March 6, 2024

Muhammad Sheikh
Staff Regulatory Affairs
1000 Lake Hazeltine Drive
Chaska, Minnesota 55318

Re: K240273
Trade/Device Name: Access Free T4
Regulation Number: 21 CFR 862.1695
Regulation Name: Free thyroxine test system
Regulatory Class: Class II
Product Code: CEC
Dated: January 31, 2024
Received: January 31, 2024

Dear Muhammad Sheikh:

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 (the 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. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database available at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. 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. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to 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.

Additional information about changes that may require a new premarket notification are provided in the FDA guidance documents entitled "Deciding When to Submit a 510(k) for a Change to an Existing Device" (https://www.fda.gov/media/99812/download) and "Deciding When to Submit a 510(k) for a Software Change to an Existing Device" (https://www.fda.gov/media/99785/download).

Your device is also subject to, among other requirements, the Quality System (QS) regulation (21 CFR Part 820), which includes, but is not limited to, 21 CFR 820.30, Design controls; 21 CFR 820.90, Nonconforming product; and 21 CFR 820.100, Corrective and preventive action. Please note that regardless of whether a change requires premarket review, the QS regulation requires device manufacturers to review and approve changes to device design and production (21 CFR 820.30 and 21 CFR 820.70) and document changes and approvals in the device master record (21 CFR 820.181).

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 and Part 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR Part 803) for devices or postmarketing safety reporting (21 CFR Part 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR Part 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR Parts 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Paula V. Caposino -S

Paula Caposino, Ph.D.
Acting Division Director
Division of Chemistry and Toxicology Devices
OHT7: Office of In Vitro Diagnostics
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

# Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 06/30/2023
*See PRA Statement below.*

510(k) Number *(if known)*
K240273

Device Name
Access Free T4

Indications for Use *(Describe)*
The Access Free T4 assay is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of free thyroxine levels in human serum and plasma (heparin) for the diagnosis and treatment of thyroid diseases using the Access Immunoassay Systems.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

**CONTINUE ON A SEPARATE PAGE IF NEEDED.**

This section applies only to requirements of the Paperwork Reduction Act of 1995.

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## 510 (k) Summary

**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.**

**510(k) Number: K240273**

**Submitter Name and Address:**
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Chaska, MN 55318

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**Date Prepared**: 3/06/2024

**Device Name**
**Trade Name:** Access Free T4

**Common Name:** Free Thyroxine Assay

**Classification Name:** Free Thyroxine Test system

**Classification Regulation:** 21 CFR 862.1695

**Classification Product Code:** CEC

**Predicate Device:**
**Device Name:** Access Free T4 Assay on the Access Immunoassay Analyzer
**510(k) Numbers:** K982250

**Device Description**

Assay type: two-step, competitive

The Access Free T4 assay is a two-step enzyme immunoassay. The Access Free T4 assay consists of the reagent pack and calibrators. Other items needed to run the assay include substrate and wash buffer. The Access Free T4 reagent pack, Access Free T4 calibrators, along with Wash Buffer II are designed for use with the Access Immunoassay Systems in a clinical laboratory setting.

The Access Free T4 contains the following components:

R1a: Dynabeads paramagnetic particles coated with streptavidin and mouse monoclonal anti-Thyroxine (T4) coupled to biotin; preservative

R1b: TRIS buffered saline with protein (avian), surfactant, preservative

R1c: TRIS buffered saline with protein (avian), surfactant, preservative.

R1d: Triiodothyronine-alkaline phosphatase (bovine) conjugate in a TRIS buffer with protein (avian), surfactant, preservative.

R1e: TRIS buffer with protein (avian and murine), surfactant, preservative

**Intended Use**

The Access Free T4 assay is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of free thyroxine levels in human serum and plasma (heparin) for the diagnosis and treatment of thyroid diseases using the Access Immunoassay Systems.

