

Journal of Drug Delivery Science and Technology

Polymer-drug conjugates containing antimalarial drugs and antibiotics

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<https://www.sciencedirect.com/science/article/pii/S1773224719307622>.

Abstract

Most of the currently used antimalarial drugs suffer from drug resistance, poor bioavailability and biodegradability, drug toxicity and poor water solubility. To overcome some of the aforementioned limitations, combination therapy involving the combination of two or more antimalarials is currently used. Malaria is also treated by combining selected antibiotics with antimalarials resulting in good treatment outcomes. In this research, the aforementioned approach was employed by developing polymer-drug conjugates incorporated with antimalarials and antibiotics for a synergistic effect. The successful incorporation of antimalarials and antibiotics onto the polyaspartamide-based conjugates was confirmed by ¹H NMR, FTIR and SEM. The XRD spectrums displayed the amorphous nature of the conjugates and indicated the absence of free drugs. The antiplasmodial evaluation of the conjugates further revealed their antimalarial activity against the asexual stage of the parasite with a % inhibition in the range of 35.6–99.9 at 1 μM, and 55.4–100.8 at 5 μM which was either comparable or better than the free drugs. The incorporation of the antibiotics together with the antimalarials into the polymer revealed a synergistic effect indicating that antibiotics act as a potentiating agent. However, more research is needed to confirm these findings.