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Media Contact:

Sharon Dewar, Public Relations Director

312-742-2246; SDewar@lpzoo.org

Origins of Deadliest Strain of Human Malaria Discovered

Chicago (Sept. 22, 2010) – Investigations by an international consortium of scientists has discovered the origin of the world’s deadliest form of human malaria, *Plasmodium falciparum*. The findings indicate this strain of malaria, responsible for hundreds of millions of infections and more than one million deaths per year, is of gorilla origin, and not chimpanzee, bonobo or ancient human origin as originally theorized. The findings are published in the September 23 edition of the journal *Nature*.

Malaria is a blood infection caused exclusively by the bite of the *Anopheles* mosquito. Of the five types of mosquito borne *Plasmodium* parasites that cause malarial infection in humans, *P. falciparum* causes the greatest morbidity and mortality. Its greatest impact is on children. In Africa a child dies every 45 seconds from malaria, according the World Health Organization, and the disease accounts for 20 percent of all childhood deaths worldwide. By far, Africa is most impacted, accounting for more than 85 percent of the world’s malaria deaths.

While much progress has been made in the treatment and prevention of malaria, the origin and reservoir(s) of *P. falciparum* remained controversial until now.

“Until recently, the closest known relative of this strain of malaria was a chimpanzee parasite which was assumed to have diverged from its human counterpart at the same time as the ancestors of chimpanzees and humans more than five million years ago,” explained Beatrice Hahn, Professor of Medicine at the University of Alabama at Birmingham, the lead author of the study. The recent findings reject that theory, and shed new light on the deadliest malaria strain.

Twenty-two researchers collaborated on the investigation which involved conducting DNA sequences of fecal samples collected from wild-living apes. Nearly 3,000 specimens from numerous field research sites throughout Central Africa were examined. The data indicate that chimpanzees and western lowland gorillas represent substantial *Plasmodium* reservoirs, with *P. falciparum* being of western gorilla origin. The authors were surprised to find that no *Plasmodium* infection was detected in eastern gorillas or bonobos suggesting that malaria parasites are rare or absent in some wild-living ape communities. Additional field studies are needed to determine if eastern gorillas and bonobos are infected with *Plasmodium* at other locations, or if they harbour divergent parasites not detected by current diagnostic assays.

“An important finding was that gorillas in the Goualougo Triangle (Republic of Congo), showed high prevalence of *Plasmodium* infection,” explained Chicago’s Lincoln Park Zoo researcher Dave Morgan, PhD, an author on the study who leads the Goualougo Triangle Ape Project. “This population of gorillas is very important in terms of understanding the ecology of malaria and its relation with gorillas. One important question and area of further research is if current gorilla populations represent a source of recurring infection of malaria in humans.”

Morgan explained the significance of this study, as it sheds new light on what scientists know about malaria, which will help in the fight to eradicate it. “Studies like this can assist in developing better malaria eradication strategies as well as provide information on how *Plasmodium* has evolved and adapted in both apes and humans,” said Morgan.

The international consortium comprises researchers from Centre de Recherche Medicale, Cameroun, Chicago’s Lincoln Park Zoo, Harvard Medical School, Harvard University, State University of New York, University of Alabama at Birmingham, University of Edinburgh, University of Kisangani, University of Montpellier, University of New Mexico, VaccinApe, Washington University, Wellcome Trust Sanger Institute and Wildlife Conservation Society.

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Chicago's Lincoln Park Zoo, a historic landmark founded in 1868, is dedicated to connecting people with nature by providing a free, family-oriented wildlife experience. A leader in conservation science both globally and locally, the zoo exemplifies the highest quality animal care and educational outreach. The not-for-profit zoo, managed by The Lincoln Park Zoological Society, is a member-supported organization and one of the nation's only free, privately managed zoos. For more information, call 312 -742-2000 or visit www.lpzoo.org.