U.S. Senate Committee on Environment and Public Works
Subcommittee on Water and Wildlife
April 24, 2012 Hearing on the

Great Ape Protection and Cost Savings Act (S.810)

Scientific and Public Testimony
Respectfully Submitted for Consideration by

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Introduction

Over the past seven years, NEAVS' focused program Project R&R: Release and Restitution for Chimpanzees in U.S. Laboratories has pulled together experts in psychology, chimpanzee behavior, genetics, biomedical research, veterinary medicine, pathology, and other areas to critically examine the scientific value of and need for chimpanzee experiments, and the psychological and physical impact laboratory life and research has on chimpanzees' suitability as research subjects and well-being. Though a national organization with an international presence, NEAVS has a proud 117 year history as a Boston based 501 (c) 3 animal protection organization—one of the first in the country.

The result of this scientific approach to our ethical concerns is a considerable body of evidence published in peer-reviewed journals, which demonstrates that chimpanzee research is neither necessary for, nor even helpful to, human scientific and medical progress. Given the breadth of these comprehensive studies, and the contribution they have made to the Institute of Medicine's (IOM) hearings and conclusions regarding chimpanzees, we respectfully ask that the Subcommittee consider our studies in its deliberations and vote the Great Ape Protection and Cost Savings Act (GAPCSA) favorably out of committee. We offer here a summary of our studies (full papers available on request) in the hope that our input will be considered.[1]

Some long-standing yet unsubstantiated arguments in support of chimpanzee research were offered as testimony to the IOM inquiry. On weight of evidence, the IOM dismissed those arguments, concluding that there is no current scientific need for invasive chimpanzee research. Some of those arguments put forth are cited below with our rebuttals.

Presented together, we believe the studies cited below provide compelling evidence that GAPCSA will have no negative and significant positive implications for human health. GAPCSA would ensure that a demonstrably poor research model would be replaced by more human-relevant and cost-effective research methods; would ensure superior care for the chimpanzees who have spent decades in labs; and would provide significant savings to the taxpayer.

We provide below a précis of this evidence, and also include for the Subcommittee's attention summaries of the associated publications.

Scientific Investigation and Associated Claims

HIV/AIDS

[Bailey, J. (2008). An assessment of the role of chimpanzees in AIDS vaccine research. *ATLA,* **36(4),** 381-428]

HIV/AIDS is the reason why so many chimpanzees were bred for research and why there has been a "surplus" in American labs for decades. This study assessed past and potential future contributions of chimpanzees to AIDS vaccine development by determining to what degree AIDS vaccine trials in chimpanzees were predictive of human response. This analysis showed:

[1] http://www.iom.edu/Reports/2011/Chimpanzees-in-Biomedical-and-Behavioral-Research-Assessing-the-Necessity.aspx

- The majority of HIV vaccines & vaccine types had been tested in chimpanzees prior to human clinical trials.

- Vaccine responses in chimpanzees and humans are highly different.

- Vaccine responses in chimpanzees were, are, and cannot be predictive of responses in humans.

By 2008, 85 different vaccines had been tested in almost 200 clinical trials. None of the vaccines provided protection and/or significant therapeutic effects in humans, in spite of prior "successful" trials in chimpanzees.

Claims that chimpanzees are still important for testing HIV/AIDS vaccines have no scientific foundation:

- AIDS-related chimpanzee studies fell by nearly 90% from 1998 to 2005.

- Due to their differing genetics and biochemistry, chimpanzees do not get AIDS from HIV.

- VaxGen's AIDSVAX vaccines—perhaps the most promising vaccine—failed to protect almost 8000 trial participants from HIV infection.

During the IOM inquiry, Professor Haigwood, director of the Oregon National Primate Research Center, acknowledged that science had "started to get out of chimp HIV research in about 1997 due to 'gray' and 'differential' results," and that there had been a "general consensus that it was a good idea to move on."

