

Managing canine stress levels: dietary approach

Val Strong, Karen Marsh, Ross Tiffin and Christine Ward explore how a novel form of dog food may help with stress and anxiety in these animals

The worldwide COVID-19 pandemic has focused our minds on the problems of stress and anxiety in our communities, yet veterinary professionals are all too familiar with canine patients presenting with signs of stress and anxiety, which can be initiated or exacerbated by a wide variety of environmental factors (Vincent et al, 2020; Dixon and Mistry, 2020).

Stress in dogs is often demonstrated in unwanted behaviours, which can lead to a cycle of interrelated stress in the owners, surrender of the dog to the rescue sector or, in extremis, euthanasia. Veterinary practice can offer drug and/or pheromone treatment, as well as referral to qualified animal

behaviourists, in an attempt to break this cycle, but the overall aim is to manage rather than cure the condition.

The development of drug therapy has recognised that, by enhancing the transport of individual amino acids into the brain, it is possible to alter both animal and human behaviour. This change in behaviour is preceded by altered synthesis rates of neurotransmitters, including serotonin and its precursor tryptophan.

Serotonin is known to reduce behaviours such as aggression, anxieties, over-excitability and reactivity by raising overall mood state, and promoting more positive emotional responses. Serotonin is also known to improve learning and decision-making, therefore aiding the success of behaviour therapy and rehabilitation.

As part of their management strategy, behaviourists have long been familiar with “Val’s Diet”, a nutritional approach that was designed to help a dog reach and maintain optimal emotional balance and mood state. The diet features a unique ingredient balance that allows the vital amino acids and vitamins needed to synthesise key neurotransmitters, such as serotonin to reach the brain for when they are required.

First published in 1998, the Val Strong diet uses insulin, secreted in response to carbohydrate ingestion, to regulate plasma glucose levels and divert large neutral amino acids to peripheral skeletal tissues where they are involved in energetic and immune system pathways, enabling tryptophan to gain a competitive edge across the blood-brain barrier. Behaviourists had been constrained in their ability to use the diet by the need for dog owners/carers to assemble the ingredients on a daily basis, with both convenience and compliance being cited as being limiting factors.

In 2017, a commercially available, complete, dry dog food version of “Val’s Diet” was produced by the manufacturers of Oscar Pet Foods and has been distributed primarily among behaviourists. Initially this “Breakthrough” diet was trialled by several qualified behaviourists with their clients’ and vets’ approval.

In total, 22 dogs were included in this trial, with

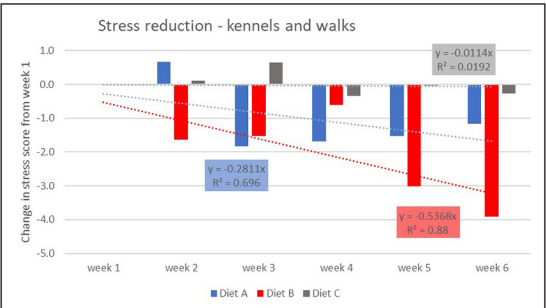
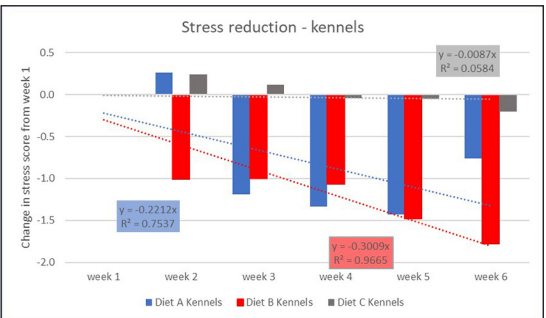


Figure 1 (top). Stress reduction monitored in kennels over the six weeks the dogs were fed three different diets. **Figure 2.** The combined effect on mean stress levels in kennels and at exercise over the six weeks.

21 dogs showing significant improvement in both their emotional assessments and mood state. At the end of the trial, all owners requested to continue feeding the diet. One owner, who had subsequently relocated to Spain, was so impressed with the improvement in her dog’s behaviour, she arranged to have the diet shipped at her own cost.

Since then, the “Breakthrough” diet has been tested in a kennel environment at the Wood Green, The Animals Charity centre, where the study looked at anxiety, agitation and inability to settle versus calm, relaxed behaviour in one group, and at reactivity and low impulse control versus composed and responsive behaviour in a second group. Results were impressive in both groups and were published in 2017 (Strong, 2017). Anecdotally, staff at the centre were particularly impressed with two cases where, in a managed outreach situation, sufficient improvement in the dogs’ behaviour allowed the owners to avoid any need to surrender their dogs to rescue at all.

