Adequate intake of calories and other nutrients is critical for the optimal care of hospitalized patients. A healthy animal that does not get enough calories will lose primarily fat. In contrast, a sick or injured animal will lose lean body mass when it is not given adequate calories because it cannot make the adaptive responses necessary to use fat (instead of protein) as an energy source. Therefore, the sick or injured patient continues to mobilize protein (i.e., stressed starvation).

This loss of lean body mass impairs the animal’s strength, immune function, wound healing, and overall survival. When oral intake is not possible, either because of contraindications or because the animal will not eat sufficient amounts voluntarily, nutritional support techniques are then needed to provide some or all of the nutrient requirements. The optimal route for feeding in these animals depends upon a number of patient-dependent issues including the function of the GI tract, the patient’s ability to tolerate tube placement, and risk of aspiration, as well as non-patient issues such as cost and technical expertise and support.

Whenever possible, the enteral route should be used because it is the safest, most convenient, most physiologically sound, and least expensive method of nutritional support. In addition, enteral nutrition supports normal GI structure and function. It is critical to think about the route of feeding before doing any procedures on hospitalized animals. If an animal is likely to be anorectic or unable to eat voluntarily and has a functional gastrointestinal tract, consider placing a tube when the animal is sedated or anesthetized for a diagnostic or therapeutic procedure. If the animal ends up not needing it or only needing it for a few days, it can be easily removed. Not placing a feeding tube at the time of anesthesia often results in suboptimal feeding — few clinicians want to anesthetize a patient a second time “just to place a tube.” In most cases, however, the availability of the tube provides an important part of the therapy for the patient. In cases where the patient is vomiting, has severe malabsorption, or an inability to guard the airway, parenteral nutrition would be preferred.

**Options for Feeding Tubes**
There are a number of options for enteral nutrition, which will depend upon the length of time the animal is expected to require nutritional support, ability to tolerate anesthesia, nutritional status, hospital facilities, cost, and the clinician’s comfort level with different techniques for tube placement.

- Nasoenteric tubes
- Esophagostomy tubes
- Gastrostomy tubes
- Jejunostomy tubes

**Tube Care**
The care of enteral feeding tubes is important for their success and carefully securing them in place is the first step. All animals with nasoenteric tubes should wear an Elizabethan collar at all times. A light bandage should be used for all enteral feeding, gastrostomy, and jejunostomy tubes. The bandage should be changed and the tube site should be checked frequently for redness, swelling, discharge as well as for tube displacement. Some animals with these tubes will also need E-collars to prevent them from chewing or dislodging them. Owners should be instructed to bring the patient in for evaluation if they have any concerns about the placement of the tube. Flushing the tube with warm water before and after each feeding and keeping the tube capped between feedings is important to prevent clogging. Finally, many medications are incompatible with enteral formulas or may clog the tube.

**Diet Selection**
A number of options are available for diets to use in animals with feeding tubes; the choice depends on patient factors such as concurrent medical conditions, as well as type of tube, diet availability, and cost.
• Veterinary enteral “recovery or critical care” diets - diets that meet canine and feline nutritional requirements and tend to be relatively caloric dense (e.g., CliniCare/CliniCare RF liquid diet, Iams Maximum Calorie, Royal Canin Recovery, Hill’s a/d)
• Blenderized veterinary therapeutic pet foods - blenderized with water and then strained. Generally used when veterinary enteral diets are contraindicated (e.g., need a low fat or reduced protein diet) – examples: Royal Canin Low Fat, Hill’s k/d
• Human enteral products: None of the many human enteral diets meet canine or feline requirements. This doesn’t mean that you can’t use them; just that you need to make adjustments (almost all human enteral products require additional protein, B-vitamins, arginine, and taurine for use (for short term use) plus calcium, zinc, iron, and choline (for long term use)).

Nasoesophageal and jejunostomy tubes will require liquid diets (e.g., CliniCare). Esphagogostomy and gastrostomy tubes, because of their larger size, allow use of a wider variety of diets, including those that are more calorically dense than liquid diets. Iams Maximum Calorie, Hill’s a/d, or Royal Canin Recovery are generally the first choices unless a specialized diet is required (e.g., a low fat diet or a reduced protein diet). However, the differences in nutrient profile between these diets should be considered. Immunomodulatory nutrients are included in some veterinary “critical care” diets but the amounts vary widely.

Enteral feedings can be given either as a bolus or continuous rate infusion. With either method, be sure to start slowly, often feeding to meet 50% of resting energy requirement on the first day, then increasing the amount if the patient is tolerating the feedings. Bolus feeding: usually start with 4-6 feedings per day in the hospital administered over at least 10-15 minutes. Food should be fed warmed to between room and body temperature. When sending the animal home, it is best to try to adjust to TID feedings. The maximum bolus size (based on stomach capacity for most animals with tubes) is usually about 20 ml/kg (although some animals will not tolerate this much as a bolus). Continuous feedings are a good choice for patients that don’t tolerate bolus feeding (e.g., delayed gastric emptying, ileus). This method should be used in nearly all patients with jejunostomy tubes.

To find out more on this topic, including:
• Potential Complications and Patient Monitoring
• When and How to Discontinue Enteral Feeding
• An Enteral Nutrition Worksheet

register for the Pacific Veterinary Conference and attend Dr. Freeman’s sessions!

Dr. Freeman is a Professor in the Clinical Sciences Department at Tufts Cummings School of Veterinary Medicine. Recently, she was one of five veterinary experts named to lead the development of new nutrition guidelines for the American Animal Hospital Association (AAHA). She will be conducting seven sessions in the Small Animal Medicine tracks at the Pacific Veterinary Conference in San Francisco on Saturday, July 17 (see page 28 for details).