

Abstract

Bone is a tissue that is constantly being renewed during the whole life. This complex biological process, controlling among others adaptation to environmental loads, is called bone remodelling. It is due to this complexity that the process hasn't been fully biomechanically described yet. However, several mathematical models of bone remodelling have been conjectured, one of which we will introduce and analyze in this thesis. The model describes bone metabolism by five chemical equations. Using the biothermodynamical laws we will derive from these equations a system of ordinary differential equations. Then we will effectuate a qualitative analysis, while focusing on existence, uniqueness and stability of a stationary solution. Finally the impact of the mechanical loading on bone remodelling will be outlined. We will also mention the relation with vascular remodelling.