July 31, 2019

Hycor Biomedical
Kaitlyn Weinkauf
Regulatory Affairs Associate
7272 Chapman Avenue
Garden Grove, California 92841

Re: K191510
Trade/Device Name: Noveos Immunoanalyzer System, Noveos Specific IgE (slgE), Capture Reagent D002, Dermatophagoides farinae
Regulation Number: 21 CFR 866.5750
Regulation Name: Radioallergosorbent (Rast) Immunological Test System
Regulatory Class: Class II
Product Code: DHB
Dated: June 4, 2019
Received: June 6, 2019

Dear Kaitlyn Weinkauf:

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,

Doug Jeffery, Ph.D.
Chief
Division of Immunology
and Hematology 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)*
K191510

Device Name
NOVEOS Specific IgE (sIgE) Assay,
Capture Reagent House Dust Mite D002, Dermatophagoides farinae

Indications for Use *(Describe)*

The NOVEOS Specific IgE Assay is an in vitro quantitative assay for the measurement of allergen specific IgE in human serum. NOVEOS Specific IgE Assay is to be used with the NOVEOS Immunoassay Analyzer. It is intended for use as an in vitro diagnostic aid in the clinical diagnosis of IgE mediated allergic disorders in conjunction with other clinical findings and is to be used in clinical laboratories.

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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510(k) Summary

This 510(k) Summary is prepared in accordance with the requirements of 21 CFR Part 807.92.

Date of Preparation:	31-July-2019
Manufacturer:	HYCOR Biomedical, LLC 7272 Chapman Avenue Garden Grove, CA 92841
Contact Person:	Kaitlyn Weinkauf, MS Regulatory Affairs Associate 7272 Chapman Ave Garden Grove, CA 92841 (714) 933-3020 kweinkauf@hycorbiomedical.com

Device Name:

NOVEOS™ Specific IgE (sIgE) Assay

Capture Reagent House Dust Mite – D002, *Dermatophagoides farinae*

Classification

NOVEOS™ Specific IgE (sIgE) Assay

Product Code DHB

Class II

21 CFR § 866.5750

Substantial Equivalence to: K051218

ImmunoCAP Specific IgE Assay and ImmunoCAP Specific IgE Conjugate 100 and Conjugate 400

ImmunoCAP Allergen D2, House dust mite

Indications for Use

The NOVEOS™ Specific IgE Assay is an *in vitro* quantitative assay for the measurement of allergen specific IgE in human serum. NOVEOS™ Specific IgE Assay is to be used with the NOVEOS™ Immunoassay Analyzer. It is intended for use as an *in vitro* diagnostic aid in the clinical diagnosis of IgE mediated allergic disorders in conjunction with other clinical findings and is to be used in clinical laboratories.

General Description

Reagents

The IgE Common Kit includes: Diluent A, Conjugate IgE, Substrate A, Substrate B, Fluo Beads™. Other required and recommended reagents include the allergen specific Capture Reagent, IgE Calibrator Set (6 levels - Cal 0.07 kU/L, Cal 0.35 kU/L, Cal 0.70 kU/L, Cal 3.5 kU/L, Cal 17.5 kU/L, Cal 100 kU/L), Calibrator Antibody IgE, Probe Wash Pack, Wash Buffer Concentrate, Cuvette Wash Pack, IgE Negative Control Pack, and IgE Positive Control Pack.
The liquid ready-to-use reagents demonstrate on-board stability of up to 48 hours for calibrators and controls from 5 to 28 days for common assay components.

Assay Principle

The NOVEOS™ Specific IgE Assay is an immunometric, chemiluminescent procedure for the quantitative determination of IgE of known specificity in human serum samples. It employs fluorescent labelled magnetic, streptavidin coated microparticles which are incubated with a biotinylated allergenic capture reagent, patient sample and monoclonal anti-human IgE antibody: horseradish peroxidase conjugate. After a final wash, the resulting complex is incubated with the enzyme substrate and a chemiluminescent signal is generated, the magnitude of which is proportional to the concentration of IgE in the patient sample.

The concentration of allergen-specific IgE is determined from a standard curve, which is traceable to the World Health Organization (WHO) reference reagent serum Immunoglobulin E (IgE) 11/234.

Device Comparison

NOVEOS™ Specific IgE Assay on the NOVEOS™ Immunoassay Analyzer is comparable to the predicate device, ImmunoCAP Specific IgE on the ImmunoCAP 100.

Similarities and Differences		
Attribute	**NOVEOS sIgE, D002**	**Predicate Phadia ImmunoCAP K051218**
Intended Use	The NOVEOS™ Specific IgE Assay is an *in vitro*	ImmunoCAP Specific IgE is an *in vitro* quantitative

	quantitative assay for the measurement of allergen specific IgE in human serum. NOVEOS™ Specific IgE Assay is to be used with the NOVEOS™ Immunoassay Analyzer. It is intended for use as an *in vitro* diagnostic aid in the clinical diagnosis of IgE mediated allergic disorders in conjunction with other clinical findings and is to be used in clinical laboratories.	assay for the measurement of allergen specific IgE in human serum or plasma (EDTA or Na-Heparin). ImmunoCAP Specific IgE is to be used with instruments Phadia 100, Phadia 250, Phadia 1000, Phadia 2500 and Phadia 5000. It is intended for *in vitro* diagnostic use as an aid in the clinical diagnosis of IgE mediated allergic disorders in conjunction with other clinical findings, and is to be used in clinical laboratories
Specimen Type	Serum	Serum or plasma (EDTA, Na Heparin)
Sample Volume	4 µL	40 µL
Assay Type	Quantitative	Same
Detection Antibody	Horseradish peroxidase conjugated mouse anti-human IgE monoclonal antibody	β-Galactosidase-anti-human IgE (mouse monoclonal antibody)
Detection Limit	LoB: 0.03 kU/L LoD: 0.05 kU/L LoQ: 0.17 kU/L	LoB: 0.001 kU/L LoD: 0.02 kU/L LoQ: 0.10 kU/L
Laboratory Setting	Clinical Laboratory	Same
Assay Principles	Fluorescence adjusted, immunometric, chemiluminescent assay	Fluoroenzyme-immunoassay
Solid Phase	Magnetic microparticles	Cellulose derivative
Calibrator Traceability	World Health Organization (WHO) reference reagent serum Immunoglobulin E (IgE) 11/234	Same
Calibration Method	Heterologous interpolation based on Total IgE calibration curve	Same

Number of Calibrators	Six	Same
Calibrator Levels	0, 0.35, 0.7, 3.5, 17.5 and 100 kU/L	Same
Assay Range	0.17-100 kU/L	0.1-100 kU/L
Reaction Temperature	37°C	Same
Time to First Result	1 hour 45 minutes	1 hour 45 minutes to 2 hour 30 minutes depending on model

Data

The following table shows percent agreements between the NOVEOS sIgE and the ImmunoCAP results using a cut-off value of 0.35 kU/L by testing a total of 234 samples including 97 skin prick test positive samples.

NOVEOS sIgE D002	ImmunoCAP d2		
	Positive	Negative	Total
Positive	96	0	96
Negative	6	132	138
Total	102	132	234

Positive percent agreement (PPA): 94.1% (95% CI: 87.8% to 97.3%)
Negative percent agreement (NPA): 100.0% (95% CI: 97.2% to 100.0%)
Total percent agreement (TPA): 97.4% (95% CI: 94.5% to 98.8%)

Clinical Performance

A clinical study was performed to support the diagnostic performance of the NOVEOS sIgE Assay for House Dust Mite D002. The clinical study comparing NOVEOS sIgE results to the allergic status of n=187 samples from patients was carried out in accordance with CLSI guideline I/LA20-A3*, Analytical Performance Characteristics, Quality Assurance, and Clinical Utility of Immunological Assays for Human Immunoglobulin E (IgE) Antibodies of Defined Allergen Specificities*. A total of 75 samples with allergic status was confirmed by skin-prick testing and clinical history, and the other 112 samples from healthy, non-atopic donors with no reported allergy. Results are expressed as positive when a sample with a sIgE value

is greater than or equal to 0.35 kU/L or negative when a sample with an sIgE value is less than 0.35 kU/L.

NOVEOS sIgE, D002	Clinical Diagnosis		
	Atopic	Non-atopic	Total
Positive	58	0	58
Negative	17	112	129
Total	75	112	187

Clinical Sensitivity: 77.3% (95% CI 66.7% to 85.3%)
Clinical Specificity: 100.0% (95% CI 96.7% to 100.0%)

Imprecision/Reproducibility

Repeatability and within-laboratory precision were determined in accordance with CLSI guideline EP05-A3: *Evaluation of Precision Performance of Quantitative Measurement Methods: A Statistical Approach*. Samples were assayed in duplicate in 2 runs per day for 20 days on 3 NOVEOS™ Immunoassay Analyzers for a total of 80 replicates per sample. The SD and % CV of the within-run, between-run, between-day, and total imprecision were calculated for each sample and results are summarized in the following table:

Sample	Mean (kU/L)	Within-Run		Between-Run		Between Day		Total	
		SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
PP02	0.47	0.02	4.20%	0.01	2.60%	0.02	3.60%	0.03	6.10%
PP03	2.11	0.06	3.00%	0.06	2.60%	0.08	3.80%	0.12	5.50%
PP04	15.31	0.49	3.20%	0.75	4.90%	0.33	2.20%	0.96	6.30%
PP08	28.93	1.15	4.00%	1.35	4.70%	1.24	4.30%	2.16	7.50%
PP10G	81.8	4.69	5.70%	2.01	2.50%	5.21	6.40%	7.29	8.90%
LoQ01	0.22	0.02	8.40%	0.00	0.00%	0.01	5.10%	0.02	9.80%
LoQ03	0.22	0.02	7.90%	0.01	3.40%	0.01	5.10%	0.02	10.00%

LoQ04	0.17	0.01	3.20%	0.01	4.50%	0.01	6.30%	0.01	8.40%

Lot-to-lot imprecision was evaluated with three different lots of the NOVEOS™ sIgE Assay, D002, using a panel of eight (three negative and five positive) serum samples in two replicates per run, two runs per day for twenty days (for a total of 240 replicates per sample). The results are summarized in the following table:

Sample	Mean (kU/L)	Within-Run		Between-Day		Between-Lot		Total	
		SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
PP02	0.42	0.02	3.7%	0.01	3.2%	0.05	11.5%	0.06	13.3%
PP03	1.96	0.07	3.8%	0.06	2.9%	0.16	8.1%	0.19	9.9%
PP04	13.54	0.52	3.8%	0.36	2.7%	1.79	13.2%	1.96	14.5%
PP08	26.68	1.26	4.7%	0.91	3.4%	2.40	9.0%	3.06	11.5%
PP10G	73.67	4.41	6.0%	3.17	4.3%	7.21	9.8%	9.40	12.8%
LoQ01	0.20	0.01	7.2%	0.01	3.8%	0.02	8.2%	0.02	11.6%
LoQ03	0.20	0.01	6.1%	0.01	4.2%	0.02	8.2%	0.02	11.6%
LoQ04	0.16	0.01	4.5%	0.02	9.8%	0.01	6.5%	0.02	13.1%

Site-to-site reproducibility was evaluated by testing a panel of 4 patient pools (one negative and three positive) and 2 controls (run as samples) at three sites using the same lot of reagent. Each sample was tested in five replicates per run, one run per day for five days on one NOVEOS™ Immunoassay Analyzer at each site (for a total of 75 replicates per sample). The results are summarized in the following table:

Panel	Mean (kU/L)	Within-Run (Repeatability)		Between-Day		Between-Site		Reproducibility	
		SD	CV	SD	CV	SD	CV	SD	CV
LYP	12.75	0.66	5.2%	0.29	2.3%	0.14	1.1%	0.73	5.7%
NOV	25.40	1.63	6.4%	0.41	1.6%	0.73	2.9%	1.83	7.2%
PP41	0.21	0.01	4.8%	0.01	4.8%	0.01	4.8%	0.02	9.6%
PP42	0.38	0.02	5.3%	0.01	2.6%	0.01	2.6%	0.03	7.9%
PP43*	2.58	0.25	9.7%	0.04	1.5%	0.16	6.2%	0.30	11.6%
PP53	76.42	5.20	6.8%	1.75	2.3%	2.06	2.7%	5.86	7.7%
*includes an outlier with a value of 4.43 kU/L									

Linearity

Linearity was evaluated in accordance with CLSI guideline I/LA20-A3, *Analytical Performance Characteristics, Quality Assurance, and Clinical Utility of Immunological Assays for Human Immunoglobulin E (IgE) Antibodies of Defined Allergen Specificities*. Dilutions of D002 specific IgE samples with analyte concentrations from 0.04 to 126 kU/L, fully encompassing the measuring interval of 0.10 to 100 kU/L were used to calculate the linear regression statistics below.

