

• SCIENTIFIC RELEASE

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STRESS MANAGEMENT: BRING SERENITY TO THEIR BOWL



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STRESS MANAGEMENT: BRING SERENITY TO THEIR BOWL

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Pets are today considered as treasured family members sharing their owners’ home and lifestyle. However, their environment may be stressful for them. If stress is a normal physiological reaction that prepares an individual to face threats or unexpected changes, it might become damaging for health when it is chronic. Moreover, cats and dogs facing situations they perceive as challenging may develop several behaviors such as indiscipline or even aggression. These behavioral changes will be considered as inappropriate by their owners and thus alter their relationship.

Pet parents want to preserve the health and well being of their companion animals. When they notice significant behavioral changes or decreased health status, they actively try to find adapted solutions to help their pets. Choosing diets targeted to physiological needs and life style is a first step to reach this target. Several products exist on the market to alleviate effects of stress and reduce the risk of inappropriate or aggressive pet behaviors.

WHAT IS STRESS?

Some definitions

“Stress” and “anxiety” are the most common words used by owners seeking help for their pet’s behavioral problem. “My dog is stressed when I leave him alone at home” or “My cat has been anxious ever since we moved” are typical complaints that arise in veterinary consultations.

There is actually no consensus on the definition of stress. Stress can be considered as a normal reaction of a subject in response to an acute situation perceived as threatening. When an individual is confronted to physical or psychological stressors that might threaten its integrity, he reacts with different physiological and behavioral responses to cope with the situation and to reestablish a normal physiological state and well being.

Anxiety is an emotional state characterized by reactions leading to a loss of self control and adaptability. These signs of behavioral distress may be associated with physical troubles relating to cardiovascular, digestive or neurological systems.

Classification and causes of stress

Stress can be classified in a variety of ways:

- First approach consists in distinguishing acute and chronic stress;
- A differentiation can also be done according to the type of stressor that causes stress :
 - biogenic stressors, directly triggering the stress process without cognitive evaluation (caffeine, amphetamine...)

- psychosocial stressors with cognitive evaluation (acceptance in a group, threat felt to be out of control...).

- Another classification can be made by separating physiological stress from non-physiological stress, also called psychogenic stress (table 1). For companion animals, psychogenic stressors can range from slight perturbations in everyday life, to dramatic social changes like the separation from a family member. This latter point is of particular importance since it has been demonstrated that pets could develop hyper attachment towards their owner.

Table 1: Characterization of stress

	Physiological stress	Psychological stress
Exposure	<ul style="list-style-type: none"> • Physical challenges (positive or negative) - Excess of exercise • Systemic challenges - Systemic illness such as obesity, trauma, surgery • Environmental challenges - Poor housing conditions due to confinement (lack of fresh air, light, etc.) 	<ul style="list-style-type: none"> • Psychological challenges - Separation from a caretaker, family member - Invasive procedures in the absence of familiar caretakers - Exposition to a novel or changed environment (e.g. thunder noise, vet visit) • Social challenges - Interactions with aggressive pets
General consequences on pets	Perturbation of body's homeostasis, i.e. body physiological balance	Disruption of psychological well-being

From Hekman et al., 2014

HOW DOES STRESS IMPACT PET-OWNER RELATIONSHIP

Behavioral manifestations of stress

As they do with their kids, most of pet parents expect their companions to always have an appropriate comportment. Behavioral troubles are thus a common complaint in veterinary medicine. **Figure 1** presents canine behavior referral cases in young and old dogs. These populations are particularly sensitive to new situations and have different abilities to face them: young pets have to learn how to react and manage new situations; whereas old pets tend to have decreased cognitive abilities and consequently poor coping capacities. In both cases, if they are not able to adapt their behavior, they may develop unexpected or aggressive behaviors.

