



Progesterone (Human) ELISA Kit

Catalog Number KA0235

96 assays

Version: 02

Intended for research use only

www.abnova.com

Table of Contents

Introduction	3
Intended Use	3
Background	3
Principle of the Assay	3
General Information	5
Materials Supplied	5
Storage Instruction	5
Materials Required but Not Supplied	5
Precautions for Use	6
Assay Protocol	7
Reagent Preparation	7
Sample Preparation	7
Assay Procedure	7
Data Analysis	9
Calculation of Results	9
Performance Characteristics	10
Resources	13
References	13
Plate Layout	14

Introduction

Intended Use

For the quantitative determination of Progesterone concentration in human serum.

Background

Progesterone is a C21 steroid which is synthesized from both tissue and circulating cholesterol. Cholesterol is transformed to pregnenolone which is then converted via a combined dehydrogenase and isomerase to progesterone. The principle production sites are the adrenals and ovaries and the placenta during pregnancy. The majority of this steroid is metabolized in the liver to pregnanediol and conjugated as a glucuronide prior to excretion by the kidneys.

Progesterone exhibits a wide variety of end organ effects. The primary role of progesterone is exhibited by the reproductive organs. In males, progesterone is a necessary intermediate for the production of corticosteroids and androgens. In females, progesterone remains relatively constant throughout the follicular phase of the menstrual cycle. The concentration then increases rapidly following ovulation and remains elevated for 4-6 days and decreases to the initial level 24 hours before the onset of menstruation. In pregnancy, placental progesterone production rises steadily to levels of 10 to 20 times those of the luteal phase peak. Progesterone measurements are thus performed to determine ovulation as well as to characterize luteal phase defects. Monitoring of progesterone therapy and early stage pregnancy evaluations comprise the remaining uses of progesterone assays.

Principle of the Assay

The Abnova progesterone EIA is based on the principle of competitive binding between progesterone in the test specimen and progesterone-HRP conjugate for a constant amount of rabbit anti-progesterone. In the incubation, goat anti-rabbit IgG-coated wells are incubated with 25 µl progesterone standards, controls, patient samples, 100 µl progesterone-HRP Conjugate Reagent and 50 µl rabbit anti-progesterone reagent at room temperature (18-25°C) for 90 minutes. During the incubation, a fixed amount of HRP-labeled progesterone competes with the endogenous progesterone in the standard, sample, or quality control serum for a fixed number of binding sites of the specific progesterone antibody. Thus, the amount of progesterone peroxidase conjugate immunologically bound to the well progressively decreases as the concentration of progesterone in the specimen increases. Unbound progesterone peroxidase conjugate is then removed and the wells washed. Next, a solution of TMB Reagent is then added and incubated at room temperature for 20 minutes, resulting in the development of blue color. The color development is stopped with the addition of Stop Solution, and the absorbance is measured spectrophotometrically at 450 nm. The intensity of the color formed is proportional to the amount of enzyme present and is inversely related to the amount of unlabeled progesterone in the sample.

A standard curve is obtained by plotting the concentration of the standard versus the absorbance. The progesterone concentration of the specimens and controls run concurrently with the standards can be calculated from the standard curve.

General Information

Materials Supplied

List of component

Component	Amount
Goat Anti-Rabbit IgG-coated microtiter wells	96 wells
Progesterone Reference Standards: 0, 0.5, 3.0, 10, 25, and 50 ng/ml. Liquids, ready to use.	0.5 ml each
Rabbit Anti-Progesterone Reagent (pink color)	7 ml
Progesterone-HRP Conjugate Concentrate (11x)	1.3 ml
Progesterone-HRP Conjugate Diluent	13 ml
Progesterone Control 1, Liquid, Ready to use.	0.5 ml
Progesterone Control 2, Liquid, Ready to use.	0.5 ml
TMB Reagent (One-Step)	11 ml
Stop Solution (1N HCl)	11 ml

Storage Instruction

Unopened test kits should be stored at 2-8°C upon receipt and the microtiter plate should be kept in a sealed bag with desiccants to minimize exposure to damp air. Opened test kits will remain stable until the expiration date shown, provided it is stored as described above.

