December 19, 2019

Sentinel CH. SpA
Patricia Dupe
Head of Quality System
Via Robert Koch, 2
Milano, IT 20152

Re: K193001
Trade/Device Name: Albumin BCP
Regulation Number: 21 CFR 862.1035
Regulation Name: Albumin test system
Regulatory Class: Class II
Product Code: CJW
Dated: October 23, 2019
Received: October 28, 2019

Dear Patricia Dupe:

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,

Marianela Perez-Torres, Ph.D.
Acting Deputy Director
Division of Chemistry and Toxicology Devices | OHT7:
Office of In Vitro Diagnostics and Radiological Health
Office of Product Evaluation and Quality
CDRH | Food and Drug Administration

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)*
K193001

Device Name
Albumin BCP

Indications for Use *(Describe)*
The Albumin BCP assay is an in vitro diagnostic test used for the determination of albumin in human serum or plasma. Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys.
The assay is intended for professional use only.
For In Vitro Diagnostic use only.

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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5. 510(k) SUMMARY (SUMMARY OF SAFETY AND EFFECTIVENESS)

for the Albumin BCP (6x20mL), Albumin BCP (6x50 mL)

This summary of the 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

5.1. 510 (k) Number: K193001

5.2. Applicant Name

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Primary contact person for all communications:

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Date Summary Prepared: October 23th, 2019

Date Summary Revised: December 13th, 2019

5.3. Device Name

Albumin BCP

Device Classification: Class II
Classification Name: Bromcresol purple dye-binding, albumin
Governing Regulation: 21CFR862.1035
Product Code: CJW
Panel: Clinical Chemistry (75)

5.4. Predicate Device

ADVIA Chemistry BCP assay (ALBP) (k132664)

5.5. Intended Use of the Device

The Albumin BCP assay is an in vitro diagnostic test used for the determination of albumin in human serum or plasma.
Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys.

The assay is intended for professional use only.
For In Vitro Diagnostic use only.

5.6. Description of Device

Albumin BCP reagent is ready to use liquid reagent that is supplied in two configurations: fill volume 20 mL in a 20 mL wedge or 50 mL in a 50 mL wedge, 6 wedges/kit.

Test per kit calculation (based on the minimum reagent fill volume)	
Albumin BCP (6x20 mL)	2700
Albumin BCP (6x50 mL)	6000

Reactive Ingredients	Concentration
Acetate Buffer	6.8 %
Stabilizer	4.38 %
Bromcresol purple	0.028 %
Detergent	0.045 %
Sodium azide	<0.1 %.

5.7. Principles of the Procedure

Albumin at pH 5.0 – 5.5 reacts with bromocresol purple (BCP) forming a colored complex. The color intensity of this complex is proportional to the concentration of albumin present in the sample measurement as an endpoint reaction at 600/700 nm.
Methodology: Colorimetric

5.8. Comparison of Technological Characteristics

The Albumin BCP assay is intended for the quantitative measurement of albumin in human serum and plasma.

For In Vitro Diagnostic use only.

A comparison of the candidate device (Albumin BCP) and the predicate device [ADVIA Chemistry BCP assay (ALBP)] is presented in Table 5.1

Table 5.1: Comparison of Albumin BCP to Predicate (k132664) ADVIA Chemistry Albumin BCP assay (ALBP)

Characteristics	Predicate Assay (k132664) ADVIA Chemistry Albumin BCP assay (ALBP)	Candidate Assay Albumin BCP
Technical Characteristics		
Classification	Regulation name: Albumin BCP assay	Same
Method Principle	Bromcresol purple (BCP) dye-binding method	Same
Intended Use/Indications for Use	For in Vitro diagnostic use in the quantitative measurement of albumin in human serum or plasma on ADVIA Chemistry Systems. Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys	The Albumin BCP assay is an in vitro diagnostic test used for the determination of albumin in human serum or plasma. Albumin measurements are used in the diagnosis and treatment of numerous diseases primarily involving the liver or kidneys. The assay is intended for professional use only. For In Vitro Diagnostic use only.
Analyte Measured	Albumin	Same
Instrument to be used	Advia 1650 Chemistry System	AU680 Automatic Analyzer
Measurement	quantitative	Same
Specimen type	Serum, plasma	Same
Reference Value	34 – 50 g/L	35 – 52 g/L
Reagents	Single reagent	Same
Format	Liquid	Same
Analytical measuring interval	6.0 – 80 g/L	6.0 – 70 g/L
Standardization	ERM-DA 470k Reference Material	Same (ERM-DA 470k/IFCC)

