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SDS-coated atovaquone nanosuspensions show improved therapeutic efficacy against experimental acquired and reactivated toxoplasmosis by improving passage of gastrointestinal and blood-brain barriers

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Toxoplasmic encephalitis (TE) is the most common clinical manifestation of reactivated infection with Toxoplasma gondii in immunocompromised patients that is lethal if untreated. The combination of pyrimethamine plus sulfadiazine or clindamycin is the standard therapy for the treatment of TE, but these combinations are associated with hematologic toxicity and/or life-threatening allergic reactions. Therefore, alternative treatment options are needed. Atovaquone is safe and highly effective against T. gondii in vitro, but the oral micronized solution shows poor bioavailability. We synthesized atovaquone nanosuspensions (ANSs) coated with poloxamer 188 (P188) and sodium dodecyl sulfate (SDS) to improve oral bioavailability and passage through the blood-brain barrier (BBB). Coating of ANSs with SDS resulted in enhanced oral bioavailability and enhanced brain uptake of atovaquone compared to Wellvone(®) in murine models of acute and reactivated toxoplasmosis as measured by high performance liquid chromatography (HPLC). Parasite loads and inflammatory changes in brains of mice treated with SDS-coated ANS were significantly reduced compared to untreated controls and to Wellvone(®)-treated mice. In conclusion, nanosuspensions coated with SDS may ultimately lead to improvements in the treatment of TE and other cerebral diseases.

Biography

Hend Shubar has completed her Ph.D at the age of 36 years from Berlin Free University, Germany. She is working as a lecturer at the department of Microbiology and Immunology, faculty of Pharmacy, Tripoli University, Libya. She has published 4 papers in the field of drug targeting.

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