



# Module 17: Biobehavioural Monitoring in Dogs

- The definition of biobehaviour
- What is monitoring?
- How it applies to dogs
- Why is biobehavioural monitoring in dogs so important?

In Module 17 you will learn the definition of biobehaviour and what it means for your dog. The following topics will be discussed:

- The definition of biobehaviour
- What is monitoring
- How it applies to dogs
- Why biobehavioural monitoring in dogs is so important
- What is the future of this area of study

**Biobehavioural Monitoring in Dogs - 5m27s**

## 17.1 Introduction

**There has long been the mistaken assumption that no other animal had emotions and that it was purely a human quality.**

Now there are plenty of researchers examining the truth. Research is focusing on a concept called biobehavioural monitoring. In order to understand this concept you will have to understand what the words mean.

The whole idea of the biobehavioural approach is to understand the science behind abnormal behaviours. For example, biobehavioural science can explain why dogs get so excited to see us. Brain scans reveal that dogs get very excited when they're able to detect the smell of a familiar human.

For them, our return home signals a relief from boredom and loneliness. Studies show a substantial rise in neurological activity when they sense us at the door. Gregory Berns, a neuroscientist at Emory university studies trained dogs under an MRI scanner and describe his findings in a book called 'What it's like to be like a dog'. When dogs react positively to stimulus, the reward neural pathways show enhanced activity.

Biobehavioural studies show many similarities between human and canine brain structure and functions. For example, the caudate nucleus is a structure in the brain that is known to contain the highest density of dopamine receptors.

Dopamine is a pleasure neurotransmitter but is actually much more complex than just that. The caudate nucleus is active in dogs when they anticipate something pleasurable.

## 17.2 Defining Biobehaviour



**Bio plus behavioural becomes biobehavioural meaning 'of or relating to the application of biological methods and ideas to the study of behaviour in an attempt to understand emotions and reactions in terms of brain and physiological function', according to dictionary.reference.com.**

Biology has always been the study or research of hypotheses to prove a theory with regards to biological functions. Biology studies living organisms including their function, structure, evolution, growth, taxonomy and distribution.

When you add the word to behavioural, you are adding in psychology.

Behaviour is the study of how one conducts themselves or acts, particularly towards others. The behavioural aspect looks at how a dog might react to a situation or stimulus.

You will discover that many things in the following modules continue to reappear.

Operant conditioning, if you will recall, is about providing a stimulus to your dog and getting the appropriate reaction. It also means you can train for certain behaviour by introducing a stimulus and training for that specific reaction to occur, while providing rewards to your dog for their good response. That biobehaviour has now been defined and we can look a little at the history to see how it applies to this module.

The first time biobehaviour appeared in written works was in the early 1980s.

The beginning of what is considered biobehavioural monitoring in dogs started then. You should also recall this was about the time that training methods for dogs changed. Now the idea that how you interact with your dog could influence their responses to you was becoming more accepted.

With more research and newer technology more changes have occurred with regards to understanding dogs, how they can be trained, and how they will interact with you. Cognitive neuroscience, neurobiology and psychobiology are revolutionary areas of study that use biobehavioural concepts to help researchers understand emotion, cognition and other functions.

There is one more thing that researchers are adding to the concept of biobehaviour and that is neural substrates. Neural substrates or pathways are all about the neurological pathways of emotions and feelings. For example, how do you feel pain?

Let's use pain in your finger as an example.

You have just given yourself a paper cut and are bleeding. You immediately felt pain. You have nerve cells in your fingers which were cut, but the neuro pathway from the nerve cell to your brain is actually how you recognised that pain. Until the message of the cut went from your finger to your brain, you did not register the pain. The same can be said with dogs. They have neural substrates that connect in the brain to display emotion and other behaviour.

Scientists call impulse control and attention executive functions. These are functions that occur in a different part of the brain over regular reactions and behaviour. Often it is about your ability to concentrate on one thing and learn, while also being able to multitask. For dogs it is about giving you a short amount of attention for learning before they want to play again.

Learning is studied based on biobehavioural concepts as a way to understand more than normal function, development and how the brain interacts with your dog to yield certain behaviour.

Brain scientists or neuroscientists have started accumulating an impressive amount of information with regards to stress and organic related causes of abnormal behaviour. What this all means is that scientists are mapping neural substrates to determine which parts of the brain are active during emotional behaviour and learning.

Panksepp, in 1998, launched a book regarding the psychobiological theory of emotion. He postulated that 'emotional command systems interact in biologically prepared ways to modulate and shape expression of motivated behaviour'.

Your dog's emotional ability is related to biological pathways that will modulate and shape the behaviour you see in a motivated manner. Some behaviour is motivated by needs or wants, and thus

the behaviour you see is going to fulfil those requirements. In addition, the way your dog is motivated to follow through is pre-set by the type of motivations.

The theory further postulates that behavioural disturbances most likely result from traumatic events or adverse learning which disrupt the equilibrium of the "emotional systems". Using this theory you can understand and treat several behaviour problems in dogs. Panksepp calls this a 'quadrant of emotional command systems' with a primary drive towards the traditional dog behaviour. For some behaviourists and trainers most equipment has been purchased in order to learn the dog's 'neural basis of reward'. A dog is mapped for its usual behaviour, with the neural substrates highlighted with a coloured fluid and a machine that shows the neurons. This is mapped out so the trainer or behaviourist can see a normal functioning brain and apply it to a change in behaviour or emotional display that may be abnormal.

## **FACT**



Dogs have the same brain structures that produce emotions in humans.

