February 8, 2019

Sekisui Diagnostics PEI Inc.
Penny White
Regulatory Affairs Manager
70 Watts Avenue
Charlottetown, PE
Canada, C1E 2B9

Re: K180835
Trade/Device Name: SEKURE Acetaminophen L3K Assay
Regulation Number: 21 CFR 862.3030
Regulation Name: Acetaminophen test system
Regulatory Class: Class II
Product Code: LDP
Dated: December 21, 2018
Received: December 26, 2018

Dear Penny White:

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. 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 located 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.

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 803) for devices or postmarketing safety reporting (21 CFR 4, Subpart B) for combination products (see https://www.fda.gov/CombinationProducts/GuidanceRegulatoryInformation/ucm597488.htm); 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 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/) and CDRH Learn (http://www.fda.gov/Training/CDRHLearn). 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 (http://www.fda.gov/DICE) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Kellie B. Kelm -S

for Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
K180835

Device Name
SEKURE Acetaminophen L3K Assay

Indications for Use *(Describe)*
Intended for the in vitro quantitative measurement of acetaminophen in serum, lithium heparin plasma and sodium heparin plasma. Measurement of acetaminophen is used in the diagnosis and treatment of acetaminophen overdose toxicity.

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.

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510(k) Summary

This 510(k) Summary of Safety and Effectiveness is being submitted in accordance with the requirements of 21 CFR §807.92. This is a Traditional 510(k).

The assigned 510(k) number: K180835

Applicant Information and Date [807.92(a)(1)]

Applicant Name and Address: SEKISUI DIAGNOSTICS P.E.I. INC.
70 Watts Avenue, Charlottetown, PE
Canada, C1E 2B9
Establishment Registration Number: 8020316

Application correspondent: Penny White
Regulatory Affairs Manager
902-628-0934
Penny.white@sekisuidiagnostics.com

Date Summary prepared: February 8, 2019

Device Name and Classification [807.92(a)(2)]

Trade Name	Common Name	Classification Name	Classification	Product Code
SEKURE Acetaminophen L3K Assay	Acetaminophen	Acetaminophen Test System	Class II 21 CFR 862.3030	LDP

Identification of Legally Marketed Predicate Devices [807.92(a)(3)]

Predicate Device	Predicate 510(k) Number
SEKURE Acetaminophen L3K Assay	K081938

Device Description [807.92(a)(4)]

Trade Name	Device Description
SEKURE Acetaminophen L3K Assay	The SEKURE Acetaminophen L3K assay is an enzymatic, spectrophotometric assay for the measurement of acetaminophen concentration in serum, lithium heparin plasma and sodium heparin plasma. The assay consists two working reagents, an enzyme reagent and a color reagent. The enzyme reagent contains acyl amidohydrolase, which cleaves the amide bond of the acetaminophen, forming *p*-aminophenol which then reacts with the 2,5-dimethylphenol (contained the color reagent) in the presence of manganese. The product of that reaction causes increased absorbance at 605 nm which is directly proportional to the acetaminophen concentration in the sample. Testing is performed on open system clinical chemistry analyzers, such as the Hitachi 717 (K872494) in conjunction with a calibrator (510(k) exempt) which is included and controls which are provided separately.

Intended Use [807.92(a)(5)]

For the *in vitro* quantitative measurement of acetaminophen in serum, lithium heparin plasma and sodium heparin plasma. Measurement of acetaminophen is used in the diagnosis and treatment of acetaminophen overdose toxicity.

