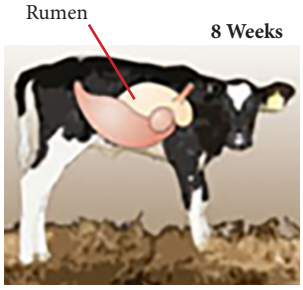
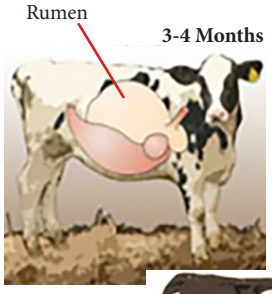
It's All About the Rumen: Get Your Calves Off to a Great Start

It is important to understand the key role proper nutrition plays in rumen development. Studies show that if a calf is not provided with proper nutrition early on, it can negatively affect growth and milk production.

There are three stages to the development of the digestive system of a calf:





Pre Ruminant Phase
When: From birth to 2nd/3rd week of life
Where: Abomasum
What: Milk or high quality milk replacer should be fed along with fresh water and calf starter.
**Will last longer if dry feed isn't offered.*

Transition Phase
When: From the 2nd/3rd week of life until weaning time (depends on farmer, usually 6-10 weeks)
Where: Abomasum and Rumen
What: Rumen fermentation begins slowly as the calf consumes more dry feed. Production of volatile fatty acids from carbohydrate fermentation aids in developing rumen papillae. Diet should still include milk or high quality milk replacer, fresh water and calf starter.
**Hay may slow down development of rumen if fed before weaning.*

Ruminant Phase
When:From weaning onward
Where:Rumen
What: Well developed rumen becomes the largest compartment and fermentation is in full speed. Diet consists of dry feed and water.
**Can feed hay in this phase since rumen is functional. Once calf is weaned, it will now get energy and protein from feed sources.*

Did You Know?

The Rumen is lined with small fingerlike projections called papillae. Papillae increase surface area for improved absorption of feed components into the blood stream and to the liver. Microbes live in the rumen and turn feed into nutrients that can be used by the cow. For example, microbial fermentation of carbohydrates produces volatile fatty acids (VFA's): acetate, propionate and butyrate. These VFA's are then absorbed by the papillae, released into the blood stream and into the liver. In the liver they are converted to other sources of energy. The main function of acetate (acetic acid) involves production of milk fat. If acetate production is low (occurs in diets high in grain or low in fiber), milk fat production may decrease. If you feed too much grain, microbe function will change and result in improper fiber digestion.

Notice the different diets, and their effect on rumen development. The milk and grain diet shows what a rumen should look like at weaning.

Sources:
http://assets.fwi.co.uk/5233518-rumen-development-guide.jpg , http://aorakistockfoods.co.nz/images/AorakiStockfoods_Rumen2.jpg , http://www.ag.auburn.edu/~chibale/an15dairycattlefeeding.pdf , http://www.aphis.usda.gov/animal_health/nahms/dairy/downloads/bamn/BAMN03_GuideFeeding.pdf , http://www.publish.csiro.au/?act=view_file&file_id=SA0501041.pdf