**Comparison of Technological Characteristics to the Predicate (Assay)**

| Parameter | Predicate Device<br>Access Free T4 Assay<br>on the Access Immunoassay Analyzer (k982250) | Modified Device<br>Access Free T4 |
|---|---|---|
| Intended Use | The Access Free T4 assay is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of free thyroxine levels in human serum and plasma (heparin) using the Access Immunoassay Systems. | The Access Free T4 assay is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of free thyroxine levels in human serum and plasma (heparin) for the diagnosis and treatment of thyroid diseases using the Access Immunoassay Systems. |
| Analyte Measured | Free Thyroxine | Same |
| Calibration | Utilizes a stored calibration curve | Same |
| Technology | Chemiluminescent | Same |
| Format | Two-step competitive enzyme Immunoassay | Same |
| Method | Automated | Same |
| Sample Type | Human serum or plasma | Same |
| Sample Volume | 30 µL | Same |
| Reagent Stability | Stable at 2 to 10°C for 28 days after initial use | Same |
| Antibody | Mouse monoclonal anti-Thyroxine (T4) | Same |
| Measuring Range | 0.25 – 6.0 ng/dL | 0.40 – 6.0 ng/dL (Access 2)<br><br>0.32 – 6.0 ng/dL (DxI 9000 Access Immunoassay Analyzer) |

| Parameter | Predicate Device<br>Access Free T4 Assay<br>on the Access Immunoassay Analyzer (k982250) | Modified Device<br>Access Free T4 |
|---|---|---|
| Assay architecture | Biotinylated mouse monoclonal anti-thyroxine antibodies not pre-coupled to paramagnetic particles coated with streptavidin | Biotinylated mouse monoclonal anti-thyroxine antibodies pre-coupled to paramagnetic particles coated with streptavidin |
| Linearity | Not applicable | A study based on CLSI EP06-Ed2 performed on the Access 2 Immunoassay System determined the assay demonstrated linearity across the measuring interval. |
| Biotin Interference | Specimens with biotin concentrations ≤ 10 ng/mL demonstrated non-significant bias (≤ 10%) in results. Biotin concentrations > 10 ng/mL can lead to significant (> 10%) positive bias in Free T4 results. | No significant interference (± 10%) observed in samples containing up to 3,510 ng/mL of biotin. |
| Substrate | Access Substrate | Same (Access 2)<br>Lumi-Phos PRO substrate (DxI 9000 Access Immunoassay Analyzer) |
| Instrument | Access® Immunoassay Analyzer | Access 2 Immunoassay Analyzer<br>DxI 9000 Access Immunoassay Analyzer |

**Summary of Studies**

**Method Comparison:** A method comparison study was performed to compare the Access FT4 assay on Access 2 and DxI 9000 Immunoassay system to the predicate device. A total of one hundred and sixty three (163) serum samples falling within the measuring range of the Access FT4 assay were evaluated. The results of the within range method comparison study met the acceptance criteria of slope 1.00 ± 0.12.

A study based on CLSI EP09c, 3rd Edition[20] using Passing-Bablok regression compared the Access 2 Immunoassay System and predicate device.

| N | Concentration Range* (ng/dL) | Slope | Slope 95% CI | Intercept | Intercept 95% CI | Correlation Coefficient R |
|---|---|---|---|---|---|---|
| 163 | [0.27 - 5.32] | 1.02 | [1.00 to 1.04] | - 0.04 | [-0.06 to - 0.02] | 0.98 |

*Values are from predicate device.

A study based on CLSI EP09c, 3rd Edition[20] using Passing-Bablok regression compared the DxI 9000 Access Immunoassay Analyzer and predicate device.

| N | Concentration Range* (ng/dL) | Slope | Slope 95% CI | Intercept | Intercept 95% CI | Correlation Coefficient R |
|---|---|---|---|---|---|---|
| 163 | 0.25 – 5.31 | 1.02 | 0.99 to 1.05 | 0.03 | 0.01 – 0.06 | 0.95 |

*Values are from predicate device.

