

Brain tumor treatment for dogs may soon be used in human patients

October 13 2017, by Olivia Coleman



Meet Q. After a neurologist diagnosed Q with a large brain tumor earlier this year, she headed to Blacksburg to participate in a clinical trial at the Virginia-Maryland College of Veterinary Medicine. Her tumor has since shrunk in half. Credit: Jordan Fifer

Data from a clinical trial at the Virginia-Maryland College of Veterinary Medicine at Virginia Tech to treat brain tumors in dogs may eventually be used to help humans.

The study is trying to determine the safety of a new chemotherapeutic drug and drug delivery method in the treatment of brain tumors in dogs. It's funded by the National Institutes of Health and is a collaboration between the college and the Thomas K. Hearn Brain Tumor Research Center at the Wake Forest School of Medicine.

The goal of the trial is to try to identify a safe, effective dose of the drug to use in a future clinical trial. Because canine and human brains are very similar, researchers hope the data found in the trial can be applied to people.

John Rossmeisl, professor of neurology and neurosurgery in the Department of Small Animal Clinical Sciences and principal investigator on the study, explained that research on dogs with cancer can be a pathway to accelerate drug development for human cancers.

"The dogs are benefiting from this, but eventually this drug is intended to go into humans," he said.

One dog from the Washington, D.C., area is doing exceptionally well after participating in the trial. Her name is Q Bentley.

"She's kind of the center of attention in our family. She's always been very high energy," Q's owner Mark Kazmierczak said.



John Rossmeisl (right), principal investigator of the Molecular Combinatorial Therapy clinical trial, along with Meg Bentley (left) and Mark Kazmierczak (center), Q's owners, take a look at Q before her scheduled MRI. Credit: Jordan Fifer

Back in March, Q's owners, Kazmierczak and Meg Bentley, noticed that Q was unusually whiny and seemed to have forgotten commands she used to know. One day when they were on a walk, Q had a seizure.

"Behavioral changes can be extremely subtle and the owners are the best people to detect those," Rossmeisl said. "Behavioral changes are the second-most common clinical sign of [brain tumors](#) in dogs. Seizures [are the first]."

Q's parents first went to their primary care veterinarian, who then sent Q to a neurologist at Bush Veterinary Neurological Services (BVNS) in Rockville, Maryland. Q was diagnosed with a glioma brain tumor, with a probable survival of only a few months.

"If a dog with a glioma receives no specific treatment for that tumor, the average survival is about two-and-a-half months," Rossmeisl said.

"Unfortunately, these tumors are aggressive and they almost universally come back, even after treatment."

The same day that Q was diagnosed with the tumor, Daniel Cuff, of BVNS, told Bentley and Kazmierczak about the clinical trial at Virginia Tech.

"We're both Ph.D. biologists, so the clinical trial aspect was actually quite interesting. We looked up the science behind it and everything, which was fascinating," Kazmierczak said. "We thought it was her best option."

The trial required Q to stay at the hospital for six days. During the first day, Rossmeisl discussed the trial with the owners and their role in Q's treatment and performed basic laboratory tests and an examination on the dog. On the second day, Q underwent a tumor biopsy and then rested for a couple of days while the biopsy was processed.



Mark Kazmierczak, Q's dad, smiles and pets Q before her scheduled MRI.
Credit: Jordan Fifer

On the fifth day, specially modified chemotherapy drugs injected directly into Q's tumor went to work attacking the cancer. The drugs are unique in that they are designed to affect only cancerous cells and not normal brain cells. Q went home the day following the CED infusion.

Since the initial treatment in March, Q has been back at the Veterinary Teaching Hospital twice: six weeks after the infusion and again four months after.

"That makes coming here kind of exciting," Bentley said. "So the whole process was easy to go through. I think people at Virginia Tech made

that easier to go through for us."

Her tumor has reduced significantly.

"It's not exact, but from the initial MRI that Bush Veterinary Neurology did, it shrunk by 50 percent. From the initial follow-up to the four-month follow-up, it shrunk by another 50 percent. It's not gone, but it's a little teeny spot now," Rossmeisl said.

Follow-up care every two to three months will require several more MRI exams to monitor Q's tumor over the next few months.

"We wanted to get her the best treatment we could," Kazmierczak said. "Having to come to Blacksburg every once in awhile is really not that difficult."

The trial would not have been possible without the Collaborative Research Network, which enables specialty practices in Virginia and Maryland to build unique partnerships with researchers at the college. When a practice such as BVNS, which is a member of the Collaborative Research Network, identifies a mass on an MRI that looks like a glioma, they reach out to the college's Veterinary Clinical Research Office to connect the owners with relevant clinical trials happening at the veterinary college.

"That's actually how we recruit the vast majority of our patients into these trials," Rossmeisl said.

Not all dogs respond to the treatment as well as Q.

"There's multiple sub-types of gliomas. The tumors are different, so their genetics are different," Rossmeisl said. "We've had some tremendous success stories with dogs living for a year with their tumor

shrinking and others having no response."

Previous generations of one of the drugs used in this trial have been used safely in human brain [tumor clinical trials](#), and the findings of this study will be transferrable to future human [trials](#) as well.

"This has a good chance of going into a person in five years or less," Rossmeisl said.

The clinical trial began in 2014 and is still accepting dogs to participate. Rossmeisl and his team follow the participating [dogs](#) for a one-year period.

"If a patient finishes the trial, if they live a year, we know that individual patient has received a significant benefit," Rossmeisl said. "Q is already a success. There's no doubt that she's had a successful outcome."

Provided by Virginia Tech

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