

BioSign® hCG

Serum/Urine

One-Step Pregnancy Test

For Professional *In Vitro* Diagnostic Use Only

Rapid Immunoassay for the Qualitative Detection of Human Chorionic Gonadotropin in Serum or Urine

For the Early Detection of Pregnancy

Catalog No.	BSP-120S-35	35 Test Kit
	BSP-120S-10	10 Test Kit

Intended Use

BioSign® hCG Serum/Urine—One Step Pregnancy Test is a simple immunoassay for the qualitative detection of human chorionic gonadotropin (hCG) in serum or urine for the early confirmation of pregnancy.

Summary and Principle of Procedure

Human chorionic gonadotropin (hCG) is a glycoprotein hormone produced by the placental trophoblastic cells shortly after the fertilized ovum is implanted in the uterine wall.^{1,4} The primary function of hCG is to maintain the corpus luteum during early pregnancy. The appearance of hCG in both the urine and serum soon after conception and its rapid rise in concentration make it an excellent marker for confirmation of pregnancy. The hormone may become detectable in both urine and serum as early as 7 to 10 days after conception.¹⁻⁴ The concentration of hCG continues to rise rapidly, frequently exceeding 100 mIU/mL by the first missed menstrual period and peaking in the 30,000–100,000 mIU range by 10 to 12 weeks into pregnancy. The hormone is comprised of two non-covalently bound dissimilar subunits containing approximately 30% carbohydrate by weight.⁵ The alpha subunit is structurally similar to other human pituitary glycoprotein hormones, whereas the beta (β) subunit confers unique biological and immunological specificity to the molecule.^{6,7}

The **BioSign® hCG Serum/Urine—One Step Pregnancy Test** is a rapid serum or urine test for detecting hCG. The test is a solid-phase, two-site immunometric assay in which a combination of monoclonal and polyclonal antibodies is used to selectively detect elevated levels of hCG in serum or urine with a high degree of sensitivity. In the test procedure, sample is added to the sample well with the aid of a transfer pipette and sample is allowed to soak in. If hCG is present in the specimen, it will react with the conjugate dye, which binds to the antibody on the membrane to generate a colored line. Presence of two colored lines, one at the Test position (T) and the other at the Control position (C) in the Result window, indicates a positive result, while the absence of the line at the Test position indicates a negative result.

Reagents

The **BioSign® hCG Serum/Urine—One Step Pregnancy Test** kit contains enough reagents and materials to perform all the tests.

Materials Provided

- **BioSign® device.** Test device containing the polyclonal anti-hCG

coated membrane and a pad with the mouse monoclonal IgG (anti-hCG)-dye conjugate in a protein matrix containing 0.1% sodium azide.

- Disposable dropper
- Package insert

Materials Required But Not Provided

- Timer
- Specimen cup

Precautions

- For *in vitro* diagnostic use only.
- Do not interchange materials from different product lots and do not use beyond the expiration date.
- Reagents in this kit contain sodium azide as a preservative, which may react with lead or copper in plumbing to form potentially explosive metal azides. Upon disposal, always flush with large volumes of water to prevent azide buildup in drains.
- The **BioSign®** device should remain in its sealed pouch until ready for use.

Storage and Stability

BioSign® hCG Serum/Urine—One Step Pregnancy Test kit should be stored at 2–30°C (36–86°F) in the sealed pouch.

