K033360

DEC 2 3 2003

DIAZYME

Summary

Submitter's name: Diazyme Laboratories Division, General Atomics

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Date the summary was prepared: October 16, 2003

Name of the device: Lithium Enzymatic Assay
Trade Name: Diazyme Lithium Enzymatic Assay
Common/Usual Name: Enzymatic Assay, Lithium
Classification Name: Single (Specified) Analyte Controls (Per 21CFR section 862.1660)
Device Class: II

Predicate Device:

The legally marketed device to which we are claiming equivalence [807.92(a)(3)]:
Trace Lithium Reagent (K003583) manufactured by Trace America, Inc., Arlington, Texas.

Description of the devices

Currently, the most commonly used methods to detect serum lithium are ion-selective electrode (ISE) atomic absorption spectrophotometry, and flame emission photometry. However, routine maintenance of these analyzers requires much effort and sometimes can be cumbersome. Diazyme's lithium enzymatic assay is a spectrophotometric method, which can be adapted to most automated clinical chemistry analyzers.

In Diazyme's lithium enzymatic assay, Lithium is determined spectrophotometrically through a kinetic coupling assay system involving a Diazyme's proprietary phosphatase whose activity is sensitive to lithium concentration (IC_{50}=0.1mM). Through enzymatic coupling, the phosphatase substrate, adenosine biphosphate (PAP) is converted to hypoxanthine by a series of enzymatic reactions to generate uric acid and hydrogen peroxide (H_2O_2). H_2O_2 generated reacts with N-Ethyl-N-(2-hydroxy-3-sulfopropyl)-3-m-toluidine (EHSPT) and 4-aminoantipyrine (4-AA) in the

presence of peroxidase (POD) to form a quinone dye which has maximal absorbance at 556nm. The rate of the quinine dye formation is inversely proportion to the concentration of lithium in serum samples.

Intended Use of the Device:

Diazyme Lithium Enzymatic Assay Kit is for quantitative *in vitro* determination of lithium in human serum and plasma. Measurements of lithium are carried out essentially to ensure that proper drug dosage is administered in the treatment of patient suffering from bipolar disorder and to avoid toxicity.

Performance Characteristics

Diazyme's lithium enzymatic assay is a two reagent (R1 and R2) based kinetic assay system. The results are obtained in 10 min by measuring absorbance at 550 nm. No off line pretreatment is needed. The assay has a wide measuring range from 0 to 3 mmol/L. The assay offers excellent precision as shown in the table below:

	1.0mM Li^+	2.4mM Li^+
Within Precision	CV%=4.7%	CV%=3.3%
Total Precision	CV%=6.9%	CV%=5.5%

Diazyme's Lithium Enzymatic assay has good correlation with both Trace colorimetric method and ISE method (correlation coefficient of 0.97 for both methods). We have conducted interference study by spiking the substances to be tested to the pooled human sera and found little interference at the indicated concentrations

Interference	Concentration
NH_4Cl	0.5 mM
KPi	1.5 mM
$CaCl_2$	5 mM
NaCl	200 mM
KCl	10mM
$CuCl_2$	0.25 mM
$FeCl_3$	0.25mM
$ZnCl_2$	0.25 mM
Triglyceride	250mg/dl
Ascorbic Acid	5 mM
Bilirubin	45 mg/dl

Conclusion: Comparison analysis presented in the 510K submission for this device in the comparison section, together with linearity, precision and interference study presented demonstrated that the Diazyme's Lithium Enzymatic assay has excellent accuracy and is safe and effective. There is no significant deviation between the results obtained by Diazyme's Lithium Enzymatic assay and legally marketed predicate Trace Lithium Reagent when testing clinical patient serum samples. Therefore, Diazyme's Lithium Enzymatic assay is substantially

similar to the commercially available products to measure lithium levels in human serum samples.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

DEC 2 3 2003

Chong Yuan, Ph.D.
Managing Director
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3550 General Atomics Court
San Diego, CA 92121-1194

Re: k033360
Trade/Device Name: Diazyme Lithium Enzymatic Assay Kit
Regulation Number: 21 CFR 862.3560
Regulation Name: Lithium test system
Regulatory Class: Class II
Product Code: JII
Dated: October 16, 2003
Received: October 29, 2003

Dear Dr. Yuan:

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 (301) 594-3084. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). Other general information on your responsibilities under the Act may be obtained 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/dsma/dsmamain.html.

Sincerely yours,

Steven Gutman

Steven I. Gutman, M.D., M.B.A.
Director
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

FDA INDICATIONS FOR USE FORM

510(k) Number (if known): K033360

Device Name: Diazyme Lithium Enzymatic Assay Kit

Indications for Use:

Diazyme Lithium Enzymatic Assay Kit is for quantitative *in vitro* determination of lithium in human serum. Measurements of lithium are carried out essentially to ensure that proper drug dosage is administered in the treatment of patient suffering from bipolar disorder and to avoid toxicity.

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

Concurrence of CDRH, Office of Device Evaluation (ODE)

Prescription Use ✓ **OR** **Over-The-Counter Use**

(Per 21 CFR 801.109)

(Optional Format 1-2-96)

Carol Benson

Division Sign-Off

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) K033360