Anti-streptolysin O (ASO or AST) is the antibody produced against an antigen produced by group A streptococci. The enzyme is called streptolysin O, involved in hemolysis (beta-hemolysis).

Vahid Naseri

**ANTI-STREPTOLYSIN**

**Significance**

- When the body is infected with streptococci, it produces antibodies against the various antigens that the streptococci produce. ASO is one such antibody.
- So, a raised or rising levels can indicate past or present infection.
ANTI-STREPTOLYSIN TEST

Why the Test Is Performed
This test is used to detect prior infection by Group A *Streptococcus*, the bacteria responsible for diseases such as:
- Bacterial endocarditis
- Glomerulonephritis
- Rheumatic fever
- Scarlet fever

ANTI-STREPTOLYSIN TEST

These antibodies produced against the bacteria cross react with human antigens and hence attack the cellular matrix of various organs, mainly the heart, joints, skin, brain.
ANTI-STREPTOLYSIN TEST

- **Values**
  - Normal value ranges may vary slightly among different laboratories. Acceptable values, where there is no clinical feature are as follows:
    - Adults: less than 200 units/ml
    - Children: less than 300 unit/ml
  - This titre has a significance only if it is greatly raised, or if a rise in titre can be demonstrated in paired blood samples taken days apart
  - Serological methods like latex agglutination, slide agglutination or ELISA may be performed to detect the exact titre value.

CRP - C-reactive protein
C-REACTIVE PROTEIN

- CRP is an acute phase protein (synthesized by the liver) found in the blood, the levels of which rise in response to inflammation.
- It was named CRP after the C-polysaccharide of Pneumococci, because it was discovered first as a substance reacting with this structure and rising in Pneumococcus infection. Later turned out that it rises in other inflammations as well.

C-REACTIVE PROTEIN

- Function
  - CRP levels rise dramatically during inflammatory processes occurring in the body due to a rise in the plasma concentration of IL-6, which is produced predominantly by macrophages.
  - It assists in complement-binding to foreign and damaged cells and enhances phagocytosis by macrophages.
  - CRP rises up to 50,000-fold in acute inflammation, such as infection. It rises above normal limits within 6 hours, and peaks at 48 hours.
C-REACTIVE PROTEIN

**Why the Test Is Performed**

- The CRP test is a general test to check for inflammation in the body but it cannot pinpoint the exact location.
- However, a low CRP level does not always mean that there is no inflammation present. Levels of CRP may not be increased in patient with rheumatic arthritis.
C-REACTIVE PROTEIN

- A positive test means you have inflammation in the body. This may be due to a variety of different conditions, including:
  - cancer
  - Connective tissue disease
  - Heart attack
  - Inflammatory bowel disease (IBD)
  - Lupus
  - ALL Infections, e.g.
    - Pneumococcal pneumonia
    - Rheumatoid arthritis
    - Rheumatic fever
    - Tuberculosis

C-REACTIVE PROTEIN

- Note:
  - Positive CRP results also occur during the last half of pregnancy or with the use of birth control pills (oral contraceptives).
  - A more sensitive CRP test, called a high-sensitivity C-reactive protein (hs-CRP) assay, is available to determine a person's risk for heart disease. Many consider a high CRP level to be a risk factor for heart disease.
  - However, it is not known whether CRP is merely a sign of cardiovascular disease or if it actually plays a role in causing heart problems.
C-REACTIVE PROTEIN

- Normal value ranges may vary slightly among different laboratories, According to the American Heart Association:
  - low risk of developing cardiovascular disease if hs-CRP level is lower than 1.0 mg/L
  - high risk for cardiovascular disease if hs-CRP level is higher than 3.0 mg/L
PROCALCITONIN

- protein, precursor of calcitonin hormone, not released into circulation in healthy people
- **more specific for bacterial infections than other inflammatory markers**
- **not elevated** in autoimmune disease, cancer, mild infections, viral infections so if elevated, indicates severe bacterial infection
- **elevates within hours after severe infection, sooner than other inflammatory markers** - early diagnosis of sepsis possible

PROCALCITONIN

- important in the evaluation of FUO= fever of unknown origin - if elevated PCT, suspect bacterial infection
- especially important in early detection of infections of immunosuppressed and critically ill ICU patients
- helps to decide if e.g. meningitis is viral or bacterial.
PROCALCITONIN

- monitoring dynamics, prognosis of the infection: decreases rapidly if infection is improving
- detection is rapid, bedside test available

BRAHMS PCT-Q
- The rapid test:
  - For the fast diagnosis
  - At any time in any hospital
- Result after 30 min
- Non-instrument based
- Semiquantitative

PROCALCITONIN

<table>
<thead>
<tr>
<th>PROCALCITONIN GUIDELINES</th>
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<tbody>
<tr>
<td><strong>&lt;0.1 µg/L</strong></td>
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<tr>
<td>NO antibiotics!</td>
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<tr>
<td><strong>0.1 - 0.25 µg/L</strong></td>
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<tr>
<td>NO antibiotics?</td>
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<tr>
<td><strong>0.25 - 0.5 µg/L</strong></td>
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<tr>
<td>Consider antibiotics?</td>
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<tr>
<td><strong>&gt;0.5 µg/L</strong></td>
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<tr>
<td>Consider antibiotics!</td>
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</tbody>
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PCT control after 6-24 h
- Consider antibiotics if:
  - respiratory or hemodynamic instability
  - sepsis suspect
  - need for ICU admission

PCT control after 6-24 h
- Consider antibiotics if:
  - severe sepsis
  - localized infection (abscess, empyema)
  - localized infection (stenosis, empyema)
  - compromised host defenses (e.g., immunosuppression, neutropenic fever)
  - Chronic and challenging infection (endocarditis, TB, and others)

Reevaluation after 3, 5 and 7 days
- PCT measurement
- Stop antibiotics using the same cut-offs
- **ICU**
- Reevaluation after 3, 5 and 7 days
- PCT measurement
- Stop antibiotics using the same cut-offs
- If initial PCT levels are very high, then stop when 80-90% decrease of peak PCT.