Researchers find first conclusive evidence of Alzheimer's-like brain tangles in nonhuman primates

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Researchers at the Yerkes National Primate Research Center, Emory University, have discovered the first conclusive evidence of Alzheimer's-like neurofibrillary brain tangles in an aged nonhuman primate. The unprecedented finding, described in the online issue of the *Journal of Comparative Neurology*, has the potential to move the scientific community one step closer to understanding why age-related neurodegenerative diseases, such as Alzheimer's disease, are uniquely human and seem to never fully manifest in other species--including our closest evolutionary relative, the chimpanzee.

Lead researchers Rebecca Rosen, a doctoral student who is conducting her research at Yerkes, and Lary Walker, PhD, a neuroscientist and research professor at Yerkes, in collaboration with colleagues at UCLA, made the unanticipated finding during a routine post-mortem study of an aged, female chimpanzee that died of natural causes. The researchers also discovered deposits of beta-amyloid protein in plaques and blood vessels of the chimp's brain tissue, although these changes were infrequent compared to Alzheimer's disease in humans.

"We've seen these plaques in aged chimpanzees before, but this is the first time researchers have found both hallmark features of Alzheimer's disease--plaques and neurofibrillary tangles--in a nonhuman primate," explains Walker.

As many as five million Americans are living with Alzheimer's disease, the most common form of dementia. A cure has eluded researchers, and the disease is considered progressive and fatal. Brain plaques and tangles associated with the disease are prime suspects in damaging and killing nerve cells that cause memory loss and dementia.

"Alzheimer's disease has a huge number of potential causes," says Rosen. "By studying the development of human features of the disease that occur naturally in nonhuman primates, we may be able to isolate what makes people so susceptible to neurodegenerative disease and identify targets for therapeutics."

The research reported in the Journal of Comparative Neurology is just one of the projects at Yerkes aimed at uncovering underlying mechanisms and pathogenesis of Alzheimer's disease. Walker is evaluating the immune response of squirrel monkeys to a vaccine targeting beta-amyloid protein. The goal is to see if the vaccine prompts the immune system to make antibodies against the protein without side effects. In another study, Rosen is looking at the structure of beta-amyloid protein in multiple primate species with the hope of identifying the correct target for new drugs and immunotherapy.

Rosen noted Yerkes has provided her with unparalleled access to resources for graduate-level research and training. Added Walker, "Yerkes is one of the only facilities in the world that offers researchers the resources to study chimpanzees across the entire lifespan, including behavior, biochemistry, physiology, molecular biology and disease pathology."

For more than seven decades, the Yerkes National Primate Research Center, Emory University, has been dedicated to conducting essential basic science and translational research to advance scientific understanding and to improve the health and well-being of humans and

nonhuman primates. Today, the center, as one of only eight National Institutes of HealthÐfunded national primate research centers, provides leadership, training and resources to foster scientific creativity, collaboration and discoveries. Yerkes-based research is grounded in scientific integrity, expert knowledge, respect for colleagues, an open exchange of ideas and compassionate, quality animal care.

Within the fields of microbiology and immunology, neuroscience, psychobiology and sensory-motor systems, the center's research programs are seeking ways to: develop vaccines for infectious and noninfectious diseases, such as AIDS and Alzheimer's disease; treat cocaine addiction; interpret brain activity through imaging; increase understanding of progressive illnesses such as Parkinson's and Alzheimer's; unlock the secrets of memory; determine behavioral effects of hormone replacement therapy; address vision disorders; and advance knowledge about the evolutionary links between biology and behavior.

Source: Emory University