Petition for Rulemaking
U.S. Department of Agriculture

May 7, 2014

To Establish Criteria to Promote the Psychological Well-Being of Primates as Required by the Animal Welfare Act (7 U.S.C. § 2143(a)(2)(B)), Including Adopting the "Ethologically Appropriate Environments" Accepted by the National Institutes of Health with Respect to *All* Primates Used in Research

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Darla at Fauna Sanctuary © NJWight

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1. Introduction

The New England Anti-Vivisection Society (NEAVS), the North American Primate Sanctuary Alliance (NAPSA), the Laboratory Primate Advocacy Group (LPAG), and the Animal Legal Defense Fund (ALDF) petition the Secretary of the United States Department of Agriculture (USDA) to exercise its authority under the Animal Welfare Act (AWA) (7 U.S.C. § 2143(a)(2)(B)) to promulgate clear standards and definitions to promote the psychological well-being and appropriate ethological environments for primates used in research. The AWA provides that "[t]he Secretary shall promulgate standards to govern the humane handling, care, treatment, and transportation of animals by dealers, research, facilities, and exhibitors;" and that such standards "shall include minimum requirements…for a physical environment adequate to promote the psychological well-being of primates." (7 U.S.C. § 2143(a)(1) - (2)(B)).

Current implementing regulations, 9 C.F.R. § 3.81 et seq, allow facilities to develop their own "plan" for environmental enhancement "adequate to promote the psychological well-being of non-human primates." *Id.* To fulfill this requirement of the AWA, the regulations further provide that "[t]he plan must be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides." *Id.* Unfortunately, this current requirement is so vague that it lacks any enforceable definition of how to evaluate if such a plan is actually effectively designed or implemented in a way that *promotes* the primates' psychological well-being. While some additional guidance is provided regarding social grouping, environmental enrichment, special considerations, restraint devices, and exemptions (*see* 9 C.F.R. § 3.81(b) - (e)), importantly, a lack of concrete, measureable, and enforceable definitions and criteria within the regulations has resulted in almost no meaningful regulation of the psychological well-being of primates used in research, and a lack of congruent application across facilities. For the reasons stated herein, the USDA must take action to promulgate enforceable standards and criteria to promote the psychological well-being of primates.

On June 26, 2013 the National Institutes of Health (NIH) accepted recommendations of an NIH-convened Council of Councils (CoC) concerning the "ethologically appropriate environment" for chimpanzees used in NIH-funded research – e.g. "captive environments that do not simply allow but also, importantly, promote a full range of behaviors that are natural for chimpanzees." (78 FR 39741 (July 2, 2013)). The new NIH recommendations are based on scientific evidence and expertise from some of the world's leading experts on chimpanzee well-being. These recommendations present a substantiated and clear definition of key components of what is

minimally necessary to promote the psychological well-being for primates – i.e. environmental enhancement, access to the outdoors, and opportunities for choice and self-determination. With this Petition, ***we urge the USDA to adopt these same, species appropriate standards as the "minimum requirements" for a "physical environment adequate to promote the psychological well-being" of all primates used in research***. (7 U.S.C. § 2143(a)(2)(B)).

As explained by former USDA Animal and Plant Health Inspection Service (APHIS) Deputy Administrator Dale Schwindaman, the USDA and NIH have a history of working "together to ensure harmonized animal welfare requirements by those two agencies," such as the initial implementation of the 1985 amendments to the AWA and the Interagency Research Animal Care Committee. (Schwindaman, 2011; USDA, 1989). The AWA itself stresses the importance of this relationship by providing that the Secretary of Agriculture "shall consult with the Secretary of Health and Human Services" prior to issuing regulations. (7 U.S.C. § 2145).

As a matter of consistency, and to promote harmonization of regulatory approaches to the same problems, NIH's newly accepted recommendations for ethologically appropriate environments for chimpanzees provide standards that should be adopted by the USDA for chimpanzees and provide a baseline that should be adopted with appropriate modifications for *all* primates held in laboratories.

As discussed herein, the past two decades have provided ample evidence that clearer, enforceable standards are imperative for the USDA to fulfill its statutory mandate of promoting and protecting the psychological well-being of primates. As APHIS's Animal Care's Primate Environment Enhancement Team concluded 15 years ago:

> [E]ducational efforts alone are not sufficient to gain compliance. There always exist some facilities that must be compelled by enforcement. . . Fairness in government requires that if regulations exist, they are enforced uniformly and consistently. . . *In order for minimum standards to be enforceable, the standards must have definition and structure. It must be clear to all facilities when violations occur and enforcement action is necessary*. The concept of minimum criteria has been useful in government regulations because it objectifies what is unacceptable and increases fairness.

(Animal and Plant Health Inspection Service, 1999, emphasis added).

The necessity of the AWA's mandate to promote the psychological well-being of primates was clear to Congress when it passed this 1985 amendment; it is even clearer today given the overwhelming body of scientific evidence that has been amassed over the last 30 years as to the psychological capabilities and needs of primates, our ethical responsibilities towards them, and the implications of psychological well-being for scientifically valid research results. Currently, primates often develop pathological behaviors and suffer severe stress due to confinement, little or no social or mental enrichment, a complete lack of control over their environments, and living in an artificial environment where stressors are ever-present, unpredictable, and create learned helplessness given the animals' complete inability to deter, escape, or fight off harm or hardship. There is a wealth of information concerning the psychological well-being of primates that was not available at the time the USDA regulations for psychological well-being were drafted in 1991. The NIH's new recommendations for chimpanzee environments provide a valuable and readily available starting point for the USDA to amend Section 3.81 of the AWA regulations to upgrade the "minimum requirements" for a "physical environment adequate to promote the psychological well-being of primates." (7 U.S.C. § 2143(a)(1) – (2)(B)).

2. Description of Petitioners

The **New England Anti-Vivisection Society** (NEAVS), founded in 1895, is a Boston-based, national animal advocacy organization dedicated to ending the use of animals in research, testing, and science education. Through research, outreach, education, legislation, litigation, and policy change, NEAVS advocates for replacing animals with modern alternatives that are ethically, humanely, and scientifically superior.

The **North American Primate Sanctuary Alliance** (NAPSA) is an alliance of sanctuaries which meet the standards of care and accreditation set forth by the Global Federation of Sanctuaries, and includes Fauna Foundation, Center for Great Apes, Chimp Haven, Chimps Inc., Chimpanzee Sanctuary Northwest, Jungle Friends Primate Sanctuary, Cleveland Amory Black Beauty Ranch, and the Primate Rescue Center.

The **Laboratory Primate Advocacy Group** (LPAG) is comprised of individuals representing more than 60 years of experience working with nonhuman primates. Current human members have worked in 18 laboratories, zoos, field sites, and sanctuaries.

Animal Legal Defense Fund (ALDF) is a non-profit corporation founded in 1979 to protect the lives and interests of animals through the enforcement of laws enacted to protect animals, and through the provision of information to others desiring to protect the lives and interest of animals. Based in Petaluma California, ALDF has approximately 100,000 members nationwide, including lawyers, law professors, law students, and other individuals interested in protecting the lives and interests of primates.

3. Current Regulations Addressing the Psychological Well-Being of Primates

A. The Animal Welfare Act

Congress has recognized the increasing need to protect animal welfare through regulation over the past five decades. Initially known as the Laboratory Animal Welfare Act (P.L. 89-544), the AWA is the first and predominant federal law regulating animals in research. Originally enacted in 1966, the law was narrowly focused on curtailing the buying and selling of stolen dogs and cats. The statute also directed the Secretary of Agriculture to "promulgate standards to govern the humane handling, care, treatment, and transportation of animals by dealers and research facilities," defining "animals" as dogs, cats, monkeys, guinea pigs, hamsters, and rabbits. However, in the original Act, the USDA's regulatory authority was limited to activities that occurred "pre-research." (Adams & Larson, 2012).

The AWA was amended numerous times in an attempt to "strengthen enforcement, expand coverage to more animals and activities, or curtail practices viewed as cruel, among other things." (Cowan, 2012). The 1970 amendment expanded species coverage to include "any live or dead dog, cat, monkey (nonhuman primate mammal), guinea pig, hamster, rabbit, or such other warm-blooded animal, as the Secretary may determine is being used, or is intended for use, for research, testing, experimentation, or exhibition purposes, or as a pet..." (7 U.S.C. § 2132(g), Pub. L. 91–579). The amendment also required a standard requiring "the appropriate use of anesthetic, analgesic, tranquilizing drugs, or euthanasia…" (7 U.S.C. § 2143(a)(3)(A), Pub. L. 91–579). The 1976 amendments formally named the statute the "Animal Welfare Act" and expanded coverage of the Act in various ways, including to animals in transport and dogs used for hunting, security, or breeding purposes. (Pub. L. 94–279).

Further amendments largely aimed to increase standards and protections for animals, including 1990 amendments to prevent the buying and selling of stolen pets (*see* Pub. L. 101–624); 2002 amendments to expand animal fighting prohibitions (*see* Pub. L. 107–171[1]); 2007 amendments to prohibit animal fighting activities (*see* Pub. L. 110-22); and, 2008 amendments to increase fines for violations (*see* Pub. L. 110–246).

[1] The 2002 amendment also excluded AWA coverage for birds, rats, and mice bred for research purposes.

However, the 1985 amendments to the AWA are considered the most comprehensive, "provid[ing] major changes regarding the scope and breadth of USDA's jurisdiction over animal welfare in the laboratory, testing of animals, animals used in higher education (e.g., not food or fiber related courses), animals on exhibit and captive marine mammals." (Adams & Larson, 2012). Among other critical modifications, the 1985 amendments mandated standards to minimize pain; exercise requirements for dogs; the establishment of Institutional Animal Care and Use Committees (IACUCs) to oversee animal care and use; the consideration of alternatives to animal use when experiments involved pain, suffering, or unnecessary duplication; and "minimum requirements" to "promote the psychological well-being of primates." (S*ee* Pub. L. 99-198 § 1752).

B. Amendment Mandating a Minimum Standard to Promote the Psychological Well-Being of Primates

The 1985 AWA amendment provided:

> (1) The Secretary shall promulgate standards to govern the humane handling, care, treatment, and transportation of animals by dealers, research facilities, and exhibitors.
> (2) The standards described in paragraph (1) shall include minimum requirements--
>
> (B) for exercise of dogs, as determined by an attending veterinarian in accordance with the general standards promulgated by the Secretary, and for a physical environment adequate to promote the psychological well-being of primates.

(Pub. L. 99-198 § 1752(a)(2)).

Regarding the psychological well-being of primates, Montana Senator John Melcher, DVM, who championed the 1985 AWA amendment, commented:

> I have seen the types of cages used in many facilities to house primates. These cages are not much wider than the average shower stall and there is hardly enough room to allow the animal to stand erect. Under the new provisions, I think *we are not only providing humane treatment of these*

> *animals, but assur[ing] more confidence in the results in the experiments they are used in*.

(Kulpa-Eddy et al., 2005, emphasis added).

As Jodie Kulpa-Eddy, an APHIS veterinarian, Sylvia Taylor, a former APHIS Field Specialist, and Kristina Adams, a USDA Animal Welfare Information Center Technical Information Specialist, wrote in 2005:

> The purpose of the 1985 amendments was to set the bar higher. For example, the writers knew they wanted to see more primates in *larger complex cages, housed together with other primates, receiving more mental and physical stimulation, and behaving in a more normal manner*.

(Kulpa-Eddy et al., 2005, emphasis added).

The USDA finalized implementing regulations for the AWA's psychological well-being mandate in 1991. (*See* Exhibit 1). The regulations require that "Dealers, exhibitors, and research facilities must develop, document, and follow an appropriate plan for environment enhancement adequate to promote the psychological well-being of nonhuman primates," and that the "plan must be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian." (9 C.F.R. § 3.81). They require that "the environment enhancement plan must include specific provisions to address the social needs of nonhuman primates of species known to exist in social groups in nature" and the "physical environment in the primary enclosures must be enriched by providing means of expressing noninjurious species-typical activities." (9 C.F.R. § 3.81(a) – (b)).

The regulations additionally state that those primates "that show signs of being in psychological distress through behavior or appearance," infants and young juveniles, those who are on a protocol requiring restricted activity, those housed completely alone, and great apes of a certain size require "special considerations." (9 C.F.R. § 3.81(c)). There is no additional information on what such "special considerations" must be.

Therefore, in contrast to other USDA standards that mandate enforceable requirements – *see* e.g., 9 C.F.R. § 3.5(a) "The ambient temperature must not fall below 45°F (7.2°C) for more than 4 consecutive hours when dogs or cats are present, and must not exceed 85°F (29.5°C) for more

than 4 consecutive hours when dogs or cats are present"[2] – the only concrete requirement for the psychological well-being of primates is the existence of the requisite "plan." There are no specific minimum requirements defined, nor is there any requirement that the facility's plan even be reviewed and approved by the USDA, or, for that matter, that the plan even be submitted to the agency.[3]

C. Current Standards are Unenforceable

The lack of defined and enforceable minimum standards for the psychological well-being of primates has had consequences at odds with Congress's intent in enacting the AWA and subsequent amendments. Valarie Stanley, University of Maryland Francis King Carey School of Law professor and former senior staff attorney at the Animal Legal Defense Fund, recounted at a USDA sponsored symposium that, although the flexibility for regulated facilities resulting from a lack of clearly defined minimum standards was intended to allow facilities to provide the best possible care for the animals it has accomplished the opposite result. As she explained:

> What we've said is there needs to be very specific standards so that all regulated entities provide at least the minimum of what is required. Even under such a scenario, everyone is free to provide and do more for their animals, but when you have a situation where you have so much flexibility, it actually can result in nonenforcement of the Act. I understand there was one License C who told a veterinarian who was inspecting him, "You know, with regard to this plan for the psychological well-being of primates, there's nothing you can do to me because there's nothing in those regulations that tell me what I have to do. So as long as I have a plan, that's all that counts and you can't take any other action against me." And I'll bet you that attitude is widely held, especially when there are no prosecutions of violations of that requirement. That message is out there that you can do whatever you want as long as you have a plan on paper.

(Stanley, 1996).

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[2] *See also,* e.g., 9 C.F.R. § 3.6 "(A) Each primary enclosure housing cats must be at least 24 in. high (60.96 cm); (B) Cats up to and including 8.8 lbs (4kg) must be provided with at least 3.0 ft^2 (0.28 m^2); (C) Cats over 8.8 lbs (4 kg) must be provided with at least 4.0 ft^2 (0.37 m^2)…",

[3] As a result, these plans also are not generally available for public scrutiny under the Freedom of Information Act.

In 1989, the USDA informed the public that "[W]e believe that upon promulgation of a final rule to amend part 3 [the psychological well-being regulations], all regulated entities will have adequate guidance in complying with the Act." (United States Department of Agriculture, 1989). However, several APHIS inspector surveys conducted since the regulations were promulgated have demonstrated that this intention has not been borne out.

The first APHIS survey of inspectors in 1993 noted grave dissatisfaction with the enforceability of the regulations. As reported by Kupla-Eddy et al.:

- One-third of inspectors responded that they were unable to distinguish compliance from violation, or enforce these two standards.

- Nearly half of the respondents believed that exemptions to social grouping were being claimed by facilities for "convenience" rather than legitimate health or protocol reasons.

- The majority of respondents believed that the requirement for "special considerations" for certain primates had failed to generate the needed increase in enrichment or other intervention for these animals.

- More than one-third of respondents indicated they were dissatisfied with how research facilities were implementing primate enrichment.

- All respondents said that at least half of the research facilities they were assigned to inspect were still generally single-housing primates.

(Kulpa-Eddy et al., 2005).

A December 1996 USDA/APHIS survey of inspectors similarly revealed that approximately 45% of inspectors expressed the opinion that it was unclear what facilities needed to do in their enrichment plans to be in compliance with the regulations, and nearly 50% of inspectors said that criteria were not adequate for enforcement purposes. (Kulpa-Eddy et al., 2005).

The 1996 survey noted a significant "lack of clarity and specificity in the standards." (Animal and Plant Health Inspection Service, 1999). In response, APHIS recommended improving regulations regarding psychological well-being by:

- developing guidelines to provide more structure to the existing standards; and

- requiring facilities to demonstrate through documentation continued effectiveness of their primate enhancement plans.

(Animal and Plant Health Inspection Service, 1999).

In 1996, APHIS acknowledged that the regulations regarding the primate environmental enrichment criteria (in Section 3.81) were sowing "*confusion among the regulated public concerning on what basis they will be judged by inspectors as meeting or not meeting the requirements.*" (*See* 64 FR 38145, 38146 (July 15, 1999), emphasis added).

APHIS conducted follow-up inspector interviews in 1997. The results published in 1999 revealed similar complaints about the unenforceability of the regulations – i.e., inspectors expressed their view that "*the standards contain few solid criteria on which an inspector can judge the content of a plan as 'in compliance' or 'out of compliance'*" and they "had concerns about Agency support for particular interpretations or judgment because of *the vague language and nature of the performance standard.*" (Kulpa-Eddy et al., 2005, emphasis added). Another problem was the difficulty in proving actual implementation of an enhancement plan, and the report noted that inspectors recommended clearer requirements for documentation of implementation. *Id.*

In the 1997 interviews, again inspectors noted that too many primates were unnecessarily single-housed. (Kulpa-Eddy et al., 2005). Inspectors also noted that some facilities considered enrichment plans adequate simply with the provision of "one perch, one rubber toy, and a few grapes now and then for each singly caged primate." (Kulpa-Eddy et al., 2005). Some facilities only made efforts to fulfill one need for psychological well-being, such as the provision of limited treats, while neglecting other species' needs, such as social companionship and agency (Kulpa-Eddy et al., 2005).

As April Truitt, the Executive Director of the Primate Rescue Center explains:

> Monkeys require a variety of species-typical enhancements to their environments and enrichment measures. For their psychological well-being to not suffer, monkeys cannot be provided with just one enhancement or enrichment to their environment, rather their psychological well-being must be addressed through multiple avenues… Currently, the USDA regulations regarding psychological well-being for primates are not sufficient to provide for the well-being of primates. Licensees are not required to enrich primates' environments by addressing multiple or specific needs of each species, thereby condemning many primates to live out their lives in barren, lonely, and/or substandard environments.

(Declaration of April Truitt, Exhibit 2 at ¶ 5, 7, emphasis added).

In 1998, the National Research Council (NRC) issued a report entitled *The Psychological Well-Being of Nonhuman Primates*, which discussed the essential ingredients required for the psychological well-being of nonhuman primates, including social companionship; opportunities to engage in species-typical behaviors, postures, and locomotion; freedom from pain or distress; and positive interactions with human caregivers. (U.S. National Research Council 1998).

The following year APHIS's own Animal Care's Primate Environment Enhancement Team concluded:

> The Animal Welfare Act was intended to promote the psychological well-being of nonhuman primates, not just prevent abnormal behaviors from occurring . . . most inspectors feel the lives of primates have been improved some, but that overall not enough is being done to provide a 'physical environment adequate to promote the psychological well-being of primates'… Put in a constructive way, facilities should be required to enhance the environment of nonhuman primates in a way that promotes the expression of a wide variety of positive, normal behaviors. Prevention is better than treatment, in mental health as in physical health … The USDA's obligations under the Animal Welfare Act include requiring standards aimed at *prevention* of problems.

(Animal and Plant Health Inspection Service, 1999, emphasis in original).

In response, APHIS issued a Draft Policy to implement these recommendations. (Draft Policy, 64 FR 38145 (July 15, 1999), Exhibit 3). The Draft Policy included five general elements that APHIS considered "critical" to environments that adequately promote the psychological well-being of nonhuman primates: (1) social grouping; (2) social needs of infants; (3) structure and substrate; (4) foraging opportunities; and (5) manipulanda – i.e., objects that can be moved, used, or altered in some manner by the primate's hands. (64 FR 38147, 38149). The Draft Policy also cited "novelty," "sensory stimulation," and "control over the environment" as important elements of any environment to promote the psychological well-being of primates. (64 FR 38149). Despite these recommendations and the results of the agencies' own internal surveys, the USDA's 1991 regulations have yet to be updated. Accordingly, the regulations still provide significant – unenforceable – leeway in how facilities meet the psychological well-being requirements.

In addition to the issue of unenforceability, there are numerous other significant problems resulting from the absence of crucial definitional language in the current regulations. Further, the enrichment plans are not publically available and the wide variety of plans among facilities can lead to disharmony of plans. The regulations for psychological well-being can be easily, even entirely, circumvented.

Social housing is an area where the inability of the current language to meet the goals of the 1985 psychological well-being amendment is especially apparent. As explained by Kulpa-Eddy et al.:

> From the Federal Register discussions up to and including the final rule, one can see that social grouping was meant to become the default housing scheme…Prolonged single caging does not promote well-being, especially when it is started at an early age. In one modified preference test, the value level of social companionship was so high that primates chose it in lieu of food.

(Kulpa-Eddy et al., 2005).

Chance French, current Sanctuary Manager of Jungle Friends Primate Sanctuary with experience at multiple primate sanctuaries, concurs with this assessment:

> I have been working with primates for over ten years and can say with absolute certainty that primates who have been species isolated or lacking in enrichment, be they from labs or ex-"pets", show higher levels of stress and exhibit atypical and self-injurious behavior. These primates are also harder to socialize, which, unfortunately, can lead to a continuation of the negative effects of species isolation. Special care and attention are required to ensure a healthy psychological state for these monkeys. I have seen first-hand that although harder to socialize, *once monkeys who have been species isolated are able to be with their own kind, their psychological health improves dramatically*.

(Declaration of Chance French at ¶ 5, Exhibit 4).

However, unfortunately, social housing is *not* consistently the default standard. Regulations implementing the AWA's command for "minimum requirements" to insure "a physical environment adequate to promote the psychological well-being of primates." (7 U.S.C. § 2143(a)(2)(B)), do not require that primates always be housed in compatible social groups – they only specify that individually housed nonhuman primates must be able to see and hear nonhuman primates of their own or compatible species, unless the attending veterinarian determines that it would endanger their health, safety, or well-being. (9 C.F.R. § 3.81(a)(3)). This extremely broad interpretation of the concept of "social housing" simply cannot adequately meet nonhuman primates' social needs, which include and are dependent upon *touch* as one of the primary sensory social experiences by which primates communicate and comfort themselves and each other. Thus, while primates are known to bond through their cages if this is their *only* opportunity for social interaction, this completely unnatural world thwarts the animals' natural needs and behaviors. As explained by Ned Buyukmihci, VMD, a veterinarian with 41 years of experience, "meaningful *social contact is the core requirement* [for psychological well-being] that can then be enhanced by other forms of enrichment." (Declaration of Ned Buyukmihci, VMD at ¶ 8, Exhibit 5, emphasis added).

"This juvenile male rhesus macaque shows a behavioral distress reaction to permanent confinement in a barren cage. He bit his upper arms, wrists and thighs 636 times during a 60-minute video recording." (Reinhardt, 2008). Photo courtesy of Reinhardt, 2008.

Years after the passage of the 1985 AWA amendment for psychological well-being, inspectors still believed that too many primates were unnecessarily single-housed, resulting in "*maladjusted primates that were passed from facility to facility because of their aberrant behavior.*" (Kulpa-Eddy et al., 2005, emphasis added).

Indeed, a 2011 review demonstrated that studies reporting the amount of time monkeys lived in single cages *did not significantly change after the passage of the AWA amendment.* (Jonathan Balcombe, Ferdowsian, & Durham, 2011). Two independent surveys of primate facilities in the U.S. demonstrated that in both 1994 and 2003 *only about one-third of primates lived with one or more companions and two-thirds lived alone.* (K. C. Baker, Weed, Crockett, & Bloomsmith, 2007; Reinhardt, 2008). Another 2003 study documented that 362 rhesus macaques were housed individually at the New England Regional Primate Research Center (NERPRC), and of those, 321 ***exhibited abnormal behaviors such as pacing and self-injury***. (Lutz, Well, & Novak, 2003). In 2010, it was reported that 70% of more than 4,000 cynomolgus (also known as crab-eating or long-tailed) and rhesus macaques housed at six facilities live alone. (Reinhardt, 2010 pp. 122).

Unfortunately, this great preponderance of the single-housing of primates remains the case. Over approximately a two-year period from 2010 through 2012, at least 25 instances of single-housing identified as "unjustified" by inspectors, including the solitary housing of juvenile primates, were noted in inspection reports at various facilities, including prestigious universities, such as

Harvard, Georgetown, and Johns Hopkins, and large companies, such as Merck, Covance, and Shin Nippon Biomedical Laboratories (SNBL). (*See* Inspection Reports for Harvard Center for Comparative Medicine Site 001 on July 31, 2012 (Exhibit 6), Georgetown University Site 001 on May 26, 2011 (Exhibit 7), The Johns Hopkins University Site 003 on May 22, 2012 (Exhibit 8), Merck Sharp & Dohme Corporation Site 005 on April 6, 2011 (Exhibit 9), Covance Laboratories Inc. Site 003 on March 2, 2012 (Exhibit 10), and SNBL Site 002 on July 10, 2013 (Exhibit 11)). In fact, a July 2011 USDA inspection report for SNBL noted that approximately ***83% of the primates were single-housed without documented exemptions***. (*See* the Inspection Report for SNBL Site 001 on July 13, 2011, Exhibit 12).

According to Kendra Buchanan, LVT, the lead veterinary technician at Jungle Friends Primate Sanctuary and a former laboratory veterinary technician, "In my experience, it was common for researchers to come up with excuses to avoid the socialization of primates…" (Declaration of Kendra Buchanan, LVT, Exhibit 13 at ¶ 5).

The vast majority of primates at SNBL are single-housed.
Photos courtesy of People for the Ethical Treatment of Animals, 2011.

Thus, in 2011, at the NIH-sponsored Symposium on Animal Welfare and Scientific Research, a participant lamented the obvious – that the housing for primates has not changed in decades: "If you show a picture of a primate cage from 40 years ago and a primate cage now, it's basically the same: it's all metal with a perch added." ("Animal housing facilities discussion. Proceedings of the symposium on animal welfare and scientific research: 1985-2010," 2011).

Clear standards, such as those requiring social housing, would be far easier to enforce and clearer to understand, and would help to guarantee that the most basic psychological and behavioral needs of these animals are met.

Setting concrete standards modeled on NIH's ethologically appropriate environment recommendations for chimpanzees, along with concrete criteria for signs of psychological well-being and distress, would go a long way to fulfilling the original intent of the 1985 Amendment and help enforce this important mandate for a "physical environment adequate to promote the psychological well-being" of primates used in research.

Confinement at the University of Washington.
Photo courtesy of Stop Animal Exploitation Now, 2012.

4. NIH Actions Promoting Psychological Well-Being

A. Institute of Medicine Conclusions

In December 2010, at the request of NIH, and in response to Congressional inquiry, the Institute of Medicine (IOM), in collaboration with the NRC, convened the Committee on the Use of Chimpanzees in Biomedical and Behavioral Research to consider the necessity of the use of chimpanzees in NIH-funded research. The Committee completed its report, *Chimpanzees in Biomedical and Behavioral Research: Assessing the Necessity*, in December 2011. The Report concluded that "*most current research use of chimpanzees is 'largely unnecessary' and that any future research be guided by a set of principles and criteria.*" (National Institutes of Health Division of Program Coordination, Planning, and Strategic Initiatives, 2013, emphasis added). It introduced the concept of "ethologically appropriate physical and social environments" (Institute of Medicine, 2011) – meaning "captive environments that do not simply allow but also, importantly, promote a full range of behaviors that are natural for chimpanzees." (*See* 78 FR 39741, 39743 (July 2, 2013)).

B. Council of Councils Working Group on the Use of Chimpanzees in NIH-Supported Research

In response, the NIH Council of Councils (CoC) formed the Working Group on the Use of Chimpanzees in NIH-Supported Research to advise NIH on implementation of the IOM findings. NIH requested that the Working Group develop a plan to implement the IOM's guiding principles and criteria for chimpanzee research, analyze the current use of chimpanzees in research, assess the placement and size of chimpanzee populations, and review the potential for future use of chimpanzees in research. (Council of Councils Working Group on the Use of Chimpanzees in NIH-Supported Research, 2013). The Working Group submitted its final report to the CoC in January 2013.

The Working Group recommendations – unanimously approved by the full CoC – concluded that any and all theoretical potential future use of chimpanzees must be subjected to a strict independent oversight committee to assess whether their use is acceptable, critical, and meets IOM guidelines – including housing in an ethologically appropriate environment.

The CoC submitted the report to NIH, and, on June 26, 2013, after considering public comments, the NIH accepted nearly all of the CoC's recommendations, including nine of 10 recommendations regarding ethologically appropriate environments. These recommendations provide concrete minimum standards for environments in which chimpanzees are held, including specific physical and social parameters.

C. NIH-Accepted Recommendations for Chimpanzees

In support of the need for ethologically appropriate environments, the Institute of Medicine explained:

> Chimpanzees live in complex social groups characterized by considerable interindividual cooperation [cooperation between individuals], altruism, deception, and cultural transmission of learned behavior (including tool use). Furthermore, laboratory research has demonstrated that chimpanzees can master the rudiments of symbolic language and numericity, that they have the capacity for empathy and self-recognition, and that they have the humanlike ability to attribute mental states to themselves and others (known as the "theory of mind"). Finally, in appropriate circumstances, chimpanzees display grief and signs of depression that are reminiscent of human responses to similar situations. It is generally accepted that all species, including our own, experience a chronic stress response (comprising behavioral as well as physiological signs) when deprived of usual habitats, which for chimpanzees includes the presence of conspecifics and sufficient space and environmental complexity to exhibit species-typical behavior. Therefore, *to perform rigorous (replicable and reliable) biomedical and behavioral research, it is critical to minimize potential sources of stress on the chimpanzee*. This can be achieved primarily by maintaining animals on protocols either in their natural habitats, or by *consistently maintaining with conspecifics in planned, ethologically appropriate physical and social environments*...

(Institute of Medicine, 2011, emphasis added).

