

Multi-Drug

Multi-Line Twist Screen Test Device (Oral Fluid) Package Insert

A rapid, screening test for the simultaneous, qualitative detection of amphetamine, methamphetamine, cocaine, opiates, marijuana, methadone and phencyclidine and their metabolites in human oral fluid.

For medical and other professional *in vitro* diagnostic use.

INTENDED USE

The Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) is a lateral flow chromatographic immunoassay for the qualitative detection of amphetamine, methamphetamine, cocaine, opiates, marijuana, methadone, phencyclidine and their metabolites in oral fluids at the following cut-off concentrations:

Test	Calibrator	Cut-off
Amphetamine (AMP)	d-Amphetamine	50 ng/mL
Methamphetamine (MET)	d-Methamphetamine	50 ng/mL
Cocaine (COC)	Benzoylcegonine	20 ng/mL
Opiates (OPI)	Morphine	40 ng/mL
Methadone (MTD)	Methadone	30 ng/mL
Marijuana (THC)	Δ^9 -THC	100 ng/mL
Phencyclidine (PCP)	Phencyclidine	10 ng/mL

This test will detect other related compounds, please refer to the Analytical Specificity table in this package insert.

AMP: Amphetamine is a sympathomimetic amine with therapeutic indications. The drug is often self-administered by nasal inhalation or oral ingestion.¹

COC: Cocaine is a potent central nervous system (CNS) stimulant and a local anesthetic derived from the coca plant (*Erythroxylum coca*).¹

THC: Tetrahydrocannabinol, the active ingredient in the marijuana plant (*cannabis sativa*), is detectable in oral fluid shortly after use. The detection of the drug is thought to be primarily due to the direct exposure of the drug to the mouth (oral and smoking administrations) and the subsequent sequestering of the drug in the buccal cavity.²

MET: Methamphetamine is a potent stimulant chemically related to amphetamine but with greater CNS stimulation properties. The drug is often self-administered by nasal inhalation, smoking or oral ingestion.¹

OPI: The drug class opiates refers to any drug that is derived from the opium poppy, including naturally occurring compounds such as morphine and codeine and semi-synthetic drugs such as heroin. Opiates control pain by depressing the CNS, and demonstrate addictive properties when used for sustained periods of time. Opiates can be taken orally or by injection routes including intravenous, intramuscular and subcutaneous; illegal users may also take the intravenously or by nasal inhalation.³

*The window of detection varies for different opiates. Codeine can be detected within one hour and up to 7-21 hours after a single oral dose. Morphine is detectable for several days after a dose.

MTD: Methadone is an analgesic compound most frequently used for the treatment of opiate addiction. One clinical study suggested that the ratio of methadone to plasma was approximately 0.51.⁴ Using known half life data for plasma, the detection window in saliva is expected to be up to 2 days after use.

PCP: Phencyclidine is a hallucinogen, and can be detected in oral fluid as a result of the exchange of the drug between the circulatory system and the oral cavity.⁵

This assay provides only a preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) and gas chromatography/tandem mass spectrometry (GC/MS/MS) are the preferred confirmatory methods. Professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are indicated.

PRINCIPLE

The Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) is an immunoassay based on the principle of competitive binding. Drugs that may be present in the oral fluid specimen compete against their respective drug conjugates for binding sites on their specific antibody.

During testing, a portion of the oral fluid specimen migrates upward by capillary action. A drug, if present in the oral fluid specimen below its cut-off concentration, will not saturate the binding sites of its specific antibody. The antibody will then react with the drug-protein conjugate and a visible colored line will show up in the test line region of the specific drug strip. The presence of drug above the cut-off concentration in the oral fluid specimen will saturate all the binding sites of the antibody. Therefore, the colored line will not form in the test line region.

A drug-positive oral fluid specimen will not generate a colored line in the specific test line region of the strip because of drug competition, while a drug-negative oral fluid specimen will generate a line in the test line region because of the absence of drug competition.

To serve as a procedural control, a colored line will always appear at the control line region, indicating that proper volume of specimen has been added and membrane wicking has occurred.

REAGENTS

The test contains membrane strips coated with drug-protein conjugates (purified bovine albumin) on the test line region, a goat polyclonal antibody against gold-protein conjugate at the control line region, and a dye pad which contains colloidal gold particles coated with mouse monoclonal antibody specific to Amphetamine, Methamphetamine, Benzoylcegonine, Morphine, Δ^9 -THC, Methadone and Phencyclidine.

PRECAUTIONS

- For medical and other professional *in vitro* diagnostic use only.
- Do not use after the expiration date.
- The test device should remain in the sealed pouch until use.
- All specimens should be considered potentially biohazardous and handled in the same manner as an infectious agent.
- The used collector and device should be discarded according to local regulations.

STORAGE AND STABILITY

Store as packaged in the sealed pouch at 2-30°C. The test is stable through the expiration date printed on the sealed pouch. The test devices must remain in the sealed pouch until use. DO NOT FREEZE. Do not use beyond the expiration date.

SPECIMEN COLLECTION AND PREPARATION

The oral fluid specimen should be collected using the collector provided with the kit, following the detailed instructions under Directions for Use. No other collection devices should be used with this assay. Oral fluid collected at any time of the day may be used.

MATERIALS

Materials Provided

- Test devices
- Tamper evident tapes
- Caps
- Package insert
- Collectors

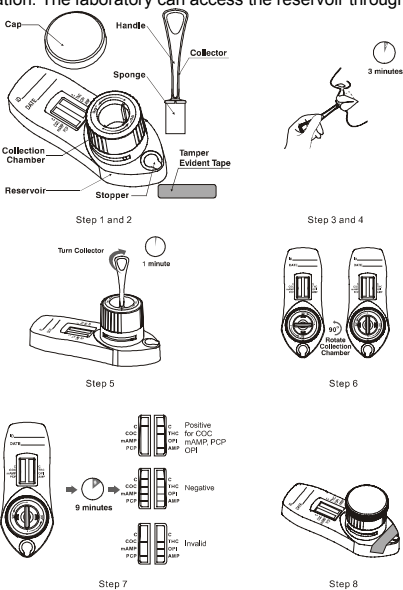
Materials Required but not Provided

- Timer

DIRECTIONS FOR USE

Allow the Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) to come to room temperature (15-30°C) prior to testing. Instruct the donor to not place anything in the mouth including food, drink, gum, or tobacco products for at least 10 minutes prior to collection.

- Bring the pouch to room temperature before opening it. Remove the test and cap from the sealed pouch and use the test as soon as possible.
- Remove the collector from the sealed pouch and give it to the donor.
- Instruct the donor to **insert the sponge end of the collector into the mouth** and actively swab the inside of the mouth and the top of the tongue. As soon as the sponge softens slightly, the donor should gently press the sponge between the tongue and teeth to ensure complete saturation.
- The sponge is saturated when no hard spots can be detected. Collect for a total of three (3) minutes before removing the sponge.
- Remove the collector from the mouth. With the test device on a flat surface, **insert the collector into the test device** by aligning the notches on the collector with the tracks on the inside of the collection chamber. Push the collector into the chamber and **turn the collector clockwise** until it is engaged.
- After 1 minute, **rotate the collection chamber counterclockwise** and set the timer for 9 minutes.
- Read results at 9 minutes.**
- If positive results are observed, remove the collector by turning it counterclockwise and pulling. Secure the cap over the collection chamber, seal the reservoir with tamper evident tape and send the device to a laboratory for confirmation. The laboratory can access the reservoir through the stopper.



INTERPRETATION OF RESULTS

(Please refer to the previous illustration)

NEGATIVE: Two lines appear. One colored line should be in the control region (C), and another apparent colored line should be adjacent in the test region (Drug/T). This negative result indicates that the drug concentration is below the detectable level.

