BHE-023

Multiple Signaling Pathways Mediate OSX, an Osteoblast Specific Transcription Factor

Phil G. Campbell
Research Associate Professor, Institute for Complex Engineered Systems and Biomedical and Health Engineering, Carnegie Mellon University, Pittsburgh, PA

Abstract

Non-viral based gene therapies represent one possible tissue engineering based approach to improve bone regeneration. The primary goal of this research is to establish the exact interconnection between *Runx2* and *Osx* that play critical roles for the differentiation of osteoblasts and bone formation. This database will provide critical information in deciding which transcription factor to pursue as a therapy. As a result of a previous PITA project, focus changed to OSX regulation pathways as OSX has become recognized as the further downstream transcription factor for osteoblastic lineage progression (ie., specifically makes bone). Therefore we wanted to provide a map of the signaling network that mediates this critical gene for bone formation. Based on existing data, we concluded that during osteogenic lineage progression, in addition to the BMP-2/Smad pathway, IGF-I and MAPK signalling may mediate *Osx* and a possible involvement of Wnt signalling in *Osx* expression parallel to or independent of these signalling components requires further clarification. In this project, we will expand our research to include the involvement of protein kinase C and Wnt signalling. We will carry out experiments to determine whether protein kinase C is a mediator of the BMP-2 induction of OSX. We will further explore the synergy between Wnt and BMP-2 signalling and its possible effects on OSX. Upon successful completion of these experiments we will have provided the signalling network that mediates OSX expression during osteoblast differentiation.