Specimen Collection and Preparation

Urine Assay

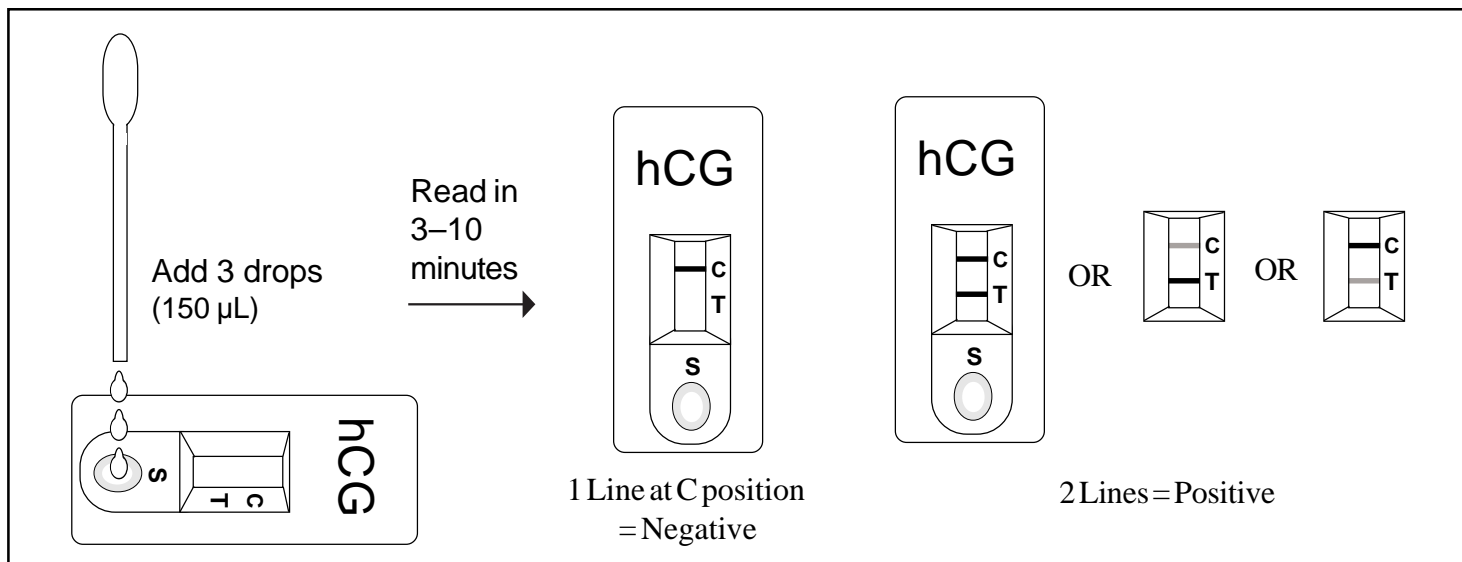
- Approximately 150 µL of serum or urine sample is required for each test.
- For optimal early detection of pregnancy, a first morning urine specimen is preferred since it generally contains the highest concentration of hCG. However, randomly collected urine specimens may be used.
- Collect the urine specimen in a clean glass or plastic cup without preservatives.
- Urine containing excessive bacterial contamination should not be used since spurious results may occur with such specimens.

Serum Assay

- Remove the serum from the clot as soon as possible to avoid hemolysis. When possible, clear, non-hemolyzed specimens should be used. Specimens containing particulate matter may give inconsistent test results. Such specimens should be clarified by centrifugation prior to assaying.
- If refrigerated, bring specimens to room temperature (18–30°C) prior to testing.
- Frozen specimens must be completely thawed, thoroughly mixed, and brought to room temperature prior to testing by allowing the specimens to stand at room temperature for at least 30 minutes.

Specimen Storage

- If testing will not be performed immediately, the specimens should be refrigerated (2–8°C) or kept reasonably cool (below 25°C) for up to 24 hours. Bring specimens to room temperature prior to testing.
- For prolonged storage, specimens may be frozen and stored below –20°C. Frozen specimens must be completely thawed, thoroughly mixed, and brought to room temperature prior to testing by allowing the specimens to stand at room temperature for at least 30 minutes. Avoid repeated freezing and thawing.
- If specimens are to be shipped, they should be packed in compliance with Federal regulations covering the transportation of etiologic agents. For urine samples, add sodium azide to a concentration of 0.1% as a preservative and ship by the quickest means possible.



