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2011–2012

Their Health Is in Your Hands

WILDLIFE SPONSORSHIP OPPORTUNITIES

2011 - 2012 Wildlife Health Is in Your Hands

Help us create a healthier tomorrow

Throughout the world, wildlife species are threatened by emerging diseases and other issues that affect their health and welfare—and many species that are critical to the ecosystem are on the verge of extinction. Morris Animal Foundation has established a strong reputation for addressing the health and welfare issues that threaten the very survival of many wild species worldwide. Our funding is critical to preserving the unique and beautiful species that populate the planet and make the world a more interesting place.

With your past support and the help of Betty White, one of our trustees and an avid wildlife study sponsor, Morris Animal Foundation has funded studies that have improved the lives of millions of animals. We've helped wild animals reproduce more successfully in captivity and in the wild. We've helped prevent the spread of infectious diseases. And we've helped improve the living conditions of animals in captivity.

Your sponsorship today could help save a species from extinction tomorrow

When you sponsor a wildlife study for $3,000 or more, you help ensure that your favorite animal—be it bird, frog, elephant, cheetah, turtle or dolphin—will survive and thrive. As a sponsor, you will receive progress updates throughout the length of the study, final reports, a thank-you letter from the lead scientist and recognition on the Morris Animal Foundation website and in printed publications that discuss your project.

Please call 800.243.2345 or email sponsorship@MorrisAnimalFoundation.org to choose your study that advances the health and welfare of wildlife.

Wildlife

Helping the world's wildlife survive and thrive

It takes a lot to thrive in the wild. Since 1967, your donor support has helped Morris Animal Foundation fund research that has advanced the health of our planet's wildlife—and, in some cases, has ensured the very survival of a species. Here are a few of the recent successes that have improved wildlife health and welfare.

Assessing the Health of Dolphins in the Gulf: In response to the 2010 oil spill in the Gulf of Mexico, the Foundation began funding a study to monitor the long-term health of about 160 bottlenose dolphins living in Sarasota Bay. While it's too early to predict the extent to which the oil spill will affect native wildlife, there is an urgent need to collect data on the dolphin population to better understand the situation.

Addressing Whale Health and Environmental Factors: North Atlantic right whales are one of the most critically endangered whale species in the world; there are only 400 in existence. With Foundation funding, scientists from the New England Aquarium uncovered important information about how toxins affect right whale health and reproduction.

Saving Reindeer in Mongolia's Mountains: About 250 seminomadic herders live with their reindeer herds in the area of Khuvsgol, Mongolia—and they rely on the animals for survival. The health of their reindeer has declined significantly, and Foundation-funded research identified emerging diseases affecting the reindeers' health.

Reducing Stress in Injured Birds: Rehabilitation of raptors sometimes involves stressful procedures. Researchers at the University of Minnesota used a new tool to assess stress-hormone levels and stress responses in injured free-ranging raptors. The information they learned will improve the management, health care and health outcomes of injured raptors throughout the rehabilitation process.

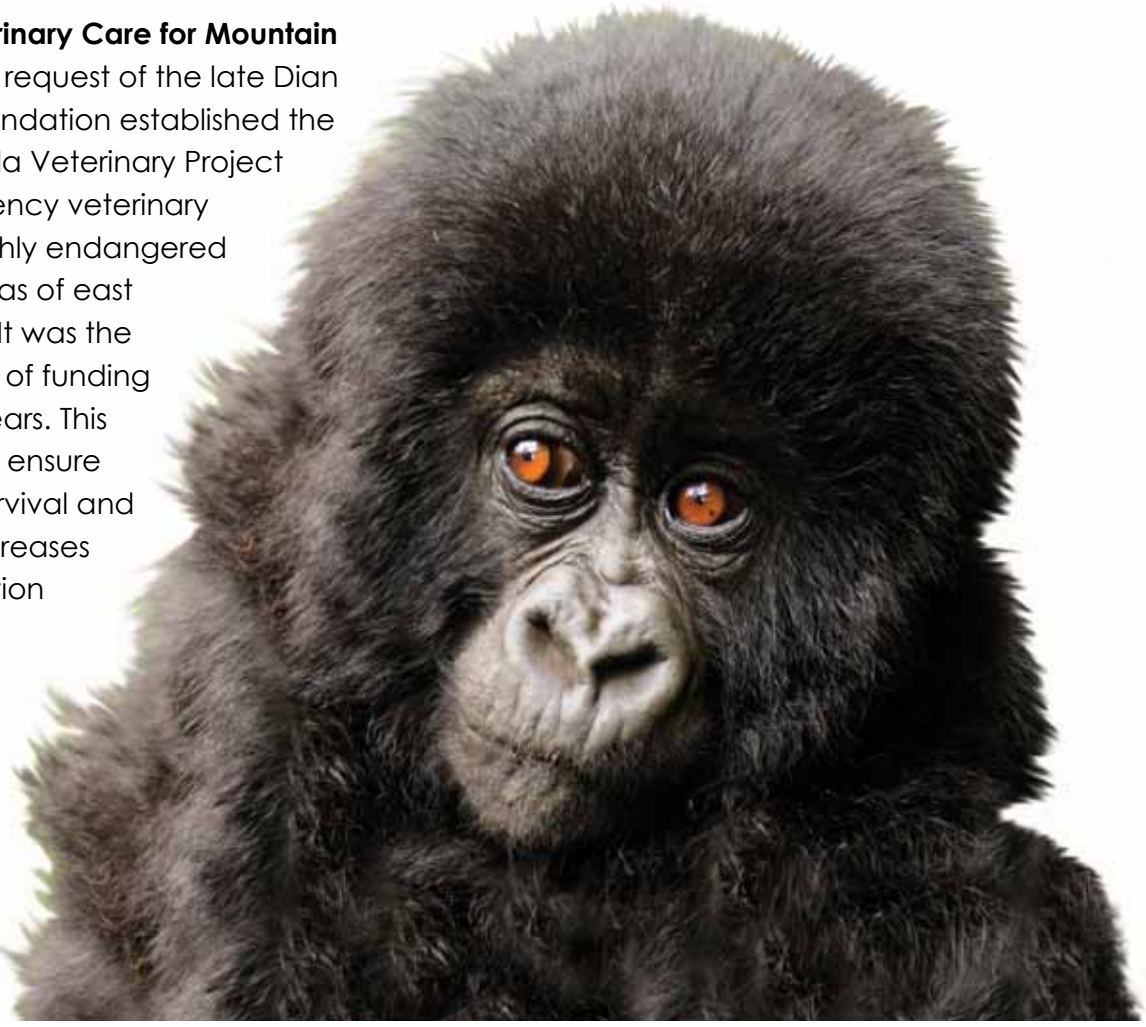
Establishing a Genome Bank for Tasmanian Devils: Once living throughout Australia, wild Tasmanian devils are now found only on the island of Tasmania. Scientists at the University of Sydney established the first Tasmanian devil genome bank and gathered information that could help develop assisted reproductive technology to aid in the devils' survival.

Wildlife Health Is in Your Hands

Diagnosing and Managing Infectious Disease: Foundation-funded studies improved the knowledge of infectious-disease risk factors for endangered California sea otters, leading to improved management policies and increased legal protection for these playful creatures.

Making Anesthesia Safer: Researchers established safe anesthetic protocols for giraffes and rhinos, improving their safety when medical treatment is needed.

Providing Veterinary Care for Mountain Gorillas: At the request of the late Dian Fossey, the Foundation established the Mountain Gorilla Veterinary Project to give emergency veterinary care to the highly endangered mountain gorillas of east central Africa. It was the primary source of funding for nearly 25 years. This project helped ensure the species' survival and even led to increases in their population numbers.



Learn more about our animal health successes at www.MorrisAnimalFoundation.org.

AMPHIBIANS/FISH

Understanding Impacts of Reproductive Chemicals on Fish

Dr. Edward Orlando, University of Maryland, D12ZO-046

Total Study Cost: $123,467

Fish are highly sensitive to their environment and are often the first animal to show negative effects of exposure to pollutants or other environmental damage. Endocrine disruptors, chemicals that occur in both natural and manmade forms, can interfere with the endocrine system and affect reproduction and development in fish and other animals. Aquatic ecosystems contain mixtures of chemicals, including endocrine disruptors, which originate from waste-water treatment plants, agricultural fields and pens, residences and air pollution deposits. Some endocrine disruptors mimic natural steroid hormones, such as progestins. Progestins function through progesterone receptors and have critically important roles in reproduction. Currently, there are only a few published studies about the potential effects of environmental progestins. This study will determine whether these endocrine disruptors could interfere with progesterone-receptor signaling, which could have important effects on the reproduction and the robustness of fish populations. Data from this study will contribute to the understanding of the biological effects of altered progesterone-receptor signaling in wild fish.

