DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
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November 24, 2014

Auxogyn, Inc.
Julia Anastas
Director, Regulatory Affairs
1490 O'Brien Drive, Suite A
Menlo Park, CA 94025

Re: K142147
Trade/Device Name: Eeva™ System (EVS2210)
Regulation Number: 21 CFR 884.6195
Regulation Name: Embryo Image Assessment System, Assisted Reproduction
Regulatory Class: Class II
Product Code: PBH
Dated: October 31, 2014
Received: November 3, 2014

Dear Julia Anastas,

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); 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.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm. 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.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Benjamin R. Fisher -A

Benjamin Fisher
Director
Division of Reproductive, Gastro-Renal,
and Urological Devices
Office of Device Evaluation
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)*
K142147

Device Name
Eeva™ System, Model EVS2210

Indications for Use *(Describe)*

The Eeva System is indicated to provide adjunctive information on events occurring during the first two days of development that may predict further development to the blastocyst stage on Day 5 of development. This adjunctive information aids in the selection of embryo(s) for transfer on Day 3 when, following morphological assessment on Day 3, there are multiple embryos deemed suitable for transfer or freezing. The device may also be used to collect additional time-lapse images until Day 5 of development for embryos not selected for transfer, to allow monitoring of continued embryo development.

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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1.0 510(K) SUMMARY, K142147

Submitter: Auxogyn, Inc.
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Date Summary was Prepared: November 20, 2014

Trade or Proprietary Name: Eeva™ System
Model Number: EVS2210
Common or Usual Name: Assisted Reproduction Embryo Image Assessment System
Regulation Number: 21 CFR 884.6195
Product Code: PBH
Device Class: II
Predicate Device: Eeva System, Model EVS2000; K120427, DEN120015
This predicate has not been subject to a design-related recall.

No reference devices were used in this submission.

1.1 DESCRIPTION OF THE DEVICE

The Eeva™ System is an Assisted Reproduction Embryo Image Assessment System (21 CFR 884.6195), installed in an IVF lab and used by embryologists and other IVF professionals. None of the System components have an individual, prior 510(k) clearance. Eeva System, Model EVS2210 requires the use of the 12-microwell configuration of the Eeva™ Dish (K141663, also referred to as the "dish"), which is placed on the Eeva Scope (an assisted reproductive microscope). The Eeva Scopes are placed in commercially-available standard-sized incubators. The microscope employs high resolution time-lapse imaging to record an embryo's development during its first two days of incubation. Automated measurements of cell division timing parameters and the Eeva Test results are provided to the user after approximately 42 hours predicting the likelihood of whether an embryo will develop to the blastocyst stage. In Eeva System, Model EVS2210, image recording may continue through Day 5 of embryo development.

1.2 INDICATIONS FOR USE

The indications for use statement for the Eeva System is:

> The Eeva System is indicated to provide adjunctive information on events occurring during the first two days of development that may predict further development to the blastocyst stage on Day 5 of development. This adjunctive information aids in the selection of embryo(s) for transfer on Day 3 when, following morphological assessment on Day 3, there are multiple embryos deemed suitable for transfer or freezing. The device may also be used

to collect additional time-lapse images until Day 5 of development for embryos not selected for transfer to allow monitoring of continued embryo development.

This statement is identical to that of the predicate device, with the addition of a new feature to collect additional time-lapse images to allow monitoring of continued embryo development up to Day 5 of development. This new device feature is a convenience for the user but does not alter or add to the intended use of the device.

The subject and predicate devices have the same intended use, which is to obtain and analyze light microscopy images, and provide information to aid in the selection of embryos(s) for transfer when there are multiple embryos deemed suitable for transfer or freezing.

1.3 SUMMARY OF TECHNOLOGICAL CHARACTERISTICS COMPARISON

The table below compares the subject and predicate device with respect to principles of operation, technological characteristics, and testing performed.

