CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

Sean G. Laput

Project Number

S1298

Project Title

The Effect of Sodium Intake on the Urinary Calcium Excretion in Mice Using Colorimetric Assay and HPLC

Abstract

Objectives/Goals

The objective was to investigate the correlation between sodium intake and urinary calcium excretion in mice using and comparing two different methods: colorimetric assay and HPLC.

Methods/Materials

Six mice were used, three as the control and three as the experimental group. In a period of ten days, both groups were given 0.35% w/w sodium diet (standard) during the first five days. For the last five days, the control was maintained with the standard diet while the experimental was given 7.4% w/w high sodium diet. Calibration curves for calcium quantification were obtained via colorimetric assay and HPLC. Urine was collected every 24 hours and was measured for calcium content using a Calcium Colorimetric Assay Kit (BioVision Inc.).

Results

Two out of three mice in both groups exhibited consistent results. Two of the control mice displayed a steady decrease in urinary calcium concentration (UCa) over the ten days. In contrast, two of the experimental mice showed a significant increase in UCa after the switch to the high sodium diet.

Conclusions/Discussion

The results obtained from the experimental group support my hypothesis on the positive correlation between an increased sodium intake causing increased calcium excretion via urine. Based on the results from the control group, it is speculated that a low, standard sodium concentration allows better renal and intestinal (re)adsorption of calcium ions in the mice over time, which would explain the decreasing UCa in their urine. This data suggests an explanation on studies investigating patients with hypertension due to a high sodium diet and their susceptibility to osteoporosis.

Summary Statement

I am studying the effect of a high sodium diet on the urinary calcium excretion in mice over a period of ten days using a colorimetric assay kit and HPLC.

Help Received

Father provided transportation; Mother helped maintain mice; Dr. Malhotra provided general support and guidance; Dr. Cauchon assisted in HPLC operation and analysis; Dr. Tannaci provided necessary chemicals; Used lab equipment at Amgen under supervision of Dr. Mytych..