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## BEHAVIORAL VETERINARY MEDICINE: A NEW DIRECTION IN THE STUDY OF BEHAVIORAL DISORDERS IN COMPANION ANIMALS

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### ABSTRACT

The substantiation of the relevance of a new direction in veterinary medicine - "Behavioral Veterinary Medicine" is given to conduct a thorough analysis of the causes, consequences, as well as methods of prevention, diagnosis, therapy and correction of behavioral disorders in cats and dogs, to raise their level of welfare. Among domestic animals, cats and dogs are the most popular species, since in the modern world communication with them increases the emotional comfort of a person, positively affects his state of health. In this regard, in many countries, there has been an increase in the number of companion animals. At the same time, undesirable forms of animal behavior violate the harmonious relationship between owners and pets, being one of the main reasons for which they are transferred to another owner or shelters, thrown away or subjected to euthanasia. Unwanted forms of behavior include various types of aggression, fears, phobias, anxiety, neurosis, depression, stereotyping, hypertensions, unscrupulous behavior, reproductive behavior disorders, as well as other behavioral problems (hyperactivity, destructive behavior, stalking cars, barking outsiders, excessive vocalization, etc.). The most common and dangerous form of deviant behavior in cats and dogs is aggression. There are many causes of abnormalities in animal behavior. This includes pathophysiological disorders of various etiologies, hereditary factors, and adverse environmental conditions that do not allow satisfying the dominant need, which ultimately leads to the development of chronic stress and a decrease in the level of animal welfare. Specialists in behavioral veterinary medicine developed questionnaires for collecting a behavioral history, methods for diagnosing disorders in the behavior of cats and dogs of various etiologies, and developed algorithms for treating behavioral disorders. The effectiveness of these protocols will depend on the skill of the veterinarian in the field of behavioral veterinary medicine.

**Disciplinary:** Veterinary Medicine.

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## 1. INTRODUCTION

For millennia, pets have been an integral part of most societies. In recent years, people's attitudes toward pets, in particular cats and dogs have changed from a utilitarian to a more emotional one. Numerous studies indicate that communication with pets is of great benefit to human health and, as a result, owners of cats and dogs are less likely to see a doctor and do not need long-term medication (Anderson, 1996). In this regard, the number of these animals in many countries of the world is regularly increasing. Worldwide, the number of owner dogs is about 400 million individuals (Coppinger, et al., 2002). In Russia, according to the data for 2018, the number of domestic cats and dogs is about 33 million and 19 million animals, respectively, which puts it in third place in the world in the number of cats and fifth in the number of dogs. More than half of the households in our country have cats or dogs, and 15% of them have both a cat and a dog. In the United States of America and countries of Western Europe, up to 40% of families keep dogs; in Australia, 53% of families have dogs or cats (Burghardt, 1991).

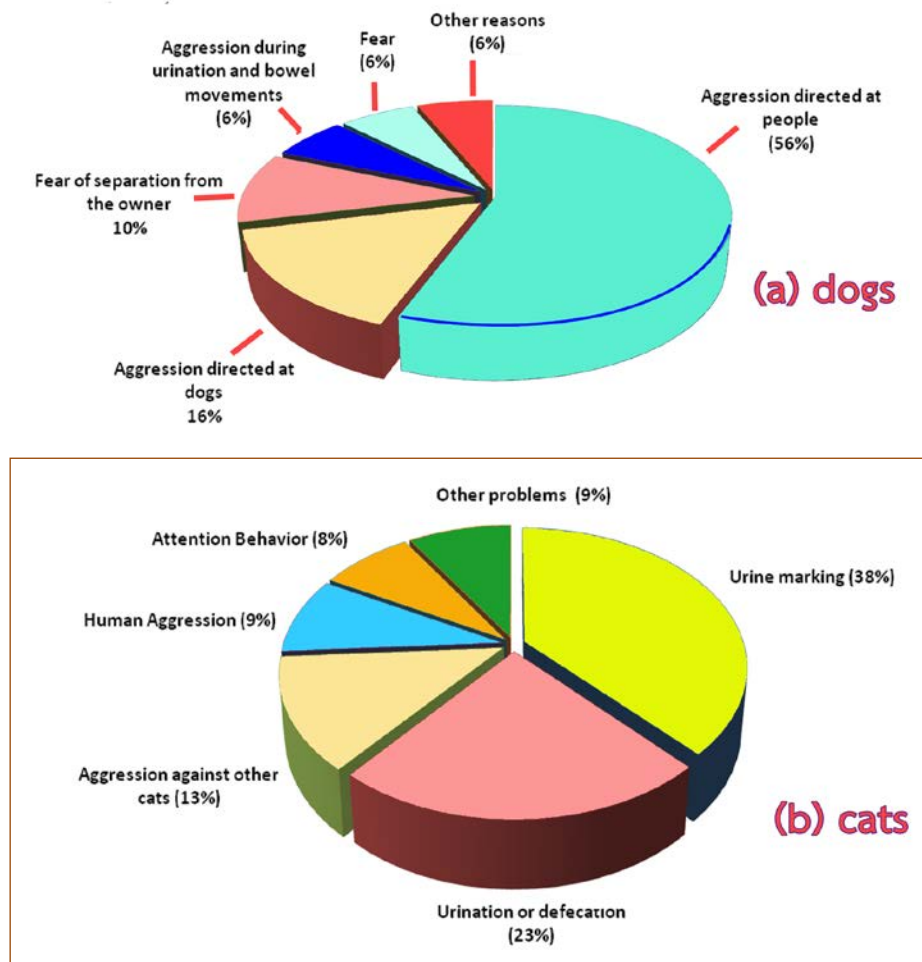
## 2. EPIDEMIOLOGY OF ABNORMAL BEHAVIOR OF CATS AND DOGS

