In vitro anti-invasion activity of surface modified gold nanorods against prostate cancer

By
Hakam Mohammad Saleh Al-aqabani

Supervisor
Dr. Nouf Nawaf Mahmoud
Co-Supervisor
Prof. Rana M. Abu-Dahab
Dr. Suhair Hikmat Jasim

Al-Zaytoonah University of Jordan, 2020

Abstract

Prostate cancer is one of the most popular cancers in men. Cell invasion is an important step in the process of cancer metastasis. Herein, gold nanoparticles of non-spherical shape were synthesized by two different methods. The synthesized gold nanorods (GNRs) were conjugated with polydopamine (PDA). The results reveal that all GNRs conjugated with PDA demonstrated excellent colloidal stability upon lyophilization and mixing with cell culture media with or without fetal bovine albumin (FBS) compared to unconjugated nanoparticles. The cellular viability of the nanoconjugates was in the range of 60-100% over concentration of 0.03-0.00097 nM, while it was in the range of 20-40% for unconjugated GNRs for the same range of concentration towards DU-145 and PC3 prostate cancer cell lines. Furthermore, PDA-conjugated GNRs demonstrated significant anti-invasion activity towards DU-145 cell line in terms of preventing cell migration and cell adhesion; where ~ 20% reduction in DU-145 cell adhesion was observed compared to control untreated cells. The PDA-GNRs could be considered as a promising nanoplatform toward cancer treatment by retarding the invasion activity with synergistic photo-thermal activity, also it could be considered as drug delivery system for chemotherapeutic agents.