MAR 13 2006

*Status*First™ CHF NT-proBNP and DXpress™ Reader system
510(k) Premarket Submission
K051596

Summary of Safety and Effectiveness of *Status*First™ CHF NT-proBNP

This 510(k) summary of safety and effectiveness is submitted in accordance with the requirements of 21 CFR Sec. 807.92.

Submitter's Name	Nanogen Inc.
Address	10398 Pacific Center Court San Diego, California 92121
Phone Number	858-410-4877
Contact Person	Van N. Schramm Vice President, Regulatory Affairs and Quality Assurance
Date of Original Preparation	June 13, 2005
Date of Response to Request for Additional Information	March 6, 2006
Device Names	Trade Name: *Status*First™ CHF NT-proBNP Common Name: Immunoassay for the quantitative determination of NT-proBNP in human EDTA plasma Classification Name: B-Type Natriuretic Peptide Test system (21 CFR 862.1117, product code NBC)
Predicate Device	Roche's Elecsys® pro-BNP Immunoassay K032646
Intended Use	*Status*First™ CHF (Congestive Heart Failure) NT-proBNP is a rapid test for the *in vitro* quantitative determination of N-terminal pro-Brain natriuretic peptide (NT-proBNP) in human EDTA plasma. The device is intended for use with the DXpress™ Reader to provide quantitative results as an aid in the diagnosis of CHF.

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Device Description

The *Status*First™ CHF NT-proBNP test device utilizes biotin coupled anti-NT-proBNP antibody/streptavidin solid-phase chromatographic immunoassay technology to quantitatively determine the concentration of NT-proBNP in human EDTA plasma. After a sample has been dispensed into the sample well, the *Status*First™ CHF NT-proBNP test device is placed in the DXpress™ Reader. The DXpress™ Reader displays the NT-proBNP concentration 15 minutes after sample addition. The DXpress™ Reader is programmed to automatically convert the intensity of the test band (as indicated by the "pBNP" line on the test device) into a concentration of NT-proBNP by using lot specific calibration factors supplied with each box of 20 *Status*First™ CHF NT-proBNP test devices. The NT-proBNP concentration in the sample correlates with the intensity of the test band.

Comparison to Predicate

A method comparison was performed using a total of 355 CHF subjects and 333 non-CHF subjects. The non-CHF subjects include 282 apparently healthy subjects and 51 subjects with diabetes, renal insufficiency, hypertension or chronic obstructive pulmonary disease.

NT-proBNP levels from the above patient samples were measured with both the *Status*First™ CHF NT-proBNP test in conjunction with the DXpress™ Reader, and the Roche Elecsys® proBNP immunoassay on the Roche Elecsys® 2010 immunoassay analyzer. Results within the measuring range of the *Status*First™ CHF NT-proBNP test (20-5,000 pg/mL) were analyzed using Passing-Bablok regression.

a. CHF subjects
*Status*First™ CHF NT-proBNP = 50.2 pg/mL+0.899* Elecsys® proBNP
95% confidence interval for intercept = [18.3, 74.0]
95% confidence interval for slope = [0.868, 0.939]
Spearman Rank correlation was calculated as 0.922 with n = 324

b. Non-CHF subjects
*Status*First™ CHF NT-proBNP = 5.0 pg/mL+1.022* Elecsys® proBNP
95% confidence interval for intercept = [0.3206, 9.4558]
95% confidence interval for slope = [0.9648, 1.0913]
Spearman Rank correlation was calculated as 0.948 with n = 324

c. All subjects

*Status*First™ CHF NT-proBNP = 9.4 pg/mL+0.956* Elecsys® proBNP
95% confidence interval for intercept = [5.1, 12.6]
95% confidence interval for slope = [0.934, 0.981]
Spearman Rank correlation was calculated as 0.973 with n = 648

The table below compares the *Status*First™ CHF NT-proBNP test to the predicate device.

