

# Difference Between ESR and CRP

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## Key Difference - ESR vs CRP

Inflammation is a process caused due to an infection by foreign particles or organisms such as bacteria, fungi, and virus. Inflammation is actually a part of our body's immune response. Through inflammation, our body attempts to protect itself from the infection. When inflammation starts, white blood cells release certain chemicals to reach the infection site and fight against the infective foreign particles. As a result of it, the area of infection becomes reddish, swollen or warm. There are several blood tests to detect inflammation in the body. Erythrocyte sedimentation rate (ESR or sed rate) and C-reactive protein (CRP) are two biomarkers for inflammation. The key difference between ESR and CRP is that **ESR measures the rate of red blood cells sedimentation in a period of one hour** while **CRP measures the C-reactive protein levels in the blood**.

## What is ESR?

**Erythrocyte sedimentation rate** or **sed rate** is a technique which detects inflammation in the body. This test has been designed to measure the rate of red blood cell sedimentation in one hour. The ESR value is expressed in millimeters per hour (mm/h). ESR is a commonly performed hematology (blood) test. The test was invented by the Polish pathologist Edmund Biernacki in 1897.

ESR test is performed in a special tube called Westergren tube (an upright glass test tube). Anticoagulated blood is placed in westergren tubes and the rate of red blood cell sedimentation is monitored and reported. Red blood cell sedimentation is related to the inflammation process. When inflammatory process starts, the level of fibrinogen in the blood increases. These high levels of fibrinogen cause the red blood cells to stick together and form stacks. These stacks settle faster due to their high density. Hence, ESR value increases with the presence of an inflammation. This measurement is important because it indicates the presence of an abnormal level of fibrinogen in the blood by signaling a potential chronic infection.

ESR is a potential meaningful biomarker for disease differentiation. The ESR value increases under different diseases as well such as conditions such as pregnancy, anemia, autoimmune disorders, some kidney diseases and some cancers

(such as lymphoma and multiple myeloma). ESR value decreases under several diseases such as polycythemia, hyperviscosity, sickle cell anemia, [leukemia](#), low plasma protein, and congestive heart failure.

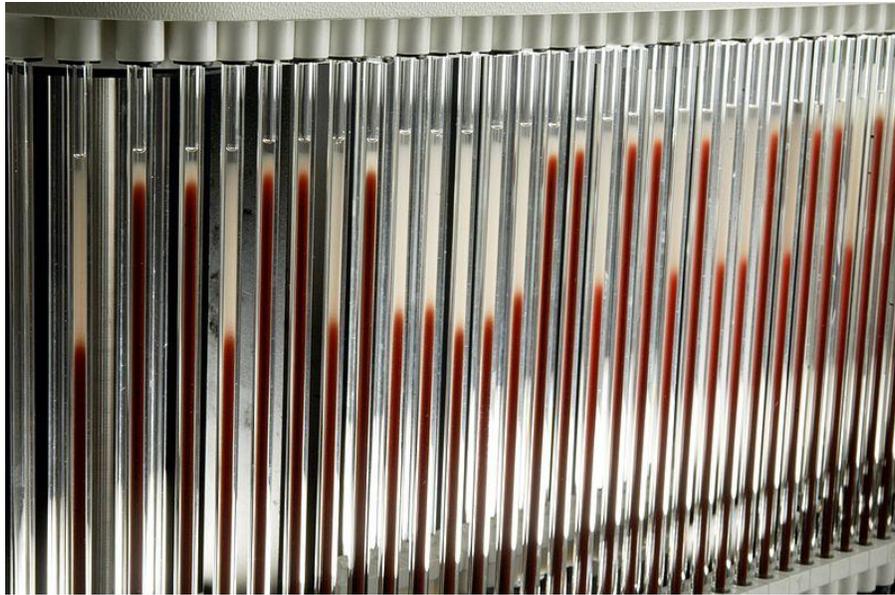


Figure 01: ESR

## What is CRP?

**C-reactive protein test** is another blood test to detect inflammation in the body. C-reactive protein is a special protein produced by the liver and released into the blood. When there is an inflammation or infection, the C-reactive protein level in the [blood plasma](#) increases rapidly. Hence, it is a good biomarker for the identification of acute phase inflammations. Soon after the infection, the level of CRP rises within 2 hours of an adult and persists in the blood plasma for about 18 hours. This rapid increase of CRP level indicates the acute or the first phase of infection. Hence, CRP is known as **acute phase protein** as well.

