

# Study reveals the role of sex in spread of deadly disease

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Research involving scientists at the University of York has provided important new information about transmission of human leishmaniasis, a group of infectious diseases which kills more than 100,000 people a year.

Professor Deborah Smith of the Centre for Immunology and Infection at York, working with colleagues at the Wellcome Trust Sanger Institute and Charles University in Prague, has shown that *Leishmania* parasites reproduce sexually in the wild.

The research, published in *PLOS Genetics*, is a significant step forward in understanding how [leishmaniasis](#) is spread in endemic regions. Caused by *Leishmania* parasites, human leishmaniasis is a serious public health problem in more than 90 countries worldwide. There are high fatality rates among children and young people and those with suppressed immune systems. Pharmaceutical treatments are limited and there is no vaccine.

These microscopic organisms infect humans through the bite of a female blood-feeding sand fly carrying infective parasites in its gut. People only become infected, therefore, in geographical regions that are well-suited to support sand fly populations—those with suitable habitats, humidity and temperature. But the biology of the parasite in the sand fly is also critically important in determining the outcome of infection in man.

The new research uses DNA sequencing to investigate genetic variation

at the highest level of resolution in *Leishmania* parasites isolated from sand flies caught in a defined focus of human leishmaniasis in south-east Turkey. This analysis provides evidence that *Leishmania* [parasites](#) can reproduce sexually in wild-caught sand flies, an event only detected previously under specialised laboratory conditions.. It also establishes, for the first time, quantitative estimates of the relative rates of sexual and asexual reproduction during the parasite life cycle.

Professor Smith said: "This information is critical to our understanding of how *Leishmania* has become genetically-adapted for successful transmission by sand flies to man and the resulting spread of human disease."

**More information:** "Genomic Confirmation of Hybridisation and Recent Inbreeding in a Vector-Isolated *Leishmania* Population" is published in *PLOS Genetics* at [www.plosgenetics.org/doi/pgen.1004092](http://www.plosgenetics.org/doi/pgen.1004092)

Provided by University of York

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