510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE

A. 510(k) Number:

k103227

B. Purpose for Submission:

New device

C. Measurand:

Amphetamine, Methamphetamine, Cocaine, Opiates, PCP and THC

D. Type of Test:

Qualitative, immunochromatographic

E. Applicant:

Branan Medical Corporation

F. Proprietary and Established Names:

Oratect® Oral Fluid Drug Screen Device

OratectCheck Saliva/Oral Fluid Controls (Positive and Negative)

G. Regulatory Information:

Product Code	Classification	Regulation Section	Panel
DKZ	II	862.3100 – Amphetamine test system	91-Toxicology
DJC	II	862.3610 –Methamphetamine test system	91-Toxicology
DIO	II	862.3250-Cocaine and cocaine metabolite test system	91-Toxicology
DJG	II	862.3650-Opiate test system	91-Toxicology
LCM	Unclassified	Enzyme immunoassay Phencyclidine	91-Toxicology
LDJ	II	862.3870-Cannabinoid test system	91-Toxicology
DIF	Class I, Reserved	862.3280 – clinical toxicology control material	91-Toxicology

H. Intended Use:

1. Intended use(s):

   See indications for use below

2. Indication(s) for use:

   The Oratect Oral fluid Drug Screen Device is a one-step lateral flow immunoassay device for the qualitative detection of d-Methamphetamine (ME).Delta-9-Tetrahydrocannabinol (TH), Cocaine (CO), d-Amphetamine (AM), morphine (OP) and Phencyclidine (PC) in human oral fluid. The Oratect tests detect these drugs at the cutoff concentration listed below.

Test	cutoff
Oratect Oral Fluid Drug Screen Device d-Amphetamine	50 ng/mL
Oratect Oral Fluid Drug Screen Device d-Methamphetamine	50 ng/mL
Oratect Oral Fluid Drug Screen Device Delta-9-Tetrahydrocannabinol	40 ng/mL
Oratect Oral Fluid Drug Screen Device Cocaine	20 ng/mL
Oratect Oral Fluid Drug Screen Device Morphine	40 ng/mL
Oratect Oral Fluid Drug Screen Device Phencyclidine	10 ng/mL

These products are for *in vitro diagnostic use* and intended for prescription point of care use.

The Oratect® Oral Fluid Drug Screen Device provides only preliminary drug test results. A more specific alternative method must be used in order to obtain a confirmed analytical result. Liquid chromatography/mass spectrometry/mass spectrometry (LC/MS/MS) is the preferred confirmatory method. Samples for confirmatory testing should be collected with the Oratect Oral Fluid Collection Tube (50 mL polypropylene tube) provided. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are indicated. The tests are not intended to be used in monitoring drug levels.

OratectCheck™ Oral Fluid Controls (Negative and Positive controls of the analytes) are available but not supplied with the Oratect® Oral Fluid Drug Screen Devices. The OratectCheck™ Oral Fluid Controls are used as quality control materials with Oratect® Oral Fluid Drug Screen Devices.

Special conditions for use statement(s):

The Oratect Oral Fluid Drug Screen Device provides only preliminary drug test results. For a quantitative result o for a confirmation of a presumptive positive result obtained by the Oratect Oral Fluid Drug Screen Device, a more specific alternative method must be used. GC/MS or LC/MS is the preferred confirmatory method.

These products are for *in vitro diagnostic use* and intended for prescription point of care use.

4. Special instrument requirements:

Not applicable, as the device is a visually-read single-use device

I. Device Description:

The Oratect® Oral Fluid Drug Screen Device contains one or two membrane strips and a collection pad. Each strip consists of a membrane, a colloidal gold conjugate pad, a sample pad and an absorbent pad.

Membrane:
ME/TH/CO test strip: Methamphetamine, THC and Cocaine-protein conjugates are coated onto specific region on the membrane known as the "Test Region".
AM/OP/PC test strip: Amphetamine, Morphine, Phencyclidine protein conjugates are coated onto the test region of the membrane.
Colloidal Gold Conjugate Pad: The colloidal gold conjugate pad for the ME/TH/CO test strip contains mouse monoclonal anti-methamphetamine, anti-THC and anti-cocaine antibody colloidal gold conjugates coated onto a fibrous pad. The colloidal gold conjugate pad for the AM/OP/PC test strip contains mouse monoclonal anti-amphetamine, anti-morphine, anti-phencyclidine antibody colloidal gold conjugates.
Collection Pad: The collection pad consists of an absorbent material.

