510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

A. 510(k) Number:

K182049

B. Purpose for Submission:

New device

C. Manufacturer and Instrument Name:

ExCell Company LLC

ExCellerator Cervical Collection Device

D. Type of Test or Tests Performed:

Not applicable.

E. System Descriptions :

1. Device Description :

The ExCellerator Cervical Collection Device is a non-sterile, single use, disposable cervical sampling device (spatula), comprised of inert food grade polypropylene plastic, intended for sampling the ectocervix during the cervical sample collection procedure. Additionally, it aids in a more complete transfer of the cytological sample collected with an IVD labeled endocervical brush (cytobrush) into the PreservCyt vial for the preparation of ThinPrep Pap test slides.

2. Principles of Operation:

For collection of cytological samples from the ectocervix, apply the dog-bone end of the spatula to the cervix and, while maintaining firm contact, rotate it 360 degrees to collect material from the entire ectocervical surface. Remove the spatula and place directly into the vial of PreservCyt Solution. Transfer the spatula sample into the vial by swirling the dog-bone end of the spatula vigorously ten (10) times in the PreservCyt Solution. Leave the spatula in the vial.

For transferring the collected specimen into the PreservCyt solution, after sampling the endocervix using an IVD labeled endocervical brush, transfer the brush sample into the vial by placing the cytobrush into the PreservCyt solution per instructions specified in the cytobrush label or ThinPrep Pap test label. Then, run the brush down along the "rails" of the ExCellerator spatula, and while keeping them both submersed, move the brush

bristles in-and-out of the hole in the ExCellerator spatula 10 times while rotating the shaft between the fingertips. Swirl the brush vigorously to release additional material. Remove the brush and discard it. Swirl the ExCellerator spatula in the solution up to five more times, then discard it. Replace and tighten the vial cap so that the torque line on the cap passes the torque line on the vial.

3. Modes of Operation:

   Does the applicant's device contain the ability to transmit data to a computer, webserver, or mobile device?

   Yes _____ or No ____X____

   Does the applicant's device transmit data to a computer, webserver, or mobile device using wireless transmission?

   Yes _____ or No ____X____

4. Specimen Identification:

   Not applicable.

5. Specimen Sampling and Handling:

Collected specimens are placed in PreservCyt solution and transported to the laboratory.

6. Calibration:

   Not applicable.

7. Quality Control:

   Not applicable.

8. Software:

   FDA has reviewed applicant's Hazard Analysis and Software Development processes for this line of product types:

   Yes_____ or No____X____

   Not applicable since the device is a cytological sampling device.

F. Regulatory Information:

1. Regulation section:

21 CFR 884.4530 Obstetric-gynecologic specialized manual instruments.

2. Classification:

   Class II

3 Product code:

   HHT – Spatula, cervical, cytological

4. Panel:

   Obstetrics/Gynecology

G. Intended Use:

The ExCellerator Cervical Collection Device is a cervical spatula intended for collecting ectocervical specimens for the ThinPrep Pap test. The device is also intended to be used to aid in a more complete transfer of the specimen material from the endocervical brush (cytobrush) to the PreservCyt solution for ThinPrep Pap testing.

The ExCellerator device must be used with an IVD labeled endocervical brush.

1. Indications for Use:

   See Intended Use above.

2. Special Conditions for Use Statement(s):

   For prescription use only.

   It is not intended for use in pregnant women.

   "Caution: For use by medical professionals only."

H. Substantial Equivalence Information:

1. Predicate Device Name(s) and 510(k) numbers:

   Pap Smear Kit consisting of a cytobrush and spatula (K861389).

2. Comparison with Predicate Device:

Similarities		
Item	Device	Predicate
Material	Plastic	Same
Dimensions	Overall Length: 7.12” Paddle End Width: .5” Head End Width: .6875”	Same Same Same
Supplied	Non-Sterile-Disposable	Same

Differences		
Item	Device	Predicate
Technological Characteristics	Additional oblong opening 0.250x0.130” near paddle end of the spatula	No additional oblong opening
Intended Use	The ExCellerator Cervical Collection Device is a cervical spatula intended for collecting ectocervical specimens for the ThinPrep Pap test. The device is also intended to be used to aid in a more complete transfer of the specimen material from the endocervical brush (cytobrush) to the PreservCyt solution for ThinPrep Pap testing. The ExCellerator device must be used with an IVD labeled endocervical brush.	Predicate device (spatula) is intended for ectocervical sampling

I. Special Control/Guidance Document Referenced (if applicable):

ISO 10993-5: Biological evaluation of medical devices – Part 5: Tests for *in vitro* cytotoxicity (2009).

ISO 10993-10: Biological evaluation of medical devices – Part 10: Tests for irritation and skin sensitization (2010).