Hepatitis C

[Bailey, J. (2010). An assessment of the use of chimpanzees in hepatitis C research past, present and future: 1. Validity of the chimpanzee model. *ATLA,* **38(5),** 387-418]
[Bailey, J. (2010). An assessment of the use of chimpanzees in hepatitis C research past, present and future: 2. Alternative replacement methods. *ATLA,* **38(6),** 471-494]

These studies showed how chimpanzees were used historically because researchers felt there were few if any other options, despite many admitting numerous and serious problems with the chimpanzee model and stressing the urgent need for *in vitro* systems to culture the virus and accelerate discoveries, as had occurred for viruses such as polio and measles.

Human-based research features heavily in the discovery of hepatitis C and early characterization of the virus. *Human*-based contributions include: demonstrating that non-A non-B hepatitis (NANBH) was the salient complication of transfusion therapy; defining NANBH's natural history; identifying surrogate markers of the disease; and lowering the incidence of transfusion-associated NANBH, even prior to the identification of the virus itself.

Chimpanzees were useful in the generation of serum samples with high titers of the infectious agent, which aided identification of HCV. Advanced molecular techniques that now exist were not available then, however; and in retrospect, it is likely that the use of uncharacterized ("standard" titer) samples not screened in chimpanzees would have been equally useful for cDNA library construction, and the eventual identification of HCV clones and the virus itself.

Chimpanzee use in hepatitis C research has declined markedly by around 50-60% over the past 30 years and is at an historic low. Non-animal hepatitis C research has increased 80-fold over the same period. This would not be the case if chimpanzee use was crucial. Much of this pattern is due to the chimpanzee being a poor model, as HCV pathology in chimpanzees and humans is very different. For example: there is a much lower rate of chronic infection in chimps due to greater viral clearance; immune responses to HCV differ; resultant liver fibrosis and cirrhosis are milder in chimps; and hepatocellular carcinoma is rare.

Chimpanzees are used infrequently in the development of HCV antiviral drugs. Regulatory requirements for preclinical pharmacokinetic and toxicological data from two animal species have been fulfilled in the majority of cases without recourse to chimpanzees. There are, to date, no publicly available data to show that chimpanzee HCV-antiviral and vaccine data is predictive of human response. It is widely acknowledged, even among chimpanzee-use advocates, that there is no need for chimpanzees in the future development of HCV antivirals. With regard to HCV vaccines, informative therapeutic vaccine trials are taking place with no requirement for chimpanzee preclinical efficacy data that may or may not have been predictive. For prophylactic vaccines, the IOM inquiry noted that similar field trials could be achieved, especially in countries where blood transfusions are not screened.

There are now robust and productive *in vitro* methods of hepatitis C research. It is possible—without chimpanzees—to investigate in a human-based, and therefore completely relevant, context the entire HCV life cycle from the moment the virus attaches itself to the cells it infects; to study immune responses to infection and the roles of host factors; and to identify and test new therapies and vaccines. While full life-cycle infectious cellular clones represent the long awaited and most comprehensive *in vitro* system for many aspects of HCV study, all the *in vitro* methods employed, including HCV-infected cultured primary and immortalized cells, infectious molecular clones, subgenomic and genomic replicons, and virus-like particles and pseudoparticles, have added greatly to the body of knowledge on the hepatitis C virus and hepatitis C pathology, and enhanced progress toward new treatments.

Full life-cycle infectious clones (HCVcc), which were urgently called for by the research community for decades, provide the necessary data to facilitate the development and testing of HCV therapies, when supported by clinical, epidemiological, *ex vivo* and *in silico* methods—in contrast to dependence on the chimpanzee. These approaches are augmented by human clinical studies of hepatitis C patients and those at risk of infection. Even studying pathological events early in HCV infection is not the preserve of the chimpanzee, despite claims to the contrary. Informative studies have been performed with sufferers of needle stick injuries, recipients of contaminated blood products, and the screening of new admissions, for example. HCV investigations have entailed the use of human liver biopsies, resulting in important discoveries.

