Human-Animal Bonds in the Laboratory: How Animal Behavior Affects the Perspective of Caregivers

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Abstract

Experiencing the human-animal bond in the laboratory context can potentially improve the quality of life of animals as well as increase job satisfaction for animal caregivers. With today's centralized facilities, caregivers generally focus entirely on providing routine care for animals without involvement in experimental procedures. Results of responses to a detailed and open-ended survey of 16 caregivers and five campus veterinarians at seven University of California campuses are presented, in addition to six interviews of additional caregivers and veterinarians. The survey revealed that these individuals became caregivers because of their attraction to the animals. Positive interactions with the animals were highly rewarding. Approximately half of the caregivers reported feeling less attracted to mice than other species. Job satisfaction could perhaps be increased by offering seminars for the research team that would include the caregivers and providing support related to animal deaths and euthanasia.

Key Words: animal; behavior; cats; dogs; euthanasia; mice; rats; well-being

In past decades, scientists usually assumed the caretaking responsibilities for their laboratory animals. With other staff, they not only performed experiments but also provided daily care and cleaned the cages. Such personnel were often in an ideal position to note fluctuations in the behavior of the animals. An important but gradual change in policy has been to shift away from small animal units toward centralized housing and care of most animals within an institution in an effort to provide required veterinary guidance and improve oversight. As early as 1963, the Institute for Laboratory Animal Research (ILAR[1]) (originally the Institute of Laboratory Animal Resources) offered guidance in the care, housing, and husbandry of vertebrate animals by, for example, publishing the *Guide to the Care and Use of Laboratory Animals* (NRC 1963). In subsequent years, changes were made in the Animal Welfare Act, leading to more centralized facilities; and numerous revised editions of the *Guide* were published (NRC 1965, 1968, 1972, 1978, 1985, 1996; Sideris et al. 1999).

With the more centralized vivaria that are typical today, the husbandry of the animals at many institutions is provided by a team of veterinary specialists and laboratory animal caregivers who have little direct participation in the use of the animals for research or teaching. The research scientists plan the experimental procedures with their team members, who interact with animals only during those relatively brief periods when a specific procedure such as surgery or a behavioral test is being conducted. After the procedure, the animals are returned to their usual caging area where they again experience the routine daily care the caregiving team provides. Thus, for the most part, one group of individuals conducts the research or teaching procedures and a different group of individuals provides daily care.

Depending on the specific animal use protocol, members of the research team may have little opportunity to develop a close awareness of individual differences among their animals. In contrast, caregivers have daily contact with their animals when they experience the behavioral repertoires of conscious animals. Caregivers sometimes assume responsibility for specific groups of animals, overseeing them for long periods of time and establishing relationships with some of them. The caregivers' work plays a central role in ensuring the ongoing comfort of the animals.

Interesting contrasts exist with regard to the most essential issues for animal well-being. One position, on which the National Institutes of Health and ILAR concur (NRC 1996), emphasizes the importance of the care, housing, and husbandry of animals in laboratories, noting that these factors are important for the animals' well-being as well as essential for obtaining reliable scientific results (Sideris et al. 1999). Similarly, Policy 12 of the Animal Welfare Act (USDA 2000), which the Animal and Plant Health Inspection Service of the US Department of Agriculture administers, requires consideration of refinement of animal care along with the alternatives of reduction and replacement. An active research area in animal welfare focuses on such issues as specific preferences of animals, including mice, regarding their husbandry, caging environment, and social contact (e.g., Van Loo et al. 2001).

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[1]Abbreviations used in this article: ILAR, Institute for Laboratory Animal Research; NHP, nonhuman primate; UC, University of California.

Despite the available research literature on refinement of animal care, discussions of the assessment of well-being of animals often focus on minimizing the acute impacts of certain procedures or interventions, or accurate measures of the impacts (Mellor and Reid 1994), including specific consideration for particular species. Many discussions of refinement to ensure animal comfort focus on pain and distress associated with procedures applied to the animals, as seen in the many publications that address animal pain or suffering (e.g., Crawford 2000; Dawkins 1980; Fraser 1984/85; Hellebrekers 2000; NRC 2000; Rollin 1998). A similar emphasis is evident in studies of the culture of animal caregivers. The most well known of these studies are Arnold Arluke's ethnographic studies of the culture of scientists and technicians who work with animals. His focus includes individuals who, although not researchers, are involved in carrying out scientific treatments as well as husbandry tasks (Arluke 1989, 1990). His writings emphasize the juxtaposition of technicians' complex feelings for their animals, including guilt and affection for animals that are treated to some extent as pets (Arluke 1992). Although he mentions caregivers among the individuals he interviewed, he more typically focuses on researchers and technicians.

Taking a different tack, Wolfle (2000) emphasizes the importance of the daily routines animals experience, pointing out that stress results from both experimental and nonexperimental sources. He notes that the nonexperimental sources of stress may occur throughout each day and be more disturbing in their total impact than a brief intervention. What is usually not emphasized is that these nonexperimental, more frequent, and routine interactions with the animals usually are with the caregiving staff, not the research team. For example, the quality of the caregivers' handling techniques can help habituate the animals to procedures for changing cages or drawing blood, which can decrease the level of fear and stress the animals experience in subsequent procedures with other people. In correspondence to the latter perspective, this article focuses on the interactions of the caregivers, who have little involvement in the research with laboratory animals.

Caring treatment of nonhuman primates (NHP[1]) has been emphasized elsewhere and thus will not be addressed in this paper. NHPs are given special consideration in the Animal Welfare Act, and they receive strong emphasis from the general public. For many years, the work of Viktor and Annie Reinhardt has focused on creative methods for addressing the needs of NHPs; and they have recently depicted a broad approach toward environmental enrichment for rhesus macaques photographically (Reinhardt 1990; Reinhardt and Reinhardt 1991, 2001). Many of these techniques have more general application that could be applied to other species.

We take for granted in this article that the routine interactions of laboratory animals with caregiving staff are of central importance in assuring animal comfort (e.g., Figures 1-3). The quality of these interactions involves the knowledge and motivation of the caregivers and can lead to improved animal health. As an example, simply petting and talking to rabbits was found in one classic study to lessen the extent of their diet-induced atherosclerotic lesions (Nerem et al. 1980). We sought to extend our understanding of the nature of caregivers' perspectives on their interactions with laboratory animals by examining, contrasting, and comparing the research literature with responses to questionnaires and interviews with caregivers and head veterinarians at some University of California campuses, as described below. This project, which explored the rewarding aspects of the caregivers' relationships with animals in the laboratory, characterizes the features of the work with animals that they valued as well as situations they found were especially challenging. Inasmuch as relationships are composed of behavioral interactions, we also focused on specific behaviors that could be rewarding to the caregivers and would reveal both the comfort level of the animal and the animal's acceptance of the caregiver (after habituating to the person).

Relationships Between Caregivers and Animals

Human Perspectives on the Sentiments of the Animals

Humans cannot, of course, directly experience or interpret the feelings and thoughts of animals. However, just as owners of companion animals can judge the well-being of their pets, caregivers of laboratory animals are empathetic with their animals and, in dealing with them on a daily basis, acquire a sense of the preferences and desires of animals. In short, they come to believe that they know something about how a particular animal feels. These impressions of caregivers are supported by studies of Hank Davis and his group on the behavioral preferences of animals, in which they found that a variety of species have the ability to discriminate between individual human beings (Davis 2002). Furthermore, these animals frequently demonstrate a preference for a particular familiar person, which has been documented with sheep (Davis et al. 1998) and rats (Davis et al. 1997), among several other species. In the case of rats, the preference continued to be retained after the person had been absent 5 mo, providing evidence that social information is important and conserved by rats. Additional evidence that rats value their relationships with humans is the fact that a rat will work to be petted by a care-giving person (Davis 1996, p. 70). Studies in this area clearly document that many animal species not only distinguish and prefer familiar humans rather than unfamiliar ones but that they also seek out interactions with people.

