510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

A. 510(k) Number:
k062708

B. Purpose for Submission:
New Device

C. Measurand:
Anti-Deaminated Gliadin-derived Peptide (DGP) Antibodies

D. Type of Test:
Semi-quantitative ELISA

E. Applicant:
INOVA Diagnostics, Inc.

F. Proprietary and Established Names:
QUANTA Lite™ Celiac DGP Screen

G. Regulatory Information:

1. Regulation section:
   21 § CFR 866.5750 Radioallergosorbent (RAST) Immunological Test System
2. Classification:
   II
3. Product code:
   MST, Antibodies, Gliadin
4. Panel:
   Immunology (82)

H. Intended Use:

1. Intended use(s):
   The QUANTA Lite™ Celiac DGP Screen is an enzyme-linked immunosorbent assay (ELISA) for the semi-quantitative detection of IgA and IgG antibodies to synthetic deaminated gliadin-derived peptides in human serum. The presence of deaminated peptide antibodies can be used in conjunction with clinical findings and other laboratory tests to aid in the diagnosis of both IgA sufficient and IgA deficient celiac disease as well as dermatitis herpetiformis.
2. Indication(s) for use:
   Same as intended use.
3. Special conditions for use statement(s):
   For prescription use only.
4. Special instrument requirements:
   Microplate reader capable of measuring OD at 450 nm (or 620 for dual wavelength readings).

I. Device Description:

Each device contains the following: polystyrene microplate strips with breakaway (12-1x8) microwells coated with purified synthetic deaminated gliadin peptide antigen; high positive, low positive, and negative controls (human serum); HRP wash concentrate; HRP sample diluent; HRP Anti-human IgG/IgA conjugate (goat); TMB chromogen; and 0.344M sulfuric acid stop solution.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   QUANTA Lite™ Gliadin IgG II
   QUANTA Lite™ Gliadin IgA II
2. Predicate 510(k) number(s):
   k052142 (IgG)
   k052143 (IgA)
3. Comparison with predicate:

Similarities			
Item	New Device	Predicate Device	
	QUANTA Lite™ Celiac DGP Screen	QUANTA Lite™ Gliadin IgG II	QUANTA Lite™ Gliadin IgA II
Technology	ELISA	Same	Same
Assay Format	Semi-quantitative	Same	Same
Assay Platform	96 well microtiter plates	Same	Same
Positive and Negative Control	Pre-diluted human serum. Ready to use.	Same	Same
Sample type and dilution	Serum at 1:101	Same	Same
Sample volume required	5 µL	Same	Same
Antigen	Purified synthetic deaminated gliadin peptide	Same	Same
Substrate	TMB Chromogen	Same	Same
Incubation times	30-30-30 minutes	Same	Same
OD reading	450 nm (or 620 for dual wavelength readings)	Same	Same
Cut-off	20.0 units	Same	Same

Differences			
Item	Device	Predicate	
	QUANTA Lite™ Celiac DGP Screen	QUANTA Lite™ Gliadin IgG II	QUANTA Lite™ Gliadin IgA II
Intended use	For the semi-quantitative detection of IgA and IgG antibodies to synthetic deaminated gliadin-derived peptides in human serum	For the semi-quantitative detection of IgG anti-gliadin antibodies in human serum	for the semi-quantitative detection of IgA anti-gliadin antibodies in human serum

Differences			
Item	Device	Predicate	
Indications for Use	Aid in the diagnosis of both IgA sufficient and IgA deficient celiac disease as well as dermatitis herpetiformis.	Aid in the diagnosis of celiac disease	Aid in the diagnosis of celiac disease
Enzyme-Conjugate	Horseradish Peroxidase, Goat anti-human IgG and anti-human IgA	Horseradish Peroxidase, Goat anti-human IgG	Horseradish Peroxidase, Goat anti-human IgA

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

None referenced.

L. Test Principle:

The purified synthetic deaminated gliadin peptides are bound to the wells of a polystyrene microwell plate under conditions that will preserve the antigen in its native state. Pre-diluted controls and diluted patient sera are added to separate wells, allowing any anti-gliadin peptide IgA or IgG antibodies present to bind to the immobilized antigen. Unbound sample is washed away and an enzyme labeled anti-human IgA and IgG conjugate is added to each well. A second incubation allows the enzyme labeled anti-human IgA and IgG to bind to patient antibodies which have bound to the gliadin peptides in the microwells. After washing away any unbound enzyme labeled anti-human IgA and IgG, the remaining enzyme activity is measured by adding a chromogenic substrate and measuring the intensity of the color that develops spectrophotometrically. The color intensity in the patient wells is compared to the color in the control wells.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

   a. *Precision/Reproducibility*:

   The intra-assay precision was determined by testing thirteen serum samples five times. Results showed that 5 samples with high anti-DGP concentrations (51.8-162.0 units) had %CV of 0.5-2.7%, 5 samples close to the cut-off (17.4-27.5 units) had %CV of 1.6-2.8% and 3 negative samples (5.3-7.9 units) had %CV of 2.6-4.7% (see below).

Intra-assay Performance of QUANTA Lite™ Celiac DGP Screen

	1	2	3	4	5	6	7	8	9	10	11	12	13
Mean units	57.5	51.8	102.0	27.5	121.0	162.0	7.9	4.6	5.3	17.7	25.0	17.4	23.4
SD	0.3	1.4	0.9	0.4	1.3	2.8	0.4	0.2	0.1	0.4	0.7	0.4	0.7
CV%	0.5	2.7	0.9	1.6	1.1	1.7	4.7	4.1	2.6	2.2	2.8	2.2	2.8

The inter-assay precision was determined by testing eight serum samples and

one high positive control (HPC) twice daily for three days. Three of the samples had high anti-DGP concentrations (48.5-157.9 units), 3 samples were close to the assay cut-off (18.8-27.5 units) and 2 were negative samples (9.8-16.4 units). The following table summarizes the results with %CV for the high samples ranged from 2.4-3.8 %, the samples near the cut-off 3.2-3.6% and the negative samples 4.7-5.8%.

Inter-assay Performance for QUANTA Lite™ Celiac DGP Screen

	HPC	A	B	C	D	E	F	G	H
Mean units	110.4	54.6	48.5	27.5	157.9	9.8	16.4	22.2	18.8
SD	3.4	1.4	1.9	1.0	3.8	0.6	0.1	0.7	0.6
CV%	3.0	2.5	3.8	3.6	2.4	5.8	4.7	3.2	3.4

b. Linearity/assay reportable range:
Not applicable.

c. Traceability, Stability, Expected values (controls, calibrators, or methods):
There is no reference standard for gliadin. The positive and negative controls are prepared in-house and arbitrary units are assigned during the development process.

d. Detection limit:
Not applicable.

e. Analytical specificity:
Interference by endogenous substances: No data provided. The package insert states that grossly hemolyzed, lipemic, microbially contaminated, heat-treated samples or specimens containing visible particulate should be avoided in this assay.

Crossreactivity with other autoantibodies: The QUANTA Lite™ Celiac DGP Screen was tested with 86 sera containing other autoantibodies specific for Centromere (4), Actin (4), Sm (9), SS-A (12), RNP (9), Jo-1 (9), SS-B (8), Scl-70 (8), GBM (4), MPO (6), RF (5), Ribo P (4), and M2 (4). All samples were negative with the QUANTA Lite™ Celiac DGP Screen with a mean value of 2.4 units which was eight standard deviations below the 20 units cut-off.

f. Assay cut-off:
The cut-off value of 20 units for the assay was established from a combined panel of 497 asymptomatic healthy individuals residing in the United States. Age and gender were available for 300 samples and unavailable for the remaining 197 samples. Of the 300 samples, there were equal number of males and females. The age range for the female subjects was 14-76 years and for the male subjects, 24-78 years. The assay specificity was 99.2% (493/497). The average value discounting the four positive samples was 3.84 units. Of the 4 positive samples, two were weak positive with values of 20.1 and 20.2 units; and the other two had values of 42.6 and 25.4 units, one of these subjects was believed to have celiac disease based on a positive tTG result.

2. Comparison studies:
   a. *Method comparison with predicate:*
      Testing was performed on 81 samples from clinically defined patients (30 celiac, 33 gluten-free diet celiac and 18 first degree celiac relatives from three reference labs) and on 517 normal samples (20 samples from the three reference lab and 497 from the assay cut-off study). The Positive Percent Agreement was 78.0% (39/50); the Negative Percent Agreement was 99.4% (545/548) and the Overall Agreement was 91.6% (548/598).

		QUANTA Lite™Gliadin IgG II and/or Gliadin IgA II		
		Positive	Negative	Total
QUANTA Lite™ Celiac DGP Screen	Positive	39	3*	42
	Negative	11**	545	556
	Total	50	548	598

* Of the 3 samples found to be Celiac DGP Screen positive but negative on both the Gliadin II kits), 2 were celiac patients on a gluten free diet with 28.7 and 20.9 units. The third patient was a 1st degree relative of a celiac patient with 20.2 units.

** Of the eleven samples found negative by the Celiac DGP Screen kit yet positive by either gliadin II kit, 9 samples were from normal subjects (2 were IgG positive with 20.9 and 23.4 units and 7 were IgA positive with 20.7, 25.8, 34.5, 39.6, 57.9, 80.8, and 106.4 units) and 2 samples from celiac patients on a gluten free diet (one was 20.1 units on Gliadin IgG II and the other was 25.3 units on Gliadin IgA II).

   b. *Matrix comparison:*
      The assay use serum as matrix.
3. Clinical studies:
   a. *Clinical Sensitivity and Specificity*:
      The clinical sensitivity and specificity study were evaluated on 885 clinically defined samples from patients with the following diagnosis: 85 Celiacs, 50 Celiac IgA Deficient, 33 Celiacs on Gluten-Free Diet, 18 Celiac 1st degree relatives, 65 Dermatitis Herpetiformis, 36 IgA Deficient Controls, 81 Non-Celiac Disease Patients, and 517 Healthy individuals. The Celiac DGP assay sensitivity for celiac and Dermatitis Herpetiformis patients were as follows: 97.0% (131/135) for the celiac patients; 90.8% (59/65) for Dermatitis Herpetiformis as shown in the table below:

		Diagnosis				
		Positive (Celiac)	Celiacs on Gluten-Free Diet	Dermatitis Herpetiformis	Negatives (Non-Celiac and Healthy Controls)	Total
QUANTA Lite™ Celiac DGP Screen	Positive	131	9	59	7	206
	Negative	4	24	6	645	679
	Total	135	33	65	652	885

In addition, a summary of the results with Celiac DGP assay with the individual diagnosis is listed below:

	Diagnosis	n	Positive Celiac DGP	% Sensitivity
Patient Groups	Celiacs	85	81	95.3
	Celiac IgA Deficient	50	50	100.0
	Celiacs on Gluten-Free Diet	33	9	27.0%
	1st degree relatives	18	2	11.0%
	Dermatitis Herpetiformis	65	59	91.0%
	IgA Deficient Controls	36	0	0.0%
	Non-Celiac Disease (Other GI diseases)	81	1	1.2%
Normals		517	4	0.8%

b. Other clinical supportive data (when a .is not applicable):
Not applicable.

4. Clinical cut-off**:**
Same as assay cut-off.
5. Expected values/Reference range:
Expected values in the normal population should be negative.

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.