AMPHIBIANS/FISH

Examining Whether Trade of Ornamental Amphibians Introduces Toxins to Wild Populations

Dr. Trenton W.J. Garner, Zoological Society of London, United Kingdom, D12ZO-002

Total Study Cost: $128,307

It's estimated that up to 41 percent of existing amphibian species are threatened, and the fungus *Batrachochytrium dendrobatidis* is recognized as one of the most important drivers of global amphibian declines. It is not clear how this fungus continues to spread, although the amphibian trade is suspected as an important factor in the global spread of *B. dendrobatidis*. Using a highly discriminatory *B. dendrobatidis* genotyping system, the researchers of this study have developed scientific evidence that two arms of the amphibian trade (research and food) are responsible for introducing *B. dendrobatidis* in Europe. They will study the contribution the ornamental trade in amphibians may have made to the emergence of *B. dendrobatidis*. They will work to determine if the United States, the primary external source of ornamental amphibians for Europe, has been responsible for significant *B. dendrobatidis* introductions into Europe, or has the capacity to do so in the near future. They will survey imports from the United States for evidence of infection, determine whether retailers in Europe are selling amphibians that harbor infections and identify whether the presence or prevalence of *B. dendrobatidis* in wild European populations is correlated with the introduction of ornamental amphibian species. Their results could directly influence European policy with regards to the control and mitigation of *B. dendrobatidis* in wild amphibians.

AMPHIBIANS/FISH

Identifying Genes That Help Amphibians Fight Deadly Fungus

Dr. Lee F. Skerratt, James Cook University, Australia, D10ZO-046

Total Study Cost: $109,189

Chytridiomycosis, which is caused by the fungus *Batrachochytrium dendrobatidis*, has been implicated in the decline or extinction of hundreds of frog species worldwide since its emergence in the 1960s. Eradicating the *B. dendrobatidis* fungus is impossible, so other methods of prevention and control are essential to save amphibian species from extinction. The goal of this study is to identify genes that may provide immunity from chytridiomycosis. Identifying resistant genes will help researchers select immune frogs for captive breeding and successful reintroduction, screen populations to predict their risk of decline and develop targeted vaccines.

AMPHIBIANS/FISH

Identifying Potential Treatment for a Fungus That Kills Frogs

Dr. Lisa Kay Belden, Virginia Tech, D10ZO-028

Total Study Cost: $69,489

Amphibian populations—which are critical to the world's ecosystems—are declining worldwide at unprecedented rates. *Batrachochytrium dendrobatidis*, a fungus that attacks the skin, has been linked to a large proportion of declines and extinctions. The good news is that some individual frogs, populations and species are resistant to infection or carry the fungus but never develop the disease. Amphibians host an array of bacterial species on their skin, many of which have antifungal properties and might prevent *B. dendrobatidis* infection in certain amphibians. This study will identify the types of bacteria that live on the skin of three common amphibian species and determine whether beneficial bacteria that live on amphibian skin might be used as a probiotic treatment to prevent *B. dendrobatidis* fungal infections before the fungus wipes out more of these endangered species.

AMPHIBIANS/FISH

Assisted Reproduction for Endangered Amphibians

Dr. Andrew J. Kouba, Memphis Zoological Society, D09ZO-032

Total Study Cost: $106,372

Amphibians—though extremely critical to the world's ecosystems—are in crisis worldwide as species become extinct. This escalating problem has resulted in global triage efforts to save the remaining biodiversity in captive colonies, but breeding failures are threatening the long-term goals for genetic diversity in amphibian populations. Assisted breeding techniques could improve reproductive success and genetic diversity, but further research is needed to establish effective and appropriate breeding protocols. This study will test a novel hormone method that could optimize artificial insemination techniques in three species of endangered toads. The goal is to increase the number of tadpoles that can then be reintroduced into the wild. This study has far-reaching implications for the conservation of all declining amphibian populations.

BATS

Surveying Bat Populations to Gauge Disease Risks

Dr. Thomas H. Kunz, Boston University, D10ZO-048

Total Study Cost: $216,435

White-nose syndrome is an emerging disease that has caused unprecedented mortality of bats in the northeastern United States, particularly for the little brown myotis, which has suffered a 93 percent decline since 2006. Since its discovery in New York, the disease has spread to 19 states and has affected six bat species. White-nose syndrome is linked to a cold-loving fungus and is thought to be transmitted from bat to bat. The little brown myotis may be the species that is spreading white-nose syndrome because it is the most common and widest-ranging North American bat species, spanning much of the United States and southern Canada. Researchers will survey the genetic diversity of little brown myotis populations at swarming sites and near hibernation locations used in fall and winter to learn how these bats disperse. They will then use the data to predict the bats' migration routes and identify other bat populations at risk.

> "The research that you are supporting in my lab through the Morris Animal Foundation is critical because it focuses on identifying the population genetic structure of little brown bats, the species that, to date, has been most affected by white-nose syndrome."
>
> — Dr. Thomas H. Kunz, Boston University

Create a Healthier Tomorrow

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BIRDS

Assessing Impacts of Crude Oil on Reproduction of Migratory Birds

Dr. Patrick Redig, University of Minnesota, D12ZO-067

Total Study Cost: $50,987

The Deep Water Horizon oil spill in the Gulf of Mexico in 2010 contaminated large areas of Gulf waters, seabed and shoreline, which are crucial for overwinter survival of migratory birds, such as loons, pelicans, cormorants and herons, that breed in Minnesota and winter in the Gulf of Mexico. There is a very high probability that these birds were exposed to components of the crude oil, including polycyclic aromatic hydrocarbons (PAHs), or to the dispersant agents that were used to break up the oil. Long-standing monitoring projects in Minnesota will assess whether populations of these birds are being affected by exposure to hydrocarbons in the ensuing years. In this study, researchers will assess the impact on individual birds by collecting eggs from migratory and nonmigratory birds in Minnesota and determining whether PAHs in the eggs are linked to the oil spill. By thoroughly studying the ramifications of this particular oil spill, experience and knowledge may be gained to more completely define the threats emanating from oil-spill catastrophes and provide additional momentum to prevent such outcomes in the future.

BIRDS

Developing a Tool to Detect Illness in Raptors Without Clinical Signs

Dr. Lisa Tell, University of California–Davis, D12ZO-026

Total Study Cost: $72,239

Techniques for monitoring the health of avian patients, especially raptors, are limited, and early detection of many conditions is often difficult because birds exhibit minimal behavioral changes until they are severely ill. Acute-phase proteins produced by the liver in response to inflammatory stimuli are becoming increasingly important in the evaluation and treatment of mammalian diseases but have rarely been applied to birds. The researchers of this study believe inflammatory markers can be used to distinguish injured or infected raptors from healthy birds before they exhibit signs of illness. They hope to develop a panel of inflammatory markers measured in peripheral blood of red-tailed hawks to help assess disease conditions in raptors and allow earlier detection of health problems.

BIRDS

Evaluating Effects of Persistent Environmental Contamination on Birds

Dr. Sonia Hernandez, University of Georgia, D12ZO-024

Total Study Cost: $58,903

The Brunswick, Georgia, area has four Superfund sites, formerly home to heavily contaminated toxic waste sites. Contaminated sediment was removed from one of the most contaminated sites in the late 1990s, but since then investigators continue to find high concentrations of toxic materials in the area. This study will evaluate the toxic levels and the effects of persistent environmental contaminants on the health and reproductive success in least terns, a colonial, fish-eating seabird living on a highly contaminated estuary near Brunswick. The researchers hypothesize that the least terns breeding around this Superfund site will exhibit compromised reproductive success and health because of the contamination of their food source. The study will provide environmental stewards with tools to effectively monitor contamination in an ecosystem and will benefit a variety of wildlife species cohabitating with least terns along rivers and coastlines across the country.

