
A diffusive model to describe the mechanically driven biological stimulus for bone remodeling: following in the footsteps of Roux and Frost

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Abstract

The mechanically driven biological stimulus in bone tissues regulates and controls the action of special cells called osteoblasts and osteoclasts. Different models have been proposed to describe the important and not yet completely understood phenomena related to this 'feedback' process. In Lekszycki and dell'Isola (2012) an integro-differential system of equations has been studied to describe the remodeling process in reconstructed bones where the biological stimulus in a given instant t depends on the deformation state of the tissue at the same instant. Instead biological knowledge suggests that the biological stimulus, once produced, is 'diffused' in bone tissue to reach the target cells. In this presentation, we propose a model for describing biological stimulus diffusion in remodeling tissues in which diffusive time dependent phenomena are taken into account. Some preliminary numerical simulations are presented which suggest that this model is promising and deserves further investigations.

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