

A rapid, one step test for the qualitative detection of Opiate in human urine.  
For professional *in vitro* diagnostic use only.

**INTENDED USE**

The OPI One Step Opiate Test Strip (Urine) is a lateral flow chromatographic immunoassay for the detection of Morphine in human urine at the cut-off concentration of 2,000 ng/mL. This test will detect other related compounds, please refer to the Analytical Specificity table in this package insert. This assay provides only a qualitative, 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) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

**SUMMARY**

Opiate refers to any drug that is derived from the opium poppy, including the natural products, Morphine and Codeine, and the semi-synthetic drugs such as heroin. Opioid is more general, referring to any drug that acts on the opioid receptor. Opioid analgesics comprise a large group of substances which control pain by depressing the central nervous system. Large doses of Morphine can produce higher tolerance levels and physiological dependency in users, and may lead to substance abuse. Morphine is excreted unmetabolized, and is also the major metabolic product of codeine and heroin. Morphine is detectable in the urine for several days after an opiate dose.<sup>1</sup> The OPI One Step Opiate Test Strip (Urine) is a rapid urine screening test that can be performed without the use of an instrument. The test utilizes a monoclonal antibody to selectively detect elevated levels of Morphine in urine. The OPI One Step Opiate Test Strip (Urine) yields a positive result when the Morphine in urine exceeds 2,000 ng/mL. This is the suggested screening cut-off for positive specimens set by the Substance Abuse and Mental Health Services Administration (SAMHSA, USA).

**PRINCIPLE**

The OPI One Step Opiate Test Strip (Urine) is an immunoassay based on the principle of competitive binding. Drugs which may be present in the urine specimen compete against the drug conjugate for binding sites on the antibody. During testing, a urine specimen migrates upward by capillary action. Morphine, if present in the urine specimen below 2,000 ng/mL, will not saturate the binding sites of the antibody in the test strip. The Morphine conjugate will be captured by antibody and a visible colored line will show up in the test line region. The colored line will not form in the test line region if the Morphine level exceeds 2,000 ng/mL because it will saturate all the binding sites of anti-morphine antibodies. A drug-positive urine specimen will not generate a colored line in the test line region because of drug competition, while a drug-negative urine specimen or a specimen containing a drug concentration less than the cut-off 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 strip contains mouse monoclonal anti-Morphine antibody-coupled particles and Morphine-protein conjugate. A gold antibody is employed in the control line system.

**PRECAUTIONS**

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

**STORAGE AND STABILITY**

Store as packaged in the sealed pouch either at room temperature or refrigerated (2-30°C). The test strip is stable through the expiration date printed on the sealed pouch. The test strip must remain in the sealed pouch until use. **DO NOT FREEZE.** Do not use beyond the expiration date.

**SPECIMEN COLLECTION AND PREPARATION****Urine Assay**

The urine specimen must be collected in a clean and dry container. Urine collected at any time of the day may be used. Urine specimens exhibiting visible precipitates should be centrifuged, filtered, or allowed to settle to obtain a clear specimen for testing.

**Specimen Storage**

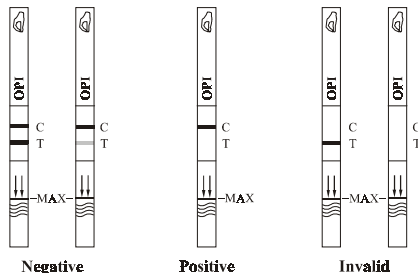
Urine specimens may be stored at 2-8°C for up to 48 hours prior to testing. For long-term storage, specimens may be frozen and stored below -20°C. Frozen specimens should be thawed and mixed before testing.

**MATERIALS****Materials Provided**

- Test strips
  - Package insert
- Specimen collection container
  - Timer

**Materials Required But Not Provided****DIRECTIONS FOR USE**

- Allow the test strip, urine specimen, and/or controls to reach room temperature (15-30°C) prior to testing.**
- Bring the pouch to room temperature before opening it. Remove the test strip from the sealed pouch and use it as soon as possible.
  - With arrows pointing toward the urine specimen, immerse the test strip vertically in the urine specimen for at least 10-15 seconds. Do not pass the maximum line (MAX) on the test strip when immersing the strip. See illustration below.
  - Place the test strip on a non-absorbent flat surface, start the timer and wait for the colored line(s) to appear. **Read results at 5 minutes.** Do not interpret the result after 10 minutes.