BIRDS

Evaluating the Effectiveness of Pain-relief Drugs for Raptors

Dr. David Sanchez-Migallon Guzman, University of California–Davis, First Award Grant, D10ZO-305

Total Study Cost: $99,050

Raptors with traumatic wounds and fractures are often brought to veterinarians in wildlife rehabilitation centers or zoos, and some require surgery. It is critical to a bird's recovery that it receives appropriate pain relief during treatment. Opioids are a class of drugs frequently used for pain management in veterinary medicine, but despite great advances in evaluating and using opioid drugs in parrot species, there have been no studies evaluating the appropriate analgesic drug, dose and frequency to treat injured raptors. This study is evaluating the drug metabolism, pain-relieving effect and required dose and frequency of two opioids—butorphanol tartrate and hydromorphone—in American kestrels. To our knowledge, this is the first controlled study evaluating the analgesic properties of any drug in a raptor species.

> *"Your significant contribution to this research will help us generate valuable information that will advance our understanding in reproductive biology of endangered whooping cranes, which in turn, will allow us to improve breeding success of captive individuals."*
>
> — Dr. Nucharin Songsasen, Smithsonian Institution

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BIRDS

Identifying Malaria Parasites That Cause Illness and Death in Zoo Birds

Dr. Robert C. Fleischer and Dr. Ellen Martinsen, Smithsonian Institution, D10ZO-043

Total Study Cost: $120,924

Malaria parasites are common in bird populations on every continent except Antarctica. Some species of malaria parasites—which are transmitted by insects that bite—are notorious for moving between captive and wild bird populations. When these parasites switch to new hosts, they often become more virulent and cause disease or death. Zoo birds are especially vulnerable because they are gathered from sites around the world, confined in small areas and exposed to the local biting insects, some of which transmit malaria parasites from native wild birds. This study will identify the malaria parasites that successfully jump from native birds to zoo birds (and vice versa) and will identify the biting insects that transmit them. This knowledge will help veterinarians and animal health workers gauge the threat of parasites found in birds under their care and allow for targeted control of the biting insects that transmit malaria parasites.

BIRDS

Determining Causes of Poor Reproduction in Endangered Cranes

Dr. Nucharin Songsasen, Smithsonian Institution, D10ZO-023

Total Study Cost: $55,018

The whooping crane is one of the most critically endangered species in North America. The species was virtually eliminated by 1942, leaving just 16 cranes. Despite decades of captive breeding and reintroduction efforts in the United States and Canada, the number of wild whooping cranes remains at only 400. To maintain genetic diversity and supply birds for reintroduction into the wild, every crane must reproduce. Unfortunately, fertility in the captive flocks is poor, and only 65 percent of eggs are fertile. This may be due to low gene diversity or to suboptimal breeding and management techniques. This study will determine the underlying causes of poor reproduction and will develop protocols to boost fertility and chick production, which are necessary to ensure the species' recovery.

BIRDS

Examining the Link Between Lead Exposure and Poor Health in Ducks

Dr. Marcela M. Uhart, Wildlife Conservation Society, D10ZO-021

Total Study Cost: $119,018

In the Santa Fe province of Argentina, an international hot spot for duck hunting, more than 10 tons of lead shot are introduced into the environment every year. Initial studies show that large numbers of native ducks ingest and are poisoned by these lead pellets. Lead contamination may also threaten the health of other species, including humans, who ingest the lead that enters the food chain. This study will further quantify the relationship between lead exposure and the health of native ducks and will measure the extent to which humans and animals are exposed to lead in the ecosystem. These data are needed to justify banning the use of lead ammunition in Argentina.

BIRDS

Improving Nutrition in Companion Birds

Dr. Donald J. Brightsmith, Texas A&M University, D09ZO-015

Total Study Cost: $81,388

Despite the large number of macaws, Amazon parrots, cockatoos and other large psittacine birds kept as pets, little is known about their nutritional requirements. Nutritional problems are the most common health problems facing captive parrots today. In particular, hand-reared chicks suffer from nutritional deficiencies. They also often aspirate the feed because of its finely ground texture; this slows digestion, which causes dehydration and malnutrition. Researchers will analyze the nutrient content of the diets of wild chicks living in Peru, Mexico, Brazil and Costa Rica and will use these measurements to formulate new hand-rearing diets for captive parrot chicks. Researchers anticipate that these new formulas will improve nutrition, reduce acute and chronic health problems and revolutionize hand feeding of companion parrots.

ELEPHANTS/HIPPOS/RHINOS

Evaluating Health of Buffalos to Help Endangered Rhino Population

Dr. Kurnia Khairani, Cornell University, Fellowship Training Grant, D12ZO-411

Fellowship Training Grant Cost: $110,000

The Javan rhinoceros is critically endangered—just 35 to 50 animals are left in the wild. A strategy was recently endorsed by the Indonesian government to create a second population of the Javan rhinoceros. The proposed site is surrounded by 19 villages, where local people use water buffalo to work the rice paddies. The potential of water buffalo entering into the proposed site poses a significant health risk to the Javan rhinoceros and threatens future plans for expanding and establishing a second population. The researchers did a preliminary survey of domestic animal diseases of concern to rhinoceros and found the buffalo to be carriers of several diseases. The current study will continue their survey in part by establishing and evaluating the prevalence of hemorrhagic septicemia, an important endemic disease affecting the region's water buffalo. The results of this study will improve the health of the resident water buffalo and improve the outlook for the health of the endangered rhinos.

ELEPHANTS/HIPPOS/RHINOS

Testing a Treatment That Could Increase Fertility in Elephants

Dr. Janine Brown, Smithsonian Institution, D12ZO-057

Total Study Cost: $35,224

The African elephant population in U.S. zoos is not self-sustaining due in part to poor reproduction. One reason for this is that many female elephants of reproductive age are not cycling normally. Data from the most recent Elephant Taxon Advisory Group/Species Survival Program Reproductive Assessment Survey found that 42 percent of female African elephants exhibit abnormal ovarian cycles, and of those, 37 percent do not cycle at all. Understanding the reason behind this problem could lead to treatments for reproductive issues and help ensure a more prosperous future for the African elephant population. Abnormal cycles in many of these elephants are associated with abnormal secretion of prolactin, a hormone produced by the pituitary gland and associated with fertility. In horses, domperidone stimulates prolactin secretion and is used to treat ovarian inactivity problems in mares. This study will treat noncycling female elephants with a modified, cyclic regimen of domperidone in an effort to establish its efficacy in treating noncycling elephants, so that they have a better chance of cycling normally and producing offspring.

ELEPHANTS/HIPPOS/RHINOS

Developing a Test to Detect Viral Infection in Elephants

Michael Fouraker, Fort Worth Zoological Park, D12ZO-038

Total Study Cost: $54,927

Acute elephant endotheliotropic herpesvirus (EEHV) is a particularly devastating disease that attacks blood vessels, the heart and other organs and is prevalent in young elephants. The disease is responsible for the deaths of 20 percent of all captive-born Asian elephants in North America. Recent studies have detected EEHV1 being shed in trunk-wash secretions of healthy asymptomatic Asian zoo elephant herd-mates of calves that previously had the disease. The researchers conducting this study hope to develop an improved, more sensitive serologic test (serology refers to the liquid portion of a blood sample after it clots) that will detect serum antibodies against multiple EEHV proteins. This test would provide a much needed tool to evaluate the prevalence of infection in North America. Such a test will also help determine whether prior infection with one strain of EEHV protects against infection by other strains.

ELEPHANTS/HIPPOS/RHINOS

Herpesvirus Prevention in Elephants

Dr. Noha Abou-Madi, Cornell University, First Award Grant, D09ZO-302

Total Study Cost: $96,796

Elephant endotheliotropic herpes viruses (EEHVs) are a leading cause of reproductive failure and neonatal and juvenile deaths in Asian elephants. These viruses continue to thwart efforts to maintain a self-sustaining captive population. Scientists have identified several herpes viruses but haven't yet isolated them from infected tissues of sick animals. The researchers hypothesize that the virus present in blood or tissues of infected animals could be replicated in the lab in an elephant endothelial-cell culture. They will use a cell culture developed to isolate and study viral replication in the lab. The researchers' findings will contribute to future studies of disease mechanisms and prevention and should help to improve the health and management of elephant populations worldwide.

