



ELISA PRODUCT INFORMATION & MANUAL

Non-species specific Allopregnanolone ELISA Kit (Colorimetric)

NBP3-18698

Sample Insert for reference use only

Enzyme-linked Immunosorbent Assay for quantitative
detection. For research use only.

Not for diagnostic or therapeutic procedures.

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Novus kits are guaranteed for 6 months from date of receipt

Assay Summary

Step 1. Add 25 μ l of Standard or Sample and 25 μ l of Biotinylated Steroid per well.
Incubate 2 hours.

Step 2. Wash, then add 50 μ l of SP Conjugate per well.
Incubate 30 minutes.

Step 3. Wash, then add 50 μ l of Chromogen Substrate per well.
Incubate 25 minutes.

Step 4. Add 50 μ l of Stop Solution per well.
Read at 450 nm immediately.

Symbol Key



Consult instructions for use.

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Introduction

Allopregnanolone is a steroid synthesized in the body through the metabolism of progesterone. This process takes place in the endocrine tissues (ovary and adrenal) and the brain (1). Low serum levels of allopregnanolone have been thought to be part of the pathophysiology of mood disorders, such as depression. It is also thought that high allopregnanolone levels during pregnancy protect mothers from a depressed mood and anxiety; however, within a few days after delivery allopregnanolone levels drop drastically, and it is hypothesized that this is the cause of postpartum depression (PPD) [2]. This theory has led to the development of allopregnanolone (a.k.a. brexanolone) as the first FDA-approved treatment for postpartum depression under the brand name Zulresso™ (3). It is also thought that allopregnanolone may be a novel treatment for patients with status epilepticus and possibly also providing protection against seizure-induced neural injury (1).

Principle of the Assay

The Non-species specific Allopregnanolone ELISA Kit (Colorimetric) is designed for detection of allopregnanolone in **plasma, serum, milk, urine, and saliva samples**. This kit is validated for use with **bovine, equine, human, mouse, rat, swine, and rabbit samples**. This assay employs a quantitative **competitive enzyme immunoassay** technique that measures allopregnanolone in approximately 3 hours. A polyclonal antibody specific for allopregnanolone has been pre-coated onto a 96-well microplate with removable strips. Allopregnanolone in standards and samples is competed with a biotinylated allopregnanolone steroid sandwiched by the immobilized antibody and streptavidin-peroxidase (SP) conjugate. All unbound material is washed away and a peroxidase enzyme substrate is added. The color development is stopped and the intensity of the color is measured.

Caution and Warning

- This product is for **Research Use Only** and is not intended for use in diagnostic procedures.
- Prepare all reagents (diluent buffer, wash buffer, standard, biotinylated steroid, and SP conjugate), as instructed, prior to running the assay.

- Prepare all samples prior to running the assay. The dilution factors for the samples are suggested in this insert. However, the user should determine the optimal dilution factor.
- Spin down the SP conjugate vial before opening and using contents.
- The Stop Solution is an acidic solution.
- The kit should not be used beyond the expiration date.

Reagents

- **Allopregnanolone Microplate:** A 96-well polystyrene microplate (12 strips of 8 wells) coated with a polyclonal antibody against allopregnanolone.
- **Sealing Tapes:** Each kit contains 3 precut, pressure sensitive sealing tapes that can be cut to fit the format of the individual assay.
- **Allopregnanolone Standard:** Allopregnanolone in a buffered protein base (416 pg, lyophilized, 2 vials).
- **Biotinylated Allopregnanolone Steroid (1x):** Lyophilized.
- **EIA Diluent Concentrate (10x):** A 10-fold concentrated buffered protein base (20 ml).
- **Wash Buffer Concentrate (20x):** A 20-fold concentrated buffered surfactant (30 ml).
- **SP Conjugate (100x):** A 100-fold concentrate (80 µl).
- **Chromogen Substrate (1x):** A stabilized peroxidase chromogen substrate tetramethylbenzidine (7 ml).
- **Stop Solution (1x):** A 0.5 N hydrochloric acid solution to stop the chromogen substrate reaction (11 ml).

