mg/500 µL
Palmitic Acid (fecal fat)	2.65 mg/500 µL
NSAID, Ibuprofen	0.25mg/500 µL

f. Analytical Specificity/Cross-reactivity:

A cross-reactivity and microbial interference study was performed to determine if potential co-contaminants of preserved human stool specimens would non-specifically react with the Premier HpSA Flex assay or interfere with detection of *H. pylori* antigen when present at high concentrations. The specificity of Premier HpSA Flex was evaluated by testing bacteria, fungi, and viral strains. Each organism was tested with a true negative sample and a contrived low positive sample (approximately 2X LoD) at a minimum concentration of $1.0x10^7$ CFU/mL (for bacteria/fungi) or $1.0x10^5$ $TCID_{50}$/mL (for viruses).

No cross-reactivity or microbial interference with the Premier HpSA Flex assay was observed. The organisms evaluated for cross-reactivity are listed below. The same microbial organisms were previously evaluated for cross-reactivity and microbial interference with the predicate assay (K182559).

Microorganism Tested	(Strain ID)	Microorganism Tested	(Strain ID)
Aeromonas hydrophila	ATCC 35654	*Listeria monocytogenes*	ATCC 19115
Bacillus subtilis	ATCC 6051	*Peptostreptococcus anaerobius*	ATCC 27337
Borrelia burgdorferi	N/A	*Proteus vulgaris*	ATCC 6380
Campylobacter coli	ATCC 43478	*Pseudomonas aeruginosa*	ATCC 10145
Campylobacter fetus	ATCC 25936	*Pseudomonas fluorescens*	ATCC 13525
Campylobacter jejuni	ATCC 33292	*Salmonella enterica subsp. enterica serovar Dublin*	ATCC 15480
Campylobacter lari	ATCC BAA-1060	*Salmonella enterica subsp. enterica serovar Hilversum*	ATCC 15784
Candida albicans	ATCC 18804	*Salmonella enterica subsp. enterica serovar Typhimurium*	ATCC 13311

Microorganism Tested	(Strain ID)	Microorganism Tested	(Strain ID)
Citrobacter freundii	ATCC 43864	*Salmonella heidelberg* (Group B)	ATCC 8326
Clostridium difficile	ATCC 43255	*Salmonella minnesota*	ATCC 9700
Clostridium perfringens	ATCC 12915	*Serratia liquefaciens*	ATCC 27952
Enterobacter cloacae	ATCC 15337	*Serratia marcescens*	ATCC 43862
Enterococcus faecalis	ATCC 49532	*Shigella boydii*	ATCC 9207
Escherichia coli	ATCC 8739	*Shigella dysenteriae*	ATCC 9361
Escherichia coli	ATCC 9637	*Shigella flexneri*	ATCC 12022
Escherichia coli	ATCC BAA-2196	*Shigella sonnei*	ATCC 25931
Escherichia coli O157:H7 (toxigenic)	ATCC 43895	*Staphylococcus aureus*	ATCC 51153
Escherichia fergusonii	ATCC 35469	*Staphylococcus aureus* (Cowan's)	ATCC 12598
Escherichia hermanii	ATCC 33650	*Staphylococcus epidermidis*	ATCC 49134
Escherichia hermanii	EMDI-64	*Yersinia enterocolitica*	ATCC 23715
Haemophilus influenzae	ATCC 9006	Adenovirus 41	Tak
Klebsiella pneumoniae	ATCC BAA-1900	Rotavirus RV4	
Lactococcus lactis	ATCC 49032		

g. Assay Cut-Off:

Not Applicable

2. Comparison Studies

a. Method Comparison with a Comparator Device:

Method comparison testing was done to compare the performance of the Premier HpSA Flex modification to that of an FDA-cleared comparator device. There were 200 archived stool specimens enrolled in the study from patients with signs and symptoms of gastroenteritis for whom a diagnostic *H. pylori* antigen test had been ordered by a practicing physician. Of those 200, viable Standard of Care (SoC) data was available for 182, all of which were evaluable specimens. Specimens were preserved in Cary-Blair or C&S transport media prior to testing with the Premier HpSA Flex assay and the comparator device in a central laboratory. Clinical performance (positive and negative percent agreement) for archived specimens against the FDA-cleared comparator device is presented in the following table. There were no observable differences in performance of the Premier HpSA Flex assay with respect to preserved media type (i.e., Cary-Blair and C&S), kit lot, or patient characteristics (i.e., age, sex, and race). Clinical performance with unpreserved stool specimens was previously evaluated under K182559.

Premier HpSA Flex	Comparator Device		
	Positive	**Negative**	**Total**
Positive	49	2*	51
Negative	0	131	131
Total	49	133	182
			95% CI
Positive Agreement	49/49	100.0%	[92.7% - 100.0%]
Negative Agreement	131/133	98.5%	[94.7% - 99.6%]

* 1/2 Premier HpSA Flex false positive specimens produced a positive result by the Standard of Care (SoC) testing using an FDA-cleared commercial assay.

b. Matrix Comparison:
Not applicable

3. Clinical Performance

a. Clinical Sensitivity:
Not applicable

b. Clinical Specificity:
Not applicable

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

4. Clinical Cut-off:

Not applicable

5. Expected values/Reference Range:

Not applicable

J. Proposed Labeling

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

K. Conclusion

The Premier® HpSA® Flex assay, as supported by the information submitted in this premarket submission, is substantially equivalent to the predicate device (PREMIER Platinum HpSA® PLUS; K182559).