The Association of Primate Veterinarians & The European Primate Veterinarians

The Value of Nonhuman Primates in Research

The Association of Primate Veterinarians (APV) and the European Primate Veterinarians (EPV) recognize the vital role research using nonhuman primates (NHPs) has played, and continues to play, in improving understanding of NHP biology and of the diseases affecting both human and NHP health. The knowledge gained from research not only contributes to human and NHP health, but also to the conservation and preservation of NHPs in their natural habitats. APV and EPV are committed to using evidence-based approaches to advance the medical and behavioral care of NHPs to maximize their well-being, while facilitating the implementation of the 3Rs (Reduction, Refinement and Replacement) for humane research (Russell & Burch, 1959).

APV and EPV support the responsible use of NHPs in research. When NHPs are needed studies must include scientific justification, often written in terms of progressing fundamental understanding of NHP biology and benefits to human and animal health. Furthermore, APV and EPV believe such research should be appropriately regulated as well as being subject to ethical review and full implementation of the 3Rs, and that such research should only be conducted by those appropriately trained and competent to the highest contemporary standards of animal care.

The importance of NHP models in biomedical research has been recently documented, most notably by representative groups of scientific and medical experts (Anon, 2016) and individual eminent scientists (Gurdon et al., 2016). These articles highlight the contemporary importance of this research for continued progress in scientific and medical research and reinforce the position previously established by other experts and organizations (e.g. Passingham, 2006; Weatherall, 2006; European Academies Science Advisory Council, 2008; Hottiger & Zeller, 2015; European Commission – SCHEER, 2017). Additional online resources provided by research advocacy organizations provide compelling evidence for the historical and current importance of NHP research (e.g. Understanding Animal Research:  http://www.understandinganimalresearch.org.uk/; Foundation for Biomedical Research:  https://fbrresearch.org/).

Medical Breakthroughs Using NHP Models

The WHO/World Bank ‘World Report on Disability’ lists the diseases which trigger the most pain and discomfort, and negatively impact the quality of life of millions of people (World Health Organization, 2011). In those areas (including ophthalmology, strokes, diabetes, endometriosis, neurodegenerative diseases) as well as in infectious disease research, NHP models continue to be fundamental and critical components for scientific discoveries for both human and animal health.

NHPs remain unique translational models for understanding complex biological mechanisms in humans under normal and pathological conditions and for evaluating efficacy and safety of new drugs, treatments, vaccines, and diagnostic tools in targeted fields of research (e.g. Capitanio & Emborg, 2008; Bensmaia & Miller, 2014; Phillips et al., 2014; Rivera-Hernandez et al., 2014; ’t Hart et al., 2015).

Remarkable scientific and medical progress has been achieved which would not have been possible without research using NHPs (Anon, 2016). Vital work needs to continue if human and animal medicine is to meet existing health challenges (e.g. tuberculosis, malaria, AIDS, cancer, retinal
degeneration, autoimmune diseases) as well as understand, prevent, and treat contemporary health issues such as emerging, and re-emerging, infectious diseases (Ebola, Zika, influenza, etc.), neurodegenerative diseases, neuronal trauma, aging-related diseases, regenerative medicine (Daadi et al., 2014), and lifestyle-related diseases. In addition to continuing the basic research with NHPS which underpins many medical breakthroughs, there is a continued need for their use in future studies looking into the efficacy and safety testing of novel treatment or preventative modalities (i.e. vaccine development).

In addition to the sources cited above which outline advances in medical research where NHP research has proved critical, some recent specific examples are noted below to highlight breakthroughs which have the potential to significantly improve the quality of life and/or survival of both humans and NHPs:

- Treatment and vaccines have recently been developed for Ebola (e.g. Geisbert et al., 2010; Marzi et al., 2012; Qiu et al., 2014) which, in addition to saving human lives, provides hope for the survival of populations of wild NHPs, especially chimpanzees, bonobos and gorillas, threatened by Ebola outbreaks (Bermejo et al., 2006; Walsh et al., 2017).

- A genetic therapy for Parkinson’s disease has produced an outstanding recovery in NHP models of the disease (ProSavin®: Jarraya et al, 2009). It has also been successfully administered to human patients and showed significant improvement in motor symptoms for up to four years post-treatment (Palfi et al., 2002, 2014; Oxford Biomedica, 2015).

- At the opening ceremony of the 2014 football World Cup in Brazil a paralysed man in a robotic exoskeleton kicked the first ball of the tournament (Nicolelis, 2014; https://www.youtube.com/watch?v=fZrvdODe1QI!). This neuroprosthetic, from the Walk Again project, was developed with contributions from NHPs (Blakeslee, 2008; Ifft et al., 2013).

- The retinal prosthesis Argus II is the first device used in-clinic to restore minimal vision in blind patients (Humayun et al., 2012). It was made possible with preclinical trials on macaques to study the neuronal pathways of vision and the effects of neuro-stimulations (e.g. Tehovnik et al., 2009). Further NHP studies will be needed to increase the device’s effectiveness and to maximize the restoration of vision.

- NHP research has allowed recent scientific breakthroughs in stem cell therapy (Grow et al., 2016) and transgenic models of autism in monkeys (Liu et al., 2016).

**Supporting Ethical Research Using NHPs**

APV and EPV both recognize that research with NHPs may be controversial; having significant moral/ethical challenges with associated societal concerns. Working with NHP models is a privilege that should be subject to rigorous ethical and scientific scrutiny, and conducted in compliance with applicable regulations. Given the proven importance and validity of NHP research, APV and EPV support the continued, responsible use of NHPs in studies where the research is subject to ethical scrutiny, including the application of harm-benefit analysis and the 3Rs (Russell & Burch, 1959).

Veterinarians, veterinary technicians, animal care technicians, IACUCs and ethics committees, behaviorists/ethologists, physicians, and the scientists who conduct NHP research play key roles in
the improvement and application of best practices in housing, care, husbandry and experimental procedures. The continued development of improved research techniques and equipment designed to reduce or eliminate animal pain and distress (e.g. state-of-the-art anesthesia, analgesia, and pre-, peri- and postoperative care) is promoted throughout the laboratory animal community through objective scientific assessment. Comprehensive primate behavioral management programs informed by evidence-based data, including social housing, positive reinforcement training, human-animal interaction, food-related enrichment, and provision of enrichment devices are standard practices in modern NHP research and breeding facilities. These approaches in combination contribute to the improved well-being and health of the animal, and produce more reliable and consistent research results when NHP studies are performed. The members of APV and EPV are committed to maximizing the welfare of the animals under their care as members of a caring profession and to ensure the most valuable research outcomes.

It is important to highlight the contributions of NHP research, conducted under proportionate regulatory, ethical and scientific oversight. This will improve public understanding of the need for NHPs in research and help ensure its continued contribution to improving quality of life for both humans and animals.

References