Procedure

Test Procedure Summary

The procedure consists of adding the specimen to the sample well in the device and watching for the appearance of colored lines on the membrane.

Procedural Notes

The instructions below must be followed to achieve optimal test reactivity with serum or urine specimens.

- Allow specimens and the **BioSign® hCG Serum/Urine—One Step Pregnancy Test** device to stand at room temperature for at least 30 minutes prior to testing.
- Label the **BioSign®** device with the patient name or control number.
- Allow the dropper to fill with sample. Holding the dropper in a vertical position, add 3 drops of sample into the Sample well (S).
- Handle all specimens as if capable of transmitting disease.
- After testing, dispose of the **BioSign®** device and the dropper following good laboratory practices. Consider each material that comes in contact with specimen to be potentially infectious.

Test Protocol

1. For each test, open one **BioSign® hCG** pouch, and label the **BioSign®** device with the patient ID.
2. Holding the dropper in a vertical position, add 3 drops (150 µL) of sample into the Sample well (S).
3. Read the result after 3 minutes, but within 10 minutes.

Results

How to Read the Test

Positive: Two pinkish-purple lines, one each at the Test position (T) and at the Control position (C) in the Result Window. Each of the following indicates a positive test result:

- a. Two strong pinkish-purple lines, one each at the Test (T) and Control (C) positions.
- b. One strong pinkish-purple line at the Test position (T) and one light pinkish-purple line at the Control position (C).
- c. One light pinkish-purple line at the Test position (T) and one pinkish-purple colored line at the Control position (C).

Negative: Only one pinkish-purple line, at the Control position (C).

Notes on Results

Positive

A specimen containing a detectable level of hCG will generate a pinkish-purple line at the Test position (T) within 3 minutes. The time required to generate the line is dependent on the hCG concentration in the sample. Some positive results can be read in as early as one minute. Lower levels of hCG may require longer than 3 minutes to develop. To be interpreted as positive, the pinkish-purple line at the Test position should be clearly distinguishable from the background color of the membrane. In strong positive tests, the color intensity of the Control line (C) may be much lighter than that of the Test line (T).

Negative

In the absence of hCG, or in the case that the hCG concentration is below the detection limit of the test, there will be no apparent line at the Test position. The control line at the Control position should be clearly readable.

Inconclusive or Invalid Results

If there is no distinct pinkish-purple line visible at the Control position, the test is inconclusive. If there is a suspected procedural error made by the user, the result should be considered inconclusive. It is recommended that in this case the test be repeated or a fresh specimen be obtained and tested. A Control line should always appear. The absence of a pinkish-purple line at the Control position means the test is invalid and should be repeated with a new test device.

Limitations

- Elevated hCG levels have been reported in patients with both gestational and nongestational trophoblastic diseases.^{8,9,10} The hCG of trophoblastic neoplasms is similar to that found in pregnancy. Therefore, these conditions, including choriocarcinoma and hydatidiform mole, should be ruled out before diagnosing pregnancy.
- An extremely low concentration of hCG during the early stage of pregnancy can give a negative result. In this case, another specimen should be obtained at least 48 hours later and tested.
- The hCG level may remain detectable for several weeks after normal delivery, delivery by cesarean section, spontaneous abortion, or therapeutic abortion.¹¹
- The hCG level in the case of spontaneous abortion may be very low and eventually decrease. The test is highly sensitive, and specimens which test positive during the initial days after conception may later be negative due to natural termination of the pregnancy. Natural termination occurs in 22% of clinically unrecognized pregnancies and 31% of pregnancies overall.¹² Subsequent testing of a new urine or serum sample after an

additional 48 hours is recommended in order to confirm that the hCG level is rising as indicated in a normal pregnancy.

