

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE**

A. 510(k) Number:

k061990

B. Purpose for Submission:

New device

C. Measurand:

Urine Albumin (microalbumin)

D. Type of Test:

Quantitative

E. Applicant:

Dade Behring, Inc.

F. Proprietary and Established Names:

Dimension Vista™ MALB Flex® Reagent Cartridge

Dimension Vista™ Protein 3 Calibrator

Dimension Vista™ Protein 3 Control

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
DCF	II	21 CFR 866.5040 Albumin, Antigen, Antiserum, Control	82 (Immunology)
JIT	II	21 CFR 862.1150 Calibrator, secondary	75 (Chemistry)
JJY	I	21 CFR 862.1660 Single (specified) analyte controls (assayed and unassayed)	75 (Chemistry)

H. Intended Use:

1. Intended use(s):

See indications for use below.

2. Indication(s) for use:

The MALB method is an in vitro diagnostic reagent for the quantitative determination of albumin in human urine on the Dimension Vista™ System. Measurement of albumin aids in the diagnosis of kidney and intestinal disease.

Protein 3 Calibrator is an in vitro diagnostic product for the calibration of the Microalbumin (MALB) method on the Dimension Vista™ System.

Protein 3 Control is an assayed intralaboratory quality control for the assessment of precision and analytical bias in determination of Microalbumin (MALB) on the Dimension Vista™ System.

3. Special conditions for use statement(s):

For prescription use only.

4. Special instrument requirements:

Dade Behring Dimension Vista™ System

I. Device Description:

The Dimension Vista™ Microalbumin Flex® Reagent Cartridge is a twelve well reagent cartridge containing microalbumin (MALB) supplement, phosphate buffer, polyethylene glycol, rabbit antiserum to human albumin and preservatives.

The Dimension Vista™ Protein 3 Calibrator is a one level lyophilized calibrator that is a diluted into seven levels by the analyzer of 4.4, 8.8, 18, 35, 70, 140, and 412 mg/L. The calibrator contains urinary protein of human origin containing albumin and preservatives. Donors of human urine used in the preparation of this product were tested by FDA-approved methods for the presence of antibodies to HIV-1 and HIV-2, Hepatitis B Surface Antigen (HBsAg) and antibodies to Hepatitis C Virus (HCV).

The Dimension Vista™ Protein 3 Control is one level lyophilized, polygeline control containing albumin of human origin with a target value of approximately 165 mg/L. Donors of human urine used in the preparation of this product were tested by FDA-approved methods for the presence of antibodies to HIV-1 and HIV-2, Hepatitis B Surface Antigen (HBsAg) and antibodies to Hepatitis C Virus (HCV).

J. Substantial Equivalence Information:

1. Predicate device name(s):

Dade Behring N Antiserum to Human Albumin Assay

Dade Behring N Protein Standard SL

Dade Behring N/T Protein Control LC

2. Predicate 510(k) number(s):

k860894

k012470

k991704

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended Use	Quantitative determination of albumin in human urine on the Dimension Vista™ system. Measurement of albumin aids in the diagnosis of kidney and intestinal diseases.	Quantitative determination of albumin in human serum and human urine in cerebrospinal fluid (CSF) using BN Systems.
Principle	Nephelometric	Nephelometric
Antibody	Rabbit Polyclonal	Rabbit Polyclonal

Differences		
Item	Device	Predicate
Analyzer	Dimension Vista	BN Systems
Assay Range	5 – 340 mg/L	11 – 340 mg/L
Calibrator	Only albumin	Multi-Analyte
Control	Only albumin	Multi-Analyte

K. Standard/Guidance Document Referenced (if applicable):

CLSI EP7-A Interference Testing in Clinical Chemistry

CLSI EP5-A Evaluation of Precision Performance of Clinical Chemistry Devices

L. Test Principle:

The Dimension Vista Microalbumin (MALB) Flex Reagent Cartridge utilizes a method based on nephelometric measuring principles that allows direct quantitation of albumin in urine samples. The cartridge contains specific antibodies to human albumin, which form immunocomplexes in an immunochemical reaction with albumin contained in human urine. These complexes cause a beam of light to scatter when passed through the urine sample. The intensity of the scattered light is proportional to the albumin concentration in the sample. The rate of aggregation is measured by reading the increased light signal at 840 nm. The results are evaluated by comparison with a standard of known concentration.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Within-lab and repeatability precision was assessed according to EP5-A2. One low urine pool, one higher urine pool and the Dade Behring N/T Protein Control LC (twenty specimens per level) were analyzed in duplicate, twice a day for twenty days. The precision data is summarized in the chart below.

