TCA

One Step
Tricyclic Antidepressants Test Device (Urine)
Package Insert

(Catalog Number: 1191-C)

BIOMERICA

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

For in vitro diagnostic use only.

INTENDED USE

The TCA One Step Tricyclic Antidepressants Test Device (Urine) is a lateral flow chromatographic immunoassay for the detection of Nortriptyline (metabolites of Tricyclic Antidepressants) in human urine at a cut-off concentration of 1000ng/mL.

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

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 or 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 Device (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 Device (Urine) yields a positive result when the Nortriptyline in urine exceeds 1000 ng/mL.

PRINCIPLE

The TCA One Step Tricyclic Antidepressants Test Device (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 1000ng/mL, will not saturate the binding sites of the antibody coated particles in the test device. 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 1000ng/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 or a specimen containing a drug concentration less than the cut-off will generate a line in the test line region. 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 device contains mouse monoclonal anti-Tricyclic Antidepressants particles and Tricyclic Antidepressants conjugate coated on the membrane. A goat antibody is employed in the control line system.

PRECAUTIONS

- For *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 hazardous and handled in the same manner as an infectious agent.
- The used test device should be discarded according to federal, state and local regulations.

STORAGE AND STABILITY

The kit can be stored at room temperature or refrigerated (2-30°C). The test device is stable through the expiration date printed on the sealed pouch. The test device 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 devices
- Disposable specimen droppers
- Package insert

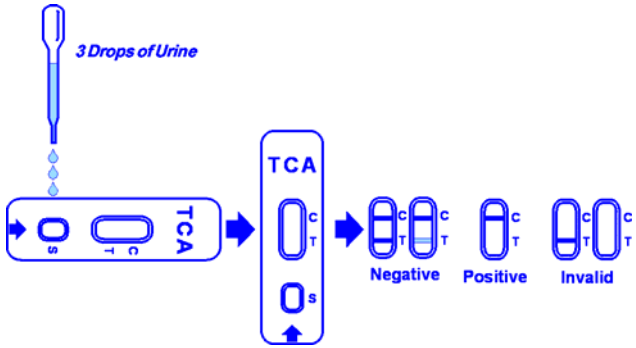
Materials Required But Not Provided

- Specimen collection container
- Timer

DIRECTIONS FOR USE

Allow the test device, 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 device from the sealed pouch and use it as soon as possible.
2. Place the test device on a clean and level surface. Hold the dropper vertically and **transfer 3 full drops of urine** (approx. 100µl) to the specimen well (S) of the test device, and then start the timer. Avoid trapping air bubbles in the specimen well (S). See the illustration below.
3. Wait for the red line(s) to appear. The result should be **read 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 red line should be in the control region (C), and another apparent red or pink line should be in the test region (T). This negative result indicates that the Tricyclic Antidepressants concentration is below the detectable level (1,000 ng/mL Nortriptyline).

*** NOTE:** The shade of red in the test line region (T) may vary, but it should considered negative whenever there is even a faint pink line.

POSITIVE: One red line appears in the control region (C). No line appears in the test region (T). This positive result indicates that the Tricyclic Antidepressants concentration exceeds the detectable level (1,000 ng/mL Nortriptyline).

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 device. 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 red 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. 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 Device (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.[1,2]
2. It is possible that technical or procedural errors, as well as other interfering substances in the urine specimen may cause

erroneous results.

3. 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.
4. A positive result indicates presence of the drug or its metabolites but does not indicate level of intoxication, administration route or concentration in urine.
5. 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.
6. Test does not distinguish between drugs of abuse and certain medications.

PERFORMANCE CHARACTERISTICS

Accuracy

A side-by-side comparison was conducted using the TCA One Step Tricyclic Antidepressants Test Device (Urine) and a leading commercially available TCA rapid test. Testing was performed on 300 clinical specimens. Ten percent of the specimens employed were either at –25% or +25% level of the cut-off concentration of Tricyclic Antidepressants. Presumptive positive results were confirmed by GC/MS. The following results were tabulated:

Method		Other TCA Rapid Test		Total Results
TCA One Step Test Device	Results	Positive	Negative	
	Positive	141	1	142
	Negative	4	154	158
Total Results		145	155	300
% Agreement with this Rapid Test kit		97%	99%	98%

When compared with GC/MS at a cut-off of 1000ng/ml, the following results were tabulated:

Method		GC/MS		Total Results
TCA One Step Test Device	Results	Positive	Negative	
	Positive	136	8	144
	Negative	3	153	156
Total Results		139	161	300
% Agreement with GC/MS Analysis		98%	95%	97%

Analytical Sensitivity

A drug-free urine pool was spiked with Tricyclic Antidepressants at the following 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	25	5
1,000	Cut-off	30	16	14
1,250	+25%	30	3	27
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 Device (Urine) at 5 minutes.

Compound	Concentration (ng/mL)
Notriptyline	1,000
Nordoxepine	1,000
Trimipramine	2,000
Amitriptyline	1,000
Promazine	1,000
Desipramine	125
Imipramine	250
Clomipramine	50,000
Doxepine	2,000
Maprotiline	750
Promethazine	37,500

Precision

A study was conducted at 3 geographically distinct physician's offices by untrained operators using 3 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 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. For the specimens at -50% cut-off concentration, the 3 sites had a 97% agreement. For the –25% to +25% cut-off specimens, the 3 sites demonstrated a 73% agreement. For specimens at +50% cut-off concentration, the 3 sites demonstrated a 92% agreement. The 3 sites demonstrated an overall agreement of 87%.

Effect of Urinary Specific Gravity

Fifteen (15) urine specimens with specific gravity range from 1.001 to 1.032 were spiked with 500 ng/mL and 1,500 ng/mL of Nortriptyline respectively. The TCA One Step Tricyclic Antidepressants Test Device (Urine) was tested in duplicate using the fifteen neat and spiked urine specimens. The results demonstrate that varying ranges of urinary specific gravity does not affect the test results.

Effect of the 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 Device (Urine) in duplicate. The results demonstrate that varying ranges of pH does 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 Nortriptyline-positive urine. The following compounds show no cross-reactivity when tested with the TCA One Step Tricyclic Antidepressants Test Device (Urine) at a concentration of 100 µg/mL.

Non Cross-Reacting Compounds

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

BIBLIOGRAPHY

1. Rose,J.B.,*Tricyclic antidepressants toxicity*. J. Toxicity Clin. Toxicol., 11,381-402,1977.
2. *Urine Testing for Drugs of Abuse*, National Institute on Drug-Abuse (NIDA), Research Monogragh 73 ,1986.
3. Fed. Register, Department of Health and Human Services, Mandatory Guidelines for Fedaral Workplace Drug Testing Programs,53,69,11979,1988.
4. McBay, A. J.Clin.Chem.,33,33B-40B,1987.

	Storage Temperature	EC REP	Authorized Representative
LOT	Lot Code		Caution, See Instructions
	Expiration	IVD	For in vitro diagnostic use
	Manufacturer	REF	Catalog No.

Biomerica, Inc., 1533 Monrovia Avenue
Newport Beach, CA 92663 USA

EC REP

CE

according to IVDD 98/79/ EC
MDSS
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