February 6, 2020

Exalenz Bioscience Ltd.
Raffi Werner
CEO
4 Ha'Maayan st.
Modiin, 7177872
IL

Re: K193610
Trade/Device Name: BreathID Smart System
Regulation Number: 21 CFR 866.3110
Regulation Name: Campylobacter fetus serological reagents
Regulatory Class: Class I, reserved
Product Code: MSQ, JJQ
Dated: December 22, 2019
Received: December 26, 2019

Dear Raffi Werner:

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

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
K193610

Device Name

BreathID® Hp Lab System or BreathID® Smart System

Indications for Use *(Describe)*

The Exalenz BreathID® Hp Lab System or Exalenz BreathID® Smart System is intended for use to non-invasively measure changes in the 13CO2/12CO2 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 Lab System or Exalenz BreathID® Smart System is indicated for use as an aid in the initial diagnosis and post treatment monitoring H. pylori of infection in adult patients and pediatric patients ages 3-17 years old. The Exalenz BreathID® Hp Lab System consists of the appropriate IDkit Hp™ kit, and the BreathID® Hp device, Auto Sampler and Lab Application. The Exalenz BreathID® Smart System consists of the appropriate IDkit: Hp™ kit and the BreathID® Smart device.

To be administered by trained personnel as ordered by a licensed healthcare practitioner.

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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510(k) Summary

Purpose of this 510(k):

The primary purpose of this Special 510(k) submission is to clear a modified configuration of the already cleared BreathID® Hp Lab System (K173777) which has the same Intended Use and Indication for Use. The modified configuration combines the three existing stand-alone components of the BreathID® Hp Lab System into one integrated device.

Applicant's Name

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Contact Person

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Date Prepared

Jan 29, 2020

Trade Name

BreathID® Smart System

Classification Name

Test, urea (breath or blood)

Product Code

MSQ, JJQ

Device Class

I

Regulation Number

866.3110

Panel

Microbiology

Predicate Device

Exalenz BreathID® Hp Lab System [Exalenz Bioscience Ltd.] cleared under K173777

Device Description

The Modified BreathID® Hp Lab System, with the trade name BreathID® Smart, 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, an integrated Auto Sampler, integrated software, and a test kit.

The IDkit Hp™ Two test kit consists of:

- A 75mg ^{13}C-urea tablet
- A 4.3g package of powdered Citrica (citric acid)
- Drinking straw
- Package Insert (Instructions for Use)
- 2 Breath Sample Bags (Baseline and Post Ingestion) with bar code labels
- A large Sample Transport Bag

Using bags for breath collection enables off site and deferred testing as well as testing of multiple breath sample bags sequentially in a batch. The BreathID® Smart 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 Lab Systems 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 Lab System or Exalenz BreathID® Smart System is intended for use to 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 Lab System or Exalenz BreathID® Smart 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 Lab System consists of the appropriate IDkit Hp™ kit, and the BreathID® Hp device, Auto Sampler and Lab Application. The Exalenz BreathID® Smart System consists of the appropriate IDkit: Hp™ kit and the BreathID® Smart device.

To be administered by trained personnel as ordered by a licensed healthcare practitioner.

Substantial Equivalence

The following table summarizes the data on the Exalenz BreathID® Smart System (subject of this 510(k) submission) and compares to the Exalenz BreathID® Hp Lab System cleared under K173777 (the predicate device).

Device & Predicate Device(s):	**BreathID® Smart System** ***(The Subject Device)***	**BreathID® Hp Lab System** ***(The Predicate Device)***
Device Trade Name	BreathID Smart System	BreathID Hp Lab System
General Device Characteristic Similarities		
Intended Use/Indications for Use	The Exalenz BreathID Smart System is intended for use to 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 Lab System is intended for use to 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.

