Cardiovascular test
C-reactive Protein (CRP)

Description: An inflammatory marker produced by the liver, CRP levels rise in response to inflammation.
Clinical Use: High-sensitivity CRP (hs-CRP) is used to assess cardiovascular risk and inflammation's role in coronary artery disease

C-reactive protein (CRP) is a pentameric protein produced by the liver, with levels that increase in response to inflammation. It serves as an acute-phase reactant, primarily stimulated by interleukin-6 (IL-6), which influences the gene responsible for CRP transcription during the acute phase of inflammatory or infectious events. There is ongoing debate regarding the potential dysregulation of CRP's role in clearing apoptotic cells and cellular debris and its contribution to the pathogenesis of systemic lupus erythematosus (SLE), although definitive evidence is lacking. Animal studies have indicated that CRP may offer protective effects in lung tissue during alveolitis by mitigating neutrophil-induced damage to the alveoli and reducing protein leakage into the lungs.[1]

CRP exhibits both proinflammatory and anti-inflammatory characteristics. It is involved in identifying and eliminating foreign pathogens and damaged cells by binding to various molecules, including phosphocholine, phospholipids, histones, chromatin, and fibronectin. Additionally, it can activate the classical complement pathway and stimulate phagocytic cells through Fc receptors, facilitating the clearance of cellular debris, damaged or apoptotic cells, and foreign pathogens. However, this process can become pathological when autoantibodies that target the phosphocholine component are involved in autoimmune conditions, such as idiopathic thrombocytopenic purpura (ITP).[2] In certain scenarios, CRP activation can exacerbate tissue damage through complement system activation and subsequent inflammatory cytokine release. In contrast to the erythrocyte sedimentation rate, which serves as an indirect measure of inflammation, CRP levels respond quickly to the presence and resolution of inflammatory stimuli. Persistently elevated CRP levels may indicate chronic inflammatory conditions, including chronic infections or inflammatory arthritides like rheumatoid arthritis.[3]

Elevated levels of C-reactive protein can arise from a variety of acute and chronic conditions, which may be either infectious or non-infectious in nature.

Significantly increased levels of CRP are typically linked to infectious origins, serving as an example of pathogen-associated molecular pattern recognition. Additionally, trauma can lead to heightened CRP levels due to the alarmin response. In contrast, more moderate increases in CRP are often related to a wider range of causes, including sleep disorders and periodontal disease.

References

1. Cleland DA, Eranki AP. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Apr 23, 2023. Procalcitonin.
2. Jungen MJ, Ter Meulen BC, van Osch T, Weinstein HC, Ostelo RWJG. Inflammatory biomarkers in patients with sciatica: a systematic review. BMC Musculoskelet Disord. 2019 Apr 09;20(1):156.
3. Kramer NE, Cosgrove VE, Dunlap K, Subramaniapillai M, McIntyre RS, Suppes T. A clinical model for identifying an inflammatory phenotype in mood disorders. J Psychiatr Res. 2019 Jun; 113:148-158.