**INTERPRETATION OF RESULTS**

(Please refer to the illustration above)

- NEGATIVE:** \* **Two lines appear.** One colored line should be in the control line region (C), and another apparent colored line should be in the test line region (T). This negative result indicates that the Morphine concentration is below the detectable level (2,000 ng/mL).
- \*NOTE:** The shade of color in the test line region (T) may vary, but it should be considered negative whenever there is even a faint colored line.
- POSITIVE:** **One colored line appears in the control line region (C).** No line appears in the test line region (T). This positive result indicates that the Morphine concentration exceeds the detectable level (2,000 ng/mL).
- 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 strip. If the problem persists, discontinue using the lot immediately and contact your local distributor.

**QUALITY CONTROL**

A procedural control is included in the test. A colored line appearing in the control line region (C) is considered an internal procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique. Control standards are not supplied with this kit; however, it is recommended that positive and negative controls be tested as good laboratory testing practice to confirm the test procedure and to verify proper test performance.

**LIMITATIONS**

- The OPI One Step Opiate Test Strip (Urine) 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) is the preferred confirmatory method.<sup>2,3</sup>
- It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause erroneous results.
- Adulterants, such as bleach and/or alum, in urine specimens may produce erroneous results regardless of the analytical method used. If adulteration is suspected, the test should be repeated with another urine specimen.
- Certain medications containing opiate derivatives may produce a positive result. Additionally, foods and tea containing poppy products (the origin of opiate) may also produce a positive result.
- A positive result indicates presence of the drug or its metabolites but does not indicate level of intoxication, administration route or concentration in urine.
- A negative result may not necessarily indicate drug-free urine. Negative results can be obtained when drug is present but below the cut-off level of the test.
- Test does not distinguish between drugs of abuse and certain medications.

**PERFORMANCE CHARACTERISTICS****Accuracy**

A side-by-side comparison was conducted using The OPI One Step Opiate Test Strip (Urine) and a leading commercially available OPI rapid test. Testing was performed on 300 clinical specimens previously collected from subjects present for Drug Screen Testing. Ten percent of the specimens employed were either at -25% or +25% level of the cut-off concentration of 2,000 ng/mL Morphine. Presumptive positive results were confirmed by GC/MS. The following results were tabulated:

Method	Other OPI Rapid Test		Total Results
	Positive	Negative	
OPI One Step Test Strip	Results Positive	150	150
	Results Negative	0	150
	Total Results	150	300
% Agreement	>99%	>99%	>99%

When compared to GC/MS at the cut-off of 2,000 ng/mL, the following results were tabulated:

Method	GC/MS		Total Results
	Positive	Negative	
OPI One Step Test Strip	Results Positive	134	150
	Results Negative	0	150
	Total Results	134	300
% Agreement	>99%	90%	95%

**Analytical Sensitivity**

A drug-free urine pool was spiked with Morphine at the following concentrations: 0 ng/mL, 1,000 ng/mL, 1,500 ng/mL, 2,000 ng/mL, 2,500 ng/mL and 3,000 ng/mL. The result demonstrates >99% accuracy at 50% above and 50% below the cut-off concentration. The data are summarized below:

Morphine Concentration (ng/mL)	Percent of Cut-off	n	Visual Result	
			Negative	Positive
0	0%	30	30	0
1,000	-50%	30	30	0
1,500	-25%	30	30	0
2,000	Cut-off	30	13	17
2,500	+25%	30	4	26
3,000	+50%	30	0	30

**Analytical Specificity**

The following table lists compounds that are positively detected in urine by the OPI One Step Opiate Test Strip (Urine) at 5 minutes.

Compound	Concentration (ng/mL)	Compound	Concentration (ng/mL)
Codeine	2,000	Morphine	2,000
Ethylmorphine	5,000	Norcocodeine	12,500
Hydrocodeine	12,500	Normorphine	50,000
Hydromorphone	5,000	Oxycodone	25,000
Levorphanol	75,000	Oxymorphone	25,000
6-Monoacetylmorphine	5,000	Procaine	150,000
Morphine 3- $\beta$ -D-glucuronide	2,000	Thebaine	100,000

**Precision**

A study was conducted at three physicians' offices by untrained operators using three different lots of product to demonstrate the within run, between run and between operator precision. An identical panel of coded specimens containing, according to GC/MS, no Morphine, 25% Morphine above and below the cut-off and 50% Morphine above and below the 2,000 ng/mL cut-off was provided to each site. The results are given below:

Morphine Concentration (ng/mL)	n	Site A		Site B		Site C	
		-	+	-	+	-	+
0	15	15	0	15	0	15	0
1,000	15	15	0	15	0	14	1
1,500	15	13	2	11	4	7	8
2,500	15	4	11	1	14	2	13
3,000	15	0	15	0	15	2	13

**Effect of Urinary Specific Gravity**

Fifteen urine samples of normal, high, and low specific gravity ranges were spiked with 1,000 ng/mL and 3,000 ng/mL of Morphine. The OPI One Step Opiate Test Strip (Urine) was tested in duplicate using the fifteen neat and spiked urine samples. The results demonstrate that varying ranges of urinary specific gravity do not affect the test results.

