A MUMMY FAMILY?

Research Area: Anthropology / Archaeology

Background: In 1988, Chinese archeologists working on a remote site in the western Chinese desert discovered a number of perfectly preserved mummies. Dry conditions

found in deserts are ideal for preserving human remains and artifacts. Dating of artifacts, cloth, wood and plants from the burial site all indicated a date around 3000 ybp. Upon close examination of the mummies, scientists made two important discoveries. The pattern of the cloth worn by the mummies was not typical of other sites in the region. In fact, the cloth appeared to have a very distinct checked pattern that was completely unknown in Chinese archeology but that closely resembled eastern European examples from the same age. More striking was the appearance of the mummies themselves. The mummies were tall, one being over 6 ft, they had long reddish-blond hair, European noses and distinct facial features. None of the mummies' body features were consistent with modern-day Chinese. Archaeologists now believe that they may have been citizens of an ancient civilization that existed at the crossroads between China and Europe. One burial group at the site proved to be of particular interest. Eight mummies were found grouped together in a common grave. Two mummies, Male A293 and Female A294, both approximately 40 years of age, had been placed together at the north end of the grave in a position that suggested they were to be overlooking the others. A significant collection of house-keeping artifacts surrounded the pair. At their feet the remains of a small child (A295) were found. In a larger, deeper area to the south were five other mummies. One, a female (A296 -- approximately 20 years old), had partially dismembered limbs and gouged eyes, suggesting that she was a sacrificial victim. A mummified boy (A297), approximately one-year-old was found in the arms of A296. He appeared to have been buried alive. The remaining three mummies were an older female (A298), an older male (A299) and a teenage female (A300). Archaeologists hypothesize that the burial represented a family group, possibly stricken by some disease. The pair may have been parents to some of the individuals in the grave and the two older individuals were assumed to be older family members. The sacrifice may have been part of a ritual to rid the community of the illness.

Information and Data:

You have been contacted to help determine the relationships (if any) of the individuals found in the grave. Application of the basic rules of Mendelian genetics should provide information that will be critical to the archeologists.

- You are provided with 8 DNA samples, the relationships among the individuals yielding the samples is unknown
- Male A293 and Female A294 were buried together with artifacts suggesting that they were important individuals
- Your laboratory has the capability to determine genotypes at six microsatellite loci. All of the loci exhibit co-dominant modes of inheritance. Some of the locus will be informative, some may not. You may use as many or as few loci as you feel are necessary.

Assignment:

1. Use the *ELS* program to collect genotype data from each of the 8 individuals. Be sure to carefully record the sample identification information on the **Electrophoresis Loading Sheets** and the genotypes on the **Genotyping Data Sheet.** Your data set is called *Mummy Data.*
2. Before examining the data, propose a hypothesis for one possible outcome of your investigation. Based on this hypothesis, state a prediction and an alternative that will allow you to answer the investigator's question.

Hypothesis:

Prediction 1:

Alternative:

3. As a starting point, assume that the hypothesis that is a family group is correct and that A293 and A294 are parents of some of the mummies. Based on the genotypes of these two individuals, what genotype patterns are possible for their children?

4. Examine the full data set. Does this appear to be a family group? If so, what do you hypothesize are the relationships of the individuals? Can you refute either your prediction or the alternative? Carefully consider the logic that you use. Remember that alleles that can exclude samples are more “powerful” than those that are shared.

5. Are any of the mummies not related to the others?

6. Using the word processor on your computer, write a report (see Report Format instructions) outlining your investigation, describing the results and providing your conclusions. Be sure to include careful statements about the logic that led you to your decision.

7. Submit your report and your worksheets to your TA.