ISO 10993-12: Biological evaluation of medical devices – Part 12: Sample preparation and reference material (2012).

J. Performance Characteristics*:*

1. Analytical Performance:

a. Accuracy:

Not applicable.

b. Precision/Reproducibility:

Not applicable.

c. Linearity:

Not applicable.

d. Carryover:

Not applicable.

e. Interfering Substances:

Not applicable.

2. Other Supportive Instrument Performance Data Not Covered Above:

The following clinical and non-clinical studies were performed to assess the clinical performance of the subject device:

a) Real World Evidence (RWE) Data Procurement and Analysis

RWE data was collected to demonstrate the equivalency of specimen adequacy and diagnoses of Pap test per The Bethesda System (TBS) for reporting cervical or vaginal cytologic diagnoses when using ExCellerator spatula compared to the predicate device (Pap-Perfect Plastic Spatula, K861389).

RWE data was collected from 399,821 Pap tests performed in two CLIA certified clinical laboratories for years 2003, 2006 and 2008. The two participating laboratories had annual volume between 88,800 and 90,400, and 34,200 and 57,200 Pap tests, respectively. In 2003, only the predicate device (Pap Perfect Spatula) was used for the Pap tests, however, in 2006, 50% of Pap test specimens were collected with the predicate device and 50% were collected using the ExCellerator spatula. In 2008, all Pap test specimens were collected with the ExCellerator spatula. The ExCellerator spatula was used according to the Instructions for Use. The dataset (as shown in Tables 1 and 2) includes data on specimen adequacy and on TBS diagnostic categories for Pap test specimens collected with both the predicate and the subject device. ThinPrep Pap test was used on all specimens. In 2003, all specimens were reviewed by manual microscopy and in 2006 and 2008 all specimens were reviewed using the ThinPrep Imaging System.

Specimen adequacy and diagnoses were also compared with benchmark College of American

Pathologists (CAP) National Percentage Data published on 27 September 2007 and 17 June 2010.

Table 1: Specimen Adequacy and Diagnoses of Pap Tests* using ExCellerator Spatula

			Unsat	Neg	LSIL	HSIL	ASC-US	ASC-H	AGC	CA
Collection Device Used**	**Year**	**Total Cases**	#	#	#	#	#	#	#	#
Pap Perfect Spatula	2003	124238	1362 1.1%	112243 90.3%	4154 3.3%	706 0.6%	5295 4.3%	298 0.2%	162 0.1%	18 0.0%
~50% Pap Perfect Spatula (76, 289)/ ~50% Ex Cellerator (70, 864)	2006	129506	949 0.7%	112143 86.6%	5460 4.8%	785 0.8%	9568 7.2%	413 0.3%	172 0.1%	16 0.0%
Ex Cellerator	2008	146077	742 0.5%	125608 86.0%	6967 4.8%	1148 0.8%	10527 7.2%	745 0.5%	323 0.2%	17 0.0%

Note:

***Results based on The Bethesda System (TBS) for reporting cervical or vaginal cytologic diagnoses:**

ASC-US: Atypical Squamous Cells of Undetermined Significance
ASC-H: Atypical Squamous Cells, Cannot Rule Out High Grade Squamous Intraepithelial Lesion
LSIL: Low Grade Squamous Intraepithelial Lesion
HSIL: High Grade Squamous Intraepithelial Lesion
ASC/SIL: ASCUS to SIL Ratio
AGC: Atypical Glandular Cells
UNSAT: Unsatisfactory

**In year 2006 approximately 50% of pap smears were collected with Pap Perfect Spatula and 50% with the ExCellerator Cervical Collection Device. Breakdown by device type data are not available.

Table 2: College of American Pathologists Benchmarks on ThinPrep Laboratory Percentile-Reporting Rate in 2007*

CATEGORY	5th	10th	25th	50th	75th	90th	95th
ASC-US (%)	1.7	2.5	3.3	4.9	6.7	9.6	11.5
ASC-H (%)	0.0	0.1	0.2	0.3	0.6	1.0	2.0
LSIL (%)	1.1	1.5	2.2	3.0	4.0	6.0	7.3
HSIL (%)	0.1	0.2	0.4	0.6	0.9	1.3	2.0
ASC/SIL	0.7	0.8	1.1	1.5	2.0	2.5	3.4
AGC (%)	0.0	0.0	0.1	0.2	0.3	0.9	1.4
UNSAT	0.1	0.3	0.6	1.1	1.7	2.9	3.4

Note: *College of American Pathologists. (2007). Cytopathology Checklist: CYP.07600. Rev. 09/27/2007

Table 3: College of American Pathologists Benchmarks on ThinPrep Laboratory Percentile-Reporting Rate in 2010*