Technological Similarities and Differences to the Predicate [807.92(a)(6)]

Characteristic	Predicate Device	Modified Device
	SEKURE Acetaminophen L3K Assay	**SEKURE Acetaminophen L3K Assay**
Intended Use	For the *in vitro* quantitative measurement of acetaminophen in serum and plasma. Measurement of acetaminophen is used in the diagnosis and treatment of acetaminophen overdose toxicity.	Similar For the *in vitro* quantitative measurement of acetaminophen in serum, lithium heparin plasma and sodium heparin plasma. Measurement of acetaminophen is used in the diagnosis and treatment of acetaminophen overdose toxicity.
Platform	Hitachi 717 (K872494)	SAME
Methodology	Enzymatic (Acyl amidohydrolase) and Spectrophotometric (2,5-dimethylphenol chromophore)	SAME
Specimen type	Serum and lithium heparin plasma	Similar Serum, lithium heparin plasma and sodium heparin plasma
Measuring interval	0.6 to 377.5 µg/mL (4 to 2500 µmol/L)	Similar 17.4 to 377.5 µg/mL (115 to 2500 µmol/L)

Summary of Non-Clinical Performance Data [807.92 (b)(1), 807.92 (b)(3)]

Precision

Testing was conducted according to CLSI EP05-A3. Two unaltered patient serum samples, two spiked patient serum samples and three levels of controls were assayed in duplicate twice a day for 20 days on the Hitachi 717 with daily calibration. Each sample was evaluated using three lots of Acetaminophen L3K Assay. The mean, standard deviation and coefficient of variation (%CV) were calculated using EP Evaluator. The acetaminophen data in µmol/L are summarized in the following table.

Lot	Sample	N	Mean Acetaminophen (µmol/L)	Repeatability		Within Laboratory		Acceptance Criteria	Pass/Fail
				SD (µmol/L)	%CV	SD (µmol/L)	%CV		
1	Control 1	80	68	1.8	2.7	2.5	3.8	≤ 4% CV	Pass
	Control 2	80	238	4.4	1.9	6.1	2.6		Pass
	Control 3	80	764	13.4	1.8	14.3	1.9		Pass
4	Unaltered P1	80	170.3	2.1	1.2	2.4	1.4		Pass
	Unaltered P2	80	195.5	2.4	1.2	2.6	1.4		Pass
	Spiked 1	80	1295.9	11.5	0.9	19.7	1.5		Pass
	Spiked 2	80	2278.6	17.3	0.8	51.0	2.2		Pass
2	Control 1	80	68	1.1	1.7	2.4	3.5		Pass
	Control 2	80	238	3.9	1.7	5.8	2.4		Pass
	Control 3	80	764	14.2	1.9	14.2	1.9		Pass
5	Unaltered P1	80	169.5	1.5	0.9	2.1	1.2		Pass
	Unaltered P2	80	195.4	2.6	1.3	2.6	1.3		Pass
	Spiked 1	80	1294.3	12.8	1.0	21.4	1.7		Pass
	Spiked 2	80	2281.5	15.9	0.7	52.3	2.3		Pass
3	Control 1	80	68	1.4	2.0	2.4	3.5		Pass
	Control 2	80	238	4.0	1.6	5.8	2.4		Pass
	Control 3	80	764	13.6	1.7	14.2	1.8		Pass
6	Unaltered P1	80	175.0	1.6	0.9	2.0	1.2		Pass
	Unaltered P2	80	202.0	2.7	1.3	3.0	1.5		Pass
	Spiked 1	80	1339.3	13.8	1.0	22.5	1.7		Pass
	Spiked 2	80	2357.9	17.5	0.7	50.0	2.1		Pass

Analytical Sensitivity

Limit of Blank (LoB) and Limit of Detection (LoD)

Limit of Blank and Limit of Detection testing was based on CLSI EP17-A2. Testing was conducted using three lots of SEKURE Acetaminophen L3K reagent and two lots of calibrator on the Hitachi 717 analyzer. Testing involved analyzing five blank samples and five low concentration samples in quadruplicate over three operating days, producing a total of 60 measurements on each lot of reagent. The LoB for each lot was determined using a non-parametric approach to determine the rank position value at the 95th percentile. The LoD for each lot was determined using a parametric approach using the pooled SDs across low level samples.

