PHILIPS

Effect of natural compounds on bone regeneration

Patricia A. Miguez

Natural compounds or phytochemicals have been widely used for treatment of several pathologies from bacteremia to cancer in Eastern and more recently in Western medicine. In vitro, some compounds are found to affect cell proliferation, increase tissue mass, and promote cross-linking of collagen in connective tissues. The mechanisms behind these functions are just in the early steps of being uncovered. In light of such positive effects observed in vitro and the current availability of such compounds for human consumption, the effect of physiological doses on cell and matrix responses in vivo should be explored. Our laboratory has expertise on bone research and is interested in developing therapeutics to promote mineralized tissue maintenance and regeneration. Based on the current data, we hypothesize that some natural compounds affect bone not only by their exogenous non-enzymatic cross-linking ability but also by altering cell responses via changes in growth factor availability. Our pilot study will address the following specific aims: 1. Human subjects will ingest natural compounds daily prior to tooth extraction until dental implant placement. Through biopsies of alveolar connective tissue/bone, some growth factors important for maintenance and repair, i.e., bone morphogenetic protein (BMP)-4 and -7, transforming growth factor (TGF)-β, and platelet derived growth factor (PDGF) will be tested by means of gene expression 24 h after tooth extraction. 2. Bone quality will be accessed prior to implant placement at day 60 by means of histological collagen analyses. Understanding how these natural agents function could pave the way to develop them into therapeutics for tissue remodeling in periodontology and other multiple clinical areas.