



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Effects of Vitamin D3 on Osteocalcin mRNA Expression in MG63 Cells	
Objectives/Goals To find out how Vitamin D3 will benefit bone formation by testing the effects of Vitamin D3 on osteocalcin mRNA expression in MG63 cells	
Abstract	
Methods/Materials Methods: 1). Grow MG63 cells 2). Seed the cells into dishes. 3). Add vitamin D3 and its solvent into dishes, respectively. 4). Isolate total RNA from using TRIZOL reagent. 5). Measure total RNA concentration with spectrometer. 6). Perform electrophoresis to test isolated total RNA. 7). cDNA synthesis by reverse transcription reaction of total RNA, which is used for PCR and real-time quantitative RT-PCR. 8). Amplify OC gene by RT-PCR to get its fragment from gel for probe preparation of Northern blot. 9). Perform real-time RT-PCR to quantify OC mRNA expression in control and Vitamin D3-treated cells, respectively. 10). Perform Northern blot. Materials: 1. MG63 cells from ATCC, DMEM, FBS; 1á, 25(OH)2 Vitamin D3, TRIZOL Reagent 2. Electrophoresis Apparatus, Superscript II reverse transcriptase kit, SYBR Green PCR kit; Real-time PCR machine 3. Hybond-XL nylon membrane Random Primer Labeling Kit; X-ray film; primers ;spectrometer 4. test tubes, pipettors, Eppendoff tubes, centrifuge, X-ray film, Milli Q H2O	
Results It was found that vitamin D3 up-regulated osteocalcin mRNA expression in MG63 cells with a fold induction of 91.66. Northern blot also showed the similar result.	
Conclusions/Discussion Osteocalcin is the human bone formation marker of osteoblast cells, an increase in its expression means an increase in bone formation by the osteoblast cells. Vitamin D3 does benefit bone formation.	
Summary Statement Through real-time RT-PCR and Northern Blot analysis it was found that vitamin D3 up-regulated osteocalcin mRNA expression in MG63 cells.	
Help Received the experient was done in my father's lab.	