August 21, 2019

Diagnostic Grifols, S.A.
Joaquin Tamparillas
Technical Director at Diagnostic Industrial Group of Grifols S.A.
Passeig Fluvial, 24
Parets del Valles, Barcelona 08150 Spain

Re: K183390
Trade/Device Name: QNext and DG-PT
Regulation Number: 21 CFR 864.5425
Regulation Name: Multipurpose system for in vitro coagulation studies
Regulatory Class: Class II
Product Code: JPA, GJS
Dated: July 20, 2019
Received: July 22, 2019

Dear Joaquin Tamparillas:

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/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 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 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,

Takeesha Taylor-Bell
Chief
Division of Immunology
and Hematology Devices
OHT7: Office of In Vitro Diagnostics
and Radiological Health
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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
k183390

Device Name
QNext and DG-PT

Indications for Use *(Describe)*

QNext:
The QNext is a fully-automated, random-access instrument, intended for in vitro diagnostic use in clinical laboratories to perform hemostasis testing by detecting the changes in optical density.

DG-PT:
DG-PT is a thromboplastin reagent for the quantitative determination of Prothrombin Time on human plasma samples collected in 3.2% sodium citrate.
The product is used for the evaluation of the extrinsic and common coagulation pathways in seconds and for the monitoring Oral Anticoagulant Therapy with warfarin in International Normalized Ratio (INR).
For use with QNext.
For clinical professional laboratory and prescription use only.
For in vitro diagnostic use.
The performance of this device has not been established in neonate and pediatric patient populations.

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 submitted in accordance with the requirements of 21 CFR 807.92 and follows the FDA guidance 'The 510(k) Program: Evaluating Substantial Equivalence in Premarket Notifications [510(k)]', issued July 28, 2014.

5.1 Submitter Information

Company Information: Diagnostic Grifols S.A.
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Date Prepared: June 13, 2019

5.2 Devices

Trade Names: QNext and DG-PT.
Common Names: Multipurpose System for In Vitro Coagulation and Prothrombin Time.
Regulation Number: 864.5425 and 864.7750
Regulatory Class: Class II
Product Codes: JPA and GJS

5.3 Predicate Devices

Trade Names: ACL Top 700 (K160276) and HemosIL PT Fibrinogen HS Plus (K060931).
Common Names: Instrument Coagulation Automated and Prothrombin Time.
Regulation Number: 864.5400 and 864.7750
Regulatory Class: Class II
Product Codes: GKP and GJS

5.4 Device Description

QNext is designed to automatically perform all stages of the procedures associated to hemostasis tests allowing the operator to:

- Absorb the workload involved in running hemostasis laboratory tests profiles, optimizing the execution of these profiles in the shortest time possible, and ensuring the maximum possible precision and accuracy in the results.
- Increase the reliability of the analytical process, eliminating any possible errors in the identification and treatment of samples and products and in the revision and transcription of the results.
- Reduce the risk of Operator contamination by minimizing interaction between the Operator and samples and products during the analytical process.

To perform the operations for which it has been designed, QNext automatically follows the steps listed below:

- Sample management: loading, positive identification, aspiration, dilution (if required) and dispensation into cuvettes.
- Reagent management: loading, positive identification, cooling, stirring, aspiration and dispensation into cuvettes.
- Cuvette management: loading, transport, incubation during the reactions and management of used cuvettes.
- Management of test requests.
- Execution of test procedures.
- Result management: optical measurement of the reactions, algorithm calculation of analytical parameters from reaction curves, validation of results, traceability, bi-directional transmission of requests and results to the LIS.
- Management of disposable components.

The data analyzed can be stored, displayed and printed. Additionally, the analyzer allows conducting integrated functions, such as the analysis of urgent samples or the Quality Control module.

DG-PT consists of a glass vial containing lyophilized thromboplastin (tissue factor and phospholipids) from rabbit brain tissue, buffer, calcium ions and preservative. The closure system includes a stopper and a screw cap.