Characteristics	Predicate Assay (k132664) ADVIA Chemistry Albumin BCP assay (ALBP)	Candidate Assay Albumin BCP
Performance Characteristics		
Reagent storage temperature	2-8 °C	15-30 °C
Use of Calibrators	Yes	Same
Use of Controls	Yes	Same

5.9. Summary of Performance Testing

All performance were established using the AU680 analyzer.

5.9.1. Limit of Blank (LoB) Study

The Limit of Blank (LoB) Study was performed to determine the highest measurement result that is likely to be observed (with a stated probability) for a blank sample.

The LoB, study was performed based on guidance from the Clinical and Laboratory Standards Institute (CLSI) document EP17-A2.

Acceptance criteria: the Limit of Blank (LoB) should be ≤ 1 g/L

A summary of the results is presented below:

Reagent	Calibrator	Limit of Blank (LoB) g/L	Acceptance criteria g/L
Lot F0390	Lot E0179	0.2	≤ 1 g/L
Lot F0391		0.3	
Lot F0480		0.3	

The observed Limit of Blank supports the LoB claim of 0.3 g/L.

5.9.2. Limit of Detection (LoD) Study

LoD is the lowest analyte concentration likely to be reliably distinguished from the LoB and at which detection is feasible.

The Limit of Detection (LoD) was determined on the basis of CLSI EP17-A2 Guideline (Evaluation of detection capability for clinical laboratory measurement procedures).

Acceptance criteria: the Limit of Detection (LoD) should be ≤ 3 g/L.
A summary of the results is presented below:

Reagent	Calibrator	Limit of Detection (LoD) g/L	Acceptance criteria g/L
Lot F0390	Lot E0179	0.6	≤ 3.0 g/L
Lot F0391		0.8	
Lot F0480		0.8	

The results meet the acceptance criteria. The Limit of Detection is chosen to be the highest of the values obtained. The LoD observed supports the claim of 0.8 g/L.

5.9.3. Limit of Quantitation (LoQ) Study

LoQ is the lowest amount of a measured in a material that can be quantitatively determined with stated accuracy (as total error or as independent requirements for bias and precision), under stated experimental conditions.

The results of the LoQ study are provided for completeness in conjunction with the LoB and LoD studies.

The LoQ, study was performed based on guidance from the Clinical and Laboratory Standards Institute (CLSI) document EP17-A2.

Acceptance criteria: the Limit of Quantitation (LoQ) should be ≤ 5 g/L

A summary of the results is presented below:

Reagent	Calibrator	Limit of Quantification (LoQ) g/L	Acceptance criteria g/L
Lot F0390	Lot E0179	1.3	≤ 5.0 g/L
Lot F0391		1.3	
Lot F0480		1.3	

The results meet the acceptance criteria. The LoQ observed supports the claim of 1.5 g/L.

5.9.4. Precision Study

The Precision study verifies the agreement between indications or measured quantity values obtained by replicates measurements on the same or similar objects under specified conditions. One human serum sample pool and two human serum based controls were used. After calibration at Time zero (0), 2 replicates of each sample were performed on 2 different runs per day. The precision was determined on the basis of CLSI EP05-A3 Guideline (Evaluation of Precision of Quantitative Measurement Procedures).

Acceptance Criteria:
The Precision should be $\leq 2.5\%$ across all tested concentrations

A summary of the results is presented below:

Reagent	Material	N	Concentration g/L	Total %CV	Acceptance criteria
Lot F0390	Level 1	80	26.26	2.2%	≤ 2.5%
	Level 2	80	40.53	2.0%	
	Level 3	80	49.96	1.8%	
Lot F0391	Level 1	80	26.50	2.1%	
	Level 2	80	40.64	1.8%	
	Level 3	80	50.30	1.9%	
Lot F0480	Level 1	80	26.62	2.2%	
	Level 2	80	40.67	2.1%	
	Level 3	80	50.47	1.6%	
Lot 90228	Level 1	88	19.10	1.9%	
	Level 2	88	40.18	1.2%	
	Level 3	88	51.33	1.3%	

All calculated CV's were well within the acceptance criteria of ≤ 2.5%. The highest %CV was 2.2%. The data show good precision across the concentration range from 18 to 55 g/L.