The differential responsiveness of animals to particular or known caregivers could serve as an asset in scientific work by easing handling and cooperation of the animal, as suggested by the Reinhardts (Reinhardt and Reinhardt 2001). Others, however, have viewed a special relationship more as an obstacle and have sought to train the animals

Figure 1 A technician gathers (A) rose petals and (B) grape leaves before checking two young fawns. (C) After a few weeks of her care, they have habituated to her and approach her to take food. (D) It is extremely rewarding to her when a fawn shows affection. These fawns are used to introduce veterinary students to handling procedures with some wild ungulates; the habituation decreases the stress for the animals. Preferred and varied foods can enhance the quality of life of many species.

enough to dampen the differential responses to caregivers or automate the testing and care procedures in an effort to remove responses to humans as a variable (Dewsbury 1992).

Human Sentiments and Experiences of Intimacy with Laboratory Animals

Many people find it extremely rewarding to work with animals. Thus, humane societies and animal shelters often are able to offer modest salaries and still retain highly qualified and motivated employees. These institutions, as well as zoos, veterinary clinics, and assistance dog organizations, may also benefit from the large number of volunteers who offer their time because they greatly enjoy being with animals. In these varied contexts, special relationships may develop when animals are given extra care (McBride 1993, p. 151). Laboratory technicians provide care to animals and also receive the animals' affection (Stephens 1996, p. 61), both of which contribute to building a close bond. Thus, working with laboratory animals potentially offers similar rewards to these other environments with animals.

For many people, the phrase "animals in laboratories" conjures up the intervening procedures that are sometimes involved in research studies. Arluke (1990, 1999) writes about the conflict that technicians may feel between their nurturing and the experimental manipulations they perform. However, the caregivers who are responsible for the daily care of these animals are likely to carry a different mental picture, which emphasizes the daily living situation of the animal, rather than an occasional procedure that accounts for only a tiny proportion of the time the animal spends in the laboratory setting.

Figure 2 Young puppies already are learning a few commands such as sit. The up-turned buckets offer a more convenient height for the technician in working with the small puppies. Habituation and some training facilitate handling dogs in the laboratory.

It is sometimes claimed that the most popular (not numerate) small animal used in scientific research is the laboratory rat. Two negative responses of rats that detract from their popularity are freezing and biting, emotional behaviors that are affected by handling. Gentle handling of rats can reduce emotionality so that the rat then can more readily perform a required experimental task (Daly 1973). Maintaining the tame docile behavior characteristic of laboratory rodents may in fact fulfill one criterion of a successful maintenance environment because animals showing low levels of reactivity may be more comfortable than those showing high levels (Galef 1999).

Relieving the Stress of Dealing with Animal Death

Although caregivers spend most of their time offering care and comfort to animals, they also sometimes face the emotional challenges of performing euthanasia and accepting animal death. A comprehensive resource (Lagoni et al. 1994) is available and offers guidance in dealing with animal death. The book, which is based on extensive experience in dealing with veterinary clients and their pets, provides scripts for helping people through such crises, and also includes phrases that should not be used. Stewart (1999) has recently contributed a veterinary perspective on companion animal death. In the laboratory, offering a service to acknowledge the contribution of animals to excellence in research and teaching encourages an attitude of respect for the animals (Taylor and Davis 1992). Although unusual in North America, such a practice is conventional in the Buddhist or Shinto religion in Japan, as a mark of respect and form of honoring the contribution of the animals (Iliff 2002). After one such annual Shinto ceremony, one participant explained, "Then you feel clean" (S. Kondo, Hokkaido University, Japan, personal communication, 1995).

