



THE EEHV CONSORTIUM
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NEHL at the National Zoo
2017. Vol 4 #2

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The EEHV Consortium at National Elephant Herpesvirus Laboratory **Update**



Intervening with Platelet Therapies

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MEETING, LONDON,
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Asian Elephants exposed to EEHV may experience massive internal hemorrhage that can rapidly lead to death. Traditional therapeutic techniques for elephants with EEHV Hemorrhagic Disease (EEHV HD) include antiviral drugs and plasma transfusions, as well as general intensive supportive care. These methods have had some limited success, but infected elephants are still at risk of dying from the hemorrhagic effects of the virus before these techniques help them successfully fend off the infection. Platelet and whole blood transfusion techniques have been successful in humans and domesticated animals such as dogs and cats to counter the effects of blood loss during hemorrhage and in cases of viral hemorrhagic fevers (e.g. Dengue, Ebola, Lassa viruses). However, limited access to sterile refrigeration and sufficient elephant blood volume to maintain a fresh platelet supply undermines the usefulness of this technique for most captive elephant populations. Scientists have developed a method to lyophilize (freeze-dry) platelets from Asian elephants as a way of extending the shelf life of this blood product. Given the high success rate reported in human and canine studies, research has started to explore application of the use of lyophilized platelets in Asian elephants.

Lyophilization of platelets allows for longer-term storage at ambient temperature than traditional platelet transfusion products, providing functional platelets to aid in clotting to intervene in active internal bleeding and other hemostatic abnormalities in critical patients.

Lyophilized platelets have a shelf life of 24 to 36 months and can be rehydrated with sterile water. The decreased overall volume of the dried platelet product and the ability to remain stable at room temperature allows for easier transport and storage to elephant care facilities around the world. To date, lyophilized platelets have shown the greatest success during acute hemorrhagic events in human and canine trials. By taking part in the platelet “sink” effect associated with viral hemostatic imbalances common during excessive bleeding, this treatment is meant to stabilize patients until other treatments and the patient’s immune system can beat back the disease.

The goal in researching the treatment of EEHV with this new technology is to provide a stable method of treatment that avoids traditional limitations of transfusion products including availability of donor animals, storage of donation products, and transfusion reaction risks. The Smithsonian Conservation Biology Institute’s Global Health Program, Houston Zoo, Fort Worth Zoo, the Feld Group, and other elephant care facilities, in collaboration with Cellphire, Inc., and funded by the International Elephant Foundation, are developing a standardized protocol for the production of a freeze-dried platelet product generated from Asian elephant blood. This product will be used to conduct a clinical trial to test its efficacy in treating the hemostatic imbalance caused by EEHV HD, with the eventual goal of having a protocol in place to quickly replenish lost platelets in elephants suffering acute blood loss because of a viral infection.



Figure 1: Lyophilized platelet dose; courtesy of Cellphire, Inc.

PLATELET THERAPY

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Cellphire is working to complete the characterization of Asian elephant platelets to obtain information about the platelet cell signaling mechanisms and functionality, and has demonstrated the ability to adapt the technology from the human and canine studies to develop an initial Asian elephant lyophilized platelet product from donated Asian elephant blood. Looking ahead, additional Asian elephant samples from numerous individuals will be collected to complete the characterization of Asian elephant platelets. This information will not only give further insight into the coagulation process in Asian elephants and potentially guide further treatment developments, but is also vital to evaluation of the lyophilized product on a more standardized basis and ensure avoidance of transfusion reactions due to the immunogenicity of platelets. These samples will also be used to aid in the development of stringent quality control measures that will ensure lyophilized Asian elephant platelets will perform successfully in vivo. Once the standardized protocol for producing lyophilized platelets has been developed, the task of developing and implementing a successful clinical trial will be undertaken to determine the effectiveness of the use of these lyophilized platelets during treatment of acute hemorrhagic events, and predicting how the treatment will impact overall survivability of this devastating illness. Be on the lookout for more developments in this exciting new potential treatment for EEHV HD!

