510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

A. 510(k) Number:
k052142

B. Purpose for Submission:
Device modification: The capture antigen was changed from a purified native gliadin protein to a synthetic gliadin peptide.

C. Measurand:
Anti-gliadin IgG antibodies

D. Type of Test:
Semi-quantitative ELISA

E. Applicant:
INOVA Diagnostics, Inc.

F. Proprietary and Established Names:
QUANTA Lite™ Gliadin IgG II

G. Regulatory Information:
1. Regulation section:
   21 CFR 866.5750 Radioallergosorbent (RAST) immunological test system
2. Classification:
   Class II
3. Product code:
   MST, Antibodies, Gliadin
4. Panel:
   Immunology 82

H. Intended Use:
1. Intended use(s):
   QUANTA Lite™ Gliadin IgG II is an enzyme-linked immunosorbent assay (ELISA) for the semi-quantitative detection of gliadin IgG antibodies in human serum. The presence of gliadin antibodies can be used in conjunction with clinical findings and other laboratory tests to aid in the diagnosis of celiac disease.
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 450 nm.

I. Device Description:
Each device contains the following: microwell plate with breakaway microwells coated with a synthetic, deamidated peptide (Gliadin) antigen, plate holder, assay controls (high positive, low positive and negative), HRP sample diluent, HRP wash concentrate, HRP IgG conjugated goat anti-human IgG, TMB chromogen and HRP Stop solution.

J. Substantial Equivalence Information:
1. Predicate device name(s):

QUANTA Lite™ Gliadin IgG

2. Predicate 510(k) number(s):
   k964985

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended use	QUANTA Lite™ Gliadin IgG II is an enzyme-linked immunosorbent assay (ELISA) for the semi-quantitative detection of gliadin IgG antibodies in human serum. The presence of gliadin antibodies can be used in conjunction with clinical findings and other laboratory tests to aid in the diagnosis of celiac disease.	QUANTA Lite™ Gliadin IgG II is an enzyme-linked immunosorbent assay (ELISA) for the semi-quantitative detection of anti-Gliadin antibody of the IgG class in human serum. Detection of these antibodies is an aid in diagnosis of certain gluten sensitive enteropathies such as celiac disease and dermatitis herpetiformis.
Technology	ELISA	Same
Assay format	Semi-quantitative	Same
Positive & negative controls	Ready to use	Same
Assay Platform	96-well microtiter plates	Same
Sample type and dilution	Human serum at 1:101	Same
Enzyme-conjugate	Horseradish peroxidase conjugated to goat anti-human IgG	Same
Substrate	TMB chromogen	Same

Differences		
Item	Device	Predicate
Antigen	Synthetic, deamidated peptide	Purified native gliadin protein

K. Standard/Guidance Document Referenced (if applicable):
   None referenced.

L. Test Principle:
   Synthetic gliadin antigen is bound to the wells of a polystyrene microwell plate. Pre-diluted controls and diluted patient sera are added to separate wells, allowing any anti-gliadin antibodies present to bind to the immobilized antigen. Unbound sample is washed away and an enzyme labeled anti-human IgG antibody is added to each well. A second incubation allows the enzyme label to bind to any patient antibodies which have become attached to the microwells. After washing away any unbound

enzyme conjugate, the remaining enzyme activity is measured by adding a chromogenic substrate and measuring the intensity of the color that develops. The assay is evaluated by comparing the color that develops in the patient wells with the color in the control wells.

M. Performance Characteristics (if/when applicable):

1. <u>Analytical performance:</u>

   a. *Precision/Reproducibility:*

   Intra-assay studies: (4 high, 2 near cut-off and 3 negative) were assayed for a total of five times each. The mean units ranged from 3.7 to 59.7 units, the standard deviations (SD) ranged from 0.3-2.0 and the percent CV ranged from 2.9-10.0.

   Inter-assay studies: Five samples (3 high and 2 negative) plus a High positive kit control were tested in duplicate, twice daily, for three days. The mean ranged from 5.2-113.8 and the standard deviations ranged from 0.3-4.1 and the percent CV ranged from 3.0-9.8.

   b. *Linearity/assay reportable range:*

   Not applicable.

