

# European-wide study to examine the prevalence of heart disease in apes

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Wild gorillas and chimpanzees are on the brink of extinction threatened primarily by habitat loss and poaching. At the same time, they are among our closest relatives in the animal kingdom and researchers are exploring whether great apes are also susceptible to heart disease, the most common cause of death in humans?

The Ape Heart Project is a European-wide research programme led by leading primate specialists at Twycross Zoo, in collaboration with The University of Nottingham, to investigate why great apes such as chimpanzees and gorillas are prone to [heart disease](#).

Twycross Zoo CEO Dr Sharon Redrobe was responsible for initiating this long term research study over the next 10 years, which will contribute to our growing understanding of the management and welfare of primates in human care. The Ape Heart Project is endorsed by the European Association of Zoos and Aquaria (EAZA), for which Redrobe, an internationally renowned primate expert, is the veterinary adviser to the Great Ape Taxon Advisory Group (TAG).

Dr Victoria Strong, from the University's School of Veterinary Medicine and Sciences is the first of several doctoral students to begin work on this research project at the zoo and is hoping to pinpoint which form of heart disease most commonly affects primates and why they develop the illness.

Dr Strong explains: "At the moment we're unsure why great apes in

human care develop heart disease. We have also yet to find out whether their wild counterparts are affected to the same degree. We know that those primates living in zoos tend to live longer than their counterparts in the wild, as they are protected from threats such as exposure to infectious diseases, predation or poaching. So perhaps the answer could be connected to age-related degeneration."

Dr Strong is working as part of the team at Twycross Zoo led by Dr Sharon Redrobe, who is also an honorary associate professor at the University's Vet School and a Trustee of Ape Action Africa, a charity supported by Twycross Zoo, which is committed to protecting Cameroon's endangered great apes. This cooperation provides a vital link between studying great apes in the wild with those living in zoo environments and members of Twycross Zoo's primate team visit Cameroon several times each year to provide veterinary support to conservationists working in the field.

The Ape Heart Project has undertaken a retrospective mortality review across all of the European zoo collections for great apes over an 11 year period up until the end of 2014, which covers the study of a total of 151 gorillas, 384 chimps, 120 orangutans and 47 bonobos - the latter being unique to Twycross amongst the UK zoos.

This important study has established that heart disease is a major cause of death in adult chimps, bonobos and gorillas in human care and the researchers expect to find similar outcomes in orangutans when the data analysis is completed.

The mortality study also uncovered major differences in the way in which post-mortem examinations were conducted in zoos across Europe, making it difficult to easily compare results from various individuals. Dr Strong is working with veterinary pathologist Dr Kerstin Baiker (also from the University's School of Veterinary Medicine and Science) and

has produced a protocol, which has been adopted by zoos across Europe to standardise the approach to cardiac post-mortem examination and sample collection.

The researchers involved in the study also receive hearts from great apes that die in zoos and sanctuaries from across the world and carry out detailed pathology to establish whether heart disease is the likely cause of death. Working in collaboration with Professor Mary Sheppard, a human cardiac pathologist and sudden cardiac death specialist at St. George's University, London, they also aim to pinpoint the type of heart disease which is at play. So far, they have been able to carry out a detailed analysis of hearts from nineteen chimps, two orangutans, two bonobos and three gorillas and have more individuals yet to examine.

Coronary heart disease (ischaemic heart disease) is the leading cause of death in humans both in the UK and worldwide and is linked to lifestyle factors such as a poor diet and sedentary lifestyles. Given our anatomical similarities to our [great ape](#) cousins, could these lifestyle factors also affect primates' mortality in captivity? Probably not, says Dr Strong. "In humans we most commonly see the build-up of fatty deposits that causes atherosclerosis, which is caused by eating badly and exercising rarely, but so far this is not what we are seeing in apes. In the apes we are observing the death of the cardiac muscle, which is then replaced by scar tissue. At present we do not know what might be causing heart tissue degeneration, but we are looking into the role that genetics, nutrition and even viruses might play."

The project has also produced guidelines aimed at improving heart screening in European zoos, recommending that all great apes which undergo veterinary procedures involving anaesthesia, routinely have their blood pressure assessed; a 12-channel ECG performed; cardiac biomarkers measured; and a heart ultrasound carried out, to enable zoos to help identify animals with heart disease before it is too late for

treatment.

At Twycross Zoo, both vets and keepers are leading the field in ape heart screening. As part of its chimp integration programme, in which the zoo is aiming to increase the size of the social groups in which their chimps live to mimic those seen in the wild, any animals which undergo anaesthesia routinely have their hearts screened. In addition, the zoo is training its chimps for conscious ECG assessment, in which the animals present their chests to the keepers for 30-60 seconds, which allows the team to measure their heart rate and rhythm using specially designed probes.

Visitors to Twycross Zoo can find out more about the Ape Heart Project through a new interactive signage designed by Dr Strong and funded with £500 by a grant awarded by The University of Nottingham's Catalyst Partnership. Adjacent to a life-sized picture of one of the zoo's chimps, the signage offers visitors the chance to listen to a chimp's heart beat and gather some basic information about the research programme via a video screen.

Dr Sharon Redrobe concludes: "The Ape Heart Project is really only in its infancy and while it represents an extremely important research initiative, the scope of the study will inevitably widen over the next decade and beyond as we begin to study different factors affecting ape heart health."

Provided by University of Nottingham

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