March 13, 2020

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

Re: K192817
Trade/Device Name: Curian HpSA, Curian Analyzer
Regulation Number: 21 CFR 866.3110
Regulation Name: *Campylobacter fetus* Serological Reagents
Regulatory Class: Class I, reserved
Product Code: LYR
Dated: September 30, 2019
Received: October 1, 2019

Dear Cathlena Martinez:

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

510(k) Summary

510(k) number: K192817 **Date of Preparation:** September 30, 2019

Owner: **Meridian Bioscience, Inc.**
3471 River Hills Drive
Cincinnati, Ohio 45244 USA
Phone: (513) 271-3700
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Contact: **Primary Contact:**
Cathlena Martinez
Senior Regulatory Affairs Specialist

Secondary Contact:
Jack Rogers
Director, Regulatory Affairs and Design Assurance

Trade Name: **Curian™ HpSA®**

Common Name: *Helicobacter pylori*

Classification Name: *Campylobacter fetus* serological reagents
(21 CFR 866.3110, Product Code LYR)

Predicate Device: **PREMIER Platinum HpSA® PLUS**
K182559

Device Description

The Curian™ HpSA® assay is a qualitative *in vitro* diagnostic test for the detection of *Helicobacter pylori* in human stool. The Curian™ HpSA® assay utilizes fluorescence technology with the newly developed Curian™ Analyzer to detect *H. pylori* antigen. The Curian™ Analyzer has been designed to disposition sample results from lateral flow immunoassays.

Intended Use / Indications for Use

Curian HpSA, for use with the Curian Analyzer, is a rapid, qualitative, fluorescent immunoassay for the detection of *Helicobacter pylori* antigen in human stool. Test results are intended to aid in the diagnosis of *H. pylori* infection and to demonstrate loss of *H. pylori* antigen following treatment. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy. Test results should be taken into consideration by the physician in conjunction with the patient history and symptoms.

Predicate Device Comparison

Similarities Between the New Device and the Predicate Device		
	NEW DEVICE **Curian™ HpSA®** **K192817**	**PREDICATE DEVICE** **PREMIER Platinum HpSA® PLUS** **K182559**
Product Code	Same as predicate	LYR
Intended Use / Indications for Use	Curian HpSA, for use with the Curian Analyzer, is a rapid, qualitative, fluorescent immunoassay for the detection of *Helicobacter pylori* antigen in human stool. Test results are intended to aid in the diagnosis of *H. pylori* infection and to demonstrate loss of *H. pylori* antigen following treatment. Accepted medical practice recommends that testing by any current method, to confirm eradication, be done at least four weeks following completion of therapy. Test results should be taken into consideration by the physician in conjunction with the patient history and symptoms.	The Premier Platinum HpSA PLUS enzyme immunoassay (EIA) is an *in vitro* qualitative 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.
Measurand	Same as predicate	*H. pylori* stool antigen
Target Population	Same as predicate	Persons suspected of having *H. pylori* infection
Specimen Type	Same as predicate	Unpreserved human Stool
Type of Test	Same as predicate	Qualitative
Quality Control	Same as predicate	Positive and Negative Controls are provided in kit
Kit Storage	Same as predicate	Refrigerated (2 to 8 °C)

Differences Between the New Device and the Predicate Device		
	NEW DEVICE **Curian™ HpSA®** **K192817**	**PREDICATE DEVICE** **PREMIER Platinum HpSA® PLUS** **K182559**
Technology	Fluorescent immunoassay	Enzyme immunoassay (EIA)
Format	Single use lateral flow cassette	Microwell plate
Result Interpretation	Instrument report	Visual or Spectrophotometric
Time to Result	20 minutes	15 minutes

NON-CLINICAL PERFORMANCE DATA

Analytical Performance

Precision/Reproducibility

Reproducibility of the Curian™ HpSA® assay was evaluated by testing contrived sample panels at three investigational sites over a period of five days. Contrived panel members were prepared by spiking *H. pylori* purified flagellar antigen into negative diluted natural stool (70% natural stool/ 30% physiological saline) at antigen concentrations above, near and below the assay limit of detection. The sample panel consisted of a low positive

(1.5x LoD), moderate positive (3x LoD), high negative (0.5x LoD), and true negative samples. Diluted natural stool was used because of difficulties preparing dilutions with neat stool for analytical testing. The moderate positive and low positive panel members were positive 99.3% (149/150) and 98.0% (147/150) of the time. The high negative and true negative panel members were negative 88.7% (133/150) and 96.7% (29/30) of the time. These results are acceptable.