Materials Required but Not Supplied

- ✓ Precision pipettes: 25 µl, 50 µl, 100 µl, 200 µl, and 1.0 ml.
- ✓ Disposable pipette tips.
- ✓ Distilled or deionized water.
- ✓ Vortex mixer or equivalent.
- ✓ Absorbent paper or paper towel.
- ✓ Linear-linear graph paper.
- ✓ A microtiter plate reader with a bandwidth of 10 nm or less and an optical density range of 0-3 O.D. at 450 nm wavelength is acceptable for use in absorbance measurement.

Precautions for Use

- ✓ Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of the package insert instructions and with adherence to good laboratory practice.
- ✓ The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
- ✓ Serum samples demonstrating gross lipemia, gross hemolysis, or turbidity should not be used with this test.
- ✓ The results obtained from the use of this kit should be used only as an adjunct to other diagnostic procedures and information available to the physician.

Assay Protocol

Reagent Preparation

1. All reagents should be brought to room temperature (18-25°C) before use.
2. To prepare Working Progesterone-HRP Conjugate Reagent, add 0.1 ml of Progesterone-HRP Conjugate Concentrate (11x) to 1.0 ml of Progesterone-HRP Conjugate Diluent (1:10 dilution) and mix well. The amount of conjugate diluted depends on your assay size. Discard the excess after use.
3. Samples with expected progesterone concentrations over 50 ng/ml may be quantitated by dilution with diluent available from Abnova, Inc.

Sample Preparation

1. Only human serum should be used.
2. No special pretreatment of sample is necessary.
3. Serum samples may be stored at 2-8°C for up to 24 hours, and should be frozen at -10°C or lower for longer periods. Do not use grossly hemolyzed or grossly lipemic specimens.
4. Please note: Samples containing sodium azide should not be used in the assay.

Assay Procedure

1. Secure the desired number of coated wells in the holder.
2. Dispense 25 µl of standards, specimens and controls into appropriate wells.
3. Dispense 100 µl of Working Progesterone-HRP Conjugate Reagent into each well.
4. Dispense 50 µl of rabbit anti-progesterone reagent to each well.
5. Thoroughly mix for 30 seconds. It is very important to mix them completely.
6. Incubate at room temperature (18-25°C) for 90 minutes.
7. Rinse and flick the microwells 5 times with distilled or deionized water. (Please do not use tap water.)
8. Dispense 100 µl of TMB Reagent into each well. Gently mix for 10 seconds.
9. Incubate at room temperature (18-25°C) for 20 minutes.
10. Stop the reaction by adding 100 µl of Stop Solution to each well.
11. Gently mix 30 seconds. It is important to make sure that all the blue color changes to yellow color completely.
12. Read absorbance at 450 nm with a microtiter well reader within 15 minutes.

- **Quality control**

Good laboratory practice requires that controls are run with each calibration curve. A statistically

significant number of controls should be assayed to establish mean values and acceptable ranges to assure proper performance. We recommend using Bio-Rad Lyphochek Immunoassay Control Sera as controls. Abnova Progesterone EIA kit also provides with internal controls, Level 1 and 2.