Canine behavior referral cases in dogs according to age

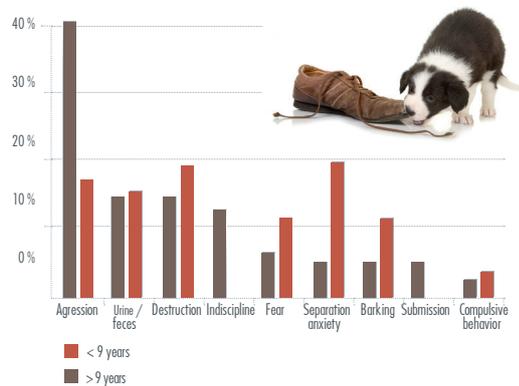


Figure 1 : Canine behavior referral cases (%) in dogs aged beneath or above 9 years.

Pet behavioral modifications vary according to the type of stress:

- In reaction to sudden and acute stressors, like aggression from other pets, dogs and cats adapt their body language either to provoke intimidation during confrontation, or to be defensive. **Table 2** shows examples of postures that are characteristic of cat emotional state. Other cues of sudden stress including trembling, excessive panting or incapacity of answering to owner's request because of sharp apathy are seen in dogs. On the opposite, some dogs submitted to stress will bark continuously and even growl aggressively; hence possibly creating misunderstandings with the owner and altering their relationship.

Table 2: Body postures traducing cat emotional state

Body Postures	
1 Relaxed	<p>Activity – sleeping or resting, alert or active, may be playing Body – lying on side, on belly or sitting; if standing or moving, back horizontal Breathing – slow to normal Legs – bent, hind legs may be laid out; when standing extended Tail – extended or loosely wrapped; up or loosely down when standing</p>
2 Alert	<p>Activity - resting, awake or actively exploring Body – lying on belly or sitting; if standing or moving the back is horizontal Breathing – normal Legs – bent; when standing extended Tail – on body or curved back; up or tense downwards when standing; may</p>
3 Anxious	<p>Activity – alert, may be actively trying to escape Body – lying on belly or sitting; if standing or moving the back of the body is lower than the front Breathing – normal or fast Legs – under body, bent when standing Tail – close to the body; may be curled forward close to body when standing.</p>
4 Fearful	<p>Activity – motionless, alert or crawling Body – lying on belly or crouched directly on top of all paws, may be shaking; if standing the whole body is near to the ground, may be shaking Breathing – fast Legs – bent; when standing bent near to surface Tail – close to the body; curled forward close to the body when standing.</p>
5 Terrified	<p>Activity – motionless alert Body – crouched directly on top of all paws, shaking. Hair on back and tail bushy. Breathing – fast Legs – stiff or bent to increase apparent size Tail – close to body</p>

- The consequences of chronic stress on pet behavior are more severe. In cats it can be characterized by excessive and compulsive licking, possibly to the point of body damage; or on the contrary the absence of grooming. Cat anxiety can also lead to isolation, continuous meowing, and alteration of the feeding behavior with anorexia or polyphagia (excessive feeding). In dogs and cats, stress can also be expressed by urinary marking (possibly causing urinary infections) or random defecations, causing real nuisance for the owner.

EFFECTS OF STRESS ON PETS HEALTH

Stress can have several negative effects on pet health. The relationship between the stress response and the immune system is well documented and depends on the type and duration of stressor. The initial response to an acute stress boosts pet defenses, for instance to prepare the immune system to fight an impending challenge such as microbial invasion. However, when the stress is exaggerated or prolonged, it may inappropriately inhibit the immune



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response decrease sensitivity to infections, decrease the response to vaccination or even cause cancers.