Although the presence of an animal in the house gives certain advantages, it often creates several problems. Often cats and dogs exhibit behaviors that disrupt the relationship between humans and animals. Unwanted animal behavior can pose a threat to human health and life. For example, in the US, the number of dog bites causing injuries exceeds 2 million per year. Problems with animal behavior are some of the most common reasons they are given to another owner or shelter, thrown away, or euthanized. Every year, millions of cats and dogs are handed over to shelters all over the world, and in 89% of cases, this is caused by disturbances in animal behavior (Australian Companion Animal Council, 2009). In the United States, for example, 15 to 20 million dogs and cats are euthanized every year in animal shelters. Most of these animals end up in shelters due to unacceptable behavior. 30% of dog owners and 18% of cat owners consider euthanizing their pets due to behavioral abnormalities. Almost 100% of the dogs brought to the Behavioral Clinic were previously recommended by someone to euthanize. One year after going to the clinic, less than 10% of dogs and less than 1% of cats were euthanized. In Scotland, 39% of euthanasia cases of physically healthy dogs are associated with behavioral disorders (Overroll, 2005).

Thus, most companion animals in the world, regardless of age, do not die a natural death, and behavioral problems are currently considered one of the many causes of euthanasia in domestic animals. At the same time, these problems are one of the most common causes of death of pets in the first year of life. So, all over the world, the average age of dogs is only 3.5 years (Burghardt, 1991).

Today, the veterinarians do not pay enough attention to behavioral problems, not only because of a lack of time but also because most of them have a poor understanding of the treatment of these disorders. Perhaps, for this reason, dog owners with problematic behaviors of their pets are contacting training specialists. In some cases, behavioral abnormalities are associated with the general state of the animal's health, for example, with the first signs of an undiagnosed disease. So training methods may be ineffective. Unscrupulous behavior can be caused by both insufficient locomotion and other violations of care, and polyuria, characteristic of diabetes mellitus, diseases of the kidneys or urinary tract. The causes of increased aggressiveness are sometimes in chronic or acute pain, hyperthyroidism in cats, and hypothyroidism in dogs. Also, some neurological diseases (brain damage, epilepsy) and heart disease significantly affect normal behavior, causing corresponding changes.

Unfortunately, at present, about half of the owners of dogs and cats report signs of deviant behavior in their pets, the manifestation of which does not suit them for any reason. Such behavior includes various types of aggression, fears, phobias, anxiety, neurosis, depression, stereotyping, hypertension, unscrupulous behavior, reproductive behavior disorders, as well as other behavioral problems (hyperactivity, destructive behavior, car harassment, barking outsiders, excessive vocalization, etc.), see Figure 1.



**Figure 1:** Relative incidence of major behavioral problems in (a) dogs and (b) cats (after Borchelt and Voith, 1982)

Moreover, some of these forms of undesirable behavior are characteristic only of young animals and pass with age, some of them appear sporadically, but they are often a cause for serious concern (Horwitz, et al., 2005).

Specialists in the field of behavioral veterinary medicine consider aggression in dogs as the most common form of deviant behavior, and in cats it takes the second place after unscrupulous behavior.

