Bad medicine: Using elder chimpanzees in human aging research

Though memory loss is recognized as common during aging, many older individuals who experience memory problems lead rich, rewarding, independent lives. Compensation for memory difficulties through the use of calendars, notes and other helpful tools help many people cope with normal forgetfulness. However, for some, memory loss progresses. Recently, physicians have categorized degrees of memory loss and consider higher levels of impairment to be an indicator of a disease process impacting brain function[1].

The syndrome of subjective memory problems known as "Mild Cognitive Impairment" (MCI) is considered a transitional state between the changes normally associated with aging and the debilitating conditions known as dementia and Alzheimer's Disease.[2] MCI can include changes in a range of cognitive abilities such as remembering and using words, understanding spatial relationships, making decisions and recalling memories.[2]

Doctors have discovered that MCI may be linked to certain genes[3] and to specific physical changes in the brain, such as reduced volume in the hippocampus.[4] Measurements of brain function and neuropsychological test results can also be markers of MCI.[5,6] Identifying critical indicators like these is one of the vital outcomes of human research studies that allow doctors to look at individuals and groups of people in clinical and epidemiological research.

Of course, if we want to know how healthy aging brains function and how cognitive impairments affect real individuals and families, it is best to study people in different stages of their lives – from 18 to 80 and beyond, which is what is done in clinical and epidemiological studies. In fact, more than 300 human clinical studies of aging, cognition and memory are now underway.[7] While some research programs conduct memory and cognitive testing, others help seniors figure out how they are doing and then engage them in appropriate support programs. The University of Illinois has developed one such program called *Senior Odyssey*, where group problem-solving and puzzles help seniors learn coping skills and get a mental workout.[8]

Bad medicine: Using chimpanzees in human aging research is a losing proposition

Recently, the Yerkes National Primate Research Center received its largest ever multiyear grant - $10 million-awarded by the National Institute of Aging. This five-year federal grant will examine aspects of aging in 400 human women, 25 chimpanzees and other primates. Essentially the center has taken a human epidemiological research study and added a series of primate experiments. But why? Chimpanzees, our closest primate relatives, do share many human traits - from intelligence to culture to close friendships. Does that mean we need chimpanzee experiments to find out what causes MCI or how to detect it? Absolutely not.

Even the primate center itself acknowledges that chimpanzees do not get Alzheimer's disease or MCI.[9] Given that, is there any compelling case to search for clues to early detection or the causes of MCI or Alzheimer's in the chimpanzee? To the contrary. In fact, chimpanzee experiments offer little, if any, promise of resulting in information important to human health. Sophisticated genetic studies have already offered a glimpse into species differences in aging. In fact, a team that examined how genes were expressed in the cortex found that the pattern observed in the chimpanzee brains had "no detectable similarity" with that observed in humans.[10] The extraordinary differences observed in the study, despite the fact that chimpanzees are our closest primate relatives, led the authors to conclude that

> "…making specific inferences about human brain aging from [animal] model organisms may be difficult." (p. 1659)

While chimpanzee experiments cannot answer questions about the causes or consequences of human MCI, they will squander the limited precious resources committed to this area of research and prolong the suffering of Chimpanzee Elders who have languished in laboratories for decades.

Elders at Risk

Aging experiments performed on chimpanzees are not only a scientific gamble, they cause pain and suffering for the chimpanzees involved. Chimpanzees feel physical pain just as humans do. They also have psychological/emotional reactions to experiments. These can range from signs of mild to moderate emotional distress observed during cognitive testing[11] to severe behavioral and psychological pathologies that result from being held in captivity and subjected to experiments. Primatologists have long recognized that chimpanzees who are isolated from other chimpanzees, kept in impoverished laboratory conditions for extended periods and subjected to repeated experiments exhibit a wide range of physical and psychological abnormalities. A 2002 survey reported that chimpanzees used in experiments exhibited severely abnormal behavior ranging from r consuming their own feces to compulsively plucking out their hair to slapping themselves.[12] Notably, these results are from the MD Anderson Cancer Research Center which holds 21 Elders.

More and more scientists are taking note of the seriousness of the psychological conditions of chimpanzees. Some in the EU have recommended that chimpanzees (and other great apes) could benefit from and indeed should receive psychiatric care similar to that provided for humans.[13] More recently, a research team that included NEAVS President Dr. Theodora Capaldo, a psychologist, published an article showing that chimpanzees who were subjected to laboratory experiments exhibited symptoms of complex Post-traumatic Stress Disorder (PTSD).[14] The study concluded that,

> "The costs of laboratory caused trauma are immeasurable in their life-long psychological impact on, and consequent suffering of, chimpanzees."

The psychological maladies and traumatic experiences that afflict so many chimpanzees in laboratories make it even less likely that further tests on them can reveal anything about the natural aging process; what we see is simply the sad and damaging legacy of laboratory life.

There are also physical risks for Chimpanzee Elders who are used in experiments. For chimpanzees, being anesthetized is a dramatic and traumatic process. Because of their tremendous strength, they must often be taken forcibly or shot with dart guns in a process that's referred to as a "knock down." Nancy Megna, a former chimpanzee caretaker who worked in biomedical laboratories and is currently a Program Specialist for Project R&R, describes knock-downs as "horrific to watch." She adds, she never doubted that they were even worse for the chimpanzees.

> "Seeing several humans surround their 5' x 5' x 7' foot cages with dart guns pointed at them, knock downs were terrifying for chimpanzees. They would scream, involuntarily urinate and defecate and try desperately to escape. But they were trapped – and helpless."

Many chimpanzees have been injured or have died due to complications with knock downs or the anesthetics .A study published earlier this year reported that the risk of death for chimpanzees over the age of 30 (chimpanzees are considered "elderly" at age 34) was about 30 times higher than the

risk for younger individuals.[15] Clearly, the prospect of anesthetizing older chimpanzees over and over again to perform brain scans and exams, as planned for the 10-million dollar grant mentioned earlier, dramatically increases their chances of an untimely death.

First, do no harm: Humane alternatives

The good news is that *if* we can learn something by comparing humans and chimpanzees, we could do so by using humane methods that cause no harm to Chimpanzee Elders. One such humane approach is to examine preserved blood and tissue samples already stored in laboratories. Such samples can be used in genetic and other laboratory tests, for instance. Lists of specimens available for use, as well as some results from tests that have already been completed, can be reviewed on the internet or in computer databases. In fact, the federal government already funds special programs like a tissue bank[16] and the Primate Aging Database[17] for such inquiries.

As noted earlier, many human studies have shown that MCI is associated with physical changes in the brain. If scientists want to determine whether similar changes ever take place in chimpanzees, they can do so without using live chimpanzees in experiments. For example, a researcher can use the results of MRIs and other brain scans taken during autopsies or physicals. Another humane option is to use ethically sourced specimens from chimpanzees living in zoos and sanctuaries after they die of natural causes. A July 2007 news report explained that this very process was underway for Bill, a chimpanzee who was thought to be about 60 years of age.[18] Upon his death, samples of Bill's DNA, tissue and even his brain were donated to science.

Scientists can also observe chimpanzees who have been retired to sanctuary by watching them from a distance or making non-intrusive video recordings. Sanctuary research allows chimpanzees to live freely and safe from harm while scientists gather information about their behavior. This approach is being used in a state-of-the-art facility that recently opened in Japan.[19] The Chimpanzee Sanctuary Uto is home to 78 chimpanzees who were formerly used in laboratory experiments. The residents now enjoy the many benefits of sanctuary, especially the companionship of other chimpanzees. When asked about the research program, Dr. Testsuro Matsuzawa, a primatologist and director of the primate research institute noted that he wanted to truly understand how chimpanzees live out their lives in social groups. He is also hopeful that observations made at the sanctuary will contribute to the "welfare and longevity" of humans.

Similar humane studies are underway at African sanctuaries with orphaned or rescued chimpanzees and sanctuaries in North America with chimpanzees retired from labs. This compassionate research could also provide valuable data about how to care for Chimpanzee Elders in the future; the population of Elders is growing, not unlike our own human society.

Conclusions

Chimpanzee experiments have been shown time and again to be unnecessary and even dangerous to human medical advances. The scientific community itself is in debate about the efficacy of chimpanzee research to study human health and disease. Aging research is no exception. Although chimpanzees have 96% of the same DNA as humans, we now know that these differences can result in crucial disparities in how we respond to diseases, how we respond to drugs and treatments and even how we age. Today's scientists are and should be seeking answers with more sophisticated science than using chimpanzees.

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NEAVS believes that the Chimpanzee Elders deserve to live out the remainder of their lives in retirement at sanctuaries designed to meet their physical and psychological needs. We know that a strong majority of Americans agree with us. A survey conducted by the Humane Research Council in 2005 showed that a full 71% of people surveyed thought that chimpanzees used in research for more than 10 years should be retired. Of course, when it comes to the Chimpanzee Elders, we are talking about individuals who have languished in labs for not just 10 years, but 20, 30, 40 or more..

We cannot afford ---in human health, tax dollars and chimpanzee suffering -- to repeat the past failures of chimpanzee experiments. Rather than wasting millions of dollars and precious time - and bearing the ethical costs of experimenting on these sensitive and intelligent creatures - we can turn to humane science that is more promising, and release the Elders into sanctuaries. If we want to learn lessons from the Elders, sanctuaries still provide a humane and cost-effective venue for observing the aging process in a safe and more natural setting. For the Chimpanzee Elders, compassionate science means a chance at retirement and relief from the pain and suffering that they have endured – for decades, if not their entire lives -- in laboratories.

The Chimpanzee Elders are counting on our wisdom and compassion. For more information visit: www.releasechimps.org or contact 617 523 6020 or releasechimps@neavs.org.

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