While there are caveats with *in vitro* methods—and all scientific models—they must be compared and contrasted to the considerable caveats of using HCV-infected chimpanzees, with their different pathologies and viral responses. Further, while the performance and relevance of these *in vitro* methods are being improved, the benefits and limitations of the chimpanzee model remain stagnant.

It is appropriate to note the power of VaxDesign's MIMIC system ("Essentially a clinical trial in a test tube for human immunity"), which provides human relevant vaccine immunogenicity data (see papers cited above, and VaxDesign.com). This system uses white blood cells from volunteer donors, and allows immune responses

induced by new vaccine candidates to be studied at the vaccination site and/or point of virus attack, as well as the assessment of immune cell activities and antibody production. Advantages include its capacity to test adjuvants, vaccine components and complete vaccines and assess the quality of established vaccines in different human immune systems—reflecting biological and immunological diversity. Stated goals are to obviate preclinical animal-based vaccine tests and to identify optimal human vaccine formulations. Given the performance of this system to date, there is robust evidence that it will reduce the risk of adverse events in clinical trials, elucidate why some vaccines work in certain populations of people and not others, and address safety and immunogenicity issues.

GlaxoSmithKline (GSK) decided it was unnecessary to use chimpanzees, including for hepatitis C drugs and vaccines, as long ago as 1998. GSK's Director of HCV Biology, Robert Hamatake, testified to the IOM that they utilized *in vitro* alternatives a great deal, such as replicon systems, enzymatic assays, and the full life cycle infectious virus system, all of which had been valuable for drug discovery. A global pharmaceutical company the size of GSK having done without using chimpanzees for so long further discredits proponents of chimpanzee use. Dr. Hamatake opined that there was no resultant delay in the development of GSK's putative HCV vaccines because they do not use chimpanzees, nor did GSK's decision indicate a lack of interest in competitive vaccine development.

Cancer

[Bailey, J. (2009). An examination of chimpanzee use in human cancer research. *ATLA,* **37(4),** 399-416]

A study of cancer—one of the leading causes of human death and a major research focus—found that, between 1968 and 2008 inclusive—(forty years):

- Chimpanzees were scarcely used in cancer research. Many of the few published papers were published over 25 years ago.
- Chimpanzees have a very low incidence of cancer, especially epithelial cancers that kill humans; and chimpanzee tumors are biologically different from human cancers in their causes and in apoptosis and metastasis.
- Evidence indicates chimpanzees are not essential in the development of therapeutic monoclonal antibodies for cancer treatment. No publications were identified that described chimpanzee use in the development or testing of these drugs.
- The few papers that described potential new cancer therapies tested in chimpanzees included warnings concerning species differences, acknowledged that the chimpanzee model performed no better than other animal models, and/or described interventions that had not been pursued, presumably due to adverse results.

The reasons for such differences are genetic. A recent structural genomics study, which compared the regulation of apoptosis (programmed cell-death) between humans and chimpanzees acknowledged that nutritional and ecological differences contributed to changes in cancer incidence between the species, but could not "coherently explain" an order of magnitude increase in cancers of the breast, ovary, lung, stomach, colon and rectum in humans. Instead, the authors implicated some of the estimated 40 million differences between the human and chimpanzee genomes, which determine susceptibility and tolerance.

The examination of around 500 proteins involved in cancer-related pathways showed many of the proteins analyzed were expressed from genes with significant differences between the two species, both in constitution and regulation. Such genetic differences are responsible for the wholesale changes in carcinogenicity between humans and chimpanzees.

Human-Chimpanzee Genetic Differences

[Bailey, J. (2011). Lessons from chimpanzee-based research on human disease: The implications of genetic differences. *ATLA*, **39(6),** 527-540]

This study examined genetic differences between humans and chimpanzees, which underpins all evidence for the chimpanzee as a poor model for human biology. It is claimed by advocates of chimpanzee use that humans and chimpanzees are 98-99% genetically identical, and that it follows that they are very similar biologically in the diseases they suffer, their responses to infectious agents and drugs, and so on.

