

## News & Comments

# A Pilot Study on Sphingolipidomics of Bovine Pink Eye

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The tear film is a dynamic structure that shields the surface of the eye from dehydration, physical damage from blinking, and immunological protection against infections and contaminants. When a tear film infection, such as bovine pink eye, affects the lipid components of the outer lipid layer and triggers cytoprotective biochemical pathways, the stability of the tear film is disrupted. Sphingolipids play a crucial role in the structure of membranes and the tear film, and hydroxy sphingolipids serve as stabilizers because of their enhanced hydrogen bonding ability. Changes in these hydroxy lipids can disturb the tear film layer, causing the eye to become dehydrated and irritated. For this investigation, a herd of roughly 1200 Black Angus cattle ranging in age from 0 to 15 years was used.

1 mL of water and 2 mL of methyl-tert-butyl ether were added to the cotton swabs in 1 mL of methanol. The tubes were then forcefully shaken for 30 minutes at room temperature before being centrifuged at 4000 g for 30 minutes at room temperature. Centrifugal vacuum evaporation was used to separate and dry the top organic layer. We were unable to determine the volume of the samples obtained because they were absorbed onto cotton swabs for extraction. As a result, it was unable to standardize the data based on tear volume. In our pilot investigation, 8 controls without any clinical symptoms of eye infections and 8 calves with stage 3 pink eye infections were chosen for the lipidomics studies.

Like this study, earlier research has shown that the tear film contains a variety of ceramides, with these lipids declining in dry eye and eye infections caused by the ectoparasite desmodex. These published studies and our own results imply that infections and meibomian gland dysfunction are associated with large decreases in tear film ceramides. It has been proposed that the tear film structure is preserved by the hydrogen bonding abilities of these lipids' head groups. Researchers in the past have looked at ceramides, hexosylceramides, and sphingomyelins in tear film, but they haven't written about the many hydroxy forms of sphingolipids. To create phytosphingosine and phytosphingosines, sphinganine monooxygenase adds a hydroxy group to the sphingolipid bases of sphinganine and dihydroceramides, respectively.

This is the first study to show that phytoceramides, hydroxy-phytoceramides, and hydroxyceramides exist in tear film. Because the processes for producing and metabolizing hydroxy sphingolipids are interrelated, a thorough pathway analysis cannot be produced until many of the important enzymes have been quantified. Reduced levels of some of these hydroxy sphingolipids cause dehydration of the eyes and may have an impact on their ability to fight off microbes.



Source: [Veterinary Sciences](#)

**KEYWORDS**

Bovine pink eye; Infectious Bovine Keratoconjunctivosous (IBK); sphingolipids