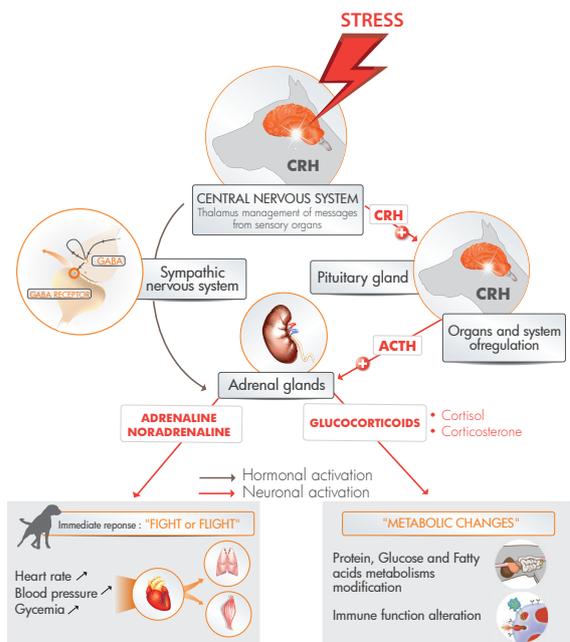
In humans, it has been shown that both acute and chronic psychogenic stress can negatively impact wound healing. This might also be expected for pets, especially for animals facing traumatic wounds or surgical incisions. Other health consequences of stress are suggested in pets. The link between chronic gastric diseases and anxiety has been demonstrated in dogs; other links with skin or cardiovascular diseases are also documented. On the long term, the stress response may also impact growth and reproduction, or even ultimately be associated with shortened life expectancy, as demonstrated in dogs.

HOW TO TREAT AND PREVENT STRESS?

- Understanding physiological mechanisms behind stress

Stress is a complex mechanism involving the central nervous system, the sympathetic nervous system and various organs with numerous hormones interactions (figure 2).

Stress response mechanisms



CRH: Corticotropin - releasing hormone
ACTH: Adreno - Cortico Tropic Hormone

Figure 2 : Mechanisms behind physiological and metabolic changes resulting from stress

Stressor stimuli are first transmitted from one neuron to another to reach the Central Nervous System (CNS). Brain then interprets experiences as threatening or non threatening and determines the behavioral and physiological response to each situation.

When the brain perceives a threat, the nervous system transmits impulses to adrenal glands which release adrenalin and noradrenalin. Consequently, the organism adjusts to the stressful condition; all organs involved in this mechanism (heart, lung and muscles) are stimulated to enable a quick reaction. This has been labeled the "fight-or flight" response

A hormonal mechanism is then activated: CRH is released from hypothalamus and triggers the liberation of ACTH from the pituitary gland, resulting in the production and discharge of cortisol and corticosterone from the adrenal glands. These glucocorticoids influence a large number of metabolic processes including protein, glucose, and fatty acid metabolism, as well as immune function.

- 2 approaches to manage stress

Brain is the primary mediator and target of stress resiliency and vulnerability processes, as it determines what is threatening, and regulates the behavioral and physiological response to a given stressor. There are two main possibilities to act on brain and nervous system to make pets less sensitive to stress:

- The most common method includes the use of anxiolytics. However, management of stress with pharmacologic means has been extensively studied, and it has been demonstrated that these drugs generate habituation issues.
- An alternative way consists in using adaptogen solutions which improve ability to cope with stress. With that approach, pets are able to build their own reaction, and to learn and enhance their adaption abilities.

- Adaptogen solutions can improve pet ability to cope with stress

Today, numerous solutions claim natural stress management functionalities. Yet, the vast majority of these available ingredients lack clinical proves and relevant dosage advises to support their effects. Indeed, in regards with regulatory approach and public concern towards clinical tests, it becomes more and more difficult to demonstrate product effects in an ethical way.

To respond to this growing demand for behavior management with natural products, DIANA Pet Food experts in pet health and well being (Vit2Be) have developed the GABOZEN 3D, a natural solution to be used in food or treats. This unique ingredient combines targeted nutrients acting on nervous system and mediation in neurotransmission. Its adaptogen properties mainly rely on the regulation of GABA (γ -Aminobutyric acid), a well-established neuromodulator that inhibates ACTH release and can thus lower effect of stress.

