

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY**

**A. 510(k) Number:**

k042241

**B. Purpose for Submission:**

This is a new device.

**C. Measurand:**

Total IgE

**D. Type of Test:**

Immunoturbidimetric, quantitative

**E. Applicant:**

Kamiya Biomedical Company

**F. Proprietary and Established Names:**

K-Assay® Total IgE Assay

K-Assay® IgE Calibrator

**G. Regulatory Information:**

1. Regulation section:

21 CFR§ 866.5510 Immunoglobulins A, G, M, D, E Immunological Test System

21 CFR§ 862.1150 Calibrator, secondary

2. Classification:

Class II

3. Product code:

DGC, IgE, Antigen, Antiserum, Control

JIT, Calibrator, secondary

4. Panel:

Immunology (82)

Chemistry (75)

**H. Intended Use:**

1. Intended use(s):

The Kamiya K-Assay® Total IgE is an in vitro diagnostic reagent for the quantitative determination of circulating total IgE in human serum or plasma by immunoturbidimetric assay for use as an aid in the clinical diagnosis of IgE mediated allergic disorders in conjunction with other clinical findings.

The Kamiya K-Assay® IgE Calibrator Set is an in vitro diagnostic reagent for the calibration of the Kamiya K-Assay® Total IgE Assay.

2. Indication(s) for use:  
Same as above.
3. Special conditions for use statement(s):  
The device is for prescription use only.
4. Special instrument requirements:  
Roche Diagnostics Hitachi 917 Analyzer

**I. Device Description:**

The Kamiya K-Assay® Total IgE Assay kit is composed of the following reagents that are ready to use:

R1: Buffer Reagent (0.1M Tris hydrochloride buffer)

R2: Antiserum Reagent (Latex particles coated with goat anti-human antibody)

The Kamiya K-Assay® IgE Calibrator Set has 6 levels and is human-serum based. Controls are not provided in this kit.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):  
Pharmacia Unicap Total IgE Assay
2. Predicate 510(k) number(s):  
k964152
3. Comparison with predicate:

Similarities		
Item	Device	Predicate
	K-Assay® IgE Assay	Unicap Total IgE Assay
Intended Use	Quantitative determination of IgE	Same
Matrix	Serum or plasma samples	Same
Calibrator reference	2 <sup>nd</sup> WHO International Reference preparation NIBSC Code No. 75/502 of human serum IgE	Same
Calibrator matrix	Human serum base	Same
Levels of calibrator	6 levels	Same

Differences		
Item	Device	Predicate
Methodology	Immunoturbidimetry	Fluoroimmunoassay
Assay range	20-2000IU/mL	2-5000 IU/mL
Volume of calibrators	1.0 mL/vial	0.2 ml/well

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

None referenced

**L. Test Principle:**

Latex particles coated with antibody specific to human IgE form immune complexes in the presence of IgE from the sample. The immune complexes cause an increase in light scattering which is proportional to the concentration of IgE in the serum or plasma sample. The light scattering is measured by reading turbidity at 570 nm. The sample IgE concentration is determined versus IgE standards of known concentration.

**M. Performance Characteristics (if/when applicable):**1. Analytical performance:a. *Precision/Reproducibility:***Within-Run Precision**

The following results were obtained on a Roche Hitachi 917 analyzer with 5 pooled human serum samples. Each sample was assayed 10 times in the same run.

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
<b>N</b>	10	10	10	10	10
<b>Mean (IU/mL)</b>	105.3	174.1	350.5	1117.8	1908.6
<b>SD (IU/mL)</b>	1.06	2.85	7.68	13.26	30.25
<b>CV (%)</b>	1.01	1.63	2.2	1.2	1.6

**Between- Run Precision**

The following results were obtained on a Roche Hitachi 917 analyzer with 5 pooled human serum samples. Each sample was assayed in replicates of 5 over 10 days. A new calibration is performed before each days testing. Each value is the average of 5 measurements

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
<b>N</b>	10	10	10	10	10
<b>Mean (IU/mL)</b>	105.4	177.6	663.7	2147.5	3304.7
<b>SD (IU/mL)</b>	2.72	3.24	11.22	33.56	16.67
<b>CV (%)</b>	2.58	1.82	1.69	1.56	0.50

b. *Linearity/assay reportable range:*

Low (600 IU/mL), medium (1200 IU/mL), and high (2000 IU/mL) controls were serially diluted (2-fold) with saline that contains 1% BSA. The samples were assayed and the R value of the regression line calculated. The criteria are set as follows: R value  $\geq 0.99$  and the measured value must be  $\pm 10\%$  of the theoretical value. The regression equations are as follows:

Low range linearity  $y = 54.764x - 8.1818$ ,  $R = 0.9991$

Medium range linearity  $y = 110.55x - 3.0455$ ,  $R = 0.9998$

High range linearity  $y = 189.89x - 4.3636$ ,  $R = 0.9992$

The assay range is 10 – 2000 IU/mL

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

The 2<sup>nd</sup> WHO International Reference Preparation NIBSC Code No. 75/502 of

human serum IgE was the reference material used for value assignment of the K-Assay IgE calibrator. IgE standardization procedure for the calibrator was provided. First, a primary standard was prepared using the 2<sup>nd</sup> WHO International Reference Preparation NIBSC Code No. 75/502 according to package insert. Secondary standards using pooled plasma with high IgE value were prepared. IgE values for the secondary standards were then evaluated. The standard curves were prepared using 4 different lots of assay reagents and used to calculate the mean value of the primary standard (n=5). Value assignment for the calibrator was based on the value of the primary standard measured previously.

Accelerated stability studies were performed and the following results were obtained:

- The IgE assay reagent and calibrator is stable for at least 12 months when stored unopened at 4°C – 10°C.
- The IgE assay reagent and calibrator is stable for at least 1 month when stored opened at 4°C (tightly capped).

*d. Detection limit:*

The analytical sensitivity is defined as the lowest IgE concentration that the analyzer can distinguish using a mean±2 standard deviation (SD). The lowest IgE sample that had an absorbance range (mean±2 SD) above the absorbance range for saline was 10 IU/mL.

*e. Analytical specificity*

**Interference Study:** The following interference samples were diluted serially with serum diluent. IgE was measured in each of the 6 diluted samples and the % recovery calculated based on IgE concentration of the serum. No interference was observed up to the measured concentration of each interferent.

Bilirubin F (18.5 mg/dL)

Bilirubin C (21.6 mg/dL)

Hemoglobin (467 mg/dL)

RF sample (500 IU/mL)

Sodium citrate (15.0 mg/mL)

*f. Assay cut-off:*

See Expected Values section.

2. Comparison studies:

*a. Method comparison with predicate device:*

The Kamiya K-ASSAY® Total IgE assay was compared to the Pharmacia Unicap Total IgE assay. 80 serum samples were tested on the Roche Hitachi 917. Sixty one of the samples were single donor serum from male and female adults obtained from Blood Services. 19 samples were from healthy Japanese female adults. No other demographic information was available.

A linear regression equation of  $y = 0.98x + 10.62$  was obtained, where y is the

Kamiya K-Assay® and x is Pharmacia Unicap. The correlation coefficient R was 0.9928. The 95% CI of the slope is 0.72 to 1.25 and the 95% CI of the y-intercept is -15.43 to 36.65 IU/mL. The standard error is 94.11 IU/mL.

*b. Matrix comparison:*

Fifty one serum and sodium citrate plasma samples covering the entire measuring range of the Kamiya K-Assay® Total IgE Assay were run using on the Roche Hitachi 917. The regression equation showed  $y = 1.1944x + 9.1707$ ,  $R = 0.9992$ , where y is plasma IgE values and x is serum IgE values. The 95% CI of the slope is 1.18 to 1.21 and 95% CI of the y-intercept is 1.32 to 17.02 IU/mL. The standard error is 25.63 IU/mL.

3. Clinical studies:

*a. Clinical Sensitivity:*

Not provided

*b. Clinical specificity:*

Not provided

*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:

413 random, non-pooled individual human serums were used in this study. This data was collected from Japanese patients. The top 35.9% was excluded from the data. Japanese Ministry of Health, Labor, and Welfare performed a study on 36,506 individuals and found that 35.9% of healthy populations were clinically allergic. The mean  $\pm 1.96$  standard deviations of the corrected population were set to be the normal range which is less than 178 IU/mL.

The exact percentage of the allergic population in the U.S has not been defined. A reference range for U.S. populations ( $<300$  IU/mL) cited in the literature (Jacobs DS, et al, "Laboratory Test Handbook, 4<sup>th</sup> edition" 1996, p409) has been added to the package insert. A statement has been added to the Limitations of the Procedure that states the reference range was calculated using Japanese adults.

**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.