These conclusions also apply to other species of nonhuman primates for which extensive studies have shown high levels of psychological abilities and needs. (*See e.g.,* Bekoff, Allen, &

Burghardt, 2002; Bekoff & Sherman, 2004; Bekoff, 2003; Bradshaw, Capaldo, Lindner, & Grow, 2008, 2009; Capaldo & Bradshaw, 2011; Ferdowsian et al., 2011; Marino, 2002; Tomasello & Call, 1994).

Further studies of mammalian brains elucidate the complexity and overlap of primate brains. (Bradshaw et al., 2008, 2009; Capaldo & Bradshaw, 2011). For example, other nonhuman primates such as macaques, that are commonly used in research, share many cognitive abilities (M. Kavanagh 1984 pp.13); have active minds (Shumaker & Beck, 2003 pp.24); have inquisitive natures (Shumaker & Beck, 2003 pp.24); are inventive (M. Kavanagh, 1984 pp.173); are sociable (Cawthon Lang, 2005; M. Kavanagh, 1984 pp.169; Redmond, 2011 pp.13, 111; Maestripieri and Hoffman, 2012); have caring relationships (Redmond, 2011 pp.9); make and use tools (Shumaker & Beck, 2003 pp.118,121); have a culture (M. Kavanagh, 1984 pp. 173; Redmond, 2011 pp.13, 20); have complex emotions (Shumaker & Beck, 2003 pp.147); analyze past results, imagine different outcomes, and experience regret (Melnick, 2011); appear to understand others' perceptions, thoughts, and feelings (Santos, Nissen, & Ferrugia, 2006); and have a sense of justice and fairness (Brosnan, 2006, 2013).

According to Brian Hare, Ph.D., a biological anthropologist at Duke University, who testified before the IOM, "Most of what you know about great apes is also true about monkeys." (Keim, 2013). Accordingly, like chimpanzees, *the well-being of other nonhuman primates is dependent upon a social and complex environment, foraging opportunities, outdoor access, access to vertical dimension, and choice and self-determination, among other things* (Chamove, Anderson, Morgan-Jones, & Jones, 1982; Kavanagh, 1984; Redmond, 2011; Reinhardt, 2008). (For more background information, see exhibits 14 – 21.) Therefore, because other nonhuman primates share many of the characteristics that the IOM and NIH believe warrant greater protections and the provision of ethologically appropriate environments for chimpanzees, these other nonhuman primates are, borrowing the words of NIH Director Dr. Francis Collins, also worthy of "special consideration." (National Institutes of Health, 2011). Therefore, all laboratories should be required to provide *all* nonhuman primates such basic ethologically appropriate environments, with modifications specific to each species.

Indeed, applying species-appropriate standards based on the NIH-approved recommendations for ethologically appropriate environments for chimpanzees to *all* primates used in research will help USDA meet one of its originally stated aims: "To administer and enforce one uniform body of regulations at all research facilities regulated by the Act [AWA]." (USDA, 1989). Accordingly, these recommendations, as discussed below, should be adopted for chimpanzees as

stated below and accepted by NIH, and, with appropriate modifications, for all primates held in laboratories as the "minimum standards" necessary to promote the psychological well-being of primates, within the meaning of the AWA. (7 U.S.C. § 2143(a)(1) - (2)(B)).

NIH-ACCEPTED RECOMMENDATIONS FOR CHIMPANZEES HELD IN CAPTIVITY AND THEIR APPLICATION TO ALL PRIMATES

Set forth below are those NIH-accepted recommendations that should be applied to all primates used in research, as further explained in the discussion following each recommendation.

> **NIH-accepted recommendation 1: Chimpanzees must have the opportunity to live in sufficiently large, complex, multi-male, multi-female social groupings, ideally consisting of at least 7 individuals. Unless dictated by clearly documented medical or social circumstances, no chimpanzee should be required to live alone for extended periods of time. Pairs, trios, and even small groups of 4 to 6 individuals do not provide the social complexity required to meet the social needs of this cognitively advanced species. When chimpanzees need to be housed in groupings that are smaller than ideal for longer than necessary, for example, during routine veterinary examinations or when they are introduced to a new social group, this need should be regularly reviewed and documented by a veterinarian* and a primate behaviorist.**[4]

Discussion

In its acceptance of this recommendation, the NIH stated that it "also believe[s] that housing chimpanzees in larger groups has the potential to offer greater social complexity and more environmental stimuli than housing them in smaller groups. At the same time, the agency believes that chimpanzee facilities should evaluate individual chimpanzees to determine their suitability for successful integration into larger social groups…The NIH believes that the recommendation is sufficiently flexible and permits facilities to adjust

[4] This recommendation also states that "[t]he Working Group defines a 'veterinarian' as a licensed, graduate veterinarian with demonstrated expertise in the clinical care and welfare of nonhuman primates (preferably chimpanzees) and who is directly responsible for the routine clinical care of the animal(s) in question."

the sizes of research chimpanzee social groups as necessary, *as long as these facilities support any downward adjustments with proper documentation and regular reviews by a veterinarian and a primate behaviorist.* (National Institutes of Health, 2013 pp.6; Exhibit 22, emphasis added).

Accordingly with very few exceptions, all primates should be socially housed. The only exceptions to social housing being those nonhuman primates who are known to be solitary in nature and those very few who would be adversely affected by such an arrangement due to their independently documented physical, behavioral, or social state. Even orangutans, which have classically been thought of as a solitary species in the wild, benefit from social housing in captivity (Orangutan Husbandry Manual, Chicago Zoological Society).

For example, rhesus macaques are the primate species most commonly used in scientific research. In the wild, macaques live in large troops that can include up to 200 animals. In captivity, rhesus macaques who are paired with at least one other individual show a significant decrease in abnormal and anxiety-related behavior compared to isolated individuals (Baker et al., 2012).

The critical need for social housing is supported by APHIS' 1999 Draft Policy, the accreditation standards of the American Zoological Association (AZA), and the standards of the Global Federation of Animal Sanctuaries (GFAS).

In the 1999 Draft Policy, APHIS stated that:

> According to our research, primates are clearly social beings and social housing is the most appropriate way to promote normal social behavior and meet social needs. In order to address the social needs of nonhuman primates under §3.81(a), the plan must provide for each primate of a species known to be social in nature to be housed with other primates whenever possible…Housing should maximize opportunities for a full range of species-appropriate contact, except that reproduction may be limited or prevented entirely.

(64 FR 38147).

Similarly, the AZA standards for exhibitors state that:

> All animals must be housed in enclosures and in appropriate groupings which meet their physical, psychological, and social needs. Wherever possible and appropriate, animals should be provided the opportunity to choose among a variety of conditions within their environment. Display of single animals should be avoided unless biologically correct for the species.

(AZA 2013 Accreditation Standards and Related Policies 1.5.2, Exhibit 23).

GFAS concurs:

> Animal group composition shall be appropriate for the species and sufficient to meet their social and behavioral needs in terms of size, age and sex structure based upon the natural history of the species housed…

(2009 GFAS General Animal Care Standards (I)(o)(i)(b)(iv), Exhibit 24).

> **NIH-accepted recommendation 2: Chimpanzees must be housed in environments that provide outdoor access year round. They should have access to natural substrates, such as grass, dirt, and mulch, to enhance environmental complexity**.

Discussion

In its acceptance of this recommendation, NIH stated that it "believes that research chimpanzees need year-round access to natural substrates and the outdoors to enhance their environmental complexity." (National Institutes of Health, 2013 pp. 9). This recommendation should apply to all nonhuman primates, subject to the temperature and environmental needs of the species, whose psychological well-being would be greatly improved by year-round access to the outdoors. It is supported by GFAS standards which state that "[a]ll animal enclosures shall provide animals access to, and choice between the indoor and outdoor portion of their enclosure unless otherwise advised by the veterinarian/animal care manager." (2009 GFAS Operational Standards (f)(8)(a)(ii),

Exhibit 25). Even for tropical species, such as marmosets and tamarins, outside enclosures can be equipped with heating lamps or easy access to heated indoor spaces when temperatures drop to freezing or below.

> **NIH-accepted recommendations 3: Progressive and ethologically appropriate management of chimpanzees must include provision of foraging opportunities and of diets that are varied, nutritious, and challenging to obtain and process**.

Discussion

APHIS' 1999 Draft Policy highlighted the importance of foraging for primates, and both a nutritionally and psychologically-appropriate diet. APHIS' 1999 Draft Policy explained that:

> In the wild, nonhuman primates spend a significant proportion of their time foraging for food. 'Working' for food is one of the most frequently found species-typical activities for nonhuman primates. Captive nonhuman primates that are not provided with enough time-consuming foraging tasks may self-mutilate, over-groom, or become aggressive. As part of enriching the physical environment [ ], the plan should provide for each primate to have, on a daily basis, some type of time-consuming foraging opportunity…The diet for each primate should contain a variety of tastes, smells, and textures.

(64 FR 38149).

The AZA standards further state that "[t]he institution should have a written nutrition program that meets the behavioral and nutritional needs of all species, individuals, and colonies/groups in the institution. Animal diets must be of a quality and quantity suitable for each animal's nutritional and psychological needs." They further provides that "[t]he institution should assign at least one person to oversee appropriate browse material for the animals." (AZA 2013 Accreditation Standards and Related Policies 2.6.2 - 2.6.3).

Likewise, GFAS standards provide that "animal diets shall be of a quality, quantity and variety suitable for each animal's nutritional and psychological needs…Where appropriate, fresh browse and produce shall be provided daily as dietary supplements and enrichment for the animals." (2009 GFAS General Animal Care Standards (I)(o)(ii)(a)).

> **NIH-accepted recommendation 4: Chimpanzees should have the opportunity to climb at least 20 ft (6.1 m) vertically. Moreover, their environment must provide enough climbing opportunities and space to allow all members of larger groups to travel, feed, and rest in elevated spaces**.
>
> **NIH-accepted recommendation 5: Chimpanzees must be provided with materials to construct new nests on a daily basis**.

Discussion

Cages should provide nonhuman primates sufficient space and complexity to carry out varied behaviors. In its June 2013 announcement, NIH stated that it agrees that "sufficient square footage is needed for chimpanzees to travel, patrol, coexist in social groups of 7 or more members, and sometimes separate from others…" (National Institutes of Health, 2013 pp. 7). All nonhuman primates need space for these and similar species-specific behaviors.