With the close interaction of different species, the inevitable occurrence of conflict situations and accidents is manifested in the form of aggression and attack of an animal on a person (Makenova M.T., et al., 2013). Aggressive behavior of cats and dogs is a very serious threat to human health and life, as well as to the animal itself (Patronek et al., 2006).

Potentially, any animal in a certain situation can show aggression towards humans and harm their health (Presutti, 2001). According to some authors, at least one dog out of 20 bites a person once in the course of his life (Griego et al., 1995). Aggressive behavior of dogs aimed at children and adolescents is also one of the reasons for the development of serious psychological disorders in

victims (Schalamon, et al., 2006). Table 1 show a record example of dog biting human.

According to studies conducted in one of the major cities of Russia for 2006-2010, 11,849 dog bites were recorded, which averaged over 2,900 bites per year. In 99% of cases, according to the victims, the owners' dogs showed aggression, and in 66% of cases, they were animals known to the victims. In most episodes, aggression was provoked by a game or petting of a dog, interference in the conflict of fighting animals, deliberate provocation, as well as if the victims accidentally stepped on the tail, or paw of the animal, bothered while eating, tried to pick it up, on a leash, etc. (Beck et al., 1975).

**Table 1:** The relative frequency of manifestations of various types of aggression in the behaviour of dogs (Nikolskaya, 2011)

Types of aggression	The number of bitten	
	Human	%
Protective	141	37
Dominant	136	35
Game	66	17
Redirected	23	6
Interspecific	1	0.25
Parent	2	0.5
Idiopathic	17	4.25

According to epidemiological data of dog bites in the US, more than 1 million people are attacked annually, 10 of them die, and 50% of the injured remain scars (Overroll, 2005).

Nether the less serious problems are noted in cases of manifestation of aggression by cats, the frequency of occurrence of which among other behavioral deviations are quite high and amounts to 25%. The manifestation of aggression in cats has a specificity, in addition to bites, scratching leads to no less serious consequences, which causes a fairly common and serious disease - cat scratch disease. Annually, 22,000 cases of this disease are recorded in the United States, with 10% of the victims being hospitalized (Overroll, 2005).

### 3. ETIOLOGY OF DEVIANT BEHAVIOR IN COMPANION ANIMALS

There are many reasons that cause various kinds of deviations in the behavior of animals. These include problems indicating pathophysiological disorders (organic CNS lesions; toxicosis; cardiovascular diseases; infectious diseases; inflammatory diseases; injuries; metabolic disorders; parasitic diseases, etc.) and hereditary abnormalities, effectiveness diagnosis and treatment of which largely depends on the knowledge of the veterinarian about the behavior of different species of animals. Also among the reasons can be attributed to a lack of personal experience (social deprivation (isolation) in the first months of life); adverse environmental conditions or stressful situations; exposure to strong aversive external irritants (causing hostility, disgust, perceived as punishment - fireworks, small noisy children, unwanted stroking and squeezing, cruel punishments, attack of other dogs and cats, etc.); excessive praise (encouragement) on the part of the owner (unintentional "taming" of undesirable behavior, for example, asking for food, attracting attention, aggressive reaction to strangers and other dogs), as well as problems caused by species-typical behavior (strongly pronounced hunting instinct, cats scratching furniture, dog aggression towards each other, high need for movement, digging in normal breeds of dogs, marking territory, desire to dominate family members) (Askew, 1999).

Thus, ignoring the internal life of the animal, the lack of training in the basic signals of

obedience, and appropriate veterinary care increases the risk that it will form unwanted behavior and it will end up in a shelter or be euthanized (Landsberg et al., 2003). Along with this, owners of cats and dogs exacerbate the problem by the improper choice of the animal, unjustified expectations, and possibly underestimating or not knowing how much time, money, and effort it will take to ensure the animal a high level of comfort throughout life.

Most behavioral disorders in cats and dogs arise due to the lack of competence of owners in the field of keeping, feeding and behavior of their pets, which does not make it possible to fully satisfy many basic needs of animals (needs for novelty, movement, game, diversity of habitat, social contacts, etc.). Behavior is a complex adaptive activity of an animal, including processes due to which it senses the external world and the internal state of its body, adequately responds to incentives that arise. It plays an important role in the preservation and self-development of the individual and the species as a whole. The basis of modern ideas about the physiological mechanisms of purposeful behavior is the triad "need - motivation - emotion." The first stage in the organization of purposeful behavior is the dominant need, reflecting the body's need for something. Need is the main driving force of behavior that connects the animal's body with the outside world and encourages it to act. The need for an active state is expressed in mental activity in the form of emotions and becomes a motivation for a particular behavior.