> "Previous support of our investigation of the prevalence and risk factors for ear cancer in Catalina Island foxes and the support of the current study have been critical to our understanding of this serious condition."
>
> — Dr. Winston Vickers, University of California–Davis

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ELEPHANTS/HIPPOS/RHINOS

Safer Anesthesia in Black Rhinoceros

Dr. Robin Gleed, Cornell University, D09ZO-012

Total Study Cost: $91,573

The black rhino is critically endangered, and only an estimated 4,000 live in southern Africa. Because of these low numbers, range countries must actively manage rhino populations for conservation purposes. This often requires capture and anesthesia. Although the practice is routine, capture-related deaths remain unacceptably high. Of particular concern are life-threatening respiratory and muscle disorders resulting from capture techniques. The researcher's preliminary data suggest that the rhino's posture after capture may influence breathing and blood lactate levels, which contribute to these disorders. This study will help determine the posture that provides the best outcome for anesthetized rhinos. Improving translocation success is a top research priority for the Association of Zoos and Aquariums' Rhinoceros Research Council, and understanding the effects of posture will help veterinarians in range countries reduce morbidity and mortality of rhinos undergoing capture and translocation.

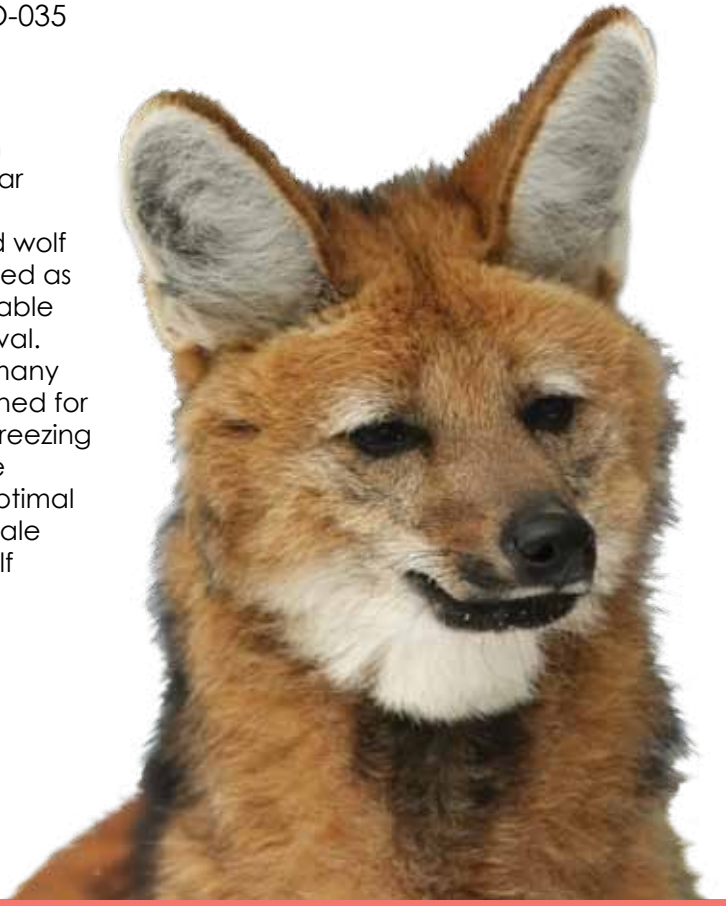
FOXES/WILD DOGS/WOLVES

Assisted Reproduction in Maned Wolves

Dr. Nucharin Songsasen, Smithsonian Institution, D09ZO-035

Total Study Cost: $56,434

The maned wolf—once a thriving species throughout South America—now lives in only four countries and is listed as near threatened on the International Union for Conservation of Nature Red List of Threatened Species. Because the maned wolf population is declining rapidly and growing more fragmented as its habitat is converted into farmland, establishing a sustainable captive population is critical to the species' long-term survival. Artificial insemination (AI) is a valuable tool for enhancing many wildlife species in zoos, but protocols haven't been established for maned wolves. Fundamental data associated with sperm freezing and hormone therapies are needed. This study will examine factors affecting sperm cryo-survival and will develop an optimal hormone therapy for controlling reproductive cycles in female wolves in hopes of increasing the knowledge of maned wolf reproduction and allowing AI with fresh or thawed sperm.



MARINE LIFE — NON-MAMMALS

Assessing the Effects of Oil and Oil Dispersants on Oysters

Dr. Sylvain De Guise, University of Connecticut, D12ZO-041

Total Study Cost: $114,238

The explosion of the Deepwater Horizon resulted in an unprecedented release of oil into the Gulf of Mexico. It is reported that BP used about 1.84 million gallons of dispersant and injected a significant amount into the deep waters near the mile-deep oil gusher. Few efforts have been undertaken to assess the exposure levels and the effects of exposure on bivalve mollusks. This study will identify the mechanisms associated with sublethal effects of oil and oil dispersant in oysters in controlled laboratory conditions to help identify and quantify the specific damages, or lack thereof, to oysters in the Gulf of Mexico. Given the potentially toxic effects of oil and dispersants on ecologically and economically important marine species such as the Eastern oyster, definitive data on the sublethal effects of oil and dispersant on the health of bivalves is needed to make informed decisions regarding the use of such dispersants in the event of future oil spills.

MARINE LIFE — NON-MAMMALS

Identifying a Virus That Causes Illness and Death in Mollusks

Dr. Elizabeth W. Howerth, University of Georgia, D09ZO-048
Dr. Susan Knowles, University of Georgia, Fellowship Training Grant, D10ZO-403

Total Study Cost: $32,287
Fellowship Training Grant Cost: $109,424

Soft-shell clams play a vital role in the ecosystem by filtering pollutants from water and by serving as prey for marine animals. Once so abundant in Maryland's Chesapeake Bay that they could filter the estuary's water in a single week, the soft-shell clam population has declined so much that it now takes them a year to filter the same amount of water. Potential reasons for the decline include overharvesting, environmental degradation, alterations of temperature and salinity due to tropical storms, predation and disease. Recently, soft-shell clams from the bay have been found with enlarged cells covering the gills. Researchers believe a virus is causing illness in the clams. In this study, researchers will identify the virus and develop ways to detect it. They will also determine the prevalence and risk factors for infection in the clams and see if it is present in other mollusk species. Their findings will help repopulate natural clam beds. This is a fellowship and provides hands-on training for a student.

MARINE MAMMALS

Looking for Genes Associated with Cancer in Sea Lions

Dr. Matthew Breen, North Carolina State University, D10ZO-003

Total Study Cost: $100,035

Stranded California sea lions often suffer from an aggressive cancer that spreads throughout their reproductive organs and urinary system and causes a slow, painful death. The cause is unknown. Although herpesvirus has been found in all sea lions with these tumors, the virus is also present in healthy sea lions. Zoos and rehabilitation facilities are reluctant to house sea lions because of concerns over potential disease transmission. As a result, apparently healthy animals are often euthanized. Because most mammalian cancers of the same type share common genetic mutations, researchers will compare the genome of the domestic dog to that of the California sea lion to identify genes associated with this cancer in sea lions. The information will provide a foundation for developing cancer treatment options for these animals.

MARINE MAMMALS

Distemper in Vulnerable Marine Mammals

Dr. Jonna A.K. Mazet, University of California–Davis, D09ZO-019

Total Study Cost: $77,167

Populations of northern sea otters and Steller sea lions in Alaska have declined drastically over the past 30 years, and the ice seal population is also at risk. Phocine distemper virus has caused massive harbor seal deaths in the Atlantic Ocean, and with Morris Animal Foundation funding, the researchers recently identified this virus as the cause of sea otter deaths in Alaska. This was the first confirmation of phocine distemper virus in marine mammals in the Pacific Ocean. The researchers will further examine the association of this virus with recent and ongoing sea otter deaths and determine the presence of this pathogen in Steller sea lions, harbor seals and ice seals in Alaska. Evaluating the role of distemper in marine mammal deaths is critical because a new outbreak could devastate the recovery efforts of already declining and vulnerable Arctic marine mammals.

