Effect of Artesunate on *Toxoplasma gondii*:

In Vitro and In Vivo Experimental Studies

Thesis
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By

Rasha Abdallah Meselhey

M.B, B.Ch
Demonstrator of Medical Parasitology
Faculty of Medicine, Ain Shams University

Under Supervision of

Prof. Dr/ Doreya Mohsen Mahmoud

Professor of Medical Parasitology
Faculty of Medicine, Ain Shams University

Prof. Dr/ Manal Salah El-Din Mahmoud

Professor of Medical Parasitology
Faculty of Medicine, Ain Shams University

Dr/ Hayam Mohammed Ezz El-Din

Lecturer of Medical Parasitology
Faculty of Medicine, Ain Shams University

Medical Parasitology Department
Faculty of Medicine, Ain shams University

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Contents

Abstract

Toxoplasma gondii, the causative agent of toxoplasmosis, is an obligate intracellular protozoan able to infect a wide range of vertebrate cells. The most common therapy for toxoplasmosis is the combination of sulfadiazine and pyrimethamine. This treatment is associated with adverse reactions, thus, the development of new drugs is necessary. The effect of artesunate in vitro and in vivo was studied. In vitro experiments were performed with the VERO cell line infected with RH virulent *T. gondii* strain using multiple concentrations. A maximum reduction of tachyzoites viability of approximately 83.33% was obtained with a concentration of 0.1μg/ml artesunate after 48 hours. Transmission electron microscopic analysis showed morphological changes of the parasites including membrane damage, organelle vesiculation and then complete disruption. Also it revealed progressive vesiculation in the cytoplasm of treated parasites which did not occur in the host cell. Vesiculation inside the parasite resulted in its death, In vivo, artesunate produced a decrease in cerebral cyst count of approximately 48% after 8 days of treatment in immunocompetent group compared to untreated control group.

Key words: *Toxoplasma gondii*, artesunate, in vitro and in vivo

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List of Abbreviations

ACTs	Artemisinin Combination Therapies
AIDS	Acquired immunodeficiency syndrome
ART	Artemisinin
CO2	Carbon dioxide
CMV	Cytomegalovirus
CNS	Central nervous system
CSF	Cerebrospinal fluid
CT	Computed tomography
DAT	Direct Agglutination test
DNA	Deoxyribonucleic acid
DHA	Dihydroartemisinin
DHFR	Dihydrofolate reductase
DHPS	Dihydropteroate synthase
ELISA	Enzyme linked immunosorbent assay
IFAT	Indirect immunofluorescence
Ig	Immunoglobulin
IHAT	Indirect haemagglutination test
HIV	Human immunodeficiency virus
Hrs	Hours
IL	Interleukin
ISAGA	Immunosorbent Agglutination assay
LAT	Latex Agglutination Test