New imaging method could lead to improved stroke care

By Jodie Jackson Jr.

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When a stroke occurs and a blocked artery prevents blood from getting to the brain, time is of the essence to minimize brain damage — or worse.

“Precious time,” said Ashish Nanda, an associate professor at the University of Missouri and director of University Hospital’s stroke program. “Every second there are millions of neurons that are lost.”

Even after diagnosing a stroke with magnetic resonance imaging, or MRI, medical professionals are able to see only the general area of the brain where a blockage is located. While that technology can lead to effective treatment — “busting” the clot or removing it via aspiration — the treatment and side effects can be risky.

There might be hope for a quicker treatment based on a research effort spearheaded by the MU School of Medicine. The study, led by MU Associate Professor Zezong Gu, has found a way to view strokes at the molecular level.

During an ischemic stroke, the most common type of stroke, the brain is deprived of oxygen and other nutrients. Gu said brain damage often stems from harmful enzymes called gelatinase, which become overactive in areas of the brain where blood flow is cut off.

The researchers hypothesized that if they were able to visualize and track the enzyme activity — which does not show up on an MRI — they might be able to develop a way to block the activity and prevent brain damage.

The contrast agents that imaging technicians use to “see” sectional images of the brain via MRI are not specific or sensitive enough to reveal molecular activity such as gelatinase. Research team member Roger Tsien, a biochemist and Nobel laureate at the University of California-San Diego, developed a method to “tag” peptides that recognize the gelatinase activity.
When the tagged peptides reach the site of the increased gelatinase activity, Gu said, the peptides are absorbed into the cells. Working with mice, the researchers found that when enough of the peptides were absorbed, the stroke became visible on an MRI.

“Using this model, we successfully tracked gelatinase activity,” he said.

The next step for the study is developing an inhibitor to prevent the damage caused by the harmful enzymes. While the study doesn’t focus on other brain diseases such as Alzheimer’s or Parkinson’s, Gu said, the findings might also lead to more understanding or treatment for those conditions.

Nanda believes future use of the technology might lead to treatments that could even reverse brain damage.

“This is exciting,” Nanda said. “It’s so hard to understand the complexities that occur at the molecular level in the brain.”

Gu said the team still has a lot of work to do before the findings could be applied to clinical trials in humans.

“Finding a way to monitor the enzyme activity is crucial,” he said. “This is still in the very early research phase.”

The study was recently published in the Journal of Cerebral Blood Flow and Metabolism. Funding for the study was provided by the National Institutes of Health, the Dana Foundation, the American Heart Association National Scientist Development award and the MU Department Research Fund.

MU Health officials touted the research findings to showcase the importance of academic medical centers that have cooperating research and clinical departments.

Two years ago, the Centers for Disease Control and Prevention reported that stroke was the fifth-leading cause of death in the United States. In an update issued March 15, stroke is now the fourth leading cause of death.

While studies continue to find better ways to diagnose and treat stroke, Nanda said, there are many known factors in preventing stroke. He said Central Missouri is part of an area known as the “stroke belt” based on the high incidence of stroke in the region.

Risk factors for stroke include high blood pressure, smoking, diabetes, old age and high cholesterol.
Mizzou on track for record fundraising year

The University of Missouri-Columbia recorded $115 million in new gifts and pledges in the current fiscal year for its "Mizzou: Our Time to Lead" capital campaign, and the campus is on course for its best-ever year in fundraising.

That total is $30 million higher than through the same period a year earlier, the Columbia Tribune reports. A large pledge from an undisclosed donor pushed Mizzou's fundraising to $21.9 million in February and toward a record year in soliciting private support, Vice Chancellor of University Advancement Tom Hiles told the publication.

Total fundraising this year is $6.9 million more than donations to this point in fiscal 2014, previously the school's best year for fundraising, the Tribune reports.

A drop in smaller donations seen after campus unrest last fall is being offset somewhat by large pledges. Donors withdrew $2 million in pledges and November and December donations were $8.6 million below the prior year, the Tribune reports.

"We are still hearing some of the same things, there are still questions about leadership," Hiles told the newspaper. "The difference is major gifts, gifts of $1 million or more, are very individualized gifts built on relationships of years."
COLUMBIA — Elizabeth Kennedy is going to be 90 years old in May, and she believes that Dolly, a 12-year-old Boston terrier, is the last dog she'll ever have. For the last six years, Dolly has been one of her best friends.