Device & Predicate Device(s):	**BreathID® Smart System** ***(The Subject Device)***	**BreathID® Hp Lab System** ***(The Predicate Device)***
	The Exalenz BreathID® Smart 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® Smart System consists of the appropriate IDkit: Hp™ kit and the BreathID® Smart device. To be administered by trained personnel as ordered by a licensed healthcare practitioner.	The Exalenz BreathID® Hp Lab 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 Lab System consists of the appropriate IDkit Hp™ kit, and the BreathID® Hp device, Auto Sampler and Lab Application. To be administered by trained personnel as ordered by a licensed healthcare practitioner.
Test Sample	Human breath exhaled into breath sample bags	Same
Sample Collection Method	Two breath sample bags: for baseline and post ingestion	Same
Organism	*Helicobacter pylori*	Same
Reagent	^{13}C Urea (NDA 21-314)	Same
Test Duration	15 – 20 minutes	Same
Detection Method	Measuring levels of $^{13}CO_2$ and $^{12}CO_2$ the spectroscopy	Same
Test Output (Reported Result)	DOB of the $^{13}CO_2$ / $^{12}CO_2$ ratio before and after ingestion of ^{13}C Urea	Same
Cut-off Point	5.0 DOB per mil (post dose minus pre dose)	Same
General Device Characteristic Differences		
System Hardware Components	• BreathID® Smart device • IDkit Hp Two test kit	• BreathID® Hp device • Auto Sampler • IDkit Hp Two test kit • PC
System Software Components	• BreathID® Smart device embedded SW	• BreathID® Hp Lab embedded SW • BreathID Hp Lab Application • Auto Sampler embedded SW

Comparison of Intended Use

The intended use of the modified BreathID® Hp Lab System, (to include the BreathID® Smart System) has essentially remained equivalent to the predicate; both are intended for the initial diagnosis and post treatment monitoring of *H. pylori* infection in adult and pediatric (ages 3-17 years old) patients, and both are prescription devices. Both devices are designed for performing multiple $^{13}CO_2$ based breath tests automatically one after the other. But while the cleared BreathID Hp Lab system has an external auto sampler which enables sequential testing of 10 pairs of Breath Sample bags, the BreathID Smart analyzer includes an integrated auto sampler that enables sequential testing of 4 pairs of Breath Sample bags. These pairs are measured sequentially and automatically as in the predicate BreathID® Hp Lab System.

Test Kit and Ingested Drug

The BreathID® Smart System and the predicate BreathID® Hp Lab System both use the same IDkit Hp™ Two kit that consists of ^{13}C urea, approved in NDA 21-314, and breath collection bags, approved in K162150. The protocol for breath collection and ingestion of ^{13}C urea remains unchanged.

Comparison of Technological Characteristics

- The BreathID® Smart System shares with its predicate device the same measurement system based on the same technology, the same test kit, 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 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).
- The predicate device includes an analyzer which is connected to an external auto sampler, enabling automatic and sequential testing of 10 pairs of breath sample bags. The modified device is based on the same analyzer as the predicate, with an integrated auto sampler, enabling four pairs of breath sample bags to be measured automatically and sequentially.

- The predicate device includes an external computer component to run the BreathID Lab Application software that communicates with the BreathID analyzer and external auto sampler. In the modified device, the computer and application software are built into the BreathID analyzer.

Summary of Performance Testing

Exalenz has performed extensive and well executed verification and validation to verify the performance of the BreathID® Smart System. The verification and validation testing program for the BreathID Smart system was designed based on the device specifications and requirements, as well as on the associated potential risks, as identified and evaluated in the risk analysis and in accordance with FDA recognized standards.

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 software requirements. Verification 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.

System Performance and Safety Testing

The performance bench testing program consisted of the following tests:

- Precision Tests (Precision, Repeatability and Reproducibility). Precision testing focused on the within laboratory precision/repeatability of the system and used one device, while the reproducibility test used 3 devices.
- Sample Carry-Over Test. The carry-over test was designed to demonstrate that the system has no sample carry-over effect.
- Environmental Tests (transportation, storage and operating conditions). The specified transportation, storage and operating conditions of the BreathID® Smart Device are identical to those of the predicate system. The environmental tests included temperature and altitude end conditions, vibrations and drop tests. The BreathID® Smart system was functionality tested several times during the Environmental test and found within the acceptance criteria.

- Comparison test between the predicate BreathID® Hp Lab System and the BreathID® Smart System. A comparison test between the predicate system and the device subject of this submission ran 80 measurements on each system and statistically shows that both systems may be used interchangeably.
- Electrical safety and electromagnetic compatibility (EMC)

The above tests used contrived gases for simulating different levels of $^{13}CO_2$ as a result of *H. pylori* infection. All the pre-defined acceptance criteria were met; therefore, it can be concluded that the BreathID® Smart System was verified to give accurate and repeatable results over time.

Conclusion:

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