The role of Probiotics in the management of rabbit gut stasis.

As rabbits have become the third most popular pet in UK,¹ there has been a recent necessary push in the veterinary field to vastly improve our knowledge of their medicine and husbandry, thus moving away from myth, misconception and anecdote, in the management of gastrointestinal (GI) disease.

Hind gut function
Rabbits are strict herbivores, and as such have evolved their GI system to ingest and digest poorly digestible fibre.

The rabbit is a hind gut fermenter, it features a well developed caecum and mechanism within the colon to separate the larger fibre particles from the fine particles and solutes. The fine particles and fluid are sent back to the caecum for further digestion, whilst the large indigestible fibre portion is quickly formed into hard faecal pellets and expelled.²³

Role of Dietary fibre
Fibre plays a critical role in rabbit nutrition. Fibre stimulates motility and has a protective effect against enteritis. A diet low in fibre will cause a decrease in motility, caecal pH and microflora which in turn predisposes the rabbit to overgrowth by potential pathogens such as E. coli and Clostridial species.³ Long term (life time) feeding of good quality hay and the importance of a high fibre diet cannot be over emphasised.

Caecal microflora
The caecum contains a well established population of microorganisms that allow fermentation to occur. The caecal microflora produce the volatile fatty acids (VFA) which provide almost 40% of the energy requirement of the rabbit.⁴

The normal gut flora in the rabbit consists predominantly of anaerobes of the Bacteroides species,⁵ but unlike other mammals, Lactobacilli feature infrequently.⁶ Caecotrophs contain a representative sample of the population of the caecum.⁷

Factors which can adversely affect the caecal microflora balance include:⁸
- Use of Antibiotics
- Pathogenic organisms
- Toxins (consumed and produced by pathogens)
- Increased glucocorticoid levels (stress)
- Gastrointestinal hypomotility
- Poor dietary composition (low fibre, high carbohydrate and protein)

Dysbiosis, or microfloral imbalance, is a feature of the common GI problems which occur in adult rabbits, such as gut stasis or ileus.⁷
**Role of Caecotrophs**

Coprophagy or caecotrophy is practised by rabbits as part of their normal digestive process. After fermentation of the digestible fibre in the caecum, soft mucous-covered caecotrophs are formed then expelled and eaten directly from the anus. These are consumed whole, ensuring the intact protective coating to shield bacteria from the low stomach pH and facilitate continued fermentation by the microorganisms.\(^9\) Caecotrophs are rich in microorganisms, essential amino acids, volatile fatty acids and contain high levels of B vitamins and vitamin K.\(^7\) Caecotrophs provide 15-25% of the total amino acid; and 9-15% energy requirements of the rabbit.\(^10\)

**Gut Stasis**

Gut stasis or ileus is a commonly seen medical problem in rabbits in small animal practice. Stasis can occur secondary to pain or stress which lead to hypomotility of the gut. Lack of dietary fibre is also a major predisposing factor because indigestible fibre stimulates gut motility.\(^11\) Stress may result from various causes (see text box).

Rabbits all too easily succumb to stress, something which vastly affects their GI function. Stressors to the domestic rabbit include:\(^1,11\)

1. Fright (proximity to predators; trauma; transport)
2. Pain (abdominal, skeletal or oral pain; injury)
3. Poor husbandry (rough or increased handling; inappropriate diet)
4. Change of environment (loss of companion; re-homing; excess heat or cold)
5. Recent surgery (incisor removal; neuter)

Ileus is commonly characterised by reduction or cessation of faecal production, anorexia, hypothermia and often pain.\(^3,11\) Pain may be detected by a hunched appearance, grinding teeth, shallow breathing and abdominal tenderness.\(^12,13\)

Historically, gut stasis was thought to be due to excessive grooming and production of hairballs. Now hairballs are considered to be a normal clinical entity in the stomach of normal rabbits.\(^9,12\) The true scenario of ileus is now considered to be hypomotility of the gut due to any trigger, resulting in loss of fluid from the stomach and subsequent dehydration of the hairball leading to a mass or trichobezoar, which cannot be passed.\(^9\)