MARSUPIALS

Studying How Genes Affect Mate Selection and Future Health in Tasmanian Devils

Dr. Rebecca E. Spindler, Taronga Conservation Society, Australia, D10ZO-017

Total Study Cost: $80,636

Tasmanian devil populations have plummeted since 1996, which is when a devil facial tumor disease was discovered. Increasing the captive population of Tasmanian devils is critical to reestablishing a self-sustaining wild population and preventing extinction. Understanding the implications of breeding decisions and the genetic composition of the offspring is essential for attaining that goal. The transmissible facial cancer spreads when an infected devil bites another, leaving a cell behind that grows into a new cancer. The immune system doesn't attack these tumors because most devils share similar cell surface markers, known as the major histocompatibility complex (MHC), so the cells aren't recognized as foreign. The MHC group of genes is also an important signal that helps avoid inbreeding in many species—devils seem to choose mates with different MHC genes than themselves. Giving animals a mate choice based on MHC rather than overall genetic diversity may improve reproduction and survival in the captive population. This study will determine the importance of MHC in mate selection, reproductive success, health of offspring and well-being of breeding pairs.

MULTIPLE SPECIES

Developing Better Tools for Detecting Pregnancy in Elephants and Pandas

Dr. Budhan Pukazhenthi, Smithsonian Institution, Pilot Study, D10ZO-840A

Total Study Cost: $11,462

Detecting pregnancy and studying reproductive disorders in wildlife remains a challenge. Standard methods for detecting pregnancy in wildlife include monitoring progesterone in the blood or measuring progesterone metabolites in feces or urine, but the results are often inconclusive, especially in species that may exhibit false pregnancy. Recent studies in women and mice have demonstrated the presence of placental microRNAs, or molecules, that control gene function and increase as gestation progresses. This study will determine the presence of these molecules in pregnant Asian elephants and giant pandas. Researchers will compare the expression profiles of miRNAs in pregnant versus nonpregnant animals to identify novel pregnancy-specific biomarkers. Successful completion of this study could increase the understanding of factors involved in implantation and placental formation, help wildlife managers detect pregnancy earlier so they can better manage pregnant animals in captivity and provide insight into the probable causes of reproductive failure in rare and endangered species.

MULTIPLE SPECIES

Studying Disease Transmission Among Otters, Mink and Dogs

Dr. Randall S. Singer, University of Minnesota, D10ZO-057

Total Study Cost: $140,246

The endangered southern river otter, found in southern Chile and southwest Argentina, has the smallest distribution of any of the 13 species of otters worldwide. The American mink, an introduced carnivore, has become widespread throughout this otter's habitat, sharing its food sources, latrines and even dens. Both river otters and mink are susceptible to many canine diseases, including distemper. Because mink move freely between water and land, they may be transmitting disease to otters from domestic dogs living near otter habitats. This study will collect scat to examine the amount of contact among southern river otters, mink and domestic dogs. Researchers will create mathematical models to predict the potential for disease transmission and to estimate the probability of extinction of the southern river otter.

OTHER SPECIES

Identifying Genetic Factors That Predispose Badgers to Disease

Dr. Lorna J. Kennedy, University of Manchester, United Kingdom, D12ZO-056

Total Study Cost: $57,471

Bovine tuberculosis (bTB) is a zoonotic bacterial disease caused by *Mycobacterium bovis,* which infects both wild and domesticated species. It is reemerging as a significant threat to wildlife and domestic cattle in a number of countries worldwide. In the United Kingdom, the Eurasian badger acts as a wildlife reservoir of bTB and may transmit the disease to farm animals. Within badger populations, some animals are seemingly resistant to infection, whereas others become persistently infected. This suggests that genetic factors likely influence the badger's response to *M. bovis.* The major histocompatibility complex (MHC) contains a number of immune response genes that play a major role in immunity. This project aims to characterize MHC gene diversity within the badger population in the United Kingdom and to investigate how this influences resistance to bTB infection and responses to vaccination. Data gathered from this study could allow the most appropriate control measures to be targeted to specific populations, maximizing the chances of successful intervention.

> "Our findings continue to be interesting and exciting, and they will have important implications for the marine mammal populations in Alaska. We are very grateful to you for making this work possible."
>
> — Dr. Tracey Goldstein, University of California–Davis

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OTHER SPECIES

Evaluating *E. coli* Transmission Between Humans and Mongoose

Dr. Kathleen Alexander, Virginia Tech, Pilot Study, D10ZO-828A

Total Study Cost: $11,880

Emerging infectious diseases are on the rise, threatening both human and wildlife populations. Increasingly, human waste has been identified as an attractant to wildlife as a food resource, a potential health threat and a source of disease exposure for wildlife populations living near humans. Though it is difficult to detect in routine surveillance, there is evidence that wildlife hosts are being exposed to and invaded by specific human-associated pathogens. In this pilot study, the researchers will evaluate *Escherichia coli,* which is commonly found in both humans and banded mongoose, as a model to identify possible disease transmission methods. If transmission of *E. coli* between human and mongoose can be identified in banded mongoose with high levels of exposure to human waste, data from this study will provide the foundation for structuring studies of human-waste exposure and pathogen transmission to wildlife. This research is critical to managing human impacts on wildlife populations, particularly those living in and around protected areas, and identifying the potential for emerging infectious disease.

PRIMATES

Studying Disease Transmission Between Humans and Mountain Gorillas

Dr. Tiffany Wolf, University of Minnesota, Pfizer Animal Health–MAF Fellowship, D10ZO-902

Total Fellowship Cost: $176,000

The fellow was introduced to the field of wildlife research early in veterinary school when she received a student grant to conduct a survey for exposure to Eastern equine encephalitis virus in free-ranging chelonians (turtles/tortoises). Although her work has primarily been clinically based, she has a strong interest in wildlife infectious disease and population research. As a fellow, Wolf will participate in a PhD program at the University of Minnesota and will study the risks of tuberculosis transmission from humans to habituated mountain gorillas. The data gathered could provide invaluable information about the understudied area of anthropozoonotic disease transmission.

> “Thank you for your confidence in our abilities to advance this important area of our work. We live in a very exciting time for biomedical advances, and the combined expertise used in our project will hopefully make sure that advances are extended to improving wildlife health as well as human and companion animal health.”
>
> — Dr. Matthew Breen, North Carolina State University

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PRIMATES

Stopping Illegal Trading of Monkeys

Dr. Sylvia Vitazkova, George Mason University, Pilot Study, D10ZO-819A

Total Study Cost: $11,880

Between 1999 and 2008, the Wildlife Care Center of Belize and Belizean forestry officials rescued 28 black howler monkeys from the illegal pet trade. Howler monkeys are endangered, and their populations are projected to decline by 60 percent over the next 30 years, mainly because their habitat is being destroyed and they are being hunted for food and captured for the pet trade. Tracking where these primates originate would help stop the illegal trade because forestry officers could target enforcement in areas where the endangered animals are being collected, thereby discouraging their capture and sale. However, it is often difficult to determine a captured monkey's origins because those in possession of the animal may be unwilling to divulge this information. The objective of this study is to map the genetic profiles of howler monkey in Belize using noninvasive molecular methods. This will allow officials to determine the origin of illegally captured monkeys, which, in turn, will help focus enforcement and education efforts by Belizean forestry officials and help eradicate the illegal nonhuman primate pet trade.

PRIMATES

Examining How Social Behaviors Affect Disease Transmission in Apes

Dr. Julie L. Rushmore, University of Georgia, Fellowship Training Grant, D10ZO-401

Fellowship Training Grant Cost: $57,674

Infectious diseases are a threat to endangered African apes, and recent outbreaks of Ebola virus, measles and flu-like viruses have caused many deaths in these animals. Little is known about how social interactions among apes affect pathogen transmission, and no studies have examined how sexually transmitted diseases (STDs), which often cause sterility in humans, affect wild apes already at risk of extinction. This study examines the role of primate social behaviors in the transmission of and defense against STDs and other infectious pathogens. Scientists will screen wild and sanctuary chimpanzees, mountain gorillas and bonobos for specific STDs. They will also observe groups of habituated chimpanzees over a 10-month period to determine how often pairs engage in social and mating encounters. Finally, they will design models to predict the spread of potential infectious pathogens. The results will be used to evaluate strategies to prevent or slow disease outbreaks in wild apes. This fellowship provides hands-on training for a student.