Lot	Limit of Blank (µmol/L)	Limit of Detection (µmol/L)
1	1.0	2.38
2	1.0	1.95
3	1.0	2.23

The stated LoB and LoD are the maximal values across the three lots. The LoB is 1.0 µmol/L and the LoD is 2.4 µmol/L.

Limit of Quantitation (LoQ)

Limit of Quantitation testing was based on CLSI EP17-A2. Testing was conducted using three lots of SEKURE Acetaminophen L3K reagent and two lots of calibrator on the Hitachi 717 analyzer. Five low concentration samples were tested in forty replicates over five runs across three operating days on each reagent lot. The stated LoQ is the highest value across the three lots. The mean, standard deviation, bias and %TE (calculated using the Westgard model) were determined for each low level sample.

Theoretical Acetaminophen (µmol/L)	N	Lot 1		Lot 2		Lot 3		Total Error Limit
		Mean (µmol/L)	Total Error (%)	Mean (µmol/L)	Total Error (%)	Mean (µmol/L)	Total Error (%)	
12	40	12.48	15.89	11.93	16.36	12.45	15.04	≤25%
10	40	10.53	18.83	9.90	19.00	10.43	18.49	
8	40	8.28	20.41	**7.70**	**23.52**	7.90	22.28	
6	40	6.05	22.12	5.53	34.05	**5.90**	**21.35**	
4	40	**4.00**	**25.32**	3.35	54.73	3.80	35.38	

The LoQ for each reagent lot was determined as the lowest acetaminophen concentration at which the %TE was ≤25%. The claimed LoQ for the assay is the maximal value obtained across the three lots. The LoQ claimed is 8 µmol/L.

Linearity/Assay Reportable Range

A linearity study was performed based on guidance from CLSI EP06-A. Linearity testing was conducted using three lots of SEKURE Acetaminophen L3K reagent and two lots of calibrator. Internally prepared linearity assessment material comprised nine samples from 100 to 2700 µmol/L acetaminophen. Each sample was assayed in quadruplicate on each reagent lot. The mean and deviation of the measured mean from theoretical values were calculated using EP Evaluator.

Theoretical Acetaminophen (µmol/L)	N	Lot 1		Lot 2		Lot 3		Acceptance Criteria	Pass/ Fail
		Observed (µmol/L)	Deviation (%)	Observed (µmol/L)	Deviation (%)	Observed (µmol/L)	Deviation (%)		
100	4	98.8	-1.2%	99.3	-0.7%	101.3	1.3%	±10%	Pass
115	4	116.3	1.1%	115.5	0.4%	118.5	3.0%		Pass
125	4	125.3	0.2%	124.5	-0.4%	128.8	3.0%		Pass
250	4	251.0	0.4%	251.5	0.6%	260.3	4.1%		Pass
500	4	489.5	-2.1%	493.0	-1.4%	509.8	2.0%		Pass
1000	4	1015.8	1.6%	1022.8	2.3%	1048.8	4.9%		Pass
2000	4	2018	0.9%	2020.0	1.0%	2079.5	4.0%		Pass
2500	4	2515	0.6%	2501.3	0.0%	2587.3	3.5%		Pass
2700	4	2690.3	-0.4%	2686.5	-0.5%	2784.5	3.1%		Pass

The linearity data met acceptance criteria and support an assay measuring range up to 2500 µmol/L.

Traceability, Stability, Expected Values (controls calibrators or methods)

Value Assignment

The SEKURE Acetaminophen Calibrator is prepared gravimetrically from USP grade reference acetaminophen material to a concentration of 151 µg/mL (1000 µmol/L). The calibrator preparation is verified against the master calibrator (an internal reference standard). Two lots of Acetaminophen Calibrator were verified and met acceptance criteria.

Stability

Shelf-life claims based on testing performed according to CLSI EP25-A. Stability testing supports a shelf life of 12 months.

