510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE

A. 510(k) Number:
k063663

B. Purpose for Submission:
new assay on Dimension Vista™

C. Analyte:
Soluble transferrin receptor (STFR)

D. Type of Test:
automated turbidimetric immunoassay

E. Applicant:
Dade Behring Inc.

F. Proprietary and Established Names:
Dimension Vista™ STFR Flex® Reagent Cartridge

G. Regulatory Information:

1. Regulation section:
   21 CFR 866.5880, Transferrin Immunological Test System
   21 CFR 862.1150, Calibrator
   21 CFR 862.1660, Quality Control Material
2. Classification:
   Class II
3. Product Code:
   DDG
   JIX
   JJY
4. Panel:
   82DDG
   75JIX, 75JJY

H. Intended Use:

1. Intended use:
   The Dimension Vista™ STFR Flex® Reagent Cartridge (STFR method) is an *in vitro* diagnostic test for the quantitative determination of soluble transferrin receptor in human serum and heparinized plasma on the Dimension Vista™ System. Measurements of soluble transferrin receptor aid in the diagnosis of malnutrition, acute inflammation, infection and iron deficiency anemia.

Prot 1 CAL is an *in vitro* diagnostic product for the calibration of the C3 Complement (C3), C4 Complement (C4), Immunoglobulin A (IGA), Immunoglobulin G (IGG), Immunoglobulin M (IGM), Prealbumin (PREALB), and soluble transferrin receptor (STFR) methods on the Dimension Vista™ System.

Prot 1 CON L, M, and H are assayed intralaboratory quality controls for assessment of precision and analytical bias in the determination of C3 Complement (C3), C4 Complement (C4), Immunoglobulin A (IGA), Immunoglobulin G (IGG), Immunoglobulin M (IGM), Prealbumin (PREALB), and Soluble transferrin receptor (STFR) on the Dimension Vista™ System.

2. Indications for use:
   See intended use.

3. Special condition for use statement(s):
   For prescription use.

   Each laboratory should establish its own expected values for soluble transferrin receptor as performed on the Dimension Vista™ System.

   Note: all analytes in the controls and calibrator, other than STFR, were cleared previously. The manufacturer references k061852, k061338, k051087, k061845, and k062055.

4. Special instrument requirement(s):
   For use on the Dimension Vista™.

I. Device Description:

Reagents

Wells	Form	Ingredient	Concentration	Source
1-2	Liquid	STFR Supplement Reagent 1: Phosphate Buffer, Polyethylene Glycol Sorbitan Monolaurate	5.4 g/L	
3-4	Liquid	STFR Supplement Reagent 2: Phosphate Buffer, Immunoglobulin	0.6 g/L	Mouse
11-12	Liquid	STFR Reagent[d]: Polystyrene Particles,	0.7 g/L	
		Antibodies to STFR, monoclonal	0.03 g/L	Mouse

Contains sodium azide (< 0.1%) as a preservative.

Contains human source material. Each donor or donor unit was tested and found to be negative for human immunodeficiency virus (HIV) 1 and 2, hepatitis B virus (HBV) and hepatitis C virus (HCV) using either test found to be in conformance with the In Vitro Diagnostic Directive in the EU or FDA approved tests. Because no known test can offer complete assurance of the absence of infectious agents, all human derived products should be handled using good laboratory practice to avoid skin contact or ingestion.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   Dade Behring N Latex STFR Assay
   N Protein Standard SL
   N/T Protein Control SL
2. Predicate K number(s):
   k991157
   k012470
   k012468
3. Comparison with predicate:
   The predicate device is for use on BN Systems. The new device is for use on the Dimension Vista™ Systems.

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

CLSI EP5-A2, EP7-A2.

L. Test Principle:

Polystyrene particles coated with monoclonal antibodies specific to human soluble transferrin receptor are aggregated when mixed with samples containing soluble transferrin receptor. These aggregates scatter a beam of light passed through the sample. The intensity of the scattered light (measured at 840 nm) is proportional to the concentration of human soluble transferrin receptor in the sample. The result is evaluated by comparison with a standard of known concentration.