5.9.5 Intra Assay Precision Study

The Intra Assay Precision Study was performed to verify the precision and the trueness of the method relative to the assigned values of materials with known concentrations.
One human serum sample pool and two human serum based controls were used. After calibration, 20 replicates of each sample were run on 3 different runs (each run with a new calibration).

The Intra Assay Precision was determined on the basis of CLSI EP15-A3 Guideline (User Verification of Precision and Estimation of Bias).

Acceptance Criteria:
The Intra Assay Precision should be ≤ 1.5 % across all tested concentrations

A summary of the results is presented below:

Reagent	Material	Concentration g/L	Total %CV	SD g/L	Acceptance criteria % CV
Lot F0390	Level 1	21.4	0.75%	0.2	≤ 1.5%
	Level 2	35.7	0.79%	0.3	
	Level 3	50.2	0.40%	0.2	
Lot F0391	Level 1	21.5	0.74%	0.2	
	Level 2	35.8	0.61%	0.2	
	Level 3	50.3	0.49%	0.2	
Lot F0480	Level 1	21.5	0.95%	0.2	
	Level 2	35.6	0.74%	0.3	
	Level 3	50.3	0.44%	0.2	

The results meet the acceptance criteria. All the samples gave %CV lower than 1.5%

5.9.6. Linearity (Measuring Range)

The Study was performed to establish the Upper Limit of Measuring Range (MR) based upon the linearity of the Albumin BCP assay on the AU680 System.

Linearity was evaluated using guideline CLSI EP6-A Guideline (Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach).

Acceptance Criteria: the absolute bias should be between - 2 g/L and + 2 g/L or
The relative bias should be between -6% and + 6%

A summary of the results is presented below:

Reagent	Tested range (g/L)	Linear regression equations
Lot F0390	4.17 to 78.30	y = 0.00 + 1.000x, r = 0.999
Lot F0391	4.30 to 78.67	y = 0.00 + 1.000x, r = 0.999
Lot F0480	4.20 to 78.03	y = 0.00 + 1.000x, r = 0.999

The results meet the acceptance criteria, demonstrating that the assay is linear up to 70 g/L. The upper limit of the MR is 70 g/L.
The MR is claimed as 6.0 to 70 g/L.

5.9.7 Endogenous Interferences Study

The Endogenous Interferences study was performed to evaluate the effect of some substances on the performances of the product.
The interference was evaluated at the following Albumin concentrations:
Low: ≈ 35 g/L (±10%)
High: ≈ 50 g/L (±10%)
For each concentration 2 aliquots of serum pool were prepared (Base and Test pool)
Test pool was divided into 4 sub-aliquots, then spiked using the interfering substances under evaluation. The 4 Test Pool aliquots were diluted using the Base Pool to obtain additional dilution levels in the ratio: 100%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%, 0%.

Potential interferences study was performed on the basis of CLSI document EP07-A2 – Interference Testing in Clinical Chemistry

Acceptance Criteria:

Interfering substance	**Tested concentration up to**	**Acceptance criteria**
Hemoglobin	2000 mg/dL	% bias: ±10%
Unconjugated bilirubin	66 mg/dL	
Conjugated bilirubin	66 mg/dL	
Lipids (as Triglycerides)	2000 mg/dL	

A summary of the results is presented below:

Interfering substance	**Tested concentration up to**	**Found concentration without Interferences**	**Acceptance criteria**
Hemoglobin	2000 mg/dL	2000 mg/dL	% bias: ±10%
Unconjugated bilirubin	66 mg/dL	66 mg/dL	
Conjugated bilirubin	66 mg/dL	66 mg/dL	
Lipids (as Triglycerides)	2000 mg/dL	1200 mg/dL	

The results meet the acceptance criteria.

5.9.8 Reagent stability

The Stability study was performed to determine, both open on-board and calibration stability of the Albumin BCP assay on the AU680 System.

