Detect and trend systemic inflammation in dogs with the new Catalyst* CRP Test

What is CRP?

C-reactive protein (CRP) is a highly sensitive and specific marker for systemic inflammation in dogs.[1] It is made by the liver and released into the circulation in response to tissue injury, and its concentration will change rapidly after improvement or worsening of the inflammatory situation. It does not provide information on the causes of the inflammation (see figure 1).

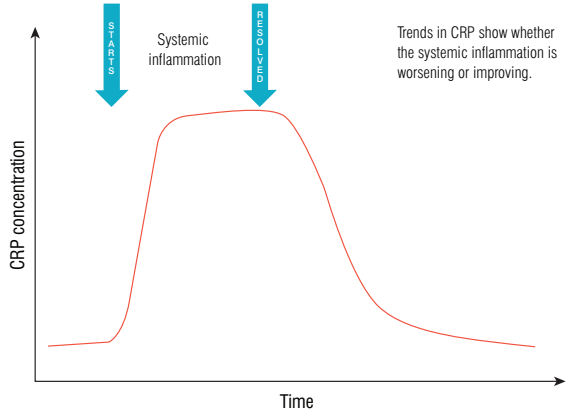

Figure 1: Relative CRP concentration in response to inflammatory stimulus over time. An increase in CRP is detectable as early as 6 hours after the inflammatory stimulus. Improvements may be seen in as little as 24 hours.[1]

What does CRP do?

At the site of any tissue injury, monocytes and macrophages will respond by producing inflammatory cytokines. Cytokines are a category of small proteins involved in cell signaling. Initially, the concentration of these inflammatory cytokines increases in the local, affected tissue. With more significant tissue damage, the inflammatory cytokine concentrations in the plasma will also increase (see figure 2).

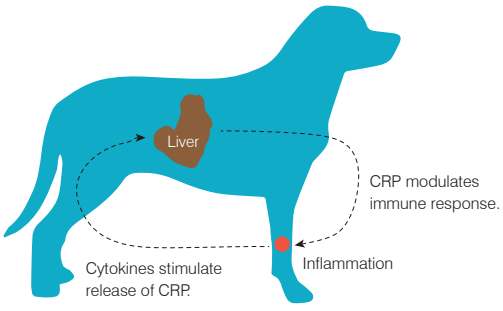

Figure 2: Systemic inflammation and release of CRP in the dog

†Acute phase proteins: Proteins whose plasma concentrations change in response to inflammation. This response is called the acute-phase response. CRP is an example of an acute phase protein.

The inflammatory cytokines trigger the liver to produce various acute phase proteins†, including CRP. The CRP in circulation then modulates the body's innate immune response to the tissue injury. More precise details are unknown.

What information does the Catalyst* CRP Test provide?

- **Detects** and **characterizes the severity** (but does not indicate the cause) of systemic inflammation.
- Allows **monitoring** of progression.
- Helps with **prognostication**. In various studies, dogs with a decrease in CRP over time tended to show more favorable outcomes.[2,3,4]
- Is only for use in dogs.

How do I interpret Catalyst CRP Test results?

CRP is measured to detect, characterize the severity of, and monitor systemic inflammation in dogs.

CRP values will be significantly increased as early as 6 hours after the onset of significant inflammation. After resolution, concentrations of CRP can fall within 24 hours.

CRP is not significantly affected by age, gender, breed, stress, or diet.[5]

Is systemic inflammation present?