GABOZEN 3D is made of 3 components:

- A *Paciflora incarnate* extract with a high content of GABA and polyphenols.



- A Patented fish hydrolysate with a high proportion of low molecular weight peptides acting on the liberation of GABA.



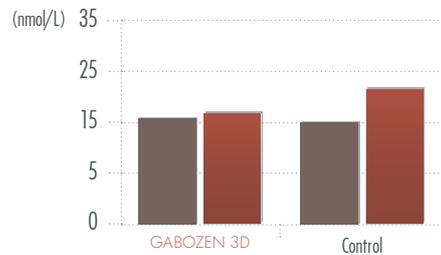
- A *Valeriana officinalis* extract standardized in valerenic acid which modulates GABA effect and interact with glutamate receptors to limit neuronal excitation and therefore stress intensity.



Several experimental protocols have already shown the benefits of these ingredients tested separately on laboratory species. Some of these plants active compounds are known to pass through the blood brain barrier and affect the GABA synthesis and release as well as the stimulation of it's receptors.

A specific protocol conducted on 40 dogs was designed to assess the effect of the product on anticipation and management of stress when applied at 5% in treats. In this study, stress level was quantified by measuring the changes in salivary cortisol and plasma ACTH after moderate (J0 - J2) and intensive stressing (J2). Moderate stressing was simulated by a change of environmental conditions and veterinary consultation. Intensive stress was induced by submitting dogs for 20 minutes to a transport simulation.

Evolution of average salivary cortisol level (nmol/L) after moderate stressing (J0 - J2)



Evolution of average ACTH plasma level (pg/mL) after moderate stressing (J0 - J2)

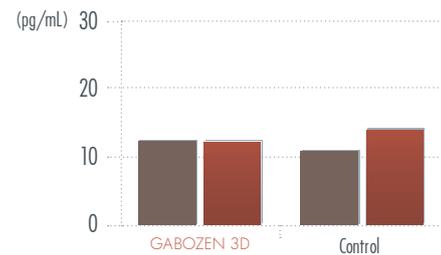


Figure 3 : GABOZEN 3D effect on salivary cortisol and ACTH plasma levels in dogs submitted to stressing conditions

Results shown in figure 3 demonstrate GABOZEN 3D effect on stress perception. The stability of ACTH and salivary cortisol release observed in dogs fed treats containing the adaptogen shows that the product limits the impact of stressful situation on the animal perception, strongly suggesting that animals are able to react positively.

Adaptogen products applied in diets, treats or nutritional complements may be indicated to help pets cope with stressful situations. They may be particularly adapted in specific cases such as weaning, transient changes (holiday, hospitalization, contest, change in feeding pattern), post traumatic anxiety or pain, privation or separation. Diets supplemented with adaptogen natural solutions could contribute to delay or limit outbreak of stress linked disorders.



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STRESS MANAGEMENT CLAIMS IN PETFOOD: «REDUCED STRESS» OR «IMPROVED SERENITY»?

Stress management functionality, if scientifically substantiated, can definitely bring added value to pet food brands since it addresses a growing demand from pet owners. However, pet food manufacturers need to answer a crucial question when promoting this benefit: which claim is the most suitable? In fact, talking about stress can carry a negative image since owners could consider themselves as one of the stresses factors and feel guilty about that. It is thus crucial for pet food manufacturers to find the best language to promote stress management benefits to pet owners. Claiming “enhanced serenity” or “increased adaptation capacity” could be a good solution. Indeed, highlighting the fact that providing companion animals with a diet helping them to face a stressful situation and thus increase their well-being carries a better image to pet owners.

CONCLUSION

Increased urbanization has resulted in smaller living spaces, higher population densities and longer working hours. Pets are expected to be flexible, even while their owners may have less time to meet their needs. A wide range of solutions from drugs and nutraceuticals to alternative therapies exists to manage stress and prevent health problems. The use of natural ingredients enhancing animal adaptability abilities is a promising way to help pets and owners enjoy their new ways of living.

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