DG-PT reagent is used to perform PT tests for:

- the evaluation of the extrinsic and common coagulation pathways.
- The monitoring Oral Anticoagulant Therapy with warfarin.

The assay is based on the activation of the extrinsic coagulation pathway by the addition of the reagent to the plasma sample. The thromboplastin interacts with FVII and calcium ions activating a series of specific enzymes that comprise the extrinsic and common pathways of the coagulation cascade ultimately leading to the formation of a fibrin clot. The QNext reader measures the light change produced during the reaction.

5.5 Indications for Use

QNext:
The **QNext** is a fully-automated, random-access instrument, intended for *in vitro* diagnostic use in clinical laboratories to perform hemostasis testing by detecting the changes in optical density.

DG-PT:
DG-PT is a thromboplastin reagent for the quantitative determination of Prothrombin Time on human plasma samples collected in 3.2% sodium citrate.
The product is used for the evaluation of the extrinsic and common coagulation pathways in seconds and for the monitoring Oral Anticoagulant Therapy with warfarin in International Normalized Ratio (INR).
For use with QNext.
For clinical professional laboratory and prescription use only.
For in vitro diagnostic use.
The performance of this device has not been established in neonate and pediatric patient populations.

5.6 Comparison to Predicate Devices

5.6.1 *Similarities*

Item	Subject Device QNext	Predicate Device ACL Top 700
Intended Use	The **QNext** is a fully-automated, random-access instrument, intended for *in vitro* diagnostic use in clinical laboratories to perform hemostasis testing by detecting the changes in optical density.	The ACL TOP is a bench top, fully automated, random access analyzer designed specifically for in vitro diagnostic clinical use in the hemostasis laboratory for coagulation and/or fibrinolysis testing in the assessment of thrombosis and/or hemostasis. The system provides results for both direct hemostasis measurements and calculated parameters.
Specimen type	3.2% Citrated Plasma	Same
Methodology	Cloting tests. *Note: QNext doesn't include the chromogenic and turbidimetric methods in the intended use. This indication will be presented in a future 510(k) submission.*	– Cloting tests. – Chromogenic – Turbidimetric
Quality Control	Automated QC	Same
Modes of Operation	Automated and continuous	Same
Cuvettes loading	Continuous	Same

Item	Subject Device QNext	Predicate Device ACL Top 700
Samples and Reagents bar code reader	Yes	Same
Sample pre-dilution	Yes	Same
Sample liquid level detection	Yes	Same
Reagent container	Original container	Same

Item	Subject Device DG-PT	Predicate Device HemosIL PT-Fibrinogen HS PLUS
Intended Use	DG-PT is a thromboplastin reagent for the quantitative determination of Prothrombin Time on human plasma samples collected in 3.2% sodium citrate. The product is used for the evaluation of the extrinsic and common coagulation pathways in seconds and for the monitoring Oral Anticoagulant Therapy with warfarin in International Normalized Ratio (INR). For use with QNext. For clinical professional laboratory and prescription use only. For in vitro diagnostic use. The performance of this device has not been established in neonate and pediatric patient populations. *Note: DG-PT doesn't include the determination of fibrinogen in the intended use. This indication will be presented in a future 510(k) submission.*	A very high sensitivity calcium thromboplastin for simultaneous determinations of Prothrombin Time (PT) and Fibrinogen (Fib), for the evaluation of the extrinsic coagulation pathway and monitoring Oral Anticoagulant Therapy in human citrated plasma on the IL Coagulation Systems.
Principle of the test	The assay is based on the activation of the extrinsic coagulation pathway by the addition of a PT reagent to plasma. Tissue thromboplastin interacts with FVII and calcium ions activating a series of specific enzymes that comprise the extrinsic and common pathways of the coagulation cascade, ultimately leading to the formation of a fibrin clot. The PT is the time (in seconds) from the mixing of the plasma with a thromboplastin reagent until a fibrin clot is detected.	Same

