

Testimony to The House Appropriations Subcommittee
Labor, Health and Human Services, Education, and Related Agencies for Fiscal Year 2019

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This Testimony is submitted by Citizens for Alternatives to Animal Research & Experiments (CAARE), a national non-profit organization dedicated to promoting modern technology to replace animals in painful and unproductive experiments. CAARE requests that Congress end federal funding for two research projects: Grant Nos. 2R01EY005253-31 and 5R01EY027361-02, each scheduled to received \$500,000 from the National Eye Institute for a total of \$1 million for FY 2019. The funding period is scheduled to extend through 2021 with this same yearly allotment.

CAARE analyzes federally-funded animal research to screen for projects which are especially cruel and invasive, scientifically outdated, and do not live up to the mission of the National Institutes of Health “to seek fundamental knowledge about the nature and behavior of living systems **and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.**”

At the State University of New York (SUNY) College of Optometry, researchers have spent \$7.95 million in taxpayer dollars since 1985 trying to create a map of the feline visual cortex. These experiments, funded by the National Eye Institute (NEI), have little or no relevance to human visual health because they do not represent normal, human visual processing. Furthermore, the research has not resulted in any treatments for vision disorders, nor is it likely to do so. The Principal Investigator (PI), Jose Manuel Alonso, PhD, has stated that after 30 years, they still have only a “limited understanding of the precise arrangement” of visual neurons in the

cat. It is important to note that a map of the feline visual cortex, when and if created, would apply only to cats, with little to no relevance for human health or visual disorders.

Not only has this research proved expensive and fruitless, it is gruesome and highly invasive. Young cats, 4 to 12 months old, are surgically dissected during experiments that remove the skull to insert electrodes that probe their brains to plot the location of each neuron in an area known as the visual cortex. These lengthy invasive procedures go on for hours, or perhaps even days. The researchers have not reported the length of the experiments in their published papers (contrary to standard practice) and SUNY has refused to disclose this information to CAARE after multiple Freedom of Information Act (FOIA) requests submitted to SUNY and NEI.

Anesthetized and paralyzed, the cats' heads are mounted in frames to keep their eyes focused on images while the eye membranes are retracted using drugs and forced open with specialized contact lenses that keep the eyes in a fixed position.

A second grant from NEI, begun in 2017, uses monkeys in addition to cats. These experiments involve monkeys that are awake during the recording sessions and are forced to cooperate by being confined in restraint chairs while subjected to long-term water restriction. They too, have brain electrodes inserted to allow for recordings of visual activity in brain cells, as well as eye coils implanted to track eye movements.

In the past 25 years, outstanding progress has been made in non-invasive human brain-mapping that allows doctors and scientists to understand the human brain. This includes mapping the human visual cortex and other areas of the brain.

It is unjustifiable to inflict suffering and death on animals using outdated methods such as these experiments conducted at SUNY. Additional discussion follows on the cruelty, waste and medical futility of these experiments.

The research is unproductive and inapplicable to human medicine

After more than three decades of brain experiments on cats, this research has failed to provide an accurate map of the feline visual cortex. The lead researcher on the study has even gone so far as to state “the precision of the current visual cortical maps is still closer to a 150 AD Ptolemy-map of the world than a Google map.” If, after so many years of repetitive experiments, the findings are still off by nearly 2,000 years, it is fair to question the methodology. Indeed, this research could go on forever and still be unproductive because tracking the way a neuron fires in an anesthetized cat is an artificial way of studying visual processing. Moreover, even a complete map of the feline visual cortex will not result in improvement for human visual disorders because of inherent differences between the human and feline brain.

In addition, the disorders at issue are already well understood and treatable. The Public Health Relevance statement for the grant claims the research has “major implications for visual diseases (e.g. amblyopia, myopia)”.¹

Myopia, or nearsightedness, is already treatable with corrective lenses or refractive surgery. Amblyopia, widely known as “lazy eye,” is the most common vision disorder in children. It occurs when one eye is better able to focus than the other. Over time the strong eye takes over the deficiency, causing the weak eye to decline even more. If not corrected, it can lead to blindness in the weak eye. However, amblyopia has been successfully treated for decades using an eye patch to occlude the “lazy eye” forcing it to focus.

In 2015, Amblyz™ digital eyeglasses were developed, which work by intermittent darkening of one lens, and have proven to be a successful replacement for eye patch treatment. The digital glasses were hailed by the American Academy of Ophthalmology as the first effective treatment for childhood amblyopia in fifty years. ² **These glasses demonstrate the ingenuity of modern computer and visual optics technology and were developed entirely without animal research.**

Even if this research on cats and monkeys could be applied to human beings, the currently available treatment options for myopia and amblyopia are effective, economical, and largely non-invasive. The idea of implanting electrodes into human brains as a desirable – or commercially viable – treatment alternative for these disorders is patently absurd.

Experiments are highly invasive and capable of causing great suffering

SUNY claims the cats do not suffer during the experiments, but to date has refused to turn over records in response to CAARE's FOIA request that document the monitoring of cats during experiments, such as heart rate, blood pressure and other vital indicators that would demonstrate the cats are free of distress. SUNY researchers have further refused to disclose complete information about doses of drugs, anesthesia or euthanasia drugs. Unless and until these questions are addressed, CAARE maintains that there is insufficient evidence to back SUNY's claims that the cats are free from suffering.

In addition, CAARE is concerned about the proper administration of euthanasia because any reference to euthanasia is consistently absent in many of the publications on this research. Documents obtained through FOIA indicate standard methods are presently used for euthanasia, but do not state at what point the cats are euthanized. There is also evidence that cats may be used in more than one experiment before being euthanized. A 2009 paper states: "The data

reported in this study were collected from 23 cats that were also used for other research projects on thalamocortical connectivity over a period of time that spanned >5 yr.”³

A major concern over the use of cats in multiple experiments would be the need for post-procedure pain management. There are more nerve endings per square inch in the cornea than anywhere else in the body, so the application and removal of a contact lens could cause considerable pain to the cats.

Crude brain recordings in animals should be replaced with modern alternatives

With the advent of functional magnetic resonance imaging (fMRI) in the early 1990s, huge strides have been made in non-invasive brain imaging. Other modalities have emerged that are aiding scientists to understand the biology of the human brain. MRI recordings can be supplemented with brain imaging techniques that provide precise electrical measurements such as electroencephalography (EEG) and magnetoencephalography (MEG) which directly track the electrical activity of neurons, similar to intracranial electrodes.⁴ Moreover, single neuron recordings obtained from animal experiments provide only a limited understanding of the brain, which functions as a composite of the interconnection of billions of neurons.

¹ Neuronal Mechanisms of Cortical Processing in Early Vision, Grant no. 5R01EY027361-02
https://projectreporter.nih.gov/project_info_details.cfm?aid=9431213&icde=38888935

² American Academy of Ophthalmology, Nov. 2015, "Programmable Electronic Glasses Provide Children Effective, Digital Lazy Eye Treatment," <https://www.aao.org/newsroom/news-releases/detail/programmable-electronic-glasses-provide-children-e>

³ Chun-I Yeh, Carl R. Stoelzel, Chong Weng and Jose-Manuel Alonso, Functional Consequences of Neuronal Divergence Within the Retinogeniculate Pathway, Journal of Neurophysiology, Vol. 101, No. 4, April 2009,
<http://jn.physiology.org/content/101/4/2166.long>

⁴ Hall SD, et al, The missing link: analogous human and primate cortical gamma oscillations. *Neuroimage*. 2005 May 15;26(1):13-7.
<https://www.ncbi.nlm.nih.gov/pubmed/?term=15862200>