

عنوان مقاله:

Sonodynamic Therapy Using Protoporphyrin IX Conjugated to Gold Nanoparticles: An In Vivo Study on a Colon Tumor Model

محل انتشار:

مجله علوم پایه پزشکی ایران، دوره 15، شماره 2 (سال: 1391)

تعداد صفحات اصل مقاله: 9

نویسندگان:

Ahmad Shanei - *Department of Medical Physics and Medical Engineering, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran*

Ameneh Sazgarnia - *Research Centre and Department of Medical Physics, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

Naser Tayyebi Meibodi - *Skin Research Centre and Department of Pathology, Emam Reza Hospital, Mashhad University of Medical Sciences, Mashhad, Iran*

Hossein Eshghi - *Department of Chemistry, School of Science, Ferdowsi University of Mashhad, Mashhad, Iran*

Mohammad Hassanzadeh-Khayyat - *Pharmaceutical Research Centre, School of Pharmacy, Mashhad University of Medical Sciences, Vakilabad Blvd., School of Pharmacy, Mashhad, Iran*

Habibollah Esmaily - *Department of Community Medicine & Public Health, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran*

Neda Attaran Kakhki - *Department of Chemistry, School of Science, Ferdowsi University of Mashhad, Mashhad, Iran*

خلاصه مقاله:

Objective(s) Sonodynamic therapy is a physical treatment which utilizes ultrasound waves with an appropriate sensitizer such as protoporphyrin IX (PpIX). The activation of sensitizer depends on cavitation, and therefore, high intensity ultrasound is an important necessity. Beside, high intensity ultrasound can induce side effects on the healthy tissues which have surrounded tumor. The particles in a liquid decrease the ultrasonic intensity threshold needed for onset of cavitation. The non-radiative relaxation time of PpIX in the presence of gold nanoparticles (GNP) is longer than the similar time without GNP. Materials and Methods This study was conducted on colon carcinoma tumor in BALB/c mice. The tumors were induced by subcutaneous injection of CT26 cells. Ultrasound irradiation were performed on tumors 24 hr after the injection of PpIX into GNPs. Antitumor effects were estimated by measuring tumor relative volume, doubling time and time being five times of the tumors and by calculating the average survival time of tumor-bearing mice after treatment. Results There is no inhibitory effect in control group. Ultrasound irradiation alone showed a slight antitumor effect which was enhanced by ultrasound plus PpIX (SDT). The synergistic inhibitory effect was significant when ultrasound plus PpIX was conjugated to GNPs. Conclusion Our experiments suggested a significant synergistic effect of ultrasound combined with Au-PpIX that reduced tumor relative volume and increased average animal survival fraction. This effect was obviously stronger than ultrasound alone and synergistic effect of

کلمات کلیدی:

Acoustic, Cavitation, Nanoparticle, Protoporphyrin IX, Ultrasound

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1297094>

