K053597

510(k) Summary

This summary of the 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1900 and CFR 807.92.

The assigned 510(k) number is:

Summary prepared on: December 9, 2005

JUL 2 1 2006

Submitted by:
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Establishment Registration Number: 2245578

Identification of Device:

Test:

Device Name: i-STAT® BNP Test
Proprietary/Trade Name: i-STAT® BNP Test
Common Name: BNP, B-Type Natriuretic Peptide
Device Classification: II
Regulation Number: CFR§ 862.1117
Panel: B-Type Natriuretic Peptide Test System
Product Code: NBC

Controls/calibration verification controls:

Device Name: i-STAT® BNP Control Level 1
i-STAT® BNP Control Level 2
i-STAT® BNP Control Level 3
i-STAT® BNP Calibration Verification Control Set
Proprietary/Trade Name: i-STAT® BNP Control Level 1
i-STAT® BNP Control Level 2
i-STAT® BNP Control Level 3
i-STAT® BNP Calibration Verification Control Set
Common Name: BNP controls, BNP calibration verification controls
Device Classification: I
Regulation Number: 21 CFR§ 862.1660
Panel: Single (Specified) Analyte Controls (Assayed and Unassayed)
Product Code: JJX

Identification of the Predicate Device:

Test:

Device Name: BNP test for use on the Biosite Triage® Meter.

Controls/calibration verification controls:

Device Name: Triage® BNP Calibration Verification Controls

Intended Use of the Device:

Test:

The i-STAT BNP test is an *in vitro* diagnostic test for the quantitative measurement of B-type natriuretic peptide (BNP) in whole blood or plasma samples using EDTA as the anticoagulant. BNP measurements can be used as an aid in the diagnosis and assessment of the severity of congestive heart failure.

The cartridge is to be used with the i-STAT 1 Analyzer bearing the (Immuno) symbol, but not with the i-STAT Portable Clinical Analyzer or the Philips Medical Systems (formerly Agilent Technologies) Blood Analysis Module (BAM). As part of the i-STAT System, the BNP test is to be used by trained health care professionals in accordance with a facility's policies and procedures.

Controls:

The i-STAT BNP Controls are assayed liquid plasma used to verify the integrity of newly received i-STAT BNP cartridges.

Calibration verification controls:

The i-STAT BNP Calibration Verification Controls are assayed liquid plasma used to verify the calibration of i-STAT BNP cartridges throughout the reportable range.

Description of the Device:

Test:

The i-STAT BNP test is contained in a single-use test cartridge. In use, the user scans a bar code and then places approximately 17 µL of whole blood or plasma in the cartridge. After the cartridge is closed, it is inserted into the thermally controlled i-STAT 1 Analyzer, and all analytical steps are performed automatically. Patient and use information may be entered into the analyzer via a keypad during the automated analysis cycle.

As the analyzer performs several quality checks and controls the temperature of the sensors via resistive heating to the underside of the sensor chips, the substrate/wash fluid is released into a conduit within the cartridge and a metered volume of the sample over the sensor chips. The enzyme-linked antibody conjugate dissolves into the sample and the sample incubates for a controlled time. The sample is then pushed into a waste chamber and the substrate/wash solution is brought over the sensors. The alkaline phosphatase captured on the BNP sensor cleaves the substrate present in the substrate/wash fluid, giving rise to an amperometric signal that is measured.

Controls:

The i-STAT BNP Controls are supplied in three levels packaged as six vials of one level per box with each vial containing 1 mL of control material. The three levels are in frozen liquid form, require no reconstitution or dilution, and are each comprised of a different level of BNP, a chemical synthetic peptide, prepared in human EDTA plasma and preserved with sodium azide. The first level of BNP is set at a typical diagnostic cutoff level while the second and third are set at higher levels spanning the range of the test. The BNP value will be provided in the value assignment sheet for each level.