Figure 3 Mature dogs are maintained as blood donors. It continues to be easy to work with dogs when they are handled regularly and when technical staff and students take them for walks.

For animal care personnel and technicians, various situations, especially animal death, can lead to sadness for the animals or for others who grieve (Arluke 1996). Other individuals who seem unsympathetic or callous, who exhibit a lack of concern, can be a source of anger or frustration to anyone working in a situation in which euthanasia occurs (Hart and Mader 1995). The emotional consequences of conducting euthanasia in animal control shelters is acknowledged to be stressful; a nonprofit association for euthanasia technicians, the MAZER Guild, publicizes 12 supportive concepts (MAZER Guild 2001). Indeed, a particular type of stress is associated with jobs that require killing animals for reasons other than alleviating pain and suffering (Rollin 1986-1987). Euthanasia or having things go wrong can be a source of guilt (Stewart 1999, p. 162-163). In veterinary clinics, such upsetting occurrences are sometimes addressed in scheduled weekly support meetings (Hart et al. 1990). For the grieving person, some ritual or ceremony marks the occasion and can provide comfort (Iliff 2002; McNicholas and Collis 1995).

Ensuring the Comfort of the Animals

Many people equate the stress of animals with pain, and they regard absence of pain as good welfare. Others emphasize the importance of the ongoing quality of life and comfort. For example, Wolfle (2000) highlights the five methods of avoiding stress for animals as set forth in the National Research Council 1998 (NRC 1998) report: providing them appropriate social companionship; offering them opportunities to engage in behaviors related to activities that are species appropriate; providing housing that permits suitable expression of behaviors; encouraging positive interactions with personnel; and ensuring freedom from unnecessary pain or distress. Most of these methods relate to daily care and husbandry rather than experimental procedures.

Some perspectives on the welfare of farm animals may have relevance. Hemsworth and Coleman (1998) examine the importance of farm animal caregivers in their classic work, which points to the central role of the caregiver and the nature of handling that influences the stress and productivity of animals. They emphasize the importance of the stockperson being a professional, with appropriate skills, knowledge, and status. Among important considerations are appropriate selection and training for individuals with appropriate skills and knowledge, personality, motivation, and commitment as well as low absentee and turnover rates. The caregivers' behavior can affect animals that fear humans. Hemsworth and colleagues (1993) have found that an animal that fears being handled may experience a series of acute stress responses or a chronic stress response, which adversely affects the animal's welfare.

Some caregivers choose to spend free time with their animals because they enjoy it and feel that some animals need it. For example, NHP caregivers see their charges as having individual and appealing personalities, and they develop strong, nurturing bonds with their favorites (Arluke and Sanders 1996, p. 116-117).

Technical Requirements

Rose (1994) has reviewed a wide array of environmental variables that affect the quality of life of animals in laboratories, including temperature, humidity, light, sound, and air quality. She describes the importance of how the habitat is constructed and mentions ventilation, floor area, space, floor and roof construction, and bedding, as well as environmental enrichment. Finally, she emphasizes the importance of the social environment, including the human-animal interactions with caregivers.

For many rodents, the opportunity to retreat from light into a burrow is especially important (Glickman and Caldwell 1994). Mice will work to gain access to resources other than food, such as toys, shelter, bedding, running wheels, and increased space (Sherwin 1996a). Mice in one study preferred sleeping in sawdust rather than tubes, but they still repeatedly used the tubes for other purposes (Sherwin 1996b). With extensive barriers, the housing requirements for mice may limit their social contact with each other and with their caregivers. In addition, changing stations where caregivers wear gloves and use forceps limit human contact with the mice. The sounds of air filtration and the numbers of animals per room may also pose greater challenges for optimizing human-animal relationships for those working with mice. Individuals who work with mice as well as other species such as rats or guinea pigs should receive basic instructions that include specific techniques for picking up and restraining the animals (Flecknell 1991). Humans' social contact with rodents is most effective when it mimics the rodents' intraspecific behavior (Dewsbury 1992).

