K140829

JUL 14 2014

510(k) SUMMARY

1.0 **Submitted By:**

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2.0 **Date Submitted:**

July 2, 2014

3.0 **Device Name(s):**

3.1 **Proprietary Names**
UniCel DxC SYNCHRON Systems Hemoglobin A1c3 (HbA1c3) Reagent

3.2 **Classification Name**
Glycosylated hemoglobin assay 21 CFR § 864.7470 [LCP]

4.0 **Predicate Device:**

Candidate(s)	Predicate	Manufacturer	Docket Number
UniCel DxC SYNCHRON Systems Hemoglobin A1c (HbA1c3) Reagent	UniCel DxC SYNCHRON Systems Hemoglobin A1c- (HbA1c-) Reagent	Beckman Coulter, Inc.	K121492

5.0 **Description:**

The UniCel DxC SYNCHRON Systems Hemoglobin A1c3 (HbA1c3) Reagent is intended for the quantitative determination of hemoglobin A1c concentration in human whole blood. The UniCel DxC Systems utilize two unique cartridges, Hb3 and A1c3, to determine hemoglobin A1c concentration as a ratio of total hemoglobin.

Hb3 reagent is used to measure total hemoglobin concentration by a colorimetric method. The system automatically proportions the appropriate sample and reagent volumes into the cuvette. The ratio used is one part sample to 8.6 parts reagent. The system monitors the change in absorbance at 410 nanometers. This change in absorbance is directly proportional to the concentration of total hemoglobin in the sample and is used by the system to calculate and express total hemoglobin concentration.

A1c3 reagent is used to measure the hemoglobin A1c concentration by a turbidimetric immunoinhibition method. In the reaction, hemoglobin A1c antibodies combine with hemoglobin A1c from the sample to form soluble antigen-antibody complexes. Polyhaptens from the reagent then bind with the excess antibodies and the resulting agglutinated complex is measured turbidimetrically. The system automatically proportions the appropriate sample and reagent volumes into the cuvette. The ratio used is one part sample to 28 parts reagent. The system monitors the change in absorbance at 340 nanometers. This change in absorbance is inversely proportional to the concentration of hemoglobin A1c in the sample and is used by the systems to calculate and express hemoglobin A1c concentration as a ratio of total hemoglobin.

6.0 Intended Use:

The UniCel DxC Synchron Systems Hemoglobin A1c3 (HbA1c3) Reagent, when used in conjunction with UniCel DxC 600/800 SYNCHRON Systems, UniCel DxC SYNCHRON Systems HbA1c3 Calibrators and HbDIL reagent, is intended for the quantitative determination of hemoglobin A1c concentration in human whole blood.

The A1c3 and Hb3 values generated as part of the HbA1c3 assay are intended for use in the calculation of the A1c3/Hb3 ratio and must not be used individually.

Measurement of hemoglobin A1c measures long-term glycemic control in patients with diabetes mellitus.

7.0 Comparison to Predicate(s):

The following table shows similarities and differences between the predicate identified in Section 4.0 of this summary.

Similarities to the Predicate

DxC HbA1c3 Reagent	Intended Use	Predicate: "The Hemoglobin A1c- reagent, when used in conjunction with UniCel DxC 600/800 SYNCHRON Systems, UniCel DxC SYNCHRON Systems HbA1c- Calibrators and SYNCHRON and AU Systems Hemolyzing Reagent, is intended for the quantitative determination of hemoglobin A1c concentration in human whole blood." "The UniCel DxC Synchron Systems Hemoglobin A1c3 (HbA1c) Reagent,when used in conjunction with UniCel DxC 600/800 SYNCHRON Systems, UniCel DxC SYNCHRON Systems HbA1c3 Calibrators and HbDIL reagent, is intended for the quantitative determination of hemoglobin A1c concentration in human whole blood." Note: Hemolyzing Reagent (offline sample preparation) = HbDIL (online sample preparation) same formulation
	Reagent formulations	Same
	Calibrator levels/formulation	Same: 5 levels, Hemolysate (human and sheep)

	Calibrator traceability	IFCC HbA1c reference method
	Acceptable Anticoagulants	EDTA & heparin whole blood. K2-EDTA K3-EDTA Lithium Heparin Sodium Heparin
	Specimen Stability	Whole blood samples stable for 8 hours at 15° to 25°C 7 days at 2 - 8°C 3 months at -15° to -20°C 18 months at -70°C (literature reference)
	Analytical Range	Hb- 6.0 – 24 g/dL A1c- 0.30 – Cal 5 g/dL %HbA1c 4.0 - 17% 9 (NGSP)
	Technology	Colorimetric
	Methodology	Turbidimetric immunoinhibition

