FEB 01 2002

K012966

Section 807.87(h)

Attachment 1: 510(k) Summary

Diagnostics Roche

COBAS TaqMan Analyzer

In accordance with the Safe Medical Devices Act of 1990, a 510(k) summary is provided as outlined in 21 CFR 807.92.

1. Identification of 510(k) Sponsor

Roche Molecular Systems, Inc.

4300 Hacienda Dr.

Pleasanton, CA 94588-2722

510(k) submission dated August 31, 2001

Contact: Gary S. Riordan

Telephone: (925) 730-8111

Facsimile: (908) 225-0207

2. Device Name

Trade/Proprietary Name: COBAS TaqMan™ Analyzer

Common or Usual Name: Automated batch analyzer for nucleic acid amplification and detection

Classification Name: 862.2170 Analyzer, Chemistry, Micro, for clinical use

3. Identification of Legally Marketed Device to Which the 510(k) Sponsor Claims Equivalence

The two primary operational components of the COBAS TaqMan Analyzer are the Thermal cycler, and the photometric detection system. The COBAS TaqMan Analyzer combines these operational functions into a single automated instrument that provides an interpretative qualitative or quantitative result. The performance of the COBAS AMPLICOR is substantially equivalent to the COBAS AMPLICOR Analyzer.

Table 1: Predicate Devices for the COBAS TaqMan Analyzer

Predicate Device	Regulatory Class	Classification Number	Predicate Product Name	Predicate 510(k) Number
COBAS AMPLICOR Analyzer	Class 1	862.2170	COBAS AMPLICOR Analyzer	K964506

4. Description of the Device

The COBAS TaqMan Analyzer is a flexible, automated batch analyzer that automates the real-time kinetic amplification and detection steps of the Polymerase Chain Reaction (PCR) process. The COBAS TaqMan Analyzer combines the operations of automated handling of reaction tubes (K-Tubes), thermal cycling, controlled temperature incubation, real-time photometric detection at each cycle and result reporting into a single automated analyzer. The instrument consists of four major sub-components: (1) a thermal cycler module; (2) a robotic transfer unit; (3) a photometer module and (4) a workstation, which together with an on-board real-time processor controls and monitors the major components including system and run control, results calculation, and system diagnostic tests and provides the user interface.

Potentiality infectious specimens are prepared off-line by manual or automated sample preparation methods resulting in highly purified nucleic acids, The purified nucleic acids solutions are added to K-Tubes containing PCR amplification and detection reagents, prior to placing on the analyzer. After the K-Tubes are loaded on the COBAS TaqMan Analyzer, the robotic arm transfers the K-tubes to each of four K-Tube Carriers which are in turn moved to the thermal cyclers for amplification and detection. Once reagents are added and the K-Tubes closed they are never opened again. Detection is achieved using dual labeled fluorescent probes contained in the PCR reaction. Cleavage of these probes during amplification results in an increase in fluorescent signal. The intensity of this signal is proportional to the amount of infectious organisms present in the specimen and quantitative results are determined based on both target and internal quality standard (IQS).

Fluorescent data is collected for both the target and the IQS at each cycle of the PCR. The titer of the sample is calculated at the end of the PCR run. On completion of cycling the intact capped K-Tubes are automatically removed from the thermal cyclers and disposed of into the waste station.

5. Statement of Intended Use

The COBAS TaqMan Analyzer is a fully automated amplification and detection system for nucleic acids using 5'nuclease technology. The COBAS TaqMan Analyzer is intended to be used by laboratory professionals trained in laboratory techniques and on the use of the analyzer.

6. Summary of the Technological Characteristics of the New Device In Comparison to those of the Predicate

The COBAS TaqMan Analyzer is a flexible bench top analyzer that automates the amplification and detection steps of the Polymerase Chain reaction (PCR) process. The principles of operation of the COBAS TAQMAN Analyzer are substantially equivalent to those used for the predicate COBAS AMPLICOR Analyzer. The primary operational components of the analyzer are the thermal cycler, and the photometer. Both systems combine PCR amplification and detection into a single automated instrument and both provide interpretative results. The COBAS TaqMan Analyzer as a system performing various steps such as heating and measuring light intensity is substantially equivalent to the COBAS AMPLICOR Analyzer.

6.1 Similarities and Differences to Comparable Commercial Products

The amplification and detection methods used in the COBAS TaqMan Analyzer are similar to that previously described for the COBAS AMPLICOR Analyzer. The notable similarities and differences are as follows:

6.1.1 Similarities

- The COBAS TaqMan Analyzer and the COBAS AMPLICOR Analyzer provide an automated method for performing the PCR amplification, hybridization and detection procedures. These include: sample incubation, thermal cycling, and photometric measurement and the calculation of results.