Storage Condition

- Upon arrival, immediately store components of the kit at recommended temperatures up to the expiration date.
- Store Standard and SP Conjugate at -20°C.
- Store Microplate, Diluent Concentrate (10x), Wash Buffer, Stop Solution, and Chromogen Substrate at 2-8°C.
- Unused microplate wells may be returned to the foil pouch with the desiccant packs and resealed. May be stored for up to 30 days in a vacuum desiccator.
- Store Biotinylated Steroid at 2-8°C before reconstituting with Diluent and at -20°C after reconstituting with Diluent.

Other Supplies Required

- Microplate reader capable of measuring absorbance at 450 nm
- Pipettes (1-20 µl, 20-200 µl, 200-1000 µl, and multiple channel)

- Deionized or distilled reagent grade water

Sample Collection, Preparation, and Storage

- **Plasma:** Collect plasma using one-tenth volume of 0.1 M sodium citrate as an anticoagulant. Centrifuge samples at 3000 x *g* for 10 minutes and collect plasma. A 20-fold human plasma sample dilution is suggested into EIA Diluent; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles (EDTA or Heparin can also be used as an anticoagulant).
- **Serum:** Samples should be collected into a serum separator tube. After clot formation, centrifuge samples at 3000 x *g* for 10 minutes and remove serum. A 20-fold human serum sample dilution is suggested into EIA Diluent; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Milk:** Collect human milk using sample tube. Centrifuge samples at 800 x *g* for 10 minutes. A 30-fold sample dilution is suggested into EIA Diluent or within the range of 10x – 600x; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Urine:** Collect urine using sample pot. Centrifuge samples at 800 x *g* for 10 minutes. A 5-fold human urine sample dilution is suggested into EIA Diluent or within the range of 1x – 50x; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.
- **Saliva:** Collect human saliva using sample tube. Centrifuge samples at 800 x *g* for 10 minutes. The sample is suggested for use at 1x or within the range of 2x – 10x into EIA Diluent; however, user should determine optimal dilution factor depending on application needs. The undiluted samples can be stored at -20°C or below for up to 3 months. Avoid repeated freeze-thaw cycles.

Applicable samples may also include biofluids, cell culture, and tissue homogenates. If necessary, user should determine optimal dilution factor depending on application needs.

Refer to Dilution Guidelines for further instruction.

Guidelines for Dilutions of 100-fold or Greater <i>(for reference only; please follow the insert for specific dilution suggested)</i>	
100x	10000x
A) 4 µl sample : 396 µl buffer (100x) = 100-fold dilution <i>Assuming the needed volume is less than or equal to 400 µl.</i>	A) 4 µl sample : 396 µl buffer (100x) B) 4 µl of A : 396 µl buffer (100x) = 10000-fold dilution <i>Assuming the needed volume is less than or equal to 400 µl.</i>
1000x	100000x
A) 4 µl sample : 396 µl buffer (100x) B) 24 µl of A : 216 µl buffer (10x) = 1000-fold dilution <i>Assuming the needed volume is less than or equal to 240 µl.</i>	A) 4 µl sample : 396 µl buffer (100x) B) 4 µl of A : 396 µl buffer (100x) C) 24 µl of B : 216 µl buffer (10x) = 100000-fold dilution <i>Assuming the needed volume is less than or equal to 240 µl.</i>

