

Microbial Symbiosis

Rumination

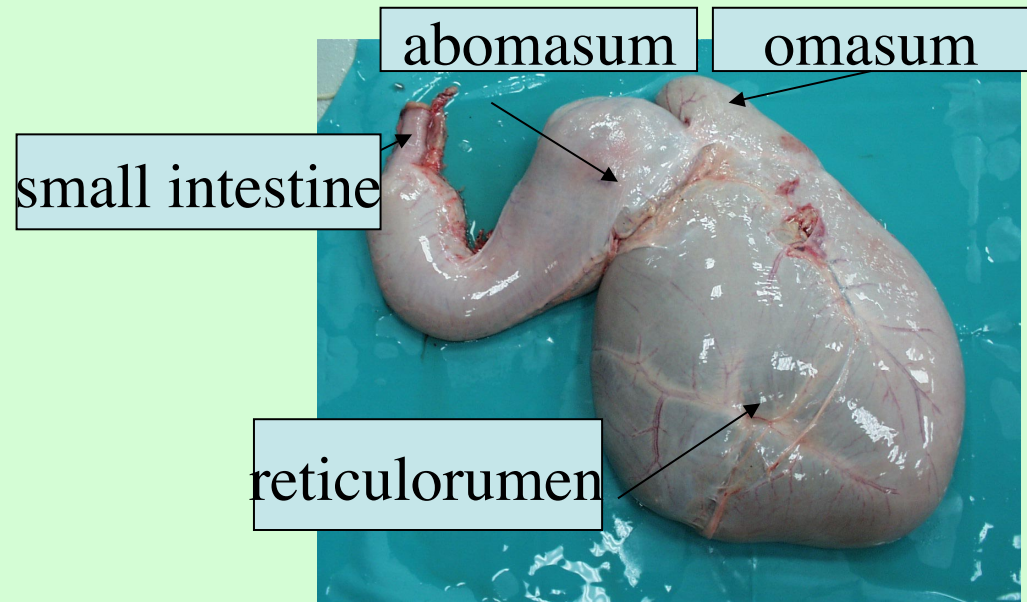
The Dairy Cow

- Dairy cows have advanced gastrointestinal tracts that enable them to make use of plant material.
- When we feed ruminant animals, we are actually feeding the microbial population in the rumen.



The Reticulorumen

- The reticulorumen consists of 4 compartments: the reticulum, rumen, omasum, and abomasum.
- All 4 sections have papillae that increase surface area for digestion and absorption.
- The average rumen can hold up to 60 liters of digesta.



The Fermenters

- These fermenters are designed to replicate the action of the rumen.
- They allow researchers to conduct in vitro trials to decrease the variability from the animal.



From Cow to Lab

- Contents are collected from fistulated (cannulated) cows and placed in fermenters.
- The fermenter is fed daily, just as a cow would be, and measurements can be extracted.



Bacterial Population

- The bacteria and protozoa in the rumen are capable of digesting fibrous feedstuffs, like grasses, hays, and silage.
- The end products of the microbial metabolism, (i.e. volatile fatty acids, methane, carbon dioxide, microbial protein, and carbon skeletons) are what give the animal its sources of energy, protein, and some vitamins.

Bacteria Continued

- These bacteria are also present in smaller concentrations in humans and other animals.
- Not to mention, several foods that we eat are made tasty by our little fermenting friends (i.e. yogurt, beer, wine, cheese, tofu).