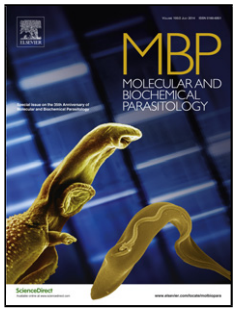

Title: The nuclear envelope and gene organization in parasitic protozoa; specializations associated with disease.

Author: Samson O. Obado Lucy Glover Kirk W. Deitsch

PII: S0166-6851(16)30097-4
DOI: http://dx.doi.org/doi:10.1016/j.molbiopara.2016.07.008
Reference: MOLBIO 11008

To appear in: *Molecular & Biochemical Parasitology*

Received date: 4-4-2016
Revised date: 12-7-2016
Accepted date: 26-7-2016

Please cite this article as: Obado Samson O, Glover Lucy, Deitsch Kirk W.The nuclear envelope and gene organization in parasitic protozoa; specializations associated with disease.*Molecular and Biochemical Parasitology* http://dx.doi.org/10.1016/j.molbiopara.2016.07.008

The nuclear envelope and gene organization in parasitic protozoa; specializations associated with disease.

Samson O. Obado[1*], Lucy Glover[2] and Kirk W. Deitsch[3]

[1]The Rockefeller University, Laboratory of Cellular and Structural Biology, Box 213, New York, NY, 10065, USA.

[2]Department of Parasites and Insect Vectors, Institut Pasteur, Paris, France.

[3]Department of Microbiology and Immunology, Weill Cornell Medical College, New York, NY, 10065, USA

[*]Corresponding author.

Highlights;

- *Trypanosoma brucei* and *Plasmodium falciparum* are two well-studied and evolutionarily distant protozoan parasites that utilize similar strategies to evade the host immune system.
- Both parasites utilize strict monoallelic transcription to express only one of their multi-copy surface antigens and virulence genes at any given time, whilst simultaneously silencing the expression of multiple other copies and variants of the same gene within their genome.
- To achieve this, both parasites take advantage of specialized chromatin associated with telomeric regions of chromosomes to silence the expression of other copies of their surface antigens.
- In conjunction with telomeric chromatin, both parasites locate their telomeres in subnuclear compartments associated with non-permissive transcription, especially the heterochromatic regions in the nuclear periphery.

Abstract.
The parasitic protozoa *Trypanosoma brucei* and *Plasmodium falciparum* are lethal human parasites that have developed elegant strategies of immune evasion by antigenic variation. Despite the vast evolutionary distance between the two taxa, both parasites employ strict monoallelic expression of their membrane proteins, *variant surface glycoproteins* in Trypanosomes and the *var*, *rif* and *stevor* genes in Plasmodium, in order to evade their host's immune system. Additionally, both telomeric location and epigenetic controls are prominent features of these membrane proteins. As such, telomeres, chromatin structure and nuclear organization all contribute to control of gene expression and immune evasion. Here, we discuss the importance of epigenetics and sub-nuclear context for the survival of these disease-causing parasites.

Keywords: Trypanosome; Plasmodium; Nucleus; Transcription; Immunity; Heterochromatin