Improving human health: Challenges and Methodology for controlling thermal doses during Cancer therapeutic treatment

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Abstract

Controlled thermal ablation in order to maximize the therapy and minimize the side effects poses a challenge during the heating of the biological tissue. Traditionally, these processes are modelled by the bio heat equation introduced by Pennes, who used the Fourier's theory of heat conduction. During my talk I will present our automated thermal dose control and prediction system for cancer tumors therapy by using Implantable Bio-chip solution. The proposed system is able to control thermal ablation doses deposition during a laser surgery/cancer treatment. A system would help physicians to predict thermal diffusion to organize the treatment as well as maximize therapeutic effects while minimizing side effects. A case study of the Laser Interstitial Thermal Therapy (LITT) will demonstrate his feasibility as Cancer therapeutic treatment. Furthermore, our Dosimetry Framework of the Bio-heat Transfer for Laser/Cancer Treatment will be introduced. This would provide a precise idea of the predicted reaction depending on selected doses, tissue geometry, and the laser source prior to the treatment; so new treatment strategies can be proposed and evaluated.