Oratect Oral Fluid Collection Tube (50 mL polypropylene tube) for confirmation shipping

J. Substantial Equivalence Information:

1. Predicate device name(s):

STC Amphetamine-Specific Intercept Micro-plate EIA and controls, Orasure Technologies Inc
STC Cocaine Metabolite Intercept Micro-plate EIA and controls, Orasure Technologies Inc
STC Methamphetamine Intercept Micro-plate EIA and controls, Orasure Technologies Inc

STC Cannabinoids Intercept Micro-plate EIA and controls, Orasure Technologies Inc
STC Opiates Intercept Micro-plate EIA and controls, Orasure Technologies Inc
STC PCP Intercept Micro-plate EIA and controls, Orasure Technologies Inc

2. Predicate K number(s):

k992918, k001197, k993208, k002375, k981341 and k000399, respectively

3. Comparison with predicate:

Similarities/Differences		
Item	Device	Predicates
Intended use	Preliminary Drug screening test for the qualitative detection of drug analytes in oral fluid (human saliva) For *InVitro* Diagnostic Use	Same
Test Principle	Specific non-radioimmunoassay. The assay of small drugs of abuse molecules are based on competitive immunoassay methodology, the presence of analyte will produce a negative signal. Competitive lateral flow immunochromatographic assay	Specific non-radioimmunoassay. The assay of small drugs of abuse molecules are based on competitive immunoassay methodology, the presence of analyte will produce a negative signal. Competitive enzyme-labeled immunoassay
Specimen	Oral fluid	Same
Drug analytes	d-amphetamine, cocaine. d-methamphetamine, cannabinoids, Opiates and PCP	Same
Test result interpretation	Visual reading	Instrument reading
Control matrix	Synthetic oral fluid	Oral fluid diluent
Testing site	Point-of-care	Laboratory

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

None were referenced

L. Test Principle:

The Oratect Oral Fluid Drug Screen Device is based on a competitive immunoassay procedure in which drug derivatives immobilized on the membrane compete with the drug(s) which may be present in oral fluid for limited antibody binding sites on the colored colloidal gold antibody conjugate.

When no drug is present in the sample, the colored colloidal gold antibody conjugate will bind to the drug derivatives on the membrane to form visible bands at specific

test regions, a negative result. When a sufficient amount of drug is present in the sample, the drug will saturate the antibodies, and the colored colloidal gold conjugate cannot bind to the drug derivatives on the membrane giving a positive result.

The device has an internal process control which indicates that sufficient volume of test sample was applied to the device. Also, the flow of the blue lines indicates that a sufficient amount of oral fluid has been collected.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. Precision/Reproducibility:

Precision studies were performed at three point-of-care sites using drug-free oral fluid spiked to the following concentrations: negative (zero), cutoff, +/-25%, +/-50%, +/-75% and 100% of the cutoff. The samples were aliquoted, randomized and blinded, then given to each site. A minimum of 45 determinations were made at each concentration. Testing was performed once a day over 10 days by 4 intended use operators (2 at site 1 [technician training certificate], and 1 each at sites 2 [medical technologist] and 3 [vocational nurse]). The intended users performed the testing by following the instructions for use. Sample concentrations were confirmed by LC/MS/MS or GC/MS.

Methamphetamine

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	180	0	180	0	120	0	480	0
-75%	15	0	15	0	15	0	45	0
-50%	30	0	30	0	15	0	75	0
-25%	29	1	28	2	15	0	72	3
Cutoff	10	5	8	7	8	7	26	19
125%	2	28	2	28	2	13	6	69
150%	0	32	1	29	0	15	1	76
175%	0	11	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

THC

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	195	0	195	0	120	0	510	0
-75%	15	0	15	0	15	0	45	0
-50%	30	0	30	0	15	0	75	0
-25%	30	1	28	2	15	0	72	3
Cutoff	9	6	8	7	8	7	25	20
125%	4	26	1	29	2	13	6	68
150%	1	29	1	29	0	15	2	73
175%	0	15	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

Cocaine

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	180	0	180	0	120	0	480	0
-75%	15	0	15	0	15	0	45	0
-50%	30	0	30	0	15	0	75	0
-25%	29	1	29	1	15	0	73	2
Cutoff	10	5	8	7	9	6	27	18
125%	3	27	3	27	1	14	7	68
150%	2	28	3	27	0	15	5	70
175%	0	15	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

