

Laboratory 10: C-Reactive Protein

EXERCISE 10: C-Reactive Protein (CRP) Latex Agglutination Test

Objectives:

1. Select and evaluate specimens for acceptability for CRP testing.
2. Perform latex agglutination tests for the detection of CRP to obtain control and patient results that match instructor values with 100% accuracy.
3. After reviewing the procedure and package insert state:
 - a. the substance being analyzed,
 - b. samples which are acceptable for testing,
 - c. the principle of the procedure,
 - d. the expected value,
 - e. significance of abnormal results,
 - f. limitations of the procedure, and
 - g. troubleshooting procedures to follow when control results are unacceptable.
4. Accurately record kit information, patient information and record results as instructed.
5. List five limitations of the procedure.

Introduction:

Serum from patients with pneumococcal pneumonia (*Mycoplasma pneumoniae*) possess a protein that specifically reacts with the C-polysaccharide of the pneumococcus. Upon electrophoresis, this group of three proteins migrate to an area between the Beta and Gamma regions. They are considered to among the 'acute phase proteins' whose concentrations increase in a non-specific response to inflammation and cellular necrosis.

C-Reactive Protein (CRP) is manufactured by the liver and released into the plasma during many necrotic, inflammatory or infectious diseases including myocardial infarction (MI), active rheumatic fever, and pneumococcal pneumonia. CRP disappears rapidly from the blood after recovery from disease and is not present in the serum from healthy people. The presence of CRP in a patient with MI or rheumatic fever is considered to be the most sensitive indicator of necrosis and inflammation.

CRP detection is considered to be of greater practical significance than all other indices of inflammation in assessing inflammatory diseases. CRP has several advantages over the erythrocyte sedimentation rate (ESR) including:

- it is abnormally elevated immediately whereas ESR determinations may be borderline and may, in some cases, remain elevated in the absence of inflammation.
- results are not influenced by anemia, ESR will be falsely elevated
- results are not altered by abnormal serum proteins which affect the ESR.

Although it is not diagnosis of any particular disease, the level of CRP in serum indicates the intensity of the disease, the response of the patient to treatment, and can be used to monitor patient progress.

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Principle:

When latex particles coated with human anti-CRP are mixed with a patient's serum containing C - reactive proteins, an agglutination reaction will take place. Agglutination indicates the presence of CRP, no agglutination indicates CRP is not present or is not present in a sufficient quantity to be detected by the test.

Review the principle of the specific kit being used in this laboratory.

Materials:

1. C - Reactive Protein test kit..
2. Patient serum specimens.
3. Digital/Electronic Timer
4. Other materials as directed by reagent package insert for kit utilized.

Procedure:

See reagent package insert for kit utilized.

Interpretation:

Agglutination of latex particles is considered a positive reaction, indicating the presence of C-Reactive Protein at a significant and detectable level. Specimens which do not contain human CRP will not cause agglutination. Consult the reagent product insert(s) for specific information.

Results are reported out in a qualitative manner. If agglutination of the latex particles occurs report out as "positive", if no agglutination of latex particles occurs report out as "negative", if controls do not give expected reactions the test is invalid and must be repeated.

Expected Results:

Consult the reagent product insert(s) for interpretation.

Limitations:

1. Specimens with markedly high CRP may demonstrate postzone (antigen excess) effect. Therefore, some manufacturer's recommend diluting the specimen prior to testing. Consult product literature.
2. A quantitative titration procedure on positive specimens is required to observe increasing or decreasing levels. Consult product literature.
3. Patients with high titers of rheumatoid factors may give positive results. It is recommended that patients suspected with RA be tested for presence of rheumatoid factors.
4. Procedure must be followed carefully and results read at the appropriate time. Reading after the specified time may result in mis-interpretation due to drying of specimen/reagents.
5. Avoid contamination of reagent or reagent dispensing dropper.
6. Consult package insert for additional limitations.

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EXERCISE 2: C-Reactive Protein (CRP) Latex Agglutination Test

Name _____

Date _____

Test Kit Name _____

Manufacturer _____

Lot Number _____

Expiration Date _____

Package insert revision date: _____

****State the interpretation (i.e. positive or negative).**

Patient Name and	Identification Number	Interpretation
1.		
2.		
Controls		
	Positive	
	Negative	

INSTRUCTOR USE ONLY

Skill	Possible Points	Points Awarded
1. Only asked questions that were NOT answered by procedure OR asked for clarification purposes only.	5	
2. Performed and reported out results of the procedure according to written protocol AND verbal instructions given by instructor.	10	
3. Student results matched instructor results.	10	
4. Organized and stayed on task.	5	
5. No clerical errors.	5	

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Name _____

Date _____

1. Based on the control results, can these patient results be reported? (circle one) **Yes** **No**
If “no”, explain why. (1 point)
2. According to the product insert, what does the presence of CRP indicate? (1 point)
3. What are the latex particles coated with?(1 point)
4. State three (3) advantages that the the CRP test has over ESR. (1.5 points)
 - 1)
 - 2)
 - 3)
5. List the types of samples which may be used for this test.(1 point)
6. Why do some manufacturers recommend testing specimens diluted and undiluted?(1 point)
7. According to the criteria discussed in class, would a *false negative* reaction due to increased levels of CRP be considered prozone, zone of equivalence, or postzone? (0.5 point)
8. List two limitations of this procedure. (2 point)
9. After reviewing the product insert state the **principle** of this test kit including the appearance of positive and negative reactions and what each indicates. (2 point)