Further work looking at urine cortisol levels was carried out at the University of Glasgow, as part of a master’s degree submission, and it was felt a double-blind study looking at efficacy in a controlled situation, where the maintenance of effect could

also be measured, would be advantageous.

As a result, a double-blind trial was conducted in a rescue kennel situation.

Summary of findings

Methodology

Three groups of dogs, each of between 10 and 13 dogs of differing stress levels, were subject to three diets. Diet C was the standard treatment (control), and A and B were trial diets. For the purpose of identification in the featured charts, Diet A was a commercially available complete dog food from the same manufacturer as Diet B – which was the “Breakthrough” diet.

Stress was measured over a nine-week period using a number of metrics, each providing a score of between 0 and 10, with all scores averaged to provide the mean stress score. The assessment was made separately for the kennelled and exercise/walk periods.

After the sixth week, the trial diets were replaced with the standard diet to explore whether the effect (positive or negative) was maintained.

Effect on reducing stress levels

The mean stress scores for each group of dogs were compared each week, with their baseline mean scores at the beginning of the trial (week one), showing the change in average

stress levels over the period.

When analysed relative to the control group on Diet C, the groups on Diet A and Diet B both exhibited decreased stress levels over the period they were on the new diets. A reduction in measured stress levels was evident both when kennelled and during exercise periods, and this reduction tended to increase over the six weeks. However, the reduction was more consistent when kennelled, perhaps as a result of differences in exposure to stressful situations.

As would be expected, the same pattern was demonstrated when the kennel and walk data were combined.

Dogs on Diet B showed a more consistent trend in stress reduction than those on Diet A. Those on Diet C showed no noteworthy change in stress scores over the period.

Figure 1 shows stress reduction monitored in kennels over the six weeks when dogs were fed the three different diets (before they were taken off Diets A and B in week 7). The trendlines indicate the reduction in stress levels in dogs on Diet B continued at the rate of approximately 30 per cent per week and the reduction in stress in those on Diet A grew by around 20 per cent per week. Response to Diet A appeared to be less consistent (evidenced by the lower R² figure, which is a measure of correlation).

The stress reduction observed in kennels was more apparent and consistent than on walks. The combined effect on mean stress levels in kennels and at exercise over the six weeks is shown in **Figure 2**. The combined reduction in stress levels of dogs on Diet B grew by 50 per cent per week on average. The stress scores of dogs on Diet A were also

reduced compared with week one, but the response grew at a slower and less consistent pace.

Difference in stress reduction when taken off the new diets

When the diet reverted to the standard diet (Diet C) for the final two weeks of the trial, the reduction achieved to that point was maintained. This was most obvious for Diet B (**Figure 3** and **Figure 4**). The authors think it would be interesting to find out whether this was sustained over a longer period.

While the work to date is not conclusive, the early indications are impressive and show diet can potentially make a contribution to stress reduction.

Mode of action

The amino acids tryptophan and tyrosine are converted to neurotransmitters in the mammalian brain. Tyrosine is converted to the catecholamine stimulants dopamine and noradrenaline, while tryptophan is converted to serotonin.

Serotonin plays a role in the regulation of mood, the control of sleep and arousal, the management of pain and in the control of eating. A lack of serotonin causes a reduction of the reward cascade (Blum et al, 1996), which means new or alternative behaviours cannot be learned, and depresses the release of encephalins (the body’s natural analgesics), causing an increase in touch sensitivity.

Nutritional application

Tryptophan is an essential amino acid and, therefore, its concentration in the body depends ultimately on the presence of adequate dietary intake, whereas tyrosine is a non-essential amino acid, therefore not dependent on dietary intake as it can be

synthesised from the essential amino acid phenylalanine (Eastwood, 1997; Fernstrom and Fernstrom, 1965).

The synthesis of serotonin depends on certain cofactors being present. The enzymes involved in serotonin synthesis are B6 and riboflavin-dependent as these act as cofactors. As the B-group vitamins are water soluble, an adequate concentration needs to be provided in the daily diet.

The concentration of an amino acid in the brain does not reflect its level in the blood. A complex group of blood-brain barrier mechanisms controls both the kinds of substances that enter the extra cellular fluid of the

brain and the rate at which they enter. Amino acids, among other important substrates, use an active transport mechanism, combining with transport proteins, to cross the blood-brain barrier.