Reagent Preparation

- Freshly dilute all reagents and bring all reagents to room temperature before use.
- EIA Diluent Concentrate (10x):** Dilute the EIA Diluent Concentrate 10-fold with reagent grade water to produce a 1x solution. When diluting the concentrate, make sure to rinse the bottle thoroughly to extract any precipitates left in the bottle. Mix the 1x solution gently until the crystals have completely dissolved. Store for up to 30 days at 2-8°C.
- Allopregnanolone Standard:** Reconstitute the Allopregnanolone Standard (416 pg) with 1.3 ml of EIA Diluent to generate a 320 pg/ml standard stock solution. Allow the vial to sit for 10 minutes with gentle agitation prior to making dilutions. Prepare duplicate or triplicate standard points by serially diluting from the standard stock solution (320 pg/ml) 4-fold with EIA Diluent to produce 80, 20, 5, and 1.25 pg/ml solutions. EIA Diluent serves as the zero standard (0 pg/ml). Aliquot remaining stock solution to limit repeated freeze-thaw cycles. This solution should be stored at -20°C and **used within 3 days**.

Standard Point	Dilution	[Allopregnanolone] (pg/ml)
P1	1 part Standard (320 pg/ml)	320
P2	1 part P1 + 3 parts EIA Diluent	80
P3	1 part P2 + 3 parts EIA Diluent	20
P4	1 part P3 + 3 parts EIA Diluent	5.0
P5	1 part P4 + 3 parts EIA Diluent	1.25
P6	EIA Diluent	0.0

- **Biotinylated Allopregnanolone Steroid (1x):** Reconstitute the Biotinylated Allopregnanolone Steroid with 5 ml of EIA Diluent to generate a stock solution. Allow the vial to sit for 10 minutes with gentle agitation prior to use. Any remaining stock solution should be stored at -20°C and used within 30 days. Avoid repeated freeze-thaw cycles.
- **Wash Buffer Concentrate (20x):** Dilute the Wash Buffer Concentrate 20-fold with reagent grade water to produce a 1x solution. When diluting the concentrate, make sure to rinse the bottle thoroughly to extract any precipitates left in the bottle. Mix the 1x solution gently until the crystals have completely dissolved.
- **SP Conjugate (100x):** Spin down the SP Conjugate briefly and dilute the desired amount of the conjugate 100-fold with EIA Diluent to produce a 1x solution. The undiluted conjugate should be stored at -20°C.

Assay Procedure

- Prepare all reagents, standard solutions, and samples as instructed. Bring all reagents to room temperature before use. The assay is performed at room temperature (20-25°C).
- Remove excess microplate strips from the plate frame and return them immediately to the foil pouch with desiccants inside. Reseal the pouch securely to minimize exposure to water vapor and store in a vacuum desiccator.
- Add 25 µl of Allopregnanolone Standard or sample to each well, and immediately add 25 µl of Biotinylated Allopregnanolone Steroid to each well (on top of the standard or sample). Gently tap plate to ensure thorough mixing. Break any bubbles that may have formed. Cover wells with a sealing tape and incubate for 2 hours. Start the timer after the last addition.
- Wash the microplate manually or automatically using a microplate washer. Invert the plate and decant the contents; hit 4-5 times on absorbent material to completely remove the liquid. If washing manually, wash five times with 200 µl of Wash Buffer per well. Invert the plate each time and decant the contents; hit 4-5 times on absorbent material to completely remove the liquid. If using a microplate washer, wash six times with 300 µl of Wash Buffer per well; invert the plate and hit 4-5 times on absorbent material to completely remove the liquid.
- Add 50 µl of SP Conjugate to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed. Cover wells with a sealing tape and incubate for 30 minutes. Turn on the microplate reader and set up the program in advance.
- Wash the microplate as described above.
- Add 50 µl of Chromogen Substrate to each well. Gently tap plate to thoroughly coat the wells. Break any bubbles that may have formed.

Incubate in ambient light for 25 minutes or until the optimal blue color density develops.

- Add 50 µl of Stop Solution to each well. The color will change from blue to yellow. Gently tap plate to ensure thorough mixing. Break any bubbles that may have formed.
- Read the absorbance on a microplate reader at a wavelength of 450 nm **immediately**. If wavelength correction is available, subtract readings at 570 nm from those at 450 nm to correct optical imperfections. Otherwise, read the plate at 450 nm only. Please note that some unstable black particles may be generated at low concentration points after stopping the reaction for about 10 minutes, which will reduce the readings.