**Effect of Urinary pH**

The pH of an aliquoted negative urine pool was adjusted to a pH range of 5 to 9 in 1 pH unit increments and spiked with Morphine to 1,000 ng/mL and 3,000 ng/mL. The spiked, pH-adjusted urine was tested with the OPI One Step Opiate Test Strip (Urine) in duplicate. The results demonstrate that varying ranges of pH do not interfere with the performance of the test.

**Cross-Reactivity**

A study was conducted to determine the cross-reactivity of the test with compounds in either drug-free urine or Morphine positive urine. The following compounds show no cross-reactivity when tested with the OPI One Step Opiate Test Strip (Urine) at a concentration of 100  $\mu$ g/mL.

**Non Cross-Reacting Compounds**

4-Acetamidophenol	Creatinine	Maprotiline	Phenylpropanolamine
Acetophenetidin	Deoxycorticosterone	Mepredilone	Prednisone
N-Acetylprocainamide	Dextromethorphan	Meprobamate	D,L-Propranolol
Acetylsalicylic acid	Diazepam	Methadone	D-Propoxyphene
Aminopyrine	Diclofenac	Methoxyphenamine	D-Pseudoephedrine
Amiripyrtine	Diflunisal	(+)-3,4-Methylenedioxyamphetamine	Quinine
Amobarbital	Digoxin	(+)-3,4-Methylenedioxy-methamphetamine	Ranitidine
Ambocillin	Diphenhydramine	Nalidixic acid	Salicylic acid
Ampicillin	Doxylamine	Egonine hydrochloride	Secobarbital
Ascorbic acid	Egonine methylester	Nalorphine	Serotonin (5-Hydroxy-tryptamine)
D,L-Amphetamine	Apopromine	Naloxone	Sulfamethazole
Ethyl-p-aminobenzoate	Erythromycin	Naltrexone	Sulindac
Atropine	$\beta$ -Estradiol	Nifedipine	Tetracycline
Benzoic acid	Estrone-3-sulfate	Niacinamide	Temazepam
Benzoic acid	Aspartame	Nifedipine	Tetracycline
Benzoylecgonine	Fenpropfen	Norethindrone	Tetrahydrocortisone, 3-Acetate
Benzphetamine	Furosemide	D-Norpropoxyphene	Tetrahydrocortisone, 3-Acetate
Bilirubin	Genticic acid	Noscapine	Tetrahydrocortisone, 3-( $\beta$ -D-glucuronide)
Brompheniramine	Hemoglobin	D,L-Octopamine	Tetrahydrozoline
Caffeine	Hydralazine	Oxalic acid	Thiamine
Cannabidiol	Hydrochlorothiazide	Oxazepam	Thiamine
Chloralhydrate	Hydrocortisone	Oxolinic acid	Thioridazine
Chloramphenicol	O-Hydroxyhippuric acid	Oxymetazoline	D, L-Tyrosine
Chloridiazepoxide	p-Hydroxy-Methamphetamine	Papaverine	Tolbutamide
Chlorothiazide	3-Hydroxytyramine	Penicillin-G	Trameterene
( $\pm$ ) Chlorpheniramine	Ibuprofen	Pentazocine	Trifluoperazine
Chlorpromazine	Imipramine	Pentobarbital	Trimethoprim
Chlorzoxazone	Iproniazid	Perphenazine	Trimipramine
Cholesterol	( $\pm$ ) Isoproterenol	Pericyclidine	Tryptamine
Clomipramine	Isoxsuprine	Phenelzine	D, L-Tryptophan
Clonidine	Ketamine	Perphenazine	Tyramine
Cocaine hydrochloride	Ketoprofen	Phentermine	Uric acid
Cortisone	Labetalol	L-Phenylephrine	Verapamil
( $\pm$ ) Cotinine	Loperamide	$\beta$ -Phenylethylamine	Zomepirac

**BIBLIOGRAPHY**

- Tietz NW. *Textbook of Clinical Chemistry*. W.B. Saunders Company, 1986; 1735
- Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 2nd Ed. Biomedical Publ., Davis, CA, 1982; 488
- Hawks RL, CN Chiang. *Urine Testing for Drugs of Abuse*. National Institute for Drug Abuse (NIDA), Research Monograph 73, 1986

**Index of Symbols**

	Storage Temperature		Manufacturer		Do not reuse
	LOT		Authorized Representative		For in vitro diagnostic use
	Expiration		Caution, see instructions		Catalog No.