Analytical Specificity (Endogenous and Exogenous Interference)

Endogenous Interference

An interference study was performed based on CLSI EP07-A2 to assess common or known substances that could interfere with the Acetaminophen L3K Assay. Interference testing was conducted using three lots of SEKURE Acetaminophen L3K reagent. All potential interferents were tested at acetaminophen concentrations of 33, 100, 199 and 900 µmol/L in replicates of five. Significant interference was identified as a percent difference greater than ±10% or 8 µmol/L from control.

Substance Tested	Highest Tested Concentration with No Significant Interference	Acetaminophen Concentration
Hemoglobin	200 mg/dL (31 µmol/L)	4.5 µg/mL (30 µmol/L)
	200 mg/dL (31 µmol/L)	14.0 µg/mL (93 µmol/L)
	400 mg/dL (62 µmol/L)	28.4 µg/mL (188 µmol/L)
	1000 mg/dL (155 µmol/L)	130 µg/mL (861 µmol/L)
Conjugated Bilirubin	2 mg/dL (23.7 µmol/L)	4.7 µg/mL (31 µmol/L)
	2 mg/dL (23.7 µmol/L)	14.8 µg/mL (98 µmol/L)
	32 mg/dL (364 µmol/L)	17.4 µg/mL (115 µmol/L)
	40 mg/dL (475 µmol/L)	30.2 µg/mL (200 µmol/L)
	40 mg/dL (475 µmol/L)	144 µg/mL (957 µmol/L)
Unconjugated Bilirubin	2 mg/dL (34.2 µmol/L)	5.0 µg/mL (33 µmol/L)
	4 mg/dL (68 µmol/L)	14.8 µg/mL (98 µmol/L)
	32 mg/dL (547 µmol/L)	17.4 µg/mL (115 µmol/L)
	24 mg/dL (410 µmol/L)	30.2 µg/mL (200 µmol/L)
	40 mg/dL (475 µmol/L)	144 µg/mL (958 µmol/L)
Ascorbic Acid	3000 µg/dL (170 µmol/L)	4.5 µg/mL (30 µmol/L)
	3000 µg/dL (170 µmol/L)	16.2 µg/mL (107 µmol/L)
	3000 µg/dL (170 µmol/L)	32.5 µg/mL (215 µmol/L)
	3000 µg/dL (170 µmol/L)	142.8 µg/mL (946 µmol/L)
N-Acetylcysteine	1500 mg/L	4.5 µg/mL (30 µmol/L)
	1500 mg/L	16.6 µg/mL (110 µmol/L)
	1500 mg/L	32.5 µg/mL (215 µmol/L)
	1500 mg/L	139.2 µg/mL (922 µmol/L)
Intralipid	600 mg/dL [1800 mg/dL (20 mmol/L) Simulated Triglycerides]	4.8 µg/mL (32 µmol/L)
	1000 mg/dL [3000 mg/dL (34 mmol/L) Simulated Triglycerides]	15.1 µg/mL (100 µmol/L)
	1000 mg/dL [3000 mg/dL (34 mmol/L) Simulated Triglycerides]	30.7 µg/mL (203 µmol/L)
	1000 mg/dL [3000 mg/dL (34 mmol/L) Simulated Triglycerides]	135.6 µg/mL (898 µmol/L)

Exogenous Drug Interference

Potential drug interference testing was performed based on CLSI EP07-A2 to assess common or known drugs that could interfere with the Acetaminophen L3K Assay. All potential drug interferents were tested at acetaminophen concentrations of approximately 33, 100, 199 and 900 µmol/L in replicates of five. Significant interference was identified as a percent difference greater than ±10% or 8 µmol/L from control.