Kennedy and Dolly live together at TigerPlace, a retirement community that helps residents care for their pets as both age. Researchers say pets benefit their owners' mental and physical health in several ways, although it can be difficult for aging adults to care for pets.

While many retirement residencies allow pets, TigerPlace, 2910 Bluff Creek Drive, is the only one in Columbia that offers pet-care services.

Kennedy has no immediate family in Columbia and has lived alone since her parents died 20 years ago. Dolly has become more than a companion, Kennedy said — she's like a family member.

When her last dog died six years ago, Kennedy looked for an older dog, and eventually, they came together to TigerPlace.

"One reason I came here is I could bring (Dolly)," Kennedy said. "She’s too old to start over with somebody new or go to a shelter."

A growing trend among retirement communities is offering pet-care services, according to Rebecca Johnson, director of the Research Center for Human-Animal Interaction based at the College of Veterinary Medicine.
She's also the Millsap Professor of Gerontological Nursing and Public Policy at the Sinclair School of Nursing at MU. TigerPlace, built by Americare Systems, Inc., is operated in collaboration with the School of Nursing. It has 90 residents.

"TigerPlace is pet-encouraging, while other facilities are pet-tolerating," Johnson said.

She studies the interactions between people and pets, focusing on how those interactions affect life transitions for older adults. According to her research, pets provide mental and physical benefits to older people, such as lessening loneliness and increasing healthy behaviors like walking.

"One thing that is beautiful about dogs and cats is that they're not judgmental," said Sandra Crowder, pet-care coordinator at TigerPlace. "They don’t care if you're in a wheelchair; they don’t care if you wear glasses; they don’t care if you can’t hear anymore. They're going to love and accept you no matter what."

Staying active

Having a dog helps Kennedy stick to a schedule. The Boston terrier sleeps with her every night and helps her get up in the morning.

"She keeps me on schedule, and there’s a sense of responsibility that she needs to be fed and cared for, which is always good," Kennedy said. "Sometimes when I’m not out of bed, she’ll bark at me."

Having a pet also benefits older people psychosocially, Johnson said. Pets give their owners something to talk about with others. When people see a pet and its owner, they're more likely to engage, Johnson said.

"(Dolly) loves it here. Everybody stops, plays with her and pets her," Kennedy said. "She thinks it’s the best place she’s ever been."

Sometimes neighbors will borrow Dolly so they can a take nap with the cuddly Boston terrier.
"She’s almost a therapy dog," Kennedy said.

But Kennedy is beginning to need help taking care of Dolly's growing needs. The dog is getting gray and needs medicine twice a day because of an enlarged heart, Kennedy said. Having people like Sandra Crowder to help care for Dolly makes her life easier, she said.

Crowder is one of two dog walkers who help at TigerPlace. She and a colleague take care of all five dogs and 11 cats in TigerPlace. Every weekday, they take the dogs for about a 15-minute walk around the outside of the building. Some dog owners occasionally walk their dogs themselves if their health is good and weather permits, Crowder said.

"I think it’s very important that we help them because a lot of pets that live with older adults are extremely overweight," Crowder said. Older adults often don’t walk enough for their dogs to get the exercise they need."

The two dog walkers check on each pet daily and help with basic chores, like refilling food and water bowls, buying pet food and delivering it. Owners with cats get help with litter boxes.

These services are included in the residents’ rent, but some additional services, including bathing, trips to the veterinarian and weekend walks, cost extra.

“I’m very connected and bonded to these animals. When one of them gets sick, I can feel it like an owner," Crowder said. "All of our pet-care assistants feel a bond and a responsibility to them."

Friends for life

As an owner's health declines, pets often stay with them until their final day. The pet's presence gives the owner a sense of comfort until his or her last moments, Crowder said.

If a resident dies, Johnson's research center will take care of the pets or find a new owner. Sometimes, an owner’s neighbor will adopt the animal, Johnson said.
When a pet dies, the center will help take care of its remains and organize a funeral. Social workers are also made available to help the owner process the loss, Johnson said.

"It hurts no matter how old you are," she said. "But what happens is that if you're older and you have fewer friends or fewer family members, then you feel more alone."

Most residents who lose a pet want a new one right away, and the center aims to help residents get one, Johnson said. Others will wait or never want a pet again because the death affected them so deeply, she said.

Kennedy said she’s being realistic about possibly leaving Dolly behind. She's already made arrangements to have a friend take over Dolly’s care, if need be.

“As long as I can take care of her, I’ll keep her,” Kennedy said.