The AZA standards likewise provide that "[a]ll animal enclosures (exhibits, holding areas, hospital, and quarantine/isolation) must be of a *size and complexity sufficient to provide for the animal's physical, social, and psychological well-being; and exhibit enclosures must include provisions for the behavioral enrichment of the animals.*" (AZA 2013 Accreditation Standards and Related Policies 10.3.3, emphasis added).

APHIS recognized the importance of these recommendations in its 1999 Draft Policy, which provided that:

> The most basic components of the physical environment are the enclosure structure (its size, shape, and design) and the substrates within it (flooring, bedding, and furnishings, including perches, nest boxes, etc.). In order to

> promote psychological well-being for nonhuman primates, primary enclosures for housing and/or exercise need to be of adequate shape and design, and have adequate furnishing, to accommodate species-appropriate behaviors by all inhabitants. Each primate should be able to, at a minimum, engage in:
>
> **1.** Species-typical postures and positions for resting, sleeping, feeding, exploration, and play;
> **2.** Species-typical locomotion; and
> **3.** Social adjustments…

(64 FR 38148).

The GFAS standards similarly require that "[a]ll animal enclosures shall be of a size and complexity sufficient to maximize the animal's physical, social and psychological well-being." (2009 GFAS Operational Standards (f)(8)(a)(i), emphasis added). GFAS provides that "enclosed areas shall be equipped in accordance with the needs of the animals with *bedding material, branch work, burrows, nesting, hide boxes, pools, appropriate substrate, and vegetation and other enrichment materials designed to aid and encourage normal behavior patterns and minimize any abnormal behavior.*" (2009 GFAS General Animal Care Standards (I)(n)(ii)(iv)). In addition, it highlights the necessity for adequate space for natural behaviors observed in the wild for the species and for diversity and complexity.

> **NIH-accepted recommendation 6: The environmental enrichment program developed for chimpanzees must provide relevant opportunities for choice and self-determination**.

Discussion

Enrichment is a necessity for the well-being of social, intelligent captive animals. APHIS' 1999 Draft Policy outlined several aspects of enrichment, including manipulanda, novelty, control over the environment, and sensory stimulation. The Draft Policy stated:

> The plan should provide individual primates with the *opportunity to exercise control over some aspects of their environment*. Complex objects or environments that can be altered or controlled by the animals provide them with enhanced opportunities to utilize their cognitive abilities. Examples of control include opening doors and peep holes, moving indoors or outdoors, and influencing the temperature and lighting in the cage, as well as avoiding noxious stimuli.

(64 FR 38149, emphasis added).

The AZA standards likewise provide that the "institution must have a formal written enrichment and training program that promotes species-appropriate behavioral opportunities," and that the plan "should include the following elements: goal-setting, planning and approval process, implementation, documentation/record-keeping, evaluation, and subsequent program refinement." (AZA 2013 Accreditation Standards and Related Policies 1.6.1).

> **NIH-accepted recommendation 7: Chimpanzee management staff must include experienced and trained behaviorists, animal trainers, and enrichment specialists to foster positive human–animal relationships and provide cognitive stimulation. Given the importance of trainer/animal ratios in maintaining trained behaviors, a chimpanzee population of 50 should have at least 2 dedicated staff members with this type of expertise. Positive reinforcement training is the only acceptable method of modifying behaviors to facilitate animal care and fulfillment of management needs. Training plans should be developed for each animal, and progress toward achieving established benchmarks should be documented.**

> **NIH-accepted recommendation 8: All personnel working with chimpanzees must receive training in core institutional values promoting psychological and behavioral well-being of chimpanzees in their care. These institutional core values should be publicly accessible.**

Discussion

These recommendations should apply to all nonhuman primates held in captivity.

> **NIH-accepted recommendation 9: Chimpanzee records must document detailed individual animal social, physical, behavioral, and psychological requirements and these requirements should be used to design appropriate individualized chimpanzee management in the captive research environment.**

Discussion

The USDA should adopt a system to measure individual primates' psychological well-being. Much as the psychological state of non-verbal humans can be assessed, studies have shown that the psychological state – including depression and post-traumatic stress – can also be diagnosed in nonhuman primates. (Bradshaw et al., 2008, 2009; Capaldo & Bradshaw, 2011; Ferdowsian et al., 2011; McKinney, Suomi, & Harlow, 1971; Shively, Laber-Laird, & Anton, 1997).

For example, GFAS requires psychological well-being assessments that document the behavioral and psychological well-being of each animal, and include information on specific measures taken to ensure the welfare of individual animals. (GFAS, 2009). GFAS standards provide that:

> Measures assessed will include: species appropriate behavior, interaction with other animals, the animals' ability to respond appropriately to variable environmental conditions, physiological states, developmental stages, and social situations as well as adverse stimuli…Stereotypic behavior, self injurious behavior, inappropriate responses to various stimuli may be evidence of compromised well being and must be investigated and a plan to address the concerns must be developed…The absence of negative behaviors shall not be accepted as sole evidence of well being…A copy of the welfare report shall be kept in the animals' permanent file.

(2009 GFAS General Animal Care Standards (I)(o)(iv)(b), Exhibit 24).

The scientific literature has analyzed and identified signs of stress, including the cluster of symptoms known as "post-traumatic stress disorder." (Bradshaw, 2008). Psychological malady in nonhuman primates can be diagnosed in a similar manner as applied to humans. The fields of human psychology and psychiatry have defined behaviors indicative of mental disorders that allow for numerous possible diagnoses, as outlined in the Diagnostic and Statistical Manual of the American Psychiatric Society. Diagnostic and observable criteria apply to humans both able and unable to verbally articulate specifics regarding their psychological state.

Even among verbal humans, there are varying degrees of being able to describe one's state of being. Practitioners in the fields of social work, psychology, and psychiatry learn how to assess not only what is said, but the individual's other behaviors, and set a course of therapeutic intervention for symptomatic relief or improvement *regardless of the patients' verbal ability to describe their symptoms*. A similar set of diagnostic criteria should be developed for nonhuman primates. Such criteria can provide a clear picture of the animals' psychological well-being or degree of psychopathology.

In fact, this area of diagnosis and intervention now comprises a relatively new, and expanding, branch of veterinary medical specialization and board-certification called "veterinary behavior." (*See* American College of Veterinary Behaviorists, n.d.). Indeed, if the diagnosis and treatment of animal psycho-behavioral disorders can be successfully applied to domesticated cats and dogs, they certainly can also be applied to captive primates in labs, who are far more similar to humans.

Indeed, in light of the sparse availability of specific and clearly defined information on what constitutes psychological well-being in nonhuman primates, USDA should develop and employ a scale similar to the Global Assessment of Functioning Scale (Exhibit 26) used to assess human functioning and improvement. Thus, laboratories should be required to assess primates on their arrival at the lab and periodically thereafter. If such a scale, coupled with behavioral manifestations of clearly defined indicators of psychosocial stress, indicate that an individual primate is suffering, an appropriate intervention must be required. If that intervention fails to result in a meaningful amelioration of symptoms so that the animal can live in a state of psychosocial equilibrium, the primate must be sent to a sanctuary for psychological rehabilitation.

Unfortunately, many research facilities are not familiar with the increasing scientific literature regarding psychological well-being, enrichment, and ethologically-appropriate environments for nonhuman primates. Employees may lack knowledge of "normal" behavior and psychosocial needs of different primates, making the identification of pathologies difficult. For example, if several primates in the same facility are exhibiting stereotypic rocking or moving in incessant circles, employees may misinterpret this as "normal" behavior, rather than a well established indicator of stress or psychosis. (Hugo et al., 2003; Brune et al., 2006).

According to current USDA regulations, an environmental enhancement plan "must be in accordance with the currently accepted professional standards as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian." (9 C.F.R. § 3.81). However, the actual plans may vary significantly from facility to facility, and may not be implemented, partially due to a lack of knowledge in individual institutions and/or an institution's inability to stay current with respect to primatological studies of both captive and free-living primates. Current education requirements for veterinarians in laboratories require little training in animal behavior and/or enrichments, especially specifically related to nonhuman primates. Even the American College of Laboratory Animal Medicine (ACLAM) training program does not mention animal behavior or enrichment training. (*See* American College of Laboratory Animal Medicine, n.d.-b – "Experience should involve rodents, rabbits, primates, and other species that fairly represent the current practice of laboratory animal medicine, and must include participation in the following: *disease diagnosis, treatment, and prevention; clinical and diagnostic pathology; administration of the institutional animal care and use program; interaction with investigators; and animal resource management.*" (emphasis added).[5]

Veterinarians are required to receive substantially less training and education regarding enrichment, psychological well-being, and ethologically appropriate environments than animal behaviorists such as Associate Certified Applied Animal Behaviorists (ACAAB), Certified Applied Animal Behaviorists (CAAB), and Veterinary Behaviorists. A far more efficient, harmonized, and effective system would use the consolidated knowledge of experts as the basis for enforceable minimum standards for psychological well-being – as was done with respect to the NIH-accepted recommendations for chimpanzees – thus reducing the burden on individual institutions to keep up with this highly specialized field of literature.

[5] While animal care makes up 24% of the ACLAM examination, enrichment and species-specific husbandry are only two of thirteen topics included in the animal care section. (American College of Laboratory Animal Medicine, n.d.-a).

One reason often offered for the lack of more specific regulations for psychological well-being and environmental enrichment is the difficulty of developing and applying minimum standards for different species and for diagnosing psychological maladies in nonhuman species. However, the NIH's new recommendations for environments for chimpanzees, APHIS' 1999 Draft Policy on Environment Enhancement for Nonhuman Primates, and current literature on the psychological well-being of nonhuman primates all demonstrate that minimum standards can and should be identified for the betterment of animal well-being and scientific research. Therefore, including such minimum requirements in the psychological well-being standard will also benefit individual labs that are unable to stay informed about the expanding and extensive information concerning these issues.