M. Performance Characteristics:

1. Analytical performance:
   Evaluations were performed on the Dimension Vista™ at the manufacturer's site.
   a. Precision/Reproducibility:
   Precision was evaluated using spiked serum pools, plasma pools and the manufacturer's control material. Specimens were analyzed in duplicate twice a day for 20 days and precision calculations were performed according to CLSI EP5-A2. A single calibration was performed. Results are summarized below:

Material	Mean mg/L	Standard Deviation mg/L (%CV)	
		Repeatability	Within-Lab
PROT1 CON L	0.81	0.02 (2.14)	0.02 (2.63)
PROT1 CON M	1.04	0.03 (2.62)	0.03 (2.90)
PROT1 CON H	1.45	0.04 (2.40)	0.04 (2.63)
Serum pool	0.46	0.01 (2.63)	0.02 (3.43)
Serum pool	3.27	0.07 (2.07)	0.09 (2.83)
Plasma pool	0.75	0.03 (3.39)	0.03 (3.66)
Plasma pool	1.30	0.03 (2.22)	0.05 (3.52)

b. Linearity/assay reportable range:

Multiple evaluations of the measuring range were performed:

(1) The instrument automatically diluted the STFR calibrator with System Diluent at the following five dilutions (bottle value) 1:1, 1:2.5, 1:5, 1:10, 1:25 and 1:50 to attain expected concentrations between 0.12 and 6.00 mg/L. The calibrator dilutions were measured in replicates of three and a median was calculated. Results are tabulated below:

Known calibrator concentration (mg/L)	Observed concentration (mg/L)
6.00	5.85
2.40	2.46
1.20	1.17
0.60	0.59
0.30	0.24
0.12	0.11

(2) A 1+1 mixture of serum samples with known high and low concentrations of STFR as determined by the Dade Behring N Latex STFR assay, were prepared and the STFR concentrations determined in replicates of five on the Dimension® Vista™ a System. For each sample preparation, the % recovery was calculated [% Recovery = (measured result / calculated result) x 100]. Results are shown in the table below.

Measured value of mixture (mg/L)	Expected value of mixture (mg/L)	Recovery
2.09	2.16	96.7%
2.18	2.18	99.9%
1.81	1.70	106.7%
2.19	2.31	94.7%
1.84	1.93	95.5%

(3) An additional linearity study was performed using a serum sample with a high concentration of soluble transferrin receptor. The sample was serially diluted with System Diluent down to near the lower measuring range (3.89 to 0.212 mg/L). Each dilution was tested in replicates of three. Results are shown below.

Volume Fraction (%)	Mean observed concentration (mg/L)	Expected Concentration (mg/L)	Recovery (%)
5.00%	0.212	0.195	109%
7.50%	0.285	0.292	98%
10.00%	0.409	0.389	105%
20.00%	0.758	0.778	97%
30.00%	1.10	1.17	94%
40.00%	1.46	1.56	94%
50.00%	1.88	1.95	96%
60.00%	2.23	2.33	95%
70.00%	2.65	2.72	97%
80.00%	3.11	3.11	100%
90.00%	3.54	3.50	101%
100.00%	3.89	3.89	100%

(4) A sample spiked to a concentration of 36 mg/L was diluted 1:50. Recovery was within 10%.

c. Traceability (controls, calibrators, or method):

Calibrators contain soluble transferrin receptor and other analytes in human serum.

Master Calibrator lots are traceable to a purified protein prepared and characterized by the manufacturer. The Master calibrator lot is used to assign the commercial lot values. Commercial lot values are validated based on multiple runs using multiple reference (calibration) curves (total n=144). Products are labeled with the assigned values, which can range from 0.83 to 1.70 mg/L.