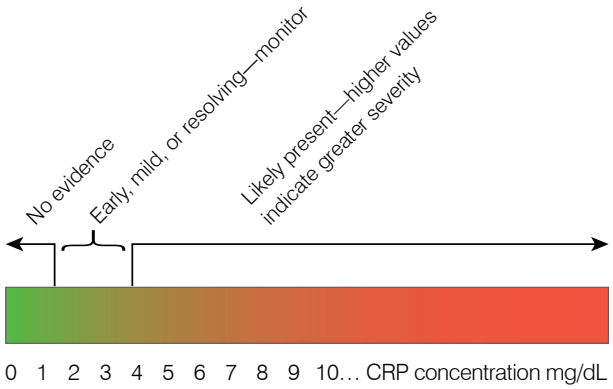

Figure 3: Interpretation of canine CRP. The reference interval for CRP is 0–1 mg/dL. At concentrations less than 1 mg/dL, systemic inflammation is unlikely. At concentrations greater than 3 mg/dL, systemic inflammation is likely to be present. For 1–3 mg/dL, sytemic inflammation could be early, mild, or resolving and the patient should be monitored.

Technical details of the Catalyst CRP Test

The **Catalyst* CRP Test** comprises a new sandwich immunoassay with gold conjugate that is designed to measure canine CRP antigen in serum or lithium heparin plasma samples from dogs. The dynamic range is 0.1–10.0 mg/dL (SI units: 1.0–100.0 mg/L). The CRP slide may be added to a chemistry profile or run as a standalone test. It is designed to produce prompt and reliable test results in the veterinary clinic.

What do you mean by systemic inflammation?

The term "systemic" implies the inflammation has moved from local inflammatory cytokine production to increased concentrations of inflammatory cytokines in the circulation. It does not imply that the disease process is affecting the animal's entire system. For example, in the early stages of a prostatic abscess, the inflammation will be local. With progression, the inflammation may become systemic. By contrast, multiple minor injuries across the dog—think of a dog running through thorn bushes—may not result in systemic inflammation.

Which canine patients will benefit from the Catalyst CRP Test?

- Sick patients: Determine if systemic inflammation is present or not in sick patients. As a marker for systemic inflammation, high CRP concentrations are likely with a wide variety of conditions:
  - Pyometra
  - Pneumonia
  - Pancreatitis
  - Immune-mediated hemolytic disease
  - Immune-mediated polyarthritis
  - Inflammatory bowel disease
  - Systemic bacterial infections, such as leptospirosis
  - Systemic viral infections, such as parvovirus
  - Systemic parasitic infections, such as leishmaniasis
  - Many others
- Patients undergoing treatment: Monitor effectiveness of treatment for above conditions during hospitalization and during recheck visits.
- Patients undergoing complex surgery: Use CRP measurements to monitor the postoperative response and quickly detect inflammatory complications.
- Patients with vague signs of illness or "ain't doing right": Consider CRP when assessing patients that "ain't doing right," as a high CRP value (>3 mg/dL) would warrant further investigations.

If the CRP concentration is increased, indicating systemic inflammation, what should I do next?

The physical examination and minimum database (complete blood count, chemistry profile with electrolytes and the IDEXX SDMA* Test, and complete urinalysis) provide valuable information to help determine the underlying cause. This will likely lead to further diagnostic testing including imaging.

CRP and the complete blood count

When compared to high total white blood cell or absolute neutrophil counts, CRP is a more sensitive indicator of active inflammation.[6,7]

In addition, CRP production is independent of neutrophil dynamics and bone marrow responses. For example, patients with overwhelming inflammatory conditions may have low neutrophil counts (due to consumption exceeding supply) and yet the CRP is dramatically increased. Furthermore, CRP is not influenced by corticosteroids, nonsteroidal anti-inflammatory agents (NSAIDS), epinephrine, and other treatment regimens that might influence circulating neutrophil numbers and confuse leukogram interpretation.[8]

The presence of band neutrophils in circulation is the hallmark of an inflammatory leukogram and is likely to be present in many dogs with high CRP values. However, unlike CRP, the presence of bands does not provide quantification and objective characterization of severity or trend.

What happens with liver disease?

Although CRP is produced in the liver, animals with severely compromised liver function still have a normal CRP response to systemic inflammation. Additionally, changes in total protein concentrations do not affect CRP responses.[9]

Review articles

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