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Enhance radiotherapy dose based on Gold nanoparticles

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Gold nanoparticles in chemotherapy is the use of colloidal gold in therapeutic treatments, often for cancer or arthritis. Gold nanoparticle technology shows promise in the advancement of cancer treatments. With tumor-targeting delivery vectors becoming smaller, the ability to by-pass the natural barriers and obstacles of the body becomes more probable. To increase specificity and likelihood of drug delivery, tumor specific ligands may be grafted onto the particles to circulate throughout the tumor without being redistributed into the body, Gold nanoparticles can absorb infrared light, resulting in heating and Removes carcinogenic cells in tumors. Gold nanoparticles have also been used for enhancing the X-ray dose to tumors. The combination of body temperature and radiotherapy is interactive, importantly allowing a reduction in X-ray dose with improved therapeutic results. Here we intratumorally infused small 15 nm gold nanoparticles engineered to be transformed from infrared-transparent to infrared-absorptive by the tumor, then heated by infrared followed by X-ray treatment. Synergy was studied using a very radio resistant subcutaneous squamous cell carcinoma in mice. It was found that the dose required to control 50% of the tumors, normally 50 Gy, could be reduced to < 10 Gy (a factor of > 3.5). Gold nanoparticles therefore provide a method to combine body temperature and radiotherapy to drastically reduce the X-ray radiation needed, thus sparing normal tissue, reducing side effects, and making radiotherapy more effective.

Biography:

Mansour Mohammed Hagar received diploma degree in radiological and medical instrumentation from Sudan University of Science and Technology, Sudan, in 2010, and the B.Sc degree in Biomedical engineering from Sudan University of Science and Technology, Sudan, in 2013. Now he is a graduate student. In 2010, he joined as clinical engineer at the Omda model hospital. In 2013 he joined Mashreg University of science and technology as a Teaching Assistant, department of biomedical engineering,. In 2015 he joined the University of Medical Science and technology Department of Biomedical Engineering as biomedical workshop coordinator. His current research interests include Nanomedicine and Medical Instrumentation design. Mr. Mansour has been a member of Sudanese Medical Engineering Society (SMES) since 2013. Also he founded the radiological and medical instrumentations engineering organization, Sudan.