March 14, 2018

Exalenz Bioscience Ltd.
% George Hattub
Senior Staff Consultant
Medicsense USA
291 Hillside Avenue
Somerset, Massachusetts 02726

Re: K173772
Trade/Device Name: BreathID Hp System
Regulation Number: 21 CFR 866.3110
Regulation Name: *Campylobacter fetus* serological reagents
Regulatory Class: Class I
Product Code: MSQ, JJQ
Dated: December 1, 2017
Received: December 12, 2017

Dear George Hattub:

This letter corrects our substantially equivalent letter of March 8, 2018.

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. 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); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); 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 http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm for the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/) and CDRH Learn (http://www.fda.gov/Training/CDRHLearn). 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 (http://www.fda.gov/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
For

Uwe Scherf, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of In Vitro Diagnostics
and Radiological Health
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: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*

K173772

Device Name

BreathID® Hp System

Indications for Use *(Describe)*

The Exalenz BreathID® Hp System is intended for use to continually and non-invasively measure changes in the $^{13}CO_2$ /$^{12}CO_2$ ratio of exhaled breath, which may be indicative of increased urease production associated with active *Helicobacter pylori* (*H. pylori*) infection in the stomach.

The Exalenz BreathID® Hp System is indicated for use as an aid in the initial diagnosis and post treatment monitoring of *H. pylori* infection in adult patients and pediatric patients ages 3-17 years old. The Exalenz BreathID® Hp System consists of the appropriate IDkit:Hp™ kit and the BreathID® Hp test device.

The device is for use by trained health care professionals. To be administered under a physician's supervision.

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.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

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"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

510(K) SUMMARY

510(K) Number K173772

Purpose of this 510(k):

The primary purpose of this 510(k) submission is to expand the indications for use of the BreathID® Hp System to include use with pediatric patients ages 3-17 years old. Both the predicate and the subject device are identical.

Applicant's Name:

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Date Prepared:

March 7, 2018

Trade Name:

BreathID® Hp System

Classification Name:

Test, urea (breath or blood)

Product Code:

MSQ

Device Class:

I

Regulation Number:

866.3110

Panel:

Microbiology

Predicate Device:

Exalenz BreathID® Hp System [Exalenz Bioscience Ltd.] cleared under K130524

Device Description:

The BreathID® Hp System is a non-invasive breath test system for detecting the presence of *Helicobacter pylori* (*H. pylori*). The system consists of an electro-optical medical device with embedded software designed to measure and compute the changes in ratio between $^{13}CO_2$ and $^{12}CO_2$ concentrations in the patient's exhalation, and a test kit. The IDkit Hp™ One kit consists of:

- A 75mg ^{13}C-urea tablet
- A 4.3g package of powdered Citrica (citric acid)
- One IDcircuit™ nasal cannula
- Drinking straw
- Package Insert (Instructions for Use)
- Quick User Guide

The BreathID® Hp System measures and computes the ratio between $^{13}CO_2$ and $^{12}CO_2$ in the patient's exhaled breath before and after the ingestion of ^{13}C-urea. The change in the $^{13}CO_2$ / $^{12}CO_2$ ratio before and after ingestion of ^{13}C-urea is used to compute the Delta over Baseline (DOB).

The ^{13}C measurement method for both the subject and the cleared (predicate) versions of the BreathID® Hp System is based on Molecular Correlation Spectroscopy™ (MCS) technology. MCS technology is based on the concept of optical absorption of specific radiation emitted from CO_2 discharge lamps.

Intended Use / Indication for Use:

The Exalenz BreathID® Hp System is intended for use to continually and non-invasively measure changes in the $^{13}CO_2/^{12}CO_2$ ratio of exhaled breath, which may be indicative of increased urease production associated with active *Helicobacter pylori* (*H. pylori*) infection in the stomach.

The Exalenz BreathID® Hp System is indicated for use as an aid in the initial diagnosis and post treatment monitoring of *H. pylori* infection in adult patients and pediatric patients ages 3-17 years old. The Exalenz BreathID® Hp System consists of the appropriate IDkit Hp™ kit and the BreathID® Hp test device.

The device is for use by trained health care professionals. To be administered under a physician's supervision.

Substantial Equivalence:

The following table summarizes the data on the Exalenz BreathID® Hp System (subject

of this 510(k) submission) and compares to the Exalenz BreathID® Hp System cleared under K130524 (the predicate).

	BreathID® Hp System ***(The Subject Device)***	**BreathID® Hp System** ***(The Predicate Device)***
510(k) Number	**K173772**	**K130524**
Product Code/Class	MSQ/Class I	Same
Regulation	*Campylobacter fetus* serological reagents, 866.3110	Same
Manufacturer	Exalenz Bioscience Ltd.	Same
Intended Use	The Exalenz BreathID® Hp System is intended for use to continually and non-invasively measure changes in the $^{13}CO_2/^{12}CO_2$ ratio of exhaled breath, which may be indicative of increased urease production associated with active *Helicobacter pylori* (*H.* pylori) infection in the stomach. The Exalenz BreathID® Hp System is indicated for use as an aid in the initial diagnosis and post treatment monitoring of H. pylori infection in adult patients and pediatric patients ages 3-17 years old.	The Exalenz BreathID® Hp System is intended for use to continually and non-invasively measure changes in the $^{13}CO_2/^{12}CO_2$ ratio of exhaled breath, which may be indicative of increased urease production associated with active *Helicobacter pylori* (*H. pylori*) infection in the stomach. The Exalenz BreathID® Hp System is indicated for use as an aid in the initial diagnosis and post treatment monitoring of *H. pylori* infection in adult patients.