This review showed that such claims are facile. Humans and chimpanzees are actually approximately 94% genetically similar. This in itself has significant implications, but when account is taken of other genetic factors and of the different systems that control gene function—even when genes are identical or almost identical between humans and chimpanzees—they are even greater. Examples of differences include genes involved in:

- Tumor formation
- Immune system function
- Cancer, schizophrenia and other cognitive disorders, migraine, and autoimmune diseases like lupus and rheumatoid arthritis.
- HIV infection.
- Parts of the brain involved in thought and language—and in problem-solving, emotion and complex thought that are linked to Alzheimer's, Parkinson's and Huntington's diseases.

Further:

- Human-chimpanzee gene-expression differences occur throughout the body: 25% in the liver; 33% in the kidney; 34% in the brain; 35% in the heart; 62% in the testes.
- 80% of orthologous proteins differ in their amino acid sequences.

In summary, there are extensive and fundamental genetic reasons why chimpanzees, however closely related, are not *and can never be* good models for human research. These intrinsic differences are further confounded by the significant effects of the environment of gene function and expression, which are just beginning to be appreciated. In biomedical animal research, the quality and richness of the environment is critical to experimental results. The stress of laboratory life for a chimpanzee is known to impact gene function and expression, and has particular consequences for immune system function, crucial to infectious disease research.

Even if we accept that we need to use chimpanzees in comparative genomics studies to benefit human medicine, we do not need captive chimpanzees in laboratories to determine or analyze these differences. Chimpanzees in sanctuaries

or zoos can provide biological samples without harm to them for genetic analysis during routine check-ups, medical interventions, post mortems, and so on.

Efficacy and Value of Chimpanzee Research

[Bailey, J., Balcombe, J. & Capaldo, T. (2007). Chimpanzee research: An examination of its contribution to biomedical knowledge and efficacy in combating human diseases. Available at: http://www.releasechimps.org/flawed-science/dangerous-and-unnecessary]

Of the approximate 1000 chimpanzees in U.S. labs, only about 10-20% are in active research protocols. Their use has decreased dramatically and is at an historic low. Use in AIDS studies is down nearly 90% and in hepatitis C research 50-60%.

A citation analysis—assuming that if chimpanzee research were important, chimpanzee studies would be highly cited by scientific papers reporting human medical breakthroughs—found that:

- Greater than 85% of chimpanzee studies are not cited or not cited with any relevance to human medicine.
- Just 15% had been cited in human medical papers.
- Those 15% had contributed little, if anything, to the outcome of studies reporting an advance in human clinical practice. The contributors to those studies' findings were a wide array of *in vitro* research methods, human clinical and epidemiological investigations, molecular assays and methods, genomic studies, etc.

Psychological and Physical Harm to Chimpanzees in Laboratories

[Bradshaw, G.A., Capaldo, T., Lindner, L. & Grow, G. (2008). Building an inner sanctuary: Complex PTSD in chimpanzees. *Journal of Trauma & Dissociation,* **9(1)**, 9-34]
[Bradshaw, G.A., Capaldo, T., Lindner, L. & Grow, G. (2009). Developmental context effects on bi-cultural posttrauma self repair in chimpanzees. *Developmental Psychology,* **45(5)**, 1376-1388]
[Capaldo, T. & Bradshaw, G.A. (2011). The bioethics of great ape well-being: Psychiatric Injury and duty of care. *Animals and Society Institute* Policy Paper]

Studies on the psychological effects of research on chimpanzees have shown that chimpanzees in laboratories suffer from posttraumatic stress disorder (PTSD), as defined by human diagnostic criteria. This has scientific and ethical implications. Stress causes significant increases in cortisol, which affects the immune system and has been associated with diseases including obesity, Alzheimer's, dementia, and depression. It affects glucose metabolism, inflammation and components of the immune system associated with diabetes. In humans, stress affects 49 different genetic pathways, including those associated with the immune system, crucial for the study of infectious diseases, and organs such as the liver, important for the metabolism of drugs being tested, and the brain, for neuroscience research, etc.

