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The effect of lopinavir/ritonavir and lopinavir/ritonavir loaded PLGA nanoparticles on experimental toxoplasmosis

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After the introduction of HIV protease inhibitors (HIV-PIs), a marked reduction has been achieved in the incidence and clinical course of toxoplasmic encephalitis. The current work was undertaken to study for the first time, the efficacy of HIV-PIs against *Toxoplasma gondii* infection in acute experimental toxoplasmosis. Lopinavir/Ritonavir (L/R) was used in the same ration present in alluvia, a known HIV-PIs drug used in the developing countries in the regimens of AID's patient treatment. Poly lactic-co-glycolic acid (PLGA) nanoparticles were used as a delivery system to L/R therapy. Both forms caused parasitological improvement. The higher efficacy was achieved by using L/R PLGA together with decrease in the effective dose. There was reduction in the parasite count in the peritoneum and the liver, parasite viability and infectivity. The antitoxoplasma effect of the drug was attributed to the morphological distortion of the tachyzoites as evident by the ultrastructure examination. Moreover, the treatment affected the egress of tachyzoites which remained enclosed within a membranous structure thus delayed the infection of new host cells. L/R also induced apoptosis and autophagy in extracellular and intracellular *Toxoplasma gondii* tachyzoites. The parasitophorous vacuole membrane was disrupted and vesiculated. The nanotubular networks inside the parasitophorous vacuole that are involved in nutrient acquisition were disrupted. Therefore, the present work opens a new possible way for the approved HIV-PIs as an alternative treatment against acute toxoplasmosis. Furthermore, it increases the list of the opportunistic parasites that can be treated by this drug. The successful in vivo effect of HIV-PIs against *Toxoplasma gondii* suggests that this parasite could be a target in HIV treated patients, thus decreases the possibility of toxoplasmic encephalitis development.

Biography

Iman Abou-El-Naga is a Professor of Medical Parasitology Department, Faculty of Medicine, University of Alexandria, Egypt. She has been working in the field of Medical Parasitology for the last 35 years, teaching Undergraduate and Post-graduate Medical students. She has published more than 30 publications. She is interested in the field of Helminthology specially Schistosoma and Toxocara as well as protozoology specially *Toxoplasma, Microsporidia, Cryptosporidia and Leishmania*.

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