Amphetamine

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	180	0	180	0	120	0	480	0
-75%	15	0	15	0	15	0	45	0
-50%	30	0	30	0	15	0	75	0
-25%	29	1	27	3	12	3	68	7
Cutoff	8	7	7	8	7	8	22	23
125%	3	27	1	29	0	15	4	71
150%	1	29	1	29	0	15	2	73
175%	0	15	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

Opiates

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	121	0	180	0	120	0	480	0
-75%	15	0	15	0	15	0	45	0
-50%	30	0	30	0	15	0	75	0
-25%	28	2	28	2	15	0	71	4
Cutoff	9	6	8	7	6	9	23	22
125%	3	27	2	28	0	15	5	70
150%	1	29	0	30	0	15	1	74
175%	0	15	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

PCP

Conc.	Site 1		Site 2		Site 3		Combined	
	Operator 1							
	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Negative	195	0	195	0	120	0	510	0
-75%	15	0	15	0	15	0	45	0
-50%	28	2	29	1	14	1	71	4
-25%	27	3	26	4	14	1	67	8
Cutoff	10	5	8	7	7	8	25	20
125%	1	29	1	29	0	15	2	73
150%	1	29	1	29	0	15	2	73
175%	0	15	0	15	0	15	0	45
100%	0	15	0	15	0	15	0	45

b. Linearity/assay reportable range:

Not applicable, the device is intended for qualitative use.

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

There is a blue line located in each test window. The purpose of the blue line is to indicate that a sufficient amount of saliva sample has been collected.

A colored line appearing in the control zone is considered as an internal procedural control Users are informed not to interpret the test if no red line appears in the control zone.

Positive controls are prepared by spiking synthetic oral fluid matrix with know concentration of drug standards which are traceable to NIST standards. The positive control concentrations are confirmed by LC/MS/MS.

Negative control is a synthetic oral fluid containing no drug.

Control standards are not supplied with this device but can be purchased separately from Branan Medical Corporation. Users are advised to follow federal, state and local guidelines for QC testing requirements.

Stability:

Accelerated studies have been conducted for the control material. Protocols and acceptance criteria were described and found to be acceptable. The manufacturer claims that when stored un-opened at -15 ºC, the product is stable until expiration date which is 24 months. Open vial stability is 7 days when stored at 4 ºC. Real time studies have been conducted and are on-going.

Shipping/recovery study:

A shipping study was performed to demonstrate the recovery of drug from oral fluid when collected in the Oratect polypropylene collection tube (provided for confirmation testing) by testing the full range of expected transport conditions (maximum time and temperature) for confirmation testing. Conditions simulating transport to 3 different destination sites with varied weather conditions (2-8ºC, room temperature and 40ºC) were performed. Negative oral fluid samples in glass bottles were spiked with a single analyte/bottle to concentrations of -50% and +50% of the cutoff. The samples were tested on the Oratect Oral Fluid Drug Screen device and the results were recorded. One (1) ml of each sample was transferred/pippetted into an amber glass vial for testing on the reference method (LC/MS/MS).

Results of the shipping study are shown in the table below:

	Temperatures	Cutoffs	AMP	COC	MET	OPI	PCP	THC
Oratect Oral Fluid Drug Screen results (POS/NEG)		-50%	Neg	Neg	Neg	Neg	Neg	Neg
		+50%	Pos	Pos	Pos	Pos	Pos	Pos
LC/MS/MS results before application to device (ng/mL)		-50%	28	12	26	22	5.2	19.7
		+50%	83	35	80	57	15	68
LC/MS/MS result after shipping in the Oratect polypropylene tube (ng/mL)	2-8ºC	-50%	28	13	24	20	5.2	19
		+50%	75	34	84	59	14.1	62.6
	20-25ºC	-50%	29	12	26	22	5.3	18.7
		+50%	73	39	91	57	13.2	60.1
	40ºC	-50%	28	12	25	19	4.4	17.4
		+50%	78	37	81	57	13.4	62.3

LC/MS/MS recovery results for the confirmation collection device are shown in the table below:

Drug Analyte	Cut-off level	Target Concentration (ng/mL)	Concentration original glass container (LC/MS/MS)	% Recovery
AMP	-50	25	23	96
	+50	75	71	100
COC	-50	10	11	100
	+50	30	34	103
MET	-50	25	27	111
	+50	75	84	95
OPI	-50	20	20	90
	+50	60	57	96
PCP	-50	5	5	100
	+50	15	17	94
THC	-50	20	21	95
	+50	60	65	105