**Imprecision:** On the Access 2 Immunoassay Analyzer and DxI 9000 Access Immunoassay Analyzer the within-laboratory (total) %CV ≤ 10.0% for values ≥ 0.61 ng/dL. The within-laboratory (total) SD was ≤ 0.06 for Free T4 concentrations < 0.61 ng/dL.

A study based on CLSI EP05-A3 performed on the Access 2 Immunoassay System tested multiple samples in duplicate in 2 runs per day for a minimum of 20 days.

| Concentration (ng/dL) | | | Within-Run (Repeatability) | | Between-Run | | Between-Day | | Within-Laboratory | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | N | Mean | SD | %CV | SD | %CV | SD | %CV | SD | %CV |
| **Sample 1** | 80 | 0.42 | 0.03 | 7.4 | 0.02 | 5.1 | 0.02 | 4.3 | 0.04 | 10.0 |
| **Sample 2** | 80 | 0.86 | 0.03 | 3.1 | 0.01 | 1.4 | 0.01 | 1.0 | 0.03 | 3.5 |
| **Sample 3** | 80 | 1.7 | 0.05 | 2.9 | 0.02 | 1.0 | 0.03 | 1.8 | 0.06 | 3.5 |
| **Sample 4** | 80 | 2.4 | 0.07 | 2.9 | 0.03 | 1.2 | 0.08 | 3.4 | 0.11 | 4.6 |
| **Sample 5** | 80 | 4.2 | 0.10 | 2.3 | 0.04 | 1.0 | 0.14 | 3.4 | 0.17 | 4.2 |

A study based on CLSI EP05-A3 performed on the DxI 9000 Access Immunoassay Analyzer tested multiple samples in duplicate in 2 runs per day for a minimum of 20 days.

| Concentration (ng/dL) | | | Within-Run (Repeatability) | | Between-Run | | Between-Day | | Within-Laboratory | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sample | N | Mean | SD | %CV | SD | %CV | SD | %CV | SD | %CV |
| **Sample 1** | 84 | 0.48 | 0.04 | 7.7 | 0.03 | 5.7 | 0.02 | 5.0 | 0.05 | 10.8 |
| **Sample 2** | 83 | 0.92 | 0.04 | 4.0 | 0.00 | 0.0 | 0.02 | 2.3 | 0.04 | 4.6 |
| **Sample 3** | 84 | 1.8 | 0.07 | 3.8 | 0.02 | 1.2 | 0.00 | 0.0 | 0.07 | 4.0 |
| **Sample 4** | 84 | 2.5 | 0.07 | 2.9 | 0.01 | 0.3 | 0.04 | 1.5 | 0.08 | 3.3 |
| **Sample 5** | 84 | 4.3 | 0.13 | 3.0 | 0.07 | 1.7 | 0.00 | 0.0 | 0.15 | 3.4 |

**DETECTION CAPABILITY:**

Limit of Blank (LoB), Limit of Detection (LoD), and Limit of Quantitation (LoQ) studies were conducted on Access 2 and DxI 9000 Immunoassay Systems following CLSI guideline EP17-A2. The LoB study included multiple reagent lots and 3 instruments over a minimum of 3 days. The LoD and LoQ studies included multiple reagent lots and 3 instruments over a minimum of 5 days.

**LOB, LOD and LOQ on Access 2 and DxI 9000 Immunoassay Analyzers are listed below.**

| | Access 2 Immunoassay Analyzer | DxI 9000 Immunoassay Analyzer |
|---|---|---|
| | ng/dL | ng/dL |
| **Limit of Blank (LoB)** | **0.25** | **0.25** |
| **Limit of Detection (LoD)** | **0.40** | **0.32** |
| **Limit of Quantitation (LoQ)** ≤20% within-lab CV | **0.40** | **0.32** |

**Linearity:** The Access Total Free T4 assay is linear on the Access 2 and DxI 9000 Immunoassay Analyzer throughout the analytical measuring interval of approximately 0.40 - 6.0 ng/dL (ng/dL) for Access 2 and 0.32 – 6.0 ng/dL for DxI 9000 Access Immunoassay Analyzer.

**Analytical Specificity:** Potential cross-reactive substances were added to serum samples at two concentrations of Free T4 (approximately 0.8 ng/dL and 1.5 ng/dL). Stock solutions of potential cross-reactants were prepared volumetrically using calibrated pipettes and the appropriate solvent. This stock solution was added directly to the serum in no more than 5% (v/v) final concentration. Control samples were prepared in the same manner using the solvent, without the potential cross-reactant added. Control and test samples were tested in replicates of six each on the Access 2 Immunoassay System within 24 hours of preparation, using three reagent lots.

The acceptance criterion is defined as: a change in concentration between the control sample and the test sample within specifications described below:

D-T4 (10,000 ng/dL): ≤ 100%
L-T3 (500,000 ng/dL): ≤ 2%
R-T3 (100,000 ng/dL): ≤25%
Tetraiodothyroacetic acid (25,000 ng/dL): ≤ 10%
D-T3 (500,000 ng/dL): ≤ 1.0%
3,3' L-T2 (5,000,000 ng/dL): ≤ 0.1%
3,5 L-T2 (5,000,000 ng/dL): ≤ 0.1%
3'5' L-T2 (5,000,000 ng/dL): ≤ 0.1%
L-Tyrosine (5,000,000 ng/dL): ≤ 0.01%
D-Tyrosine (5,000,000 ng/dL): ≤0.01%
Moniodotyrosine (5,000,000 ng/dL): ≤0.01%
Diiodotyrosine (5,000,000 ng/dL): ≤ 0.01%

**Interference:** Test samples with potential interferent were compared to control samples without potential interferent. The results are reported as a percent difference between test and control sample. Testing was completed on patient serum samples containing two levels of Free T4 at clinically relevant concentrations of approximately 0.8 (Low Free T4 Concentration) and 1.5 ng/dL (high Free T4 concentration).

See Table 1 for the list of highest concentrations tested with no significant interference effect.

Six to twelve replicates were tested for each control sample and each spiked sample preparation.

**Table 1: The list of highest concentrations of Interferents**

| Substance | Interferent Concentrations Tested |
|---|---|
| Albumin | 10.0 g/dL |
| Aspirin | 60 mg/dL |
| Bilirubin (Unconjugated) | 10 mg/dL |
| Biotin | 3510 ng/mL |
| Hemoglobin | 1 g/dL |
| Lipemia | 1800 mg/dL Triolein |
| Methimazole | 0.4 mg/dL |
| Phenylbutazone | 7.5 mg/dL |
| Phenytoin | 5.0 mg/dL |
| Prealbumin (TBPA) | 600 µg/mL |
| Sodium Salicylate | 50 mg/dL |
| Thiouracil | 5.0 mg/dL |
| Thyroxine Binding Globulin | 16 mg/dL |

The mean concentration of the replicates was calculated for the control sample and the test sample preparation. The variation added by the interferent was calculated as a difference in concentration from the control concentration.

The acceptance criterion is defined as: a change in concentration between the control sample and the test sample within ± 10%. No potential interference was found to exceed the acceptance criterion.

**Sample type:** Matched serum, lithium heparin plasma samples were tested in single replicate for each sample. For determination of equivalency between the sample types, a minimum of forty (40) matched sets of patient samples were tested with each reagent lot. A Passing-Bablok method comparison was used to compare the sample types. Representative results from each test system are summarized in the table below.

| | | | Slope | |
|---|---|---|---|---|
| **Instrument** | **Sample Type Comparison** | **N** | **Estimate** | **95% CI** |
| Access 2 | Serum vs. LiHep Plasma | 41 | 0.99 | 0.94 - 1.04 |
| DxI 9000 | Serum vs. LiHep Plasma | 43 | 0.97 | 0.93 - 0.99 |

**Conclusion:**

The modified device has the same intended use and fundamental scientific technology as the predicate device. The modified device is as safe and effective as the predicate device, as demonstrated through verification testing.

The information provided in this submission demonstrates that the modified device is substantially equivalent to the predicate device.