CRP level increases due to a wide variety of disorders such as trauma, tissue necrosis, malignancies, and autoimmune disorders. Therefore, CRP value cannot be used to diagnose a specific disease. But it indicates the disease process that is causing cell death due to inflammation. However, due to rapid action of CRP after the inflammatory or infective process begins, CRP test serves as a more sensitive test than ESR and ESR is often replaced by CRP test.

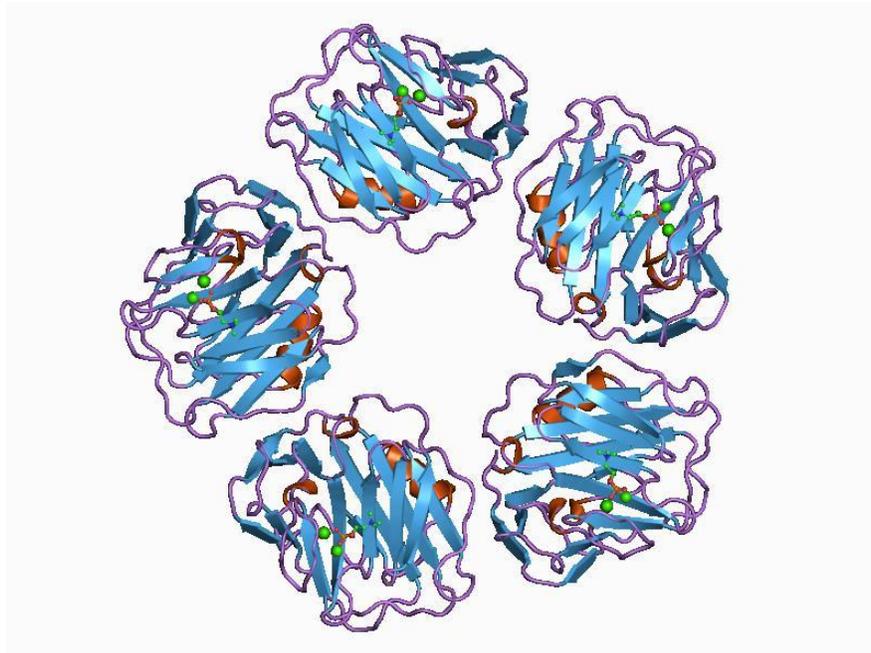


Figure 02: C-reactive protein domain

## What are the similarities between ESR and CRP?

- Erythrocyte sedimentation rate (ESR or sed rate) and C-reactive protein (CRP) are two tests performed to detect inflammation and pain during an infection.
- Both ESR and CRP are inexpensive tests.
- Both these tests may not be sensitive to detect small amounts of inflammation.

## What is the difference between ESR and CRP?

ESR vs CRP	
ESR is a blood test that measures the rate of red blood cell sedimentation per hour.	CRP is a blood test to measure the level of C-reactive proteins in the plasma.
Specificity for Diseases	
ESR can be used for disease differentiation.	CRP is a nonspecific marker for diseases.
Active Sites	
ESR is less sensitive than CRP.	CRP is more sensitive than ESR.

Acute Phase Infection Detection	
ESR is less suitable to detect the acute phase of inflammation.	CRP is accurate in detection of acute phase of inflammation
First 24 Hours of Infection	
ESR may be normal.	CRP level increases and indicates the inflammation.

## Summary - ESR vs CRP

ESR and CRP are two inflammatory biomarkers. Both methods detect the inflammation and pain in the body. ESR measures the sedimentation rate of red blood cells per hour. CRP measures the level of C-reactive proteins in the blood plasma. This is the difference between ESR and CRP. Both measures are increased as a result of inflammation.

References:

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