The Stability study was determined following:
European Standard EN 23640:2015 – Stability Testing of In Vitro Diagnostics Reagents

Acceptance Criteria
% Bias: within ± 10% vs initial measurement

A summary of the results is presented below:

Reagent	Material	%bias Min	% bias Max	Acceptance criteria % bias vs Time 0
Lot F0390	Level 1	0.0%	8.5%	±10%
	Level 2	1.2%	7.9%	
	Level 3	0.65%	7.3%	
Lot F0391	Level 1	0.0%	9.8%	
	Level 2	1.0%	9.9%	
	Level 3	0.1%	9.6%	
Lot F0480	Level 1	1.6%	10.0%	
	Level 2	0.6%	9.8%	
	Level 3	0.3%	8.8%	
Lot 90228	Level 1	-1.3%	7.3%	
	Level 2	0.0%	5.9%	
	Level 3	0.5%	5.2%	

The results meet the acceptance criteria.
The on-board reagent stability claimed is 28 days on the AU680 analyzer.
The calibration stability claimed is 14 days on the AU680 analyzer.

5.9.9 Method Comparison

Method Comparison study was performed to demonstrate correlation to the predicate device (Siemens ADVIA® 2400). 128 serum samples with concentrations spanning the measuring interval 6.0 - 70 g/L were tested in duplicate on the AU680 System and on Siemens Advia 2400. 8 samples were altered samples, prepared for a better coverage of the measuring range.

The method comparison study was performed based on guidance from the CLSI document EP09-A3.

Acceptance Criteria:
The method comparison study results were considered acceptable if the assay had a regression slope of 1.00 (± 0.10) and a correlation coefficient (r) of ≥ 0.975.
A Passing-Bablok linear regression and a linear fit regression were performed, regressing the 1st replicate of the SCH Albumin BCP assay (y-axis) versus the mean of 2 replicates of each corresponding sample of the predicate (ADVIA® Chemistry Albumin BCP) assay (x-axis).

A summary of the results is presented below:

Passing & Bablok regression method: N = 128; y (g/L) = 0.94x + 1.01; r = 0.992

Linear fit regression method: N = 128; y (g/L) = 0.95x + 0.78; r = 0.992

SCH Albumin BCP assay on the AU680 demonstrated acceptable correlation to the predicate device (Siemens ADVIA 2400, ADVIA® Chemistry Albumin BCP) by meeting the evaluation criteria.

5.9.10 Matrix Comparison Study

Matrix Comparison study was performed to demonstrate correlation between:

- serum and Lithium-Heparin plasma samples
- serum and Potassium EDTA plasma samples

77 paired plasma/serum samples with albumin concentrations throughout the range of the assay were tested.
7 samples were altered samples, prepared for a better coverage of the measuring range.

The matrix comparison study was performed based on guidance from the CLSI document EP09-A3.
The matrix comparison study results were considered acceptable if the assay had a regression slope of 1.00 (± 0.10) and a correlation coefficient (r) of ≥ 0.975.

A Passing-Bablok linear regression and a linear fit regression were performed, regressing the 1st replicate of the SCH Albumin BCP plasma, Li-Heparin (y-axis) versus the 1st replicate of each corresponding sample of the SCH Albumin BCP Serum (x-axis).

A Passing-Bablok linear regression and a linear fit regression were performed, regressing the 1st replicate of the SCH Albumin BCP plasma, potassium EDTA (y-axis) versus the 1st replicate of each corresponding sample of the SCH Albumin BCP Serum (x-axis).

A summary of the results, Serum vs Lithium-Heparin plasma samples is presented below:

Passing & Bablok regression method: N = 77; y (g/L) = 1.01x – 0.34; r = 0.995

Linear fit regression method: N = 77; y (g/L) = 1.00x + 0.01; r = 0.995

A summary of the results, Serum vs Potassium EDTA plasma samples is presented below:

Passing & Bablok regression method: N = 77; y (g/L) = 1.00x – 0.20; r = 0.996

Linear fit regression method: N = 77; y (g/L) = 0.995x – 0.05; r = 0.996

The results meet the acceptance criteria.

5.10. Conclusion

Testing results indicate that the Candidate device (Albumin BCP) is safe and effective for the stated intended use and is substantially equivalent to the predicate device.