In vitro anti-parasitic action and morphological aspects of effects of thiosemicarbazones and its 4-thiazolidinone derivatives on extracellular and intracellular Trypanosoma cruzi

L. P. Carvalho¹, M. A. G. B. Gomes², E. J. Maria², R. R. Oliveira², A. O. Carvalho³ E.J.T. Melo¹

¹ Universidade Estadual do Norte Fluminense, Centro de Biociências e Biotecnologia, Laboratório de Biologia Celular e Tecidual, Campos dos Goytacazes, RJ, 28013-602, Brazil
² Universidade Estadual do Norte Fluminense, Centro de Ciência e Tecnologia, Laboratório de Ciências Químicas dos Goytacazes, RJ, 28013-602, Brazil.
³ Universidade Estadual do Norte Fluminense, Centro de Biociências e Biotecnologia, Laboratório de Fisiologia e Bioquímica de Microorganismos, RJ, 28013-602, Brazil.

INTRODUCTION: Trypanosoma cruzi is an obligate intracellular parasite that causes Chagas Disease. The life cycle of T cruzi depends on an invertebrate host (vector) and a vertebrate host. In the cytoplasm of the host cell occurs the differentiation process from trypomastigotes to amastigotes that, after many binary division, spread to all cytoplasmic space. The drugs used during the treatment of Chagas Disease, as Rochagan, are effective only during the acute phase of infection, while the parasites are present in bloodstream. Since the current drugs are inefficient against intracellular parasites, they also induce many side effects and resistance of the parasite. Thence, alternative drugs are necessary to treat the disease. This study shows the anti-proliferative effects of drugs belong to thiosemicarbazone class and their derivatives thiazolidinones against intra and extracellular parasites. MATERIALS AND METHODS: epimastigotes were incubated with the compounds during 24-120 h in concentrations ranging from 0.1-10 mM. Vero cells were infected with trypomastigotes during 48h and after the culture was incubated with the drugs at 1mM, 24 h. All compounds were dissolved in DMSO at 1% v/v and DMEM medium. Morphologic and ultrastructural analyses were done using transmission and scanning electron microscopy, and quantification of cells and parasites were done by light microscopy. RESULTS AND DISCUSSION: the compound 3-(4-nitrobenzaldehyde-3-thiosemicarbazone ) was the most effective and induced the elimination of 80% of intracellular parasites at 1 mM and showed LD50 at 20 µM to host cells, after 24 h treating. For extracellular parasites, the compound 1 (benzaldehyde-3-thiosemicarbazone) induced a greater reduction of epimastigotes at 0.1 mM, 24 h of treatment. The mechanisms of action of thiosemicarbazones and thiazolidinones are associated with the inhibitions of Ribonucleotide Reductase. CONCLUSION: all assays induced to reduction in number of parasites due to the interruption of life cycle of the parasite, and its posteriorly destruction.
Key words: Anti-proliferative drugs; Thisemicarbazones, Thiazolidinones; Trypanosoma cruzi.

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