

# **SYNTHESIS OF PACLITAXEL LOADED POLYMERIC NANOPARTICLES AND EVALUATION OF THEIR EFFICACY IN COMBINATIONAL THERAPY**

## **SUMMARY**

Cancer is a disease that can exist in almost any part of the body, in which cells grow uncontrollably and then spread to other parts of the body, threatening human life. The current main treatment for cancer includes chemotherapy, radiotherapy, and surgery; Among these, chemotherapy is the most wide treatment applied in the clinic. Due to the disadvantages of traditional treatment methods in which chemotherapy, radiotherapy, and surgery are applied in coordination, such as toxicity, non-specific distribution in the body, poor oral bioavailability, and high drug dosage requirement; more effective, personalized diagnosis/treatment systems are being developed. Treatments such as photodynamic therapy (PDT), photothermal therapy (PTT), and magnetic hyperthermia, which is among the new generation combined treatment methods, are the promising methods. The use of these methods in combination therapy emerges as a potential treatment method in terms of increasing the efficiency of drug delivery systems and targeting the anticancer drug to the tumor site. In this study, it was aimed to use the hydrophobic chemotherapy drug paclitaxel (PTX) in combination therapy with the photosensitizing agent protoporphyrin IX (PpIX). First of all, the diblock copolymer was prepared by the RAFT polymerization method, and protoporphyrin IX and sugar components were bounded via azide-alkyne ring addition click reaction to prepare glycopolymers. Micellar formulations were prepared by encapsulating paclitaxel into glycopolymers by the nanoprecipitation method. Then, the cytotoxic effects of drug-free drug-only glycopolymer-based micelles (GM) and glycopolymeric micelles (GM-PTX) containing chemo-PDT-only paclitaxel (GM-PTX) on A549 lung cancer cell line and CCD-1079Sk healthy fibroblast cell line were investigated. Synthesis of glycopolymeric micelle-based carrier platforms that absorb/radiate red light, carry PpIX, are biocompatible, biodegradable, and release singlet oxygen-sensitive drugs triggered by NIR, and that the resulting micelle structures target lung cancer cells are important in terms of bringing a new FDT-Chemo combination therapy to the literature carries.

**Keywords:** Lung cancer, protoporphyrin IX, paclitaxel, polymeric nanocarrier systems, combination therapy.