PRIMATES

Studying a Threat to Chimpanzee Health

Dr. Thomas R. Gillespie, Emory University, D09ZO-041

Total Study Cost: $134,794

Cryptosporidiosis, a global concern for both humans and animals, causes diarrhea and other disorders linked to nutritional deficiencies and impaired weight gain as well as chronic, life-threatening infections. Despite its prevalence, little is known about how *Cryptosporidium* bacteria affect wildlife, but researchers believe the infection may be threatening the health and survival of chimpanzees in Gombe National Park in Tanzania. They will assess the prevalence of *Cryptosporidium* infections in chimpanzees and determine the sources, frequency and types of illnesses associated with infection. Because humans infected with both human immunodeficiency virus (HIV) and *Cryptosporidium* have high mortality rates, researchers will also determine whether chimps infected with *Cryptosporidium* and simian immunodeficiency virus, a virus related to HIV, have increased illness and death.

REPTILES

Improving Pain Management in Sea Turtles

Dr. Kurt Sladky, University of Wisconsin–Madison, Pilot Study, D10ZO-815A

Total Study Cost: $8,460

At the Georgia Sea Turtle Center, rehabilitators see and treat many free-ranging sea turtles suffering from human-induced injuries, such as boat propeller strikes and fishing line entanglements. The injuries are very painful and frequently require medical or surgical intervention, in addition to long-term rehabilitation, before the animal is released back into the wild. During the past few years, there has been increased understanding of reptile pain and how it can be alleviated through analgesic drugs; however, many of these drugs cause respiratory depression in reptiles. Research recently determined that oral tramadol provides pain relief in red-eared slider turtles and that the effects appear to last for four to five days after a single oral dose. In addition, tramadol causes minimal respiratory depression in those turtles. This study will determine the pharmacokinetics of oral tramadol in loggerhead sea turtles and whether sea turtle behavior will normalize more rapidly if pain is alleviated. The results of this pilot project will lead to better pain management for all captive and temporarily held sea turtles and shorten the rehabilitation time, which will lead to earlier release of sea turtles back into their natural environment.

REPTILES

Developing Tests to Detect Infectious Disease in Turtles

Dr. Matthew C. Allender, University of Illinois, First Award Grant, D10ZO-314

Total Study Cost: $21,575

The eastern box turtle is threatened in several states and declining in many areas of its range. A combination of factors is responsible, including ranavirus disease, which infects amphibian, turtle and tortoise populations. It is unknown how the disease is transmitted in reptiles or how prevalent infections are in eastern box turtles. Animals with subclinical infections may be carriers or reservoirs for the disease. Outbreaks increase in autumn, indicating that temperature may play a role in infectivity. This study aims to develop or modify tests for detecting ranaviruses or presence of antibodies against ranaviruses in free-ranging and captive eastern box turtles. The researchers also seek to determine whether infection rates vary with temperature. This information is essential for assessing ranavirus prevalence in free-ranging turtles, evaluating climate and environmental impacts of the disease and developing conservation and treatment options.

REPTILES

Diagnosing a Worldwide Infectious Disease of Snakes

Dr. Elliott R. Jacobson, University of Florida, D10ZO-045

Total Study Cost: $78,408

Inclusion body disease (IBD) causes neurological problems in snakes and is one of the few diseases affecting captive boas and pythons worldwide. There is particular concern that snakes bred in captivity and released into the wild could transmit the disease to native populations. Currently, diagnosis is based on evaluating tissue under a light microscope for the presence of inclusion bodies that contain a unique protein. Some snakes have very few inclusion bodies, however, so they are easy to overlook. Researchers for this study hope to develop more specific and sensitive tissue or blood-based tests for diagnosing IBD. More accurate tests would help snake owners and breeders keep these animals disease free. In addition, conservation managers could use the tools to screen snakes intended for release as part of reintroduction programs.

REPTILES

Determining Endangered Sea Turtles' Immune Response to Emerging Diseases

Dr. Sarah L. Milton, Florida Atlantic University, D10ZO-019

Total Study Cost: $27,722

Already highly endangered, loggerhead and green sea turtles now face two recently identified diseases. Lethargic loggerhead syndrome plagues loggerheads, leaving them listless, anemic and dying. Juvenile green sea turtles are debilitated by tumors characteristic of green turtle fibropapilloma disease. The causes of these diseases are unknown, and scientists need basic knowledge of sea turtles' immune function and response to environmental stressors, such as temperature, inadequate food supply and pollution,to understand and treat these and other diseases. This study will determine how the immune response of loggerhead and green sea turtles varies with age and nutritional status during different seasons and temperatures. Researchers will also compare immune function in turtles from areas where fibropapilloma is prevalent with turtles living in more pristine environments. The information could help save these species from new threats.

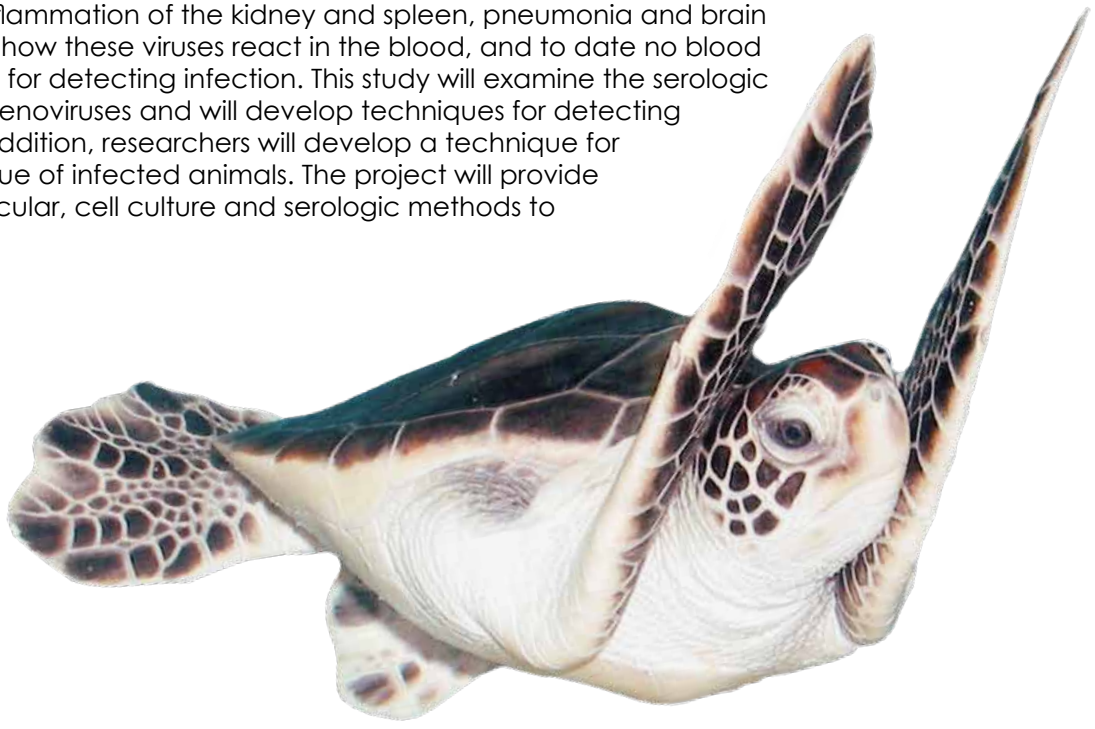
REPTILES

Tracking and Diagnosing Infection in Lizards

Dr. Rachel Marschang, Hohenheim University, Germany, D09ZO-023

Total Study Cost: $35,263

Adenoviruses are the most common viral pathogens found in lizards. They cause a host of health problems, including inflammation of the kidney and spleen, pneumonia and brain disease. Little is known about how these viruses react in the blood, and to date no blood (serologic) tests are available for detecting infection. This study will examine the serologic relationships among lizard adenoviruses and will develop techniques for detecting antibodies against them. In addition, researchers will develop a technique for detecting adenoviruses in tissue of infected animals. The project will provide training opportunities in molecular, cell culture and serologic methods to graduate students.