Sample Storage and Stability:

Accelerated and real time studies have been conducted for sample storage. Protocols and acceptance criteria were described and found to be acceptable. The manufacturer claims the following storage date:

Samples may be stored in the 50 mL polypropylene tube for up to two weeks when stored at 2-8ºC or up to 24 months when stored below -15ºC.

d. Detection limit:

Not applicable, this is a qualitative assay.

e. Analytical specificity:

Cross-reactivity was evaluated by spiking similarly structured drug compounds to a concentration of 10,000 ng/mL into drug free oral fluid. These samples were serially diluted to determine the lowest concentration that produced a positive result. The table below summarizes the results:

Drug	Compound	Concentration ng/mL producing a positive response	% Cross-reactivity
AMP	l-Amphetamine	2000	2.5%
	D,l-p-Chloramphetamine	400	12.5%
	MDA	400	12.5%
	Phentermine	100	50%
	B-Phenylethylamine	10,000	0.5%
	Tyramine	10,000	0.5%
	l-Methamphetamine	>10,000	0%
COC	Benzoylecgonine	600	3.3%
MET	d,l-Ephedrine	10,000	0.5%
	1R, 2S, l-Ephedrine	6000	0.83%
	p-Hydroxymethamphetamine	1500	3.3%
	MDEA	1500	3.3%
	MDMA	150	33.3%
	d,l-Methamphetamine	60	83.3%
	l-Methamphetamine	3000	1.7%
	Methoxyphenamine	10,000	0.5%
	l-Amphetamine	>10,000	0%
OPI	6-Acetylcodeine	40	100%
	6-Acetylmorphine	50	80%
	Codeine	40	100%
	Dihydrocodeine	200	20%
	Ethyl morphine	75	53.3%
	Herion	40	100%
	Hydrocodone	200	20%
	Hydromorphone	300	13.3%
	Nalorphine	1000	4%
THC	Cannabinol	100	40%
	Δ-8-Tetrahydrocannabinol	100	40%
	11-nor- Δ8-THC-COOH	20	200%
	11-nor- Δ9-THC-COOH	10	400%
	11-Hydroxy- Δ9-THC	400	10%

Potential interference from structurally unrelated and endogenous compounds were tested by spiking the potentially interfering compound into human oral fluid drug controls having drug concentration at +/-25 % of the cutoff. All were tested at a concentration of 10,000 ng/mL. If a false result was observed the testing was repeated at the +/-50% of the cutoff for drug. No negative or positive interference was seen in this study.

Compound	Compound	Compound
Acetaminophen	1R, 2R-(-) Ephedrine	Perphenazine
Acetylsalicylic acid	1S, 2R(+) Ephedrine	Pheniramine
l-Ascorbic Acid	(-) Ephineohrine	(+/-) Phenylpropanolamine
Aspartame	Erythromycin	Procaine
Benzilic Acid	Ethanol	Promazine
Benzocaine	Glutethimide	Promethazine
Benzoic Acid	Hemoglobin	Ranitidine
Bilirubin	Ibuprofen	Ribofiavin
Betethal	Lidocaine	Salicylic acid
Caffeine	Meperidine	Serotonin
(+) Chorpheniramine	Naloxone	Tetracycline
Cholesterol	Nalltrexone	Thiamine
Dextromrthorphan	(+) Naproxen	Tryptamine
Diphenhydramine	Papaverine	d,l-Tryptophan
Doxylamine	Pentazocine	

Potential interference from pH was tested by using human oral fluid controls at drug concentrations of +/25 and +/-50% of the cutoff. The pH of the samples was adjusted to various pH levels ranging from 4.5-8.5 in 1 pH unit increments. No negative or positive interference from pH was observed.

The following potential interferents were evaluated by spiking into human oral fluid controls having drug concentrations at +/-25% and +-50% of the cutoff : Alcohol, Mouthwash, MSG, Baking soda, Cough Syrup, Cranberry juice, Salt, Sugar, Toothpaste, Gum, Orange juice, food coloring (red, blue and green), Tea and cola. None of these substances caused positive or negative interference. Prior to the test being administered the donor was instructed not to eat, drink, smoke or chew tobacco. Potential interference from cigarette smoking, was evaluated by asking a participant to smoke a cigarette, after 15 minutes an oral fluid sample was collected and spiked with each drug at concentrations of cutoff +/-25 % and +/-50%. None of these substances caused positive or negative interference.