Observations of animal behavior in shelters have provided useful information on the husbandry of dogs and cats. For dogs, specific details of cage design and the presence of chew toys exert large effects on the levels of activity and play and can reduce apparent boredom (Hubrecht 1995). The social behavior of male and female dogs differs both when they are with other dogs and with humans; the two sexes should be handled differently during placement into new social groups (Sonderegger and Turner 1996). Among cats, those that were not socialized toward people were more stressed than those socialized toward people whether they were housed singly or in a group (Kessler and Turner 1999b). Cats that were housed singly with a floor area of $1.0m^2$ had lower stress levels than those in cages with a floor area of $0.7m^2$ (Kessler and Turner 1999a).

Perspectives of Caregivers on Relationships with Animals: Survey Results

To gain some perspective on the experiences and preferences of caregivers working in laboratories located on University of California (UC[1]) campuses, we designed and made available through the campus veterinarians a five-page questionnaire that was to be returned anonymously. We were interested in the personal responses of caregivers to different species and endeavored to learn what is especially rewarding and motivating to the animal caregivers in their positions. Given that animal death is difficult for anyone, we wondered what buffers these experiences.

Male (n = 7) and female (n = 9) laboratory animal caregivers representing five UC campuses provided information concerning their work assignments, preferences for species and activities, and experiences with animals. Most of them included expository notes explaining details related to their responses. The UC Davis campus, which has the largest vivarium among the nine campuses, was best represented, with five participants. Campus veterinarians of five campuses offered administrative perspectives in writing. We interviewed an additional six caregivers and veterinar-

ians. The resulting information includes responses from seven of the nine University of California campuses and represents qualitative information similar to that provided in focus groups.

The number of responses represents a low response rate, despite the fact that questionnaires were readily available. We suspect that the responses represent the views of particularly motivated and articulate leaders of the animal caregiver community and that their recommendations may also represent other caregivers' experiences and feelings. Especially in the major urban areas, the response rate may somewhat reflect linguistic and literacy challenges in communication with this community. Another factor that may have worked against participation was the length (five pages) of the questionnaire, as two of the responding campus veterinarians noted.

Environmental Enrichment and Special Care

According to caregivers, offering environmental enrichment expands the behavioral repertoire and interactions of the animals and provides them with increased comfort. Although standard operating procedures with these species do not specify environmental enrichment, more than half of the caregiver respondents described offering various types of environmental enrichment. These practices rest on the initiative and job satisfaction of the caregivers; they increase positive interactions with the animals.

Caregivers offered the following items for enrichment:

Mice: Commercial nesting material, toilet paper rolls, and sunflower seeds
Rats: Tubes, hay, and boxes
Rabbits: Hay, PVC pipe, cans, wood blocks, apple, carrot, alfalfa, balls, and an exercise room
Pigs: Various chew toys, large balls, apple, and carrot
Dogs: Various chew toys, Kong toys, balls, dog bones, biscuits, and walks
Chickens: Perches
Marine mammals: Toys, ice, live foods, kelp, access to new environments, rub ropes, and tactile and playful interactions

One man who cares for rabbits, rats, and mice described the challenge as "keeping animals interested in life." He said that he enjoys putting the rabbits on the floor with some hay because he believes they need some enrichment. Enrichment rooms are offered on several campuses, for cats, rabbits, or dogs. The animals are turned loose to play, use toys that are provided, and, in the case of rabbits, play in hay.

The talents of caregivers involve creative thinking. Working with postsurgical goats, one technician tried to attract the goats closer by offering grain. When that method was only partially successful, she used a pet dog to serve as a lure for the goats. Noticing that the goats were not healing quickly, the technician constructed a garment that afforded protection from scratching, and the healing proceeded faster (Eisele and Allen 2001). This example characterizes the special initiative that excellent caregivers manifest daily. Another technician, who noticed that the dogs were rather hot outdoors during the summer, proposed the inexpensive solution of installing misters to help cool the dogs. In the words of one caregiver, "The most rewarding thing is when 'your animals' recognize you and obviously enjoy your presence."