*NOTE: The shade of color in the test region (Drug/T) will vary, but it should be considered negative whenever there is even a faint colored line.

POSITIVE: One colored line appears in the control region (C). No line appears in the test region (Drug/T). This positive result indicates that the drug concentration is above the detectable level.

INVALID: Control line fails to appear. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test using a new test panel. If the problem persists, discontinue using the lot immediately and contact the manufacturer.

QUALITY CONTROL

A procedural control is included in the test. A colored line appearing in the control region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.

LIMITATIONS

- The Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) provides only a qualitative, preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Gas chromatography/mass spectrometry (GC/MS) or gas chromatography/tandem mass spectrometry (GC/MS/MS) are preferred confirmatory methods.
- A positive test result does not indicate the concentration of drug in the specimen or the route of administration.
- A negative result may not necessarily indicate a drug-free specimen. Drug may be present in the specimen below the cutoff level of the assay.

PERFORMANCE CHARACTERISTICS

Analytical Sensitivity

A PBS pool was spiked with drugs to target concentrations of \pm 50% cut-off and \pm 25% cut-off and tested with the Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid). The results are summarized below.

Drug conc. (Cut-off range)	n	COC		MET		PCP		MTD	
		-	+	-	+	-	+	-	+
0% Cut-off	30	30	0	30	0	30	0	30	0
-50% Cut-off	30	30	0	30	0	30	0	30	0
-25% Cut-off	30	30	0	28	2	30	0	24	6
Cut-off	30	20	10	23	7	22	8	14	16
+25% Cut-off	30	6	24	7	23	8	22	8	22
+50% Cut-off	30	0	30	0	30	0	30	0	30

Drug conc. (Cut-off range)	n	THC		OPI		AMP	
		-	+	-	+	-	+
0% Cut-off	120	120	0	120	0	120	0
-50% Cut-off	120	120	0	120	0	120	0
-25% Cut-off	120	108	12	108	12	109	11
Cut-off	120	60	60	60	60	60	60
+25% Cut-off	120	12	108	10	110	10	110
+50% Cut-off	120	3	117	0	120	0	120

Analytical Specificity

The following table lists the concentration of compounds (ng/mL) above which the Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) identified positive results at a read time of 10 minutes.

COCAINE (COC)	20	OPIATES (OPI)	40
Benzoylcegonine	20	Morphine	40
Cocaine	20	Bilirubin	3,500
Cocaeethylene	25	Codeine	10
Ecgonine	1,500	Diacetylmorphine (Heroin)	50
Ecgonine methylester	12,500	Ethylmorphine	24
		Hydromorphone	100
		Hydrocodone	100
METHAMPHETAMINE (MET)	50	Levorphanol	400
d-Methamphetamine	50	Oxycodone	25,000
(1R,2S)-(-) Ephedrine	400	6-Monoacetylmorphine (6-MAM)	25
Fenfluramine	60,000	Morphine 3- β -d-glucuronide	50
p-Hydroxymethamphetamine	400	Norcodeine	1,500
Methoxyphenamine	25,000	Normorphine	12,500
3,4-Methylenedioxy-methamphetamine (MDMA)	50	Nalorphine	10,000
l-Phenylephrine	4,000	Oxymorphone	25,000
Procaine	2,000	Thebaine	1,500

AMPHETAMINE (AMP)	50	METHADONE (MTD)	30
d-Amphetamine	50	Methadone	30
d,l-Amphetamine	125	Doxylamine	50,000
l-Amphetamine	4,000	Estrone-3-sulfate	50,000
p-Hydroxyamphetamine	800	Phencyclidine	50,000
(+) 3,4-Methylenedioxy-amphetamine (MDA)	150		
β -Phenylethylamine	4,000	MARIJUANA (THC)	
Tryptamine	1,500	Δ^9 -THC	100
		Cannabinal	3,000
		11-nor- Δ^9 -THC-9 COOH	12
		Δ^8 -THC	100
PHENCYCLIDINE (PCP)	10		
Phencyclidine	10		
Tetrahydrozoline	50,000		

Cross-Reactivity

A study was conducted to determine the cross-reactivity of the test with compounds spiked into drug-free PBS stock. The following compounds demonstrated no false positive results on the Multi-Drug Multi-Line Twist Screen Test Device (Oral Fluid) when tested with concentrations up to 100 μ g/mL.