Data Analysis

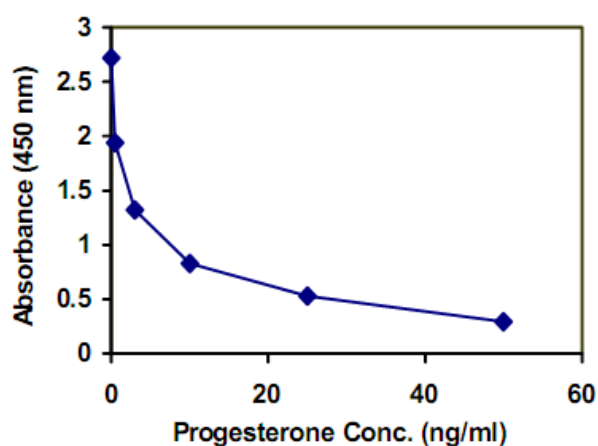
Calculation of Results

1. Calculate the mean absorbance value (A₄₅₀) for each set of reference standards, controls and samples.
2. Construct a standard curve by plotting the mean absorbance obtained for each reference standard against its concentration in ng/ml on a linear-linear graph paper, with absorbance values on the vertical or Y axis, and concentrations on the horizontal or X axis.
3. Use the mean absorbance values for each specimen to determine the corresponding concentration of Progesterone in ng/ml from the standard curve.
4. Any values obtained for diluted samples must be further converted by applying the appropriate dilution factor in the calculations.

• Example of Standard Curve

Results of a typical standard run with optical density readings at 450 nm shown in the Y axis against Progesterone concentrations shown in the X axis. Note: This standard curve is for the purpose of illustration only, and should not be used to calculate unknowns. Each laboratory must provide its own data and standard curve in each experiment.

Progesterone (ng/ml)	Absorbance (450 nm)
0	2.719
0.5	1.937
3	1.391
10	0.828
25	0.528
50	0.291



Performance Characteristics

• **Expected values**

Each laboratory should establish its own normal range based on the patient population. Abnova Progesterone EIA was performed on randomly selected outpatient clinical laboratory samples. The following information is cited from reference #9.

Males: adult	0.13 – 0.97 ng/ml
Prepubertal (children)	0.70 – 0.52 ng/ml
Females: follicular phase	0.15 – 0.70 ng/ml
luteal phase	2.00 – 25.0 ng/ml
post menopausal	0.06 – 1.60 ng/ml
Pregnancy:	
1st trimester	10.3 – 44.0 ng/ml
2nd trimester	19.5 – 82.5 ng/ml
3rd trimester	65.0 – 229 ng/ml

• **Sensitivity**

The minimum detectable concentration of the Abnova Progesterone ELISA assay as measured by 2 SD from the mean of a zero standard is estimated to be 0.0625 ng/ml.

• **Precision**

a. Intra-Assay Precision

Within-run precision was determined by replicate determinations of four different serum samples in one assay. Within-assay variability is shown below:

Samples	1	2	3	4
# Replicates.	24	24	24	24
Mean Progesterone (ng/ml)	1.8	8.0	21.7	44.8
S.D.	0.1	0.2	0.7	1.1
C.V. (%)	7.1	2.6	3.3	2.4

b. Inter-Assay Precision

Between-run precision was determined by replicate measurements of six different serum samples over a series of individually calibrated assays. Between-assay variability is shown below:

Samples	1	2	3	4
# Replicates.	20	20	20	20
Mean Progesterone (ng/ml)	1.7	7.9	21.0	44.6
S.D.	0.2	0.4	1.2	1.1
C.V. (%)	12.6	4.5	5.9	2.6

- **Linearity Study**

Four patient samples were serially diluted to determine linearity. The mean linearity was 105.9%.

#	Dilution	Expected Conc. (ng/mL)	Observed Conc. (ng/mL)	% Expected
1.	Undiluted	-----	44.4	-----
	1:2	22.2	24.9	112.0
	1:4	11.1	12.8	115.3
	1:8	5.6	7.1	127.7
	1:16	2.8	3.5	125.2
	1:32	1.4	1.8	126.7
	1:64	0.7	0.8	108.5
	1:128	0.3	0.3	81.0
				Mean = 113.8%
2.	Undiluted	-----	40.6	-----
	1:2	20.3	22.6	111.2
	1:4	10.2	9.8	96.9
	1:8	5.1	6.0	118.9
	1:16	2.5	2.6	102.0
	1:32	1.3	1.2	96.4
	1:64	0.6	0.4	70.4
	1:128	0.3	0.3	89.1
				Mean = 97.9%
3.	Undiluted	-----	30.5	-----
	1:2	15.2	16.6	108.6
	1:4	7.6	8.3	108.3
	1:8	3.8	4.5	117.9
	1:16	1.9	2.1	112.1
	1:32	1.0	0.5	54.4
	1:64	0.5	0.3	69.5
				Mean = 95.1%
4.	Undiluted	-----	41.9	-----
	1:2	20.9	24.7	118.1
	1:4	10.5	12.1	115.3
	1:8	5.2	7.1	135.6
	1:16	2.6	3.7	142.1
	1:32	1.3	1.8	135.8
	1:64	0.7	0.5	72.7
	1:128	0.3	0.3	99.0
				Mean = 116.9%