- The concentration of hCG may be very low in the case of ectopic pregnancy.¹³ A suspected ectopic pregnancy may be further evaluated using a quantitative hCG assay.
- Very high levels of hCG may exist in certain pregnancies and pathological conditions (e.g., choriocarcinoma and hydatidiform mole). This may weaken the signal line.
- The physician should evaluate data obtained from this kit in light of other clinical information.
- Samples which contain excessive bacterial contamination or have been subjected to repeated freezing and thawing should not be used because such specimens can give spurious results.
- Urine samples with low specific gravity may not contain representative levels of hCG. If such a sample is negative or weakly positive, a first morning specimen should be tested.

User Quality Control

- Control standards are not provided with this kit; however, it is recommended that controls be tested at regular intervals as good testing practice and whenever there is any doubt about the interpretation of the test result. It is recommended that a positive control which is near the sensitivity limit of the assay be used for assay control. For information on how to obtain controls, contact PBM for technical assistance. Before using a new lot of kit, a quality control test using the positive and negative control should be conducted to confirm the expected Q.C. results and the validity of the assay. Upon confirmation of the expected results, the kit is ready for use with patient specimens.
- The control line at the Control position can be considered an internal procedural control, i.e., a proper amount of sample is used; sample is added to the sample well, and not through the reading window; and the reagent system worked properly. A distinct pinkish-purple control line will always appear if the test has been performed correctly. If the control line does not appear, the test is invalid and a new test should be performed. If the problem persists, contact PBM for technical assistance.
- A clear background in the Result Window is considered an internal negative procedural control. If the test is performed correctly and the **BioSign® hCG** device is working properly, the background in the Result Window should be clear, providing a distinct negative result.

Expected Values

BioSign® hCG Serum/Urine—One Step Pregnancy Test is capable of detecting hCG levels of 15 mIU/mL (WHO 3rd International Standard, previously known as the 1st I. R.P). HCG levels in normal early pregnant women vary and hCG levels often exceed 100 mIU/mL by the first day of the missed menstrual period.¹ The test is usually capable of detecting hCG by the first day of the missed menstrual period.

Performance Characteristics

Clinical Evaluation—Urine Assay

A total of 247 blind clinical urine samples were studied. These specimens were assayed with **BioSign® hCG Serum/Urine—One Step Pregnancy Test** and **Tandem® Icon® II** according to the package inserts (Table 1). Thirty-six (36) samples are from menopausal women.

Table 1 (Urine Assay)

BioSign® hCG Serum/Urine—One Step Pregnancy Test vs. **Tandem® Icon® II** with Urine Specimens

Test Result (# of Samples)

	Tandem® Icon® II	BioSign® hCG
Positive	78	78
Negative	133	133
Menopausal	Not Determined	36 (Negative)

The data demonstrate the excellent correlation between **BioSign® hCG Serum/Urine—One Step Pregnancy Test** and **Tandem® Icon® II**. The clinical accuracy and sensitivity of the two tests are found comparable.

Overall Accuracy: 100%
Relative Sensitivity: 100%
Relative Specificity: 100%

Clinical Evaluation—Serum Assay

A total of 425 blind clinical serum samples were studied. These specimens were assayed with **BioSign® hCG Serum/Urine—One Step Pregnancy Test** and **Tandem® Icon® II** according to the package inserts. The results demonstrate 100% relative sensitivity, 99% relative specificity and 99.5% overall accuracy (Table 2).

Table 2 (Serum Assay)

BioSign® hCG Serum/Urine—One Step Pregnancy Test vs. **Tandem® Icon® II** with Serum Specimens

Test Result (# of Samples)

		Tandem® Icon® II	
		+	-
BioSign® hCG (Serum/Urine)	Positive	215	2
	Negative	0	208
	TOTAL	215	210

Overall Accuracy: 99.5%
Relative Sensitivity: 100%
Relative Specificity: 99%

Physicians' Office Laboratory Evaluation (Proficiency Study)

Reproducibility of **BioSign® hCG** test results was evaluated at three physicians' office laboratories using a total of 120 blind control samples. The control panels were prepared in serum or urine. Each panel consisted of 5 negative (-), 5 low positive (25 mIU/mL hCG), 5 moderate positive (200 mIU/mL hCG), and 5 high positive (500 mIU/mL hCG) samples. The results obtained at each site agreed 100% with expected results and with predicate tests compared in parallel.

