

An Introduction to Caribou Anatomy

R.K. Brook, S.J. Kutz, P. Flood, C. Mueller, J. Anderson, and M.M. Gillespie

Rangifer Anatomy Project, Faculty of Veterinary Medicine, University of Calgary, Calgary, Alberta, CANADA T2N 4N1



Antlers

Caribou are the only member of the deer family where both the male and female grow antlers each year. Male antlers begin developing in March and fall off after the rut (mating period) in early November for older males, though younger males may keep theirs until April. Female caribou develop antlers beginning in June and drop them days after giving birth, while females without calves lose their antlers before the spring. Antlers of adult males are much larger than those of adult females.



Fur

Caribou are covered completely in a dense layer of hollow hair that sheds water and snow, and is very warm.



Caribou or Reindeer?

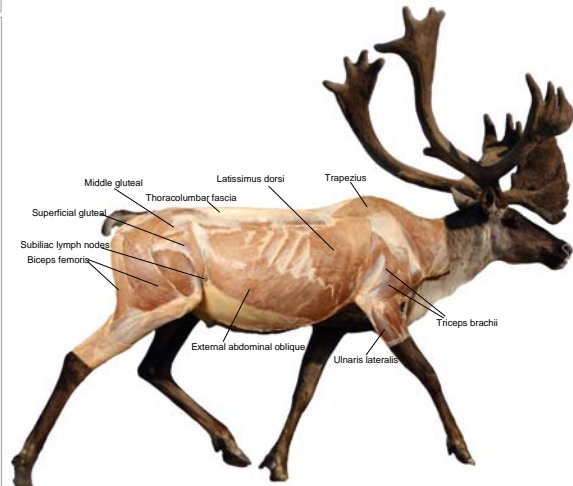
Both caribou and reindeer are member of the same species but reindeer are domesticated and raised by people for meat and fur, mostly in Siberia and Scandinavia, while caribou are wild. Caribou are typically larger, with longer legs than reindeer.

Caribou as Food for Humans

One of the most important parts of the caribou historically and even now for northern hunters is the muscle (meat), but other organs and tissues are also often consumed. Vitamin C is present at high levels in the caribou livers but is not found in muscle, so if the liver is not eaten, Vitamin C must be obtained from another source. Fat from the caribou is also a critical source of energy.



Caribou (*Rangifer tarandus*)



Superficial Muscles

Introduction

Caribou are well adapted to living in northern environments and have a wide range of anatomical features that are unique to the species. Relatively little work has been done to describe the anatomy of caribou or to demonstrate these unique features. It is important to describe what is 'normal' structure and function so that we can begin to understand 'abnormal' at a time when the North is changing at an unprecedented rate. The purpose of this project is to describe the anatomy of caribou and reindeer in ways that are useful to hunters, educators, students, biologists, and veterinarians and to produce posters, booklets, and internet based resources to communicate this information in ways that are appropriate to these diverse users.

Methods

Two captive reindeer (one male and one female) from a herd in southern Alberta were euthanized and immediately post mortem were injected with fixative to preserve all tissues in an upright natural position. These embalmed cadavers were dissected and photographed layer by layer from the surface to the deeper structures.

Results

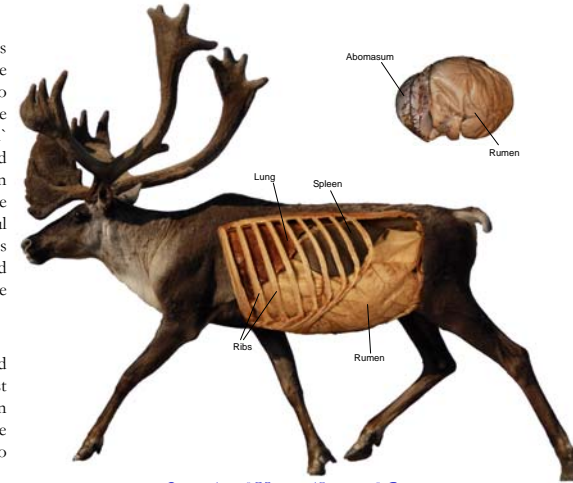
This project is being completed in stages with the initial dissections of the two reindeer finished in November 2008. Future anatomical investigations will be directed at skeletal structure including x-ray images of the body and sections of the skull.

Discussion

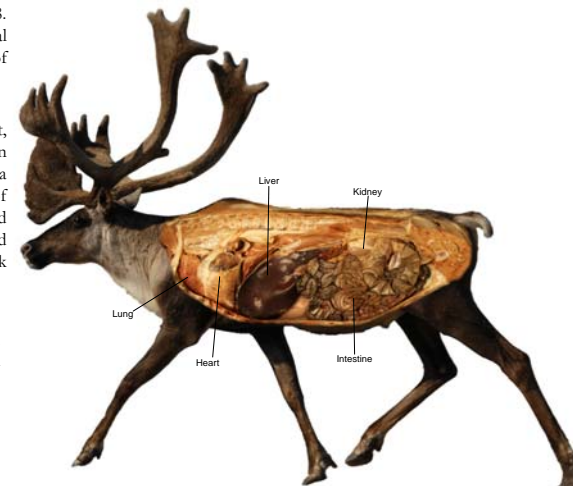
Other complementary research is planned for this project, including dissection of fresh harvested caribou in the field in a northern community in the Northwest Territories and a community in Nunavut. This will include documentation of traditional knowledge and stories about caribou anatomy and how bones and tissues of caribou were used historically and how they are used now. We are actively seeking feedback from all potential users to identify their needs.

Acknowledgements

We thank Brandie Millen, Taran Meyer, Rob McCorkell, Bregje Witlox, and Carlijn Wauben for assistance with dissections. Support for this project was provided by the University of Calgary faculty of Veterinary Medicine and the CircumArctic *Rangifer* Monitoring and Assessment Network.



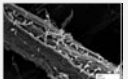
Superficial View of Internal Organs



Deeper View of Internal Organs

The Four Chambered Stomach

Caribou have a unique digestive system that includes four stomach compartments to digest their food; the rumen, reticulum, omasum, and abomasum. Of these, the rumen is the largest compartment, and it can hold many litres of food. Lichen, shrubs, grasses and other food all first enter the rumen when eaten. The rumen contains 20-50 billion bacteria and 200-500 thousand protozoa that help break down the plants. When the caribou is resting it regurgitates this food in small amounts (called cud) and chews it to reduce it further and swallows it again. The food then travels into the second and third stomachs (reticulum and omasum), where the water is removed, to the fourth stomach, the abomasum (which is most like the human stomach) where the nutrients are absorbed.



Bacteria attacking a plant fiber.

Lungs

Lungs of the caribou are relatively large and well developed, which is important for their long migration and for bursts of speed to outrun wolves. Their muzzles are specially developed to warm and moisten the air they breathe in before it reaches their lungs.



Heart

In the summer the heart rate of caribou increases and in the winter the heart rate decreases.



"In mythic time, the Gwich'in and the caribou lived in peaceful intimacy. It is said that every caribou has a bit of the human heart in him, and every human has a bit of caribou heart."

-The Gwich'in Steering Committee