CATEGORY	5th	10th	25th	50th	75th	90th	95th
ASC-US (%)	2.2	2.8	3.7	4.8	6.7	9.4	12.1
ASC-H (%)	0.0	0.1	0.2	0.3	0.4	0.7	1.0
LSIL (%)	1.2	1.5	2.0	2.8	3.7	5.0	6.0
HSIL (%)	0.1	0.2	0.3	0.4	0.7	1.1	1.5
ASC/SIL	0.7	0.9	1.2	1.6	2.2	2.8	3.2
AGC (%)	0.0	0.0	0.1	0.1	0.3	0.5	0.7
UNSAT	0.3	0.4	0.7	1.1	1.8	2.7	3.4

Note: *College of American Pathologists (2010). Cytopathology Checklist: CYP.07600. Rev. 06/17/2010

As compared to College of American Pathologists (CAP) benchmarks, RWE data showed comparable performance of the ExCellerator cervical collection device as a cervical spatula to the predicate device. Use of the ExCellerator cervical collection device resulted in a 54% reduction in unsatisfactory rates and increased detection in key diagnostic categories while ASCUS/SIL ratio remains within 20th percentile of the CAP National Data.

b) Validation Study

This study assessed the performance of the subject device when used as an aid in transferring samples from the IVD labeled cytobrush into the PreservCyt solution.

Cervical specimens were collected from 108 patients for a routine Pap test using an FDA cleared spatula and endocervical brush. These specimens were processed for Pap testing per standard of care. Following the routine Pap test collection, rather than discarding the cytobrush, the clinician transferred the residual specimen material from the cytobrush into a new vial containing the PreservCyt solution using the ExCellerator spatula and the ExCellerator technique, as described in Principles of Operation. The specimen was then sent to the study lab, processed and assessed for adequacy according to TBS 2014.

The Study results showed that out of 108 validation samples tested, 102 (94%) yielded satisfactory pap smears according to TBS 2014 and thus met the study acceptance criterion. This study demonstrated that the ExCellerator spatula is effective in aiding in more complete transfer of cytological material from the endocervical brush (cytobrush) into the PreservCyt solution.

c) Biocompatibility Studies

The subject device is a surface device that contacts the skin and mucosal membrane for a limited contact duration (<24 hour). Per the FDA Guidance document, Use of International Standard ISO 10993-1, *"Biological evaluation of medical device – Part 1: Evaluation and testing within a risk management process"*, the following tests are conducted:

- Cytotoxicity (ISO 10993-5: 2009)
- Sensitization (ISO 10993-10: 2010)
- Vaginal Irritation or Intracutaneous Reactivity (ISO 10993:10)

Cytotoxicity

The MEM (Minimum Essential Medium) Elution Cytotoxicity Assay was performed to determine the cytotoxic response from the ExCellerator Cervical Collection Device. The study was conducted in compliance with the International Organization for Standardization (ISO) 10993-5: 2009. The test article (ExCellerator) was extracted in cell culture media which was then plated onto the L-929 mouse fibroblast cell monolayer. The test and control article extracts were plated onto the cell monolayer. The monolayers were evaluated for cell death at three time points: 24, 48 and 72 hours (+/- 3 hours).

Validity Criteria: The control results met the validity criteria and the test was considered valid. No reactivity was observed in the Control Article 01 (cell media control) wells and Control Article 02 (negative control) wells as they both received a grade of '0' at 72 hours and were considered non-toxic. Complete or nearly complete destruction of the cell monolayer was observed in Control Article 03 (positive control) wells as they received a grade of '4' at 72 hours and was considered cytotoxic. Therefore, the validation criteria were met.
Final Result: No reactivity was observed; no cell lysis or reduction of cell growth was observed in the triplicate wells. The test article received a grade of '0' at 24, 48 and 72 hours and was considered Non-Cytotoxic.
Study Outcome: Pass (Non-Cytotoxic).

Sensitization

The Guinea Pig Maximization Test was performed to evaluate the sensitization or allergenic potential of the ExCellerator Cervical Collection Device. This test is used as a method for screening contact allergens in guinea pigs. The results are used as predictive measures for detecting potential sensitizers in humans. The study was conducted in

