

Dissipative Phenomena: Effect on Soft Biological Tissues and Considerations for Drug Delivery System

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Abstract - Knee cartilage is a soft tissue having viscoelastic properties. Under cyclic loadings, viscoelastic materials dissipate mechanical loadings through heat generation. In knee cartilage, this heat might not be convected because of the tissue avascularity, resulting thus to a local temperature increase. As cells are sensitive to temperature, these thermo-mechanical phenomena of energy dissipation could influence their metabolism. The goals of this study is first to evaluate the effect of thermogenesis on chondrogenic differentiation and second to use dissipation as a new environmental variable for controlling the drug release from an hydrogel to treat knee cartilage defect.