Inflammatory Proteins

Inflammatory proteins are molecules produced in response to infection, injury, or cellular stress. They mediate and regulate the inflammatory response, including immune cell recruitment, tissue repair, and resolution.

Key Categories

Cytokines

- **Interleukin-1 (IL-1)**: Promotes fever and activates leukocytes.
- **Interleukin-6 (IL-6)**: Induces acute-phase protein production in the liver.
- **Tumor Necrosis Factor-alpha (TNF-α)**: Central to systemic inflammation and fever.

Chemokines

- **CCL2 (MCP-1)**: Recruits monocytes to inflamed tissues.
- **CXCL8 (IL-8)**: Attracts neutrophils to the site of infection or injury.

Acute-Phase Proteins

Produced mainly by the liver in response to IL-6.

- **C-Reactive Protein (CRP)**: Binds to pathogens and apoptotic cells; commonly used as a clinical inflammation marker.
- **Serum Amyloid A (SAA)**: Elevated in chronic inflammation; associated with secondary amyloidosis.
- **Fibrinogen**: Involved in blood clotting and inflammation.

Other Mediators

- **High-Mobility Group Box 1 (HMGB1)**: Released during necrosis; triggers sterile inflammation.
- **Complement components (C3a, C5a)**: Promote opsonization, cell lysis, and chemotaxis.

Clinical Relevance

- Commonly measured markers: **CRP**, **IL-6**, **TNF-α**
- Used in diagnosis or monitoring of:
    - Infections
    - Autoimmune diseases (e.g., rheumatoid arthritis)
    - Cardiovascular risk (e.g., high-sensitivity CRP)
    - Cancer-associated inflammation

- Chronically elevated inflammatory proteins are associated with:
  - atherosclerosis
  - neurodegenerative diseases (e.g., Alzheimer's disease)
  - cancer progression