

DOG SYMPOSIUM 2014



A MEETING OF THE MINDS

It is not every day that things fall perfectly into place, let alone over the entire course of a weekend. The Dog Symposium 2014, initiated and organised by Turid Rugaas with the help of a very capable team, was just such an occasion. The talks were stimulating and informative and flowed seamlessly into each other, creating lively discussions both inside the conference room and outside, where endless supplies of coffee, ice cream and popcorn helped revive tired minds. Participants also had the immense pleasure of the occasional contribution from Agnes Vaelidalo's baby son Oskar (invariably at just the right moment), and an appearance by Turid's dog McKenzie outside the conference room windows.

We hope you enjoy the report, which gives a glimpse of the expertise and atmosphere in which we were privileged to partake this year. Hopefully you can join us next year on 14-15 February, which already has a line-up of exceptional speakers.

The adaptable brain

Jenny Nyberg
Center for Brain Repair and Rehabilitation
University of Gothenburg, Sweden

Dr. Jenny Nyberg is a doctor in neuroscience and works at the Institute of Neuroscience and Physiology, Sahlgrenska Academy, Gothenburg University, Sweden. Her current research involves studying brain plasticity and how the brain is affected for example by physical exercise and enriched environments. She is an obedience instructor using positive reinforcement and clicker training, and competes with her Golden Retriever and Australian Shepherd.



Jenny started with a fascinating introduction to the brain, both human and canine, and its ability to change with the environment. She pointed to learned helplessness as a particular example of this adaptability.

The first part of the talk looked at the anatomical structure of neurons, their extensions, and the networks formed in the brain. The way these cells communicate with each other using electrical impulses, chemicals and hormones is the basis on which the brain and the nervous system work in tandem with the rest of the body.

A quick look at the differences between the dog brain and human brain showed that they are also very similar. One of the differences is that dogs have more brain areas that are used for scent, or nosework. This olfactory system is more evolved compared to humans. By contrast, humans have more evolved visual processing areas and a more evolved **prefrontal cortex**, the part of the brain that is involved in higher cognitive tasks.

BRAIN PLASTICITY

Jenny explained how the actual structure of the brain is changing depending on what we do in our lives and what we experience, what environment we live in, and the demands the environment puts upon us. In addition to changes at the molecular level, she gave a fascinating description of how changes can occur at the physical level, for example by redistributing the blood supply according to what part of the brain we are using the most.

Adult neurogenesis and the hippocampus

One finding that is relatively recent is that new neurons can actually be produced in the adult brain. Prior to this it was believed that that when an individual is born, once brain cells die they disappear forever. However, we now know that new brain cells are being created throughout our lives, and that one of the areas where this is happening is the **hippocampus**.

"The hippocampus is a gatekeeper for memory. It decides what memory should be kept and what memory should not. The more new brain cells are produced in the hippocampus (neurogenesis), the better learning and memory is for the individual. We therefore want to find therapies and strategies that are based on this neurogenesis in the hippocampus, to help individuals function better, maybe to cure or to stop progression in dementia and Alzheimer's. The hippocampus is involved in long-term memory, and short-term also, but decides what memories should be kept for the long term. So if a person or a dog has an injury to the hippocampus, he/she will remember everything that happened until the injury (it could be a traumatic injury or really a stressful event or whatever), but will have a hard time remembering what happened after it. They can have short-term memory for a few seconds or minutes, but a hard time remembering long term. This is important to remember when working with dogs especially, particularly those that are traumatised. They can have this impairment in the hippocampus so that they can only remember for a short time. And then 'poof!' it's gone."

Learning and memory

Jenny described how memory is formed, and gave an interesting glimpse into how it is retrieved.

"Say something happens in the environment. We pick it up with our senses, like seeing or hearing something. It passes into our brain, and the signal moves to the limbic system, or hippocampus. The hippocampus is also very closely attached to the amygdala, which is involved in our emotions and feelings. So when we learn something, or create memories, it is always under the influence of our feelings and emotions. When it moves into the hippocampus, the hippocampus decides whether we store it there, or in the outer cortex of the brain, or not at all. When it is stored, it becomes a long-term memory. And then when we need it again for any reason, we can pick it up again from the cortex.

When we carry out all of these processes – retaining information, forming a memory, and storing it and retrieving it again – there is a change in the structure of the brain. But our memory is not constant; every time we retrieve a memory and use it again for some reason, it is a totally new memory. Every time we retrieve a formed memory, it gets taken apart by the brain and built up again, and that happens under the influence of what we have experienced in the meantime, how we feel and what we have learned etc. That is why memories are not very trustworthy, and why witnesses in a court of law are not always that reliable. The individual can really believe that it is a true memory, like the person who committed the crime having had a red hat on, whereas in fact the hat was blue. So even when we store a memory, it is quite unstable."

Some time was spent looking at various forms of stress, its impacts on the body, and its involvement in a dog's ability to learn.

Learned helplessness

One form of brain plasticity that Jenny focused on is learned helplessness.

"This is a learnt behaviour where an animal learns to be passive after it has experienced a negative situation or stressful circumstance that it cannot

control. It learns that there is no point in trying to act or escape. Then, when this animal is exposed to a situation that it actually can control or from which it could escape, it will not even try, because its behaviour is to be passive."

**In some dog-training circles, learned helplessness is considered a sign of successful therapy.
In scientific and medical research, it is considered a disease.**

Flooding is a therapy that Jenny described as "a mis-translation between human and animal." It involves overwhelming the subject with whatever it is fearful of, like throwing a dog in

water, tying it to a lamppost on a busy street if it is afraid of traffic, or having a crowd of children pet it if it is afraid of kids. It is described as "A form of therapy in which the patient receives abrupt and intense, rather than gradual, exposure to fear-producing situation."

"The reason I wanted to look more into learned helplessness is that I have two different backgrounds; I am a neuroscientist doing medical research, but I'm also a dog trainer, and dog training is my biggest interest and hobby.

In my professional work as a researcher, learned helplessness is one thing, but in dog training circles it means something else entirely. In medical research, learned helplessness is an excellent model for disease. It is a depression and anxiety model. One can take rats and make them grow into learned helplessness or behave that way. One can then take a medicine one wants to try, such as an antidepressant, to see whether or not it works. Thus learned helplessness is not something you want; it is a disease you want to treat.

But then in dog training, there is a therapy or treatment that involves learned helplessness as a method of training. It is not considered a disease. It's considered having a calm dog that will be nice and obedient, whereas if that animal were in my research lab, it would be considered a diseased dog. Not all animals go into learned helplessness if they are exposed to stressors that they cannot control, but quite a lot do. It's a disease.

Learned helplessness means different things to different groups. A lot of dog trainers or owners do this because they have been told to, without really knowing what else happens in these animals."

Jenny went on to describe a series of experiments carried out in the 1960s and 70s with rats

and dogs subjected to electric shock, some of which could escape and some of which couldn't, and the resulting effects on their behaviour.

"Learned helplessness causes changes in the brain – structural changes, chemical changes, cell death in certain areas, decreased function of the hippocampus and the ability to learn new things, and altered memory functions. It increases fear. These animals are usually a lot more fearful of normal objects or new situations. For example, a rat is normally very explorative, and if we put a new object into a rat cage they will go and sniff and explore it. Animals that have learned helplessness will stay in the corner of the area they are in, and will not go explore normal things. This is also true with other animals."

Jenny gave an extensive description of the results of these experiments, and explored the side-effects of learned helplessness. She examined the effects on serotonin, noradrenaline (involved in syndromes such as ADHD and OCD which are also seen in dogs), and dopamine, which is involved in the reward system.

"An animal who has an impaired reward system or not enough dopamine, which means that the reward system doesn't work as it should, will accept a treat, eat it and even enjoy it, but he will not want to try to get it again. You can hand him a treat and he will be happy to get it, but he will not work to get more of it. It is very hard when you are working with dogs that are impaired this way. Also, animals that have lower dopamine levels from learned helplessness will have increased aggression, decreased motivation, a decreased sense of pleasure, and impaired concentration. So there are more things happening in the brain than learned helplessness and simply the passive behaviour that one might see."

Jenny described how learned helplessness impairs the hippocampus, even causing cell death, and its major effect on learning and memory. She expressed how con-

tradictory it is that some trainers use this as a method to train a dog, when the same dog has to be able to learn and memorise things well.

Jenny then looked at another series of experiments on rats, which showed that the ability to control an event (like escaping from an electric shock) has an important effect on recovery.

A nice video clip followed, showing how a bush stone curlew was trained to a travelling crate by letting the bird make its own decisions, essentially giving it control.

"This is the galvanizing effect of control. If animals have previously learned to control stressful situations, compared to those that never have, when you put them in a situation that they cannot control, they cope a lot better. This is something that I have been thinking a lot about, having a 12-week-old puppy at home. I don't always try to avoid all mild stresses that might happen to her, just showing her that she can control

things and figure things out on her own, and then hopefully that will have a positive effect later in life, when bad things happen. No one, not humans or dogs, will go through life without any stress at all."

However, all is not hopeless. An animal that has learned helplessness can regain normal

function. Another clip, filmed over a four-month period, showed a dog that had been rescued moving gradually from complete post-traumatic stress and learned helplessness to where it could function a lot better.

Jenny ended by describing the importance of moderate physical exercise and enriched environments for learning and neurogenesis in the hippocampus. She concluded with a fascinating description of a functional MRI study in the US¹ where dogs are being trained to enjoy lying in an MRI scanner. This is the first time that images have been captured from an unsedated, relaxed dog and is very promising for the future.

"Things happen in life, and we cannot control that. But if an animal has a lot of good experiences with minor stresses and they have been able to control it, later on in life when something happens that they actually cannot control, they can handle it a lot better."

TAKE HOME MESSAGE

The brain is constantly changing
It is possible to influence the brain's functions
Control is crucial
Less stress

¹ Berns GS, Brooks AM, Spivak M (2012): Functional MRI in Awake Unrestrained Dogs. PLoS ONE 7(5):e38027

Use of pheromone collar in the therapy of behavioural disorders in dogs

Martina Načeradská DVM
Private Veterinary Practice, Prague 10 and VFU Brno
Czech Republic



Dr. Martina Načeradská is a veterinarian from the Veterinary and Pharmaceutical University in Brno. She has been interested in animal behaviour since childhood; her interest in behavioural research started in 2002, when she joined a cat behaviour study. She started the first socialisation puppy school in Prague next to her veterinary practice in 2009. She is interested in dog behaviour and the treatment of behavioural disorders, and advocates veterinary practice that is friendly to animals and treats them with respect for their behavioural needs.

Martina started by introducing various types of hormones that can be used by animals or plants to have an influence on other animals or plants. These included synomone, allomone, kairomones, and Interomone™. She discussed the **rabbit mammary pheromone** (2-Methylbut-2-enal - 2MB2), which initiates searching for the nipple,² reduces the heart rate of nervous dogs, and increases the heart rate of overly calm dogs. This is interesting, because it means that when the dog is stressed it will calm down, and when it is calm its heart rate will increase. However, the dog cannot be asked what is going on in the brain. An fMRI study would be quite interesting; perhaps this will be the future of Interomone. However, caution is advised as no one knows what the dog is feeling. If one sprays rabbit pheromone on a dog we do not know what it causes.

The main part of the talk centred on pheromones, substances released by the body that cause a predictable reaction by another individual of the same species.³ Bombykol is produced by the female silkworm to attract a male⁴ and was one of the first pheromones discovered. The boar pheromone (androstene) induces immobility in sows during oestrus⁵ and makes the sow stay still

for the boar. The best known pheromone at present is the dog appeasing pheromone, which is a composition of fatty acids (capric, lauric, myristic, palmitic, linoleic, oleic), identified by gas chromatography and mass spectrometry, which supports attachment of the puppy to the mother.⁶ It used to be called DAP but has been renamed Adaptil.

Following a brief and humorous tour of the anatomical organs involved in producing, detecting and responding to pheromones, and the importance of pheromones for social relationships, territorial marking and calming of both adult and juvenile dogs, Martina moved on to their role in the treatment and management of problem behaviour.

Problem behaviour

"The causes of problem behaviour are mostly stress, altered socialisation in puppyhood, and inconsistency of the owner in handling the dog. Socialisation is a problem, because sometimes I'm dealing with puppies that were taken from the bitch at three weeks of age. This can damage the dog for the rest of its life. We also have puppy farms. Currently I am dealing with a puppy that was bought in Spain in a pet shop, maybe imported there from the Czech Republic, and then brought back to the Czech Republic.

² Shaal et al. 2013

³ Karlson & Lushcher 1959

⁴ Butenandt 1959

⁵ Watson & Randford 1960

⁶ Pageat 1999

An individual approach is required in every case. Primarily this requires a change of the owner's behaviour. I ask the owner to change his/her own behaviour, because it's really important. There is no magic treatment, like coming to me and I give the dog a special pill that will make him happy."

Martina shared her preference for natural medicaments like Serene UM and Relaxan. This is a tryptophan that changes into serotonin in the brain, but it does not work in all dogs. She explained that she likes using it because there are no side effects at the doses that the manufacturers recommend. Ananxivia is a mixture of plants and herbs that can also be effective. Pheromones are also her preferred mode of treatment, and she again mentioned that the rabbit pheromone is worth looking into, but that there is no commercial preparation yet as the studies are still too small.

Retrospective study

Martina reported on a retrospective study, which she carried out over a period of four years involving 44 dogs of 26 breeds with behavioural problems. The most frequent breeds of dog were crossbreed dogs (10/44) and Jack Russell Terriers (7/44), the latter being a popular breed in the Czech Republic. People leave them for eight to 12 hours at home alone, and owners are seldom willing to anything about it unless they are faced with eviction due to a constantly barking dog. Damaged homes are a common problem.

The treated behavioural problems were separation anxiety, acral lick dermatitis, hyperactivity, excessive shyness, phobias related to noise (fireworks, thunderstorms), aggression, and excessive barking

Treatment

- Only pheromone collars in 23 of 44 cases
- Pheromone collars and natural medicaments (Serene UM, Ananxivia, Relaxan) in 8/44 cases
- Pheromone collars and change of owner's behaviour in 4/44 cases
- Pheromone collars, change of behaviour, and natural medicaments in 9/44 cases

Results

- Problems solved in 18 of 44 cases
- Partial improvement in 21 of the 44 cases

- No change in 5 cases. Those cases had no help at all from the owner.
- The overall success of therapy was 88%

"I remember a funny story from calling an owner. We sell owners the collar, then call them to ask how it is working. One of them answered, "It works great! Our dog only got two ticks this summer!"

Martina spent a bit of time talking about separation anxiety and now necessary it is to bring down the addiction of the dog to the owner.

"In many cases I ask the owner how the dog normally behaves and they say he is following them to the toilet everywhere. So first, what we start with is the hand signal just to teach the dog that he doesn't have to notice every move the owner makes. And then we go further if they can manage that. But that needs a change in the owner's behaviour. Plus, the dog should not be alone at all at the beginning and no more than four hours at the end. I usually ask the owner how often they take the dog out for its toilet. Sometimes they say every 12 hours! When I have to go after eight it's really painful, and that happens sometimes when patients are waiting and the day is hectic. Therapy also involves games that increase the self-confidence of the dog (hiding treats around the flat, brain-teasers, Kong toys, wobbler toy). This is where an enriched rich environment is very helpful. Also, a pheromone collar could be one of the possibilities for helping the dog. It's not a magic treatment. I usually tell the owner they at least have to do something and that if they do nothing I cannot say whether it will be successful or not. I need them to cooperate."

Martina cited two recent studies regarding pheromones.

"One of them is on thunderstorms and phobias.⁷ This was a contrast with the DAP studies, and found that this problem was not influenced at all by a DAP diffuser. This behaviour disorder is really complicated. Do dogs feel the meteorological changes, the noise, electromagnetic impulses in lightning discharges, or ozone level changes? Because it's so complicated, it's very hard to get the dog used to it once he is afraid. The most important thing is to lower the stress levels, because

⁷ Valletine DVM, Kansas State University, 2008

then they become less sensitive to noises and other things.

In another thesis, pheromones and interomones were found to change heart rate and behaviour in anxious dogs.⁸ In this scientific model, the author concluded that rabbit pheromone collars had the highest rate of success at either changing the heart rate or the behaviour of anxious dogs. SERG and DAP collars also changed the physiology or behaviour of some dogs. The study also showed how pheromone collars can change a dog's heart rate and behaviour before and after startle. This study was done in a controlled environment, which is interesting because other studies were done only with owner questionnaires."

Martina concluded that pheromone collars are successful in the treatment of behavioural disorders without any side effects, at least the ones she has tried. The overall success of therapy was 88% but she stressed that confirmation is needed on a higher number of dogs.

The talk was followed by a lively question and answer session, with some interesting points raised about pheromone collars versus plug-ins or sprays. Here is a sample:

Q: Sometimes the collars don't work as well as the plug-in or spray. How do you solve that?

A: The collars evaporate the pheromone as they become warm, so they have to fit snugly on the neck. When you use a spray, it has to be applied at least 10 -15 minutes before the dog enters the area. Some studies have been done on car travel, and the problem is that the carrier for the pheromone is alcohol. Enough time has to elapse for the alcohol to evaporate, because it is too strong for the dog. If the dog can smell the alcohol, the pheromone is useless. Another interesting thing about collars: it takes at least 14 days before they work. I have demonstrated that on one of my friend's dogs who was afraid of fireworks. They would put the collar on just the day before, and he told me said it's useless. This year I gave him the collar to put on the dog maybe two or three weeks beforehand, and he reported that she was a lot better. If he had done that the year before, maybe the dog would have had an experience that wasn't too bad. And one important thing, never use acepromazine, a drug usually used by

vets to calm down a dog during fireworks. The dog cannot move much but he can feel everything, so actually he gets a far worse experience.

Q: Is there any way that it can be dangerous for a dog, like if you use the collar and he doesn't like it? There is no way that he can get rid of it. Isn't it better to use the spray or a plug-in?

A: You need to watch the dog. If the dog is showing calming signals with the collar on, it truly says that he doesn't like it. We had one case with side effects; it was a Jack Russell Terrier. He turned out to be allergic and was having a small rash under the collar. So we took it off and he became calm. But you need to observe the dog. I haven't had this problem in dogs, but in cats, where the owner has spilt part of the plug-in. One case I had was a cat that was peeing in the owner's bed because the owner had bought a new sewing machine, and the noise was different. The cat hated it and wet the owner's bed. I suggested the plug-in to try to help the cat, because the owner needed the machine for her work. She came back and screamed at me that the cat was much worse and had turned aggressive. But on talking with her a bit more, she confessed that she had spilt the liquid. It was too much for the cat. So the answer to your question is no, it's not necessarily better to use a spray or a plug-in, because nobody has studied what happens if they spill the concentrate, what it would do to the dog.

One of the participants, Anne-Lill Kvam, offered to translate Martina's studies into English, pending approval from the Czech veterinary Journal.

Martina closed the session by inviting the participants to attend a meeting of the Czech Senate, which will be attended by lawyers talking about puppy farms. Also invited are representatives of a company in Spain and possibly others from Germany and Belgium.

STATE AND ANIMAL PROTECTION in Prague.

www.senate.cz.

⁸ Thompson DVM, Texas Tech University, 2013

Neurobehavioural development in puppies

Karen L. Overall, MA, VMD, PhD, DACVB, CAAB

Dr. Karen L. Overall is an award winning writer/speaker with several degrees from the University of Pennsylvania and a PhD degree from the University of Wisconsin-Madison. Karen has given hundreds of national and international presentations and short courses and is the author of over 100 scholarly publications, dozens of textbook chapters and she has recently released a new book and DVD; Manual of Clinical Behavioral Medicine for Dogs and Cats.

She is the editor-in-chief for Journal of Veterinary Behavior: Clinical Applications and Research. Dr. Overall serves and has served on numerous governmental committees focused on canine health and behavior.



Karen started this fascinating and touching presentation by talking about Toby, one of her Australian Shepherds that she got from a rescue shelter and that she has trained as her own service dog.

We all agreed that dogs are cognitive, and Karen gave some interesting insights into our history with them.

"We now have pretty good evidence that dogs have lived intimately with humans in a companion and working context for at least 30,000 years. The evolutionary evidence of changes in their brain may go back even further. When we look at some of the proteins that have resulted from gene changes, humans and dogs share proteins that are involved in how you react to fearful stimuli, and how you encode that in various regions of your brain. This happens in a way that we don't share with any other primate group and

that dogs don't share with any other canid group. So it's really good evidence that we grew up together and that we affected each other."

Karen described a set of experiments carried out with a Border Collie named Rico in Germany in 2004, whose owner claimed he knew more than six hundred words. Rico was able to select, under controlled conditions, objects that he knew by name. What was interesting was that when an unknown object "X" was then introduced into the room alongside the known objects, if Rico was told to fetch object "X", he found it by deduction. None of the other objects in the room fit the word. Karen commented, "Now that should scare you; because it is the first step of human language acquisition, called fast mapping."

The focus was next on the processes of learning involving especially the hippocampus and amygdala, and what happens when these structures are damaged. An especially interesting example was of a girl aged 16 who had suffered severe encephalitis at the age of two. Despite all the odds she made a full recovery. She was a bright student and an expert horseback rider, so the learning and coordination problems they had expected never materialized. To all intents and purposes, this young girl was normal — until she left the safety of her home, because she had no concept of risk. She could walk off with any stranger with no idea that it could be dangerous. Her amygdala is damaged. She has a service dog that can sense risk and will gently move her out of the way, but she will need this help for the rest of her life.

Karen went into some detail on the molecular basis of brain plasticity and learning, with an excellent series of slides showing what happens at the synapse (the gap between neurons), in the cell nucleus, and during the activation of genes.

Early neurodevelopment in dogs

A series of tables took us through what happens at different stages of a dog's development. This included the neurodevelopmental landmarks, the behavioral patterns and necessary stimuli that are needed at that age, and the problems that might occur if that exposure is missed. The stages were 0-13 days (e.g. maturation of cranial nerves: hearing, seeing), 13-20 days (e.g. startle reflex), 3-8 weeks (e.g. teeth, tail wagging, interactions) and 5-12 weeks. Karen stressed the major problem that housetraining poses in the US; puppies are thrown out because owners do not understand that neuromuscular urinary control only happens at 8.5 weeks, and that their puppy's bladder is only the size of a grape. There are many dogs in the US that are raised in flats and never taken out. They become completely panicked because they have never been exposed to other dogs or animals or humans. A dog that is removed from its home at or before about 5 weeks has no concept of what humans are. It will simply not recognize them. Similarly, if it has been raised with only cats, it will not recognize other dogs.

Epigenetic effects

This is the effect that situations have on genetic function rather than the DNA. For example, if the mother is starved or otherwise stressed, this can have an effect on how the genes in the puppies behave. Stress hormones affect how genes are decoded to make proteins, and how learning happens. Punishment has a severe effect on the amygdala, because stress hormones prevent proteins from being formed in the brain that could have helped the dog cope. This was beautifully described with a series of diagrams, including graphs on behavior in mouse pups whose mothers had been deprived of bedding. These pups had a lot more (statistically significant) attention-seeking behavior and reactivity to noises.

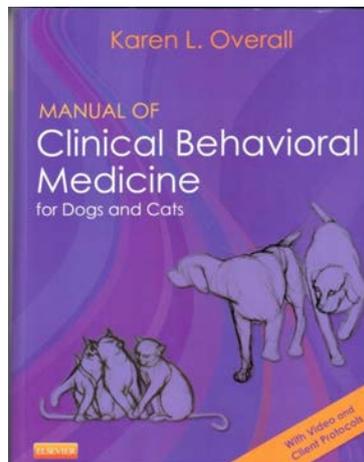
[The second session opened with a lively discussion on the best time for breeders to release puppies to their new home, and possible differences for pet dogs and working dogs. Karen again stressed that the absolutely earliest age is 8.5 weeks due to the neuromuscular-skeletal development and urinary control. The bottom line is later is better, say around 12 weeks, and for working dogs it should probably be longer still, if they can learn from older dogs. However, in the case of a puppy mill or other highly stressful situation, it is better for the puppy to be rehomed earlier with a gentle, stable, adult dog that loves teaching puppies. The ideal would be for each puppy to leave when it is ready, which is highly individual. Although bitches wean their puppies at seven weeks, puppies still need to be near her and their siblings. When a puppy starts moving further away by choice and exploring on its own,

and shows less interest in its siblings and mother, it is ready to move home. The discussion moved on to dog-wolf hybrids and resulting breeds such as the Czechoslovakian Shepherd, which is only 30 years old as a recognized breed. It was agreed that the puppies would have to be handled within 14 days, but everyone agreed that mixing these two types is a travesty and does nobody any service, least of all the wolf. It is impossible to take thousands of years of domestication and squeeze it into 30 years without some sort of damage.]

Other experiments have shown that dogs that were removed from their mother at 30-40 days of age exhibited more reactivity to noise, destructiveness, excessive barking, fearfulness on walks, toy and food possessiveness, attention seeking and aversion to strangers. These puppies are leaving before they have learned to cope. It is another reason why mental stimulation is so important for puppies when they are still with their littermates and mother.

Early intervention

Karen explained the importance of moderate and high DHA diets in helping with short-term learning. Studies have shown that high DHA diets (rich in e.g. omega-3) give dogs better reversal task learning (doing a task back-to-front), visual contrast discrimination, and maze performance. Stud-



ies have also shown that dogs on high DHA diets have a much stronger immune system than dogs without them.⁹

Other forms of early intervention include physical stimulation that promotes appropriate responses in a calm manner (e.g. gentle massage), mental stimulation and puzzle solving, especially nose-



work, and moderate exercise, preferably with normal or supra-normal dogs. Karen

explained how she used massage to help her Australian Shepherd puppy Toby when she first got him from a rescue shelter.



Karen explained why she treats puppies as young as five weeks with medications to help them learn. She stressed that the nature of her work means she sees exceptional cases, but that appropriately given medications help the neurogenic pathways important for learning to function more adequately.¹⁰ Following her excellent illustrations of how chemicals work in the brain and at the synapse, and how DNA is decoded and proteins created in the learning process, it became much clearer how medication can really help these dogs. She stressed the importance of olfactory stimulation (nosework), and showed that ageing dogs that lose their olfactory cells in the olfactory mucosa (a membrane close to the brain) also have problems with cognition.

Can early intervention strategies be treatment strategies?

Linus was puppy mill dog adopted by Karen at six weeks of age, after he was turned in by his previous owners because he was a 'vegetable'. He did not respond to people at all, in any way. They did not exist for him, because he had never learnt to recognise them. But he was great with other dogs. Karen showed a revealing picture of her

holding Linus without any reaction on his part, beyond the treat being held by the cameraman.



"We put him on a super supplement program with huge amounts of DHA, and he was held in my lap while I wrote parts of my book. He was held to my chest every time I was on the phone, was massaged every day, our dogs worked with him all the time, he was talked to a non-stop, he was rewarded for not being reactive, he was conditioned to do all the "normal" behaviours. But at 12 weeks of age I told my husband that I didn't think we were going to make it, that Linus was really severely compromised. But the next day when we came home from a dinner and opened the door, it was like a switch had been thrown. He is fabulous with people now."

Karen talked Missy Rose, a West-Texas stock dog. Trained by a hunter using a chock-collar, she had four homes by the time she was six months old and was severely underweight. He had shocked her every time she had diarrhoea, but it turned out she had EPI (exocrine pancreatic deficiency). She was basically starved for the first 18 months of her life. Missy is extremely hyper-reactive, can never keep still, and Karen showed a video of how situations need to be managed when food is involved or the dogs are waiting to go out. In Missy's case, they have her sit on a stair and come down one step at a time until the other dogs have gone out, to help her cope t.

Karen showed clearly how a combination of compassion, stimulation, intervention and medication can go a long way towards giving a dog a normal life.

Missy Rose and Linus today



⁹ Zicker et al. 2012

¹⁰ Neuropsychopharmacological drugs e.g. TCAs, SSRIs, SARIS, Gabapentin (for reactivity). Nutraceutical medications e.g. Anxitanne, Zylkene (which imitates benzodiazepene), Ocu-GLO

A pulse-measuring project

Agnes Vaelidalo, Norway

Agnes Vaelidalo is a dog trainer from Hagan dog training school. In 2012 she and her fellow dog trainer, Bente Stensland, started a brand new dog hotel. They have happy customers driving 200 km just to have their dogs stay there.

In another excellent follow-up to this ongoing project, Agnes led us through a series of highly revealing videos of what happens to a dog's pulse in everyday situations.

Following a description of the pulse and how stress affects it, Agnes gave a brief description of the equipment she uses. This is a Polar heart rate monitor initially designed for horses, which she attaches to the dog's harness. The impulse is sent to a microcontroller, which transmits the pulse signal to a computer via Bluetooth. An app recently developed by Agnes' husband now allows the pulse to be viewed in real time on an iPhone or iPad.

The main project

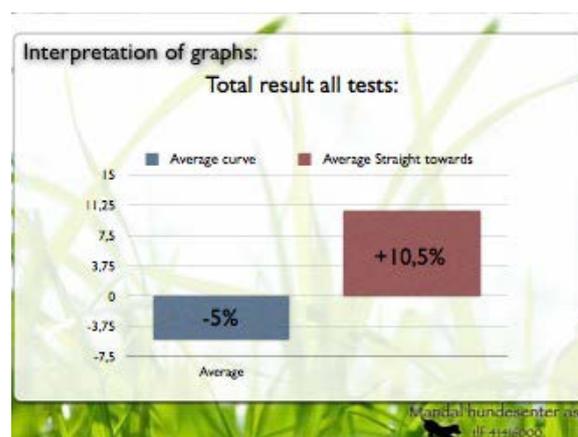
The main project set up was to measure what happens to a dog's pulse while an unfamiliar person is approaching, either in a curve or straight on. The experiment was carried out indoors, as this would prove less distracting to the dog. Three cameras were used: one behind the dog, another close up, and a third facing the dog at a distance.



Prior to each experiment the owner was asked whether the dog is reactive to strangers, and if they felt it might be a problem the dog was never approached head-on.



The results are exciting. It was expected that when a person approached head-on the dog's pulse would rise fairly high, and that when the person was curving the pulse would also rise, but not as high. In fact, the results clearly show that whereas the dog's pulse rose on average by 10% from the baseline on direct approach¹¹, with a curving approach it dropped 5% below the baseline. To date the experiment has been performed on 69 dogs and the plan is to expand it further.



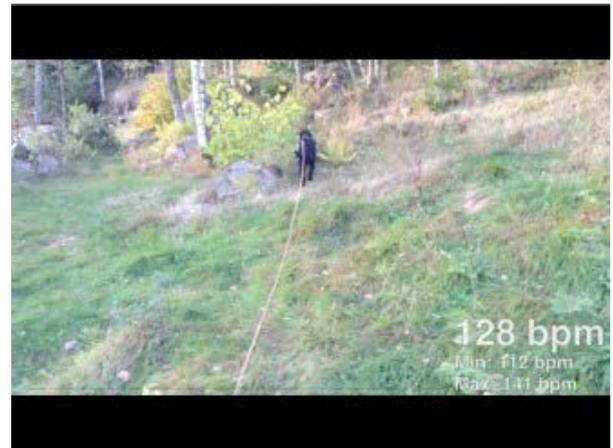
Other daily situations

Agnes led us on a fun and revealing "tour" of a dog's daily life and what happens to the pulse in different situations. For example, raising the voice causes the pulse to rise, as does ordering the dog to sit in a sharp tone. Throwing a ball shot the pulse up e.g. to 165 from a baseline of around 80, but throwing treats brought it quickly down again to around 130. Similarly, when getting up from e.g. a chair to leave the room, if the owner showed the dog the flat of her hand, as in "I'll be right back," the pulse barely rose. But if the own-

¹¹ In the worst-case scenario, upon direct approach the dog's pulse rose by more than 110% from the baseline, from 85 to 179 in a very short time.

er just got up and strode out, the pulse quickened remarkably. The pulse of a dog resting on a couch can be around 40.

From video showing dogs sniffing, playing with toys, going on their daily walks, and meeting other dogs and strangers, what clearly emerged was that mental stimulation lowers a dog's pulse (read: stress level) and that throwing things raises it significantly. Few things startle a dog as much as raising one's voice, whether at the dog or someone/something else. Throwing sticks and balls on a daily basis, which is done by so many dog owners worldwide, leads to long-term stress and chronic health problems.



Throwing a stick



Agnes stressed that the project is still in its early days; much more data needs to be gathered on many more dogs. A future topic of interest is the effects on a dog's pulse of parallel walking. There are still many questions to answer; the surface has barely been scratched, but we eagerly wait to hear more in the future.



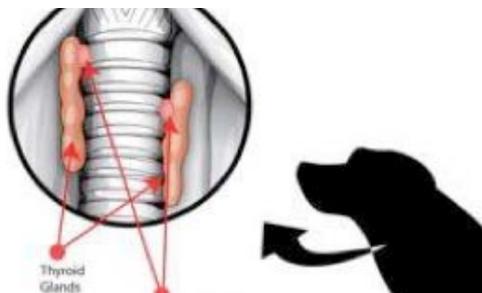
Thyroid disease and autoimmune thyroiditis

Nelis Verhoeven

*Nelis Verhoeven became interested in thyroid issues during his training with Turid Rugaas, after reading the book **The Canine Thyroid Epidemic** by Jean Dodds. He recognised that much of the unexplainable undesired behaviour of dogs he had encountered during his work as a trainer and behaviourist was the result of a fairly unknown thyroid condition –subclinical or borderline hypothyroidism.*

Nelis began by explaining that hypothyroidism is one of the most common endocrine disorders dogs, and that up to 80% of cases result from autoimmune (lymphocytic) thyroiditis. Of some 200 vets he had spoken with, only one knew of this disease. Nelis explained that when he first had his clients' dogs tested, he was shocked to discover that some 70% had the condition. Sadly, many dogs are put down every year when they could be treated with a daily dose of L-thyroxine.

After a brief introduction to the anatomy of the thyroid gland, Nelis delved more deeply into functions of thyroid hormones and the problems that result from dysfunction. He summarised the changes in cellular metabolism, neuromuscular issues, skin disorders, haematological and cardiac disorders, bowel and reproductive disorders, ophthalmological disorders and problems such as loss of smell. He also looked at some of the breeds that are susceptible to some of these disorders.



The classic signals associated with hypothyroidism (weight gain, lethargy, cold-intolerance, poor coat), occur after 70% or more of the thyroid tissue has been destroyed or affected. Other changes, such as unexpected behaviour, including reduced focus, aggression or fear, passiveness and food intolerance, may manifest during the first phase of the illness. This is interesting,



because sometimes we do not achieve the results we were hoping for with behavioural problems, despite stress reduction, mental stimulation and everything else. When Nelis found out about this, he called the owners of ten dogs that he had been unsuccessful with, and asked them to have their dog checked for thyroid disease. Seven reported back that their dog had tested positive.

We were reminded that some extrinsic factors can cause hypothyroidism, including a lack of selenium in the diet, as evidenced from an area in the UK where it is rare in the soil. Adrenaline exhaustion syndrome is another, which occurs when the adrenaline gland is over-stimulated and is unable to function normally. This can result in reduced activity of all master glands such as the thyroid. Stress is another crucial factor, and we had another look at adrenaline, noradrenaline and cortisol. Food is another culprit and certain types contain natural ingredients that may interfere with the production of thyroid hormones. Soybeans and certain vegetables may significantly affect the behaviour of the dog; these vegetables include Brussels sprouts, broccoli, cabbage, cauliflower, kohlrabi, mustard and radishes.

Assays

This part of the talk gave rise to a lively discussion at the end. A unique characteristic of the thyroid is that it uses iodine (which is present in food) to produce the hormones T4 and T3. Almost 80-90% of the hormone produced in the thyroid is T4 and just 10-20% is T3, which is up to 10 times as active as T4. To allow the body cells and tissues to benefit from the T4 (which contains 4 iodine molecules), it should be converted into T3 (which contains 3 iodine molecules). However, measuring only T3 and T4 does not give the

whole story. According to veterinarian and author Jean Dodds, a complete baseline thyroid profile should include total T4¹², total T3, free T4, free T3¹³, T3AA and T4AA, and can include cTSH and/or TgAA. The TgAA assay is especially important in screening breeding stock for heritable autoimmune thyroid disease. Most cases of thyroiditis have elevated serum TgAA levels. Measuring TgAA levels also permits early recognition of the disorder, and facilitates genetic counseling. Affected dogs should not be used for breeding.

A population study of 287,948 dogs was published by the MSU Animal Health Diagnostic Laboratory. Circulating thyroid hormone autoantibodies (T3AA and/or T4AA) were found in 18,135 of these dogs (6.3%). The 10 breeds with the highest prevalence of thyroid AA from their study were the Pointer, English Setter, English Pointer, Skye Terrier, German Wirehaired, Old English Sheepdog, Boxer, Maltese, Kuvasz, and Petit Basset Griffon Vendéen.

Aberrant behaviour and thyroid dysfunction

The principal reason for pet euthanasia stems not from disease, but undesirable behaviour. An association has recently been established between aberrant behaviour and thyroid dysfunction in the dog. Typical clinical signs include unprovoked "aggression" towards other animals and/or people, sudden onset of seizure disorder in adulthood, disorientation, moodiness, erratic temperament, periods of hyperactivity, hypoattentiveness, depression, fearfulness and phobias, anxiety, submissiveness, passivity, compulsiveness, and irritability. Nelis said that a number of clients come to him because their formerly happy puppy "suddenly" doesn't like the children anymore.

Nelis closed by stressing how important it is to convince vets that these are not fairy tales, and that in fact this problem is very common. L-thyroxine is one of the cheapest drugs on the market. The dog has to be on medication for rest of its life, but will be much happier if this condition is diagnosed.

¹²This is where many vets are mistaken; in humans, the T4 half-time is 24 hours but in dogs only 12. Therefore T4 alone is not enough to give an accurate picture of the thyroid.

¹³In Holland, new automatic analysers cannot test for free T3 and free T4, which is proving problematic.

Discussion

Turid commented that about half the dogs that she has sent for checking by a vet because of suspected hypothyroiditis has had it, some to a very serious degree. She confirmed that it is far more common than people think, and that dog trainers must be aware of the symptoms and think in that direction. Jean Dodds called it an epidemic, and although it may not be a new one, Turid believes that the number of cases is rising because we have not been aware of it before.

Following some questions concerning assays and at what point they should be done and followed up, Karen Overall shared her expertise as follows:

I think there are a couple of things that are important to remember. I would have preferred that before anybody treated this, they would have had a complete blood profile done. That is the ideal world. We don't live in an ideal world, so I am often faced with clients who have this issue. I am happy when they retest the dog to see where they are, and at that point I would very much like them to have the full profile done, so that we have the full data, and what they need to know is that without that baseline data it can be difficult to interpret what you're seeing. The dog may be within the normal reference range, but we don't know what other things have changed. I have clients whose dogs are borderline; some wish to treat them, others don't. I would suggest that no matter on which side the results come down on, they may wish to get serial samples. You can then get a sense of where the dog is going. This is important, because if it's true hypothyroidism (and this is something that is often missed) it is a dynamic process and the dog will worsen.

I wanted to raise this issue, because I see the flip side of the coin. I see dogs who are treated with hormonal supplementation and don't need it. I have had dogs brought to me with anxiety disorders like separation anxiety, and panic disorder, that actually had thyrotoxicity. I published one of these cases. The dog's T4 level was eight times the laboratory's upper reference range, and the dog couldn't stop shaking by that point. So these are not benign compounds. In fact thyroid hormones have many more potential undesirable effects than any of the medications I use for behaviour. That is not to say you shouldn't use them, it just means that one should be aware of it

and double check. When I put patients on thyroxine, I want to follow up.

Everybody should be testing – if it's an older dog, maybe every six months; if it's a healthy younger dog that is doing well, at least annually. All sorts of drugs can interfere with that testing, as can other disease states. The reason I do so much of this testing that if there is a potential thyroid pathology, I would much rather find out before I put them on medication. Because these medications, especially the ones I was covering in my talk, lower thyroid values. It makes it extremely hard to interpret a low value. Now, serial assays in partic-

ular are expensive, so what I present to my clients that it's best to spend the money first, then we can make an informed decision. If they're really worried about the financial situation, and they really want to try supplementation first, as long as we monitor the dog, I'm willing to let them do that. Then we follow up both behaviourally and physiologically. If it doesn't seem to be helping all and seems to be causing problems, then we can retest. Remember, these are dynamic situations and a complete picture is really important. If you explain that to people, they are often willing to meet the costs.

Movement and stress patterns of the canine

Julia Robertson, Galen Therapy Centre, UK

Julia Robertson established the Galen Therapy Centre in 2002, specialising in Canine Myotherapy, treating dogs with postural and loading issues. Running a busy consultancy, treating working, performing and companion dogs, she has developed a range of courses from workshops to accredited diplomas in Canine Myotherapy. As a passion advocate of canine myotherapy, working closely with vets and other professionals, Julia has put together a dedicated team of Galen Myotherapist practising throughout the UK. She is also currently setting up a Galen Myotherapy school in the Czech Republic.

She sat up Galen Natural Progression in 2006 with Elisabeth Pope to train therapists and to treat dogs using exercise physiology; a gentle prescriptive method of dogs performing natural exercises that assists their mobility, flexibility and balance. They wrote and produced the DVD Tongue to Tail, the integrated movement of the dog (2012), which recently won the 'The Maxwell Award' by the 'Dog writers association of America'.

Julia began by sharing a laugh over her company name, Galen, which she had just found out means 'crazy' in Norwegian. In fact, Galen was a Greek physician who made some significant discoveries on manual therapies and the relationship between that and the neuromusculoskeletal system. She explained what myotherapy is (muscle therapy), and stressed the importance of natural movement.

If only they could talk, if only we would listen

Julia said that she had expected this line of thought to be quite unique, but that she had heard nothing else since she arrived at the conference. Dogs communicate with us all the time, and she found it fascinating to hear how the participants saw dogs from the behaviour and training perspective, whereas her perspective is musculoskeletal but the bottom line is the same; it reflects through the dog's behaviour. Of course, if



dogs are in discomfort, or pain, they are not going to be the same as they would be without it.

We work with dogs – then they work with us

Julia referred to Jenny's talk about the importance of control, which is embedded in the way Julia and her team work. A dog can always move away when she is treating it; it has total choice and control. She explained how her hands-on approach enables her to feel areas of discomfort through how the dog's muscles change.



Working over a sensitive area

A big part of the problems that arise are due to compensatory effects, which can be massive. Julia stressed that quite often the compensation from a pathology or injury can actually be worse, as far as pain perception is concerned, than the original injury. She went on to explain how she works.

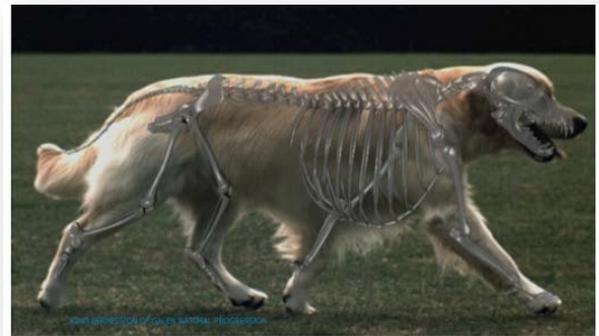
"We are looking at how the dog presents. How we do that is really important. Firstly, being able to stroke, touch, and make contact with any animal is just such an honour. Being able to work with a dog or an animal in pain just goes off the scale to me. But to get that trust, it has to be a two-way thing. We have very strict rules, both when teaching myotherapy and when working with the dog. I introduce myself, because at the end of the day they need to know who you are, and then I say to them, "If you sit here, I am going to be treating you. And if you want to get up and move, you can." It is fascinating; they get it! After 10-15 minutes, it doesn't matter how much discomfort they are in, because they know they can get up and leave. I have the benefit of time, because I allow an hour per session. So when this weekend I heard the evidence about how im-

portant that choice is, it was like manna from heaven."

Julia next showed us a photograph of a dog with bad knees from a bilateral cruciate tear. The change in loading onto her front legs was almost like she was doing a handstand. This was a significant compensatory effect. We saw another slide showing how her position had changed after just three treatments. She still had the arthritis, but the compensatory loading had changed. At the time, the dog was still young and was about to be put down; she is now 13 years old and leads a full and happy life.

Seeing it from the dog's perspective

Julia showed a video from a webcam that she had fitted to her little terrier's head for a few minutes, so we could see what the world looks at from that perspective. It was seriously revealing, not to mention the size of a person's rubber boots from the little dog's perspective. Even a slight rise in ground level, barely noticed by the human, looked very steep indeed from the terrier's viewpoint. Perhaps most striking was the ground-level view of the towering rear hatch of Julia's car being opened for the little guy to jump into. It was very revealing of how much we expect of our dogs on a daily basis, and how that can cause repetitive strains on their bodies.



We were shown a beautiful video clip of a Golden Retriever running in slow motion, and were asked to look specifically at the neck. She pointed out how long the neck was and how this is true of athletes who have an amazing posture. To illustrate the point, she got the participants to stand up and then sit down again without using their neck. A few groans from the audience illustrated how difficult this is.

Julia took us through a number of slow-motion videos, including a dog negotiating an A-frame,

her dogs jumping from the back of her car, and a dog chasing and catching a ball. The strains on the musculoskeletal system were spectacular. Julia emphasised that dogs are made to jump and chase and catch things, but that what causes the damage is being asked to do it repetitively.



Working 'with' a dog – never 'inflicting upon'

Other parts of the body are crucial, not just the neck. Julia explained the importance of abdominal muscles, the gluteal muscles and other parts of the body, and how she treats different ones to reduce loading. She illustrated this with several cases, showing photographs of the dogs before and after treatment and explaining how their personality had also improved.

Julia said that many dogs who have survived accidents seem to be just fine, but that the soft tissue injuries can be massive. Sooner or later the compensation sets in and almost becomes a part of the dog's personality.

Puppies

Referring to Karen's talk on the development of the brain in puppies, Julia added that the devel-

opment of puppies' musculature is critical for their mobility, and that the right development comes through exercise that puppies would naturally do. Yet the first thing owners do when they get a new puppy is attach it to a leash and stride off with the puppy running along. Correct exercise and movement in puppies creates good muscle patterning.

Prepare your puppy through appropriate exercise: build from the inside out not the outside in.

"The walk is the most natural and best gait of all. Look at any wildlife films; they walk and stalk. And yet it is a gait that we are almost training out of our dogs. This is important, because if your dog ever sustains an injury, the best way to help him recover is to walk him. This makes him load onto each leg, and he has to use each leg and each muscle group separately. If he is trotting, he is using his diagonals. If you are looking at developing the stability muscles, you have to stimulate them by natural movement. That's what puppies do when playing with other puppies; they move naturally. It stimulates those muscles; it gives them stability. If they are walking in straight lines, they may look okay, but the moment they have to do anything, they have no stability."

Julia said that a lot of injuries happen in puppyhood, like the mother sitting on the puppy or someone dropping it. That is why it is so important not to walk along, trotting one's puppy on a leash. Allowing them to play naturally with other puppies, and move naturally in their own environment, will strengthen the core muscles and increase stability and recovery.

Turid closed the session by sharing that when she was training horses many years ago, she learned the following from a horse expert: Walk the horse the first year, trot him the second, and he will last a lifetime

