One Step Tricyclic Antidepressants Test Strip (Urine) Package Insert

REF 1191-S

A rapid, one step test for the qualitative detection of Tricyclic Antidepressants in human urine.

For professional in vitro diagnostic use only.

INTENDED USE

The TCA One Step Tricyclic Antidepressants Test Strip (Urine) is a lateral flow chromatographic immunoassay for the detection of Nortriptyline in human urine at a cut-off concentration of 1,000 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 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) or high performance liquid chromatography (HPLC) are the preferred confirmatory methods. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

SUMMARY

TCA (Tricyclic Antidepressants) are commonly used for the treatment of depressive disorders. TCA overdoses can result in profound central nervous system depression, cardiotoxicity and anticholinergic effects. TCA overdose is the most common cause of death from prescription drugs. TCAs are taken orally and sometimes by injection. TCAs are metabolized in the liver, both TCAs and their metabolites are excreted in urine mostly in the form of metabolites for up to ten days.

The TCA One Step Tricyclic Antidepressants 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 nortriptyline in urine. The TCA One Step Tricyclic Antidepressants Test Strip (Urine) yields a positive result when the Nortriptyline in urine exceeds 1,000 ng/mL.

PRINCIPLE

The TCA One Step Tricyclic Antidepressants Test Strip (Urine) is a rapid chromatographic 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. Tricyclic Antidepressants, if present in the urine specimen below 1,000 ng/mL, will not saturate the binding sites of the antibody coated particles in the test strip. The antibodies coated particles will then be captured by immobilized Tricyclic Antidepressants conjugate 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 Tricyclic Antidepressants level exceeds 1,000 ng/mL because it will saturate all the binding sites of anti-Tricyclic Antidepressants 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 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 anti-Tricyclic Antidepressants particles and Tricyclic Antidepressants conjugate coated on the membrane.

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 particles should be centrifuged, filtered, or allowed to settle to obtain 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

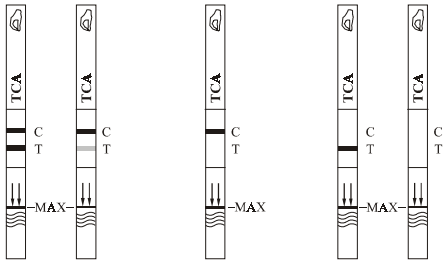
Materials Required But Not Provided

- Specimen collection container
- Timer

DIRECTIONS FOR USE

Allow the test strip, urine specimen, and/or controls to reach room temperature (15-30°C) prior to testing.

1. Bring the pouch to room temperature before opening it. Remove the test strip from the sealed pouch and use it as soon as possible.
2. 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 the illustration below.
3. 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.



Negative **Positive** **Invalid**

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 Tricyclic Antidepressant concentration is below the detectable level.

***NOTE:** The shade of color in the test line region (T) will vary, but it should always be considered as 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 Tricyclic Antidepressant concentration exceeds 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 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 positive procedural control. It confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique. In addition, if the test has been performed properly, the background will clear to provide a distinctive result.

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

1. The TCA One Step Tricyclic Antidepressants Test Strip (Urine) provides only a preliminary analytical result. A secondary analytical method must be used to obtain a confirmed result. Gas chromatography/mass spectrometry (GC/MS) or high performance liquid chromatography (HPLC) are the preferred confirmatory methods.[1,2]
2. The TCA One Step Tricyclic Antidepressants Test Strip (Urine) is a qualitative screening assay and can not determine either the drug concentration in the urine or the level of intoxication.
3. It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause erroneous results.
4. 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.
5. A positive result indicates presence of the drug or its metabolites but does not indicate level or intoxication, administration route or concentration in urine.
6. 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.

PERFORMANCE CHARACTERISTICS

Accuracy

A side-by-side comparison was conducted using the TCA One Step Tricyclic Antidepressants Test Strip (Urine) and a leading commercially available TCA rapid test. Testing was performed on 222 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 Nortriptyline. Presumptive positive results were confirmed by HPLC. The following results were tabulated:

Method		Other TCA Rapid Test		Total Results
TCA One Step Test Strip	Results	Positive	Negative	
	Positive	55	0	55
	Negative	3	164	167
Total Results		58	164	222
% Agreement		95%	>99%	99%

When compared with HPLC at a cut-off of 1,000 ng/mL, the following results were tabulated:

Method		HPLC		Total Results
TCA One Step Test Strip	Results	Positive	Negative	
	Positive	35	20	55
	Negative	0	167	167
Total Results		35	187	222
% Agreement		>99%	89%	91%

Analytical Sensitivity

A drug-free urine pool was spiked with at the following Nortriptyline concentrations: 0 ng/mL, 500 ng/mL, 750 ng/mL, 1,000 ng/mL, 1,250 ng/mL and 1,500 ng/mL. The result demonstrates > 99% accuracy at 50% above and 50% below the cut-off concentration. The data are summarized below:

Nortriptyline Concentration (ng/mL)	Percent of Cut-off	n	Visual Result	
			Negative	Positive
0	0%	30	30	0
500	-50%	30	30	0
750	-25%	30	22	8
1,000	Cut-off	30	17	13
1,250	+25%	30	5	25
1,500	+50%	30	0	30

Analytical Specificity

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

Compound	Concentration (ng/mL)	Compound	Concentration (ng/mL)
Nortriptyline	1,000	Desipramine	200
Nordoxepine	1,000	Imipramine	400
Trimipramine	3,000	Clomipramine	12,500
Amitriptyline	1,500	Doxepine	2,000
Promazine	1,500	Maprotiline	2,000
		Promethazine	25,000

Precision

A study was conducted at three geographically distinct 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 HPLC, no Nortriptyline, 25% Nortriptyline above and below the cut-off and 50% Nortriptyline above and below the 1,000 ng/mL cut-off was provided to each site. The following results were tabulated:

Nortriptyline Concentration (ng/mL)	n per Site	Site A		Site B		Site C	
		-	+	-	+	-	+
0	15	15	0	15	0	15	0
500	15	15	0	14	0	15	0
750	15	14	1	11	4	14	1
1,250	15	8	7	2	13	6	9
1,500	15	1	14	0	15	1	14

Effect of Urinary Specific Gravity

Fifteen urine specimens of normal, high, and low specific gravity ranges were spiked with 500 ng/mL and 1,500 ng/mL of Nortriptyline. The TCA One Step Tricyclic Antidepressants Test Strip (Urine) was tested in duplicate using the fifteen neat and spiked urine specimens. 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 Nortriptyline to 500 ng/mL and 1,500 ng/mL. The spiked, pH-adjusted urine was tested with the TCA One Step Tricyclic Antidepressants Test Strip (Urine) in duplicate and interpreted according to the package insert. 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 a drug-free urine pool and a drug-free urine pool spiked to contain a 1,500 ng/mL concentration of Nortriptyline. The following compounds show no cross-reactivity when tested with the TCA One Step Tricyclic Antidepressants Test Strip (Urine) at a concentration of 100 µg/mL.

Non Cross-Reacting Compounds

Acetamidophenol	Dextromethorphan	Methadone	β-Phenylethlamine
Acetophenetidin	Diazepam	D-methamphetamine	Phenylpropanolamine
N-Acetylprocainamide	Diclofenac	(L)-methamphetamine	Prednisolone
Acetylsalicylic acid	Diflunisal	Methoxyphenamine	Prednisone
Aminopyrine	Digoxin	3,4-Methylenedioxyethyl-amphetamine	Procaine
Amobarbital	Diphenhydramine	(±) 3,4-Methylenedioxy-methamphetamine	D,L-Propanolol
Amoxicillin	Doxylamine	Methylphenidate	D-Propoxyphene
Ampicillin	Ecgonine hydrochloride	Morphine-3-β-D-glucuronide	D-Pseudoephedrine
L-Ascorbic acid	Ecgonine methylester	Nalidixic acid	Quinidine
Apomorphine	(IR,2S)-(-)-Ephedrine	Naloxone	Quinine
Aspartame	L-Ephedrine	Naltrexone	Ranitidine
Atropine	Erythromycin	Naproxen	Salicylic acid
D,L -Amphetamine	Estrone-3-sulfate	Niacinamide	Secobarbital
L-Amphetamine	Ethyl-p-aminobenzoate	Nifedipine	Serotonin
Benzilic acid	Fenfluramine	Norcodein	(5-Hydroxytyramine)
Benzoic acid	Fenoprofen	Norephedrine	Sulfamethazine
Benzoylecgonine	Furosemide	Norethindrone	Sulindac
Benzphetamine	Gentisic acid	Norpropoxyphene	Temazepam
Bilirubin	Hemoglobin	Noscapine	Tetracycline
(±)-Brompheniramine	Hydralazine	D,L-Octopamine	Tetrahydrocortisone, 3-Acetate
Caffeine	Hydrochlorothiazide	Oxalic acid	Tetrahydrocortisone
Cannabidiol	Hydrocodone	β-Estradiol	3-(β-D glucuronide)
Cannabinol	Hydrocortisone	Oxolinic acid	Tetrahydrozoline
Chloralhydrate	p-Hydroxyamphetamine	Oxycodone	Thebaine
Chloramphenicol	O-Hydroxyhippuric acid	Oxymetazoline	Thiamine
Chlordiazepoxide	3-Hydroxytyramine	Papaverine	Thioridazine
Chlorothiazide	p-Hydroxy-methamphetamine	Penicillin-G	Tolbutamine
(±) Chlorpheniramine	Ibuprofen	Pentazocine	Triamterene
Chlorpromazine	(±)-Isoproterenol	Pentobarbital	Trifluoperazine
Chlorquine	Isoxsuprine	Perphenazine	Trimethoprim
Cholesterol	Ketamine	Phencyclidine	D, L-Tryptophan
Clonidine	Ketoprofen	Phenelzine	Tyramine
Cocaine hydrochloride	Labetalol	Phenobarbital	D, L-Tyrosine
Codeine	Levorphanol	Phentermine	Uric acid
Cortisone	Loperamide	L-Phenylephrine	Verapamil
(-) Cotinine	Meperidine	Promethazine	Oxazepam
Creatinine	Meprobamate	Ranitidine	Zomepirac
Deoxycorticosterone			

BIBLIOGRAPHY

1. Rose,J.B., *Tricyclic antidepressants toxicity*. J. Toxicity Clin. Toxicol. 11,381-402,1977
2. 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	Lot Code	EC REP	Authorized Representative	IVD	For in vitro diagnostic use
	Expiration		Caution, see instructions	REF	Catalog No.

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