



## **RAT C-REACTIVE PROTEIN (CRP)**

For the quantitative determination of C-reactive protein (CRP) in rat plasma and serum samples

**For Research use Only. Not For Use In Diagnostic Procedures.**

**Please see Appendix A for Reference Serum information.**

**Catalog Number:** 41-CRPRT-E01

**Size:** 96 Wells

**Version:** Version 4.1 - ALPCO 3.1

## INTENDED USE

The Rat C-Reactive Protein ELISA is a highly sensitive two-site enzyme-linked immunoassay (ELISA) for measuring C-reactive protein (CRP) in serum and plasma of rats. For research use only. Not for use in diagnostic procedures.

## PRINCIPLE OF THE ASSAY

The principle of this double antibody sandwich ELISA is represented in Figure 1. In this assay, CRP present in samples reacts with the anti-CRP antibodies adsorbed to the surface of the polystyrene microtiter wells. After removal of unbound proteins by washing, anti-CRP antibodies conjugated with horseradish peroxidase (HRP), are added. These enzyme-labeled antibodies form complexes with the previously bound CRP. Following another washing step, the enzyme bound to the captured antibodies is assayed by the addition of the chromogenic substrate, 3,3',5,5'-tetramethylbenzidine (TMB). The quantity of bound enzyme varies directly with the concentration of CRP in the sample tested, thus, the absorbance, at 450 nm, is a measure of the concentration of CRP in the test sample. The quantity of CRP in the test sample can be interpolated from the standard curve constructed from the standards and corrected for sample dilution.

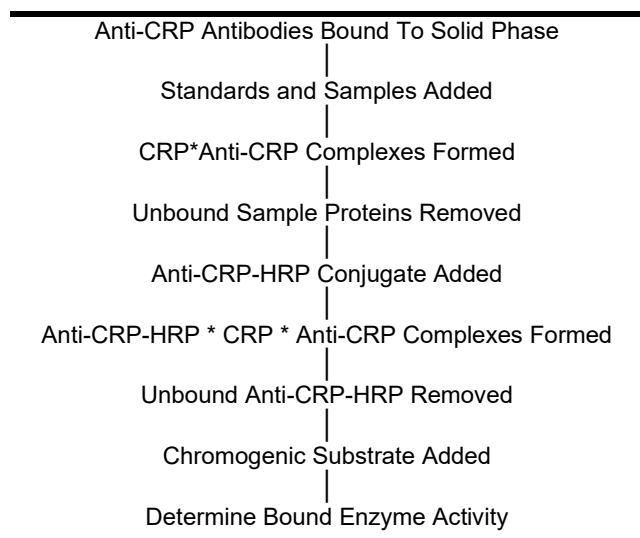


Figure 1.

## LIMITATION OF THE PROCEDURE

Reliable and reproducible results will be obtained when the assay procedure is carried out with a complete understanding of the information contained in the package insert instructions and with adherence to good laboratory practice. Factors that might affect the performance of the assay include proper instrument function, cleanliness of glassware, quality of distilled or deionized water, accuracy of reagent and sample pipetting, washing technique, and incubation time or temperature. Do not mix or substitute reagents with those from other lots or sources.

## **KIT COMPONENTS**

The expiration date for the kit and its components is stated on the box label. All components should be stable up to the expiration date if stored and used per this kit protocol insert.

