

7th International Conference on **CLINICAL TRIALS**
&
12TH WORLD CADD & DRUG DELIVERY SUMMIT
September 24-26, 2018 | Chicago, USA

Photodynamic mediated anticancer therapy using Temoporfin (Meta-tetra (hydroxyphenyl) chlorin) loaded liposomes

Sajid Ali, Amin Umair, Schaefer Jens, Jedelska Jarmila and Bakowsky Udo
Philipps University Marburg, Germany

Background: Photodynamic Therapy (PDT) is a clinically approved therapeutic modality for the treatment of various diseases including cancers. It predominantly utilizes biocompatible photosensitizer and light energy of optimal wavelength to initiate photochemical reactions, triggering the photosensitizer, converting tissue oxygen (O₂) to highly reactive oxygen species (ROS). This ROS induces oxidative damage to bio-organic molecules including proteins, nucleic acids, carbohydrates, and lipids consequently leading to the destruction and of targeted cancer cells. The present study aims to develop a novel nanocarrier for the photodynamic treatment of cancer.

Methodology: Liposomes containing mTHPC (Meta-tetra (hydroxyphenyl) chlorin) were prepared by the thin film hydration method using different lipid combinations. These liposomes were subsequently extruded with Avanti Polar extruder using polycarbonate membranes above the phase transition temperature of lipids. These extruded liposomes were characterized for size distribution, polydispersity index, zeta potential, encapsulation efficiency and morphological studies using dynamic light scattering, laser doppler velocimetry, ultracentrifugation, and atomic force microscopy. These liposomes were further evaluated with cell culture studies utilizing HT-29 cell line including *in vitro* cytotoxicity, photodynamic & antibacterial therapy, intracellular localization with CLSM, haemocompatibility assay and *in vivo* CAM model.

Results: All liposomal formulations ranged from 99 nm to 125nm in size with the PDI less than 0.2 and surface charge from -18 to +15mV. Photodynamic studies showed a dose-dependent effect with no cytotoxicity in dark. mTHPC was mainly localized in the perinuclear region with no internalization in the nucleus. *In vivo* CAM model displayed a strong occlusion of blood vessels while haemocompatibility studies demonstrated no toxicity to the blood cells.

Conclusion: Present study concludes that mTHPC liposomes can be formulated with different lipid combinations. These systems are not only biocompatible and less toxic but also effective against different cancer and bacterial infections.

Biography

Sajid Ali was born in Pakistan. He has completed Pharm D and M Phil from Pakistan. He completed his Master's thesis on the enhancement of drug permeation through the transdermal drug delivery system. He also worked with Nano and microparticles loaded transdermal patches. As a teacher, he taught Pharmaceutical technology to Pharm D students for 4 years. He got an HEC/DAAD scholarship to pursue his PhD in Germany. He is currently working as a PhD at the Department of Pharmaceutical Technology and Biopharmaceutics, Marburg, Germany. His areas of interest are the formulation of Nanocarrier based polymeric and liposomal systems targeting cancer therapy, cell culture studies and Atomic force microscopy. Currently, he is working on a combination of Nanocarrier systems (lipid coated polymeric systems) for synergistic photodynamic-chemotherapy and antibacterial therapy.

Notes: