

K980043

Exigent Diagnostics, Inc.

CareSide™ Creatinine Premarket Notification

Page 13

MAR 30 1998

revised on March 23, 1998

V. 510(k) Summary: CareSide™ Creatinine Safety and Effectiveness

I. Applicant Information

A. Applicant Name	Exigent Diagnostics, Inc.
B. Applicant/Manufacturer Address	6100 Bristol Parkway Culver City, CA 90230
C. Telephone Number	310-338-6767
D. Contact Person	Kenneth B. Asarch, Pharm.D., Ph.D.
E. FAX Number	310-338-6789
F. e-Mail Address	asarchk@worldnet.att.net
G. Date 510(k) Summary prepared	February 11, 1998

II. Device Information

A. Device Name (Trade)	CareSide™ Creatinine
B. Device Name (Classification)	Creatinine test system
C. Device Classification	Clinical chemistry panel Creatinine test system Regulation Number: 21 CFR 862.1225 Regulatory Class II Classification Number: 75JFY
D. Device Tier	Tier I
E. Special controls and performance standards	None applicable

III. Substantial Equivalence Claim

A. General equivalency claim

The ability to monitor analyte-specific biochemical reactions in dry film and other formats is widely recognized and has gained widespread acceptance for use in chemistry assays.

Creatinine *in vitro* diagnostic products, in both dry film and other formats, are already on the U.S. market, including creatinine products which utilize creatinine deaminase catalyzed generation of ammonia by reaction non-enzymatically with bromophenol blue indicator dye.

B. Specific equivalency claim

This CareSide™ Creatinine test is substantially equivalent in principle, intended use, and clinical performance to the currently marketed Vitros slides for the quantitative measurement of Creatinine on the Vitros DT 60 II.

Name of Predicate Device: Johnson and Johnson's (formerly Eastman Kodak, Inc.) Vitros CREA Slides (blank corrected method) for Johnson and Johnson's Vitros DT 60 (formerly Eastman Kodak's DT 60 II).

Predicate Device 510K number: K912844/A
Product Code: 75JLA

IV. Device Description

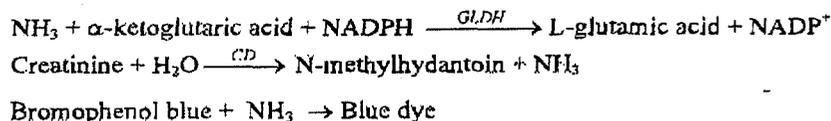
CareSide™ Creatinine cartridges are used with the Exigent Diagnostics CareSide™ Analyzer to measure creatinine concentration in anti-coagulated whole blood, plasma or serum specimens. The CareSide™ Creatinine cartridge, a single use disposable *in vitro* diagnostic test cartridge, aids in specimen separation and delivers a measured volume of plasma or serum to a dry film to initiate the measurement of creatinine concentration. The film cartridge (patent pending) contains all reagents necessary to measure creatinine concentration. When used in conjunction with the CareSide™ BUN cartridge on the CareSide™ Analyzer, the analyzer calculates a BUN to creatinine ratio.

A. Explanation of Device Function

Each Exigent Diagnostics CareSide™ Creatinine cartridge consists of a creatinine-specific multi-layer reagent film mounted in a plastic base with a hinged lid. The user introduces the anti-coagulated whole blood, serum, or plasma specimen into the cartridge sample deposition well, closes the lid and inserts the cartridge into the Exigent Diagnostics CareSide™ Analyzer.

Once loaded, the CareSide™ analyzer scans the cartridge barcode, brings the cartridge and the contained specimen to 37°C, and spins the cartridge to move the sample from the sample deposition well into the cartridge channels and chambers. As the cartridge continues to spin, the blood cells are separated from the plasma/serum and the cells accumulate in the separation well. Ten microliters of plasma (or serum, as applicable) remain in the metering passage. Any excess sample flows into an overflow well.

The ten microliters of plasma (or serum, as applicable) is automatically dispensed onto the multi-layer reagent film. The spreading layer distributes the sample evenly on the film and filters large molecular weight components such as protein and dye fragments before the specimen enters the ammonia removal layer. Endogenous ammonia is removed by the enzymatic conversion to L-glutamic acid through the action of glutamate dehydrogenase (GLDH) in the presence of α -ketoglutaric acid and NADPH. A separation layer prevents mixing the former reaction with the next layer in which the enzymic creatinine deiminase (CD) acts on creatinine in the presence of water to form ammonia gas and N-methylhydantoin. The ammonia gas crosses the gas permeation layer to enter the detection layer where it reacts with bromophenol blue to form a blue dye.

Test Reaction Sequence:

As the cartridges spin, photodiodes measure reflectance of light emitted by wavelength-specific light emitting diodes (LEDs) at a fixed time. The analyzer uses the reflectance measurements and the lot-specific standard curve to calculate creatinine concentration.

B. Test Summary

Creatinine is produced during muscle contraction when the high-energy compound phosphocreatine degrades into creatine, which subsequently dehydrates into circulating creatinine. Creatinine levels in blood serve as an indicator of total muscle mass and activity, and of renal function. Decreased levels of creatinine are seen in cases of muscular dystrophy. Increased creatinine levels are found in cases of kidney disease and urinary tract obstruction. Creatinine concentration in blood is closely correlated with the kidney's glomerular filtration rate (GFR), and the creatinine clearance rate is used as an estimate of the GFR. The creatinine clearance rate, estimated from the blood creatinine concentration, is used to determine or to adjust the dosage of certain drugs which are excreted via glomerular filtration in the kidneys.

Exigent Diagnostics, Inc.
Page 13b

CareSide™ Creatinine Premarket Notification
revised on March 23, 1998

V. Intended Use

A. Intended Use

The CareSide™ Creatinine cartridge is intended for *in vitro* diagnostic use in conjunction with the Exigent Diagnostics CareSide™ Analyzer to quantitatively measure creatinine concentration in anti-coagulated whole blood, plasma or serum by laboratory professionals. When used in conjunction with the Exigent Diagnostics CareSide™ BUN test cartridge on the Exigent Diagnostics CareSide™ Analyzer, the creatinine product may be used to calculate a BUN to creatinine ratio. The CareSide™ Creatinine test aids in the diagnosis and treatment of renal diseases.

B. Indications for Use

This product is indicated for use with patients with various renal diseases.

VI. Technological Characteristics

A. Similarities

	CareSide™ Creatinine	Vitros Creatinine DT Slides
Intended Use	Primarily to aid in the diagnosis and treatment of renal diseases.	Same
Indications	For <i>in vitro</i> diagnostic use. For professional use only.	Same
Measurement	Quantitative	Same
Method Principle	Dry film based creatinine deiminase conversion of creatinine to ammonia and reaction with ammonia indicating dye. Chromogen quantitated by reflectance measurement after fixed time.	Same except that endogenous creatinine is measured and subtracted rather than enzymatically eliminated.
Specimen dilution	Not required	Same
Materials Source	Creatinine deiminase (<i>Bacillus sp</i>) Indicator - Bromocresol blus (synthetic)	Creatinine deiminase (source unknown) Indicator - Bromocresol blus (synthetic)
Detector	Reflectance (570 nm)	Reflectance (605 nm)
Test time	Approximately 4 minute warm-up (on-board) plus 5 minute test time.	15 minutes slide warm-up (off-line) plus 5 minutes test time.
Reference Method	HPLC	HPLC
Sample Type	Serum, plasma, anti-coagulated whole blood (wb) [wb applied sample, plasma test sample]	serum, plasma
Specimen volume	10 µl test volume (85 ± 15 µl applied volume)	10 µl
Calibration	Calibration information bar-coded on each cartridge. Calibration information may change with each lot.	Run Vitros DT II calibrators whenever a new slide lot is used or when necessary.
Quality Control	2 levels	Same
Reporting Units	mg/dL or µmol/L	Same
Reaction Temp.	37 °C	Same

Exigent Diagnostics, Inc.
Page 13c

CareSide™ Creatinine Premarket Notification
revised on March 23, 1998

B. Differences

	CareSide™ Creatinine	Vitros Creatinine DT Slides
Direct blood specimen	Yes, anti-coagulated whole blood	No, requires separation of whole blood prior to sample application
Reportable range	0.2 to 16 mg/dL	0.01 to 15 mg/dL
Accurate pipetting	Not required	Required
Reagent pre-warming	Not required	Required