Job Satisfaction and Species Preferences

Respondents reported a high level of job satisfaction, with a median score of 6 on a 7-point scale. All but one respondent planned to continue working in this ("permanent") career. A woman who cares for rabbits, cats, ferrets, rodents, and frogs found rewards in "seeing how happy the animals are; watching them play, stress free; the enjoyment they get when they see me everyday." Three of the men emphasized the rewards of contributing to the research. One respondent said, "I feel good because sooner or later the research is going to be good for everybody." The three marine mammal trainers had maximal job satisfaction, and their descriptions capture their peak human-animal experience. One woman wrote, "Working with these animals has been the most rewarding thing I have ever done in my entire life. It has caused me to put off personal goals I had thought I would be working on by now, such as raising a family. I still plan to accomplish this goal but feel that the animals need me more right now."

Respondents overwhelmingly described their primary motivation for working with research animals as an interest in animals. A secondary emphasis for some was an interest in research, and minor emphases were on financial aspects and future opportunities. Participants were consistent in generally liking rats, although one person was extremely allergic to rats and disliked them. Eight individuals mentioned preferring rats particularly. Other preferred species in order of mention were cats, dogs, rabbits, ferrets, and mice. A few mentioned not wanting to work with primates, sometimes to limit their emotional involvement to a manageable emotional point, a process that Arluke (1989) has described. Six participants singled out mice as a species they do not like. One person who reported not liking mice as much as other species was still enthusiastic about working with them; she had full responsibility for managing the breeding of this colony and enjoyed that task a great deal. Half of the respondents reported spending some personal time petting, feeding, and playing with some species, including rabbits, rats, mice, dogs, cats, marine mammals, and ferrets.

Almost invariably, the person's attitude to each species improved as a result of experience with the species. They attributed these changes to the animal's personality, the experience of handling the animal, observing the animal, providing behavioral or social enrichment, and training the animal. They attributed their negative experiences as iso-

lated instances of having too little time per animal, having to restrain the animal, and getting bitten or attacked. One person had developed severe allergies that precluded her from working with mammals.

Job Enhancement

Half of the participants reported opportunities for animal adoption (usually of dogs and cats and occasionally goats, rabbits, and rats) on their campuses. Two participants alluded to animal adoptions only seldom and with difficulty, and three others reported no adoptions. These data suggest that caregivers may not be fully aware of the adoption programs that exist. The campus that initially developed a model program for adopting out animals, UC San Francisco, still places animals through a local humane society. The designer and founder of this program wrote that a primary benefit was in providing a potential alternative to euthanasia, thus raising employee morale and decreasing stress (Wyrick 1996). Her interviews with staff members confirmed that even a few adoptions helped caregivers cope with the killing of other animals. One person in our study expressed that adoption represents an important second chance for some animals. Another expressed relief at being able to deliver live rodents to be used as food at a raptor facility, and avoiding the need to perform euthanasia on those rodents.

Half of the participants mentioned that they would like to receive more information about the research program in which the animals are involved, through seminars or continuing education. This information would help caregivers feel included in the project and receive assurance of the importance of their work. Some respondents also linked the essential importance of the research to some relief from grieving. One campus veterinarian emphasized the importance of caregivers being a part of the full research team, serving as a community in which the caregivers' work is valued and considered integral to the project. Having caregivers assume responsibility for their own animals, rather than cross-training them in various projects, was more effective in building a supportive research team. However, because monotony and boredom are difficult to avoid in repetitious tasks, providing some variety of species or daily routine has merit.

