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K032764

September 1, 2003

Document Mail Center (HFZ-401)
Center for Devices and Radiological Health
Food and Drug Administration
9200 Corporate Blvd.
Rockville, Maryland 20850

RE: Premarket Notification [510(k)] for Barbiturate Enzyme Immunoassay

Attention: Document Control Clerk

In accordance with the requirements of the Section 510(k) of the Federal Food, Drug, and Cosmetic Act, Lin-Zhi International, Inc. hereby notifies you of its intention to introduce into interstate commerce for commercial distribution of the Barbiturate Enzyme Immunoassay for qualitative and semi-quantitative determination of barbiturates in human urine.

This test kit is based on the principle of specific inhibition of enzyme activity of an enzyme-drug conjugate by the specific antibody to the drug, which is identical to the homogeneous enzyme immunoassay currently available Emit® II Plus Barbiturate Assay by Syva Company (Dade Behring Inc.) in the commercial distribution.

The following information is being submitted in conformance to the requirements of 21 CFR 807.87:

1. Classification Name: Barbiturate Test System
   Common/Usual Name: Homogeneous enzyme immunoassay for the determination of Barbiturates levels in urine.
   Proprietary Name: None

2. Establishment Registration Number: 3003610499

3. Classification: The Barbiturate test system has been placed in Class II by the Bureau of Medical Devices.
   Classification Number: DIS (21 CFR 862.3150)
   Panel: 91 Toxicology

4. Performance Standards: No applicable standards have been established under Section 514 of the Act.

510(k) Summary of Safety and Effectiveness

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

Introduction

According to the requirements of 21 CFR 807.92, the following information provides sufficient detail to understand the basis for a determination of substantial equivalence.

Submitter name, Address, and Contact

Lin-Zhi International, Inc.
687 North Pastoria Avenue
Sunnyvale, CA 94085
Phone: (408) 732-3856
Fax: (408) 732-3849

Contact: Cheng-I Lin, Ph.D.
President, R&D Director

Device Name and Classification

Classification Name:	Barbiturate test system, Class II, DIS (91 Toxicology), 21CFR 862.3150
Common Name:	Homogeneous enzyme immunoassay for the determination of Barbiturates levels in urine.
Proprietary Name:	None

Legally Marketed Predicate Device(s)

Lin-Zhi International, Inc.' Barbiturate Enzyme Immunoassay is substantially equivalent to Syva EMIT® II Plus Barbiturate Assay (By Syva Company-Dade Behring Inc.), cleared under premarket notification K010934.

LZI's Barbiturate Enzyme Immunoassay is identical or similar to its predicate in terms of intended use, method principle, device components, and clinical performance.

Device Description

LZI's Barbiturate Enzyme Immunoassay is a ready-to-use, liquid reagent, homogeneous enzyme immunoassay. The assay uses specific antibody that can detect barbiturates in human urine with minimal cross-reactivity to various, common prescription drugs and abused drugs.

The assay is based on competition between barbiturate labeled with glucose-6-phosphate dehydrogenase (G6PDH) enzyme and free drug from the urine sample for a fixed amount of specific antibody. In the absence of free drug from the urine sample the specific antibody binds to the drug labeled G6PDH enzyme causing a decrease in enzyme activity. It is therefore the drug concentration is proportional to the enzyme activity. The G6PDH enzyme activity is determined spectrophotometrically at 340 nm by measuring its ability to covert nicotinamide adenine dinucleotide (NAD) to NADH.

Intended Use

The Barbiturate Enzyme Immunoassay is a homogeneous enzyme immunoassay with a 200 ng/mL and/or 300 ng/mL cutoff. The assay is intended for use in the qualitative and semi-quantitative analyses of barbiturates in human urine.

Comparison to Predicate Device

LZI's Barbiturate Enzyme Immunoassay is substantially equivalent to other products in commercially distribution intended for similar use. Most notably it is substantially equivalent to the currently, commercially marketed Emit® II Plus Barbiturate Assay (K010934) by Syva Company-Dade Behring Inc.

The following table compares LZI's Barbiturate Enzyme Immunoassay with the predicate device, Emit® II Plus Barbiturate Assay by Syva Company-Dade Behring Inc.

Similarities:

- Both assays are for qualitative and semi-quantitative determination of barbiturates in human urine.
- Both have dual cutoff design (200 ng/mL or 300 ng/mL).
- Both assays use 5 points calibration for semi-quantitative determination.
- Both assays use secobarbital as calibrators and controls.
- Both assays use the same method principle, and device components.

Difference:

- Syva's assay uses 150, 225, 250, 375 ng/mL for various control levels. LZI's assay uses 100, 200, 300, 400 ng/mL for various control levels.
- Syva's assay uses 0, 100, 200, 300 and 800 ng/mL, LZI's assay uses 0, 100, 200, 300 and 1000 ng/mL 5 points calibration for semi-quantitative assay.

Performance Characteristics

Feature	SYVA's Barbiturate EIA				LZI's Barbiturate EIA			
Within Run Precision:								
Qualitative:	(mA/min.)	Mean.	SD	% CV	(mA/min.)	Mean	SD	% CV
	Negative	205.8	0.9	0.4	Negative	269.1	2.2	0.8
	150 ng/mL	242.1	1.0	0.4	100 ng/mL	311.1	1.9	0.6
	200 ng/mL	258.4	1.2	0.5	200 ng/mL	354.2	3.7	1.1
	225 ng/mL	266.9	1.1	0.4	300 ng/mL	385.1	3.1	0.1
	250 ng/mL	276.4	1.2	0.4	400 ng/mL	404.7	2.9	0.7
	300 ng/mL	295.8	1.4	0.5	1000 ng/mL	445.3	2.7	0.6
	375 ng/mL	326.4	1.2	0.4				
Semi-quantitative:	(ng/mL)	Mean	SD	%CV	(ng/mL)	Mean	SD	%CV
	150 ng/mL	144.0	5.5	3.8	100 ng/mL	99.0	4.7	4.8
	200 ng/mL	191.4	3.5	1.8	200 ng/mL	194.7	7.4	3.8
	225 ng/mL	215.7	3.2	1.5	300 ng/mL	294.3	8.3	2.8
	250 ng/mL	242.6	3.4	1.4	400 ng/ml	386.5	13.7	3.6
	300 ng/mL	297.9	4.0	1.3	Secobarb only			
	375 ng/mL	390.1	3.8	1.0				
Run-To-Run Precision:								
Qualitative:	(mA/min.)	Mean	SD	% CV	(mA/min.)	Mean	SD	% CV
	Negative	205.8	1.2	0.6	Negative	271.1	2.3	0.8
	150 ng/mL	242.1	1.4	0.6	100 ng/mL	314.8	2.2	0.7
	200 ng/mL	258.4	1.5	0.6	200 ng/mL	359.0	1.9	0.5
	225 ng/mL	266.9	1.7	0.6	300 ng/mL	389.5	1.7	0.4
	250 ng/mL	276.4	1.7	0.6	400 ng/mL	405.6	1.8	0.4
	300 ng/mL	295.8	1.9	0.6	1000 ng/mL	447.4	1.6	0.4
	375 ng/mL	326.4	2.3	0.7		P 18		
Semi-quantitative:	(ng/mL)	Mean	SD	%CV	(ng/mL)	Mean	SD	%CV
	150 ng/mL	144.0	6.0	4.2	100 ng/mL	102.7	3.2	3.1
	200 ng/mL	191.4	4.5	2.4	200 ng/mL	191.6	9.3	4.9
	225 ng/mL	215.7	4.1	1.9	300 ng/mL	290.3	14.0	4.8
	250 ng/mL	242.6	5.8	2.4	400 ng/ml	385.3	12.7	3.3
	300 ng/mL	297.9	6.2	2.1				
	375 ng/mL	390.1	7.3	1.9		P. 19		
Sensitivity:	20 ng/mL				25 ng/mL			
Accuracy:	Vs. a commercial EIA				Vs. Syva (n=105)			
Positive Samples:	95.6 % agreement				91.1 % agreement(100% vs. GC/MS /HPLC)			
Negative Samples:	99% agreement				100 % agreement			
Analytical Recovery:								
Qualitative:	100 % accuracy on positive vs. negative tests				100 % accuracy on positive vs. negative tests			
Semi-quantitative:	Quantitates within ±15% of the nominal concentration between 40 ng/mL and 900 ng/mL.				Quantitates within ±15% of the nominal concentration between 40 ng/mL and 800 ng/mL.			
Specificity:	See attached Syva's Barbiturate Assay package insert				Comparable to the predicate device.			

Conclusion

LZI's Barbiturate Enzyme Immunoassay was evaluated for several performance characteristics including precision, sensitivity, accuracy, analytical recovery, and specificity. All the studies showed acceptable results when compared to the predicate device.

We trust the information provided in this Premarket Notification [510(k)] submission will support a determination of substantial equivalence of the LZI's Barbiturate Enzyme Immunoassay to other Barbiturate test systems currently marketed in the United States.

510(k) Summary of Safety and Effectiveness

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

Introduction

According to the requirements of 21 CFR 807.92, the following information provides sufficient detail to understand the basis for a determination of substantial equivalence.

Submitter name, Address, and Contact

Lin-Zhi International, Inc.
687 North Pastoria Avenue
Sunnyvale, CA 94085
Phone: (408) 732-3856
Fax: (408) 732-3849

Contact: Cheng-I Lin, Ph.D.
President

Device Name and Classification

(a) Classification Name: Calibrators, Drug Specific;
Class II, DLJ (91 Toxicology), 21 CFR 862.3200
Common/Usual Name: Secobarbital Calibrators
Proprietary Name: None

(b) Classification Name: Single (Specified) Analyte Controls (Assayed and Unassayed);
Class I, LAS (91 Toxicology), 21 CFR 862.3280
Common/Usual Name: Secobarbital Controls
Proprietary Name: None

Legally Marketed Predicate Device(s)

Lin-Zhi International, Inc.'s Barbiturate Urine Drugs of Abuse Calibrators and Controls are substantially equivalent to the DRI's secobarbital calibrators and controls included in the Multi-Drugs Urine Calibrators and Controls (Diagnostic Reagents, Inc., now Microgenics Corporation), cleared under premarket notifications (K935101) for Drugs of Abuse Urine Calibrators and Controls.

Device Description

All of the Single Analyte Urine DAU Calibrators and Controls are human urine-based liquid, and ready to use. These Calibrators and Controls do not have any especially unique technical characteristics. Each contains a known concentration of a specific drug analyte.

The Negative DAU calibrator is a processed, drug-free human urine matrix, which has also been used with all assays. The calibrators and controls are prepared by spiking known concentrations of drug analyte into the Negative DAU Calibrator matrix. The concentrations of drug analyte in the barbiturate calibrators and controls are summarized as follows:

	Barbiturate EIA
Reference Material	Secobarbital
Calibrator #2/Control I	100 ng/mL
Calibrator #3/Cutoff A/Control II	200 ng/mL
Calibrator #4/Cutoff B/Control III	300 ng/mL
Calibrator #5	1000 ng/mL
Control IV	400 ng/mL

Intended Use

The Barbiturate DAU Calibrators are intended for in vitro diagnostic use for the calibration of the barbiturate enzyme immunoassay to detect barbiturates in human urine.
The Barbiturate DAU Controls are intended for in vitro diagnostic use for the validation of the barbiturate enzyme immunoassay to detect barbiturates in human urine.

Comparison to Predicate Device

LZI's Barbiturate DAU Calibrators and Controls are similar in intended use, matrix, and performance to the DRI's secobarbital calibrators and controls included in the Multi-Drug Urine Calibrators and Controls.

Similarities:

- Both are for the calibration and validation of Barbiturate Enzyme Immunoassay to detect drug of abuse in human urine.
- A total of 5 levels of calibrators including the negative calibrator for each analyte.
- The nominal concentrations of the analyte in the calibrators and controls are determined and confirmed by GC/MS.
- Both are urine-based liquids.
- Storage condition is the same, at 2°C to 8°C.
- Performance characteristics on precision, accuracy and stability are similar.

Differences:

- The DRI's cutoff concentration is 200 ng/mL; LZI has 200 and 300 ng/mL cutoffs.
- For semi-quantitative assay, DRI uses 0, 100, 200, 500, and 1000 ng/mL as calibrators. LZI uses 0, 100, 200, 300, and 1000 ng/mL as calibrators.
- LZI uses 100 and 300 ng/mL as controls for 200 ng/mL cutoff, and uses 200 and 400 ng/mL as controls for 300 ng/mL cutoff. DRI uses 150 and 300 ng/mL as controls for 200 ng/mL cutoff calibrator.

Conclusion

The information provided in the premarket notification demonstrates that the LZI's Barbiturate Drug of Abuse Calibrators and Controls are substantially equivalent to previously approved predicate devices, notably the DRI's Multi-Drug Urine Calibrators and Controls, and safe and effective for its intended use.

5. Product Description: Draft copies of
(Attachment A) Product Insert, and
(Attachment B) Product Labels, are submitted along with
(Attachment C) Product Inserts from
(i) Emit® II Plus Barbiturate Assay (by Dade Behring Inc.),
(ii) Barbiturate Enzyme Immunoassay (DRI)

6. Substantial Equivalence: The test kit utilizes specific antibody and antigen-enzyme conjugate binding principle identical to those used in the Enzyme Multiplied Immunoassay Technology (EMIT®). The reagent formulation is similar to those described in the Emit® II Plus Barbiturate Assay (by Dade Behring Inc.). Examination of the enclosed data will indicate that the current Barbiturate Enzyme Immunoassay is substantially equivalent to other commercially available test kits for determination of barbiturates in human urine.

We trust the information that we have provided is satisfactory and look forward to your review of this submission.

Furthermore, a truthful and accurate statement, a 510 (k) summary, and an indications for use statement regarding to the current Barbiturate Enzyme Immunoassay are also submitted in accordance to the requirements of the 21 CFR 807.87(J), SMDA 1990, and 21 CFR807.92.

Sincerely,

Cheng-I Lin, Ph.D.
President, R&D Director
Lin-Zhi International, Inc.

Confidentiality

Lin-Zhi International requests the FDA not to disclose the nature or existence of the Premarket Notification until the substantial equivalence decision has been reached.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

NOV - 3 2003

Cheng-I Lin, Ph.D.
President, R & D Director
Lin-Zhi International, Inc.
687 North Pastoria Avenue
Sunnyvale, CA 94085

Re: k032764
Trade/Device Name: Barbiturate Enzyme Immunoassay
Barbiturate Drug of Abuse Calibrators and Controls
Regulation Number: 21 CFR 862.3150
Regulation Name: Barbiturate test system
Regulatory Class: Class II
Product Code: DIS; DLJ; LAS
Dated: September 1, 2003
Received: September 5, 2003

Dear Dr. Lin:

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). 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/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

Premarket Notification Supplement

Indications for Use Statement

510(k) Number (if known): K032764

Device Name: Barbiturate Drug of Abuse Calibrators and Controls

Indications for Use:

The Barbiturate Drug of Abuse Calibrators are intended for in vitro diagnostic use for the calibration of the Barbiturate Enzyme Immunoassay to detect barbiturates in human urine.

The Barbiturate Drug of Abuse Controls are intended for in vitro diagnostic use for the validation of the Barbiturate Enzyme Immunoassay to detect barbiturates in human urine.

Concurrence of CDRH, Office of Device Evaluation (ODE)

✓		
Prescription Use (Per 21 CFR 801.109)	**OR**	**Over-The-Counter Use**

(Optional Format 1-2-96)

Division Sign-Off for Jean Cooper

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) K032764

Recd
10-27-03

Premarket Notification

Indications for Use Statement

510(k) Number (if known): K032764

Device Name: Barbiturate Enzyme Immunoassay

Indications for Use:

The Barbiturate Enzyme Immunoassay is a homogeneous enzyme immunoassay with a 200 ng/mL and/or 300 ng/mL cutoffs. The assay is intended for use in the qualitative and semi-quantitative analyses of barbiturates in human urine. The assay is designed for professional use with a number of automated clinical chemistry analyzers.

Measurements obtained by this device are used in the diagnosis and treatment of barbiturate use or overdose and in monitoring levels of barbiturate to ensure appropriate therapy.

The Barbiturate Enzyme Immunoassay provides only a preliminary analytical test result. A more specific alternative chemical method must be used to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug-of-abuse test result, particularly when preliminary positive results are used.

Division Sign-Off for Jean Cooper

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) K032764

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)