



CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s) Haley A. Lu	Project Number S0517
Project Title AsparagYES or AsparagNO?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to determine the pattern of inheritance of the particular gene that allows one to smell an unpleasant odor in his or her urine after the consumption of asparagus and to use the Hardy Weinberg equation in order to find the values p, q, p^2, q^2, and $2pq$. P and q are the allele frequencies for each allele. P^2 and q^2 are the frequency of homozygotes, where p^2 is the frequency of the dominant homozygotes and q^2 is the frequency of recessive homozygotes. The frequency of heterozygotes is represented by $2pq$. This information will provide the knowledge required to ascertain the alleles of each tested individual to determine the genotypes.</p> <p>Methods/Materials I interviewed different families and constructed pedigrees of 217 individuals to find the pattern of inheritance. I wrote a letter and gave it to those who participated in my experiment to request their participation, inform them briefly on my project topic. They were told not to participate if they were allergic to asparagus. 217 subjects, male and female, from ages 10-75 answered whether or not they were able to smell an odor in their urine after eating asparagus. After collecting data, research and completing many family pedigrees, I determined the pattern of inheritance of the gene. I inserted my data into the Hardy Weinberg equation and found the q, p, q^2, p^2, and $2pq$ values and the number of individuals for each genotype.</p> <p>Results I learned that the pattern of inheritance for this trait is autosomal dominant. By finding what q^2 (.32) is first, I completed the Hardy Weinberg equation. I determined that out of the 217 individuals that I tested, 70 of them were homozygous recessive, 42 individuals were homozygous dominant, and 105 were heterozygous.</p> <p>Conclusions/Discussion I concluded that the pattern of inheritance for the gene that allows a person to detect an odor in his or her urine after eating asparagus is autosomal dominant. Using the pedigrees and coupling that with the Hardy Weinberg equation, the resulting genotypes were discovered. The data suggests the ability of a person to detect an odor in his or her urine is a result of a genetic pattern passed down from his or her biological parents.</p>	
Summary Statement Using pedigrees and the Hardy Weinberg equation, I determined the pattern of inheritance of the gene that allows one to be able to detect an odor in one's urine after eating asparagus and the genotypes of the tested individuals.	
Help Received 217 individuals volunteered to respond to the Yes or No question.	