# Nutrition in Critical Illness

- **When malnourished in critical illness the inflammatory state shifts towards catabolic metabolism (rather than use of glycogen stores in health)**
  - **See loss of lean muscle tissue, preservation of fat**
  - **Goal of providing nutrition in critical illness is to minimize further loss of lean body mass, restore nutrient deficiencies, provides substrate for healing and repair**
- **In shock GI perfusion is often reduced -> decreased motility, altered digestion and nutrient assimilation**
  - **Feeding under these circumstances may result in more complications**

**Nutrition assessment and plan**

- Evaluate BCS, muscle condition, and for signs of unintentional weight loss, poor hair coat, muscle wasting, hypoalbuminemia, lymphopenia, coagulopathy, signs of inadequate wound healing
  - All very non-specific markers of malnutrition
- Also need to evaluate for conditions that will effect feeding plan
  - Electrolyte abnormalities, hyperglycemia, hypertrigliceridemia
  - Comorbid illness e.g. hepatic, renal or cardiac disease
- Recommend calculating of RER not RER + illness factor:
  - Overfeeding predisposes to hyperglycaemia which has poor outcomes in critically ill people
  - Also may result in GI complications, hepatic dysfunction, increased $CO_2$ production
- Use current weight not lean body mass
  - Underweight patients likely to be overfed with these methods
  - If overweight patients are fed for lean body mass they will lose lean body mass not fat when critically ill
  - Theoretically can measure urine urea nitrogen content to assess nitrogen balance and estimate protein catabolism

**Parenteral nutrition**

Disadvantages of TPN:

- Requires jugular catheter
- slightly more expensive
- possible increased risk of metabolic complications

Disadvantages of PPN

- Not providing full nutritional requirements (70%)
- Will exceed maintenance fluid requirements in small animals (<3kg)

- *Amino acid* solutions don't contain taurine (but not a concern unless need long term (>10d)

Come with electrolytes (for patients with normal levels), or without for patients that you need to individually correct them

- *Lipids* have not been shown to inroad pancreatic secretions or worsen pancreatitis

elevated serum triglycerides may be a risk factor for pancreatitis so if this is present then in humans they recommend markedly decreasing the lipid component

  - Immunosuppressive effects of lipids have been demonstrated but not proven to increase rate of infectious complications

- TPN should be gradually increased to RER over 48hrs, and discontinued over 6-12hrs once patient is eating at least 50% RER

**Enteral nutrition**

Decision about what type of tube depends on anticipated duration, need to circumvent certain sections of GI tract, experience and ability to tolerate anaesthesia

- NG/NE are easy to place with minimal sedation but cause patient discomfort and can only use liquid diets due to small diameter
- E tubes are easy to place with short anaesthesia, can feed denser diets. Primary complications are cellulitis and tube obstruction
- G and PEG are good if patient is already having laparotomy or endoscopy, and can be used for months. Require expertise and risk of peritonitis if dislodged before 14 days
- Jejunostomy can be used if stomach/pancreas need to be bypassed. Should only be fed via CRI