1069-57-148 **J Arsuaga** and **Y Diao*** (ydiao@uncc.edu), Department of Mathematics and Statistics, UNC Charlotte, 9201 University City Blvd, Charlotte, NC 28223, and **R Kaplan** and **M Vazquez**. *The effects of density on the topological structure of the mitochondrial DNA from trypanosomes.* Preliminary report.

Trypanosomatid parasites, trypanosoma and lishmania, are the cause of disease and death in many third world countries. One of the most unusual features of these organisms is the 3 dimensional organization of their mitochondrial DNA into maxi and minicircles. In some of these species minicircles are confined into a small volume and are interlocked, forming a gigantic network. How this network was selected during evolution and how it is maintained, replicated and segregated is mostly unknown. Here we investigate the effects of minicircle density on the topology of the network using a simplified model where randomly oriented minicircles are placed on the plane with their centers on the vertices of the simple square lattice. We analytically show that a finite positive critical percolation density exists and that the probability of a network is completely saturated approaches one exponentially as the density increases when the minicircle field is bounded. We carried out numerical studies to estimate these quantities and also to estimate biologically relevant properties of the network (such as the average valence of the network). Our simulations show that the mean valence of the network near saturation density is close to 3 and the obtained network is rather heterogeneous. (Received January 21, 2011)