Substance Tested	Concentration with No Significant Interference
Theophylline	222 µmol/L
Phenylbutazone	2.89 mmol/L
Ibuprofen	2425 µmol/L
Imipramine	2.5 µmol/L
Acetylsalicylic Acid	6.51 mmol/L
Levodopa	25.3 µmol/L
Ampicillin	152 µmol/L
Doxycycline	67.5 µmol/L
Amitriptyline	3.61 µmol/L
Metronidazole	701 µmol/L
Cefoxitin	1546 µmol/L
Cyclosporin	10.0 µmol/L
Methyldopa	71 µmol/L
Rifampicin	78.1 µmol/L
Salicylate	4.34 mmol/L

Summary of Method Comparison

Method Comparison with Predicate Device

Method comparison testing was conducted based on CLSI EP09-A3 on the Roche Hitachi 717 analyzer using the modified SEKURE Acetaminophen L3K reagent a as compared to the predicate Acetaminophen L3K reagent. Testing was completed on 105 patient specimens in duplicate over seven operating days. The samples were distributed evenly throughout the assay range (115 µmol/L – 2500 µmol/L, 17.4 µg/mL – 377.5 µg/mL). Each sample was tested using three lots of the modified reagent and one lot of the predicate reagent.

The SEKURE Acetaminophen L3K assay is designed to have a slope of 1.0 ± 0.1 and a correlation coefficient (r) of ≥ 0.975 when compared to the predicate method with Deming regression.

Method Comparison Summary

Lot	Sample Range	Slope				% Bias			Correlation Coefficient		
		Target	Deming	Passing Bablok	Pass/ Fail	Target	Result	Pass/ Fail	Target	Result	Pass/ Fail
A	115.5 – 2446.5 µmol/L	1.0±0.1	0.974	0.975	Pass	± 5.0%	-2.27%	Pass	≥ 0.975	0.9999	Pass
B			0.984	0.988	Pass		-1.38%	Pass		0.9992	Pass
C			1.009	1.009	Pass		1.55%	Pass		0.9998	Pass

Matrix Comparison

A matrix comparison study was performed to qualify plasma as a specimen for analysis with the SEKURE Acetaminophen L3K Assay. The study was performed using one lot of reagent and one lot of calibrator on one Hitachi 717 instrument. The acetaminophen concentrations spanned the assay range. A set of forty matched sets were collected and tested.

The following tube types were compared to serum tubes (without gel in plastic) and recovered within the stated acceptance criteria and are therefore suitable specimens for analysis:

- Serum with gel in plastic (SST)
- Lithium heparin with gel in plastic (PST)
- Lithium heparin without gel in plastic
- Lithium heparin Barricor tube
- Sodium heparin without gel in plastic

Matrix Comparison Summary

Tube Type	Sample Range	Slope					% Bias			Correlation Coefficient		
		Target	Regular	Deming	Passing-Bablok	Pass/ Fail	Target	Result	Pass/ Fail	Target	Result	Pass/ Fail
SST	115 – 2322 µmol/L	1.0 ± 0.1	1.012	1.012	1.007	Pass	± 5.0%	1.1%	Pass	≥ 0.975	1.000	Pass
Lithium Heparin			1.015	1.015	1.012	Pass		1.2%	Pass		1.000	Pass
PST			1.009	1.009	1.000	Pass		0.8%	Pass		1.000	Pass
Sodium Heparin			1.012	1.012	1.006	Pass		1.1%	Pass		1.000	Pass
Barricor			1.004	1.005	1.000	Pass		0.2%	Pass		1.000	Pass

Clinical studies

(clinical sensitivity, clinical specificity, other clinical supportive data)

Not Applicable

Expected values/Reference Range

The package insert contains the following reference ranges cited from literature. (Tietz Textbook of Clinical Chemistry, Second Edition, pp 1168, 2212, W.B. Saunders Company, Philadelphia (1994))

Therapeutic concentration: 10-30 µg/mL (66-199 µmol/L)
Toxic concentration: > 200 µg/mL (1324 µmol/L)
These values are suggested guidelines. It is recommended that each laboratory establish its own expected range.

Proposed Labeling

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

Conclusion

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