Analytical Sensitivity

Analytical sensitivity studies were performed to determine the analytical limit of detection (LoD) of purified *Helicobacter pylori* stool antigens (HpSA) in human stool matrix for the Curian HpSA assay. For this study, HpSA antigen was diluted at varying concentrations into diluted natural stool matrix. Three lots of the Curian HpSA assay were evaluated. The LoD is defined as the lowest concentration of the target analyte that produces positive results ≥ 95% of the time.

The LoD for the Curian HpSA assay was determined to be 2.0 ng/mL.

Prozone / Hook Effect

A study was performed to determine the potential for a high-dose prozone/hook effect with the Curian HpSA assay. A prozone/ hook effect can occur when very high levels of target antigen are present in the test sample, leading to a false negative result.

Dilutions of *H. pylori* stool antigens (HpSA) were prepared in diluted natural negative sample matrix to create contrived HpSA positive samples containing known concentrations of antigen. Individual reactions were prepared such that the concentration in each replicate was that of a high positive specimen approximately 25X to 6250X LoD; ranging from 51 to 12,500 ng/mL. Each sample was tested to determine whether a prozone/ hook effect is observed with the Curian HpSA assay.

Results confirmed that prozone/ hook effect was not observed with the Curian HpSA assay when testing samples containing high concentrations of *Helicobacter pylori* stool antigens.

Analytical Specificity

Cross-Reactivity:

The specificity of Curian HpSA was tested utilizing the following bacterial, fungal and viral strains. Each potentially cross-reactive microorganism was added at minimum concentrations of 1.0 x 10^7 CFU/mL (bacteria/fungi) or 1.0 x 10^5 $TCID_{50}$/mL (for viruses) to a diluted natural negative matrix and a contrived positive matrix sample. No cross-reactivity or microbial interference with the Curian HpSA assay was observed.

Organisms evaluated for cross-reactivity are listed below.

Organism Name	Strain ID	Organism Name	Strain ID
Adenovirus 40	Dugan	*Klebsiella pneumoniae*	ATCC 13883
Aeromonas hydrophila	ATCC 35654	*Proteus vulgaris*	CCUG 6380
Bacillus cereus	CCUG 52704	*Pseudomonas aeruginosa*	ATCC 39324
Borrelia burgdorferi	B31.5A19	Rotavirus	WA
Campylobacter coli	ATCC 10956	*Salmonella spp. Dublin*	ATCC 15480
Campylobacter jejuni	ATCC 29411	*Salmonella spp. Hilversum*	ATCC 15784
Candida albicans	ATCC 18804	*Salmonella spp. Minnesota*	ATCC 9700
Citrobacter freundii	ATCC 8090	*Salmonella typhimurium* Group B	ATCC 14028
Clostridium difficile	ATCC 43255	*Shigella boydii*	ATCC 9207
Clostridium perfringens	ATCC 12915	*Shigella dysenteriae*	ATCC 9361
Enterobacter cloacae	ATCC 15337	*Shigella flexneri*	ATCC 12022
Enterococcus faecalis	ATCC 49532	*Shigella sonnei*	ATCC 25931
E. coli O157:H7	ATCC 43895	*Staphylococcus aureus*	ATCC 6538
E. coli	ATCC 9637	*Staphylococcus aureus* Cowan I	ATCC 12598
Escherichia fergusonii	ATCC 35469	*Staphylococcus epidermidis*	ATCC 51625
Haemophilus influenzae	ATCC 9006	*Yersinia enterocolitica*	ATCC 23715

Interfering Substances:

Interference testing was performed in the presence of chemical and biological substances introduced directly into contrived HpSA low positive and negative samples generated using diluted natural stool matrix. No interference was observed with the Curian HpSA assay for any of the substances tested. Substances tested and concentrations evaluated are listed below.

