The population size of *Mycobacterium ulcerans* in the Congo River basin reflects the intensity of control efforts: is the human reservoir important?

L'ampleur de la population de Mycobacterium ulcerans dans le bassin du Fleuve Congo reflète l'intensité des efforts de lutte : le réservoir humain est t'il important ?

Vandelannoote K[1,2]#, Mavinga DP[3], Kibadi AK[4], Eddyani M[1], Meehan JC[1], Jordaens K[5], Leirs H[2], Portaels F[1], Stinear PT[6], Harris RS[7], Bouke C. de Jong[1]

Summary

Background. Buruli ulcer (BU) is a slowly progressing necrotizing disease of skin and subcutaneous tissue caused by infection with the pathogen *Mycobacterium ulcerans*. After almost 70 years of study in Africa, the mode of transmission and the non-human reservoir(s) of BU are still largely unknown. The vastly greater resolution offered by genomics is opening up new possibilities to explore the pathogen's cryptic epidemiology and disease ecology.

Methods. In this retrospective study, we aimed to use comparative second and third generation genomics to explore the molecular epidemiology of BU at the continental scale, and at the smaller geographical "village scale" in a BU endemic region of The Democratic Republic of Congo. We used both temporal associations and the study of the mycobacterial demographic history to estimate the contribution of humans as a reservoir in BU transmission.

Results and conclusion. We identified a relationship between the observed past population dynamics of *M. ulcerans* from the Songololo Territory and the timing of health policy changes managing the BU epidemic in that region. We propose that humans with actively infected, openly discharging BU lesions inadvertently contaminate community water sources during bathing/wading and as such indirectly expose naïve individuals to the etiological agent.

Keywords: Buruli ulcer, molecular epidemiology, *Mycobacterium ulcerans*, Democratic Republic of Congo

1 Department of Biomedical Sciences, Institute of Tropical Medicine, Nationalestraat 155, 2000 Antwerp, Belgium;
2 Evolutionary Ecology Group, University of Antwerp, 2020 Antwerp, Belgium;
3 Institut Médical Evangélique, Kimpese, Democratic Republic of Congo;
4 Institut National de Recherche Biomédicale, Kinshasa, Democratic Republic of Congo
5 Invertebrates Section, Royal Museum for Central Africa, 3080 Tervuren, Belgium;
6 Department of Microbiology and Immunology, University of Melbourne, 3010 Victoria, Australia;
7 Wellcome Trust Sanger Institute, Genome Campus, Cambridge, UK
#Address correspondence to Koen Vandelannoote, Department of Biomedical Sciences, Institute of Tropical Medicine, Nationalestraat 155, 2000 Antwerp, Belgium; kvandelannoote@itg.be; Tel:(+32)32476318