

Genomic surveillance of *Leishmania*: countering the neglect

Jean Claude Dujardin

Molecular surveillance by pathogens' genotyping is essential for preparing and monitoring control programs. While this approach is well established for many infectious diseases (a.o. Covid-19, malaria), it is underdeveloped for leishmaniasis. In 2020, we wrote a review on the need to counter this neglect and highlighted the added value of whole-genome sequencing (WGS) in answering six overlapping questions of public health importance (a). This review has guided our efforts to bridge this gap. We first demonstrated the value of sequencing parasite's genomes directly from clinical samples (and not isolates) and developed a sensitive method for this approach. Secondly, we performed a series of proof-of-principle studies to demonstrate the unprecedented power of WGS in answering the six questions. (1) We inferred -over 150 years the evolution of *Leishmania donovani* and drug resistance in the Indian subcontinent. (2) We detected new variants of *L. donovani* in hilly districts of Nepal and in Kenya, and *L. tropica* in Ethiopia. (3) We identified the source of new outbreaks of *L. donovani*, in Western Nepal. (4) In Peru we established a link between treatment failure and co-infection of *L. braziliensis* and Leishmania RNA virus. (5) In Morocco, we tracked the circulation of *L. tropica* among humans, at micro-focal level. (6) In all the countries and *Leishmania* species studied, we documented frequent sexual recombination. Further steps are still needed to allow establishment of a *Leishmania* genomic surveillance platform on top of regular surveillance: a.o. capacity building, standardization, integration of genomic sequences with clinical and epidemiological databases.

(a) Domagalska MA & Dujardin JC. Trends Parasitol 36, 356-367 (2020)

Short biography

I am biologist, specialised in Parasitology. I am full professor at ITM, where I lead the Molecular Parasitology Unit (MPU); I am also teaching in UAntwerpen and UNamur. I am worldwide recognised as a multidisciplinary expert on the biology of *Leishmania* (genomics and drug resistance) and on parasitological aspects of leishmaniasis (treatment failure, molecular diagnostics and epidemiology). I developed a strong research vision at ITM, from the field to the lab and for the field. I coordinated several EU funded projects and for more than a decade, I coordinated the DGD-funded program of scientific collaboration in Peru. I (co-)organised 18 international conferences and gave more than 200 presentations. All over my career, I have trained 32 MSc and 27 PhD students, both of European and Southern origin and I hosted 13 postdocs. In 2027, I will pass the flame ... Salud por todo/as.

