

## ***Trypanosoma cruzi*: A new vision of an old knowledge.**

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*Trypanosoma cruzi* is the protozoan that causes Chagas disease. It divides in the insect vector gut or in the cytosol of an infected mammalian cell. Although the protozoan ultrastructure has been extensively described, little is known about how it changes during the cell division cycle (1-6). Also, as simple eukaryotes, *T. cruzi* have one mitochondria, one Golgi complex, one flagellum and one cytostoma, and are therefore good models to understand how organelles are generated during cell division. Here we provide 3D reconstructions based on images obtained from serial sections on electron microscopy of these parasites at different stages of cell cycle. The parasites were fixed in a mixture of formaldehyde and glutaraldehyde, post-fixed in osmium tetroxide, contrasted with a solution of uranyl acetate membrane contrast enhancement, dehydrated in an ethanol series and embedded in Epon resin. Ultrathin serial sections of parasites were obtained, analyzed and photographed in a transmission electron microscope (JEOL model microscope, JEM1200EX2). "Reconstruct" software (7) was used for alignment and mounting stacks for the production of a representative 3D models. Subsequently, models of certain structures were merged with the "Blender 3D" modeling software. The localization and distribution of organelles was evaluated and attributed to specific morphological patterns and deduced by distribution of markers by immunofluorescence analysis. We observed a constant arrangement of nuclear chromatin from G1 to G2 phases. The disk shaped kinetoplast, which is the mitochondrial DNA, duplicates and their division starts from the interior, concomitant with the growth of the new the flagellum. The kinetoplast is accommodated within the unique and branched mitochondria. From G1 to mitosis there is an increase in the size and number of electron dense endocytic vesicles (reservosomes). The single Golgi complex localized in the anterior part of the cell enlarge before division. Finally, there is a progressive retraction of the cytostome relative to the nucleus before the formation of a new endocytic structures. This study can help understanding how organelles are formed during cell division in an eukaryotic organism.

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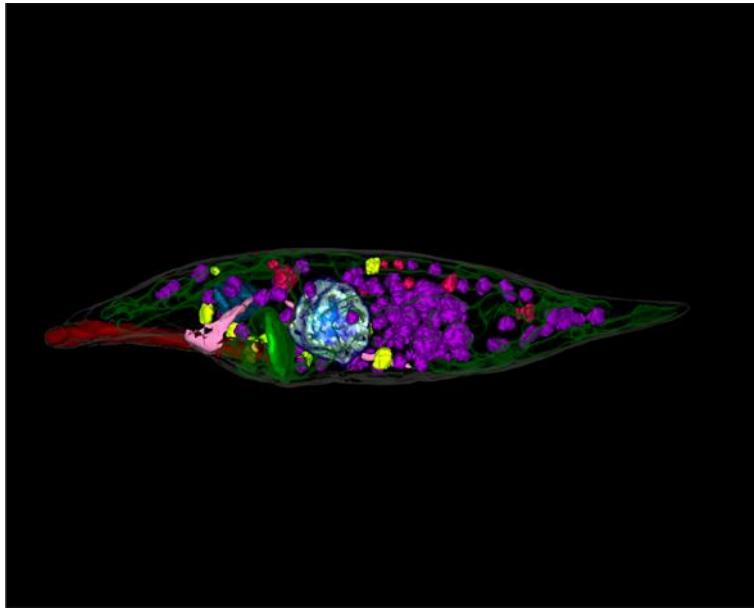


Figure 1 –Three-dimensional reconstruction during the G1 phase of the epimastigote form of the T.cruzi rendering generated in the program Blender ®.

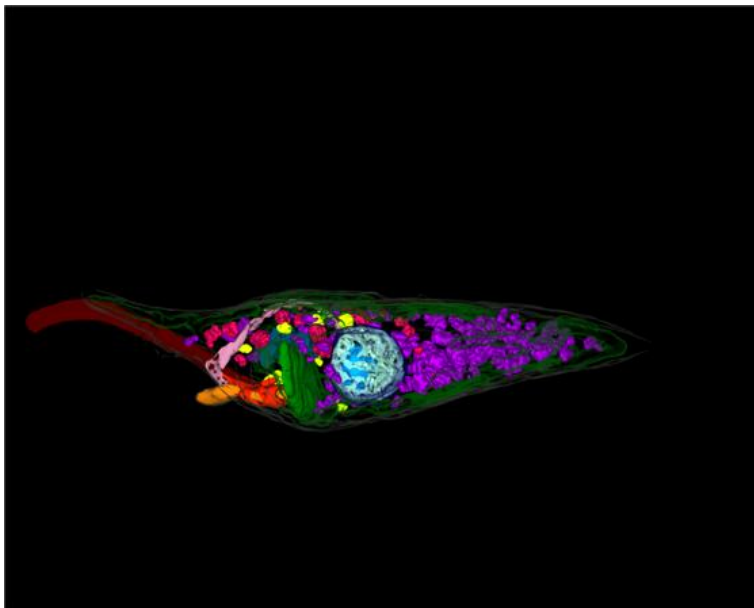


Figure 2 –Three-dimensional reconstruction during the G2 phase of the epimastigote form of the T.cruzi rendering generated in the program Blender ®.