Vial content	Lyophilized	Same
Thromboplastin origin	Rabbit brain	Same
Reagent preparation required	Yes. Reconstitution	Same
Device Class	2	Same
Classification Product Code	GJS; CFR 864.7750	Same
Common Name	Test, Time, Prothrombin	Same
Measurement	Quantitative	Same
Detection principle	Photometric	Same
Sample Type	Citrated plasma	Same
Reporting units	PT: seconds and INR	Same

5.6.2 *Differences*

Item	Subject Device QNext	Predicate Device ACL Top 700
Regulatory Classification	JPA, Class II 864.5425 Multipurpose System For In Vitro Coagulation	GKP, Class II 864.5400 Instrument, coagulation, automated
Samples on-board	60	120
Reagents on-board	30	60
Wavelength	405 nm and/or 620 nm	405 nm and/or 671 nm
Item	**Subject Device DG-PT**	**Predicate Device PT-Fibrinogen HS PLUS**
Package content	6 vials of Thromboplastin	5 vials of Thromboplastin 5 vials of Buffer.
Quality control	2 levels	3 levels
In-use Stability	Stability after reconstitution, stored at 2-8 ºC in the original vial: 10 days. On-board stability: 5 days.	Stability after reconstitution, stored at 2-8 ºC in the original vial: 5 days. On-board stability: 36 hours.

5.7 Performance Testing

5.7.1 Precision

Precision studies were designed in accordance with CLSI EP05-A3.
Repeatability and Within-laboratory precision study was performed in a single site involving seven patient derived samples with tree lots of reagent during twenty days with two runs per day and two replicates per run.
Reproducibility study was performed in three sites assaying seven patient derived samples on two instruments during five days with two runs per day and three replicates per run.
The following results were demonstrated:

Table 1. Summary of Repeatability and Within-Laboratory Precision Study Results

Test	Sample	Mean Value	N	Repeatability		Within-laboratory	
				%CV	Upper One-sided 95% Limit	%CV	Upper One-sided 95% Limit
Prothrombin time (seconds)	1	10.65	240	1.4	1.6	2.4	3.3
	2	17.02	238	1.6	1.8	3.5	5.1
	3	27.68	240	1.7	1.9	3.6	6.3
	4	29.40	240	1.9	2.1	3.4	5.9
	5	37.48	240	1.8	2.0	3.9	8.6
	6	53.82	240	1.7	1.9	4.4	10.4
	7	85.08	240	2.1	2.3	5.7	15.5
Prothrombin time (INR)	1	0.729	240	1.6	1.8	2.2	2.4
	2	1.250	238	1.7	1.9	3.9	5.6
	3	2.186	240	2.0	2.2	4.4	8.3
	4	2.343	240	2.2	2.5	4.5	9.8
	5	3.098	240	2.0	2.3	5.3	13.4
	6	4.698	240	2.0	2.3	6.2	17.4
	7	7.959	240	2.4	2.7	8.2	26.2

CV=Coefficient of Variation

Table 2. Summary of Reproducibility Study Results

Test	Sample	Mean Value	N	Repeatability		Reproducibility	
				%CV	Upper One-sided 95% Limit	%CV	Upper One-sided 95% Limit
Prothrombin time (seconds)	1	10.70	180	2.2	2.5	3.1	4.0
	2	16.78	180	1.6	1.8	3.1	4.2
	3	27.08	180	1.9	2.1	4.2	6.1
	4	29.06	180	1.7	1.9	4	6.1
	5	36.87	180	1.7	1.9	4	8.3
	6	52.27	180	1.7	1.9	5.7	9.1
	7	80.65	180	3.1	3.4	6	13.1
Prothrombin time (INR)	1	0.712	180	2.6	2.9	5.5	11.3
	2	1.212	180	1.9	2.1	5.5	10.9
	3	2.133	180	2.2	2.5	6.9	13.9
	4	2.318	180	2.1	2.3	6.9	14.4
	5	3.070	180	2	2.2	6.7	17.3
	6	4.637	180	2	2.3	8.7	18.3
	7	7.735	180	3.7	4.1	9.2	24.7