Calibration verification controls:

The i-STAT BNP Calibration Verification Control Set is packaged as a tri-level set comprised of two vials of each of three levels per box. The three levels in the BNP Calibration Verification Control Set are exactly the same materials as those used in the Level 1, Level 2, and Level 3 control products. The only difference between this product and the i-STAT BNP Controls is the number of vials and the number of levels that are packaged together.

Comparison to Technological Features of the Predicate Device:

The following is a comparison of technological features of the i-STAT and Biosite Triage BNP test methods:

Characteristic	Triage BNP	i-STAT BNP
Assay methodology	Two-site ELISA	Two-site ELISA
Capture site	Heterogeneous	Heterogeneous
Capture antibodies	Monoclonal	Monoclonal
Enzyme label antibody	Monoclonal	Monoclonal
Enzyme label	Fluorescent dye	Alkaline phosphatase
Analysis sequence	Simultaneous capture/label	Simultaneous capture/label
Analysis time	15 minutes	10 minutes
Sample type	Whole blood or plasma	Whole blood or plasma
Enzyme detection	Fluorescent	Electrochemical

The similarities and differences between the i-STAT controls products and the Biosite Triage BNP control products can be seen in the table below:

Characteristics	Triage BNP Calibration Verification Controls (predicate device)	i-STAT BNP Control Level 1, 2, & 3 and i-STAT BNP Calibration Verification Control Set (new device)
Similarities		
Matrix	Human Plasma	Human Plasma
Form	Frozen liquid	Frozen liquid
Analytes	BNP (assayed)	BNP (assayed)
Number of Levels	Three	Three
Differences		
Opened Vial Claim	Tested same day as thaw	4 hours when stored at 2 to 8°C
Vial	Plastic vial with screw top lid	10 mL plastic vial with dropper-top
Fill volume	0.5 ml	1 ml
Storage (unopened)	≤ -20 °C until expiration date	≤ -18°C until expiration date

Summary of Performance in Support of Substantial Equivalence:

Test:

- Studies established that the i-STAT BNP test is insensitive to hematocrit levels from 0 to 60 %PCV.
- The i-STAT BNP assay is not significantly influenced by the presence of NT-pro-BNP, ANP or CNP at 1000 pg/mL or 20,000 pg/mL.
- Studies established that there are no significant interference effects on the i-STAT BNP test from common medications, particularly those commonly prescribed to patients with cardiovascular conditions.
- Studies established that the lower limit of detection (LLD) for the i-STAT method is 15 pg/mL versus 5.0 pg/mL for the Triage BNP test.
- The imprecision of the i-STAT BNP test using plasma controls was established using in-house studies. The Level 1 Control %CV was 11.1% at 126 pg/mL; the Level 2 Control %CV was 8.1% at 1551 pg/mL, and the Level 3 Control %CV was 9.8% at 3337 pg/mL. This includes within-lot, lot-to-lot, vial-to-vial, analyzer-to-analyzer, and operator-to-operator components of the imprecision.

Studies conducted in-house compared the results of the i-STAT BNP test to those of the BNP test on the Abbott ARCHITECT. EDTA-anticoagulated samples were analyzed on both systems. The methods were compared using Deming regression analysis. The results are summarized in the table below:

Statistic	Definition	i-STAT vs. Abbott ARCHITECT	
		all samples	samples where [BNP] <400 pg/mL
N	The number of patient samples included in the data set	433	312
Mean	The average of the comparative method result over the sample population	482.1	51.9
Range	The range of comparative method results obtained over the sample population	5.0 – 4797.7	5.0 – 400.0
Sxx	The pooled estimate of the within-sample standard deviation of the comparative method over the sample population	38.1	7.2
Syy	The pooled estimate of the within-sample standard deviation of the test method over the sample population	97.6	11.5
Slope	The Deming slope of the correlation	0.971	1.13
Intercept	The Deming intercept of the correlation	-14.4	-7.3
Correlation	The correlation coefficient determined from regression	0.972	0.964
Sy.x	The standard error of the estimate of the regression of the regression of y (test method) on x (comparative method) calculated using the regular regression slope	198.0	25.7

Controls/calibration verification controls:

- The within-level vial-to-vial imprecision for all three levels of the i-STAT BNP controls was found to range from 0.8% to 5.8% testing three lots of each control level.
- Studies demonstrated that all three levels meet the claim of 4 hours' stability after the product has been thawed.