Data Analysis

- Calculate the mean value of the duplicate or triplicate readings for each standard and sample.
- To generate a standard curve, plot the graph using the standard concentrations on the x-axis and the corresponding mean 450 nm absorbance (OD) on the y-axis. The best fit line can be determined by regression analysis using log-log or four-parameter logistic curve fit.
- Determine the unknown sample concentration from the Standard Curve and multiply the value by the dilution factor.

Typical Data

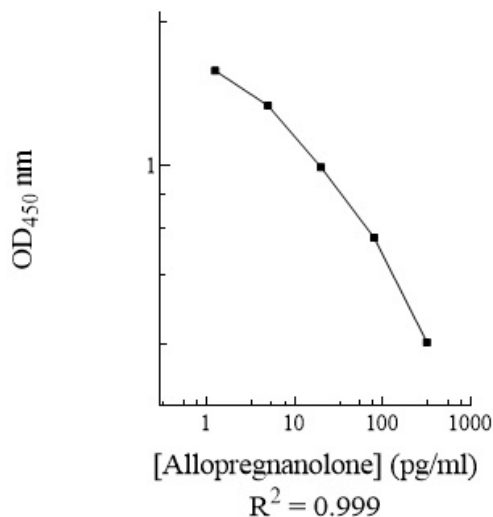
- The typical data is provided for reference only. Individual laboratory means may vary from the values listed. Variations between laboratories may be caused by technique differences.

Standard Point	pg/ml	OD	Average OD
P1	320	0.280 0.288	0.284
P2	80	0.589 0.611	0.600
P3	20	0.970 1.016	0.993
P4	5.0	1.576 1.506	1.541
P5	1.25	2.018 1.934	1.976
P6	0.0	2.134 2.154	2.144
Sample: Pooled Normal Sodium Citrate Human Plasma (20x)		0.903 0.861	0.882

Standard Curve

- The curve is provided for illustration only. A standard curve should be generated each time the assay is performed.

Allopregnanolone Standard Curve



Performance Characteristics

- The minimum detectable dose of allopregnanolone as calculated by 2SD from the mean of a zero standard was established to be 1.2 pg/ml.
- Intra-assay precision was determined by testing three human plasma samples twenty times in one assay.
- Inter-assay precision was determined by testing three human plasma samples in twenty assays.

Sample	Intra-Assay Precision			Inter-Assay Precision		
	1	2	3	1	2	3
n	20	20	20	20	20	20
CV (%)	4.1%	4.0%	5.6%	10.1%	10.2%	11.5%
Average CV (%)	4.6%			10.6%		

Recovery

Standard Added Value	1.25 – 80 pg/ml
Recovery %	84 – 108%
Average Recovery %	96%

Linearity

- Human plasma and serum samples were serially diluted to test for linearity.

Average Percentage of Expected Value (%)		
Sample Dilution	Human Plasma	Human Serum
10x	90%	90%
20x	100%	95%
40x	110%	110%

Cross-Reactivity

Steroid	Cross-Reactivity (%)
DHT	None
Progesterone	None
Cortexolone	None
Corticosterone	0.1%
Desoxycorticosterone	None
Cortisone	None
6-Keto-17 β -Estradiol	3%
5-Androsten-3 β -OL-7, 17-Dione	None
6-Keto-17 α -Estradiol	None
3-Keto-5 α , 16-Androstene	None
4-Androsten-17 α -OL-3-One	0.3%
Aldosterone	0.2%
Ethynyl Estradiol	0.2%
6-Ketoestriol	None
6-Ketoestrone	0.1%
17 β -Hydroxy-4-Androstene-3, 11-Dione	0.1%
19-Nortestosterone	0.1%
4-Pregnen-17, 20 β -Diol-3-One	0.2%
11 α -Hydroxytestosterone	1%
20 α -Hydroxyprogesterone	0.1%
6 β -Hydroxyprogesterone	0.2%
17-Hydroxyprogesterone	0.1%
Cortisol	0.1%
Testosterone	0.1%