The value of needs is that they form motivations that stimulate the activity of the body. The need grows into motivation when the internal mechanisms of maintaining constants become insufficient, that is when the need reaches a threshold level. The state of the environment can increase or decrease this limit value. Unlike needs, an individual is not able to ignore motivation.

Motivation or motivation for action arises based on the activation of brain structures that encourage higher animals and humans to perform actions aimed at satisfying their needs. Biochemical shifts in the internal environment of the body and the action of external stimuli are transformed through central chemoreceptors into an excitation process that activates special motivational centers of the hypothalamus (food, drinking, fear motivation). Hence, motivational arousal extends gradually, depending on the severity of the initial need, to the limbic and reticular formations up to the cortex of the cerebral hemispheres, and leads to targeted search behavior. Motivational arousal helps to extract engrams of memory from the brain, changes the endocrine status of the body, increases the discriminatory ability of analyzers, activates the emotional structures of the brain, which leads to a subjective feeling of the corresponding needs.

Motivational arousal plays a leading, pacemaker role in the holistic activity of the body. The state of the body during motivation is characterized by several common features: activation of the motor cortex occurs; the tone of the sympathetic nervous system rises; activation of sensory systems is observed; there is an increase in search activity; a memory of previous experience occurs; emotions arise that mobilize the body's resources.

Motivational arousal, inducing the body to purposeful behavior, is stable and persists for a long time until the need that caused it is satisfied (Ivanov, 2007)

Unmet needs lead to the formation of chronic negative emotions (Nikolskaya, 2011), and as a result of frustration, which contributes to the formation of a focus of stagnant arousal, depletion of the central nervous system and, as a result, stress.

The stress response system is designed so that the animal can effectively respond to the stress

factor, using appropriate behavioral patterns and thereby get rid of discomfort. Thus, stress is essentially a normal adaptive response that allows the animal to survive in a diverse and variable environment. If the animal cannot avoid the influence of the stress factor, since it cannot control the situation using the appropriate behavioral reaction, the stress response leads to negative consequences for the body. At the same time, a negative emotional reaction persists and the generation of a neuroendocrine response continues, resulting in a decrease in immunity, depletion of compensatory mechanisms, and the development of various somatic disorders. According to the fundamental principles of the doctrine of the dominant of Ukhomsky (1966), the theory of functional systems (Anokhin, 1970) and the biological theory of emotions of Anokhin (1964), without achieving the final useful result in one or another functional system of the body, appear the prerequisites for the development of pathological processes of endogenous origin under the influence of a stressor (Salekhov, 2014; 2015).

#### **4. ANIMAL BEHAVIOR AS A REFLECTION OF THEIR WELL-BEING**

The physical and mental health of the animal is an indicator of its welfare. The welfare of animals is the state of an individual, which indicates the ability of animals to cope with the external environment, adapt to it, and make an emotional assessment of the result of adaptation. Welfare depends on how much effort (energy) the animal spends on adapting to environmental conditions and how long it takes these efforts. Animals that are under stress for a long time have a low level of well-being. In most countries of the European Union and the United States, animal welfare is given great attention, where control over the level of animal welfare is fixed legislatively. The pet welfare assessment system was developed in the UK by the Farm Animal Welfare Council in 1977. It is based on the rule of five freedoms:

- 1) Freedom from hunger and thirst. Animals on any farm should have constant access to water and feed to maintain good health and welfare.
- 2) Freedom from discomfort. Animals should be in an environment that implies the availability of shelter from adverse environmental and climatic factors and a place of comfortable rest.
- 3) Freedom from bodily harm, pain, and illness. The system for keeping animals should include mechanisms for urgent diagnosis and treatment of animals.
- 4) Freedom to display normal behavior. This freedom is guaranteed by sufficient space, a variety of environments, and the ability to contact their fellow tribesmen.
- 5) Freedom from fear and stressful shocks. Animal conditions should exclude mental discomfort and animal suffering.

To assess the well-being of different types of productive animals, methods have been developed that allow a comprehensive assessment of the condition of animals according to four principles: feeding, keeping, health and behavior (Ivanov A.A., et al., 2013). However, there are no clear rules for assessing the well-being of pets, in particular cats and dogs. All responsibility for their condition lies with the owners, whose level of knowledge in this area is often quite low.

#### **5. CORRECTION OF DEVIANT BEHAVIOR OF CATS AND DOGS**

Veterinary medicine specialists have a wide range of tools and services for treating pets from many infectious, non-infectious, and parasitic diseases. However, behavioral abnormalities in cats and dogs in our country are not given due attention, due to the lack of systematic knowledge among specialists in the field of veterinary medicine about the treatment of these disorders. But before

talking about deviant behavior, it is necessary to define the concept of a norm that will serve as a standard for diagnosing any behavioral anomalies. Until recently, even in Western countries, veterinary medicine did not recognize clinical behavioral medicine. This is a new field of science in which there is still much unknown. The first attempt to legitimize this discipline in the United States was made by the Society for the Study of Animal Behavior, which developed the requirements for certification of specialists in this field. In the United States, behavioral medicine became licensed only in 1995, thanks to the efforts of Bonnie Beaver, Ph.D. in veterinary medicine at the University of Texas School of Veterinary Medicine. From that moment, this discipline was included in the curricula of veterinary schools, and clear curricula were developed. According to 2005 data, in the USA and Canada, there were 9 veterinary schools where courses on correcting the behavior of domestic animals were taught, in 4 schools there was a system for training graduate students and residents in behavioral medicine.

Specialists from the UK, USA, Canada, Belgium, France, and Australia in the field of behavioral veterinary medicine have developed algorithms and protocols that allow for effective differential diagnosis of various types of disorders in the behavior of cats and dogs. With their help, the causes of these disorders are also identified, which ultimately help to prescribe effective treatment and correction of the revealed deviations (Horwitz et al., 2005).

Behavioral veterinary medicine is designed to solve the problems of the prevention and treatment of behavioral disorders in animals. Informing future owners about the biological and social needs of pets will prevent them from developing behavioral abnormalities. These measures include recommendations for choosing an animal, attending training and socialization courses for puppies and kittens; training owners on the rules of restricting the freedom of movement of the animal; methods of teaching pets how to behave in a home to prevent unscrupulous, destructive, and aggressive behavior. To correct the undesirable behavior of animals, various methods are used, which include: the formation of the desired behavior (education); eliminating the possibility of committing unwanted behavior; punishment or negative reinforcement when used properly; quenching unwanted behavior; the formation of incompatible behavior; the relationship of behavior with a specific signal; reinforcement of the absence of unwanted behavior; elimination of motivation; training and veterinary measures (castration, the use of tranquilizers that reduce anxiety, which should be used as part of a comprehensive therapeutic program).

Unfortunately, increasingly, problems with the behavior of animals in the modern industrial world are causing them to abandon or prematurely die. Prevention and treatment of behavioral disorders in companion animals is not an easy task, however, veterinarians with a qualified and rational approach to this problem can really help maintain the health and improve the quality of life of their patients and their owners. Deviations in the behavior of animals can be one of the indicators of their health and well-being. In the field of veterinary medicine over the past decades, knowledge in the field of physiology, biology, pathology and therapy has risen to a whole new level. But only in recent years have been identified the causes of many behavioral disorders of animals, sometimes representing manifestations of severe pathological conditions and requiring qualified assistance from veterinarians. To help the animal, specialists in the field of behavioral veterinary medicine must be able to competently change behaviors taking into account the cognitive needs of cats and dogs. And the prudent use of drugs that affect behavior can play an important role in this process. As a result, the

integration of all these methods in modern veterinary medicine should be the main approach to solving behavioral problems that can bring real benefits both to the patient and his owner, as well as to the doctor himself.

## 6. CONCLUSION

The role of animal - companions in the life of a modern person has changed significantly since the intense pace of life causes emotional stress and due to the presence of pets, this condition is leveled. In this regard, the population of domestic cats and dogs is steadily increasing, but at the same time, cases of occurrence of undesirable forms of behavior that cause discomfort in the relationship between man and animal. And it has become more frequent. Unfortunately, behavioral disorders in companion animals have recently become one of the main reasons why animals find themselves in the street, in shelters, or undergo euthanasia. Veterinarians are required to provide comprehensive assistance to their patients, including assessing deviations from normal behavior, as well as suggest ways to solve problems before they become too dangerous. To do this, veterinarians must learn to distinguish deviant from normal behavior and anticipate or diagnose cases when a deviation from the norm occurs. "Behavioral veterinary medicine", as a new direction in veterinary medicine, allows providing companion animals a high level of welfare due to qualified prevention, diagnosis, and comprehensive treatment of behavioral abnormalities in cats and dogs.

## 7. AVAILABILITY OF DATA AND MATERIAL

Information of this study can be made available by contacting the corresponding author.

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