compliance with the International Organization for Standardization (ISO) 10993-10: 2010. A total of 18 animals (12 test and 6 control) per test article (ExCellerator) were used. The study was comprised of two induction phases (intradermal and topical) and one challenge phase. The intradermal induction phase (Induction I) used a series of intradermal injections consisting of Freund's complete adjuvant and the test article and negative control extract and/or selected solvent with Freund's to enhance the state of immunological activity of the animal to the material of interest. Prior to the start of the topical induction phase (Induction II), a pretreatment of 10% sodium lauryl sulfate (SLS) was used as an inflammatory precursor to maximize uptake of test article or negative control applied to the treatment site. Subsequently, within 24 +/- 2 hours, the test article was applied to the intrascapular region of each animal using a patch (filter paper) covering the Induction I injection sites. After the induction phases, the animals were on an observatory period for 14 +/- 1 day. All test and control animal groups were then challenged with the test article (challenge phase). The test article and negative control were administered to the upper right and left flanks of each animal for 24 +/- 2 hours. The challenge skin sites were then observed for evidence of skin sensitization at 24 +/- 2 hours and 48 +/- 2 hours after the removal of the dressings. All the animals on study were euthanized at the end of the survival period.
Validity Criteria: Magnusson and Kligman grades of 1 or greater in the test group generally indicate sensitization, provided grades of less than 1 are seen in control animals. The outcome of the test is presented as the frequency of positive challenge results in the test and control animals. All assay validity criteria were met.
Final Result: The overall pattern, intensity and duration of the reactions in the test group were compared with the negative control group. The overall frequency of the test scores was similar to the control scores. The test article showed no evidence of delayed dermal contact sensitization in the guinea pig.
Study Outcome: Completed (Non-sensitizer)

Irritation

Vaginal Mucosal Irritation Test was performed to evaluate the irritation potential of the ExCellerator Cervical Collection Device. This test is used as a method for screening irritants in rabbits. The results are used as predictive measures for detecting potential irritants in humans. The study was conducted in compliance with the International Organization for Standardization (ISO) 10993-10: 2010. A total of 6 animals per extract were used. At a dosage regimen of 1 mL per day for five consecutive days, the test article (ExCellerator) was administered intravaginally. Observations were made prior to initial dosing, at 24 +/- 2 hours after the initial application, immediately prior to each subsequent treatment and prior to euthanasia. The appearance of vaginal opening and perineum was documented for signs of discharge, erythema and edema. At 24 +/- 2 hours after the final dose the animals were euthanized. The entire vagina was dissected free, opened longitudinally and examined for signs of irritation, injury to the epithelial layer of tissue and necrosis. The animals were processed for histological examination performed by the study pathologist. The results of the study were interpreted based upon the frequency of animals displaying irritation responses.
Validity Criteria: All assay validity criteria were met.

Final Test Score: To obtain the final irritation index, the microscopic evaluation grades for each group were added and the sum was divided by the number of observations to obtain a test group average. The control group average was subtracted from the test group average to obtain the irritation index. The final test article score was 0 for Normal Saline (NS) and 0 for Sesame Seed Oil (SSO), indicating that an irritation response was not observed for either extract.
Study Outcome: Completed (Non-irritant)

Based on the data provided, the conducted biocompatibility tests are acceptable.

d) Mechanical Tests

Structural Assessments – Summary:

Two groups of ExCellerator devices (A-new, B-aged 7 years), were assessed for Static Bend (Static Cantilever Bend Test), Static Tension and Static Torsion.

Structural Assessments – Criteria:

Static Bend
- Clinically Relevant Load (CRL): Ranges from .01 - .05 lbs. or .044 - .222 N
- Acceptance Criteria: At Max CRL of .222 N - Device experiences $\leq$ 2-3mm displacement (bend)

Static Tension
- Clinically Relevant Force (CRF): Ranges from .10 - .50 lbs. or .44 - 2.22 N
- Acceptance Criteria: At Max CRF of 2.22 N - Device experiences $\leq$ 1mm deformation

Static Torsion
- Clinically Relevant Torque (CRT): Ranges from .01 - .05 inch-lbs. or .0011 - .0056 Nm
- Acceptance Criteria: At Max CRT of .0056 Nm - Device experiences $\leq$ 45 degrees displacement (angular)

Structural Assessments – Results:

Static Bend
- Acceptance Criteria: $\leq$ 2-3mm displacement (bend)
- Group Mean Displacement Results
    - Group A (New – Produced 2017): Mean Displacement - 0.147mm
    - Group B (Aged – Produced 2009): Mean Displacement - 0.157mm

Static Tension
- Acceptance Criteria: $\leq$ 1mm deformation
- Group Mean Deformation Results
    - Group A (New – Produced 2017): Mean Deformation - 0.0147mm
    - Group B (Aged – Produced 2009): Mean Deformation - 0.0137mm

Static Torsion

- Acceptance Criteria: ≤ 45.00 degrees displacement (angular)
- Group Mean Angular Displacement Results
    - Group A (New – Produced 2017): Mean Displacement - 14.44 degrees
    - Group B (Aged – Produced 2009): Mean Displacement - 11.19 degrees

Mechanical Testing Interpretation:
Mirrored structural assessment of New (2017) and (Aged 2009) devices – Results:

- No indication of any meaningful variance in performance between the groups
- No individual device from either group approaches failure to acceptance criteria

All tests met the acceptance criteria.

K. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Parts 801 and 809, as applicable.

L. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.