**Ruminal Fluid Analysis**

Indications for clinical evaluation of ruminal microflora include suspicion of ruminal acidosis (e.g., carbohydrate engorgement), vagal indigestion, abomasal emptying defect of sheep, and rumen atony. Sometimes the analysis precedes surgery, but correction of the problem occurs during the postoperative period.

***Procedure***

A weighted stomach tube or a needle and syringe can be used to collect ruminal fluid for analysis. When a weighted collection tube is used, it is simply passed into the rumen, pushed back and forth to sink the tube, and aspirated. The first 100 ml or so is discarded to reduce salivary contamination. Aspirating transabdominally through the left flank by using a 16- to 18-gauge, 5-inch needle also helps eliminate salivary contamination.

***General Interpretation***

A relatively simple analysis is sufficient for clinical evaluation of most presurgical and postsurgical cases. Color, odor, and smell should be evaluated immediately. Normal color is gray-green to green to brownish-yellow, depending on the diet. Milky gray or yellow fluid is associated with CHO engorgement.

***PH Interpretation***

The pH of rumen fluid ranges from 5.5 to 7.0 in healthy cattle on a balanced ration. A pH paper with half-unit sensitivity is sufficient to diagnose ruminal acidosis or alkalosis of a single clinical case. A hand-held pH meter is required for adequate sensitivity at herd-level diagnosis of mild chronic acidosis. Cattle on high carbohydrate diets have lower pH values than those on roughage diets. Acid pH less than 5.5 in an anorectic ruminant indicates ruminal acidosis. Ruminal pH greater than 7.0 indicates ruminal alkalosis. Simple ruminal inactivity, or anorexia, results in ruminal alkalosis. Cattle with abomasal reflux may have an unusually low pH for an animal that has been off of feed for several days (e.g., 6.5 in comparison to an expected value of 8.0). This is because the abomasal acid has refluxed or been “vomited” into the rumen.

***Methylene blue reduction Test***

A very simple function test, the methylene blue reduction (MBR) time, can be performed rapidly without special equipment. The MRB test measures metabolic activity of the ruminal flora by indicating the relative redox potential of the rumen. One part of 0.03% methylene blue is added to 20 parts of strained ruminal fluid in a glass blood collection tube and is incubated at 37°C. A second tube of ruminal fluid serves as a control. Clearing of the dye in 5 to 6 minutes indicates active ruminal microbes. Delayed clearing indicates diminished anaerobic bacterial activity.

***Microscopic examination***

Direct microscopic examination of fresh ruminal fluid on a slide is a quick and useful way to assess the health of the ruminal microflora. Abundant, live, active protozoa of various sizes and shapes will be present in cattle with a normal rumen. Very large entodiniomorphs are the most fragile species; their presence suggests a healthy rumen. For further evaluation of the microflora, a drop of Lugol’s iodine can be added to a few drops of fresh rumen fluid. Lugol’s iodine kills the protozoa and stains carbohydrate in protozoa and bacteria. If the protozoa are depleted of carbohydrate, this indicates a depletion of carbohydrate in the rumen.