**Dysbiosis/ management of Ileus**

There are a number of fundamentals that we should consider when treating gut stasis or ileus in the rabbit. Aggressive medical management consisting of:

1. Fluid therapy – Fluids are indeed a life saving component to the management of ileus in the rabbit. Oral fluids in addition to intravenous fluids are essential to rehydrate the trichobezoars, or hairballs, to assist their passage from the stomach.\(^3,12\)
2. Analgesics – Pain will further exacerbate the problems in the gut stasis rabbit. Analgesics commonly used include meloxicam and buprenorphine.

3. Normalise temperature – Hypothermia is not uncommon in ileus cases and warmed fluids and external warming of the patient should be included in the management.

4. Restore gut motility – Low fibre diets result in poor stimulation of gut motility as already mentioned. Liquid high fibre foods given by syringe or naso-oesophageal tube, several times daily are appropriate in the critical care phase. Prokinetic drugs are beneficial in stimulating gut motility and some, e.g. ranitidine, have added benefits relating to rapidly developing gastric ulcers in the anorexic rabbit.

5. Nutritional support - Due to the limited caecotroph production, providing vitamin supplementation is recommended and may help to stimulate appetite. A high fibre diet also stimulates appetite and caecotrophy.

6. Antibiotics - Unless the ileus is known to be caused by a bacterial overgrowth, antibiotics are generally not recommended as these may further adversely affect the caecal microflora balance.

7. Re-establish faecal microflora - Probiotics vrs Transfaunation.

**Probiotics in rabbits**

Probiotics are described as: “A live microbial” “which beneficially affects the host animal by improving its intestinal microbial balance.” Actions and benefits of yeast probiotics, such as *Saccharomyces cerevisiae* have been reported as: stimulating lactate consuming organisms to maintain optimal caecal pH; increasing cellulytic bacteria and thus production of volatile fatty acids; supplying nutrients to the rabbits; removal of toxins and pathogenic bacteria, such as Salmonella, by adhering to the yeast cell wall.

The stomach pH in kits is 5.5-6.0 but this decreases to 1.5-2.2 after weaning. A common inaccurate conclusion many veterinary trained persons make is to believe that any orally administered probiotic organisms, such as *S. cerevisiae* yeast, will not be able to survive these conditions to colonise the hind gut. In vitro testing of probiotic organisms shows survivability of the probiotic strain under conditions which mimic the rabbit’s stomach pH, a unique feature afforded by the microencapsulation of quality manufactured probiotic products.
When held at a pH of 2.0 and pH 1.5 for a 2 hour period, the loss of less than 0.1 of a log is not significant. A two hour contact time period without any buffering effect of e.g. food or water, before plating out.

This survivability of *S. Cerevisiae* is further supported in the positive effects on growth, and resistance to illness, seen in young rabbits.¹⁸

Transfaunation or feeding one rabbit’s caecotrophs to another, has been suggested,¹²,¹⁹ but administration of the whole caecotroph, including it’s intact mucosal protection, may prove extremely difficult, not to mention unpalatable to the already inappetant patient. This method of attempting to restore caecal microflora also carries risks associated with transfer of possible pathogenic bacteria from the donor rabbit, further affecting the patient’s imbalance.

Early studies in rabbits suggest probiotics are beneficial in providing support to the caecal microflora,²⁰ where dysbiosis is commonly a factor in gut stasis development. More work is needed to evaluate their precise role in the management of specific conditions of the gut. Certainly probiotic products which are manufactured specifically for rabbits will be most appropriate. Currently in the EU, only the yeast probiotic, *Saccharomyces cerevisiae* (SC47) is permitted for use in domestic rabbits. Products incorporating this probiotic and other apt ingredients to manage gut stasis, such as electrolytes for rehydration or high fibre in easy to administer oral preparations would be most beneficial.

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References:


