Tracey Peake:

Hello and welcome to NC State's Audio Abstract. I'm your host, Tracey Peake. If you've had pet dogs of different breeds, you likely have some definite ideas about how each breed's personality differs. And maybe you've noticed that some are more sensitive to pain than others, but did you know that dogs pain sensitivity is affected by breed and that the way your veterinarian views that sensitivity may be different from the way that you do?

We're speaking today with Margaret Gruen, associate professor of behavioral medicine at NC State about breed specific pain sensitivity and why some veterinarians long-held beliefs on the topic may be wrong. Welcome, Margaret.

Margaret Gruen:

Thank you for having me.

Tracey Peake:

I'm glad you're here. We're talking about a study that you and Duncan Lascelles recently published, and it's fascinating because it does basically talk about dog breed sensitivity to pain. Does this exist? Is there a difference? And how do we know, how do we know it exists?

Margaret Gruen:

It's a great question. I think it depends a bit on how we define sensitivity. What we did in this study was look at 10 different breeds of dogs who had been rated by veterinarians as being highly sensitive to pain, average sensitivity, and low sensitivity. And we looked at their threshold for response to different types of pressure and to a hot temperature. So we were looking at how quickly they would remove their paw from that.

And we found that there were actually some breed differences. There were some breeds that responded consistently more quickly than other breeds. When they respond more quickly, they have that lower threshold. They were differences in those thresholds for response.

Tracey Peake:

Let's take up from there. We're talking about here, people would normally maybe consider that to be the equivalent of having a high or low pain tolerance, even though we're not out here causing discomfort to any of these dogs in any meaningful way. But that's what you would tend to think of when you think of breed specific sensitivity would be almost like a reaction to pain or a pain response.

Margaret Gruen:

Yes. It's the best proxy that we have for dogs. In people, we can ask you. We can use the same type of probe. In fact, it's the exact same stimulus. And we can say, "How high would you rate this stimulus, 0 to 10?" And people can tell us.

But with really young children, with dogs, we have to use a behavioral response. So we look at that threshold for removal and we say, "Okay, well, we're going to use that as our proxy measure for a sensitivity threshold." That's how we used it to say, "This breed tends to be more sensitive to this kind of pressure or this temperature than another breed."

Tracey Peake:

A lot of people might think that this kind of sensitivity would be linked to size. You would think a little chihuahua or a little Shih Tzu would kind of be, not to insult people who have chihuahuas or Shih Tzu, but a little wimpier in those terms compared to something like maybe a Great Dane. We don't know. But size wasn't necessarily the deciding factor here, correct?

Margaret Gruen:

Yes. And really that rating, looking at size, is one of the things that drove this research. We know that people do tend to think that size is really related to pain sensitivity. And so, one of the things that we were looking at was trying to control for size when we selected our breeds.

But what we found was that for most of the tests that we did, size was not as good at explaining the differences that we saw as breed was. Now, that was different for one of the measures. If we think about the blunt end of a pen and using that to look at how quickly they will withdraw their paw.

With that test, size actually was better than breed at explaining the differences that we saw. So that's really interesting for us moving forward. It means that when we do this type of research, we really need to control for size when we're using that type of stimulus. It also means that we as researchers need to be really careful about reporting the ways that we've measured these thresholds and what conclusions we make based on those.

Tracey Peake:

Okay. Just to clarify for people who may not be familiar with the study, the tests were like, you would press the end of something like a ballpoint pin against the top of a little back paw, or there would be a little temperature probe that you would briefly touch to the paw and then see how quickly the dog moved their paw.

Margaret Gruen:

Exactly.

Tracey Peake:

And so it was based on time response.

Margaret Gruen:

For the two pressure ones. We had one that was like the ballpoint pen, and then one, if you flip that pen over and use the blunt side of that pen. For both of those, we were actually looking at the pressure, the force at which they would remove their paw.

For the temperature, we had a temperature set at a certain temperature, a warm probe, and we would look at the time until they would remove their paw for that one.

Tracey Peake:

Okay. So that's how you got the two different things. That does give you a little more insight into why pressure might differ for a bigger dog. If you step on, again, a Great Dane's foot, they might not notice for a minute, but if you stomped on a chihuahua by accident, they would probably be quite upset.

Margaret Gruen:

It may be. That's certainly the things that we're going to be really interested in looking at moving forward. Do we see those differences for those two different types of stimuli?

Tracey Peake:

Another aspect of what you did was more of a behavioral side. It wasn't just how quickly do you move your paw? Do you notice someone pressing on you? There were a couple of tests that you did that were behavior based. So can you give me a little information about why you included those and what they were?

Margaret Gruen:

Absolutely. I mean, we were really interested in if there aren't any differences in these thresholds, then what's driving these ratings of dogs as having different pain sensitivities? And so, one of our theories was that this was a behavioral response, that when we talk about pain sensitivity, we're not talking really about differences in the pain sensory system. We're talking about behavioral responses to painful interactions or frightening interactions.

So we were really interested in how dogs respond to a novel stimulus. We put a little toy monkey that moved and made sounds, something that the dogs wouldn't typically encounter in their everyday life. And we looked at their reaction to that. We scored their reaction to that.

And then we looked at a test we called the disgruntled stranger test where someone would be sitting in the hallway on their phone loudly talking about disagreements with an ump over a football game. We looked at the dog's response to that person. And then the person would take a deep breath, look over at the dog, call the dog over. So we looked both at their initial response and then their willingness to approach that person. Those were our two behavioral measures.

Tracey Peake:

In the study you found that a few breeds that were involved in the study tested differently from the way veterinarians would rank them in terms of sensitivity. So let's talk a little bit about what the results might say about that, why that might be so.

Margaret Gruen:

We found that when we look at their responses to the novel object, that didn't line up that well with the pain sensitivity ratings or with the results that we found. The disgruntled stranger test, however, did tend to better associate with the pain sensitivity ratings from veterinarians, so the way that the dogs reacted to that disgruntled stranger.

If we think about what happens when dogs come into a vet practice, it may be very busy, it may be quite loud. There's a lot going on. And so that behavioral response may get sometimes mixed up in our discussions about pain sensitivity.

We also know that actually when you're anxious, when you're focusing on pain or something hurting, that your sensitivity actually does increase some. So if I'm thinking about how much something's going to hurt, it will hurt me more. That doesn't mean that my actual pain tolerance or my actual pain threshold is lower than yours, but in that circumstance, I might respond much more quickly because of that environment that I'm in.

To me, what that means is that we need to really think carefully about how we're talking about pain and pain sensitivity and how we're talking about fear and anxiety and responses because they need to be addressed differently. We need to think about how we're bringing those dogs in, how we're using all the tools that we have for low stress handling and for decreasing anxiety and managing those dogs so that we're not kind of mixing those two things up together.

Tracey Peake:

Right. Just to further clarify, let's talk about one example that you found. I thought the most interesting one was the Siberian Husky.

Margaret Gruen:

Me Too.

Tracey Peake:

Which is a medium-sized breed of dog. If you've ever had a Siberian Husky or interacted with them, they're very personable dogs. They know what they want and they're going to tell you about it and it's fine. So they're kind of prima donna-y a little bit.

I think veterinarians had ranked them as being a little more pain sensitive or having a lower pain tolerance or a higher pain sensitivity, this is where I want to make sure I don't mix up the terms, than they actually were on your testing.

Margaret Gruen:

Exactly. They were rated as one of our high sensitivity dogs when we just ask about rating pain sensitivity. But it turns out that across the tests that we did, they're average to low pain sensitivity. So they're not more sensitive to pain in terms of withdrawing earlier than another breed.

That's where I really think that behavioral piece comes in, because their response on the disgruntled stranger test did align more, they were less likely to approach that disgruntled stranger. And so that may get kind of mixed up in their response to pain.

They're also quite vocal, which we know plays into how people rate pain and pain sensitivity. They tend to be a highly vocal breed, and that does tend sometimes to lead to people thinking they are more sensitive to pain than perhaps they are.

Tracey Peake:

This kind of takes us in a couple of different directions. It's interesting to be able to start quantifying something that could have been just dismissed as veterinarian old wives' tales or received veterinary wisdom. We know that there are differences between breeds, but nobody's ever really set out to quantify it, so that's good. So on the pain tolerance itself side, what does this open up?

Margaret Gruen:

Yes. This actually was one of the neatest things about this research is that no matter what we found, it was going to be interesting. If we found differences, then that opens up these avenues to look at, are there real differences in the pain sensory system in these dogs? Are there genetic differences that we need to understand that might affect how these dogs need to be treated?

If we found no differences, then we need to understand where these ratings are coming from. What's driving these beliefs? Does it actually impact how dogs are being treated? Where are veterinarians learning this? How is this being taught?

So either one would've been amazing or interesting, but we actually found both, which is even more exciting. We found real differences, which means it does open up those avenues to look at those genetic drivers of these differences. But we also found that they didn't quite align with what veterinarians would predict, meaning we need to understand more about what's actually going on there and where it's coming from.

Tracey Peake:

Okay. While we do the forensics behind why is this belief system being propagated, what does this mean for veterinarians right now? You're a veterinarian and you've got a bunch of dogs coming in. You've got a Maltese coming in, you've got a Labrador retriever, a Siberian Husky, a Jack Russell, and a pit bull. What can you as a veterinarian do right now to make sure that you're paying the attention to the dog's pain level while they're visiting?

Margaret Gruen:

I think it's a really early stage right now, but I think just being aware of the fact that we carry some of these beliefs around and that they might not necessarily be true, and that we need to really think about each of these patients as an individual and really be thinking about the role that anxiety might be playing in the responses that we're seeing. So really focusing on trying to do our best to decrease anxiety in the vet hospital.

We did find that Labradors kind of across the board did tend to have higher sensitivity thresholds, but we don't know that that means that they need less pain medication. So I think we have a long way to go here, but I think just raising awareness of the fact that these beliefs existed, that they don't necessarily actually align with what we find and that there's a lot more for us to do, helps us kind of really think critically about how we're approaching them.

Tracey Peake:

Finally, what was your favorite thing or the coolest thing that you have found? It could be this particular project that you're working on, or really any of the stuff that you do, because all the stuff you do, I think is really cool because it's all animal behavior based. And as someone who currently just has cats, they tend to have a flatter affect. It's a little hard to-

Margaret Gruen:

I love cats.

Tracey Peake:

It's a little harder sometimes to suss out what's happening in the world of cat than it is for a dog. So what's your favorite thing?

Margaret Gruen:

Well, I'll tell you my favorite dog thing because I could go on for a long time about my favorite cat things, but my favorite dog things that we've learned, I mean, I think one was just how interested and excited owners were to participate in this study. We had people coming from Washington DC, so as you said in the intro, people are excited about their dogs and their breed.

I think a lot of that we also owe to the two researchers who drove this project, so Rachael Cunningham and Rachel Caddiell, who took something that on paper you'd think might be kind of hard to advertise for and got people really excited about it. So I think that was really cool, just that we could do it in general.

The other things that I think are really neat are that we're starting to look at pain catastrophizing. When I said that increasing anxiety can increase actual perception of pain in humans, we talk about pain catastrophizing and pain catastrophizers, so people who are focused on how much something's going to hurt and that they actually have worse outcomes even after surgery.

So I think that coming off of this study and starting to look into those pieces, whether those phenomena exist, whether they are going to affect how dogs do in the hospital, that I think is really cool and exciting too.

Tracey Peake:

Awesome. Before you go, one cool cat fact. I just need one cool cat fact. Can you narrow it down to one? You can do more than one if you want to. I just feel like I should give the cat people a little extra time here at the end.

Margaret Gruen:

I know. Cats recognize their owners' voices and can respond to their names. There's been some really neat research that has shown that they may act more aloof, but actually they really know you well, and they know when you're talking to them.

Tracey Peake:

Yeah, I can tell. When I fuss at my cats, they get the scolded face. Even though they don't have eyebrows, I can tell. I'm like, "I know you hear me. I know you hear me, and I know you know did a bad thing."

Well, thank you so much for being here today, Margaret. It's been very interesting.

Margaret Gruen:

Thank you. It's been great being here. Thanks for having me.

Tracey Peake:

Absolutely.

We've been speaking today with Margaret Gruen, associate professor of behavioral medicine at NC State. This has been Audio Abstract. I'm your host, Tracey Peake. Thank you so much for listening.