

# Anhidrosis in Horses

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## Overview

In adult horses, anhidrosis, or “drycoat,” refers to a decreased ability or loss of ability to sweat in response to appropriate stimuli.<sup>1,2</sup> Like humans and a limited number of other mammals, members of the *Equidae* family, including horses and ponies, rely on sweating for regulating body temperature and avoiding hyperthermia. Horses that are unable to sweat do not perform well athletically.<sup>1</sup> Severe cases result in collapse, convulsions, and death.<sup>3</sup>

About 5-10% of horses are thought to suffer from anhidrosis, and some reports indicated up to 20% of racehorses in Florida might be affected.<sup>3</sup> According to a review of literature, there does not appear to be breed, age, sex, or coat color predisposition.<sup>1</sup>

## What Causes Anhidrosis?

The underlying cause of anhidrosis remains unclear.<sup>2</sup> One hypothesis is the problem is at the level of the sweat gland. In response to high circulating levels of the sweat-stimulating hormone epinephrine, there is first a desensitization to epinephrine, then a decrease in the number of Beta-2 adrenergic receptors on the sweat glands. This makes the glands unable to sweat in response to circulating epinephrine. Ultimately, the sweat glands appear to degenerate over time.<sup>1</sup> Sweat glands from anhidrotic horses also secrete chloride ions differently than the glands from normal, free-sweating horses. Chloride ions play an important role in sweat formation.<sup>4</sup>

## Clinical Signs of Anhidrosis

Common signs of disease in horses



Horses that are unable to sweat do not perform well athletically. Severe cases can result in death.

include: exercise intolerance; tachypnea (increased respiratory rate); increased body temperature (hyperthermia); slow rate of recovery post-exercise (i.e., “blow” abnormally and have dilated nostrils, even at rest); and absence or decreased amount of sweat, particularly over the rump, gluteal muscles, flanks, and ribs.

Affected horses can become quite distressed and death can occur. The coat of anhidrotic horses often appears dry, flaky, and pruritic (itchy), and alopecia (hair loss) can occur.<sup>1,2</sup>

Anhidrosis can develop gradually in horses transported from temperate regions to hot, humid climates.

Alternatively, anhidrosis can occur abruptly even in horses native to hot, humid climates. For example, horses that

were normal as foals can lose the ability to sweat as adults.

## Diagnosis

Sweating is primarily stimulated by epinephrine in the circulation binding with Beta-2 adrenergic receptors on the sweat glands. Thus, traditional means of testing horses for anhidrosis involves the intradermal injection of epinephrine or other Beta-2 adrenergic agonists such as salbutamol or terbutaline. Normal, free-sweating horses sweat freely over the injection sites whereas anhidrotic horses do not.<sup>1</sup>

In 2008 a more refined technique was described in the *Equine Veterinary Journal* to assist in diagnosing anhidrosis in horses. This test, called the quantitative intradermal terbutaline sweat test (QIST), also involves the intradermal injection of terbutaline; however, the QIST then compares the amount of sweat

produced to the amount of sweat produced by normal, free-sweating horses injected with the same amount of terbutaline.

The QIST therefore is a quantitative rather than semi-quantitative test that can more accurately identify anhidrotic horses than the traditional tests.<sup>5,6</sup>

## Treatment

There is no cure for anhidrosis. However, there are many medical treatments advocated for anhidrosis, including dietary supplements (e.g., a patented product called One AC containing the catecholamine precursor L-tyrosine, ascorbic acid, niacin, B vitamins, etc.), electrolyte supplementation, methyl dopa (to decrease epinephrine levels, thereby allowing the sweat gland to resensitize), thyroid supplementation,

clenbuterol (to stimulate receptors on the sweat glands), alternative therapies (acupuncture), and more.

One AC underwent a field trial at the University of Florida in the early 1990s, and a patent was awarded in 1994 when the product showed efficacy in 117 trial horses, including pregnant mares.<sup>7</sup>

Only when the exact cause of anhidrosis is elucidated can a cure be developed.<sup>2</sup>

In the meantime, environment management (i.e., climate control) of anhidrotic horses is very important. Removing the horse from the hot, humid climate and reducing the horse's work is currently touted as the most reliable way to manage the condition. Nonetheless, it is not 100% effective.

Not all anhidrotic horses that are removed from a hot, humid environment regain the ability to sweat.

Further, if a horse does regain the ability to sweat, anhidrosis will recur (usually within about three weeks) if the horse returns to the hot, humid climate.

When relocating the horse to a cooler climate is not an option, anhidrotic horses require aggressive management.

Anhidrotic horses benefit from air conditioning or fans, cold hosing, body clipping for horses with thick coats, and ensuring access to shade and plenty of water when turned out.

Avoid turning out or exercising anhidrotic horses during the hottest periods of the day.

Instituting a change in feed (i.e., decreasing protein and carbohydrate and increasing fat) has been embraced by some owners/trainers of anhidrotic horses. Always discuss feed changes and the use of nutritional supplements with your vet.

### Prognosis

Since hyperthermia can be life-threatening, anhidrotic horses require appropriate management as described above. Failure to provide treatment will result in serious health issues and possibly death. Even if removed from the hot, humid climate, some anhidrotic horses never regain the ability to sweat.

If horses are able to sweat freely again after moving to a more temperate climate, anhidrosis will recur if they return to a hot, humid environment.

### Prevention

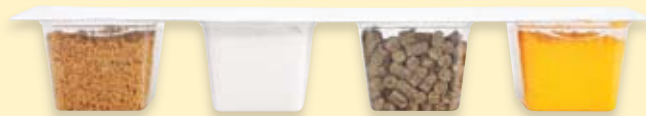
Since the cause of anhidrosis is unclear and there are no known risk factors for anhidrosis, it is difficult (or impossible) to predict which horses will become anhidrotic.

Prevention is generally not possible at this time; however, there are some reports of maintaining racehorses in air conditioned stalls to prevent the potential onset of anhidrosis while temporarily residing in extremely hot, humid conditions. 🐾

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*Authored by Stacey Oke, DVM, MSc;  
reviewed by Benjamin Franklin Jr., DVM.*



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