510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

A. 510(k) Number:
k041155

B. Purpose for Submission:
New device

C. Analyte:
C-Reactive Protein

D. Type of Test:
Quantitative, latex particle enhanced immunoturbidimetric assay

E. Applicant:
Stanbio Laboratory

F. Proprietary and Established Names:
Wide Range C-Reactive Protein (Wr CRP) Assay

G. Regulatory Information:

1. Regulation section:
   21CFR § 866.5270, C-Reactive Protein Immunological Test System
   21CFR § 862.1660, Quality Control Material (Assayed and Unassayed)
   21CFR § 862.1150, Calibrator
2. Classification:
   Class II
   Class I
   Class II
3. Product Code:
   DCK, C-Reactive Protein, Antigen, Antiserum and Control
   JJX, Single (Specified) Analyte Controls (Assayed and Unassayed)
   JIT, Calibrator, Secondary
4. Panel:
   Immunology (82)
   Chemistry
   Chemistry

H. Intended Use:

1. Intended use(s):
   The Wide Range C-Reactive Protein (Wr CRP) Assay is an *in vitro* diagnostic test intended for the quantitative determination of C-reactive protein in human serum and plasma.

The Stanbio Wr CRP Multi-Calibrator Set A is for use in multi-calibration of the Stanbio Wr High-Sensitivity CRP (HS-CRP) quantitative assay.
The Stanbio Wr CRP Multi-Calibrator Set B is for use in multi-calibration of the Stanbio Wr CRP (Normal-CRP) quantitative assay.

The Stanbio CRP (HS) Control Set A and the CRP Control Set B (Normal sensitivity) is intended to be used to validate the accuracy and precision of tests for quantitative determination of CRP on photometric systems.

2. Indication(s) for use:
   The measurement of C-reactive protein aids in the diagnosis and evaluation of inflammation, infection and tissue injuries.
3. Special condition for use statement(s):
   The device is for prescription use only.
4. Special instrument Requirements:
   The device is suitable for automated analyzers that use a multipoint calibration method. Measurements of absorbance are to be made with a spectrophotometer able to read absorbances at 570 nm.

I. Device Description:

The device test kit is comprised of two reagents, Wr CRP buffer (R1) and Wr CRP latex (R2)

There are two sets of calibrators. Set A is high sensitivity, assay range of 0.005 to 1.500 mg/dL and Set B is normal sensitivity, assay range of 0.02 to 30.00mg/dL. Each has 5 levels. If medical condition warrants that some irritation is at hand, then the high sensitivity or Set A Calibrators would be run to determine level of inflammation. Should level exceed the top linear range for this set of calibrators, then Set B would be run to evaluate ranges above the lower level.

There are two sets of controls (Set A and Set B) with two levels each.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   Dade Behring N High Sensitivity CRP Assay
2. Predicate K number(s):
   k991385
3. Comparison with predicate:

Similarities		
Item	**Device**	**Predicate**
	Stanbio WrCRP	Dade Behring N High Sensitivity CRP
Intended Use	Quantitative determination of CRP in human serum and plasma	Same
Sample matrix	Serum and plasma	Same

Differences		
Item	**Device**	**Predicate**
Methodology	Particle enhanced turbidimetric immunoassay	Particle enhanced immunonephelometry
Calibration	Calibrated using lot independent standard	Calibrated using a lot dependent standard (included in the kit)

K. Standard/Guidance Document Referenced (if applicable):
None referenced

L. Test Principle:
The Stanbio WR™ CRP uses stabilized C - reactive protein coated latex particles which are monospecific for CRP. Calibrators, controls, and patient samples are pipetted into sample cups. Microvolume of samples and reagent buffer are automatically pipetted into individual cuvettes. Following an initial incubation, the latex enhanced anti-sera is added to the cuvettes. The immune responses created cause an increase in light scattering which correlates with the concentration of specimen CRP. Following an incubation period lasting approximately 10 minutes, the absorbance of the solution is measured at 500 nm.

A calibration curve is generated by assaying a series os calibrators with known concentrations os CRP using the instrument data reduction capability or manually plotting the changes in absorbance versus concentration. Concentration of the control and patient samples are interpolated from the calibration curve.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

With Calibrator Set A (HS-CRP) , within-day precision was established by running 20 assays on 3 sera. "Day-to-day" values were obtained by assaying three different sera daily for twenty days.