Sensitivity—Urine Assay

Standard controls (calibrated to the WHO 3rd International Standard) ranging from 5 mIU/mL to 25 mIU/mL in urine were tested in 5 replicates. The results confirm sensitivity of 10 mIU/mL in 4 minutes and 25 mIU/mL in 2 minutes assay time (Table 3).

Table 3. Urine Assay Sensitivity—Example

BioSign® hCG Serum/Urine—One Step Pregnancy Test Sensitivity and Assay Time

	Standards (hCG, mIU/mL)				
hCG concentration	5	10	15	20	25
Reading time (min.)	7'	4'	2'40"	2'20"	1'50"

Sensitivity—Serum Assay

Standard controls (calibrated to the WHO 3rd International Standard) ranging from 5 mIU/mL to 25 mIU/mL in serum tests were tested in 5 replicates. The results indicate sensitivity of 10 mIU/mL in 4 minutes and 25 mIU/mL in 2 minutes assay time (Table 4).

Table 4. Serum Assay Sensitivity—Example

BioSign® hCG Serum/Urine—One Step Pregnancy Test Sensitivity and Assay Time

	Standards (hCG, mIU/mL)				
hCG concentration	5	10	15	20	25
Reading time (min.)	6'	3'40"	3'10"	2'30"	1'40"

Specificity

Thirty-six (36) urine specimens collected from menopausal women were studied. Specimens from menopausal women are known to interfere frequently with pregnancy tests due to cross-reactivity with other gonadotropin hormones. These specimens were assayed with **BioSign® hCG Serum/Urine—One Step Pregnancy Test**. All 36 specimens were found negative.

The assay is free from interference with other commonly known homologous hormones and interfering substances when tested at the levels specified below.

Other Interfering Substances

Potentially interfering substances were prepared at the following concentrations in both urine and serum which contain either 0 or 25 mIU/mL hCG. These samples were tested with the **BioSign® hCG**. No interference was found (Table 5).

Table 5

Substance Added	Concentration Added	
	in Urine	in Serum
Drugs:		
Acetaminophen	20 mg/dL	20 mg/dL
Acetylsalicylic Acid	20 mg/dL	20 mg/dL
Ampicillin	20 mg/dL	20 mg/dL
Ascorbic Acid	20 mg/dL	20 mg/dL
Atropine	20 mg/dL	20 mg/dL
Caffeine	20 mg/dL	20 mg/dL
Gentisic Acid	20 mg/dL	20 mg/dL
Phenothiazine	20 mg/dL	20 mg/dL
Phenylpropanolamine	20 mg/dL	20 mg/dL
Salicylic Acid	20 mg/dL	20 mg/dL
Tetracycline	20 mg/dL	20 mg/dL
Urinary Analytes:		
Bilirubin	2 mg/dL	30 mg/dL
Glucose	2000 mg/dL	2000 mg/dL
Hemoglobin	25 mg/dL	250 mg/dL
Ketones	100 mg/dL	—
Protein	2000 mg/dL	14000 mg/dL
Triglycerides	—	2000 mg/dL
Homologous Hormones:		
hFSH	1000 mIU/mL	1000 mIU/mL
hLH	500 mIU/mL	1000 mIU/mL
hTSH	1000 µIU/mL	1000 µIU/mL

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Symbols Key

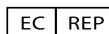
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	Authorized Representative
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	Temperature Limitation
	Contains sufficient for <n> tests
	Do not reuse
	Contents
	Test Device
	Transfer Pipette
	Instructions for Use
	Pregnancy Test

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