

# **In Silico Studies of the Mechanical Stimuli within Bone Tissue and Bone-Tissue-Engineered-Scaffolds**

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Mechanical stimuli are one of the factors involved in bone tissue regeneration since cell and tissue differentiation pathways are related to the local mechanical environment. Therefore, determining the distribution of mechanical stimuli within bone and engineered-scaffolds at the microscopic scale, as well as the effect of these stimuli on tissue differentiation, is critical for the development of scaffolds for bone tissue engineering. To determine the local stress and strain affecting the micro-environment of bone cells is not easy because they depend not only on the applied loads but also on the mechanical properties and the morphology of the tissue (or the scaffold). Using computational models, for instance micro computed tomography images combined with the finite element method, the distribution of the stress and strain can be predicted taking into account the specific morphology of the tissue.