WILD CATS

Digestive Microbiology of Captive Cheetahs

Dr. Anne A.M.J. Becker, Ghent University, Belgium, Fellowship Training Grant, D12ZO-404

Fellowship Training Grant Cost: $116,727

Feeding mismanagement has been identified as a possible factor contributing to the development of gastrointestinal and metabolic diseases in captive cheetahs. The principal investigator's previous research determined significant differences in the production of potentially beneficial and toxic metabolites in cheetahs fed whole prey compared with those eating only meat. These results indicate that the undigested portion of a natural carnivorous diet may play a crucial role in maintaining intestinal health. To optimize the health of cheetahs in captivity, it is crucial to address the current lack of knowledge on the diversity and dynamics of the functional intestinal microbial ecosystem in cheetahs. In this study a set of protocols for microbiological analysis of fecal samples of cheetahs will be optimized and used to obtain a taxonomic inventory of the predominant intestinal microbiota. The gathered knowledge will then be used to improve feeding management and thus help improve the health of captive cheetahs.

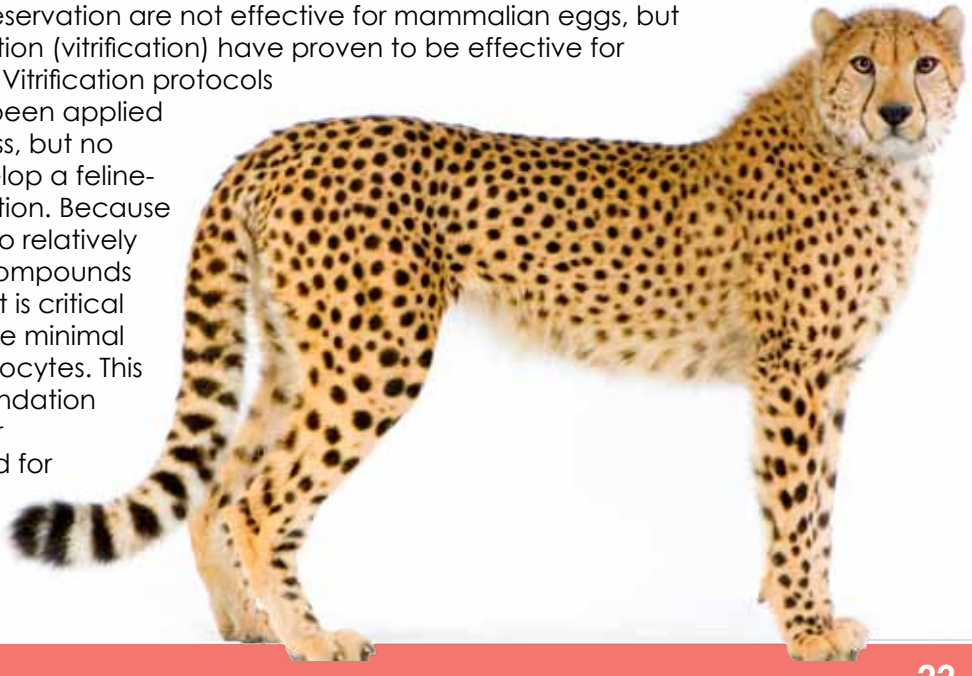
WILD CATS

Improving Reproductive Techniques in Endangered Wild Cats

Dr. Jason Herrick, University of Illinois, Pilot Study, D10ZO-824A

Total Study Cost: $11,880

Cryopreservation, or freezing of germplasm (genetic material such as eggs or sperm), is poised to play a critical role in sustaining the future of threatened animal populations. The ability to successfully cryopreserve feline eggs, or oocytes, could greatly facilitate genetic management of endangered cats. Traditional methods of cryopreservation are not effective for mammalian eggs, but ultrarapid methods of cryopreservation (vitrification) have proven to be effective for oocytes from several other species. Vitrification protocols developed for other species have been applied to feline oocytes with limited success, but no attempts have been made to develop a feline-specific protocol for oocyte vitrification. Because vitrification requires exposing eggs to relatively high concentrations of antifreeze compounds or proteins called cryoprotectants, it is critical to identify cryoprotectants that have minimal effects on the physiology of feline oocytes. This information will provide a useful foundation for the development of methods for oocyte vitrification that can be used for endangered species of cats.



WILD CATS

Studying Cross-species Disease Transmission in Bobcats and Mountain Lions

Justin Lee, Colorado State University, Fellowship Training Grant, D10ZO-415

Fellowship Training Grant Cost: $80,186

Habitat loss and fragmentation of wildlife populations reduce animal movement, decrease genetic diversity and increase animal density, which increases animal contact rates and potential disease transmission. Researchers have studied the genes from individual animals of a species, but examining the genes of the pathogens that a species carries may yield additional information about specific populations of animals. Mountain lions and bobcats have large home ranges and high resource requirements and thus are good indicators of fragmentation-related impacts on natural populations. Both species are susceptible to feline immunodeficiency virus (FIV), a rapidly mutating retrovirus that causes lifelong infection. Although FIV infection is typically species specific, FIV can sometimes be transmitted between species. This project will analyze FIV subtypes from bobcats and mountain lions with home ranges in regions where cross-species transmission has occurred. The work will shed light on the population dynamics, mechanisms of disease transmission and pathogen adaptation in new host species. This fellowship provides valuable hands-on training for a DVM/PhD student.

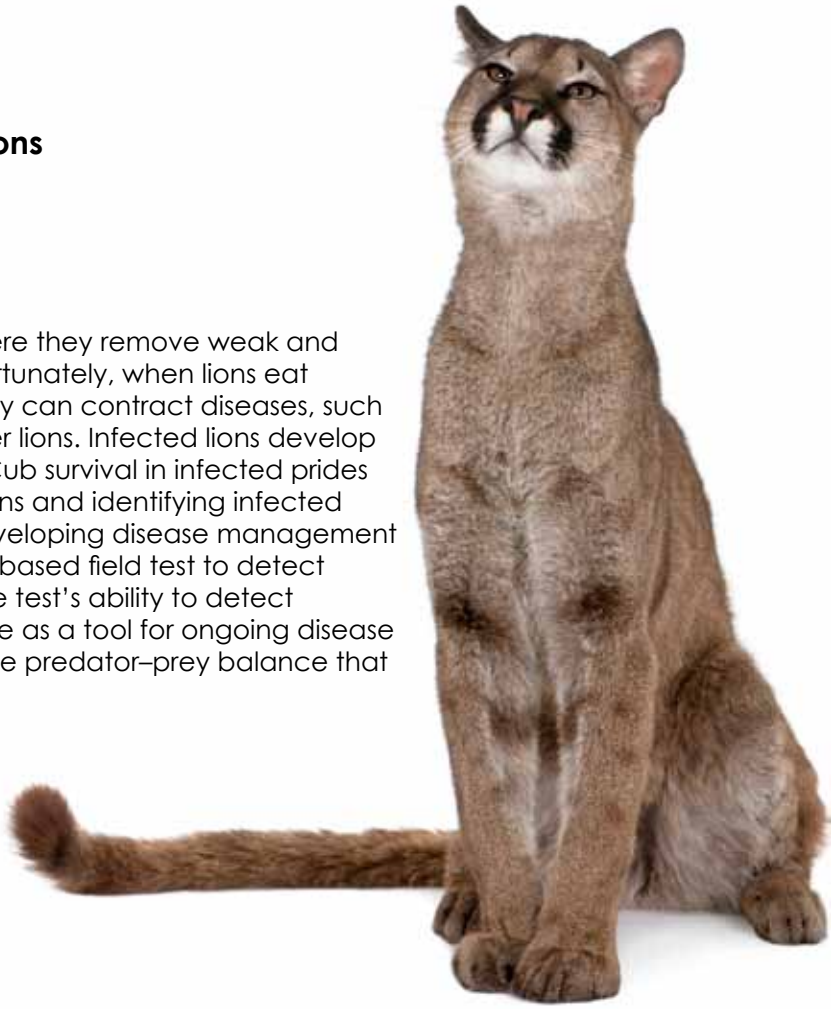
WILD CATS

Developing a Tool to Detect Tuberculosis in Lions

Dr. Michele A. Miller, Palm Beach Zoo, D10ZO-039

Total Study Cost: $72,468

Lions are a top predator in the African ecosystem, where they remove weak and diseased animals and help maintain herd health. Unfortunately, when lions eat infected Cape buffalo and other infected species, they can contract diseases, such as bovine tuberculosis (bTB), and transmit them to other lions. Infected lions develop lung and bone lesions, become emaciated and die. Cub survival in infected prides is also low. Understanding bTB transmission between lions and identifying infected animals before clinical signs develop are crucial to developing disease management strategies. This study will investigate the use of a blood-based field test to detect antibodies indicating bTB infection in lions, examine the test's ability to detect infection at different stages of disease and assess its use as a tool for ongoing disease surveillance. Keeping lions healthy will help maintain the predator–prey balance that affects the entire ecosystem.



