Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Companion Mammal)*

65TH ANNUAL INTERNATIONAL CONFERENCE OF THE WILDLIFE DISEASE ASSOCIATION

The 65th International Conference of the Wildlife Disease Association will be held from July 31 to August 5, 2016 at the Greek Peak Mountain Resort in central New York State. The plenary session will focus on the role of health in sustaining wildlife populations. Two special sessions, Turtle Health and Bringing Social Sciences to Wildlife Research, are also planned. More information can be found on the conference website at <http://www.wildlifedisease.org/wda/CONFERENCES/AnnualInternationalConference.aspx>.

2016 JOINT AMERICAN ASSOCIATION OF ZOO VETERINARIANS/EUROPEAN ASSOCIATION OF ZOO AND WILDLIFE VETERINARIANS/ INSTITUTE FOR ZOO AND WILDLIFE RESEARCH CONFERENCE

The 2016 Joint American Association of Zoo Veterinarians/European Association of Zoo and Wildlife Veterinarians/Institute for Zoo and Wildlife Research Conference will be held from July 16 to 22, 2016 at the Hyatt Regency Atlanta in Atlanta, Georgia. In addition to a full complement of lectures and workshops focusing on zoo and wildlife topics, a 2-day seminar, Exotic Animal Medicine for the Clinical Practitioner, will be offered on July 16 and 17. Seminar topics will include clinical pathology/cytology of fish, cytologic diagnosis of disease, avian radiography, necropsy techniques, animal behavior/learning, avian feather destructive behaviors, reptile digestive medicine, and more. Additional information is available on the conference website at <http://www.aazv.org/?page=2016AnnConfLanding>.

PACIFIC VETERINARY CONFERENCE

The 2016 Pacific Veterinary Conference will be held from June 23 to 26, 2016 at the Hilton San Francisco Union Square in San Francisco, California. The Avian/Exotics track will offer over 25 lectures on birds, exotic companion mammals, and reptiles/amphibians. More information is available on the conference website at <http://www>.

pacvet.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=70&MenuKey=sanfran.

WORLD HEALTH ORGANIZATION OPPOSES GLOBAL CONTROL OF KETAMINE

During the weekend of December 12, 2016, the World Health Organization (WHO) issued a statement opposing a 2015 request by the Chinese delegation to the United Nations to place ketamine under international control in order to reduce recreational abuse of the drug. The decision came after several U.S. veterinary professional organizations voiced their strong concern that restriction of ketamine would adversely impact veterinary care worldwide. In particular, ketamine is the only anesthetic induction agent used for horses in many countries, having been used for 30,000 equine surgeries during 2015 in the United States alone.

Currently, WHO categorizes ketamine as an Essential Drug—defined as a minimum medical necessity for a basic health care system. In the United States, ketamine is classified as a Schedule III drug under the Controlled Substances Act. Were ketamine to be placed under international control, it would be elevated to Class I status with other substances, such as heroin, which are defined as drugs with no medical use.

The WHO Expert Committee on Drug Dependence concluded that “the medical benefits of ketamine far outweigh potential harm from recreational use,” noting that “controlling [ketamine] could limit access to the only anesthetic and pain killer available in large areas of the developing world.”

Next, the United Nations must deliberate on the WHO recommendation when the U.N. Commission on Narcotic Drugs meets in 2016. Until then, a decision on the request made by the Chinese delegation is pending.

NOVEL, NONINVASIVE CONTRAST IMAGING YIELDS DETAILED 3-DIMENSIONAL INFORMATION

A novel, noninvasive method of imaging has recently been developed to view vessels and capillaries in unprecedented detail. BriteVu (Scarlet

Imaging, Murray, UT), a highly radiodense contrast agent containing barium, food grade ingredients, and silica, was developed by Dr. Scott Echols, a board-certified avian specialist, during his search for methods to visualize an animal's full cardiovascular system. BriteVu is easy to use and inexpensive, has minimal toxic effects, and can move from large vessels into the microvasculature throughout the body.

Since BriteVu was launched in the spring of 2015, it has been used worldwide in terminal research studies of reptiles, birds, and mammals as well as in human cadavers. At this point in time, Echols has not pursued licensing by the U.S. Food and Drug Administration for use of BriteVu in live animals.

The unparalleled 3-dimensional views obtained with BriteVu allow researchers to evaluate the cardiovascular system in detail without damaging neighboring tissues. BriteVu will potentially be helpful for:

- (1) improving understanding of anatomy by students and clinicians as well as aiding surgeons in preoperative planning;
- (2) visualizing angiogenesis during embryo formation;
- (3) elucidating the relationship between disease progression and associated blood supply; and
- (4) determining how drugs might be engineered to reach specific targets.

BriteVu was discovered during the course of the Grey Parrot Anatomy Project, a study Echols initiated to evaluate the relationship between avian health and disease. Veterinarians are invited to participate in the project, which is described in more detail at <http://www.avianstudios.com/the-grey-parrot-anatomy-project/>. Examples of BriteVu-enhanced images in multiple animal species can be viewed at: www.ScarletImaging.com and <http://blogs.scientificamerican.com/guest-blog/a-new-view-of-the-cardiovascular-system-in-3-d/>.

