

A Glucose Oxidase-Based Nanocarrier for Multimodal Synergistic Cancer Therapy

By
Rama Salem AlSamarat

Supervisor
Dr. Suhair Sunoqrot

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Abstract

According to the World Health Organization, cancer is the second leading cause of death globally. It is a complex and multifaceted disease that can occur in any part of the body and can have varying causes. In this study, a nanocarrier for Glucose Oxidase (GOx) was formulated using polymeric NPs, both alone and in combination with curcumin. The GOx-based nanocarriers were successfully prepared, optimized, and characterized. *In vitro* biological evaluation showed that formulated NPs exhibited promising anticancer activity in breast cancer cell lines.

The study incorporated DCFDA, JC-1, and caspases assays to assess ROS formation, early apoptosis, and the apoptotic pathway induced by the nanoparticles, respectively. The results showed that the presence of GOx increased ROS formation and caused cell death in a caspase-independent pathway, whereas CUR affected mitochondrial membrane potential and caused cell death in a caspase-dependent pathway.

Keywords: Cancer, Curcumin, Glucose oxidase, Nanoparticles, Reactive oxygen species.