These studies have established the severe effects on psychological well-being that laboratory life and use impose on chimpanzees, and that their suffering can be life-long. Much as humans confined and used in similar ways would react, so too do chimpanzees show an array of resulting psychological disturbances. While the Animal Welfare Act requires that the psychological well-being of chimpanzees be met, these studies indicate that laboratories have failed in their duty of care to provide for such well-being and/or that doing so within the confines and hardships of laboratory use is not possible.

While the Subcommittee is charged with examining the implications of GAPCSA for human health and federal expenditure, we trust the Subcommittee will bear in mind that the American public is a humane public. In a survey conducted for us by an independent public opinion survey company (Humane Research Council – 1,678 U.S. adults (age 18 and over) completed the survey with valid responses, resulting in a margin of error of about +/- 2.4% (at a 95% confidence level)), 71% of the American public believe that a chimpanzee held in a laboratory for 10 years or more should be retired.

- Four out of five oppose using chimpanzees in medical research all or some of the time.
- 78% are completely opposed or only support it "somewhat or sometimes."
- Four out of five support alternatives to chimpanzee testing and medical research.
- Three to one disapprove of using the same chimpanzee for multiple experiments.
- Three out of four support permanent retirement for chimps no longer in use.
- 74% said they would support "permanently retiring them to a sanctuary."
- Only 2% said "warehouse them in laboratories."

Americans reluctantly accepted chimpanzee use only because they believed it was "necessary" and only if the chimpanzees did not suffer. Today, there is indisputable scientific evidence that their use is not necessary and that they do suffer.

Summary

Many claims regarding the need for chimpanzee research have been made, in testimony to the IOM and in articles such as high-profile pieces in Nature. Authors of the Nature article and those who have testified in favor of chimpanzee research include John L. VandeBerg (Southwest National Primate Research Center, Texas); Stuart M. Zola (Yerkes National Primate Research Center, Georgia); Jo Fritz (Primate Foundation of Arizona); D. Rick Lee (Alamogordo Primate Facility, New Mexico); William C. Satterfield (M. D. Anderson Cancer Center, Texas); and Thomas J. Rowell (New Iberia Research Center, Louisiana). All are laboratory directors.

These individuals have declared that chimpanzees are essential for:

- Malaria research and the identification of genes responsible for drug resistance
- Prediction of human pharmacokinetics in drug development
- Testing of HIV/AIDS vaccines
- Research into hepatitis C and for development of vaccines and antivirals
- mAb discovery and development
- Research into diseases not yet identified

These claims have been successfully challenged by the evidence provided in our testimony, as well as by a plethora of comprehensive and peer-reviewed published research papers and the considered conclusion of the IOM. In its IOM testimony

(including the testimony listed immediately below and others), the research industry itself has disclaimed lab directors' assertions.

- **Malaria**—Ann-Marie Cruz of the PATH Malaria Vaccine Initiative informed the IOM Committee that chimpanzees were not essential for the development of malaria vaccines, that other species were used, and that the human challenge model, widely used, was best for accelerating clinical testing and development.

- **Drug development/pharmacokinetics** – As the U.S. drug regulatory agency, the FDA provided telling evidence for the lack of need for chimpanzee use in drug development and testing. FDA stated: its policy is not to request data from chimpanzee studies; it has received just seven applications that included chimpanzee data in the past five years, none of which the FDA asked for or recommended in its guidance; none of this data were toxicological; it discourages chimpanzee studies, if asked; and it believes that, if chimpanzee data were no longer available, this would have "no discernable effect" on adequate and timely review of applications.