4. Adverse Effects on the Psychological Well-Being of Primates Due to the Lack of Concrete Standards

A. Introduction

All species experience stress, whether it is the result of natural or man-made environments. It is well established that nonhuman primates have psychological capacities (mental, emotional, and other faculties of subjective experience) such as maternal behavior, facial recognition, moral development, play, sexual behavior, fear, aggression, stress and emotion regulation, empathy, love, and grief. (Narvaez, Panksepp, Schore, & Gleason, 2012; Panksepp, 1998). Theoretical and empirical studies document that brain structures and processes governing consciousness, cognition, emotions, sense of self, and other faculties are shared among vertebrates. (Bradshaw & Sapolsky, 2006). Patterns of thinking, feeling, and behavior that are shaped through relationships, and the associated brain structures affected by trauma (i.e., cortical and subcortical areas of the right brain, including the right orbitofrontal cortex, anterior cingulate, amygdala, hippocampus, and posterior areas of the right hemisphere) are also consistent across species. (Capaldo & Bradshaw, 2011). The key point is the now undeniable proposition that ***nonhuman primates suffer physically and psychologically when subjected to conditions that cause comparable suffering in humans*** (e.g., forced confinement, social and physical deprivation, being subjected to procedures without willing consent, torture, threat of death or injury, etc.).

Indeed, nonhuman primates have been used for decades to explore the effects of environmental stress on mind and behavior. (*See* Shapiro, 1998). Experiments and testing comprise not one source, but multiple sources, of physical and psychological stressors. Thus, nonhuman primates in captivity routinely sustain one or more traumatic events: premature separation from biological and cultural context (i.e., separation from their natural physical, cognitive, emotional, social, and cultural environment); attachment disruptions; inadequate care-giving; prolonged deprivation; and, in cases of biomedical experimentation, highly invasive psychophysiological insults. Laboratory confinement and experimentation are well known to cause severe stress and abnormal mental states and behaviors in animals used for research. (Brune, Brune-Cohrs, McGrew, & Preuschoft, 2006; Morgan & Tromborg, 2007).

This unfortunate fact of life for research primates is acknowledged by the IOM, which stated that "[i]t is generally accepted that all species, including our own, experience *a chronic stress response (comprising behavioral as well as physiological signs) when deprived of usual*

habitats…" (Institute of Medicine, 2011, emphasis added). Common laboratory routines, such as handling, moving and cleaning cages, and blood collection, cause rapid, pronounced, and statistically significant elevations of physiological stress indicators such as heart rate, blood pressure, and a variety of hormone levels (including cortisol), indicating significant fear, stress, and distress. (JP Balcombe, Barnard, & Sandusky, 2004; Meijer, Sommer, Spruijt, van Zutphen, & Baumans, 2007).

In addition, nonhuman primates live in constant fear and uncertainty about if and when they will be subjected to an experimental procedure. In the book *Why Zebras Don't Get Ulcers*, neuroscientist and former member of the IOM Committee on the Use of Chimpanzees in Biomedical and Behavioral Research, Robert M. Sapolsky, Ph.D., discusses the "anticipatory stress response" for which there is evidence in a number of species such as humans, great apes, elephants, dogs, and others. Due to prior adverse experiences, individual animals become hyper-vigilant, anticipating the recurrence of those experiences – much like adopted dogs that have suffered previous traumas flinch when approached by people. These individuals have learned from those experiences to identify risks of harm, and to facilitate their own safety, healing, and ability to get back to living their lives. (Sapolsky, 2004).

Nonhuman primates also undergo capture from research cages[6]; separation from their social group and isolation prior to procedure; restraint ("squeeze cage" and stereotaxic devices); various organ (including brain) biopsies; injection of potentially allergenic dyes, viruses, radioactive, and other substances; and other invasive procedures. This is followed by post-procedure stress: confusion and fear associated with sedation recovery, pain, and nausea from the procedure, isolation, and other debilitating stressors associated with serious surgeries and medical procedures.[7] This "direct" stress is compounded by other traumatic events and by standard laboratory housing conditions that impose unnatural levels of confinement, and that commonly deprive, limit, or severely alter the occupants' opportunities to engage in essential, varied, expansive, and self-determined natural behaviors.

Captivity comprises a fundamental stressor that undermines well-being because of the loss of agency – the ability to make choices surrounding one's life and needs. (Herman 1992). Because primates possess inquisitive brains and a strong need for stimulation and investigation, sensory

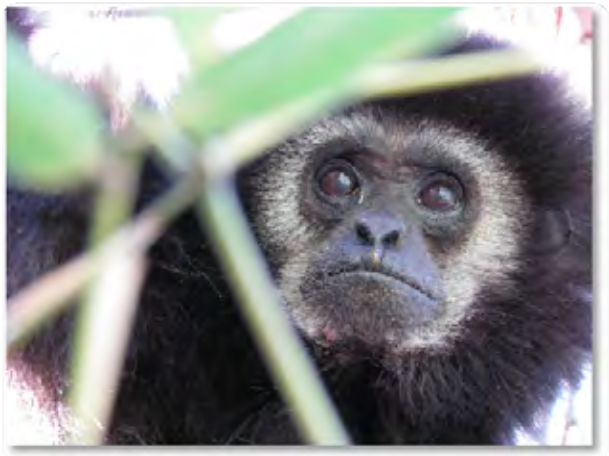
[6] For example, marmoset monkeys resolutely try to avoid capture from their research cages, during which they "easily become stressed and agitated and can cause harm to themselves." Such routine capture "has been associated with increased cortisol, signs of distress and decrease in other hormones in various nonhuman primate species." (Williams, Poole, Katos, & Hilmas, 2008).

[7] Some brain, cognitive, and behavioral studies are also associated with some of the same steps and procedures. For examples, see Kerr, Grayden, Thomas, Gilson, & Burkitt, 2013; Kobayashi, Schultz, & Sakagami, 2010; Ma & He, 2010.

and motor deprivation in barren and uncontrollable laboratory environments constitutes a major stressor. (Brune et al. 2006). The physical conditions of laboratories are harsh and unyielding relative to the socio-ecological and psychological conditions to which primates have naturally evolved. Prime stressors include physical (e.g., small concrete or metal cages, limited types of nutritious, non-endemic food, loud noises), social (e.g., lack of natural family groups, changing labs and loss of companions, isolation), and psychological (e.g., boredom and lack of appropriate stimulation) stressors; maternal deprivation; and uncertainty, pain, and fear when anesthetized and forcibly subjected experiments. In many cases, social interaction with other members of their own species and the stress relieving comforts primates can and do provide each other are not possible. (Hurst, Barnard, Tolladay, Nevision, & West, 1999; Olsson & Dahlborn, 2002). This irregular or lack of regular safe social support (i.e., intra- and inter-facility moving as well as moving from the pet or entertainment industry to laboratories), in situations where these traumas occurred, constitute additional stressors.

B. Manifestations of Psychological Distress

Laboratory conditions and experiences involving diverse experimental procedures and frequent anesthetics commonly lead to acute and long-term mental and physical breakdown. As such, stress can result in both psychological damage as well as severe physiological consequences for an individual. Different species and individuals of any species have different stressors, variable ranges of stress to which they are able to adapt, diverse spectra of tolerance, and dissimilar manifestations of excessive stress. There are, however, commonalities that transcend species, and the inability of an individual to adapt to repeated and/or chronic stress leads to allostatic overload (excessive wear and tear on the body). Symptoms of such psychological trauma are diverse, including self-mutilation, stereotypic and other abnormal behaviors, post-traumatic stress disorder, learned helplessness, diarrhea, and infant mortality.



Igor was used in research at the New York Laboratory for Experimental Medicine and Surgery in Primates (LEMSIP). He developed the habit of self-mutilation at the sight of other gibbons and was kept behind black Plexiglas for many years. In 1987, Igor was the last of several gibbons sent to sanctuary at the International Primate Protection League (IPPL) by this lab. At sanctuary, he stopped self-mutilating. He now is an especially gentle gibbon and very active considering he is more than 50 years old.
(Declaration of Shirley McGreal, Ph.D. at ¶ 5, Exhibit 27). Photo courtesy of IPPL.

Arun Rangsi was born in a lab using young gibbons in viral cancer experiments at the University of California. He was removed from his mother shortly after his birth and raised with a swinging wire surrogate. This drove him insane, and he started to self-mutilate by head-banging. He also had frequent bouts of pneumonia and dysentery. When the lab lost funding from the National Cancer Institute, it no longer wanted Arun Rangsi. He was sent to IPPL in 1981, and, after much care, he stopped head-banging. (Declaration of Shirley McGreal, Ph.D. at ¶ 4, Exhibit 27). Photo courtesy of IPPL.

Betty, a rhesus macaque, has lost hair due to compulsive self-mutilation. (Reinhardt, 2008).
Photo courtesy of Reinhardt, 2008.

Nonhuman primates in laboratories are known to develop self-injurious, stereotypic, and other abnormal behaviors in response to laboratory conditions and experimentation. Examples include over-grooming or hair-pulling to the point of injury or permanent damage or scarring to skin or follicles, hitting and/or biting one's self, banging one's self against the cage, pacing, twirling, rocking, back-flipping, swaying, eye-covering, self-clasping, repetitive circling, and digit-sucking. (Bayne et al., 1991; Bourgeois, Vazquez, & Brasky, 2007; Brune et al., 2006; Goosen, 1981; Lutz et al., 2003; Mallapur & Choudhury, 2003; Rommeck, Gottlieb, Strand, & McCowan, 2009; Roy, 1981; Declaration of Ned Buyukmihci, VMD at ¶ 4, Exhibit 5). Abnormal behaviors are those that are not normally seen or are not habitual or customary in nature. (Brune et al., 2006).

According to Ned Buyukmihci, VMD, a veterinarian with 41 years of experience:

> In every research institution with which I was involved, I observed first hand considerable stereotypical and other aberrant behavior…[abnormal] behaviors were more marked and more frequently seen in individuals who were singly housed. They indicated maladaptation of the individuals to their environment…I have never seen these behaviors in wild non-human primates of any species nor have I observed them in individuals who were

> born in captivity in a sanctuary environment where housing was either free-range or expansive and heavily enriched.

(Declaration of Ned Buyukmihci, VMD at ¶ 4, 6, Exhibit 5).