	BreathID® Hp System ***(The Subject Device)***	**BreathID® Hp System** ***(The Predicate Device)***
	The Exalenz BreathID® Hp System consists of the appropriate IDkit Hp™ kit and the BreathID® Hp test device. The device is for use by trained health care professionals. To be administered under a physician's supervision.	The Exalenz BreathID® Hp System consists of the IDkit Hp™ and the BreathID® Hp test device. The device is for use by trained health care professionals. To be administered under a physician's supervision
System Hardware Components	• BreathID® Hp device • IDkit Hp™ One	Same
System Software Components	• BreathID® Hp device embedded SW	Same
Test Sample	Human breath collected using a nasal cannula	Same
Sample Collection Method	Continual collection over the test duration through a nasal cannula	Same
Organism	*Helicobacter pylori*	Same
Reagent	^{13}C Urea (NDA 21-314)	Same
Test Duration	10-20 minutes	Same
Indications	Initial diagnosis and post treatment monitoring	Same
Detection Method	Measuring levels of $^{13}CO_2$ and $^{12}CO_2$ using Molecular Correlation Spectroscopy (MCS)	Same

	BreathID® Hp System ***(The Subject Device)***	**BreathID® Hp System** ***(The Predicate Device)***
Test Output (Reported Result)	Delta Over Baseline (DOB) of the $^{13}CO_2$ / $^{12}CO_2$ ratio (before and after ingestion of ^{13}C Urea) and positive/negative determination for *H. pylori* infection	Same
Cut-off Point	5.0 DOB per mil (post dose minus pre dose)	Same
Population	Adult and Pediatric	Adult

Comparison of Intended Use:

The intended use of the BreathID® Hp System is substantially equivalent to its predicate; both are intended for the initial diagnosis and post treatment monitoring of *H. pylori* infection in patients, and both are prescription devices. The BreathID® Hp System which is the subject device is indicted for use on both adult and pediatric patients ages 3-17 years old, while the predicate device is only indicated for adult patients. In addition, the subject device has minor software changes which have no effect on the fundamental intended use or indications for use of the system nor do they alter the system diagnostic characteristics or raise any new safety issues.

Ingested Drug:

The ingested drug product used in the BreathID® Hp System IDkit Hp™ One kit, (^{13}C-Urea tablet, 75mg and Citrica powder, 4g), was originally approved in NDA 21-314. The identical drug product with identical preparation and administration is used in the cleared predicate device BreathID® Hp System kit.

Comparison of Technological Characteristics:

The BreathID® Hp System shares with its predicate device the same technology, the same test substrate, and the same diagnostic capabilities. Both the subject and predicate systems use the MCS technology (Molecular Correlation Spectroscopy) and measure the ratio of $^{13}CO_2/^{12}CO_2$ in exhaled breath prior to and after administration of the test substrate (^{13}C-Urea). The MCS technology measures the light absorbance by an infrared spectrometry, which is correlative to CO_2 concentration in the breath sample. The output result in both systems is the Delta Over Baseline (DOB) and a positive/negative determination is based on the same assay cut-off (≥5 DOB).

Like its predicate device, the BreathID® Hp System includes an analyzer device with embedded SW and a test kit that includes a nasal cannula for breath collection.

Summary of Performance Testing:

Exalenz has performed extensive and well-executed verification and validation to verify the performance of the BreathID® Hp System.

- Software Verification and Validation

  Software testing was conducted to evaluate the performance of the subject system and to verify that it performs according to its specifications. Verifications involved functionality testing, timing analysis, integration with the hardware, and error detection and handling. Verification was achieved by design reviews, code walkthroughs, functional testing of sub-components and integration testing with the hardware. Additionally, the software was extensively verified at the system level.

- Clinical Validation

  A multi-center, non-randomized, open label study was conducted with the primary goal of confirming the safety of the ^{13}C-urea substrate in pediatric subjects, and a secondary goal of assessing performance of the BreathID® Hp System using nasal cannula breath collection in this population, compared to stool antigen testing. Supported by existing clinical performance in the adult population, device performance was assessed in a limited clinical study in a pediatric population as described below. The study was not powered to assess efficacy. A central laboratory analyzed the stool specimens with an FDA cleared *H. pylori* stool antigen test. The study was conducted at 6 clinical sites that were geographically diverse, differing in size (from small private clinics to large hospitals) and diverse in experience. Local site personnel were trained on administering the breath test using a BreathID® Hp System.

  The primary study endpoint was to confirm the safety of the ^{13}C-urea substrate using the standard dose of 75mg ^{13}C-urea and 4g citric acid in the pediatric population. The safety endpoint included all adverse events (AEs).

  The secondary endpoint was performance, assessed as the positive percent agreement and negative percent agreement between the BreathID® Hp System, applying the predefined threshold of 5 DOB, and the stool antigen test results.

  Main Results

  A total number of 54 subjects were screened, of which 1 subject was a screening failure prior to any study related procedure. Fifty-three subjects were enrolled (full analysis - FA set) and were followed for the safety assessment. Forty-one of them

completed the full study protocol requirements for the FA set with evaluable breath and stool test endpoints.

Among the 53 pediatric subjects followed for the safety assessment, one adverse event of vomiting was experienced by one subject (1.89%) and resolved on the same day. There were no reportable major safety concerns due to adverse events.

The positive percent agreement between the breath test and the stool antigen test results was 93.3% [95% CI:68.05;99.83] and the negative percent agreement was 100% [95% CI: 86.77%;100%].

These study results met the predefined success criteria for confirming the safety of the ^{13}C-urea substrate in the pediatric population, and for providing further evidence of BreathID Hp System performance in this population taking into consideration prior supportive clinical performance in the adult population.

Conclusion:

The information submitted in this premarket notification is complete and demonstrates that the BreathID® Hp System is as safe and effective as the predicate device and supports a substantial equivalence decision.