<b>Component</b>	<b>Description</b>	<b>Preparation</b>	<b>Storage</b>	<b>Stability</b>
<b>ELISA Micro Plate, antibody coated</b>	One plate of 12 removable 8 well strips, antibody coated	Ready to use as supplied.	2-8°C, In sealed foil bag with desiccant	With proper storage the plate strips are stable until the expiration date.
<b>Enzyme Conjugated Detection Antibody</b>	One vial of 150µL of 100X Horseradish Peroxidase Conjugated antibody in a stabilizing buffer	Dilute 1:100 immediately prior to use.	2-8°C in the dark	Working conjugate solution must be diluted immediately prior to use, 100X conjugate is stable until the expiration date.
<b>Calibrator</b>	One vial of calibrator	Refer to the Certificate of Analysis (CoA).	2-8°C for lyophilized calibrator. Aliquoted and frozen if reconstituted. Avoid multiple freeze-thaw cycles.	The working standard solutions should be prepared immediately before use.
<b>Diluent Concentrate</b>	One 50 mL bottle of 5X diluent buffer	Dilute 1:5 to make 1X working solution.	2-8°C for both 1X working solution and 5X concentrate	The 1X working solution is stable for at least one week from the date of preparation. The 5X concentrate is stable until the expiration date.
<b>Wash Solution Concentrate</b>	One 50 mL bottle of 20x wash solution	Dilute 1:20 to make 1X working solution.	2-8°C for both 1X working solution and 20X concentrate	The 1X working solution is stable for at least one week from the date of preparation. The 20X concentrate is stable until the expiration date,
<b>Chromogen-Substrate Solution</b>	One bottle of 12 mL tetramethylbenzidine (TMB) and hydrogen peroxide in citric acid buffer at pH 3.3.	Ready to use as supplied	2-8°C in the dark	Protect from light. The Substrate Solution is stable until the expiration date.
<b>STOP Solution</b> <b><u>WARNING:</u></b> <b><u>Avoid Contact with Skin</u></b>	One 12 mL bottle of 0.3 M sulfuric acid.	Ready to use as supplied	2-8°C	The Stop Solution is stable until the expiration date.

## **MATERIALS REQUIRED BUT NOT PROVIDED**

- Precision pipette (2 µL to 1000µL) for making and dispensing dilutions
- Test tubes
- Microtiter washer/aspirator
- Distilled or Deionized H<sub>2</sub>O
- Microtiter Plate reader
- Assorted glassware for the preparation of reagents and buffer solutions
- Centrifuge for sample collection
- Timer

- Anticoagulant (for plasma samples)

## **SAMPLE COLLECTION AND HANDLING**

All blood components and biological materials should be handled as potentially hazardous. Follow universal precautions when handling and disposing. If blood samples are clotted, grossly hemolyzed, lipemic, or the integrity of the sample is of concern, make a note and interpret results with caution. The sample collection and storage conditions listed below are intended as general guidelines. Sample stability has not been evaluated.

- Serum samples - Blood should be collected by venipuncture. Serum must be separated from the cells after clot formation by centrifugation. Remove serum and assay immediately or aliquot and store samples at -80°C (preferably) or -20°C. Avoid repeated freeze-thaw cycles.
- Plasma samples - Blood should be collected into a container with an anticoagulant and then centrifuged. Assay immediately or aliquot and store samples at -80°C (preferably) or -20°C. Avoid repeated freeze-thaw cycles.
- Known interfering substances - Azide and thimerosal at concentrations higher than 0.1% inhibit the enzyme reaction.

## **DILUTION OF SAMPLES**

The assay requires that each test sample be diluted before use. All samples should be assayed in duplicate each time the assay is performed. The recommended dilutions are only suggestions. Dilutions should be based on the expected concentration of the unknown sample such that the diluted sample falls within the dynamic range of the standard curve. If unsure of sample level, a serial dilution with one or two representative samples before running the entire plate is highly recommended.

Plasma and serum samples – Recommended starting dilution is 1:12,000. To prepare a 1:12,000 dilution of sample, transfer 5 µL of sample to 495µL of 1X working diluent. This gives a 1:100 dilution. Next, dilute the 1:100 sample by transferring 5 µL into 595 µL of 1x working diluent. There is now a 1:12,000 dilution of the sample. Mix thoroughly at each stage.

## **REAGENT PREPARATION**

**Bring all reagents to room temperature (16°C – 25°C) before use.**

**DILUENT CONCENTRATE** - The Diluent Solution supplied is a 5X Concentrate and must be diluted 1:5 with distilled or deionized water (1 part buffer concentrate, 4 parts dH<sub>2</sub>O).