Table 1. Comparison of Technological Characteristics

	Predicate Device **Eeva System** **Model EVS2000**	**Subject Device** **Eeva System** **Model EVS2210**
Principles of Operation / Conditions of Use	Assisted reproductive microscope placed in a standard (3rd party) incubator that captures time-lapse embryo images, and automatically evaluates cell division timing parameters to predict whether an embryo has a "High"/"Low" probability to reach the blastocyst stage Results after ~42 hours (500 images) Prescription use only device used by embryologists and other trained IVF professionals in an IVF laboratory.	Same
Technological Characteristics		
Design Features	Imaging system mounted in a standard (3rd party) incubator allows recording of images without opening incubator door	Same
	Fully automated dish detection and embryo focusing	Same

Table 1. Comparison of Technological Characteristics

	Predicate Device **Eeva System** **Model EVS2000**	**Subject Device** **Eeva System** **Model EVS2210**
	Time-lapse dark field imaging in single focal plane at 5 minute intervals for up to 3 days	Same but with imaging available for up to 5 days
	Low-power red LED (625 nm) illumination provides observation of key morphology features	Same
Hardware Design and Materials	Standard computer, touchscreen monitors, electronics and optics; industry standard materials such as metals and plastics	Same types of hardware and materials, with some specific component changes
	Underwent and passed electrical safety and electromagnetic compatibility performance testing in compliance with BS EN 60601-1: 2006 + A11:2011 and IEC 60601-1-2:2007	Underwent and passed electrical safety and electromagnetic compatibility performance testing in compliance with BS EN 60601-1: 2006 + A11:2011 and IEC 60601-1-2:2007
Key Software Functionality	User Interface: Scopes, Patients, Administrative and Service Tabs, Dish and Microwell Screens	Same tabs and screens with minor modifications
	User Interface: Storage of up to 200 sessions	Same storage with addition of capability to backup 2000 sessions to external USB drive and to restore backed-up sessions to the Eeva System
	Four reports: Blastocyst Prediction Report, Image Report, Patient Report, Utilization Report	Same reports, with formatting and nomenclature changes (e.g., Blastocyst Predication Report now named Results Report) and image timing changes.
	System shut down required to replace scopes	Service interface improvements including ability to replace scopes without System shut down
Embryo Image Analysis	Embryo isolation from 25-microwell configuration Eeva Dish	Embryo isolation from 12-microwell configuration Eeva Dish

Table 1. Comparison of Technological Characteristics

	Predicate Device Eeva System Model EVS2000	**Subject Device Eeva System Model EVS2210**
	Feature extraction using cell tracking and event inference	Two new processes have been combined with cell tracking for event inference
	Blastocyst prediction model	Same

1.3.1 Conclusions of Summary of Technological Comparison to Predicate Device

The key device technology changes that have been implemented in the Eeva System, Model EVS2210 do not raise new questions of safety or effectiveness because:

- The increase of the maximum imaging duration to 1440 embryo images (5 days) from 864 embryo images (3 days) raises the same questions of safety and as the predicate device, and has been appropriately evaluated using the same methods used previously,
- Changes in specific hardware components do not introduce questions of safety and effectiveness beyond those already addressed through compliance to BS EN 60601-1: 2006 + A11:2011 and IEC 60601-1-2:2007.
- The addition of backup and restore capabilities, User Interface enhancements, and changes to Test Report formatting have no impact on the Eeva Test or the calculation of the results.
- The changes to the Embryo Image Analysis software to process images from the 12-microwell Eeva Dish and the addition of two new feature extraction processes raise the same questions of safety and effectiveness as the predicate device, and have been appropriately evaluated using the same methods used to evaluate the predicate. Further, The Eeva System, Model EVS2210 does not introduce any changes to the blastocyst prediction model or to the meaning of “High” and “Low” test results.

1.4 PERFORMANCE DATA

The following performance data were provided in support of the substantial equivalence determination, and include the same testing performed for the predicate device and required by the special controls for Assisted Reproduction Embryo Image Assessment Systems.

1.4.1 Biocompatibility/Materials

Eeva System materials do not come in direct or indirect contact with the patient during use. Therefore, biocompatibility testing of device materials was not necessary to assess device safety.

1.4.2 Shelf Life/Sterility

The Eeva System is a non-sterile device. Therefore, sterilization validation information was not necessary to assess device safety. The device does not have a stated shelf life, which, based upon the nature of the device components, is acceptable.

1.4.3 Software

Software verification and validation testing were conducted and documentation was provided as recommended for a moderate level of concern device, as outlined in FDA's Guidance for the Content of Premarket Submissions for Software Contained in Medical Devices (May 11, 2005).

The testing conducted to validate device software is described in Section 1.4.4, Non-Clinical/Bench Studies.

1.4.4 Non-Clinical/Bench Studies

In addition to the testing described above, the sponsor conducted a series of non-clinical performance testing to demonstrate that the Eeva System would perform as anticipated, or in some instances leveraged testing performed on the predicate device as there had been no design or technological change. Testing is summarized in Table 2, below.