Substance (active ingredient(s))	Test Concentration
Barium Sulfate	5% w/v (50 mg/mL)
Benzalkonium chloride	1% v/v
Ciprofloxacin	0.25% w/v (2.5 mg/mL)
Ethanol	1% v/v
Hog gastric mucin	3.5% w/v (35 mg/mL)
Human blood (whole)	40% v/v
Human hemoglobin	12.5% w/v (125 mg/mL)
Human urine	5% v/v
Hydrocortisone	1% w/v (10 mg/mL)
Imodium® (Loperamide HCl, 1 mg/7.5 mL)	5% v/v
Kaopectate® (Bismuth subsalicylate 262 mg/15 mL)	5% v/v
Leukocytes	0.05% v/v
Mesalazine (5-Aminosalicylic acid)	10% w/v (100 mg/mL)
Metronidazole	0.25% w/v (2.5 mg/mL)
MiraLAX® (Polyethylene Glycol 3350, 17 g/dose)	7% w/v (70 mg/mL)
Mineral Oil	10% v/v
Mylanta® (per 10 mL: (Aluminum hydroxide 800 mg, Magnesium hydroxide 800 mg, Simethicone 80 mg)	4.2 mg/mL (2.5% v/v)
Naproxen Sodium	5% w/v (50 mg/mL)
Nonoxynol-9	1% v/v
Nystatin	1% w/v (10 mg/mL)
Palmitic acid (fecal fat)	20% w/v (200 mg/mL)
Pepto-Bismol® (Bismuth subsalicylate 525 mg/30 mL)	5% v/v
Phenylephrine	1% w/v (10 mg/mL)
Prilosec OTC® (Omeprazole 20 mg/tablet)	5 mg/mL
Sennosides	1% w/v (10 mg/mL)
Simethicone	10% v/v
Stearic acid (fecal fat)	20% w/v (200 mg/mL)
Tagamet HB 200® (Cimetidine 200 mg/tablet)	5 mg/mL
TUMS®	5 mg/mL
Vancomycin	0.25% w/v (2.5 mg/mL)

Assay Reactivity/ Inclusivity

A total of five strains of *H. pylori* were evaluated for reactivity with the Curian HpSA assay. The final reactive concentrations observed for each strain are listed below.

***H. pylori* strain tested**	**Geographic origin & other information**	**Reactive Concentration**
ATCC 43504	Australia	1.0×10^5 CFU/mL
CCUG 38771	Unknown	3.0×10^5 CFU/mL
CCUG 19087	South Africa	3.0×10^5 CFU/mL
ATCC 700392	UK; clade hpEurope	6.0×10^5 CFU/mL
ATCC 700824	US; clade hpAfrica1	3.0×10^5 CFU/mL

CLINICAL PERFORMANCE DATA

Comparison of Curian™ HpSA® assay to an FDA-cleared *H. pylori* Stool Antigen EIA

A multi-center Method Comparison Study was conducted at three sites in the USA to evaluate the performance of the Curian HpSA for detecting *H. pylori* stool antigen in human stool from patients suspected of *H. pylori* infection. Test results were compared to results from an FDA-cleared *H. pylori* stool antigen EIA that was previously evaluated

relative to the endoscopy biopsy composite reference method (i.e., culture, histology, and RUT) for initial *H. pylori* diagnosis with a demonstrated sensitivity and specificity greater than or equal to 95% and a lower bound of the two-sided 95% confidence interval (CI) greater than 89%.

Five hundred forty-two (542) evaluable specimens from the intended use population were enrolled in the study.

Positive and negative percent agreement were determined between the Curian HpSA and comparator EIA in detecting HpSA antigens in human stool. The Curian HpSA demonstrated a positive percent agreement of 96.05% (95% CI: 89.03%, 98.65%) and a negative percent agreement of 97.00% (95% CI: 95.02%, 98.20%) with the comparator EIA

Performance:

Positive and Negative Curian HpSA Results vs. FDA-cleared *H. pylori* stool antigen EIA				
		FDA-cleared *H. pylori* stool antigen EIA		
		Positive	**Negative**	**Total**
Curian HpSA Assay	**Positive**	73	14[b]	87
	Negative	3[a]	452	455
	Total	76	466	542
Agreement			**95% CI (%)**	
PPA	**96.1%**	(73/76)	89.0%, 98.6%	
NPA	**97.0%**	(452/466)	95.0%, 98.2%	

[a] 2/3 Curian HpSA false negatives were dispositioned as negative by PCR

[b] 8/14 Curian HpSA false positives were dispositioned as positive by PCR

CONCLUSION

The Curian™ HpSA® assay, as supported by the information submitted in this premarket submission, is substantially equivalent to the predicate device.