Within Day	Mean	SD	CV%
Sample 1	0.05	0.001	2.0
Sample 2	0.103	0.0009	0.87
Sample 3	1.203	0.007	0.58

Day-to- Day	Mean	SD	CV%
Sample 1	0.068	0.0022	3.2
Sample 2	0.237	0.003	1.27
Sample 3	1.074	0.016	0.99

With Calibrator Set B (Normal-CRP) , within-day precision was established by running 20 assays on 3 sera. "Day-to-day" values were obtained by assaying two different sera daily for twenty days.

Within Day	Mean	SD	CV%
Sample 1	0.1024	0.0042	4.1
Sample 2	0.1974	0.0044	2.2
Sample 3	19.92	0.40	2.0

Day-to- Day	Mean	SD	CV%
Sample 1	2.459	0.039	1.6
Sample 2	23.26	0.80	3.4

b. Linearity/assay reportable range:

Linearity of the method across the assay range for the High Sensitivity application was evaluated by serially diluting a known concentration of low CRP (2 mg/dL) with a buffer. A linear response was observed with slope of (-0.03), intercept of 1.08, and correlation coefficient of 0.9930. HS-CRP is linear from 0.-1.5 mg/dL

Linearity of the Normal CRP was evaluated by serially diluting a known concentration of high CRP (35 mg/dL) with a buffer .A linear response was observed with slope of (0.40), intercept of 1.15, and correlation coefficient of 0.9975. Normal CRP is linear from 0.02 to 30.0 mg/dL.

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

The calibrators and controls are verified against IFCC/BCR/CAP reference material for 15 plasma proteins CRM 470.

d. Detection limit:

With Calibrator Set A (HS-CRP), the sensitivity of the WR® CRP is 0.005 mg/dL.

With Calibrator Set B (Normal CRP), the sensitivity of the WR® CRP is 0.02 mg/dL.

Sensitivity is determined by running zero calibrator a total of 20 times each for Calibrator Set A and B. This represents the lowest concentration of CRP that can be distinguished from zero.

e. Analytical specificity:

<u>Interfering Substances</u>

The interference studies were conducted by taking spiked samples of serum that was assayed for their CRP content. Once the assay value was determined, the sample was split with the potential interfering substances (lipids, bilirubin and hemoglobin) added and re-assayed. A (±10%) difference was allowed for recovery from the initial assayed value.

Bilirubin up to 40 mg/dL, hemoglobin up to 500 mg/dL and lipemia (as triglycerides) up to 1500 mg/dL do not interfere with the assay.

f. Assay cut-off:
0.300 mg/dL from literature citation.

2. Comparison studies:
   a. Method comparison with predicate device:
   WR®CRP is compared with its predicate device, Dade Behring N High Sensitivity CRP.

   With Calibrator Set A, 24 serum specimens were assayed. The correlation coefficient was 0.986 and the regression equation was y = 1.016x + 0.125. For plasma, 23 specimens were assayed. The correlation coefficient was 0.996 and the regression equation was y = 1.0766x – 0.0258.

   With Calibrator Set B, 61 serum specimens were assayed. The correlation coefficient was 0.992 and the regression equation was y = 0.9157x + 0.2224. For plasma, 42 specimens were assayed. The correlation coefficient was 0.999 and the regression equation was y = 1.0235x – 0.0031
   b. Matrix comparison:
   Fifteen samples each of serum and plasma (in the high sensitivity range as well as the normal range) were spiked with various levels of CRP. With calibrator set A (HS-CRP), the correlation coefficient was 0.999 and the regression equation was y=1.0073x + 0.0004. With calibrator set B (Normal CRP), the correlation coefficient was 0.999 and the regression equation was y = 0.9866x – 0.2753.
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3. Clinical studies:
   a. Clinical sensitivity:
   Not provided.
   b. Clinical specificity:
   Not provided.
   c. Other clinical supportive data (when a and b are not applicable):
   Not applicable.
4. Clinical cut-off:
   Not provided.
5. Expected values/Reference range:
   Values for healthy individuals are below 0.300 mg/dL per published literature. It is recommended that each laboratory establish its own normal range.

N. Conclusion:

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