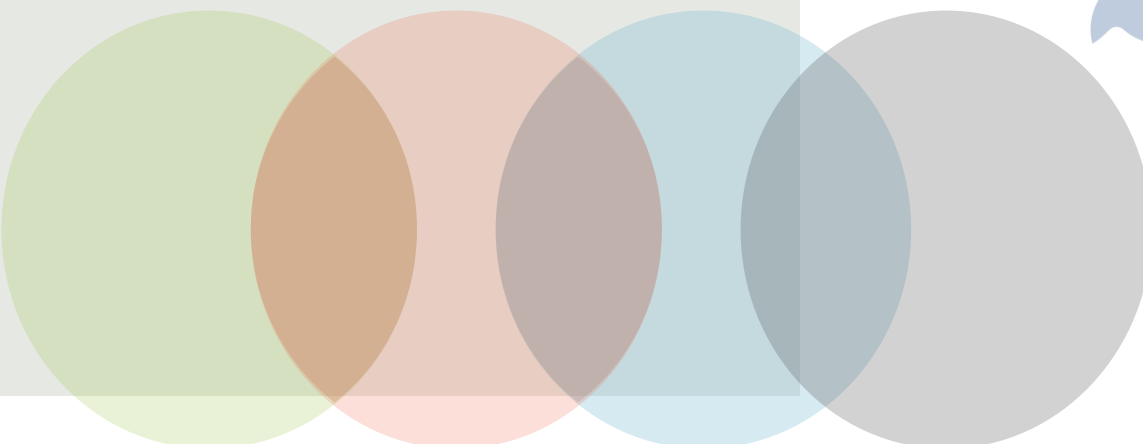
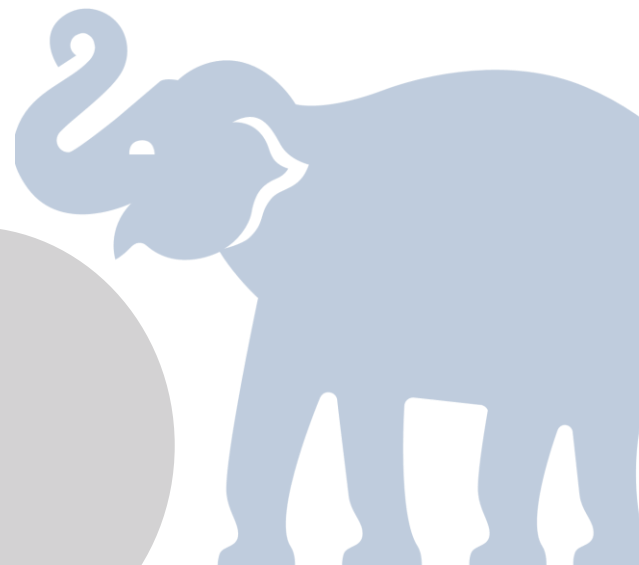


Figure 2: Discussing blood collection methods; courtesy of Ringling Bros. Center for Elephant Conservation

UPCOMING EEHV WG MEETING

There will be a meeting of the EEHV Asia Working Group at The Princess Chulabhorn International Conference Center in Huahin Thailand, Nov 17-18, 2017. Discussion will include EEHV and elephant conservation; updates on EEHV in Asia, Europe, and North America; developing standard EEHV management guidelines for Asia; research and training gaps; and practical sessions on cross-matching and plasma transfusion.

For more information, please contact:
Dr. Supaphen Sripiboon (ssripiboon@gmail.com)





RECENT EEHV PUBLICATIONS

LOPEZ J, VET M SC LD, HAYCOCK J, MCKENZIE A, SEILERN-MOY K, DASTJERDI A. (2017) Assessment of a lancet-and-swab blood sampling technique for surveillance of elephant endotheliotropic herpesvirus infection. *J Zoo Wildl Med.* pp 48(3):659-667.

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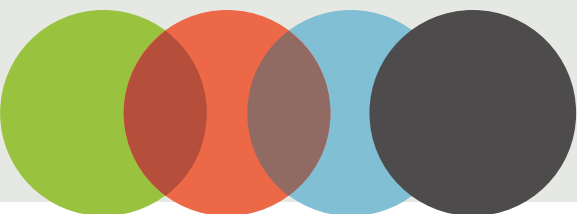
ACKERMANN M, HATT JM, SCHETLE N, STEINMETZ H. (2017) Identification of shedders of elephant endotheliotropic herpesviruses among Asian elephants (*Elephas maximus*) in Switzerland. *PLoS One*; 12(5):e0176891.

DASTJERDI A, SEILERN-MOY K, DARPEL K, STEINBACH F, MOLENAAR F. Surviving and fatal Elephant Endotheliotropic Herpesvirus-1A infections in juvenile Asian elephants - lessons learned and recommendations on anti-herpesviral therapy. (2016) *BMC Vet Res*; 12(1):178.

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TRAINING WORKSHOP

After a request for training in EEHV molecular diagnostics from the attendees of the 1st and 2nd EEHV Asia Working Group meetings in 2015 and 2016, Erin Latimer (Smithsonian's National Zoo) and Supaphen Sripiboon (Kasetsart University) put together funding and planned a training workshop to be held at Kasetsart University in Thailand from Nov 13-15, 2017. Participants will receive hands-on instruction in DNA preparation, polymerase chain reaction (PCR), and DNA analysis, as well as lectures on sample handling, field necropsies, and calf monitoring. They will leave with reagents to start the testing in their own laboratories. These new trainees will then train additional colleagues in Asian range countries to further elephant conservation, EEHV monitoring, and EEHV research. The workshop and additional training trips are made possible by support from Asian Elephant Support, Kasetsart University, Zoological Parks of Thailand, Wildlife Reserves Singapore, and the Smithsonian Institution.



ASIAN ELEPHANT
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THANK YOU

MEMBERSHIP HELPS TO PREVENT ELEPHANT DEATHS

- THE BRONX ZOO
- THE BUFFALO ZOO
- THE CLEVELAND METROPARKS ZOO
- COLUMBUS ZOO AND AQUARIUM
- THE DALLAS ZOO
- DICKERSON PARK ZOO
- FORT WORTH ZOO
- THE HOUSTON ZOO
- MARYLAND ZOO
- OKLAHOMA CITY ZOO AND BOTANICAL GARDENS
- THE OREGON ZOO
- POINT DEFIANCE ZOO & AQUARIUM
- RINGLING BROS. AND BARNUM & BAILEY
- THE ROSAMOND GIFFORD ZOO AT BURNET PARK
- SAINT LOUIS ZOO
- SMITHSONIAN'S NATIONAL ZOO AND CONSERVATION BIOLOGY INSTITUTE
- THE TULSA ZOO

