

A Brief Overview of Chimpanzees and Aging Research

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What Causes Aging?

It is thought that aging is caused by a gradual accumulation of cellular damage over time, resulting in a decline in function of the in-built systems that keep us healthy⁽¹⁾. This manifests in the familiar "symptoms" associated with increasing age, for example, changes in appearance, problems with bones and joints, loss of vision and hearing, decline in cognitive function and increased susceptibility to diseases such as cancer, stroke, and neurodegenerative disorders like Alzheimer's and Parkinson's. The mechanisms that underlie the aging process are relatively poorly understood and so it is understandably a major research focus. Furthermore, life expectancy continues to increase and it is clearly important that the aging population be as healthy as possible, for personal, social and economic reasons.

Aging research

Aging research can be split into 2 major areas; the first studies the basic science of cellular aging, often on a molecular level. This research largely uses isolated cells and tissues (human and non human) and *in vitro* methods to study the fundamental mechanisms of aging. The second major research area examines common age related health problems using human subjects, human epidemiological data and animal models of certain age-related diseases.

Use of chimpanzees in aging research

Because chimpanzees are genetically very similar to humans, they have been used as models of some human diseases. Recent research⁽²⁾ coupled with conspicuous lack of output in terms of effective treatments has cast serious doubts on their suitability as such models. It has been suggested that a number of aged chimpanzees that have been the subjects of various research projects throughout their lives could now be used in aging research. This is despite the fact that in 1998, the National Advisory Council on Aging stated "there is no scientific demand for a center for aging chimpanzees". Prior to this, of 1600 NIH grantees who were surveyed regarding their interest in using chimpanzees in aging research, three said that they would be interested in using *post mortem* brain tissue and only one indicated a positive interest in using live subjects. The scientific community clearly believes that there is enough meaningful information to be gained elsewhere without having to resort to chimpanzees. It is perhaps not surprising that scientists undertaking aging research do not wish to use chimpanzees when one considers the following: Though chimpanzees have been used in the past as models of cancer and cardiovascular disease both of which are also studied in aging research., they have not been used as models of these diseases for many years as they do not suffer from them to the same degree as humans and results gained from these studies were shown not to reflect the human situation^(3,4). Additionally, chimpanzees are not affected by Alzheimer's or Parkinson's diseases, which makes their use in these areas of research difficult to rationalize and certainly much less relevant than research utilizing human cells and tissues.

Human Studies on Aging

One of the most persuasive reasons to adopt different research methods than using chimpanzees is that many studies are now using the best possible model of human aging: human volunteers. Any results gained from chimpanzee studies may not be applicable to humans and so have to subsequently be confirmed by studying people in any case. The numbers of human studies that are ongoing are testimony to the fact that there is no shortage of volunteers willing to participate. Human volunteers provide samples to allow all aspects of aging research, some even agreeing to donate tissue after their death. Recent advances in whole body scanning techniques such as MRI and PET mean that internal organs and even specific areas of the brain can be examined in great detail in live humans⁽⁵⁾. Some studies follow groups of aged individuals and use donated samples to make correlations between aspects of the aging process and changes that are observed in cells and

tissues. Other studies recruit individuals who suffer from specific age-related diseases. Study of human *post mortem* tissue has led to great advances in our understanding of diseases such as Alzheimer's and Parkinson's⁽⁶⁾. Epidemiological studies examine whole populations to make correlations between aging and longevity and the genetics and lifestyle of individuals. The website of the National Institute on Aging lists 44 such human studies and others are being carried out all over the world. The aging chimpanzees that would be available as models of human aging have spent all of their lives in an unnatural environment as research subjects, and have been exposed to countless different substances and subjected to a multitude of stressful procedures. It has been unequivocally demonstrated that cellular insults caused by stress and exposure to certain chemicals affect the aging process^(7,8,9,10). This will have occurred differently in each chimpanzee and in addition to other limitations with their use, is likely to mean that any results gained from chimpanzee aging studies are difficult to interpret and impossible to extrapolate to the average human being.

Conclusions

Chimpanzee research is not an essential or even a likely productive route to aid efforts to increase our understanding of human aging. The chimpanzees in question have already played their part in research and should now be allowed to live out the rest of their lives in sanctuaries. The retirement of chimpanzee elders currently in US labs will not affect the government-funded Great Ape Aging Project (GAAP) which involves non-invasive study and examination of *post mortem* samples of chimpanzees in US zoos, laboratories and sanctuaries. Such studies address the interests of a minority of researchers who wish to use chimpanzees in aging research while allowing the chimpanzees who have already been in a laboratory for decades, if not their entire lives, to spend the ends of their lives in the safety and comfort of sanctuary.

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