Material	Mean (mg/L)	Repeatability SD (%CV)	Within-Lab SD (%CV)
Prot3 Control	146	3.5 (2.4)	5.8 (4.0)
Low urine pool	10	0.6 (6.4)	0.8 (7.6)
High urine pool	245	6.9 (2.8)	10.9 (4.5)

b. *Linearity/assay reportable range:*

The sponsor claims a reportable range for their assay of 5 – 340 mg/L. Linearity of the assay was evaluated using a dilution series that spanned from 6.70 to 315 mg/L. Serial dilution sets were prepared using system diluents using urine samples with high concentrations of albumin. Each dilution was tested in replicates of five. The sponsor calculated both percent recovery and linear regression. The mean recovery for the 13 dilutions was 98.1%. The dilution linearity regression line was $y=0.992 + 0.073$ with a correlation coefficient of 0.999.

The sponsor also conducted a hook effect study to evaluate urine samples above the assay range. The sponsor reports that there is no high end hook effect observed on samples up to 12693 mg/L. The Dimension Vista has an auto dilution of samples that are above 340 mg/L.

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

A 24 month stability study using 3 Flex Reagent cartridges, Protein 3 calibrator and the Protein 3 Control (all tested in triplicates) were stored at 2 and 8° C and tested at several intervals. An onboard stability study was also conducted for unwrapped cartridges and open cartridges after being stored at 2 different temperatures to determine optimum shelf-life. The studies supported the sponsor's expiration and open well stability claims listed in the chart below.

	Closed Stability	Open Stability
MALB Flex Reagent Cartridge	90 day	21 days
Protein 3 Calibrator	2 years	14 days
Protein 3 Control	2 years	14 days

d. *Detection limit:*

Analytical sensitivity was defined as the minimal level of analyte (diluent) which is distinguished from zero. The sponsor calculated the value 1.27 mg/L as the mean value of twenty replicates plus standard deviations. This calculation supports the sponsor's LOD claim of 5 mg/L.

e. *Analytical specificity:*

Interference testing was performed according to CLSI EP7-A for endogenous and exogenous substances with the Dimension Vista™ MALB Assay. Bias was determined by testing a control sample without the interferent and comparing it to the value obtained from test sample containing the potential interferent. The endogenous substances that the sponsor tested were bilirubin (conjugated and unconjugated), creatine, hemoglobin, IgG and urea. The exogenous substances tested were acetone, ascorbic acid, boric acid, ethanol, glucose, oxalic acid, riboflavin, sodium azide, sodium chloride and sodium fluoride. Each substance at the concentration tested did not cause >10% relative deviation from the base pool. See package insert for a summary of concentrations and results.

f. *Assay cut-off:*

Not applicable.

2. Comparison studies:

a. *Method comparison with predicate device:*

The Dimension Vista MALB assay was compared to the Dade Behring N

Antiserum to Human Albumin assay on the BN ProSPEC® System. Seventy-four urine samples with concentrations ranging from 5.87 to 332.7 mg/L were measured with both devices and a linear regression analysis was conducted. The resulting equation was $Y=0.988x - 0.936$ with a correlation coefficient of 0.996.

b. Matrix comparison:

Not applicable as this is a urine only assay.

3. Clinical studies:

a. Clinical Sensitivity:

Not applicable

b. Clinical specificity:

Not applicable

c. Other clinical supportive data (when a. and b. are not applicable):

Not applicable

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

The sponsor reports the following expected values obtained from literature from the American Diabetes Association: Standards of Medical Care for Patients with Diabetes Mellitus and Tietz Fundamentals of Clinical Chemistry, 5th edition.

Less than 20 µg/min^g

Less than 30 mg/24 hour

Excretion rate: less than 30 mg albumin/g creatinine^h

^g. $\text{MALB (mg/L)} \times [\text{Urine Volume (mL)} / \text{Time (minutes)}] = \text{mg MALB/min.}$

^h. $[\text{MALB (mg/L)} / \text{Urine creatinine (mg/dL)}] \times 100 = \text{mg MALB/g creatinine.}$

The sponsor has placed in their label a statement regarding intra-individual variation.

“To minimize intra-individual variation, analysis of three random urine samples collected over the course of a week has also been recommended. Each laboratory should establish its own reference interval for microalbumin as performed on the Dimension Vista System. Calculation of an excretion rate requires a timed specimen collection and accurate volume measurement.”

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

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