In Vitro Effects of Strontium Citrate on Human Osteoblasts

Michael Greene, candidate for B.S. in Biomedical Sciences
Dr. Rosemary Dziak, Ph. D
University at Buffalo School of Dental Medicine, Department of Oral Biology

Background

❖ Strontium citrate (SrCr) supplementation is commonly used by patients who exhibit symptoms of bone degenerative diseases

❖ Such diseases result from deficient net bone growth, primarily controlled by osteoblast, osteoclast and osteocyte activity

❖ This supplementation has been shown to increase osteoblast activity (bone formation) and decrease osteoclast activity (bone resorption)

❖ An optimal dose concentration of this supplementation is unknown due to inadequate research measuring such a concentration

Objective

❖ Identify an in vitro optimal concentration of strontium citrate supplementation in which osteoblast activity is maximized

Materials/Methods

❖ Human Osteoblasts (HOBs) obtained from a commercial supplier, were cultured in Minimum Essential Medium (MEM) with 10% Fetal Bovine Serum and 1% Penicillin until ~90% confluency

❖ HOBs were transferred to prepared concentrations of SrCr (0 mM, 1 mM, 0.5mM, 0.25 mM or 0.125 mM) in MEM and incubated for various durations

❖ HOB proliferation and differentiation was measured by the mitochondrial enzyme (MTT) Assay and Alkaline Phosphatase (ALP) Assay, respectively

Results/Conclusions

❖ Increases in HOB metabolism and differentiation were observed in some experiments, particularly with 1mM SrCr.

❖ While this study suggests SrCr directly affects HOB metabolism and differentiation, the effects were not consistently observed in replicate experiments.

❖ This study does not define an in vitro concentration of SrCr in which HOB activity is maximized and suggests that many undefined variables might be involved in the response to this agent.

❖ Further in vitro studies and clinical trials are necessary to delineate the optimal conditions for a SrCr effect.

Acknowledgments

❖ Funded by UB’s Center for Undergraduate Research and Creative Activities (CURCA)
❖ Thank you to Dr. Hani Ghabbani for his assistance with HOB culture and Assay procedure
❖ This study is a SUNY at Buffalo Advanced Honors College Research experience