

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE**

A. 510(k) Number:

K040411

B. Purpose for Submission:

New assay

C. Analyte:

Oxycodone

D. Type of Test:

Homogeneous enzyme immunoassay, qualitative or semi-quantitative.

E. Applicant:

Microgenics Corporation

F. Proprietary and Established Names:

DRI[®] Oxycodone Assay, DRI[®] Oxycodone Calibrators, DRI[®] Oxycodone Controls.

G. Regulatory Information:

1. Regulation section:
21CFR862.3650, 862.3200, 862.3280
2. Classification:
Class II
3. Product Code:
DJG, LAS, DLJ
4. Panel:
91

H. Intended Use:

1. Intended use(s):
The DRI[®] Oxycodone assay is intended to be used for the qualitative and semi-quantitative determination of the presence of oxycodone in human urine at cutoffs of 100 and 300 ng/ml.
The DRI[®] Oxycodone calibrators are used to calibrate the DRI Oxycodone Assay in human urine. The DRI[®] controls are used to qualify the DRI Oxycodone assay in human urine.
2. Indication(s) for use:
The assay provides a simple and rapid analytical screening procedure to detect oxycodone in human urine.
3. Special condition for use statement(s):

The assay provides only a preliminary analytical test result. A more specific alternative chemical method must be used to obtain a confirmed analytical result. GCMS is the preferred confirmatory method. Clinical and professional judgement should be applied to any drug of abuse test result, particularly when preliminary results are used.

The semi-quantitative mode can be used for estimating dilutions for confirmation by GCMS or for quality control purposes.

4. Special instrument Requirements:

For use on automated clinical chemistry analyzers. Performance data submitted was obtained using the Hitachi 717.

I. Device Description:

The assay consists of antibody/substrate reagent and enzyme conjugate/reagent. The antibody substrate reagent includes mouse monoclonal anti-oxycodone derivative antibody, glucose-6-phosphate and NAD in buffer with preservative. The enzyme conjugate reagent includes oxycodone derivative labeled with glucose-6-phosphate dehydrogenase in buffer with preservative. Calibrators and controls are sold separately. Reagents are liquid, ready to use.

J. Substantial Equivalence Information:

1. Predicate device name(s):

American BioMedica, RapidOne-OXY Test

2. Predicate K number(s):

K014101

3. Comparison with predicate:

The assays are similar in terms of intended use; both assays detect oxycodone in urine. The predicate device is a visually read lateral flow immunoassay. This device is a homogeneous enzyme immunoassay for use on automated analyzers. It is for qualitative and semi-quantitative use.

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

L. Test Principle:

The assay is based on competition between a drug labeled with glucose 6-phosphate dehydrogenase and free drug from the urine sample for antibody binding sites. In the absence of free drug from the sample, the specific antibody binds the drug labeled with G6PDH and causes a decrease in enzyme activity. This creates a direct relationship between drug concentration in urine and enzyme activity, which is monitored by measuring reduction of NAD to NADH, at 340 nm.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

Performance was evaluated at the manufacturer's site on a Hitachi 717 instrument.

a. *Precision/Reproducibility:*

Precision was determined by assaying 6 levels of control and calibrator material near the cutoff concentrations. Assays were performed in the semi-quantitative and qualitative mode, testing all samples in replicates of 6, twice per day, for 10 days. Standard deviations listed below were calculated based on the average concentrations of all samples. Results support that percent CV for controls and calibrator material near the cutoff concentrations is < 10%.

Total precision, Semiquantitative mode, near 100 ng/ml cutoff

	75 ng/ml	100 ng/ml	125 ng/ml
Total number of samples	120	120	120
Average concentration (ng/ml)	73	98	123
SD (ng/ml)	2.9	3.6	4.9
%CV	4.0	3.7	4.0

Total precision, Semiquantitative mode, near 300 ng/ml cutoff

	225 ng/ml	300 ng/ml	375 ng/ml
Total number of samples	120	120	120
Average concentration (ng/ml)	227	303	375
SD (ng/ml)	8.2	11.5	14.7
%CV	3.6	3.8	3.9

Total precision, Qualitative mode, near 100 ng/ml cutoff

	75 ng/ml	100 ng/ml	125 ng/ml
Total number of samples	120	120	120
Average (mA)	348	371	389
SD (mA)	2.9	3.2	3.1
%CV	0.8	0.9	0.8

Total precision, Qualitative mode, near 300 ng/ml cutoff

	225 ng/ml	300 ng/ml	375 ng/ml
Total number of samples	120	120	120
Average (mA)	429	458	479
SD (mA)	3.7	4.1	3.8
%CV	0.9	0.9	0.8

b. Linearity/assay reportable range:

To evaluate linearity, an oxycodone-free human urine pool was spiked with a stock solution containing approximately 1000 ng/ml oxycodone and serially diluted in 10% increments. The resulting 10 dilutions were assayed in duplicate within one run. The measured percents of observed/expected concentrations ranged from 97%-107%.

c. Traceability (controls, calibrators, or method):