NEW NDV-H5NX AVIAN INFLUENZA/ NEWCASTLE DISEASE VACCINE WITH POTENTIAL TO MASS VACCINATE POULTRY

Researchers at Kansas State University (KSU) in collaboration with Adolfo García-Sastre, PhD, of the Icahn School of Medicine at Mount Sinai have developed a vaccine that can protect poultry against Newcastle disease and multiple strains of

avian influenza found in the United States, including H5N1, H5N2, and H5N8. This multidisciplinary approach allowed KSU researchers to test the vaccine against H5N2, the deadliest of the avian influenza viruses, over the course of only 3 months.

The vaccine, called NDV-H5Nx, is live; therefore, antigenic replication is possible in birds. Thus, the vaccine can potentially be aerosolized or administered through water or into embryonated eggs as opposed to currently available H5 vaccines that require hand vaccination of individual birds. NDV-H5Nx also allows differentiation of infected versus vaccinated birds, information which is critical to trade partners.

Development of the vaccine and proof-of-concept methods were presented at a recent meeting of stakeholders and leaders in the U.S. agricultural industry who will support further development and adoption of NDV-H5Nx.

WORLD HEALTH ORGANIZATION ISSUES PRIORITIZATION FOR RESEARCH OF EMERGING DISEASES

In December 2015, the World Health Organization (WHO) issued a list of diseases requiring immediate research to potentially prevent severe outbreaks. The list includes Crimean Congo hemorrhagic fever, Ebola and Marburg virus diseases, Lassa fever, Middle East respiratory syndrome and severe respiratory syndrome coronavirus diseases, Nipha, and Rift Valley fever. These diseases were selected as most likely to cause severe outbreaks and for which few, if any, medical interventions are available. Chikungunya and Zika were designated "serious" in nature, thus requiring research and development efforts as soon as possible. Other diseases currently being addressed in major disease control and research networks include human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), tuberculosis, malaria, avian influenza, and dengue.

The priority list will likely be an important element of the WHO Research and Development Blueprint for infectious diseases with epidemic potential that will be presented in May 2016 at the 69th World Health Assembly in Geneva. The Blueprint was developed subsequent to the work by WHO during the Ebola virus disease outbreak in West Africa. The WHO stated that such epidemics have highlighted the inadequacy of current approaches to the development of vaccines, drugs, and diagnostics for potential large

scale disease threats. In particular, WHO pointed out the unsuitability of market driven research and development models during unpredictable disease outbreaks, particularly in less-developed countries and when faced with an emerging disease.

In announcing the need for a novel research and development paradigm to address future epidemics, WHO has called for outside funding. The organization intends to request proposals for flexible development and production platform technologies for vaccines, therapeutic agents, and diagnostics for the prioritized diseases. Such platforms would develop candidate vaccines or drugs to be used in phase 1 clinical trials prior to confirmed outbreaks and in phase 2/3 clinical trials during a potential epidemic. The Research and Development Blueprint Scientific Advisory Group would then select ideas to be presented during a workshop including WHO Member States and relevant research and development funders.

GENETICALLY ALTERED MICROPIGS TO BE SOLD AS PETS

In September 2015, BGI in Shenzhen, China, a center best known for a number of high-profile breakthroughs in genomic sequencing, decided that the 15-kg “micropigs” the institute originally created for human disease models would be sold as pets. BGI proposed an initial price of 10,000 yuan (U.S. \$1600) to test the market for the genetically engineered Bama breed. The institute intends to offer pigs with varied coat colors and patterns, which BGI states can be set through gene editing.

Bama pigs normally weigh 35-50 kg, so to create the smaller micropigs, BGI made clones using cells harvested from a Bama fetus. However, prior to the cloning process, researchers used transcription

activator-like effector nucleases (TALENs) to disable 1 of 2 copies of the growth hormone receptor gene (*GHR*) in fetal cells. In the absence of the receptor, cells are not signaled to grow during development, thus resulting in stunted pigs. Subsequently, stunted male clones were bred with normal females. While only 50% of the resulting offspring are micropigs, the process is more efficient than cloning and avoids potential cloning-associated health problems. At the time of the announcement, BGI reported that no adverse effects were apparent in the 20 second-generation micropigs.

Although some scientists involved in gene editing are not surprised that the process is being applied to pigs, geneticist Jens Boch at the Martin Luther University of Halle-Wittenberg in Germany, who helped develop the technique used to engineer the pigs, stated that the decision to impact the lives of other animal species should not be made lightly. This situation highlights the more general topic of how to regulate applications of gene editing globally. BGI has endorsed the need to regulate gene editing in pets and in medical-research applications, which constitute the core of the institution's research, and has stated that any profits from the sale of pets will be invested in research.

The genetically engineered pigs will continue to be used as human models of disease in studies of stem cells and gut microbiota. In addition, the animals will facilitate studies of Laron syndrome, a form of dwarfism caused by a mutation in human *GHR*.

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