

# Sleeping sickness, Chagas disease, leishmaniasis—a multitude of healthy carriers

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Credit: IRD / V. Jamonneau

Humans can tolerate the parasites responsible for sleeping sickness, Chagas disease and leishmaniasis for many years. These parasites belong to the same family of pathogens known as trypanosomatids. IRD and Cirad researchers have highlighted this tolerance phenomenon in

humans, which results from the genetic evolution of the populations being exposed.

They point out that healthy carriers actually represent the vast majority of people contaminated by trypanosomatids. It is imperative to take this previously overlooked natural reservoir into account in the [public health](#) programmes in order to eradicate these diseases by 2020, in accordance with the WHO's objectives.

Sleeping sickness, Chagas [disease](#), leishmaniasis, etc. all these ignored diseases are caused by the same family of parasites: trypanosomatids.

## **Widespread tolerance to parasites**

In a vast review study, IRD and Cirad researchers highlighted that humans can live with these pathogens for many years before falling ill or getting rid of them. This phenomenon, known as "trypanotolerance", which is well known in animals, has been taken into account for a long time to prevent the disease from developing in African livestock farms, by selecting the most tolerant animals. In humans, however, it has only been identified recently and was the subject of very limited research up until now.

During this review, the scientists scrutinised all epidemiological and detection research work conducted on these diseases throughout the world. As a result, they discovered the existence of numerous "healthy carriers" among contaminated individuals. This phenomenon could actually be the rule, rather than the exception, as previously believed!

## **A genetic heritage**

This tolerance to parasites partly stems from DNA mutations in the

exposed populations. For the sleeping sickness in particular, it seems that certain populations living in endemic areas of Africa have developed a tolerance to the *Trypanosoma brucei gambiense* parasite. These mutations have most likely been instrumental in the natural selection process in Africa.

In the case of leishmaniosis and the Chagas disease, for which this tolerance is known and widespread, the new study points out that a human's resistance or sensitivity to these infections also depends on genetic factors. Although these factors present similarities for all these diseases, they were addressed separately in public health programmes up until now.

## **A godsend or an obstacle in the eradication of these diseases?**

Healthy carriers are therefore capable, after a vector insect bite (e.g. the tsetse fly for [sleeping sickness](#)) of limiting the proliferation of [parasites](#) in their body, and thereby controlling their pathological effects, for many years in some cases. This discovery gives researchers the opportunity to study the immune responses which allow the body to control infections caused by trypanosomatids. Understanding the biological mechanisms of trypanotolerance will pave the way for vaccines and therapeutic targets, which do not yet exist.

However, these unaware contaminated people are not included in the public health schemes and could maintain a natural reservoir for these diseases, particularly in areas where the vector has not yet been eliminated. Their frequency across the world, as underlined by this research, must be taken into account in the roadmap of the World Health Organisation (WHO), which has set the goal of eradicating these diseases by 2020.

**More information:** David Berthier et al. Tolerance to Trypanosomatids: A Threat, or a Key for Disease Elimination?, *Trends in Parasitology* (2016). [DOI: 10.1016/j.pt.2015.11.001](https://doi.org/10.1016/j.pt.2015.11.001)

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