Troubleshooting

Issue	Causes	Course of Action
Low Precision	Use of improper components	<ul style="list-style-type: none"> • Check the expiration date listed before use. • Do not interchange components from different lots.
	Improper wash step	<ul style="list-style-type: none"> • Check that the correct wash buffer is being used. • Check that all wells are empty after aspiration. • Check that the microplate washer is dispensing properly. • If washing by pipette, check for proper pipetting technique.
	Splashing of reagents while loading wells	<ul style="list-style-type: none"> • Pipette properly in a controlled and careful manner.
	Inconsistent volumes loaded into wells	<ul style="list-style-type: none"> • Pipette properly in a controlled and careful manner. • Check pipette calibration. • Check pipette for proper performance.
	Insufficient mixing of reagent dilutions	<ul style="list-style-type: none"> • Thoroughly agitate the lyophilized components after reconstitution. • Thoroughly mix dilutions.
	Improperly sealed microplate	<ul style="list-style-type: none"> • Check the microplate pouch for proper sealing. • Check that the microplate pouch has no punctures. • Check that three desiccants are inside the microplate pouch prior to sealing.
Unexpectedly Low or High Signal Intensity	Microplate was left unattended between steps	<ul style="list-style-type: none"> • Each step of the procedure should be performed uninterrupted.
	Omission of step	<ul style="list-style-type: none"> • Consult the provided procedure for complete list of steps.
	Steps performed in incorrect order	<ul style="list-style-type: none"> • Consult the provided procedure for the correct order.
	Insufficient amount of reagents added to wells	<ul style="list-style-type: none"> • Check pipette calibration. • Check pipette for proper performance.
	Wash step was skipped	<ul style="list-style-type: none"> • Consult the provided procedure for all wash steps.
	Improper wash buffer	<ul style="list-style-type: none"> • Check that the correct wash buffer is being used.
	Improper reagent preparation	<ul style="list-style-type: none"> • Consult reagent preparation section for the correct dilutions of all reagents.
	Insufficient or prolonged incubation periods	<ul style="list-style-type: none"> • Consult the provided procedure for correct incubation time.
Deficient Standard Curve Fit	Non-optimal sample dilution	<ul style="list-style-type: none"> • Sandwich ELISA: If samples generate OD values higher than the highest standard point (P1), dilute samples further and repeat the assay. • Competitive ELISA: If samples generate OD values lower than the highest standard point (P1), dilute samples further and repeat the assay. • User should determine the optimal dilution factor for samples.
	Contamination of reagents	<ul style="list-style-type: none"> • A new tip must be used for each addition of different samples or reagents during the assay procedure.
	Contents of wells evaporate	<ul style="list-style-type: none"> • Verify that the sealing film is firmly in place before placing the assay in the incubator or at room temperature.
	Improper pipetting	<ul style="list-style-type: none"> • Pipette properly in a controlled and careful manner. • Check pipette calibration. • Check pipette for proper performance.

	Insufficient mixing of reagent dilutions	<ul style="list-style-type: none">• Thoroughly agitate the lyophilized components after reconstitution.• Thoroughly mix dilutions.
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References

- (1) Rogawski M *et al.* (2013) *Epilepsia*. 54(Suppl. 6):93-98.
- (2) Hellgren C *et al.* (2014) *Neuropsychobiology*. 69(3):147-153.
- (3) US FDA. *FDA approves first treatment for post-partum depression*. 2019. <https://www.fda.gov/newsevents/pressannouncements/fda-approves-first-treatment-post-partum-depression>. Accessed 5 Dec 2019.

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