94) COMPARISON OF ANTI-PHOSPHOLIPID ANTIBODIES BETWEEN WILD AND CAPTIVE BLACK RHINOCEROS (*DICEROS BICORNIS*): IMPLICATIONS FOR HEALTH AND REPATRIATION

Ray L. Ball[1], Matthew Morrow[2], Warren Magnuson[2], Markus Hofmeyr[3] and Peter Buss[3]

[1]Busch Gardens Tampa Bay, 3605 Bougainvillea Drive, Tampa, Fl, 33674, USA, dr.ray.ball@buschgardens.com; [2]Clinical Centre, National Institute of Health, Bethesda, MD, USA; [3]Veterinary Wildlife Services Kruger National Park Private Bag X402, Skukuza, 1350, South Africa

The antiphospholipid syndrome (APS) is defined as the occurrence of venous and arterial thrombosis, recurrent foetal losses, in the presence of the phospholipid antibodies (aPhL) This is a broad definition in a syndrome that can affect virtually any body system. Deep venous thromboses (DVT) and pulmonary embolism (PE) are among the most common clinical presentations of APS. Major-vessel occlusion has also been described in virtually every vessel, including the aorta, branches of the aorta, inferior vena cava, hepatic vein, portal vein, intra-abdominal and intracranial vessels, and the peripheral vasculature of the extremities. The aPhL antibody is associated with many cutaneous conditions, including livedo reticularis, superficial thrombophlebitis, cutaneous necrosis, digital ischemia, gangrene, stasis ulcers of the ankles, epidermal atrophy, splinter haemorrhages of the nailbeds, non-necrotising purpura, and blue-toe syndrome. Recurrent foetal loss is another major component of APS. Cardiac valvular disease is also common in patients with APS. The aPhL proteins result in anti-coagulant activity but actually cause a hypercoaguable state in vivo. The pathogenesis of APS is quite simply thrombosis regardless of the organ system involved. Black rhinos in captivity have been plagued by a host of clinical entities. These include superficial necrolytic dermatitis (SND), hemosiderosis, haemolytic non-haemolytic anaemia and recently the idiopathic hemorrhagic vasculopathy syndrome (IHVS) has been described in a group of black rhinos. Recent thoughts into IVHS suggest that this may indeed be manifestation of a microcoagulation state (D. Paglia pers.comm.). Other conditions affecting black rhinos include encephalomalacia and necrotic laminar disease. Secondary infectious conditions ranging from salmonella, aspergillus pneumonia, and leptospirosis have all been documented. Comparisons between APS and black rhino syndromes may not be obvious at first but there may be some parallels. Again the underlying pathogenesis for all the conditions may be thromboembolic events. Treatment of APS consists of anti-coagulation therapy. One of the most common forms, especially in women with recurrent foetal loss, is low dose aspirin and even warfarin. Warfarin has been utilised in one black rhino with resolution of clinical lameness, normalised fibrinogens, lowering of APS antibodies, and lowered serum ferritin levels. Appetite returned to normal. Nasal haemorrhage from an aspergillosis plaque was uncontrollable one month into sustained therapy before the rhinoceros was euthanased. In an effort to follow this lead, a black rhino specific IgG-aPL ELISA has been developed and validated under the direction of Dr. Sylvia Pierangeli at the Moorehouse School of Medicine in Atlanta. A standard human assay (APhL® ELISA Kit, Louisville APL Diagnostics, Inc., 3988 Flowers Rd. Ste. 620, Doraville, GA 30360, USA) was modified by substituting purified polyclonal black rhino Ig-G for the human Ig-G conjugate. To date 17/28 captive animals have tested positive. All 17 animals have some of the clinical signs associated with medical conditions in black rhinos. Of the 10 negative animals, 8 did not have any clinical signs. Several animals had increased titres with length in captivity. Twenty-one wild black rhinos tested at the Veterinary Science Services facility in the Kruger National Park all had negative titres.

Antiphospholipid antibodies are also elevated in generalised inflammatory conditions. Comparing the two populations of black rhinoceros, it is apparent that there is some inflammatory process that triggers an exaggerated response to APS antibodies in captive

black rhinoceros. The wild rhinoceros all exhibited some clinical manifestations of inflammation (tick loads, wounds, keratitis) but still had negative APS titres. An obvious difference between the two populations is the diet. Future work at BGT will focus on evaluating diet hypersensitivity and the physical form of the diet as the inciting causes. Planned evaluations include food allergy profiles and gastric biopsies during feeding trials with a browser diet consisting of a low starch and high physically effective fibre. Efforts to repatriate indigenous animals to home ranges should not only evaluate current health status and asses risk of infectious disease but also evaluate underlying or predetermining risk that may lead to secondary infectious diseases. Improved nutrition in captivity may lead to healthier animals with lowered risk of introducing infectious diseases to native populations.