Dealing with Attachment and Loss

The death of animals was a sobering subject for the caregivers. After 1 yr of experience, one respondent wrote, "There's no way to deal with death. I cry at home and tell them thank you." Another person with 5 yr of experience said, "We deal with deaths in our own way. Don't do it if there are problems with it." A woman with 18 yr of experience and a man who had worked 14 yr felt there was no way to cope except for the importance of research. Other advice was "Try not to get too attached," "Don't work with primates." These caregivers felt that help was not offered in the area of killing animals or coping with their emotions, and they seemed to feel that nothing could be done to soften this loss.

Respondents did not mention campus resources, which offer consultations with assured confidentiality. For example, the UC Davis Academic & Staff Assistance Program is available to all employees, and other campuses have similar programs. In former years, the availability of complimentary and confidential counseling with a private licensed counselor was well known at UC San Francisco (Carmack and Becker 1988; Spinelli 1996). Thus, although this opportunity is still available, awareness of it appears to have decreased. Caregivers would benefit from more active support in this area, at least by being fully informed and encouraged to use available avenues of support.

Administrative Challenges

Administrators face inevitable challenges in gaining optimal care for animals. Animal caregivers in the United States often begin their positions with little training, compared, for example, with those in the Netherlands, where a 3-wk course of training at Utrecht University is required as a minimum (Hart 1998). In addition, caregivers in the Netherlands and the United Kingdom generally have several years of academic preparation.

In urban centers of the United States, where a large majority of caregivers may not be native English speaking, linguistic limitations may pose hurdles for communication. Caregivers from other cultures sometimes require specific mentoring, as with individuals who lack previous positive experiences with dogs.

A small proportion of employees conceal their illiteracy, which poses additional problems to administrators seeking to improve animal care. When dealing with someone who conceals illiteracy, the manager may need to read aloud some key information, without making the reason obvious to the employee.

Among the various workplaces involving animal care, the laboratories of academic institutions offer salaries and benefits that often exceed those of humane societies and private veterinary clinics, which also differ from laboratories in their primary focus on dogs and cats. It would be interesting to know whether the most qualified applicants select a particular environment for providing animal care, but such information is not currently available.

Although many caregivers begin their positions with little previous formal training, on-the-job training is available. Employees are strongly encouraged to participate in the educational programs of the American Association for Laboratory Animal Science, which offers three levels of certification. Among other resources, videos on handling each species are accessible. One of the UC campuses offers a single seminar each quarter on each species. Participation

and examination may be required. It is more common for someone on the veterinary staff or an experienced staff member to mentor on a person-to-person basis, which constitutes an opportunity for modeling good procedures.

Management of employees is often a challenge for administrators. They also face dilemmas in decisions regarding the animals, for example, needing to balance the natural environment and behaviors of the animals with a pathogen-free environment. These problems increase with mice, because of the larger number of animals in a room, compared with the other species. More caregivers may work routinely in each room and feel less connected with the principal investigators. Caregivers may also feel considerable time pressure. Rather than enjoying their work with the animals, they perform robotic motions with so many mice. Inevitably, the relationship is usually not personalized.

Summary

Caregivers in animal laboratories generally find it rewarding and important to increase the comfort of their animals. With the current pattern of centralized laboratory housing, the responsibilities of caregiver and research technician generally are separate and are performed by different individuals. Most of the people who responded to our survey described above reported a high level of satisfaction in the workplace; however, some also mentioned sources of stress. Increasing the positive elements and providing greater support for the challenging aspects of their work can bolster the capability and motivation of caregivers to provide optimal care.

Four findings emerged in this study: (1) People are attracted by the animals to become caregivers in laboratories, which points to the importance of providing caregivers opportunities for rewarding interactions with the animals. (2) Opportunities that enhance the comfort of the animals and increase the performance of a full range of animal behavior increase the attractiveness of the species and job satisfaction for the person. (3) The attractiveness of mice is more limited than other species, perhaps partially due to their small size and the requirements of maintaining a barrier facility. (4) Caregivers perhaps would benefit from more evident support resulting from being included in the research group, being invited to attend seminars on the research project, and being provided options for the stress of euthanasia.

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