Calibrators contain known quantities of oxycodone spiked into a negative urine matrix. The concentration of oxycodone in each calibrator or control is validated by a GCMS methodology at three laboratories. Opened and closed calibrator stability is evaluated by accelerated studies (22-25 degrees C for 3 months) and real-time stability studies (2-8 degrees C for 19 months). Acceptance criteria for opened and closed are <2% CV and rate match within +/-5% to primary standards that are stored at -80 degrees C.

d. Detection limit:

The sensitivity was determined based on 2 x the standard deviation of 21 measurements of individual oxycodone-free samples. The sensitivity (4.9 ng/ml) is well below the cutoff concentrations.

e. Analytical specificity

To evaluate interference by endogenous compounds, known amounts of potentially interfering substances were added to urine specimens spiked to contain 225 or 375 ng/ml oxycodone. Endogenous compounds were added to the samples at concentrations the concentrations listed below and results were compared to control samples.

Substance tested	Concentration (mg/dl)
Acetone	1000
Ascorbic acid	1500
Creatinine	500
Galactose	10
Gamma globulin	500
Glucose	1500
Hemoglobin	300
NaCl	6000
Oxalic Acid	100
Human serum albumin	500
Urea	2000
Riboflavin	7.5
ethanol	1000
pH 3-11	

No significant interference was observed for any of the compounds listed above. Percent recoveries relative to control samples ranged from 91.4-107.1%.

Cross-reactivity of oxycodone metabolites were determined by adding known amounts of metabolites to oxycodone-free urine samples. Assay results were determined in duplicate and compared to control samples free of metabolites. Results are tabulated below:

Metabolite	Concentration (ng/ml)	Measured concentration	% cross-reactivity
oxymorphone	300	308	103
noroxymorphone	500,000	304	<0.1
Noroxycodone	50,000	42	<0.1

Potential interference caused by pharmacologic substances was evaluated by adding each substance to oxycodone-free urine samples and comparing results to controls samples without the added substances. Signal corresponding to that of oxycodone near the cutoff concentration of 100 ng/ml were observed for some compounds, when tested at very high concentrations (40-100 ug/ml). These include 6-Acetylmorphine (75 ug/ml) Codeine (500 ug/ml) Dihydrocodeine (200 ug/ml), Hydrocodone (200 ug/ml) Hydromorphone (40 ug/ml) Naloxone (300 ug/ml) and Naltrexone (1000 ug/ml). Other pharmacologic substances tested showed no cross-reactivity at the concentrations tested. These are listed in the package insert.

f. Assay cut-off:

To validate the cutoff concentrations, pools of oxycodone-free human urine were spiked with a stock solution to final concentrations of 75, 125, 225 and 375 ng/ml oxycodone. Performance around the cutoff was considered acceptable if 95% of samples around the cutoff yield expected qualitative results. Results are shown below:

Cutoff used	100	100	300	300
Samples	75 ng/ml	125 ng/ml	225 ng/ml	375 ng/ml
Mean dose	75.6	120.7	222.0	371.6
SD	2.4	3.2	6.8	7.6
%CV	3.2	2.7	3.1	2.0

2. Comparison studies:

a. Method comparison with predicate device:

One hundred and forty four patient samples were analyzed using the predicate device, GCMS and the DRI[®] Oxycodone Assay. Samples

were randomly selected; there were no selection criteria. Samples were evenly distributed across the calibrator concentration ranges, including near-cutoff regions. Comparison to the predicate device was performed in qualitative mode. Comparison to GCMS was performed in both qualitative and semi-quantitative mode.

100 ng/ml cutoff, qualitative mode

	Rapid One positive	Rapid One Negative
DRI [®] Positive	65	0
DRI [®] Negative	12	67

The 12 discrepant samples above had oxycodone concentrations between 0-90 ng/ml oxycodone, based on GCMS.

100 ng/ml cutoff, qualitative mode

	GCMS positive	GCMS negative
DRI [®] Positive	61	4
DRI [®] Negative	0	79

The 4 discrepant samples ranged from 55 -81 ng/ml oxycodone, based on GCMS.

300 ng/ml cutoff, qualitative mode

	GCMS positive	GCMS negative
DRI [®] Positive	39	1
DRI [®] Negative	3	101

The 4 discrepant samples ranged from 182 ng/ml (GCMS negative) and 304-337 ng/ml (GCMS positive).

Results for the comparison to GCMS in semi-quantitative mode are shown below:

100 ng/ml cutoff , semi-quantitative mode

	GCMS positive	GCMS negative
DRI [®] Positive	61	1
DRI [®] Negative	0	82

300 ng/ml cutoff semi-quantitative mode

	GCMS positive	GCMS negative
DRI [®] Positive	40	1
DRI [®] Negative	3	100

b. Matrix comparison:

Not applicable. Urine is the only matrix for which the assay is indicated.

3. Clinical studies:

a. Clinical sensitivity:

Not applicable. Clinical sensitivity is not typically provided in a 510(k) for this type of assay.

b. Clinical specificity:

Not applicable. Clinical sensitivity is not typically provided in a 510(k) for this type of assay.

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

4. Clinical cut-off:

The 100 ng/ml cutoff concentration is similar to that of the predicate device.

5. Expected values/Reference range:

NA

N. Conclusion:

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