Dilution Range (kU/L)	Regression Equation	Slope (95% CI)	Intercept (95% CI)	R^2
0.04-126.49	y=1.00x + 0.47	0.99-1.01	-0.90 to -0.05	1.000

INTERFERENCE

Interference testing was carried out in accordance with CLSI guideline EP7, *Interference Testing in Clinical Chemistry; Approved Guideline – Third Edition*. The following substances show less than or equal to 10% interference with the NOVEOS sIgE Assay, D002.

Substance	Concentration
Hemoglobin	200 mg/dL
Conjugated Bilirubin	30 mg/dL
Unconjugated Bilirubin	20 mg/dL
Lipemia	3000 mg/mL
Biotin	1200 µg/L

Diphenhydramine	19.6 µmol/L
Methylprednisolone	1000 ng/mL
Ranitidine	19.1 µmol/L
Omalizumab	0.12 mg/mL
Human Serum Albumin	120 mg/mL
Rheumatoid Factor	513 IU/mL

Cross-Reactivity

Cross-reactivity testing was carried out in accordance with CLSI guideline EP7, *Interference Testing in Clinical Chemistry; Approved Guideline – Third Edition*. The cross-reactivity with other human immunoglobulins is non-detectable at physiological concentrations of IgA, IgD, IgM and IgG.

Cross-Reactivity (Analytical Specificity)

Specificity of NOVEOS sIge Assay, D002, was demonstrated by assessing Competitive Inhibition in accordance with CLSI I/LA20, *Analytical Performance Characteristics, Quality Assurance, and Clinical Utility of Immunological Assays for Human Immunoglobulin E Antibodies of Defined Allergen Specificities*, *Third Edition*. For D002, all the related (D070, storage mite) and unrelated allergens (F001, egg white; G006, timothy grass; and W003, giant ragweed) assessed show <15% inhibition to D002.

Detection Limit

Limit of Blank (LoB), Limit of Detection (LoD) and Limit of Quantitation (LoQ) were estimated in accordance with CLSI guideline EP17-A2, *Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition*. A panel of analyte-free and low IgE samples were assayed on multiple reagent lots and instruments across six days. A total of 90 replicates of analyte-free and 300 replicates of low IgE sample were evaluated from which LoB and LoD were determined to be 0.03 kU/L, and 0.05 kU/L, respectively. The LoQ is defined as the lowest analyte concentration with a within-lab precision of 20%CV. A panel of low analyte samples were assayed in replicates of five in 2 runs per day for 5 days, 50 replicates total. The LoQ was determined to be 0.17 kU/L.

Reference Range

The expected value is negative (<0.35 kU/L) for a specific allergen in a non-atopic person. Each laboratory professional should establish its own expected value. This expected value/reference range of NOVEOS™ sIgE,

D002 in the normal population was verified by testing samples from 128 apparently healthy subjects in a clinical study. All 128 samples were tested below <0.35 kU/L.

Stability

Shelf life stability: Both an ongoing real-time stability study and an accelerated stability study were performed in accordance with CLSI EP25-A using three lots of NOVEOS™ sIgE Assay, D002. The accelerated stability data support the manufacturer's claim of 18 to 48 month unopened shelf-life stability for the individual assay components listed in the table below. The real-time stability study is on-going and available data supports 8 month unopened shelf-life stability when stored at 2-8°C per the manufacturer's instruction for use:

		Shelf-life Stability* (2-8°C)
Specific IgE Capture Reagent D002		24 months
IgE Common Kit	Diluent A	48 months
	Conjugate IgE	18 months
	Substrate A and Substrate B	24 months
	Fluo Beads™	24 months
IgE Calibrator Set		24 months
Calibrator Antibody IgE		24 months
Others	Probe Wash Pack	24 months
	Wash Buffer Concentrate	48 months
	Cuvette Wash Pack	24 months
Controls	IgE Negative Control Pack	48 months
	IgE Positive Control Pack	24 months
*Results based on accelerated stability data		

On-board stability: A real-time stability study using three lots of NOVEOS™ sIgE Assay, D002 support the on-board stability claim of 48

hours to 28 days for the individual assay components as summarized in the table below.

		On-board Stability (2-8°C)
Specific IgE Capture Reagent D002		28 days
IgE Common Kit	Diluent A	14 days
	Conjugate IgE	14 days
	Substrate A and Substrate B	14 days
	Fluo Beads™	14 days
IgE Calibrator Set		48 hours
Others	Probe Wash Pack	N/A
	Wash Buffer Concentrate	28 days
	Cuvette Wash Pack	28 days
Controls	IgE Negative Control Pack	48 hours
	IgE Positive Control Pack	48 hours