Table 2. Summary of Non-Clinical/Bench Studies

Test	Purpose and Reference (as applicable)
Embryotoxicity Assessment	
Mouse Embryo Assay (MEA)	To evaluate whether the Eeva System offers appropriate conditions within the incubator for embryo culture.
Cleaning and Disinfection	
Cleaning	To evaluate the reprocessing procedures for the Eeva System (microscope, cable, stopper) to ensure it can be properly cleaned by manual methods (reference AAMI TIR12: 2010 & AAMI TIR30:2011).
Disinfection	To evaluate the reprocessing procedures to ensure they are adequate to properly disinfect the Eeva System (microscope, cable, stopper) (reference AAMI TIR12: 2010 & AAMI TIR30:2011).
Media Spill	To evaluate the process for cleaning the Eeva Scope in case of a media spill and to ensure it is sealed from any ingress of fluid that would impact functionality.
Package Integrity and Transit Testing	
Eeva System	To evaluate if the Eeva System palletized shipping configuration can withstand simulated transit per ASTM D 4169-09.
EMC and Electrical Safety Testing	
EMC Testing	To evaluate whether the Eeva System meets the EMC requirements of IEC 60601-1-2:2007.
Electrical Safety Testing	To evaluate whether the Eeva System meets the product safety requirements of BS EN 60601-1: 2006 + A11:2011.
Simulated Use	

Table 2. Summary of Non-Clinical/Bench Studies

Installation Verification	To verify that the Eeva System can be installed and functionality verified in less than 8 hours.
System Usability	To verify that the Instructions for Use can be understood by the user and that the results of each action are stated in the IFU.
Simulated Use	To verify the Eeva System successfully operates in a real time simulated use procedures, and to verify that intermittent incubator door opening does not negatively impact imaging and embryo prediction.
Performance Testing - Bench	
Hardware	
Light Exposure and Output	To document the amount of light exposure from the Eeva microscope compared to a traditional IVF microscope. The additive light exposure from the Eeva System to the overall light exposure expected during standard assisted reproductive microscopy should not result in excessive added illumination of embryos during five days of imaging.
Hardware Controls	To verify that the hardware controls in the Eeva System properly limit the microscope lamp LED, alignment LED and LCD, camera and motor, and turn them off if the limits are exceeded.
Microscope, Scope Screen, Computer Hardware, Uninterruptable Power Supply, and Printer	To verify various microscope, incubator interface, scope screen, computer storage, accessory parameters and interactions.
Software	
Eeva System Software Verification	To verify integrated system operation and various camera, workflow and Eeva Station component requirements.
Software Fail-Safe Verification	To verify safety related parameters for the LED, LCD, Camera and Motor, as well as various workflow and Eeva Station component requirements of the configuration, microscope user interface, focus motor, LCD display and Eeva Station software components.
Algorithm Software Validation	To validate the ability of the Eeva System software to predict blastocyst formation.
Algorithm Software Verification	To verify the Eeva System image analysis
Algorithm Reproducibility	To evaluate the reproducibility of the Eeva System algorithm software.
Simulated Clinical Use	To evaluate clinical performance of the Eeva System software including determination of sensitivity, specificity, positive predictive value, negative predictive value, and odds ratio.

1.4.5 Performance Testing – Animal

In vivo animal studies were not conducted in support of the Eeva System, nor deemed necessary to support the safety and effectiveness of the Eeva System.

1.4.6 Clinical Studies

No new clinical testing was performed for the subject device. Clinical data submitted for the predicate device is representative of expected safety and effectiveness of the Eeva System Model EVS2210.

1.5 SUBSTANTIAL EQUIVALENCE CONCLUSION

Auxogyn's analyses show that the Intended Use, principles of operation, and conditions of use are identical for the subject and predicate devices, and that changes in technical characteristics do not raise different questions of safety and effectiveness. The Indications for Use statement has been updated to include a new feature allowing collection of additional time-lapse images until Day 5 of development for embryos not selected for transfer, to allow monitoring of continued embryo development. The scientific methods for evaluating the Eeva System's technological characteristics are the same as those used to evaluate the predicate, and completed testing meets the requisite special controls. The results of the testing performed provide evidence that the Eeva System Model EVS2210 meets device specifications and that the System performance is similar to the predicate device. Finally, simulated clinical testing (mechanical analysis) demonstrates that the Eeva System Model EVS2210 is informative, and the average specificity, sensitivity, positive predictive value, and negative predictive value performance are substantially equivalent in the adjunctive use of the subject and predicate devices. Based upon this analysis, Auxogyn asserts that the Eeva System Model EVS2000 and Eeva System Model EVS2210 are substantially equivalent.