Comparison to Predicate

Feature	***Status*First™ CHF NT-proBNP**	**Elecsys® proBNP**
510(k) number	**K051596**	**K032646**
Intended Use	Immunoassay for the *in vitro* quantitative determination of N-terminal pro-Brain natriuretic peptide in human EDTA plasma	Immunoassay for the *in vitro* quantitative determination of N-terminal pro-Brain natriuretic peptide in human serum and plasma
Indication for Use	*Status*First™ CHF NT-proBNP is a rapid test used for the quantitative determination of N-terminal pro-Brain natriuretic peptide (NT-proBNP) in human EDTA plasma. The device is intended to be used with the DXpress™ Reader to provide quantitative results as an aid in the diagnosis of CHF.	Elecsys® proBNP is used as an aid in the diagnosis of individuals suspected of having congestive heart failure. The test is further indicated for the risk stratification of patients with acute coronary syndrome and congestive heart failure.
Assay Protocol (Type)	Chromatographic Immunoassay	Electrochemiluminescence Immunoassay
Reference	Roche Elecsys® proBNP assay	Roche purified synthetic NT-proBNP
Calibration Interval	Calibration of each specific lot is performed by the manufacturer using clinical calibrators and employing a 5-parameter logistic curve fit. For each new lot, the end-user needs only transfer calibration information to the reader(s) from the lot-specific data chip provided. Once transferred (a one-time only requirement), the calibration information is good until the expiration date of the *Status*First™ CHF NT-proBNP test device.	E170/E2010 • After 1 month when using the same reagent lot • After 7 days when using the same reagent kit E1010 • With every reagent kit • After 7 days (20-25°C) • After 3 days (25-32°C)

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Feature	***Status*First™ CHF NT-proBNP**	**Elecsys® proBNP**
510(k) number	**K051596**	**K032646**
Sample Type	Human EDTA plasma	Human serum and plasma
Reagent Stability	Unopened • Up to stated expiration date when stored at 2-8°C • Stable for 14 days when stored at 18-30°C, provided the expiration date printed on the pouch is not exceeded	Unopened • Up to stated expiration date when stored at 2-8°C Opened • 12 weeks at 2-8°C • 8 weeks on E170 • 8 weeks on E2010 • 4 weeks on E1010 (20-25°C ambient temp – up to 20 hours opened in total)
Calibrator	Electronic code chip	Elecsys® proBNP CalSet
Controls	Commercially available proBNP controls	Elecsys® PreciControl proBNP
Result Interpretation (Cut-off)	125 pg/mL for patients younger than 75 years and 450 pg/mL for patients 75 years and older	125 pg/mL for patients younger than 75 years and 450 pg/ml for patients 75 years and older
Instrument	DXpress™ Reader	Elecsys 1010, Elecsys 2010 and MODULAR analytics E170 family of analyzers
Measuring Range	20-5,000 pg/mL	5-35,000 pg/mL
Antibody	Monoclonal (mouse) antibody and Polyclonal (goat) antibody	Polyclonal (sheep) antibody
Sample Volume	3 drops using dropper provided with test device	20 µL
Precision	Within run 11.1%CV @ 64.9 pg/mL 12.8%CV @ 103.5 pg/mL 13.1%CV @ 375.5 pg/mL 16.8%CV @ 2145.8 pg/mL Total 12.4%CV @ 64.9 pg/mL 13.7%CV @ 103.5 pg/mL 13.9%CV @ 375.5 pg/mL 18.1%CV @ 2145.8 pg/mL	E170 – Within run 0.9%CV @ 474 pg/mL 1.1%CV @ 8005 pg/mL 0.9%CV @ 13682 pg/mL E170 – Total 5.8%CV @ 494 pg/mL 4.1%CV @ 7827 pg/mL 3.7%CV @13143 pg/mL E1010/2010 – Within run 2.7%CV @ 175 pg/mL 2.4%CV @ 355pg/mL 1.9%CV @ 1068 pg/mL 1.8%CV @ 4962 pg/mL E1010/2010 – Total 3.2%CV @175 pg/mL 2.9%CV @ 355 pg/mL 2.6%CV @ 1068 pg/mL 2.3%CV @ 4962 pg/mL
Hook Effect	No effect up to 300,000 pg/mL	No effect up to 300,000 pg/mL
Functional Sensitivity	20 pg/mL	< 50 pg/mL
Limit of Detection	20 pg/mL	5 pg/mL
Specificity	No substance demonstrated	The pharmaceutical Natrecor®