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

   No recognized reference material for gliadin. The results are reported in arbitrary units.

   d. *Detection limit:*

   Not applicable.

   e. *Analytical specificity:*

   <u>Interference</u> by endogenous substances: No data provided. The package insert states that addition of azide or other preservatives to the sample may adversely affect the results. Microbially contaminated, heat-treated, or specimens containing visible particulate should not be used. Using grossly hemolyzed or lipemic serum or specimens should be avoided.

   <u>Cross-reactivity with other autoantibodies:</u> The QUANTA Lite™ Gliadin IgA II was tested with 45 sera containing other autoantibodies specific for Actin (5), PCNA (1), AMA (1), Fibrillerin (1), Chromatin (1), Histone (4), LKM (4), SS-B (4), Scl-70 (4), RNP (4), RF IgM (4), Centromere (4), $\beta 2$ IgG (2), $\beta 2$ IgM (1), $\beta 2$ IgA (1) and GBM (4). The mean value of these 45 samples was 5.0 units. The highest sample, an Actin sample, was 51 units. The mean value is four standard deviations below the 20-unit cutoff.

   f. *Assay cut-off:*

   To validate the cut-off from the predicate device with the new assay, a panel of 500 asymptomatic, healthy individuals, residing in the US was tested.

	Predicate device	New Device
Number males/Age (y)	150/24y-78y.	150/24y-78y.
Number female/Age (y)	150/14y-76y.	150/14y-76y.
Number w/ no data	200	200
Number Positive (%)	109 (21.8%)	3 (0.6%)
Mean (SD) units	15.9 (16.7)	5.53 (2.56)
Mean + SD (units)	32.6	8.09

The assay cut-off of 20 U/ml from the predicate device was maintained in the new device.

2. Comparison studies:

    a. *Method comparison with predicate device:*

A comparison between the two devices was performed in two separate studies. A panel of 500 asymptomatic and healthy individuals, residing in the US, was tested (*See Expected Values, above*). A second set of studies involved 113 blood samples from patients from three celiac disease laboratories consisting of Celiac Positive (32), Celiac Positive, Gluten-Free Diet (30), Celiac Positive Gluten-Free Diet, EMA Positive (5), 1st degree relatives (20), Celiac IgA Deficient (5), and Healthy Normal (521). The comparison showed the following:

		Gliadin IgG		
		(+)	(-)	Total
Gliadin IgG II	(+)	29	8	37
	(-)	142*	434	576
	Total	171	442	613

Positive percent agreement:	17% (29/171)
Negative percent agreement:	98% (434/442)
Overall agreement:	75% (463/613)

Of the Gliadin IgG(+)/Gliadin IgG II(-) samples(*), 114 of 142 were from the normal, healthy population and demonstrated a "false positive" result on the predicate device

    b. *Matrix comparison:*

Both assays use serum as the matrix.

3. Clinical studies:

    a. *Clinical Sensitivity:*

The study consisted of the following: Celiac Positive (32), Celiac Positive, Gluten-Free Diet (30), Celiac Positive Gluten-Free Diet, EMA Positive (5), 1st degree relatives (20), Celiac IgA Deficient (5), and Healthy Normal (521) for a total of 613 samples. The clinical sensitivities of the new device (table 1) and the predicate device (table 2) were 47.2% (34/72) and 63.9% (46/72) respectively in the target population.

Table 1

		Disease		
		(+)	(-)	Total
Gliadin IgG II	(+)	34	3	37
	(-)	38	538	576
	Total	72	541	613

Table 2

		Disease		
		(+)	(-)	Total
Gliadin IgG	(+)	46	125	171
	(-)	26	416	442
	Total	72	541	613

    b. *Clinical specificity:*

        In the 613 subjects referenced above, the clinical specificities of the new device and predicate device were 99.4% (538/541) and 76.8% (416/541) respectively in the non-target populations.

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

4. Clinical cut-off:

    See assay cut-off.

5. Expected values/Reference range:

    The expected value in the normal population is negative; however the sponsor states that other gastrointestinal disorders are known to induce circulating gliadin antibodies.

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.