**WASH SOLUTION CONCENTRATE** - The Wash Solution supplied is a 20X Concentrate and must be diluted 1:20 with distilled or deionized water (1 part buffer concentrate, 19 parts dH<sub>2</sub>O). Crystal formation in the concentrate is not uncommon when storage temperatures are low. Warming the concentrate to 30-35°C before dilution can dissolve crystals.

**ENZYME-ANTIBODY CONJUGATE** - Calculate the required amount of working conjugate solution for each microtiter plate test strip by adding 10 µL Enzyme-Antibody Conjugate to 990 µL of 1X working diluent for each test strip to be used. Mix uniformly, but gently. Avoid foaming.

**ANTI-RAT C-REACTIVE PROTEIN ELISA MICROPLATE** - Ready to use as supplied. Unseal foil pouch and remove plate. Remove all strips and wells that will not be used in the assay and place back in pouch and re-seal along with desiccant.

**RAT C-REACTIVE PROTEIN CALIBRATOR** – Prepare according to the lot-specific Certificate of Analysis.

## ASSAY PROTOCOL

### PROCEDURE

1. **All samples and standards should be assayed in duplicate.**
2. The standards and test sample(s) should be loaded into the ELISA wells as quickly as possible to avoid a shift in OD readings. Using a multichannel pipette would reduce this occurrence.  
Pipette 100  $\mu$ L of:
  - Standard 0 (0.0 ng/mL) in duplicate
  - Standard 1 (6.25 ng/mL) in duplicate
  - Standard 2 (12.5 ng/mL) in duplicate
  - Standard 3 (25 ng/mL) in duplicate
  - Standard 4 (50 ng/mL) in duplicate
  - Standard 5 (100 ng/mL) in duplicate
  - Standard 6 (200 ng/mL) in duplicate
3. Pipette 100  $\mu$ L of sample (in duplicate) into pre-designated wells.
4. Incubate the microtiter plate at room temperature for ten ( $10 \pm 2$ ) minutes. Keep plate covered and level during incubation.
5. Following incubation, aspirate the contents of the wells.
6. Completely fill each well with appropriately diluted Wash Solution and aspirate. Repeat 3 times, for a total of 4 washes. If washing manually: completely fill wells with wash buffer, invert the plate then pour/shake out the contents in a waste container. Follow this by sharply striking the wells on absorbent paper to remove residual buffer. Repeat 3 times for a total of four washes.
7. Pipette 100  $\mu$ L of appropriately diluted Enzyme-Antibody Conjugate to each well. Incubate at room temperature for ten ( $10 \pm 2$ ) minutes. Keep plate covered in the dark and level during incubation.
8. Wash and blot the wells as described in Steps 5 and 6.
9. Pipette 100  $\mu$ L of TMB Substrate Solution into each well.
10. Incubate in the dark at room temperature for precisely five (5) minutes.
11. After five minutes, add 100  $\mu$ L of Stop Solution to each well.
12. Determine the absorbance (450 nm) of the contents of each well within 30 minutes using a plate reader calibrated to manufacturer's specifications.

### RESULTS

1. Subtract the average background value (absorbance of zero Standard) from the test values for each well.
2. Average the duplicate readings for each standard and use the results to construct a Standard Curve. Construct the standard curve by reducing the data using computer software capable of generating a four parameter logistic curve fit. A second order polynomial (quadratic) or other curve fits may also be used; however, they will be a less precise fit of the data.
3. Interpolate test sample values from standard curve. Correct for sera dilution factor to arrive at the CRP concentration in original samples.

## **Appendix A – Reference Serum Information**

One vial containing a Reference Serum is included with this kit. Please refer to the enclosed Product Profile Sheet for lot-specific information. Please note the following:

1. The Reference Serum should be frozen upon receipt. It is stable until the expiry date when stored properly.
2. The Reference Serum should be diluted as appropriate to fit within the standard range curve. Refer to the “Dilution of Samples” section of the protocol for instructions.
3. While pipetting the samples (Procedure section), also pipette the Reference Serum in duplicate.