Differences From The Predicate

DxC HbA1c3 Reagent	Sample preparation	New device employs on-line sample dilution utilizing same formulation of hemolyzing reagent.
	Reagent volumes/tests per kit	HbA1c3 Two A1c3 Cartridges (125 tests/cartridge) Antibody Reagent (50 mL) Polyhapten Reagent (12.7 mL) Two Hb3 Cartridge (125 tests/cartridge) Hemoglobin Reagent (42 mL) HbA1c- Two A1c- Cartridges (200 tests/cartridge) Antibody Reagent (64 mL) Polyhapten Reagent (16.9 mL) One Hb- Cartridge (400 tests/cartridge) Hemoglobin Reagent (103 mL)

8.0 Summary of Performance Data:

The data in the Premarket Notification on safety and effectiveness supports a finding of substantial equivalence to chemistry test systems already in commercial distribution. Equivalence is demonstrated through method comparison, linearity, and imprecision, and sensitivity experiments.

DxC Method Comparison Summary

Instrument	Units	Sample Range	Acceptance Criteria	N	R	Slope	Intercept	Result
DxC 600	% HbA1c (NGSP)	4.4 to 16.6% HbA1c (NGSP)	Slope 1.0 ± 0.05 Intercept ≤ ± 0.50 R ≥ 0.97	119	0.998	1.031	-0.267	Pass
DxC 800	% HbA1c (NGSP)	4.3 to 15.9% HbA1c (NGSP)	Slope 1.0 ± 0.05 Intercept ≤ ± 0.50 R ≥ 0.97	118	0.999	1.031	-0.294	Pass

Anticoagulant Study Summary

Anticoagulant	Level of Anticoagulant Tested	Test Criteria	Deming Regression Analysis
K3-EDTA	1.74 mg/mL	Slope 1.0 ± 0.05 Intercept <± 0.75 R > 0.97	Y = 1.012X – 0.043; R = 0.999
Lithium Heparin	15.8 USP units/mL		Y = 1.007X – 0.034; R = 0.999
Sodium Heparin	15.8 USP units/mL		Y = 1.007X – 0.034; R = 0.999

CLSI EP5-A2 Precision Estimate Method Summary

Type of Imprecision	Sample Type	No. Data Points	Mean Value (%HbA1c)	EP5-A2 Calculated Point Estimates	
				SD	% CV
Within-run (DxC 600)	Whole Blood Control 1	80	5.5	0.07	1.24
	Whole Blood Control 2	80	10.0	0.11	1.13
	Human Whole Blood Sample 1	80	8.9	0.09	0.96
	Human Whole Blood Sample 2	80	6.3	0.08	1.30
	Human Whole Blood Sample 3	80	4.8	0.07	1.52
Total (DxC 600)	Whole Blood Control 1	80	5.5	0.09	1.56
	Whole Blood Control 2	80	10.0	0.15	1.46
	Human Whole Blood Sample 1	80	8.9	0.14	1.56
	Human Whole Blood Sample 2	80	6.3	0.10	1.62
	Human Whole Blood Sample 3	80	4.8	0.09	1.93

Type of Imprecision	Sample Type	No. Data Points	Mean Value (%HbA1c)	EP5-A2 Calculated Point Estimates	
				SD	% CV
Within-run (DxC 800)	Whole Blood Control 1	80	5.4	0.06	1.13
	Whole Blood Control 2	80	9.9	0.08	0.80
	Human Whole Blood Sample 1	80	8.9	0.07	0.81
	Human Whole Blood Sample 2	80	6.3	0.07	1.16
	Human Whole Blood Sample 3	80	4.6	0.06	1.34
Total (DxC 800)	Whole Blood Control 1	80	5.4	0.09	1.61
	Whole Blood Control 2	80	9.9	0.13	1.34
	Human Whole Blood Sample 1	80	8.9	0.13	1.47
	Human Whole Blood Sample 2	80	6.3	0.11	1.72
	Human Whole Blood Sample 3	80	4.6	0.09	1.89

Additional With-run Precision Study Summary

Type of Imprecision	Sample Type	No. Data Points	Mean Value (%HbA1c)	Calculated Point Estimates	
				SD	% CV
Within-run (DxC 800)	Human Whole Blood Sample @14% HbA1c	20	14.6	0.15	1.03
Within-run (DxC 600)	Human Whole Blood Sample @14% HbA1c	20	14.6	0.16	1.10

DxC Interferences Summary

Substance	Interference Pool Details (5%, 7%, & 10% HbA1c NGSP)	Highest Level Tested	Observed Effect	Result
Bilirubin (unconjugated)	Whole blood samples spiked with stock unconjugated bilirubin solution (Sigma)	30 mg/dL (0.3 g/L)	NSI*	Pass
Lipemia	Whole blood samples spiked with a fat emulsion (Intralipid)	1000 mg/dL (10 g/L)	NSI	Pass
Rheumatoid Factor	Whole blood samples spiked with high RF positive material (Human)	2000 IU/mL (2×10^6 IU/L)	NSI	Pass
Ascorbic Acid	Whole blood samples spiked with stock ascorbic acid solution (Sigma)	50 mg/dL (0.5 g/L)	NSI	Pass

*NSI = No Significant Interference (within ± 6% mathematical)

Specificity

The antibody used in this assay shows no cross-reactivity with HbA0, HbA1a, HbA1b, acetylated hemoglobin, carbamylated hemoglobin, and glycated albumin.

