APR 1 5 2004

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.

The assigned 510(k) number is: K040872

Submitter:	Bio-Rad Laboratories, Inc. Clinical Diagnostics Group 4000 Alfred Nobel Drive, Hercules, California 94547 Phone: (510) 741-5309 FAX: (510) 741-6471
Contact Person:	Jackie Buckley Regulatory Affairs Representative
Date of Summary Preparation:	January 26, 2004
Device Name:	VARIANT™ II TURBO Hemoglobin A_{1c} Program
Classification Name:	Assay, Glycosylated Hemoglobin, 81LCP
Predicate Device:	VARIANT™ II Hemoglobin A_{1c} Program K984268 Bio-Rad Laboratories, Inc.
Intended Use:	The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for the percent determination of hemoglobin A_{1c} in human whole blood using ion-exchange high performance liquid chromatography (HPLC). The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for Professional Use Only. For In Vitro Diagnostic Use.
Indications for Use:	Measurement of percent hemoglobin A_{1c} is effective in monitoring long-term glucose control in individuals with diabetes mellitus.

Description of theDevice:

The VARIANT II TURBO Hemoglobin Testing System uses the principles of high performance liquid chromatography (HPLC). The VARIANT II TURBO Hemoglobin A_{1c} Program is based on chromatographic separation of Hemoglobin A_{1c} on a cation exchange cartridge.

Technical Characteristics Compared to the Predicate:

VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} programs have the same technical characteristics that are summarized in the table below:

Characteristics	VARIANT II TURBO Hemoglobin A_{1c}	VARIANT II Hemoglobin A_{1c}
Analyte Measured: Reported	%Hemoglobin A_{1c}	%Hemoglobin A_{1c}
Intended Use	The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for the percent determination of hemoglobin A1c in human whole blood using ion-exchange high performance liquid chromatography (HPLC). The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for Professional Use Only. For In Vitro Diagnostic Use.	The Bio-Rad VARIANT II Hemoglobin A_{1c} Program is intended for the percent determination of hemoglobin A1c in human whole blood using ion-exchange high performance liquid chromatography (HPLC). For In Vitro Diagnostic Use.
Assay Principle	Cation exchange high performance liquid chromatography	Cation exchange high performance liquid chromatography
Sample Type	Human anticoagulated whole blood (EDTA)	Human anticoagulated whole blood (EDTA)
Visible Detection	415 nm	415 nm
Standardization	Traceable to the Diabetes Control and Complications Trial (DCCT) reference method and IFCC. Certified via the National Glycohemoglobin Standardization Program (NGSP).	Traceable to the Diabetes Control and Complications Trial (DCCT) reference method and IFCC. Certified via the National Glycohemoglobin Standardization Program (NGSP).

Testing To Establish Substantial Equivalence:

Accuracy:

Method correlation between VARIANT II TURBO Hemoglobin A_{1c} Program and VARIANT II Hemoglobin A_{1c} Program was evaluated using 201 EDTA whole blood patient samples ranging from 3.9% to 17.5% HbA_{1c}. The results are presented in the following regression table.

Regression Method	n	r^2	Slope	Intercept
Least Squares	201	0.9946	0.9792	0.185

Precision:

The following table provides comparison data on the precision between VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} Programs, each utilizing low and high EDTA whole blood patient samples, and both tested against samples with moderate (5.4-6.2) and high (12.5-13.7) % A_{1c} content.

Method precision was performed using a protocol based on the NCCLS Evaluation protocol, Vol.12, No. 4, EP5-A (Feb. 1999) for the VARIANT II TURBO Hemoglobin A_{1c} and NCCLS Evaluation protocol, Vol.12, No. 4, EP5-T2 (Mar. 1992) for the VARIANT II Hemoglobin A_{1c} Program. The protocols for both the VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} Programs are similar. Using these protocols, 40 runs (2 per day) were performed on one VARIANT II TURBO (or VARIANT II) Hemoglobin Testing System over 20 working days. In each duplicate daily run, one aliquot of low HbA_{1c} and one aliquot of high HbA_{1c} patient samples were each analyzed per run. Although the precision samples are different, since they were run at different time periods, the precision results between the VARIANT II TURBO Hemoglobin A_{1c} and the VARIANT II Hemoglobin A_{1c} Program are equivalent. A summary of combined comparative precision results is presented in the following precision table.

VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} Precision

	VARIANT II TURBO Hemoglobin A_{1c}		VARIANT II Hemoglobin A_{1c}	
	Low Patient (HbA_{1c})	High Patient (HbA_{1c})	Low Patient (HbA_{1c})	High Patient (HbA_{1c})
n= (number of samples)	80	80	80	80
Mean	6.2	12.5	5.4	13.7
Within run	0.82% CV	0.54% CV	1.46 % CV	0.65 % CV
Total Precision	1.94% CV	2.58 % CV	2.14 % CV	1.68 % CV

Linearity:

The following table provides comparison data on the linearity and recovery analyses between VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} Programs, each utilizing eight EDTA-based blood standards (n=2 for each standard). The % Recovery for Hemoglobin A_{1c} by the VARIANT II TURBO Hemoglobin A_{1c} Program was essentially the same as the VARIANT II Hemoglobin A_{1c} Program. The results are presented in the following linearity table.

The linear range as stated in the Instruction of Use on the VARIANT II TURBO Hemoglobin A_{1c} Program is 4.1 to 16.8% HbA_{1c} which was performed on a separate study, each using a total of seven standards (n=2 for each standard) below, at, and substantially above blood levels of typical normal levels of Hemoglobin A_{1c} and found in normal and diabetic patients.

VARIANT II TURBO Hemoglobin A_{1c} and VARIANT II Hemoglobin A_{1c} Linearity

% Contribution		VARIANT II TURBO Hemoglobin A_{1c}			VARIANT II Hemoglobin A_{1c}		
Normal	Diabetic	Theoretical % HbA_{1c}	Observed % HbA_{1c}	% Recovery	Theoretical % HbA_{1c}	Observed % HbA_{1c}	% Recovery
100	0	3.8	3.8	100	3.5	3.5	100
90	10	5.0	5.0	100	4.7	4.7	100
80	20	6.3	6.1	96.8	5.9	5.8	98.3
67	33	8.0	7.9	98.8	7.6	7.4	97.4
50	50	10.2	10.0	97.9	9.8	9.6	98.0
33	67	12.5	12.4	98.0	12.1	11.9	98.3
20	80	14.4	14.3	99.3	14.1	13.8	97.9
0	100	17.3	17.3	100	17.2	17.2	100

Interfering Substances:

Interfering Substance	VARIANT II TURBO Hemoglobin A_{1c}	VARIANT II Hemoglobin A_{1c}
Bilirubin	No interference up to 20 mg/dL	No interference up to 20 mg/dL
Lipids (Triglycerides)	No interference up to 5680 mg/dL	No interference up to 6000 mg/dL
EDTA	No interference up to 11X EDTA	No interference up to 11X EDTA

Conclusion:

When considering the similarities of the intended use, the general characteristics of the two assays, the use of the same technology and the similar correlation, accuracy and linearity between the two methods, it can be concluded that the VARIANT II TURBO Hemoglobin A_{1c} Program is substantially equivalent to the cleared and currently marketed predicate, VARIANT II Hemoglobin A_{1c} Program.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

APR 1 5 2004

Bio-Rad Laboratories, Inc.
c/o Mr. Alfredo J. Quattrone
California Department of Health Services
Food & Drug Branch
1500 Capitol Avenue
Mailstop 7602
Sacramento, CA 95814

Re: k040872
Trade/Device Name: VARIANT™ II TURBO Hemoglobin A_{1c} Program
Regulation Number: 21 CFR 864.7470
Regulation Name: Glycosylated hemoglobin assay
Regulatory Class: Class II
Product Code: LCP
Dated: March 31, 2004
Received: April 2, 2004

Dear Mr. Quattrone:

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,

Jean M. Cooper MS, DVM.

Jean M. Cooper, MS, D.V.M.
Director
Division of Chemistry and Toxicology
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

Statement of Indications for Use

510(k) Number: K040872

Device Name: VARIANT™ II TURBO Hemoglobin A_{1c} Program

Indications for Use:

The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for the percent determination of hemoglobin A_{1c} in human whole blood using ion-exchange high-performance liquid chromatography (HPLC).

The Bio-Rad VARIANT II TURBO Hemoglobin A_{1c} Program is intended for Professional Use Only. For In Vitro Diagnostic Use.

Measurement of percent hemoglobin A_{1c} is effective in monitoring long-term glucose control in individuals with diabetes mellitus.

Prescriptive Use ✓ OR Over-The-counter Use _____
(Per 21 CFR 801.109)

(PLEASE DO NOT WRITE BELOW THIS LINE-CONTINUE ON ANOTHER PAGE IF NEEDED)
Concurrence of CDRH, Office of Device Evaluation (ODE)

Carol C. Benson
Division Sign-Off

Office of In Vitro Diagnostic
Device Evaluation and Safety

510(k) K040872