- Both the COBAS TaqMan Analyzer and the COBAS AMPLICOR Analyzer perform ordering of tests.
- The COBAS TaqMan Analyzer performs thermal cycling to tolerances that meet or exceed operational characteristics of the COBAS AMPLICOR Analyzer.
- Both the COBAS TaqMan and COBAS AMPLICOR Analyzers precisely time the detection procedure.
- Specimen preparation is performed off-line for both the COBAS TaqMan Analyzer and COBAS AMPLICOR Analyzer.
- The COBAS TaqMan and COBAS AMPLICOR Analyzers use a Peltier device for cooling.

6.1.2 Differences

- The COBAS TaqMan Analyzer is capable of measuring fluorescence at 4 excitation and 4 emission wavelengths whereas the COBAS AMPLICOR Analyzer uses absorbance at a fixed wavelength.
- The COBAS TaqMan Analyzer uses a fluorescent labeled probe technology which enables real time PCR photodetection at the completion of each cycle, while the COBAS AMPLICOR Analyzer uses biotinylated primers with avidin HRP detection of the final PCR product.
- The COBAS TaqMan Analyzer uses a Peltier device for heating during thermal cycling, while the COBAS AMPLICOR Analyzer uses a foil resistance heating unit.
- The COBAS TaqMan Analyzer is a closed system for all operational steps while the COBAS AMPLICOR Analyzer is an open system during the detection step to allow for washing and addition of reagents.
- The COBAS TaqMan Analyzer has four thermal cyclers (24 samples in each) whereas the COBAS AMPLICOR Analyzer has two thermal cyclers (12 samples in each).

- The COBAS TaqMan Analyzer can amplify over a 7 – 8 log dynamic range without dilution, whereas the COBAS AMPLICOR Analyzer can only amplify over a 3 – 4 log dynamic range (high copy samples must be diluted).

7. A Brief Discussion of the Non-Clinical Data

7.1 Non-Clinical Performance

The COBAS TaqMan Analyzer was shown to be substantially equivalent to the COBAS AMPLICOR Analyzer in all non-clinical performance studies. The non-clinical performance studies were designed to evaluate the analyzer comparing it to the predicate device (COBAS AMPLICOR Analyzer). The studies included the following comparative evaluations: Linearity, Dynamic Range, Precision, Sensitivity, Specificity, Carryover and Correlation.

The COBAS TaqMan Analyzer demonstrated comparable linearity while showing an enhanced dynamic range over the COBAS AMPLICOR Analyzer. The dynamic range for the COBAS TaqMan Analyzer was enhanced by 3 orders of magnitude over the predicate device ($50 - 2x10^7$ IU's/mL).

The COBAS TaqMan Analyzer has demonstrated an improved sensitivity and specificity over the COBAS AMPLICOR Analyzer. The lower limit of quantitation was determined to be 50 IU/mL for the COBAS TaqMan Analyzer. Specificity was calculated to be 96.87% (93/96 for tested EIA sero-negative specimens). Retesting of the three TaqMan HCV positive/EIA negative samples by a manual HCV AMPLICOR Test confirmed that at least two of the three EIA negative samples were HCV RNA positive yielding a recalculated specificity of 98.9% (93/94).

8. Conclusions

The COBAS TaqMan Analyzer is an automated bench-top analyzer for the real-time amplification and detection system for nucleic acids using 5′ nuclease technology. The COBAS TaqMan Analyzer is intended to be used by laboratory professionals trained in laboratory techniques and on the use of the analyzer. The instrument gives substantially equivalent analytical performance to the predicate COBAS AMPLICOR Analyzer. Based on the pre-clinical performance data, substantially equivalent results were obtained for the quantitative COBAS TaqMan Analyzer and the COBAS AMPLICOR Analyzer.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

FEB 01 2002

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Pleasanton, CA 94566-0900

Re: k012966
Trade/Device Name: COBAS TaqMan™ Analyzer
Regulation Number: 21 CFR 862.2170
Regulation Name: Micro chemistry analyzer for clinical use
Regulatory Class: Class I, reserved
Product Code: JJF
Dated: December 3, 2001
Received: December 4, 2001

Dear Mr. Riordan:

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 the Code of Federal Regulations, Title 21, Parts 800 to 898. 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 Part 801); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

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" (21CFR 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
Division of Clinical Laboratory-Devices
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure

510(k) Number (if known): K012966

Device Name: COBAS TaqMan™ Analyzer

Indications For Use:

The COBAS TaqMan Analyzer is a fully automated amplification and detection system for nucleic acids using 5´ nuclease technology. The COBAS TaqMan Analyzer is intended to be used by laboratory professionals trained in laboratory techniques and on the use of the Analyzer.

(Division Sign-Off)
Division of Clinical Laboratory Devices
510(k) Number K012966

(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)