

# Device-ve testing

By Sandra Forsyth

Serum amyloid A is useful for detecting and monitoring acute inflammation in horses. However, the arrival of handheld devices in New Zealand means veterinarians need to take care when interpreting results.

## What is serum amyloid A?

Serum amyloid A (SAA) belongs to a group of proteins that the liver produces in large quantities during acute inflammatory reactions. It has a role in the chemotaxis of leukocytes, the opsonisation of pathogens and the induction of pro-inflammatory cytokines, and assists in tissue repair.

During acute inflammation, SAA concentrations typically increase around six hours after the tissue insult and peak after about 48 hours; they may increase up to 1,000-fold. When the inflammation resolves, the concentrations fall at a similarly rapid rate. This contrasts with fibrinogen, which starts to increase 24–72 hours after the tissue insult and may remain elevated for weeks after the inciting disease resolves.

SAA's rapid changes in concentration make it a useful parameter in detecting and monitoring acute systemic inflammation in horses – and to make it easier, handheld devices for determining SAA in horses have recently become available in New Zealand.

These devices' main benefit is their speed in identifying acute inflammation. They can readily distinguish between healthy horses with SAAs less than 20µg/mL (20mg/L) and those showing acute inflammatory responses.

However, the devices do have a potential limitation, in that they don't deliver precise results for SAA concentrations above 1,000mg/L for plasma and serum, and about 500mg/L for whole blood. This flaw may reduce the veterinarian's ability to monitor accurately the progression of inflammation or the response to therapy (Schwartz et al., 2018). Monitoring may be further challenged when different pack pouches are used, because research has shown high variation between batches for SAA concentrations over 150mg/L, and moderate variation for SAA concentrations below this (Schwartz et al., 2018).

## Need-to-knows about SAA in detection and monitoring SAA in infection

Information accompanying one of the handheld SAA analysers indicates that SAA concentrations over 50µg/mL (50mg/L) indicate infection. This is inconsistent with numerous studies in horses, which show that SAA can increase for reasons other than infection and that there's no clear cut-point that denotes infection versus sterile inflammation.

It's also important to note that while high concentrations of SAA are typically seen in septic conditions, a normal SAA does not exclude infection. For example, foals with umbilical abscesses infrequently show increases in SAA concentration (Witkowska-Piłaszewicz et al., 2019).

## **SAA's rapid changes in concentration make it a useful parameter in detecting and monitoring acute systemic inflammation in horses.**

### **SAA in horses with respiratory disease**

SAA concentrations increase by similar amounts in horses with equine herpes virus and horses with *Streptococcus equi* infections, based on an analysis of SAA by Stablelab (a handheld equine blood test with a maximum concentration of 3,000mg/L). In both groups SAA ranged from 0mg/L to 3,000mg/L. Another report found that about 15% of horses with inflammatory airway disease with no obvious infectious component have SAA concentrations up to 586mg/L (Viner et al., 2017).

Conversely, in foals with *Rhodococcus equi* pneumonia, 28% had SAA concentrations <5mg/L (Giguère et al., 2016).

### **SAA after uncomplicated surgery**

A 2019 report (De Cozar et al.) found that SAA levels in horses with uncomplicated recoveries from abdominal surgery increased up to 1,768mg/L, peaking at day two. Similarly, healthy horses undergoing laryngoplasty showed peak SAA elevations up to 200mg/L two to three days after the procedure (Jacobsen et al., 2009), and horses undergoing castration showed SAA concentrations of 400–600mg/L at day three after surgery (Jacobsen et al., 2005).

### **SAA in postpartum mares**

A 2013 report (Coutinho da Silva et al.) found SAA concentrations in healthy, warm-blooded mares of up to 305mg/L at 12 hours and 1,615mg/L at 36 hours post-partum. The elevations returned to normal within 60 hours.

### **Final word**

Measuring SAA concentrations can be valuable in assessing a horse with suspected inflammatory disease. However, it's important to take care in interpreting the result, particularly when the horse is monitored with a handheld device.

While an elevated SAA concentration often reflects an infectious process, it can increase significantly with sterile tissue injury – so a high concentration shouldn't be interpreted as an indication for antibiotic therapy.

Instead, high SAA concentrations warrant a further investigation for possible bacterial or viral infection, tissue inflammation or necrosis. Conversely, a septic process shouldn't be excluded based on a normal SAA concentration.

For more information, see Witkowska-Piłaszewicz et al., 2019, which provides an extensive review of SAA in horses. [↗](#)

Sandra Forsyth is a clinical pathologist for SVS Laboratories.

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