

Brain cancer research could help dogs—and the humans who love them

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Roel Verhaak with his dog Lola

Few heartbreaks are as devastating as when a beloved family dog falls ill

with cancer.

But a new research paper could spur development of more and better treatments for a canine companion who has a brain [tumor](#)—because it's possible that those same therapies will help human kids, too. Dogs' brain cancers are genetically akin to those found in children, a new study in the journal *Cancer Cell* reports.

"These dog tumors were much more similar to the tumors we find in kids than the tumors we find in adults," said senior researcher Roel Verhaak, associate director of computational biology at The Jackson Laboratory in Farmington, Conn.

"This is important because it means whatever results we find in preclinical experimental therapy studies involving canines is going to be most applicable—and maybe even only applicable—to children's [brain tumors](#)," he added.

Striving to cure [pet dogs](#) with brain tumors and learning which therapies work best—and why—could inform cancer treatments for children with these tumors, the researchers concluded.

It's been thought for some time that family [dogs](#) might be better for testing experimental cancer drugs than lab animals like mice or monkeys, said Dr. Len Lichtenfeld, deputy chief medical officer for the American Cancer Society.

That's because dogs live tightly alongside humans, sharing the same exposures from home and play and, often, the same food from the table, he said.

"What we need to see are the similarities and dissimilarities between the canine tumor and the human tumor, and that's exactly what this research

has done," Lichtenfeld said. "I personally find this report very exciting and very important."

The study focused on gliomas, a common type of brain [cancer](#). Senators John McCain and Ted Kennedy both died of gliomas, and a similar brain tumor claimed the life of Rush drummer Neil Peart in January.

Companion dogs develop gliomas about as often as humans do, researchers said in background notes. Dogs develop gliomas at an average age of 9 years old.

Whether in human or in canine, gliomas are incredibly difficult to treat, Verhaak and Lichtenfeld said.

"They do not respond to chemotherapy and very minimally to radiation therapy," Verhaak said. "When dogs get a brain tumor, their owners often elect compassionate euthanasia, because there are minimal treatment options for these dogs and it's costly to treat a dog for a brain tumor."

Verhaak's team collected brain tissue samples from 83 dogs that suffered natural deaths caused by gliomas. Bereaved families donated all of the samples.

Humans tend to be diagnosed with brain tumors either in childhood or between the ages of 40 and 70, Verhaak said.

Since dogs, on average, develop gliomas around age 9—middle-age for canines—researchers suspected that their tumors would closely resemble those of adult humans.

Instead, they were surprised to find that the dogs' tumors were more like those of kids, who are closer to their actual age.

The dogs' gliomas had a number of mutations similar to pediatric [brain](#) cancers. Both are lower than the number of mutations found in adult gliomas, the findings showed.

The researchers also found that the immune systems of dogs with gliomas closely resembled those of human patients, meaning that immunotherapies that work against canine gliomas might be effective in people, too.

"There are some very specific gliomas in children that don't occur in adults that are incredibly difficult to treat. We don't have drugs that are particularly successful," Lichtenfeld said. "Having a model that could advance research into gliomas in children is huge."

Comparing canine and human gliomas also has helped "fine tune" researchers' focus on the genetic changes that are most crucial in the development of gliomas, Verhaak said.

"This research allowed us to zoom in on pieces of the genome where we see changes in both human tumors and canine tumors," he said. "It really reduced the number of disease pathways that are essential to dog tumors, to kids' tumors and to adult tumors."

More information: Johns Hopkins has more about [gliomas](#).

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