Walsh, Bramblett, and Alford (1982) stated that abnormal behaviors "present[ ] a pattern of chimpanzee behavior radically different from that described for wild chimpanzees by van Lawick-Goodall [1968]…Abnormal behavior may thus be the result of pushing the chimpanzee's species-typical behavioral plasticity beyond the limits of what can be accommodated without the development of psychopathology." (Walsh, Bramblett, & Alford, 1982). While referring to chimpanzees, this statement also is applicable to other primates. According to Debra Durham, Ph.D., an animal behaviorist, "Like chimpanzees, monkeys exhibit behavioural and psychological pathologies when kept in a laboratory environment." (Submitted comments regarding European Union Directive 2010/63).

Stereotypies (captivity-induced excessive repetitive movements) are abnormal behaviors and are generally considered pathological (maladaptive) and "are the desire for stimulation…and the desire for security…A variety of stereotypies may develop to counter boredom by providing some kind of controllable stimulation in an otherwise barren and uncontrollable environment." (Brune et al., 2006; Brüne, Brüne-Cohrs, & McGrew, 2004). Stereotypies have been compared to "obsessive–compulsive disorder (OCD) spectrum of disorders in humans, particularly those involving stereotypic motor symptoms (such as stereotypic movement disorder)…Insofar as they may represent a response to the traumatic stress of captivity…they arguably fall on the spectrum of posttraumatic stress responses." (Hugo et al., 2003; Brune et al., 2006).

Self-injurious and other abnormal behaviors are indicators of frustration, uncertainty, anxiety, and psychological stress (K. Baker & Aureli, 1997; Garner, 2005), and some can result in severe tissue and muscle damage, lacerations, and dismemberment. (Bourgeois et al., 2007). Reinhardt (2010) reports, "In humans [hair-pulling] is classified as a mental disorder, causing clinically significant distress, and occurring in the context of depression, frustration, boredom, or other emotional turmoil. If hair-pulling is associated with similar mind states in nonhuman primates, it seems reasonable to conclude that the cause of this behavior deserves more attention and potential cures explored." (Reinhardt, 2010 pp. 168). He also writes that self-injurious biting continues to be a common behavioral problem in laboratories.

In an article on abnormal behaviors, Corrine Lutz, Arnold Well, and Melinda Novak, of the New England Regional Primate Research Center and the University of Massachusetts concur, stating that there is a "relatively high incidence of stereotypies and SIBs [self-injurious behaviors],

particularly in macaques…" (Lutz et al., 2003). Another study of 188 rhesus macaques housed at the New England Regional Primate Research Center showed that approximately 30% of the monkeys engaged in self-biting or self-wounding. (Novak, 2003). Regarding macaques, commonly used in research, a NIH Office of Laboratory Animal Welfare publication, for example, states, "It is well-known that raising a macaque alone, without [housing with] other macaques of the same species, will result in that animal expressing a pattern of abnormal behaviors that can become self-destructive. Even the behavior profiles of adult animals housed alone can degenerate into these abnormal behaviors, which may include repeated pacing, circling, or somersaulting; hyper-aggression; depression; and self-injurious behavior, including hair plucking or self-biting." (Bayne, 2005 pp. 47).

Conditions in laboratories, including confinement and lack of autonomy, can also lead to a phenomenon known as "learned helplessness" – the extreme passive reaction of an individual who has come to learn that he or she cannot change the environment and, therefore, must endure an aversive situation because avoidance attempts are futile. (Brune et al., 2006; Solomon, Ginzburg, Mikulincer, Neria, & Ohry, 1998; Wortman & Brehm, 1975). "Repeated exposure especially to unpredictable and inescapable stress can lead to learned helplessness in humans and nonhuman species, a state that is characterized by anxiety, inactivity and neophobia, as well as chronically increased cortisol values." (Reimers, Schwarzenberger, & Preuschoft, 2007). Examples of learned helplessness in laboratories include mothers freely handing over their babies to humans and an unnatural over-dependence on laboratory staff. Learned helplessness and dependency has been demonstrated in humans (Gatchel, Paulus, & Maples, 1975; Gatchel & Proctor, 1976; Thornton & Jacobs, 1971), including in prisoner of war research (e.g., Solomon et al., 1998) and in research on victims of physical and psychological assault (e.g., Peterson & Seligman, 1983). Helplessness has been proposed to be part of a vicious cycle that disturbs coping mechanisms in a variety of situations because it inhibits responding to an aversive environment and, therefore, produces emotional disturbances. (Solomon et al., 1998).

Conditions in labs include severe confinement, including in stereotaxic devices (pictured).
(L) Photo courtesy of Reinhardt, 2008.

Gastrointestinal problems are another symptom of stress, are common in nonhuman primates in labs, and can be chronic, severe, and intractable. (Hird, Anderson, & Bielitzki, 1984; Lewis, n.d.). Chronic diarrhea may cause significant pain, dehydration and associated problems, and even death if not treated properly. Studies have shown chronic diarrhea to be significantly associated with stress. (Chang, 2011). Co-morbidity with mood disorders such as anxiety and depression is common, with accumulating evidence indicating a role for a maladaptive stress response in irritable bowel syndrome (IBS). (O'Malley, Quigley, Dinan, & Cryan, 2011; Sapolsky, 2004). Further, it is known that changes in gastrointestinal function are mediated by stress-induced secretion of corticotropin-releasing factor, and associated inflammation and immune activation are implicated in the generation of IBS symptoms (O'Malley et al., 2011), and also in significant increases in visceral sensitivity. (Kanazawa, Hongo, & Fukudo, 2011). Other manifestations of gastro-intestinal problems include anorexia and weight loss.

Finally, infant mortality is associated with chronic stress in nonhuman primates in labs and indicates poor welfare. Laboratory captive-bred nonhuman primates are often prematurely weaned or taken from their mothers by coercion or force at infancy, bottle fed by one or more humans, and experience irregular peer socialization and little to no adult same-species interaction during infancy/childhood. Studies have shown that "[i]nfant mortality can be related to parenting behavior in many primate species." (Bloomsmith et al., 2003). Infanticide has been seen in the wild at times of socio-ecological stress. In the laboratories, the stress of captivity could also be a factor. (Capaldo & Peppercorn, 2012).

While sanctuaries are able to alleviate the psychological harm caused in laboratories for the small number of primates who are rescued, unfortunately these severe injuries

can never be completely erased. Thus, the prevention and minimization of such injuries is critical. As explained by Gloria Grow, Founder and Director of the Fauna Foundation, home to many primates retired from laboratories:

> Despite their many years living a sanctuary life, the time spent at the laboratory has forever scarred them, and they still suffer, psychologically, behaviourally and physiologically. All the primates at Fauna display some form of abnormal behaviour. Some pace, circle, and spin; are shy, nervous, and flee frantically when people approach or walk into the room; some cover their eyes with their hands; some carry/hold inanimate objects close to their chest refusing to give them up; some masturbate with inanimate objects while showing no interest in or ability for normal sexual interaction with conspecifics; some show unprovoked aggressiveness towards conspecifics and/or an inability to respond appropriately to normal circumstances; others display phantom limbs, leading to self-injurious behaviours like self-biting and other stereotypic behaviors that can be triggered by any change in their environment, no matter how positive, when new people approaching, or in response to other unidentifiable stimuli to which they react with excessive vigilance and terror. These traumatic injuries, while vastly mitigated by the safety and stimulation of life in sanctuary, are unfortunately at best dormant, continually threatening to be re-stimulated.

(Declaration of Gloria Grow at ¶ 4, Exhibit 28).

In summary, the key criteria for promoting the psychological well-being of primates must be an *absence of behavioral or affective symptoms of stress, trauma, and/or accompanying physical maladies of a psychogenic nature*. If an animal in a lab continually exhibits such symptoms, then the lab is not operating in a way that promotes the psychological well-being of the primates in its care. Again, such symptoms include, but are not limited to, stereotypic behavior, self-mutilation, post-traumatic stress disorder, learned helplessness, withdrawal and depression, persistent diarrhea, infant mortality, hyper vigilance, anorexia, and excessive aggression.

A proactive approach to promoting the psychological well-being of these primates is imperative. As the APHIS Animal Care's Primate Environment Enhancement Team succinctly explained, the claim that laboratories' "environment enhancement programs are adequate because there are no

distressing behaviors or appearances of ill health with [the] primates. . . is a short-sighted view since *waiting to improve a minimally enriched environment until a primate starts showing signs of psychological distress was not the intent of the Animal Welfare Act.*" (Animal and Plant Health Inspection Service, 1999). The Team stated that the intent of the AWA was "to provide nonhuman primates with the opportunity to express a wide range of non-injurious, species-appropriate behaviors" and "to re-emphasize attention to adequate environmental conditions before abnormal behaviors develop." (Animal and Plant Health Inspection Service, 1999).

The USDA must actively address the AWA mandate for a standard to promote the psychological well-being of primates. Unfortunately, the current lack of clear, enforceable minimum standards to accomplish this objective has contributed to the proliferation of severe maladaptive behaviors and other psychosocial and cognitive symptoms in nonhuman primates that are held in captivity.

C. Examples of Nonhuman Primate Suffering

The lack of any meaningful psychological well-being standard has permitted the prolonged, significant, and unnecessary suffering for thousands of primates held in U.S. labs. Unfortunately, because the vast majority of cases involving the disregard for the psychological well-being of primates in labs are *not* publicly documented, the examples provided here are just the tip of the iceberg.

Recent examples of psychological distress, for which none of the facilities appear to have been fined or faced disciplinary action from the USDA,[8] include:

- A February 2012 inspection report for Virginia Commonwealth University notes, "Numerous animals in the primate colony participating in protocol AM10123 have areas of hairloss on their bodies, possibly due to overgrooming. In nonhuman primates, overgrooming can be an indicator of psychological distress. There is not sufficient evidence that personnel have fully recognized and addressed this problem." (Exhibit 29).