- **mAbs** – The National Centre for the 3Rs (NC3Rs) in the UK published a review on the subject of species relevance in mAb testing, which concluded that, "...the assumption that a shift from Old World primates towards the use of chimpanzees might overcome some of the issues associated with species relevance is not necessarily supported by experts or evidence…the chimpanzee might be of limited value in the development of mAbs."

  This was echoed at the IOM hearing by Theresa Reynolds, Ph.D., Director of Safety Assessment at Genentech. She informed the IOM that due to "advances in scientific engineering" there is no need to use chimpanzees in monoclonal antibody development, and that they haven't used them since the early 1990s. She spoke of her poll of mAb developers, who agreed there was no need. She described how, when chimpanzees were used, 1 in 4 mAbs failed to progress to clinical trials on the basis of chimpanzee data, and 2 of the remaining 3 that did progress were discontinued based on adverse findings in humans not detected in chimpanzees.

- **Health security of the U.S. and biodefense** – Joseph Bielitzki (University of Central Florida) opined to the IOM that chimpanzees were "probably not" critical to U.S. health security. He cited the many years it takes to develop a vaccine, and that a health emergency would be over before anything could be developed, even with the use of chimpanzees. "Even for the H5N1 strain of avian influenza, the quickest to market took around 6 months, by which time the epidemic was over and the problem gone." He cited maintenance costs for chimpanzees, at approximately half a million dollars per chimpanzee for lifetime care. He balanced his argument with what too few have considered carefully: the management nightmare that trying to house chimpanzees in biosafety level 4 containment labs would be. Concerns include not only managing internal environments, but more importantly managing escapes of chimpanzees infected with a virus deadly to humans. The likelihood of chimp use leading to an efficacious vaccine in viruses of this nature is slim and could not mitigate the disastrous effects of the escape of an infected chimp.

  Michael Kurilla, director of the NIH Office of Biodefense Research Affairs stated chimpanzees offer "no advantage over other NHPs for product

development for biodefense," citing existing protections for smallpox, botulism, bubonic plague, etc.

James Swearengen, the Director of the National Biodefense Analysis and Countermeasures Center, stated he was "not aware of any historical or current use of chimpanzees in the U.S. in biodefense/for the Department of Defense," and that he did not envision any future speculative need.

Conclusion

We appreciate that the Subcommittee will take full measure of the IOM's study of chimpanzee research and of their recommendations. On the basis of the IOM's study and recommendations, and on our review of the scientific investigations and published literature on chimpanzee research, we respectfully hope that the Subcommittee recognizes serious reservations about the accuracy of claims regarding the necessity, relevance, and efficacy of chimpanzee research. We urge the Subcommittee to feel confident in a favorable vote on the Great Ape Protection and Cost Savings Act. A favorable vote will pave a path to more relevant and effective science on behalf of humans, and will benefit chimpanzees currently languishing in U.S. labs at enormous taxpayer expense.

Thank you for your consideration of our testimony.

APPENDIX

Related Issues

Historical Hepatitis B Research

Due to differences in hepatitis B virus (HBV) pathology, chimpanzees did not serve as useful models. Chimpanzees were used simply as "bioreactors" to provide a source of the virus for research. It is suspect to claim that without chimpanzees there would be no HBV vaccine. It would not have been developed as it was, but a greater concentration on the development of *in vitro* methods may have led to a vaccine sooner.

Drug Safety and Efficacy Studies

It has been claimed that drug-testing must involve chimpanzees because they are the most related species to humans. There is no scientific proof that chimpanzees are more predictive than any other method, *in vivo* or *in vitro,* to assess drug safety and efficacy.