WILD HOOVED ANIMALS/RUMINANTS

Evaluating Disease Risk in African Buffalos

Dr. Brianna R. Beechler, Oregon State University, Fellowship Training Grant, D12ZO-409

Fellowship Training Grant Cost: $89,311

Governments in southern African countries have begun creating sustainable developments near Kruger, Gonarezhou and Limpopo National Parks; however, removing the boundary fences between communities and the parks may increase disease spread. Invasive pathogens such as *Mycobacterium bovis*, which causes bovine tuberculosis (bTB), could spread to unaffected areas and threaten wildlife and livestock. Working in conjunction with another study, the fellow will monitor 200 radio-collared female African buffalo for bTB and Rift Valley fever (RVF), a native viral disease. She will evaluate body condition and survival in infected, coinfected and uninfected animals, compare RVF incidence in young and old hosts that have tested negative or positive for bTB and retrospectively evaluate how bTB relates to risk of RVF infection. Understanding the response of native pathogens to emerging infections will enable more comprehensive disease risk assessments and better informed policy decisions.

WILD HOOVED ANIMALS/RUMINANTS

Evaluating a New Test for Chronic Wasting Disease

Dr. Edward A. Hoover, Colorado State University, D12ZO-045

Total Study Cost: $72,222

Chronic wasting disease (CWD) is a deadly transmissible neurological disease of deer and elk that produces small lesions in the brain. It is caused by prions, which are proteins that are similar to viruses and are responsible for certain degenerative diseases of the nervous system. Current testing in elk can be inaccurate. The researcher will evaluate a new test, Quaking-induced conversion (RT-QuIC), to detect the small quantities of infectious prions in the body fluids and environment of CWD-infected animals. Preliminary data suggest that RT-QuIC has ample sensitivity to detect prions in the saliva of CWD-infected deer. Data collected from this study will increase understanding of the epidemiological, ecological and public health effects of CWD.

> “In 2010, your support helped us to conduct the world’s first transport of sperm collected from male Gopher frogs at the Memphis Zoo to Omaha Zoo for in vitro fertilization.”
>
> — Dr. Andrew Kouba, Memphis Zoological Society

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WILD HOOVED ANIMALS/RUMINANTS

Evaluating Bighorn Sheep Immunity to Pneumonia

Dr. Subramaniam Renuka, Washington State University, Fellowship Training Grant, D10ZO-407

Fellowship Training Grant Cost: $107,890

The bighorn sheep population in North America has declined from about 2 million in the 1800s to the current population of 70,000. Pneumonia is the leading cause of death in sheep, and bighorn sheep are much more susceptible to the disease than domestic sheep. Although bighorn sheep produce antibodies against pneumonia bacteria to a certain extent when vaccinated or exposed to the disease, and their immune systems recognize invading bacteria, these sheep may have fewer and/or defective white blood cells and antimicrobial proteins in their respiratory tracts than domestic sheep. As a result, bighorn sheep may be unable to clear pneumonia bacteria from their lungs, trachea and nasal passages as effectively as domestic sheep. This study will look at the number and function of innate immune cells in the respiratory tract of bighorn sheep. The results may lead to the development of an effective mucosal vaccine to prevent future herd die-offs. This fellowship provides hands-on training for a student.

WILD HOOVED ANIMALS/RUMINANTS

Evaluating Blinding Disease in Reindeer and Caribou

Dr. Morten Tryland, Norwegian School of Veterinary Science, Norway, D10ZO-025
Dr. Alina Evans, Norwegian School of Veterinary Science, Norway, Fellowship Training Grant, D10ZO-409

Total Study Cost: $27,294
Fellowship Training Grant Cost: $110,000

Reindeer and caribou are central to the culture, economy and survival of many Arctic communities. Unfortunately, many semidomesticated reindeer herds in Alaska and Scandinavia are affected with keratoconjunctivitis, or pinkeye. This painful blinding disease can result in death from starvation, predation or, in captive populations, euthanasia. Cervid herpesvirus 2 (CvHV2) was determined to be the cause of a pinkeye outbreak in reindeer in Norway, but it is not known whether this virus causes the disease in other populations. In Svalbard reindeer, sporadic cases of pinkeye have been reported, but CvHV2 is apparently absent. Scientists will examine viruses and bacteria found in the eyes of Svalbard reindeer, Norwegian wild reindeer, Alaskan reindeer and caribou, Greenland reindeer and Scandinavian moose. They will then evaluate links among viruses, bacteria and other environmental factors to provide a foundation for developing prevention, control and treatment strategies.

WILD HOOVED ANIMALS/RUMINANTS

Understanding Health Trade-offs Associated with Managing Bighorn Sheep Populations

Dr. Raina K. Plowright, Pennsylvania State University, D10ZO-056

Total Study Cost: $101,759

Disease, hunting and competition for food with livestock nearly eliminated bighorn sheep throughout the West. Despite significant efforts, this species has not recovered, and most remaining or reestablished herds are small and isolated. Small isolated wildlife populations are inherently at greater risk of extinction because of such factors as susceptibility to extreme weather, disease outbreaks, predation and fluctuations in population size. Although increasing population size and connecting remnant populations are important goals of managing bighorn sheep, attempts to achieve these goals may facilitate disease transmission and exacerbate the threat of pneumonia, a leading cause of mortality in the species. This study will analyze 13 years of data on animal movements, population size, pneumonia epidemics, survival and recruitment from 14 interconnected bighorn sheep herds to improve understanding of drivers of pneumonia epidemics. Information gathered from this study, combined with the study's emphasis on disseminating that information through multiple media, will help researchers and managers develop strategies to promote species recovery.

WILD HOOVED ANIMALS/RUMINANTS

Evaluating a Fertility Vaccine to Humanely Control Wild Horse Populations

Dr. Terry M. Nett, Colorado State University, D10ZO-034

Total Study Cost: $110,092

There is widespread concern that overabundant free-range horse populations are altering natural plant communities and reducing forage areas for native wildlife and domestic livestock. Federal and state land-management agencies have tried to reduce herds by periodically rounding up horses to adopt out or sell, but these efforts are inadequate and expensive and have resulted in injuries to animals and humans. Controlling the fertility of free-range female horses may be more cost-effective and humane, but current contraceptives have limited effectiveness and cause undesirable side effects. Researchers will administer a gonadotropin-releasing hormone (GnRH) contraceptive vaccine to induce infertility in female horses and will then evaluate its effect on reproductive and social behaviors in free-ranging horses. If results are positive, GnRH could provide a safe and effective tool for managing wild horses on public rangelands.

WILD HOOVED ANIMALS/RUMINANTS

Evaluating a Method to Control Respiratory Illness in Bighorn Sheep

Dr. Margaret A. Highland, Washington State University, Pfizer Animal Health–MAF Fellowship, D09ZO-914

Total Fellowship Cost: $176,000

Pneumonia is the leading cause of the dramatic decline of North American bighorn sheep from about 2 million animals in the 1800s to fewer than 70,000 currently. The bacterium that causes pneumonia is a deadly form of *Mannheimia haemolytica*, which also causes disease in domestic sheep and other ruminants. *M. haemolytica* produces a toxin that destroys white blood cells, causes lung damage and kills the animals. Although domestic sheep have developed immunity to this form of the bacterium, bighorn sheep have not, and exposure can result in mortality rates higher than 90 percent. No effective strategy to combat this pathogen is available because the use of antibiotics is environmentally unsafe, is not cost-effective and results in the evolution of drug-resistant pathogens. The fellow in this project will evaluate the use of bacteriophages—viruses specific to each strain of bacteria that are highly effective in killing the bacterium—as a novel and effective method of controlling transmission of respiratory pathogens from domestic sheep to bighorns. The Pfizer Animal Health–MAF Fellowships provide funding for scientists and veterinarians to pursue advanced scientific training.

Special thanks to the following people who helped in the creation of this piece.

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