Feature	*Status*First™ CHF NT-proBNP	Elecsys® proBNP
510(k) number	**K051596**	**K032646**
	significant cross-reactivity (% cross-reactivity < 0.1%)	shows no significant cross-reactivity at 300 pg/mL and 3,000 pg/mL NT-proBNP; sixteen other substances also show no significant cross reactivity.
Limitations	• No interference from bilirubin up to 10.0 mg/dL • No interference from hemoglobin up to 100 mg/dL • No interference from triglycerides up to 1500 mg/dL • No interference with d-biotin up to 100 ng/mL • In patients receiving high biotin doses (5mg/day), samples may be used without the need to wait for clearance of potentially circulating biotin • No interference observed from rheumatoid factors up to 2030 IU/mL • No interference with creatinine up to 20 µg/mL • No interference from high levels of human albumin (up to 16 g/dL) • No interference with 63 commonly used pharmaceuticals • Use in conjunction with patient medical history, clinical exam and other findings	• No interference from bilirubin up to 35 mg/dL • No interference from hemoglobin up to 1400 mg/dL • No interference from triglycerides up to 4000 mg/dL • No interference with biotin up to 30 ng/mL • In patients receiving high biotin doses > 5 mg/dL, sample should not be taken until 8 hours after administration • No interference from rheumatoid factor up to 1500 IU/mL • Rare occurrence of interference from high tiers of anti-streptavidin and ruthenium • No interference with 51 commonly used pharmaceuticals • Use in conjunction with patient medical history, clinical exam and other findings

Comments and conclusion on Substantial Equivalence

The *Status*First™ CHF NT-proBNP and the Elecsys® proBNP assays are both intended for the *in vitro* quantitative determination of NT-proBNP.
Both tests are indicated for use as an aid in the diagnosis of Congestive Heart Failure.

Good correlation has been demonstrated between the *Status*First™ CHF NT-proBNP and the Elecsys® proBNP assays.

*Status*First™ CHF NT-proBNP and the Elecsys® proBNP devices are substantially equivalent based upon their intended use and performance characteristics.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

MAR 13 2006

Ms. Van N. Schramm
Vice President, Quality Assurance and Regulatory Affairs
Nanogen, Inc.
10398 Pacific Center Court
San Diego, CA 92121

Re: k051596
Trade/Device Name: *Status*First™ CHF NT-proBNP
Regulation Number: 21 CFR§862.1117
Regulation Name: B-type natriuretic peptide test system
Regulatory Class: Class II
Product Code: NBC
Dated: February 17, 2006
Received: February 21, 2006

Dear Ms. Schramm:

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

Indications for Use

510(k) Number (if known): K051596

Device Name: *Status*First™ CHF NT-proBNP

Indications for Use: *Status*First™ CHF (Congestive Heart Failure) NT-proBNP is a rapid test for the *in-vitro* quantitative determination of N-terminal pro-Brain natriuretic peptide (NT-proBNP) in human EDTA plasma. The device is intended for use with the DXpress™ Reader to provide quantitative results as an aid in the diagnosis of CHF.

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

(PLEASE DO NOT WRITE BELOW THIS LINE-CONTINUE ON ANOTHER PAGE IF NEEDED)

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

510(k) K051596