- A September 2011 inspection report for Washington University School of Medicine notes, "There were two adult, male macaques ('Mason' and 'George') with excessive hair loss on their arms. 'Mason' was missing approximately 85% of the hair from the front

[8] These inspection reports and additional violations can be found using the Animal Care Information System Search Tool at <http://acissearch.aphis.usda.gov/LPASearch/faces/CustomerSearch.jspx>.

half of his forearms. Documentation from 25 July 2011 noted that he was 'plucking' so his enclosure was changed back to a previous orientation (horizontal as opposed to vertical) in an attempt to decrease his stress. There was no documentation since that date showing the animal received any special attention with regards to the enhancement of his environment, although his behavior was still resulting in hair loss. 'George' was missing approximately 95% of the hair from the front half of his forearms. A clinical record documented that he was 'plucking' but there was no treatment plan to correct the behavior. There was no evidence that either of these animals was provided with any additional enrichment beyond the standard enrichment that all the adult macaques in the room were receiving. Hair plucking is a common sign of distress in nonhuman primates which may decrease with enhanced psychological enrichment." *See* Exhibit 30 for the report and USDA photographs of the macaques' living conditions.

- A July 2011 inspection report for the University of Kansas Medical Center states that there were "two animals with excessive hair loss…Neither animal was currently under a treatment plan at the time of the inspection." *See* Exhibit 31 for the report and USDA photographs of the primates' living conditions.

- An August 2010 inspection report for Drug Research Laboratories in Pennsylvania states, "The environment enhancement plan for the facility states that the animals will receive some type of fresh fruit or vegetable daily. The plan is not being followed. According to the enrichment logs reviewed the 16 animals are only receiving fresh produce twice a week." (Exhibit 32).

- A July 2010 inspection report for Boston University states, "Protocol AN-14560, which has been closed since Dec. 2009, used Nonhuman Primates (NHPs) that were housed individually in isolation chambers which provided limited inter- and intra-species interaction with light cycle changes which for 3 month periods included constant dim light. Two animals were reported as having behaviors indicating psychological distress in their health records and behavioral assessments in the form of hair plucking (2/06 and 11/07) and various stereopathic displays (10/06-4/08). Based on the facility's Plan for Environmental Enrichment for NHPs these animals should have been put on special enrichment or removed from the study." (Exhibit 33).

- A July 2010 inspection report for the University of Nebraska Medical Center notes, "At least one singly housed, nonhuman primate (Animal #70193) was observed to somersault

at least six times, then rock back and forth numerous times, then somersault at least six times during the inspection. These stereotypical behaviors are indicative of psychological distress, and therefore the facility must provide this animal with special attention regarding environmental enhancement. According to the facility's Nonhuman Primate Behavior Management Program, primates showing signs of psychological distress will be placed on 'special enrichment protocols' which will provide 'increased positive social interaction with human caretakers on a daily basis, and increased environmental stimulation and variation.' The facility was unable to present documentation that this animal was receiving additional environmental enhancement." (Exhibit 34).

- A November 2009 inspection report for the University of California, Davis notes, "Animal 34313 had an extensive history of medical issues including gastrointestinal (GI) problems, numerous injuries, and self-injurious behaviors (SIB), and yet it was placed on four studies before being euthanized. The animal was placed on the fourth study despite the progressive worsening of medical and behavioral problems that lead to unnecessary discomfort, distress and pain to that animal. The animal was sedated 15 times between the third and fourth studies. Veterinary staff questioned the suitability of the animal for study on 11/5/07, noting moderate hair loss of the arms and legs with a few scars they suspected were caused by biting or hair picking, as well as a history of gastritis. Between that date and the date the animal was placed on a fourth study on 2/11/08, the medical record noted two episodes of vomiting, a suspected hole in the trachea, and self injurious behavior that prompted the staff to sedate the animal for examination due to blood in the cage. On 1/30/08 staff found excessive blood in cage. The 7.2 kilogram animal was sedated and found to have an approximately one centimeter laceration to the penis. The facility began pharmacologic intervention of the SIB on 2/7/08, four days prior to starting the fourth study. The animal continued the SIB over the course of the study. The animal was sedated an additional 16 times between the beginning of the fourth study on 2/11/08 and 8/13/08, primarily for study purposes. On 8/8/08 staff noted that the 'Monkey appears to become agitated during observations. Agitation appears to lead to increase mastirbatory behavior thus causing the bleeding observed.' Pharmacologic treatment was changed after this entry and on 8/13/08 the bleeding reoccurred. The animal was sedated, a one centimeter laceration of the penis was sutured, and the animal's hands were bandaged to keep it from further self-mutilation. The animal removed one of the bandages and bleeding at the site continued to be noted in the record intermittently. The facility decided to euthanize the animal a few days after the end of the fourth study. According to the daily observations, the condition of the animal had not worsened just

prior to euthanasia and appeared to be in similar condition at the end of the study as it was at the beginning of the study." (Exhibit 35).

5. Adverse Effects on Scientific Results and Validity

Chronic stress and psychological suffering not only severely impact primates' well-being, but also impair their physiological suitability for research. The severe stress that laboratory life imposes on primates and the physiological responses to such psychological, cognitive, and social stress confounds research data and calls into serious question the validity of any research results. This section discusses how the physical manifestations of stress can adversely affect research results. For further details, please see Exhibit 36.

The stress experienced by primates undeniably adversely affects the experimental results derived from such research. (Balcombe et al., 2004). The impact of stress on immunological and inflammatory responses is critical, as these alterations exacerbate and compound crucial immune differences that already exist between humans and other animals. (For a discussion and references *see* Bailey, 2011; Baldwin & Bekoff, 2007).

For example, genomic duplication is one of the most significant causes of genetic variation among primates (Armengol, Knuutila, Lozano, Madrigal, & Caballin, 2010), and at the root of many aspects of diversity between and within species. It differentially affects many human and chimpanzee genes involved in immune and inflammatory responses. (Perry et al., 2008). Indels (genomic insertions and deletions) also affect major histocompatibility complex (MHC) genes that are critical to immune responses and are associated with differences in the handling of various infections including HIV, hepatitis B and C viruses, and the malarial parasite Plasmodium falciparum, as well as in differing susceptibility to autoimmune diseases. Additionally, the greater abundance of inhibitory Siglecs in chimpanzees dampens chimpanzee immune responses relative to humans, which may be further impaired as a result of psychological stress. This may explain species differences in diseases that involve immunopathology, including HIV, hepatitis C, asthma, psoriasis, and rheumatoid arthritis. (Soto, Stein, Hurtado-Ziola, Hedrick, & Varki, 2010).

Published literature warns, for example, that "animals subjected to the environmental changes that occur during transportation…react with changes in their physiology, such as body weight, plasma hormonal levels, heart rate and blood pressure changes…When measurements of physiological parameters are performed using conventional measurement techniques, the results must be interpreted with caution as these conventional techniques also have effects on the animals." (Capdevila, Giral, Ruiz de la Torre, Russell, & Kramer, 2007). Most important,

"Suffering in animals can result in physiological changes which may increase the variability of experimental data." (Capdevila et al., 2007; National Research Council Committee for the Update of the Guide for the Care and Use of Laboratory Animals, 2011).

Kozorovitskiy et al. (2005) showed how "environmental complexity influences the structure and biochemistry of adult nonhuman primate brains." The authors reported that "the structure of the adult primate brain remains highly sensitive even to modest levels of experiential complexity. For adult primates, living in standard laboratory housing may induce reversible dendritic spine and synapse decreases in brain regions important for cognition."

Many scientists are well aware of the effects of psychological suffering on research, and have cautioned against disregarding such impacts. (*See, e.g.,* Brenner, Cohen, Ader, & Moynihan, 1990; Mason et al., 1968; Roberts, Soames, James, Gill, & Wheeldon, 1995). Yet, although the negative effects of pain, stress and distress, and their adverse influence on study outcome have all been acknowledged, such effects are nevertheless often either not reported or underreported in published scientific papers. (Reinhardt & Reinhardt, 2000).

6. Conclusion

As set forth in this Rulemaking Petition, the Secretary has the authority and responsibility under the AWA to issue defined criteria for the environmental enrichment and psychological well-being of nonhuman primates. This Petition requests that the Secretary perform the following actions:

1) Include in AWA implementing regulations the NIH-accepted recommendations for ethologically appropriate environments for chimpanzees as accepted by NIH;
2) Adopt clear regulations for ethologically appropriate environments for all primates using NIH's recommendations for such environments for chimpanzees as a baseline, with species-specific modifications for other primates, and;
3) Adopt regulations for determining how and when chimpanzees and other primates exhibit psychological distress and what "special attention" must be brought to bear to ameliorate these symptoms.

As also explained, if an animal in a lab continually exhibits these symptoms, then the lab is not operating in a way that is in compliance with the AWA requirement for a "physical environment adequate to promote the psychological well-being" of such animals. (7 U.S.C. § 2143(a)(2)(B)). If repeated violations occur and maladaptive behavior(s) continue unresolved, the primate exhibiting such behavior(s) should be removed to the care of a sanctuary where it can be psychologically rehabilitated.

As stated by APHIS's own Animal Care Primate Environment Enhancement Team, "USDA inspectors have found that many current enhancement programs are narrow and address only one or two aspects of the animal's life. To correct this problem, USDA must stimulate the addition of diverse environmental elements that can promote a wider repertoire of species-appropriate behavior." (Animal and Plant Health Inspection Service, 1999).

As further explained by Lynn Cuny, Founder and President of Wildlife Rescue & Rehabilitation, "Since the primates at Wildlife Rescue who were formerly in labs all come from legally sanctioned settings, and since so many arrive in poor psychological condition, it is apparent that present regulations and/or enforcement are inadequate to meet the animals' psychological and behavioral needs. Both observation and an abundance of scientific studies of primate cognitive, emotional, psychological, and social characteristics reveal that *the conditions which they*

experience in laboratories are consistently contrary to their nature and innate needs." (Declaration of Lynn Cuny at ¶ 6, Exhibit 37, emphasis added).

As discussed in this Petition, there is precedence for interagency cooperation between NIH and USDA to implement the AWA. The adoption of NIH's ethologically appropriate environment guidelines for all primate species would help rectify the current problems with implementation and enforcement of regulations, and assure that research facilities are meeting the 1985 AWA mandate that the agency issue standards to promote the psychological well-being of primates.

Implementing specific minimum standards to enforce the AWA's mandate for psychological well-being would be in the best interest of the primates, USDA inspectors, laboratories, research, and the public, which expects and relies upon the USDA to effectuate the AWA mandate.

Newton at Fauna Sanctuary © NJWight

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