Abstract

Effect of Dexamethasone Levels on Expression of Bone Resorption Genes

Corticosteroids, such as dexamethasone, are released during times of stress and have been linked with decreased bone density. This study analyzed eight genes associated with the bone remodeling process. The expression of these genes was measured using real-time polymerase chain reaction after treatment with varying concentrations of dexamethasone at acute and chronic time periods. Real-time polymerase chain reaction takes place in three steps: first the put into the reaction is denatured, that is, split into two single strands. Second, primers, which are added to the DNA, bind the two single strands in preparation for increasing the amount of DNA. The third step is elongation, or making more copies of the DNA strands. Creating more copies of the DNA and genes allowed for analysis of the genes after treatment with dexamethasone. There were statistically significant increases in the *ALP, DKK-1,* and *RANKL* genes. These increases occurred in both acute and chronic time periods, indicating that elevated dexamethasone levels would cause upregulation of these genes. In an animal model it would be expected that these increases would case lower bone density in the organism. There was also a significant decrease in the *OPG* gene. This decrease would indicate lower bone density when organisms are exposed to dexamethasone. Further research could include analysis of more genes involved in the bone remodeling process.