There is the possibility that other substances and/or factors not listed above may interfere with the test and cause false results, e.g., technical or procedural errors.

f. Assay cut-off:

Characterization of how the device performs analytically around the claimed cutoff concentration appears in the precision section, M.1.a, above.

2. Comparison studies:

a. Method comparison with predicate device:

Performance for the Oratect Oral Fluid Drug Screen Device was evaluated at typical point-of-care sites with a total of 3 operators who are typical operators at these sites. Operators collected samples from volunteer donors by swabbing the mouth and testing on the proposed device. Immediately after collecting the sample the volunteer was asked to spit into the confirmation collection tube for testing and comparison to the GC/MS. The operators were only provided the labeling to perform the testing. The results are presented in the table below:

MET50		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	5	3	58	97.5%
	Negative	180	9	9	1	0	98.4%

THC40		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	10	7	36	100%
	Negative	185	20	7	0	0	95.5%

COC20		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	3	5	38	100%
	Negative	210	6	3	0	0	98.6%

AMP50		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	7	12	34	100%
	Negative	170	38	4	0	0	96.8%

OPI40		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	4	3	55	96.7%
	Negative	186	12	3	2	0	98.0%

PCP10		Negative	Negative (<50% cutoff concentration by GC/MS)	Near cutoff negative (-50% to the cutoff concentration)	Near cutoff positive (cutoff to 50%)	High Positive (>50% cutoff)	% Agreement
	Positive	0	0	1	2	38	95.2%
	Negative	223	1	5	2	0	99.6%

The summary of discordant results is listed in the table below:

Assay	Cutoff Value (ng/mL)	Device Pos/Neg	Major metabolite present by GC/MS or LC/MS/MS value (ng/mL)
Met50	50	Positive	25.4 Methamphetamine
		Positive	35 Methamphetamine
		Positive	38.5 Methamphetamine
		Positive	42.1 Methamphetamine
		Negative	63 Methamphetamine
		Positive	49 Methamphetamine
THC	40	Positive	20.4 Delta-9-Tetrahydrocannabinol
		Positive	24.3 Delta-9-Tetrahydrocannabinol
		Positive	26.1 Delta-9-Tetrahydrocannabinol
		Positive	29.3 Delta-9-Tetrahydrocannabinol
		Positive	30.5 Delta-9-Tetrahydrocannabinol
		Positive	35.7 Delta-9-Tetrahydrocannabinol
		Positive	35.7 Delta-9-Tetrahydrocannabinol
		Positive	36.0 Delta-9-Tetrahydrocannabinol
		Positive	32.5 Delta-9-Tetrahydrocannabinol
		Positive	39.1 Delta-9-Tetrahydrocannabinol

Assay	Cutoff Value (ng/mL)	Device Pos/Neg	Major metabolite present by GC/MS or LC/MS/MS value (ng/mL)
COC20	20	Positive	15.7 Cocaine/Benzoyl Ecgonine
		Positive	15.9 Cocaine/Benzoyl Ecgonine
		Positive	17.4 Cocaine/Benzoyl Ecgonine
AMP50	50	Positive	26.1 Amphetamine
		Positive	28.3 Amphetamine
		Positive	32.5 Amphetamine
		Positive	34.8 Amphetamine
		Positive	38.3 Amphetamine
		Positive	40.9 Amphetamine
		Positive	49.2 Amphetamine
OPI40	40	Positive	27.5 Morphine/Codeine/6-Acetyl morphine
		Positive	32.7 Morphine/Codeine/6-Acetyl morphine
		Positive	38.7 Morphine/Codeine/6-Acetyl morphine
		Negative	40.2 Morphine/Codeine/6-Acetyl morphine
		Negative	43.9 Morphine/Codeine/6-Acetyl morphine
		Positive	39 Morphine/Codeine
PCP10	10	Positive	7.4 PCP
		Negative	10.8 PCP
		Negative	15.0 PCP

b. Matrix comparison:

Not applicable. The assay is intended for only one sample matrix, oral fluid.

3. Clinical studies:

a. Clinical Sensitivity:

Not applicable.

b. Clinical specificity:

Not applicable.

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:

Not applicable.

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.