Conclusions:

Test:

Based on the data, the i-STAT BNP test is insensitive to hematocrit level from 0 – 60 %PCV, is not significantly influenced by the presence of related peptides, shows no significant interference effects to common drugs, and has a comparable lower limit of detection (LLD) as the Biosite Triage BNP. Studies using plasma controls indicate adequate imprecision for low, mid-range, and high results. Clinical data indicates acceptable correlation to the predicate device.

Controls/calibration verification controls:

The i-STAT BNP Controls Level 1, Level 2, and Level 3, and the i-STAT BNP Calibration Verification Control Set are substantially equivalent to the previously cleared Triage® BNP Calibration Verification Controls as indicated by the data.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

Paul VanDerWerf, Ph.D.
Director, Regulatory Affairs
i-STAT Corporation
104 Windsor Center Drive
East Windsor, NJ 08520

JUL 21 2006

Re: k053597
Trade/Device Name: i-STAT BNP test
i-STAT BNP Control Level 1
i-STAT BNP Control Level 2
i-STAT BNP Control Level 3
i-STAT BNP Calibration Verification Control Set
Regulation Number: 21 CFR§862.1117
Regulation Name: B-type natriuretic peptide test system
Regulatory Class: Class II
Product Code: NBC, JJX
Dated: June 14, 2006
Received: June 15, 2006

Dear Dr. VanDerWerf

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.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. 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); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific information about the application of labeling requirements to your device, or questions on the promotion and advertising of your device, please contact the Office of In Vitro Diagnostic Device Evaluation and Safety at (240) 276-0484. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). 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) 443-6597 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

Alberto Gutierrez, Ph.D.
Director
Division of Chemistry and Toxicology
Office of In Vitro Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

3 a. Indications for use

510(k) Number (if known): K053597

Device Name: i-STAT BNP test

The i-STAT BNP test is an *in vitro* diagnostic test for the quantitative measurement of B-Type Natriuretic Peptide (BNP) in whole blood or plasma samples using EDTA as the anticoagulant. BNP measurements can be used as an aid in the diagnosis and assessment of the severity of congestive heart failure.

Prescription Use _____ AND/OR Over-The-Counter Use _____
(Part 21 CFR 801 Subpart D) (21 CFR 801 Subpart C)
o

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Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Carol C. Benson
Division Sign-Off

Office of In Vitro Diagnostic Device
Evaluation and Safety

(Optional) K053597

3 b. Indications for use

510(k) Number (if known): K053597

Device Names: i-STAT BNP Control Level 1
i-STAT BNP Control Level 2
i-STAT BNP Control Level 3

The i-STAT BNP Controls are assayed liquid plasma used to verify the integrity of newly received i-STAT BNP cartridges.

Prescription Use ✓ AND/OR Over-The-Counter Use _____
(Part 21 CFR 801 Subpart D) (21 CFR 801 Subpart C)

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Concurrence of CDRH, Office of In Vitro Diagnostic Devices (OIVD)

Carol Benson

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Office of In Vitro Diagnostic Device
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3 c. Indications for use

510(k) Number (if known): K053597

Device Name: i-STAT BNP Calibration Verification Control Set

The i-STAT BNP Calibration Verification Controls are assayed liquid plasma used to verify the calibration of i-STAT BNP cartridges throughout the reportable range.

(Prescription Use ✓ AND/OR Over-The-Counter Use _____
(Part 21 CFR 801 Subpart D) (21 CFR 801 Subpart C)
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Carol C Benson

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