Role of Genetics in Calcium Metabolism in Mice

During growth, dietary calcium (Ca) intake is a key determinant of peak bone mineral density. It is known that chronically low Ca intake causes an adaptive response in which intestinal Ca absorption efficiency is increased to protect bone density. However, the impact of genetics on this response is uncertain. Two individual studies were done to assess the extent of genetic control on the adaptive response. In the first, the recorded body weights of mice from 11 different inbred lines who were fed a 0.50% (adequate) Ca diet from age 4 to 12 weeks were analyzed to determine a period of rapid growth and then to assess differences between the lines in growth rate during that period. Statistical analysis (SAS) was used to indicate whether the genetics of a line varied significantly from the others. In the second the recorded body weights of mice from 51 BXD (C57Bl/6J x DBA/2J) recombinant inbred lines, who were fed a 0.5% Ca diet from age 4 to 12 weeks were analyzed for differences between lines in growth rates during the rapid growth period. Statistical analysis was used to indicate significant variance between the two lines. Then for each phenotype that appeared in C57Bl/6J and DBA/2J, the quantitative trait loci (QTL) were identified to analyze potential differences between the two genomes that may account for differences in growth rates during the crucial rapid growth phase.