- **Recovery Study**

Various patient serum samples of known Progesterone levels were combined and assayed in duplicate. The mean recovery was 111.3%.

PAIR NO.	EXPECTED [Progesterone] (ng/ml)	OBSERVED [Progesterone] (ng/ml)	% RECOVERY
1	41.5	43.1	103.9
2	43.1	45.7	106.1
3	19.9	19.8	99.1
4	18.0	19.2	106.4
5	3.8	4.3	115.4
6	7.3	8.7	118.6
7	0.8	0.7	80.4

- **Specificity**

The following materials have been checked for cross reactivity. The percentage indicates cross reactivity at 50% displacement compared to Progesterone.

Data on the cross-reactivity for several endogenous and pharmaceutical steroids are summarized in the following table:

- **Cross-reactivity (%) = Observed Progesterone Concentration / Steroid Concentration × 100**

Steroid	Cross-Reactivity
Progesterone	100%
Androsterone	0.086%
Corticosterone	0.74%
Cortisone	0.11%
Cholesterol	<0.08%
Estradiol	<0.01%
Estrone	0.08%
Estriol	<0.024%
Prednisolone	0.075%
Testosterone	0.1%

Resources

References

- ✓ Radwanska, E., Frankenberg, J., and Allen, E., Plasma progesterone levels in normal and abnormal early human pregnancy. *Fertility and Sterility*, 1978; 30, 398-402.
- ✓ Autrere, M.B., and Benson, H., Progesterone: An overview and recent advances, *J. Par. Sci.*, 1976; 65: 783-800.
- ✓ March, C.M., Goebelsmann, U., Nakamura, R.M., and Mishell, D.R. Jr., Roles of estradiol and progesterone in eliciting the midcycle luteinizing hormone and follicle-stimulating hormone surges, *J. Clin. Endo. Metab.*, 1979; 49, 507-513.
- ✓ Ross, G.T., Vande Wiele, R.L., and Frantz, A.G., The Ovaries and the breasts. In: Williams, R.H., ed., *Textbook of Endocrinology*. Saunders Company, Philadelphia; 1981: 355-411.
- ✓ Chatteraj, S.C., Endocrine function. In: Tietz, N.W., ed., *Fundamentals of Clinical Chemistry*. Saunders Company, Philadelphia; 1976: 699-823.
- ✓ Shepard, M.K., and Senturia, Y.D., Comparison of serum progesterone and endometrial biopsy for confirmation of ovulation and evaluation of luteal function. *Fertility and Sterility*, 1977; 28: 541-548.
- ✓ Johansson, E.D.B., and Jonasson, L.-E., Progesterone levels in amniotic fluid and plasma from women: I. Levels during normal pregnancy. *Acta Obstet. Gynec. Scand.*, 1971; 50: 339-343.
- ✓ USA Center for Disease Control/National Institute of Health Manual, "Biosafety in Microbiological and Biomedical Laboratories" 1984.
- ✓ Tietz, N.W. ed., *Clinical Guide to Laboratory Tests*, 3rd Edition, W.B. Saunders, Co., Philadelphia, 1995: 509-512.
- ✓ ICN Guide to Endocrine Testing. Diagnostic Division, ICN Biomedicals, Inc. pp. 2:20-27.

Plate Layout

12								
11								
10								
9								
8								
7								
6								
5								
4								
3								
2								
1								
	A	B	C	D	E	F	G	H