

عنوان مقاله:

Investigation of heat produced by three different nanoparticles in spherical tissue during hyperthermia therapy

محل انتشار:

بیست و دومین کنفرانس سالانه بین المللی مهندسی مکانیک (سال: 1393)

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خلاصه مقاله:

Magnetic fluid hyperthermia is a treatment method which uses magnetic particle to heat up cancer cells in diseased tissues. An alternating magnetic field with high frequency is applied to injected nanoparticles and it increases temperature, close to 42-45 centigrade in tumor tissue. In this study, a spherical tumor embedded in healthy tissue was considered. A polynomial function of radius and a constant value, which both produce equal power in the tumor region, were considered as heat sources. Numerical solution of the steady and time dependent temperature distributions were obtained which the results after 300s hyperthermia therapy and steady condition were the same and indicated therapeutic temperature distribution of both types of heat sources in diseased tissue. Because of similarity in the temperature distribution for constant and non-constant heat source, constant heat source was generated in the tumor region by three different nanoparticles. The effects of nanoparticles diameter, volume fraction, alternating magnetic field and frequency were investigated. Results indicate that, all these parameters significantly change by using different nanoparticles and their diameters. The combination of these parameters to produce a constant heat which creates a therapeutic temperature distribution in tumor region were obtained.

کلمات کلیدی:

Magnetic Fluid Hyperthermia, Heat generation, Nanoparticle

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