Demand for Chimpanzees by U.S. Scientists

It has been argued that research "needs" chimpanzees based on claimed demand for their use at New Iberia Research Center (NIRC), the largest chimpanzee holding facility in the world. NIRC is in receipt of NIH grants of $18+ million for the "Maintenance of…[a]…biomedical research colony" and "Leasing of chimpanzees for… research." This income is in addition to funds from private companies for the use of chimpanzees. The profitability of NIRC's business is clear, and contributes the crux of its defense of chimpanzee use in the absence of scientific evidence of need.

Continued demand to use chimpanzees is largely based on economic gains from federal grants to the private laboratories housing and maintaining them, and leasing them for use. Some "old school" scientists accustomed to using chimpanzees may be averse to new and more promising methods, and/or even lack the skills for new technologies – both reasons without scientific merit. Instead of providing evidence for the necessity of chimpanzee use, the demand for them continues to decline significantly in all of the very few areas of research in which they have been used. Those who demand chimpanzees are an ever-decreasing minority, on whose shoulders the burden of *scientific* proof must lie, especially in the evidence of the majority who have ceased to use them and see no scientific need for them now or in the future.

Demand for Chimpanzees by Other Countries

Claims that U.S. chimpanzee availability must continue because scientists from countries that have banned or limited their use rely on the U.S., fall short of substantiating fact.

The mere 27 instances of this since 2005 represent only an estimated 4 or 5% of chimpanzee studies during this entire time. A significant proportion, if not all, of these

studies appear to be collaborative, with a minor foreign component. Such data do not demonstrate the scientific necessity of chimpanzee research, nor widespread demand on U.S. chimpanzees. Throughout the world where chimpanzees are not used in science, the overwhelming majority of researchers who could now be using U.S. chimpanzees find no need to do so.

The scarcity of use, even while available, and the lack of studies initiated by foreign principal investigators, discredits the claim that chimpanzees are needed for international researchers. There is no evidence supporting the hypothetical "world crisis" that would result from the U.S. no longer having chimpanzees available for research.

New Microbial Agents for Bioterrorism

Based on available data regarding chimpanzee need in all of the major disease categories investigated, the probability that at some point in the future *only* a chimpanzee will provide a valid model for the investigation of some bioterrorism agent must be considered a miniscule possibility. Given this low probability, the merit of the substantial economic waste of limited research dollars to house and maintain chimpanzees in U.S. laboratories for this small "just in case" scenario is not merely an economic and ethical question but a scientific one as well: is it prudent to absorb critical amounts of funding that could otherwise be appropriated to other avenues of research needed and more likely productive in the here and now?

Chimpanzee Behavioral Research

Future study of chimpanzee behavior would not require invasive research conducted upon captive chimpanzees in laboratories. Instead, we agree with professional opinion that studies in sanctuary, for example at Chimp Haven, are entirely compatible with future chimpanzee behavior studies, and that this can (and should) be done entirely non-invasively. There are hundreds of suitable captive chimpanzees living comfortably in rich environments. In addition to chimpanzee well-being, such an environment facilitates less costly research.

The assertion that behavioral research is necessary for human benefit is controversial. With regard to understanding human social behavior, communication, learning and memory, there is no reason not to study humans exclusively. A wealth of non-invasive human studies has informed, and continues to inform, for example: item, source and spatial memory; cognition/brain activity; attention, perception, vision; pain, hearing, sensation; brain structure and architecture; drug effects on the brain; and so on. Most practicing psychologists and other mental health professionals believe that more funding for intervention programs, qualitative clinical research, etc., using human subjects in non- invasive research and research that might *in situ* benefit them, is the direction behavioral research must go. Rather than bench to bedside, the arguments among the practicing mental health field versus the experimental arms of that field would be "bedside to bedside." Human subjects may be questioned in detail, so thorough life histories can be determined—the protocol in longitudinal and epidemiological research. In contrast, chimpanzee records are frequently erroneous, including even conflicting information as to age. All chimpanzees in a laboratory are, inherently and unavoidably, stressed by that environment, which has significant consequences for gene expression and related biology. This confounds data produced, over and above inter-species differences.