CV=Coefficient of Variation

5.7.2 Reference Interval Study

The reference interval study was designed in accordance with CLSI C28-A3.
The study was performed at two sites using one lot of reagents. A total of 243 reference samples were tested with each reagent.
The Reference Intervals of DG-PT in seconds and INR are shown in the following tables:

Test(units)	Reference Interval
Prothrombin time (seconds)	12.1 to 16.1
Prothrombin time (INR)	0.83 to 1.17

5.7.3. Sensitivity Study

Factor sensitivity study was designed in accordance with CLSI H47-A2. DG-PT Prothrombin Time determination was made for factors II, V, VII and X in a set of samples spanning from 100% to <1% of a specific coagulation factor, in order to establish the minimum concentration at which the screening test rises above the upper limit of the established reference interval.
The sensitivity results of Prothrombin Time to factor deficiency (II, V, VII and X) plasmas are provided below:

Sensitivity (IU/dL)	
FII	29
FV	45
FVII	44
FX	43

5.7.4. Specificity Study

The study was designed in accordance with the recommendations in CLSI EP7-A2 and the statistical analyses were conducted in accordance with the recommendations in CLSI EP7-A3.
Two sample levels were tested (pooled normal samples and pooled abnormal samples). Each potentially interfering substance was added to the sample pool. The interfering screening was conducted by paired-difference.

Maximum concentration of interfering substances for DG-PT Prothrombin Time is summarized in the following tables:

	Normal level		Abnormal level	
Interfering substance / Test	**PT (s)**	**PT (INR)**	**PT (s)**	**PT (INR)**
Hemoglobin (g/L)	10.0	10.0	10.0	10.0
Conjugated bilirubin (mg/dL)	43.3	43.3	43.3	43.3
Triglycerides (mg/dL)	3000	3000	3000	3000
Citrate (%)	0.6	0.6	0.6	0.6
UFH (IU/mL)	1.1	0.9	0.7	0.7
LMWH (IU/mL)	2.3	2.0	1.8	1.6

Interference of argatroban, dabigatran and rivaroxaban was observed at all concentrations tested indicated below:

	Rivaroxaban (ng/mL)	**Argatroban** (ng/mL)	**Dabigatran** (ng/mL)
Normal sample	313, 625, 938, 1250	375, 750, 1125, 1500	150, 300, 450, 600
Abnormal sample	156, 313, 469, 625	150, 300, 450, 600	75, 150, 225, 300

5.7.5. Method comparison Study

This study was designed in accordance with CLSI EP09-A3. Method comparison study was conducted at three clinical sites. For each test, a minimum of 100 patient derived samples covering the claimed analytical measurement range (AMR) were tested at each site. Samples were assayed in a parallel, testing on both systems: QNext with DG-PT and the predicate device ACL Top 700 with HemosIL PT Fibrinogen HS Plus. The regression results are summarized in the following tables:

Results from the two US sites:

Assay	**n**	**Slope (95% CI)**	**Intercept (95% CI)**	**r**
PT (seconds)	360	0.913 (0.893-0.938)	1.118 (0.706 - 1.477)	0.983
PT (INR)	360	1.034 (1.010 - 1.060)	-0.024 (-0.054 - 0.009)	0.980

CI=Confidence interval

Results from the ex-US site:

Assay	**n**	**Slope (95% CI)**	**Intercept (95% CI)**	**r**
PT (seconds)	271	0.985 (0.962-1.003)	0.272 (-0.078 - 0.716)	0.988
PT (INR)	271	1.000 (0.978 - 1.022)	-0.070 (-0.099 - -0.042)	0.990

CI=Confidence interval

10.9 Conclusions

Diagnostic Grifols S.A based on all the information included and discussed in this submission concludes that QNext and DG-PT are substantially equivalent to the predicate devices. The information submitted to FDA demonstrates that the devices are at least as safe and effective as the legally marketed devices.