C. Comparative Performance Characteristics

	CareSide™ Creatinine	Vitros Creatinine DT Slides
Detection limit	0.2 mg/dL	Not provided
Reportable range	0.2 to 16 mg/dL	0.01 to 15 mg/dL
Accuracy	Mean recovery 99%	Not provided
Precision	Total CV, 9 mg/dL, 4.2%	Total CV, 10 mg/dL, 3.3%
Method comparison	CareSide™ = 1.08 (Vitros Creatinine DT) - 0.38, r=0.99	
Linearity	Mean deviation approx 4%, r>0.99	Not provided
Interference	No significant interference observed at tested concentration of interferent: Ammonium PO ₄ , 500 µM Ascorbic Acid, 10 mg/dL Bilirubin, 20 mg/dL 5-fluorocytosine, 80 µg/mL Glucose, 600 mg/dL Hemoglobin, 500 mg/dL Triglycerides 3000 mg/dL Urea Nitrogen (BUN), 100 mg/dL	Not provided
Specimen Types & Anticoagulants	No clinically significant difference between heparinized whole blood, serum, heparin plasma, and EDTA plasma.	No clinically significant difference between serum and heparin plasma. Whole blood is unsuitable.
Expected Values	0.4 to 0.9 mg/dL (female) 0.6 to 1.3 mg/dL (male) Central 95% interval	0.5 to 1.2 mg/dL (female) 0.7 to 1.4 mg/dL (male) Central 95% interval

D. Conclusion

The nonclinical and clinical data provided demonstrate that the CareSide™ Creatinine product is as safe, effective, and performs as well as or better than the legally marketed predicate device.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

MAR 30 1998

Kenneth B. Asarch, Ph.D.
Vice President
Quality Systems and Regulatory Affairs
Exigent Diagnostics Inc.
6100 Bristol Parkway
Culver City, California 90230

Re: K980043
CareSide™ Creatinine
Regulatory Class: II
Product Code: JFY
Dated: December 30, 1997
Received: January 6, 1998

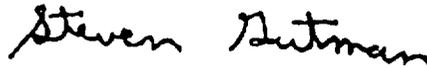
Dear Dr. Asarch:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to 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). 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 (Premarket Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. A substantially equivalent determination assumes compliance with the Current Good Manufacturing Practice requirements, as set forth in the Quality System Regulation (QS) for Medical Devices: General regulation (21 CFR Part 820) and that, through periodic QS inspections, the Food and Drug Administration (FDA) will verify such assumptions. Failure to comply with the GMP regulation may result in regulatory action. In addition, FDA may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under sections 531 through 542 of the Act for devices under the Electronic Product Radiation Control provisions, or other Federal laws or regulations.

This letter will allow you to begin marketing your device as described in your 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 advice for your device on our labeling regulation (21 CFR Part 801 and additionally 809.10 for in vitro diagnostic devices), please contact the Office of Compliance at (301) 594-4588. Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its internet address "dsma@fdadr.cdrh.fda.gov".

Sincerely yours,



Steven I. Gutman, M.D., M.B.A.
Director
Division of Clinical
Laboratory Devices
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure

Exigent Diagnostics, Inc.
Page 15

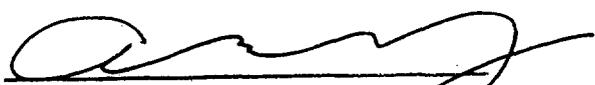
CareSide™ Creatinine Premarket Notification
Revised on March 23, 1998

VII. Indications for Use

510(k) Number: To be assigned

Device Name: CareSide™ Creatinine

Indications for use: For *in vitro* diagnostic use with Exigent Diagnostics CareSide Analyzer to measure creatinine in whole blood, plasma or serum specimens by professionals to aid in the diagnosis and treatment of renal diseases.


(Division Sign-Off)
Division of Clinical Laboratory Devices

510(k) Number

 K980043

✓ Prescription Use