Opened and closed calibrator stability studies support expiration dating.

d. Detection limit:

The claimed low end of the assay range is 0.17 mg/L. The manufacturer defines this detection limit of the assay based on multiple measurements of the sample diluent (Limit of Blank).

e. Analytical specificity:

The STFR method was evaluated for interference according to CLSI/NCCLS EP7-A2. Bias was defined as the difference in the results between the control sample (without the interferent) and the test sample (contains the interferent) expressed in percent. Results are tabulated below:

Substance Tested	Substance Concentration	STFR Concentration mg/L	Bias %
Hemoglobin (hemolysate)	1000 mg/dL	2.03	-9
Bilirubin (unconjugated)	60 mg/dL	1.93	+3
Bilirubin (conjugated)	60 mg/dL	1.93	+8

Non Interfering Substances

Biases due to the substances listed below are less than 10% at soluble transferrin receptor concentration of 0.52 mg/L to 2.17 mg/L.

Substance	Test Concentration
Acetaminophen	20 mg/dL
Amikacin	15 mg/dL
Ammonium heparin	3 U/mL
Ampicillin	5.3 mg/dL
Ascorbic acid	5 mg/dL
Caffeine	6 mg/dL
Carbamazepine	3 mg/dL
Chloramphenicol	5 mg/dL
Chlordiazepoxide	1 mg/dL
Chlorpromazine	0.2 mg/dL
Cholesterol	500 mg/dL
Cimetidine	2 mg/dL
Creatinine	30 mg/dL
Dextran 40	6000 mg/dL
Diazepam	0.5 mg/dL
Digoxin	5 ng/mL
Erythromycin	6 mg/dL
Ethanol	400 mg/dL
Ethosuximide	25 mg/dL
Furosemide	6 mg/dL
Gentamicin	12 mg/dL
Ibuprofen	50 mg/dL
Immunoglobulin G (IgG)	5 g/dL
Lidocaine	1.2 mg/dL
Lithium chloride	2.3 mg/dL

Substance	Test Concentration
Lithium heparin	3 U/mL
Nicotine	0.1 mg/dL
Penicillin G	25 U/mL
Pentobarbital	8 mg/dL
Phenobarbital	10 mg/dL
Phenytoin	5 mg/dL
Primidone	4 mg/dL
Propoxyphene	0.2 mg/dL
Protein, Albumin	6 g/dL
Protein, Total	12 g/dL
Rheumatoid Factors	500 IU/mL
Salicylic acid	60 mg/dL
Sodium heparin	3 U/mL
Theophylline	4 mg/dL
Urea	500 mg/dL
Uric acid	20 mg/dL
Valproic acid	50 mg/dL

f. Assay cut-off:

Not applicable.

2. Comparison studies:

a. Method comparison with predicate device

Serum (n=80) and plasma (n=73) samples were compared to a predicate device. The sample concentrations on the predicate device ranged from 0.25 to 3.61 mg/L. No specific sample selection criteria were applied in obtaining the samples. Data were analyzed using Passing-Bablok regression. The summary of results is tabulated below.

Analyte	Instruments	Slope (95% CI)	Intercept (CI)	Data range (U/L)	R	N
STFR	Dimension Vista™ vs. BN Prospec	1.05 (+1.04 to +1.08)	-0.08 (-0.10 to -0.06)	X=3.6 Y=4.1	0.99	153

b. Matrix comparison:

Not applicable.

3. Clinical studies:

a. Clinical sensitivity:

Not applicable.. (Not typically reviewed for this type of test.)

b. Clinical specificity:
Not applicable.. (Not typically reviewed for this type of test.)

4. Clinical cut-off:
Not applicable..

5. Expected values/Reference range:
The manufacturer reports the following:
Expected Values: 0.76 – 1.76 mg/L
The reference interval represents the 2.5th to 97.5th percentile derived from a study of 456 healthy adults (240 females and 216 males) from Central Europe*.

Each laboratory should establish its own expected values for soluble transferrin receptor as performed on the Dimension Vista™ System.

* Van den Bosch G, Van den Bossche J, Wagner C, et al. Determination of iron metabolism related reference values in a healthy adult population. Clin Chem. 2001; 47: 1465-7.

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 substantial equivalence decision.