The large neutral amino acids tryptophan, tyrosine, leucine, isoleucine and valine use the same transport system to cross the blood-brain barrier and compete for uptake. Hence, a treatment such as meal ingestion can influence the level in the brain of a given amino acid by modifying its concentration in the blood and/or the blood concentration of other amino acids that compete with it for uptake (Markus et al, 2000). Therefore, the ratio of

tyrosine or tryptophan to the sum of the other large neutral amino acids in the circulation will effectively control the amount of that amino acid taken across the blood-brain barrier. Competition between tryptophan and other large neutral amino acids is a dominant determinate of tryptophan uptake into the brain.

Insulin is secreted in response to carbohydrate ingestion, to regulate plasma glucose levels, but also diverts valine, leucine and isoleucine to peripheral skeletal tissues where they are involved in energetic and immune system pathways. Consequently, by stimulating insulin secretion, tryptophan

will gain a competitive edge over tyrosine for transport across the blood brain barrier. However, tryptophan levels can only be significantly raised by carbohydrate intake if the carbohydrate load occurs after protein has been broken down into its component amino acids.

Conclusion

This diet has been shown to be useful in reducing anxiety and in facilitating learning in a number of kennel environments. It can be used in conjunction with pharmaceuticals, such as selective serotonin reuptake inhibitors, as it enables increased levels of brain serotonin to be available for

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An age-old problem – caring for senior cats and dogs

Laura Lacey RVN, ESVPs NCert(AnBeh), CertVN ECC, ISFM CertFN, C&G CertSAN, BVNA CertVNDent, C-SQP, A1, Dip Pheromonotherapy, Dip Leadership and Management, details the disease processes that can affect small animal patients as they get older, and the importance of sharing with owners what is normal and what is not

Abstract

Age is not a disease, but sadly many disease processes exist that affect us more as we age. It is important owners are informed about what is normal and what is not. Some diseases and disorders have slow, chronic progressions that are easily mistaken for “they’re just getting older” and at the point when the owners realise a true problem is presenting, it may be too late for us to make significant improvements to the quality of life of our patients.

Keywords: getting old, metabolic diseases, arthritis, preventive health care

Reviewed by **Alex Campbell** MRCVS

GETTING old is a gift; a privilege denied to many – a very true phrase for sure, given the recent global pandemic. Many times, lives are sadly cut short – and we are very aware our companion animal lives are never as long as we would like them to be.

Advances in veterinary medicine have meant lifespans have increased dramatically over the years. The average lifespan of domestic-owned dogs is 12 years (O'Neill et al, 2013) and 14 years in cats (O'Neill et al, 2015), with some cats living into their 20s.

Cross-breeds and mixes have the greater longevity, but it has also been proven neutered dogs live longer than unneutered ones, with the greatest gain being for females (Woodmansey, 2018). The discussion relating to the best time for neutering is outside the scope of this article.

Many milestones occur in our patients' lives where we think about making changes. At certain ages we start to suggest senior diets or senior wellness checks, and for others we strongly advise preanaesthetic blood tests and IV fluid therapy if a general anaesthetic is needed. These will vary from species to species and according to their type; a large-breed dog is considered senior long before a small-breed dog. The basis for this is increased incidence of adverse occurrences.



Figure 1. Although this could be purely behavioural, it may be associated with pain.

Preventive measures

Boosters and annual health checks performed by the vet are an essential way to get our patients examined, but is this frequent enough? Significant deterioration in conditions can occur in 12 months. Also, are clients actually wanting to discuss “minor” ailments with the vet at these visits? Is the waiting room full of clients, adding to time pressures for everyone?

As we have found recently during lockdown, many of us have been running behind with routine work. Limited interactions with clients outside of the consult room, while still treating patients to high standards, has been challenging.

Nurses are perfectly positioned to advise clients further on age-related changes and the

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these drugs to exert an enhanced effect. In addition, the diet can complement other treatments, such

as pheromone therapy, and should be considered as an additional, adjunct treatment option.

• For further information, visit www.breakthroughdog.co.uk

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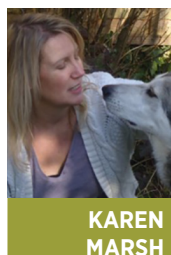
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VAL STRONG

After qualifying as a medical scientist, Val went on to pursue a career in animal behaviour and training, gaining an MSc in Companion Animal Behaviour Counselling from the University of Southampton. She specialises in the effects of diet on canine behaviour and training.



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