510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE

A. 510(k) Number:

k152155

B. Purpose for Submission:

Adding sex-hormone binding globulin (SHBG) and free testosterone index (FTI) reference ranges in the labeling

C. Measurand:

Testosterone

D. Type of Test:

Quantitative, Chemiluminescence assay

E. Applicant:

Abbott Laboratories

F. Proprietary and Established Names:

Abbott ARCHITECT 2nd Generation Testosterone

G. Regulatory Information:

1. Regulation section:

   21 CFR § 862.1680

2. Classification:

   Class I, reserved

3. Product code:

   CDZ

4. Panel:

   Clinical Chemistry (75)

H. Intended Use:

1. Intended use(s):

   See Indications for use below.

2. Indication(s) for use:

   The ARCHITECT 2nd Generation Testosterone assay is a chemiluminescent microparticle immunoassay (CMIA) for the quantitative determination of testosterone in human serum and plasma.

   Measurements of testosterone are used in the diagnosis and treatment of disorders involving the male sex hormones (androgens), including primary and secondary hypogonadism, delayed or precocious puberty, impotence in males and in, females, hirsutism (excessive hair) and virilization (masculinization) due to tumors, polycystic ovaries, and andrenogential syndromes.

3. Special conditions for use statement(s):

   Prescription use only.

4. Special instrument requirements:

   ARCHITECT I 2000_{SR} System

I. Device Description:

Each ARCHITECT 2nd Generation Testosterone Reagent Kit contains one bottle each of: Microparticles, Conjugate, Assay Specific Diluent, and Specimen Diluent.

- Microparticles (1 or 4 bottles) contain 6.6 mL Anti-Testosterone (sheep, monoclonal) coated microparticles in BIS-TRIS buffer [2,2-Bis(hydroxymethyl)-2,2',2"-nitrilotriethanol)]with protein (bovine) stabilizer and ProClin 300 preservative.

- Conjugate (1 or 4 bottles) contains 6.9 mL Testosterone acridinium-labeled conjugate in BIS-TRIS buffer [2, 2-Bis (hydroxymethyl)-2, 2', 2"-nitrilotriethanol)] with surfactant stabilizer and ProClin 300 preservative.

- Assay Specific Diluent (1 or 4 bottles) contains 25.0 mL Testosterone Assay Diluent consisting of phosphate and glycine in citrate buffer and ProClin 300 preservative.

- Specimen Diluent (1 or 4 bottles) contains 12.2 mL Testosterone Specimen Diluent consisting of phosphate-buffered saline (PBS) buffer and ProClin 300 preservative.

The testosterone reagents are identified to the reagents cleared in k120009; there are no changes to the reagents.

J. Substantial Equivalence Information:

1. Predicate device name(s):

   Abbott ARCHITECT 2nd Generation Testosterone

2. Predicate 510(k) number(s):

   k120009

3. Comparison with predicate:

Similarities		
Item	Candidate Device Abbott ARCHITECT 2nd Generation Testosterone (k152155)	Predicate Device Abbott ARCHITECT 2nd Generation Testosterone (k120009)
Intended use	Immunoassay for the *in vitro* quantitative determination of testosterone in human serum and plasma.	Same
Platform	ARCHITECT *i* System (immunoassay analyzer)	Same
Methodology	Chemiluminescence (CMIA)	Same
Specimen type	Serum and plasma	Same
Measuring range	4.33 – 1500 mg/dL	Same
Calibrator levels	6 Levels A: 0 ng/dL B: 2.88 ng/dL C: 250 ng/dL D: 500 ng/dL E: 1,000 ng/dL F: 2,000 ng/dL	Same

Difference		
Item	Candidate Device Abbott ARCHITECT 2nd Generation Testosterone (k152155)	Predicate Device Abbott ARCHITECT 2nd Generation Testosterone (k120009)
Expected values listed in the labeling	Testosterone, Sex Hormone Binding Globulin, and Free testosterone Index (FTI) or Free Androgen Index (FAI)	Testosterone

K. Standard/Guidance Document Referenced (if applicable):

CLSI EP28-A3c; Defining, Establishing, and Verifying Reference Intervals in the Clinical Laboratory; Approved Guideline-Third Edition

L. Test Principle:

The ARCHITECT 2nd Generation Testosterone immunoassay is based on a competitive test principle with anti-testosterone (sheep, monoclonal) coated paramagnetic microparticles and chemiluminescence detection. In the first step, sample, assay specific diluent and anti-testosterone (sheep, monoclonal) coated paramagnetic microparticles are combined. Testosterone present in the sample binds to the anti-testosterone coated microparticles. After incubation, testosterone acridinium-labeled conjugate is added to the reaction mixture. After further incubation and washing, Pre-Trigger and Trigger solutions are added to the reaction mixture. The resulting chemiluminescent reaction is measured as relative light units (RLUs). The concentration of testosterone is interpolated from a calibration curve established with calibrators of known testosterone concentration.

In order to obtain the free testosterone index (FTI) or Free Androgen index (FAI) result, the ARCHITECT 2nd Generation Testosterone assay and the Abbott ARCHITECT SHBG assays are utilized and are measured at the same time when the sample is tested on the analyzer. The free testosterone index (%FTI) or free androgen index (%FAI) was obtained using the following equation:

$$\text{FTI or FAI (\%)} = \frac{\text{ARCHITECT 2nd Generation Testosterone Value (nmol/L)}}{\text{ARCHITECT SHBG (nmol/L)}} \times 100$$

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

   a. Precision/Reproducibility:

   Previously established in k120009

   b. Linearity/assay reportable range:

   Previously established in k120009

   c. Traceability, Stability, Expected values (controls, calibrators, or methods):

   Previously established in k120009

   d. Detection limit:

   Previously established in k120009

   e. Analytical specificity:

   Previously established in k120009

   f. Assay cut-off:

   Not applicable

2. Comparison studies:

   a. Method comparison with predicate device:

   Previously established in k120009

   b. Matrix comparison:

   Previously established in k120009

3. Clinical studies:

   a. Clinical Sensitivity:

   Not applicable

b. Clinical specificity:

Not applicable

c. Other clinical supportive data (when a. and b. are not applicable):

Not applicable

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

Reference ranges are assay dependent for total testosterone, sex hormone-binding globulin (SHBG) and the free testosterone index (FTI). FTI is calculated from the total testosterone and SHBG results. Therefore, to determine the reference range for the FTI, new reference range studies were performed to obtain expected human SHBG and total testosterone values for apparently healthy males (n = 307) and females (n = 349) using the ARCHITECT 2nd Generation Testosterone assay and the Abbott ARCHITECT SHBG assays. The free testosterone index (%FTI) or free androgen index (%FAI) was obtained using the following equation:

$$\text{FTI or FAI (\%)} = \frac{\text{ARCHITECT 2}^{\text{nd}}\text{ Generation Testosterone Value (nmol/L)}}{\text{ARCHITECT SHBG (nmol/L)}} \times 100$$

The expected values for total testosterone, SHBG, and FTI are presented in the tables below:

Total Testosterone (nmol/L and ng/dL)				
Category	n	median	2.5th Percentile	97.5th Percentile
Males (21-49 years of age)	163	15.33 nmol/L 442.07 ng/dL	8.76 nmol/L 252.73 ng/dL	27.85 nmol/L 803.24 ng/dL
Males (≥50 years of age)	144	14.42 nmol/L 415.85 ng/dL	8.58 nmol/L 247.50 ng/dL	23.37 nmol/L 674.13 ng/dL
Females (Premenopausal, 21-49 years of age)	174	1.05 nmol/L 30.43 ng/dL	0.52 nmol/L 14.92 ng/dL	1.72 nmol/L 49.56 ng/dL
Females (Postmenopausal, ≥50 years of age)	175	0.76 nmol/L 21.83 ng/dL	0.46 nmol/L 13.34 ng/dL	1.18 nmol/L 33.90 ng/dL

SHBG nmol/L				
Category	n	median	2.5th Percentile	97.5th Percentile
Males (21-49 years of age)	163	31.1	16.2	68.5
Males (≥50 years of age)	144	35.3	13.7	69.9
Females (Premenopausal, 21-49 years of age)	174	48.6	14.7	122.5
Females (Postmenopausal, ≥50 years of age)	175	49.9	16.7	124.4

Free Testosterone Index (FTI)/Free Androgen Index (FAI) (%)				
Category	n	median	2.5th Percentile	97.5th Percentile
Males (21-49 years of age)	163	46.6	24.5	113.3
Males (≥50 years of age)	144	40.7	19.3	118.4
Females (Premenopausal, 21-49 years of age)	174	2.0	0.7	8.7
Females (Postmenopausal, ≥50 years of age)	175	1.5	0.5	4.7

The sponsor recommended that each laboratory establish its own reference range that is appropriate for the laboratory patient population (i.e., a normal range that reflects the type of specimen and demographic variables such as age and sex, as applicable).

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.