Abstract

Background

Recently, Arteether (ARE) as an oil soluble derivative of Artemisinin has drawn a great deal of attention in cancer therapy. The hydrophobicity property of this drug limits its availability to tumor tissue. To resolve the matter, in this study ARE was loaded with polyurethane (PU) nanomicelles (NMs) for augmenting the bioavailability and efficacy of drug in cancer therapy and induction immune response.

Method and Materials:

PU NMs were characterized by fourier transform infrared. Size and zeta potential of ARE loaded PU was measured by dynamic light scattering. The loading efficiency and release profile in pH of 5.4 and 7.4 respectively in citrate and phosphate buffer were considered. The cytotoxicity effect of ARE loaded PU was evaluated in vitro and in vivo settings. The level of IFN-γ and IL-4 cytokines of mice splenocytes were assessed by enzyme-linked immunosorbent assay.

Results

ARE loaded PU NMs showed negative zeta potential charge and size of -26.2 mV and 42.30 nanometer respectively and high loading capacity (92%). In vitro drug release profile showed a faster rate of drug liberation at pH 5.4 as compared to that of pH 7.4, implying involvement of a pH-sensitive mechanism for drug release from the NMs. This nanocomplex had significant inhibitory effect on the growth of 4T1 cell line and increased IFN-γ level.

Conclusion

Based upon these findings, PU as a nanocarrier of a drug such as ARE has a significant impact on treatment of breast cancer.

Keywords: Nanomicelles, Polyurethane, Arteether, Breast cance