



# U MIAMI Acute Phase Protein Laboratory

Division of Comparative Pathology • Miller School of Medicine • Phone 800.596.7390 • Fax 305.243.5662 • [www.cpl.med.miami.edu](http://www.cpl.med.miami.edu)

## What are Acute Phase Proteins?

Acute phase proteins (APP) are blood proteins which are synthesized in the liver during the acute phase response (APR). The APR is considered to be part of the innate immune system or first line defense in response to inflammatory stimuli. APP are commonly increased with trauma, infection, stress, neoplasia, and inflammation. The goal of the APR is to maintain homeostasis and promote healing. APP aid in the promotion of leukocytosis, complement activation, opsonization, clotting, and protease inhibition.

There are over 200 APP but with dominant markers in different species. C-reactive protein (CRP) is a major APP of humans and dogs. Serum Amyloid A (SAA) is a major marker of horses. Baseline or negligible levels of these proteins are present in normal animals. With appropriate stimulus, increases range from 10-100 fold. With resolution, the APP can decrease to normal range within 24-48 hours.

APP have been well described in human medicine beginning with the identification of CRP in the early 1930s. CRP is now known as a major marker of infection, autoimmune disease, trauma, and malignancy. It is commonly used as a marker of myocardial infarction. Recently, recommendations have been made to add this APP to an annual blood work panel because of its sensitivity for subclinical disease.

APP have also been extensively studied in animal species where similar applications have been observed. In dogs, CRP has been observed to increase with surgery and post surgery complications, joint disease, pancreatitis, IBD, and a variety of infectious agents. Increases in CRP are not directly correlated to increases in WBC and increases will occur prior to a WBC count increase and decreases will occur with disease resolution prior to WBC normalization. In horses, SAA has been observed to increase with colic, bacterial infection, joint disease, and surgery and post surgery complications. Other studies have detailed the application of APP to cats, chickens, cows, mice, nonhuman primate, sheep, pigs, and many zoo species.

While APP may not be diagnostic of particular diseases, they have been demonstrated to be valuable prognostic markers. In addition, they have been used as part of annual blood work and as markers of herd health. Although much is known about APP, they have been more widely recognized by the veterinary community in Europe to date. Serum protein electrophoresis has been used for years to gauge the overall acute phase response and view the cumulative changes of over 200 APP. Human assays for specific APP are not sufficiently cross reactive for animal APP. Special assays must be implemented and validated for the best quantitation of these valuable markers.