Acetaminophen	Creatinine	Labelol	Prednisone
Acetophenetidin	Deoxycorticosterone	Loperamide	d,l-Propranolol
N-Acetylprocainamide	Dextromethorphan	Meperidine	d-Propoxyphene
Acetylsalicylic acid	Diclofenac	Meprobamate	d-Pseudoephedrine
Aminopyrine	Diffunisal	Methylphenidate	Quinacrine
Amoxicillin	Digoxin	Naltrexone	Quinine
Ampicillin	Diphenhydramine	Naloxone	Quindine
l-Ascorbic acid	l- Ψ -Ephedrine	Naltrexone	Ranitidine
Apomorphine	l(-)-Epinephrine	Naproxen	Salicylic acid
Aspartame	Niacinamide	Erythromycin	Serotonin
Atropine	β -Estradiol	Nifedipine	Sulfamethazine
Benzlic acid	Ethyl-p-aminobenzoate	Nerithindrone	Sulindac
Benzoic acid	Fenoprofen	d-Norpropoxyphene	Tetracycline
Benzphetamine	Furosemide	Noscapine	Tetrahydrocortisone
d,l-Brompheniramine	Gentisic acid	d,l-Octopamine	3-acetate
Caffeine	Hemoglobin	Oxalic acid	Thiamine
Cannabidiol	Hydralazine	Oxolinic acid	Thioridazine
Chloralhydrate	Hydrochlorothiazide	Oxymetazoline	d,l-Tyrosine
Chloramphenicol	Hydrocortisone	Papaverine	Tolbutamide
Chlorothiazide	o-Hydroxyhippuric acid	Penicillin-G	Triamterene
d,l-Chloropheniramine	p-Hydroxytyramine	Pentazocine	Trifluoperazine
Chlorpromazine	lbutrofen	Perphenazine	Trimethoprim
Chloroquine	lproniazid	Phenelzine	d,l-Tryptophan
Cholesterol	d,l-Isoproterenol	Trans-2-phenylcyclopropylamine	Tyramine
Clonidine	Isoxsuprine	Uric acid	Uric acid
Cortisone	Ketamine	Phenylpropranolamine	Verapamil
l-Cotinine	Ketoprofen	Prednisolone	Zomepirac

BIBLIOGRAPHY

- Moolchan, E., et al, "Saliva and Plasma Testing for Drugs of Abuse: Comparison of the Disposition and Pharmacological Effects of Cocaine," Addiction Research Center, IRP, NIDA, NIH, Baltimore, MD. As presented at the SOFT-TIAFT meeting October 1998.
- Kim, I, et al, "Plasma and oral fluid pharmacokinetics and pharmacodynamics after oral codeine administration," Clin Chem, 2002 Sept.; 48 (9), pp 1486-96.
- Schramm, W, et al, "Drugs of Abuse in Saliva: A Review," J Anal Tox, 1992 Jan-Feb; 16 (1), pp 1-9.
- Kang GI and Abbott FS. "Analysis of methadone and metabolites in biological fluids with gas chromatography-mass spectrometry," J Chromatogr. 231(2); 311-319. Sept 1982.
- McCarron, MM, et al, "Detection of Phencyclidine Usage by Radioimmunoassay of Saliva," J Anal Tox. 1984 Sep-Oct.; 8 (5), pp 197-201.

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