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Project Title: GIP and Age-Induce Bone Loss: Correlation between the Level of GIP Receptor Expression in Bone Marrow Mesenchymal Stem Cells and Bone Loss.

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Introduction/Objectives: Gastric inhibitory peptide (GIP) is an intestinal hormone secreted in response to increased glucose load to synergistically increase insulin secretion. Recent studies have shown that bone-making cells have receptors for GIP, and these cells are directly stimulated by GIP to increase bone formation. One of these studies have shown a correlation between aging and declining GIP receptors on bone forming cells, leading to declining bone mass. My goal is to measure GIP receptor expression (plus other bone specific-genes such as *Osx*, *Runx2/Cbfa1*, *PPAR γ 2* and *C/EBP α 2*) in human bone marrow progenitor cells using quantitative RT-PCR, and correlating my findings with aging and bone loss.

Methods: Sample collection: Bone marrow aspirates from the iliac crest of patients undergoing spine fusion surgery were used. **RNA and cDNA Preparation.** Total RNA was precipitated from the bone marrow aspirate using the EPICENTRE RNA/DNA extraction kit. cDNA was synthesized from the precipitated RNA using already established lab protocols. **Real-Time PCR.** Primers and probes for nutrition and bone cell specific genes were used to sequence GIP, GIP receptor, Leptin receptor, *Runx2/Cbfa1*, and OSF receptors using RT-PCR. A number of measurements were performed following the final RT-PCR reaction. These measurements included patient's body weight, bone density using DEXA scan, and body mass index.

Results/Summary: Four patients were consented for this study with three specimens collected. These specimens have been processed, and the RNA extracted will be used to generate cDNA copies which will be amplified with RT-PCR. Analysis for the various stimulatory receptors of bone-forming cells will be carried out on the final RT-PCR product. Additional 15-20 samples will be obtained in the next 3-4 months for additional data analysis.