*Source: discovermagazine.com*

## **17.3 What is Monitoring?**

**Your dog has certain motivational needs and wants.**

Usually they are about getting food, being safe, finding affection, and finding a mate. These needs are what many believe drive your dog's behaviour. But how is this going to be seen? How can a scientist look at the biobehavioural concept of a dog? It becomes the second part of our module: monitoring.

Biobehaviour and monitoring in dogs is the way we can learn more about dog behaviour; what is normal, abnormal and why it has occurred.

You already know there is technology to monitor neural substrates. It is a part of the monitoring process. A dog is checked by various technological machines like CT scans. CT scans are able to monitor current behaviour when a dog is awake. A fluid is given to the dog that enters into the bloodstream and can actually show which areas of the brain are active neurologically.

There is other equipment that can also map a dog's brain activity. The equipment is not static or attached to a machine/computer, but is attached to and 'worn' by the dog, so that the trainer or behaviourist can monitor the behaviour while the dog is going about its normal activities. It is able to record data similar to that of a tracker or sleep apnea device. In most cases this is done in a laboratory with volunteer dogs, rather than as a home study. More and more behaviourists and trainers are starting to find these methods helpful in diagnosing a dog's behaviour.

As there has been significant progress in monitoring dog behaviour based on biobehavioural concepts there are studies available that vets, trainers and behaviourists can read. These research papers highlight certain neural substrate changes that may create certain abnormal behaviours in the brains of dogs, which then helps the average vet, trainer or behaviourist treat your dog without the in depth technology.

## 17.4 Why is Biobehavioural Monitoring in Dogs so Important?



**Do you want to know what is going on with your dog? Let's look at the human brain.**

We are still uncertain what causes medical conditions such as dementia and Alzheimer's; however, we know they are attributed to the brain. We know that certain neurological functions stop working properly which changes the behaviour of an adult and also yields memory loss.

Now think about what biobehavioural monitoring in any animal could do for figuring out behavioural changes or current behaviours that seem abnormal. Already, you know that the field of study is attempting to figure out why an animal behaves in certain ways. You know it has been attributed to certain neural substrates that bring about that behaviour based on motivation and instinct. Now, wouldn't it be nice if you could determine where trauma or stress has affected your dog and try to repair that damage?

Long ago the concept of euthanasia for animals was created. We thought it best to end an animal's life if their behaviour changed to aggression or if they had a medical problem that could not be cured.

We can actually now help these animals to live a decent life because of biobehavioural monitoring.

Dogs do not have to be killed simply because they are showing signs of aggression.

The reason behind it, whether biological or behavioural, can be assessed and corrected in many of these animals, and the dog can have a healthy and happy life.

## 17.5 What is the Future of this Area of Study?



**There are a lot of potential ways for biobehavioural monitoring to become very important in the future.**

Right now, the mapping of a normal dog's brain versus dogs with behavioural issues is being conducted. From this point many behaviourists and trainers have altered the way they view dogs and interact with them.

Trainers and behaviourists can change how they interact with dogs in order to overcome the issue found in the neural substrate. This means that if there is abnormal behaviour it may require a change in how the dog is trained with positive reinforcement. Instead of using natural reinforcement a dog may be given more treats or affection as a reward. This helps the dog to get over a traumatic experience like abuse. Desensitisation also came about due to the concept of biobehavioural monitoring. It was learned that sometimes desensitisation works, but in other cases medications that help with anxiety, fear, aggression and phobias are needed.

Medically speaking, a dog that has been through a traumatic car accident or other physical injury may have neural pathways that change. Behaviour can then change, where a sweet dog becomes fearful or more aggressive. There is no psychological fix to this problem but medications can treat the issue.

When neural substrates are damaged or going in a different behavioural direction due to non-physical trauma then medication can still be used. If there is no biological cause then medication can help rid your dog of anxiety until you can retrain their behaviour to be less aggressive or fearful. For example, a dog with medication may not react with fear and anxiety during a thunderstorm. After a while your dog may no longer need the medication.

The concept of biobehavioural monitoring in dogs is all about combining the biological functionality of a dog's neural pathways and the behaviours that result. However, sometimes there may not be a biological cause, or at least one that is found yet.

The future of biobehavioural monitoring in dogs is about finding all the pathways, studying them, understanding them, and providing better care both medically, biologically and behaviourally for

dogs. The future is also to make certain your dog is going to have a happy life.

Eventually the concept of biobehavioural monitoring in dogs will reach dog owners. There will be more books than there already are that discuss how to train your dog and monitor their behaviour. What if you could train your dog with better methods because you understand that your dog's biology, the way they think, and their neural pathways are motivating your dog's behaviour? What if you could apply this same concept to training and add in abnormal behaviours that you try to correct? You may discover that sometimes you can correct abnormal behaviour because it is more behavioural and emotional versus the neural pathway telling the brain how to react. You may also discover that medication to correct the neural pathways is necessary to help your dog function on a better emotional level.

Biobehavioural monitoring is the beginning of understanding typical canine psychiatric behaviours, such as marking in inappropriate places, urination due to excitement, submission, and soiling your home. With an understanding that some of these behaviours are biological imperatives, meaning your dog cannot help them, you can find better ways to train out this behaviour.

## **Summary**

You have learned the definition of biobehaviour, where trainers, behaviourists and scientists are studying how neural pathways determine certain behaviour in your dog.

You have also learnt about the monitoring portion of this area of study; especially the technology used to ascertain what is happening in a dog's brain when they display certain behaviour.

You also examined the importance of this field of study, how it applies to dogs, and the future of biobehavioural monitoring. You have an understanding of why certain dogs may have 'abnormal' behaviour that you cannot train out, but may be able to reduce with medication.

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