No significant effect of HbS, HbD, HbE, HbC, and up to 10% HbF was observed with this assay. Glycated HbF is not detected by the A1c3 assay as it does not contain the glycated β-chain. However, HbF is measured in the Hb3 assay.

Samples containing >10% HbF may result in lower than expected HbA1c3 results.

No significant effect of labile glycated hemoglobin (up to 2000 mg/dL, 5 hours at +37°C) was observed with this assay.

Criteria: Recovery within +/- 7% of control sample for HbS, HbD, HbE and HbC. Recovery within +/- 10% of control sample for HbF and labile glycated hemoglobin.

DxC Linearity Summary

Hb3 (6.0 – 24 g/dL)	A1c3 (0.30 – Cal 5* g/dL)	%HbA1c (NGSP) (4.0 – 17%)
Linear Regression Slope: 1.0 ± 0.1 Intercept: < ± 1.0 (g/dL) R: > 0.95	Linear Regression Slope: 1.0 ± 0.1 Intercept: < ± 0.3 (g/dL) R: > 0.95	Linear Regression Slope: 1.0 ± 0.1 Intercept: <± 0.75 (%HbA1c NGSP) R: > 0.95
DxC 600 Y = 0.992x – 0.1051; R = 0.9997 DxC 800 Y = 0.998x – 0.1899; R = 0.9993	DxC 600 Y = 1.0007x – 0.0076; R = 0.9994 DxC 800 Y = 0.9907x + 0.0032; R = 0.9999	DxC 600 Y = 0.9905x + 0.0387; R = 0.994 DxC 800 Y = 0.9839x + 0.0521; R = 0.9996

*Cal 5 Value is printed on the HbA1c3 calibrator value assignment sheet included in the kit.

Reference Interval Summary

Each laboratory should establish its own reference intervals based upon its patient population. The reference intervals listed below were taken from literature and confirmed by internal testing.

Interval	Sample Type	Conventional Units
Literature	Whole Blood	NGSP 4.0 – 6.0% IFCC 20 – 42 mmol/mol

M. Panteghini, et al., "Implementation of hemoglobin A1c results traceable to the IFCC reference system: the way forward," Clinical Chemistry and Laboratory Medicine 45(8) (2007): 942-944.

Conclusion:

As summarized, the HbA1c3 Reagent is substantially equivalent to the HbA1c- Reagent (K121492). Substantial equivalence has been demonstrated through performance to verify that the device functions as intended and that design specifications have been satisfied.

This 510(k) summary is being submitted in accordance with the requirements of the Safe Medical Device Act of 1990 and the implementing regulation 21 CFR 807.92.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

BECKMAN COULTER, INC.
ANNETTE HELLIE
250 S. KRAEMER ST
BREA CA 92821

July 14, 2014

Re: K140829
Trade/Device Name: UniCel DxC Synchron Systems Hemoglobin (HbA1c3) Reagent
Regulation Number: 21 CFR 864.7470
Regulation Name: Glycosylated hemoglobin assay
Regulatory Class: II
Product Code: LCP
Dated: May 29, 2014
Received: June 2, 2014

Dear Ms. Hellie:

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 Parts 801 and 809); 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 regulations (21 CFR Parts 801 and 809), please contact the Division of Small Manufacturers, International and Consumer Assistance 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" (21CFR 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 Small Manufacturers, International and Consumer Assistance 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,

Katherine Serrano -S

For: Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
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)*
K140829

Device Name
UniCel DxC Synchron Systems Hemoglobin A1c3 (HbA1c3) Reagent

Indications for Use *(Describe)*

The UniCel DxC Synchron Systems Hemoglobin A1c3 (HbA1c3) Reagent, when used in conjunction with UniCel DxC 600/800 SYNCHRON Systems, UniCel DxC SYNCHRON Systems HbA1c3 Calibrators and HbDIL reagent, is intended for the quantitative determination of hemoglobin A1c concentration in human whole blood.

The A1c3 and Hb3 values generated as part of the HbA1c3 assay are intended for use in the calculation of the A1c3/Hb3 ratio and must not be used individually.

Measurement of hemoglobin A1c is accepted as a method to measure long-term glucose control in patients with diabetes mellitus.

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)

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FOR FDA USE ONLY

Concurrence of Center for Devices and Radiological Health (CDRH) *(Signature)*

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